EXECUTIVE COMMITTEE

MONDAY, MAY 6, 2019 AT 3:00 PM
MATSQUI CENTENNIAL AUDITORIUM

AGENDA

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1. CALL TO ORDER

2. ADOPTION OF MINUTES

2.1 Executive Committee minutes - April 15, 2019 (0550-02) (attached) *(p. 4)*

3. PRESENTATIONS

None.

4. DELEGATIONS

4.1 Camilla Boisvert, Community Health Specialist, Fraser Health Authority - Healthier Community Partnership Initiative

- *PowerPoint presentation* (attached) *(p. 12)*

5. BUSINESS OUT OF MINUTES

None.

6. REPORTS

6.1 AIRPORT

None.

6.2 CITY MANAGER'S OFFICE

None.

6.3 FINANCE AND CORPORATE SERVICES

None.

6.4 FIRE RESCUE SERVICE

None.

6.5 ENGINEERING AND REGIONAL UTILITIES

None.

6.6 INNOVATION, STRATEGY, AND INTERGOVERNMENTAL RELATIONS

6.6.1 Verbal report by the Manager, Communications and Marketing, and Anthea Brown, Engagement Manager, Bang the Table - Launch of the City of Abbotsford's new online engagement portal (1390-01)

6.7 PARKS, RECREATION AND CULTURE

None.

6.8 PLANNING AND DEVELOPMENT SERVICES

6.8.1 Report No. PDS 044-2019, dated April 26, 2019, from the Planner and Director, Community Planning - Planning Process for Cannabis Retail Stores - Stage 3 Update (2210-20) (attached) *(p. 25)*

- *PowerPoint presentation*

6.8.2 Report No. PDS 042-2019, dated April 25, 2019, from the Planner - Urban Infill Study: Stage 3 Update (6430-20) (attached) *(p. 31)*

- *PowerPoint presentation*

6.8.3 Report No. PDS 036-2019, dated April 25, 2019, from the Planning Technician - Lounge Endorsement Application for property, located at 140-2582 Mt. Lehman Road (Owner: Sierra Developments Ltd; Director: Peter Postma) (3100-05) (PRJ19-031) (attached) *(p. 42)*

6.8.4 Report No. PDS 040-2019, dated April 25, 2019, from the Planner - Rezoning application for the property, located at 2518 West Railway Street, proposing a site specific text amendment to the Historic Downtown Commercial Zone (C7) to permit accessory assembly and accessory manufacturing uses to allow for events, concerts and the use of a kitchen for manufacturing purposes. (Owner: 676517 BC Ltd., Director: A. Shamei) (3100-05) (PRJ19-007) (attached) *(p. 55)*

6.8.5 Report No. PDS 033-2019, dated April 16, 2019, from the Planner - Land Use Contract No. 13 Discharge application, to utilize the underlying Urban Residential Hybrid Zone (RSH) to facilitate a conventional single detached dwelling on the property located at 2144 Oakridge Crescent (Owners: S.S., C.S. and M.K. Sidhu) (3100-05) (PRJ19-019) (attached) *(p. 76)*

6.8.6 Report No. PDS 034-2019, dated April 25, 2019, from the Planning Technician - Land Use Contract (LUC) No. 42 Discharge application, to utilize the underlying Urban Residential Hybrid Zone (RSH) to facilitate a conventional single detached dwelling on the property located at 31540 Oakridge Crescent (Owners: S. Sandhu) (3100-05) (PRJ18-214) (attached) *(p. 93)*

6.8.7 Report No. PDS 038-2019, dated April 25, 2019, from the Assistant Planner - Rezoning application for the property located at 31907 Old Yale Road, to allow for a two lot subdivision (Owner: 0725694 BC Ltd., Director: N.S. Sivia) (3100-05) (PRJ18-035) (attached) *(p. 112)*

6.8.8 Report No. PDS 039-2019, dated April 25, 2019, from the Planner - Rezoning application for the property located at 1684 McKenzie Road, proposing a new Comprehensive Development Ninety Two Zone (N92) and to rezone the subject property from Urban Residential Zone (RS3) to a new N92 Zone for a 5 lot development (Owners: M & P Development Ltd.; Directors: P. Dhillon and M. Nareg) (3100-05) (PRJ17-111) (attached) *(p. 143)*

6.8.9 Report No. PDS 032-2019, dated April 26, 2019, from the Planner - Supportive Recovery Use application for the property located at 1880 Eagle Street (Owners: A. and P. Kataria) (3100-05) (PRJ17-121) (attached) *(p. 188)*

6.8.10 Report No. PDS 041-2019, dated April 26, 2019, from the Planner - Rezoning and Development Permit with Variances applications for the properties, located at 32154, 32162 and 32182 George Ferguson Way, 2879 and 2869 Tims Street and 32181 Tims Avenue for a 97 unit apartment building (Owner: 1115646 BC Ltd.; Director: J. Jurinak) (3100-05) (PRJ18-122) (attached) *(p. 285)*

6.8.11 Report No. PDS 045-2019, dated April 25, 2019, from the Planner - Development Permit with Variances application for the property located at 3182 Gladwin Road (and a portion of 3172 Gladwin Road, for the Streamside Protection Bylaw variance only), for a 73 unit apartment development (Owners: Horn Park Place Developments Ltd.; Director: B. Jury and Strata Plan LMS 1495) (3100-05) (PRJ18-145) (attached) *(p. 339)*

6.8.12 Report No. PDS 043-2019, dated May 2, 2019, from the Senior Planner - Land Use Contract Discharge, Rezoning and Development Permit with Variances applications for the property, located at 34375 Gladys Avenue for 282 apartment units within 2 buildings (Owner: Gladys Development Corp., Directors: G. MacPherson and M. Wubs) (3100-05) (PRJ17-128) (attached) *(p. 663)*

7. NEW BUSINESS

8. ADJOURNMENT

Minutes of the Executive Committee of the Council of the City of Abbotsford held April 15, 2019, at 3:00 p.m. in the Matsqui Centennial Auditorium

Council Present: Mayor H. Braun; and Councillors L. Barkman; S. Blue; K. Chahal; B. Falk, D. Loewen; P. Ross and R. Siemens

Staff Present: City Manager - P. Sparanese; Director, Legislative Services/City Clerk - B. Flitton; Acting General Manager, Engineering and Regional Utilities - R. Isaac; General Manager, Finance and Corporate Services - R. Sharma (part); General Manager, Innovation, Strategy and Intergovernmental Relations - K. Treloar; General Manager, Parks, Recreation and Culture - M. Morrison-Clark; General Manager, Planning and Development Services - S. Bertelsen; Fire Chief - D. Beer; Director, Community Planning - M. Neill; Director, Development Planning - D. Braun (part); Director, Finance - K. Basatia (part); Director, Infrastructure Planning - T. Bowie (part); Director, Project Management Office - N. Koning (part); Director, Property, Risk Management and Legal Services - A. Alani (part); Director, Roads and Facilities Operations - P. Agnihotri (part); Deputy City Clerk - K. Karn; Manager, Financial Operations - A. Palmer (part); Manager, Projects - J. Loots (part); Housing and Homelessness Coordinator - D. Beno (part); Research Planner - L. Brummitt (part); Senior Planner - R. Koole (part); Information and Privacy Coordinator - T. Ketola; and Legal Articling Student - B. Nguyen (part)

Media Present: None.

Public Present: ± 6

1. CALL TO ORDER

Mayor Braun called the meeting to order at 3:00 p.m.

2. ADOPTION OF MINUTES

2.1 Executive Committee minutes - April 1, 2019 (0550-02)

Moved by Councillor Blue, seconded by Councillor Ross,

THAT the minutes of the Executive Committee meeting held April 1, 2019, be adopted.

CARRIED.

3. PRESENTATIONS

None.

4. DELEGATIONS

None.

5. BUSINESS OUT OF MINUTES

None.

6. REPORTS

6.1 AIRPORT

None.

Attachment: Executive Committee minutes, April 15, 2019 (Executive Committee minutes - April 15, 2019)

6.2 CITY MANAGER'S OFFICE

None.

6.3 FINANCE AND CORPORATE SERVICES

6.3.1 2019 Property Tax Rates (2000-02) (COR 015-2019)

Moved by Councillor Chahal, seconded by Councillor Siemens,

1. THAT Bylaw No. 2934-2019, “Tax Rates Bylaw, 2019”, proceed for three readings at the next Regular meeting of Council; and

2. THAT the Mayor and Corporate Officer be authorized to execute all documents related to this matter.

Opposed: Councillor Barkman

CARRIED.

6.3.2 Bylaw Modernization Project (3900-20) (COR 014-2019)

The Director, Property, Risk Management and Legal Services provided a PowerPoint presentation regarding the Bylaw Modernization Project.

Moved by Councillor Blue, seconded by Councillor Siemens,

1. THAT Bylaw No. 2928-2019, “Consolidation and Revision Bylaw, 2019”, proceed for three readings at the next Regular meeting of Council;

2. THAT Bylaw No. 2929-2019, “Interpretation Bylaw, 2019”, proceed for three readings at the next Regular meeting of Council; and

3. THAT the Mayor and Corporate Officer be authorized to execute all documents related to this matter.

CARRIED.

6.4 FIRE RESCUE SERVICE

None.

Attachment: Executive Committee minutes, April 15, 2019 (Executive Committee minutes - April 15, 2019)

6.5 ENGINEERING AND REGIONAL UTILITIES

6.5.1 City Hall Customer Experience, Accessibility and Security Improvements (1280-01) (ENG 007-2019)

Moved by Councillor Chahal, seconded by Councillor Falk,

THAT Council approve the customer experience, accessibility and security improvements at Abbotsford City Hall, using the remaining funds from the City Hall upgrade project.

CARRIED.

6.5.2 Fraser Highway Phase 1 Improvements - Public Information Meeting Results (5330-40) (ENG 008-2019)

Moved by Councillor Siemens, seconded by Councillor Falk,

THAT Phase 1 of the Fraser Highway Improvements Project proceed as planned, with design revisions within the approved project scope to address public feedback.

CARRIED.

6.5.3 Bylaw No. 2914-2019 - Waterworks Regulations Bylaw, 2017, Amendment No. 1 (3900-20) (ENG 009-2019)

Moved by Councillor Siemens, seconded by Councillor Chahal,

1. THAT Bylaw No. 2914-2019, “Waterworks Regulations Bylaw, 2017, Amendment No. 1”, proceed for three readings at the next Regular meeting of Council; and

2. THAT the Mayor and Corporate Officer be authorized to execute all documents related to this matter.

CARRIED.

6.6 INNOVATION, STRATEGY, AND INTERGOVERNMENTAL RELATIONS

6.6.1 Consideration of Resolutions to the Union of BC Municipalities (0400-00) (ISIR 005-2019)

Moved by Councillor Blue, seconded by Councillor Siemens,

1. THAT Council endorse the Resolution that is attached as Appendix "A" and instruct staff to forward to the Union of BC Municipalities (UBCM), calling on the Province of BC to provide funding and to work with the Government of Canada to extend the 6-laning of Trans Canada Hwy#1

Attachment: Executive Committee minutes, April 15, 2019 (Executive Committee minutes - April 15, 2019)

through the Fraser Valley;

2. THAT Council endorse the Resolution that is attached as Appendix "B" and instruct staff to forward to the Union of BC Municipalities (UBCM), calling on the Province of BC to work with the Government of Canada to consider Criminal Justice Reform that will support efforts at addressing the Lower Mainland Gang Conflict crisis; and

3. THAT Council instruct staff to forward a copy of this report and related Council Resolutions to the Province of BC and provincial stakeholders seeking their support.

Moved by Councillor Ross, seconded by Councillor Blue,

That the UBCM resolution contained in Appendix “A”, be amended, regarding the 6-laning of the Trans-Canada Highway #1 through the Fraser Valley, to:

(a) include language to add an additional lane as a High-Occupancy Vehicle (HOV) lane; and
(b) include language that a phased approach for the need for this additional lane to eventually go through to Chilliwack.

Opposed: Mayor H. Braun; and Councillors Chahal; Falk; Loewen

DEFEATED.

The main motion was then put, and

CARRIED.

6.6.2 UBCM Community Excellence Award Submissions (0400-00) (ISIR 006-2019)

Moved by Councillor Blue, seconded by Councillor Loewen,

1. THAT Council endorse the City’s application of the Plan 200K Program for an Excellence in Governance, 2019 UBCM Community Excellence Award; and

2. THAT Council endorse the City’s application of the Water Portal Project for an Excellence in Service Delivery, 2019 UBCM Community Excellence Award.

CARRIED.

Attachment: Executive Committee minutes, April 15, 2019 (Executive Committee minutes - April 15, 2019)

6.6.3 Homelessness in Abbotsford Action Plan Update (0400-00) (ISIR 007-2019)

The Housing and Homelessness Coordinator presented a PowerPoint presentation regarding a Homelessness in Abbotsford Action Plan update.

Moved by Councillor Siemens, seconded by Councillor Chahal,

1. THAT Council receive the update to the 2014 Homelessness in Abbotsford Action Plan for information; and

2. THAT staff be directed to develop a framework for Council consideration that outlines a process for developing a 2020-2025 Homelessness in Abbotsford Strategy that contemplates how the City will continue to support the work undertaken to date once a response has been received from the Government of Canada on the City's Reaching Home, Designated Community application.

CARRIED.

6.7 PARKS, RECREATION AND CULTURE

None.

6.8 PLANNING AND DEVELOPMENT SERVICES

6.8.1 Historic Downtown Neighbourhood Plan administrative corrections (3100-35) (OCP-005) (PDS 027-2019)

Moved by Councillor Ross, seconded by Councillor Blue,

THAT Bylaw No. 2920-2019, "Official Community Plan Bylaw, 2016, Amendment Bylaw No. 7", be given third reading, as amended, and adopted at the next Regular Meeting of Council with the corrections as set out in Table 1 of this report.

CARRIED.

6.8.2 Agricultural Land Commission homesite severance subdivision application in the Agricultural Land Reserve for the property, located at 75 Whatcom Road (Owners: R. and M. Dykshoorn) (3100-05) (PRJ17-189) (PDS 030-2019)

Moved by Councillor Ross, seconded by Councillor Loewen,

1. THAT, in accordance with the City's Appeal Procedure Bylaw, 2016, Council extend the deadline for consideration of Application No. 3100-05/PRJ17-189 until

Attachment: Executive Committee minutes, April 15, 2019 (Executive Committee minutes - April 15, 2019)

Council considers this application at an upcoming Council meeting, as under the City's Development Application Procedures Bylaw, 2016, the application has lapsed;

2. THAT, at the next Regular Meeting of Council, Council consider denying application 3100-05/PRJ17-189, to permit a homesite severance at 75 Whatcom Road, and not forwarding it to the Agricultural Land Commission; and

3. THAT the Mayor and Corporate Officer be authorized to execute all documents related to this matter.

Opposed: Councillors Barkman, Blue and Siemens

CARRIED.

6.8.3 Agricultural Land Commission non-farm use application to permit temporary commercial vehicle parking for the property, located at 28268 Huntingdon Road (Owners: R. and C. Crawford) (3100-05) (PRJ17-126) (PDS 031-2019)

Moved by Councillor Loewen, seconded by Councillor Blue,

1. THAT, in accordance with the City's Appeal Procedure Bylaw, 2016, Council extend the deadline for consideration of Application No. 3100-05/PRJ17-126 until Council considers this application at an upcoming Regular Meeting of Council, as under the City's Development Application Procedures Bylaw, 2016, the application has lapsed;

2. THAT, at the next Regular Meeting of Council, Council consider denying the non-farm use application 3100-05/PRJ17-126, to permit temporary commercial vehicle parking for the property located at 28268 Huntingdon Road; and

3. THAT the Mayor and Corporate Officer be authorized to execute all documents relating to this matter.

CARRIED.

6.8.4 Development Variance Permit application for the property located at 31707 Upland Crescent, to reorient proposed Lot 5 east/west from a setback perspective (Owner: 1128546 BC Ltd.; Director: K.R. Beatch) (3100-05) (PRJ17-146) (PDS 028-2019)

Moved by Councillor Blue, seconded by Councillor Chahal,

1. THAT Development Variance Permit No. 2179 be approved in principle and proceed for public comment at an upcoming Council Hearing;

2. THAT prior to Development Variance Permit No. 2179 being issued the following conditions being satisfied:

   (a) adoption of Bylaw No. 2862-2018, "Abbotsford Zoning Bylaw 2014, Amendment Bylaw No. 219"; and
   (b) registration of a building envelope covenant at time of subdivision in accordance with Schedule A of Development Variance Permit No. 2179; and

3. THAT the Mayor and Corporate Officer be authorized to execute all documents relating to this matter.

Opposed: Councillor Barkman

CARRIED.

6.8.5 Development Permit with Variances application for the properties, located at 2638 and 2642 Gladys Avenue for a mixed-use 21 unit apartment building (Owners: Pacific Boulevard Investments Inc.; Directors: H. Grewal and G. Sohi) (3100-05) (PRJ18-081) (PDS 029-2019)

Moved by Councillor Chahal, seconded by Councillor Ross,

1. THAT Development Permit with Variances No. 2182 proceed for public comment at an upcoming Council Hearing;

2. THAT prior to Development Permit with Variances No. 2182 being issued the following conditions being satisfied:

   (a) consolidating the three existing vacant parcels into a single lot;
   (b) providing a $42,900 landscaping security, in accordance with the Development Application Procedures Bylaw, 2016;
   (c) providing a $858 landscaping inspection fee, in accordance with the Development Application and Service Fee Bylaw, 2010;
   (d) providing a $20,000 community amenity contribution;
   (e) providing $39,000 for the purchase of 13 off-site parking stalls;
   (f) providing $300 cash-in-lieu for the remaining tree replacement;
   (g) revising the underground parkade drawings to include glazing into the elevator lobby and into the bike and storage rooms;
   (h) owners either:
      i. providing written permission from adjacent land owners for the removal of an off-site tree;

Attachment: Executive Committee minutes, April 15, 2019 (Executive Committee minutes - April 15, 2019)

ii. providing a revised arborist report to the acceptance of the General Manager, Parks, Recreation and Culture to ensure the off-site tree is retained safely; or

iii. revising the underground parkade to remove two parking stalls, providing $6,000 for two additional off-site parking stalls and providing a security based on a cost estimate for a vehicle for a car share program within the building;

(i) providing a construction management plan demonstrating the construction of the underground parkade and construction parking location to the acceptance of the General Manager, Engineering and Regional Utilities;

(j) owners providing written acknowledgement of the terms and conditions of the permit;

(k) providing three sets of signed, sealed development permit plans and final arborist report; and

(l) providing three sets of signed, sealed landscaping plans; and

3. THAT the Mayor and Corporate Officer be authorized to execute all documents relating to this matter.

CARRIED.

7. NEW BUSINESS

None.

8. ADJOURNMENT

Moved by Councillor Ross, seconded by Councillor Loewen,

THAT the April 15, 2019 Executive Committee, be adjourned. (5:19 p.m.)

CARRIED.

Certified Correct:

Henry Braun
Mayor

Bill Flitton
Director, Legislative Services/City Clerk

Attachment: Executive Committee minutes, April 15, 2019 (Executive Committee minutes - April 15, 2019)

The Healthy Communities Approach

A Global Movement for Health and Wellness

fraserhealth

Better health. Best in health care.

Approaches to Health

Wellness

Views health as a resource for everyday life, not the objective of living. It is a positive concept, emphasizing social and personal resources, as well as physical capacities

Attachment: Healthy Communities Delegation May 6th 2019 (Fraser Health Authority -

What is a Healthy Community?

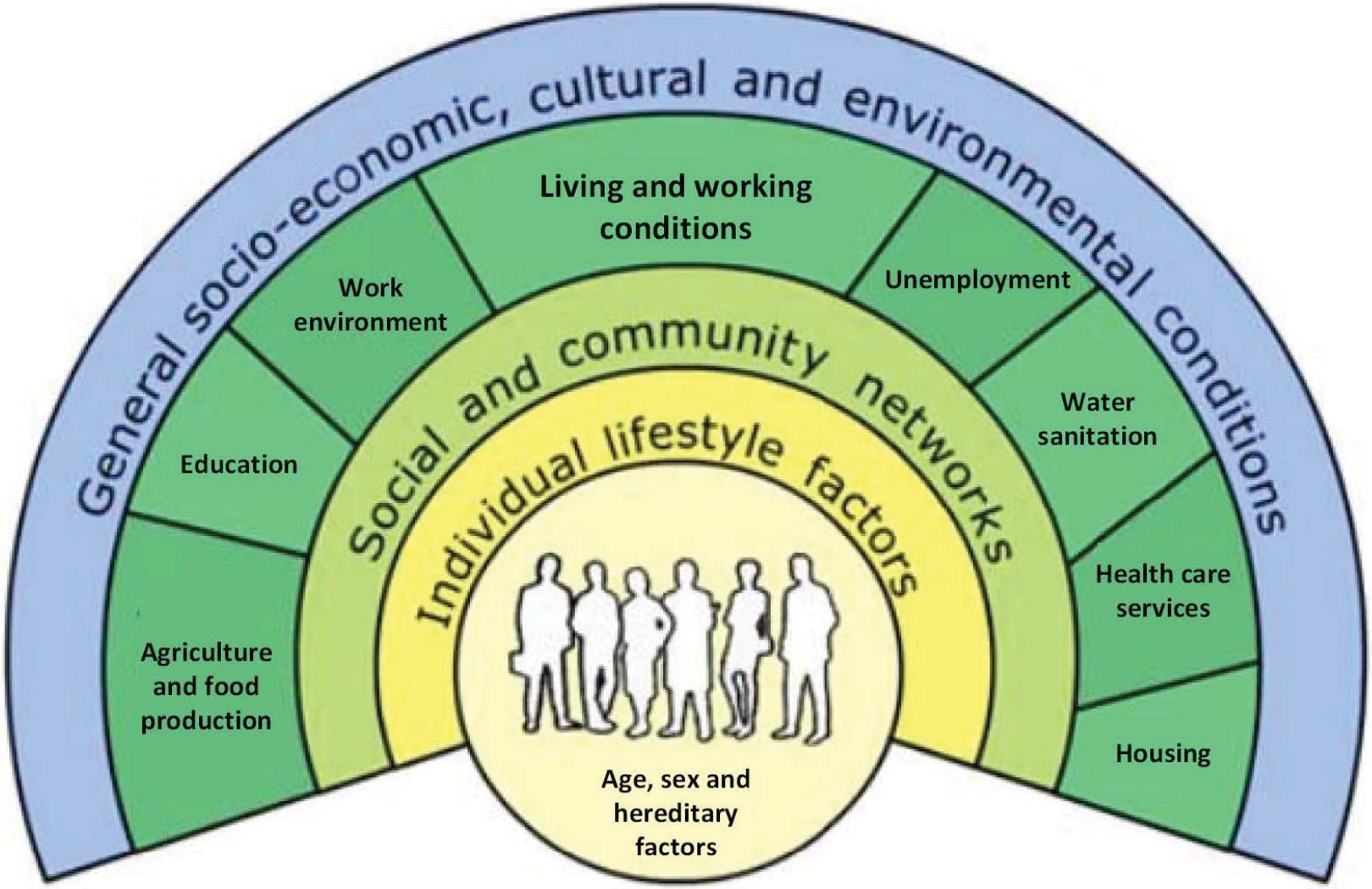
Healthy communities make it easier for residents to make healthier choices every day.

It takes the combined effort of everyone, including local governments, businesses, volunteers, organizations, schools, health authorities and health services to create a healthy community.

Source: Healthy Families BC. (2012). *What is a Healthy Community?* Retrieved from https://www.healthyfamiliesbc.ca/your-community/what-is-healthy-community

Attachment: Healthy Communities Delegation May 6th 2019 (Fraser Health Authority -

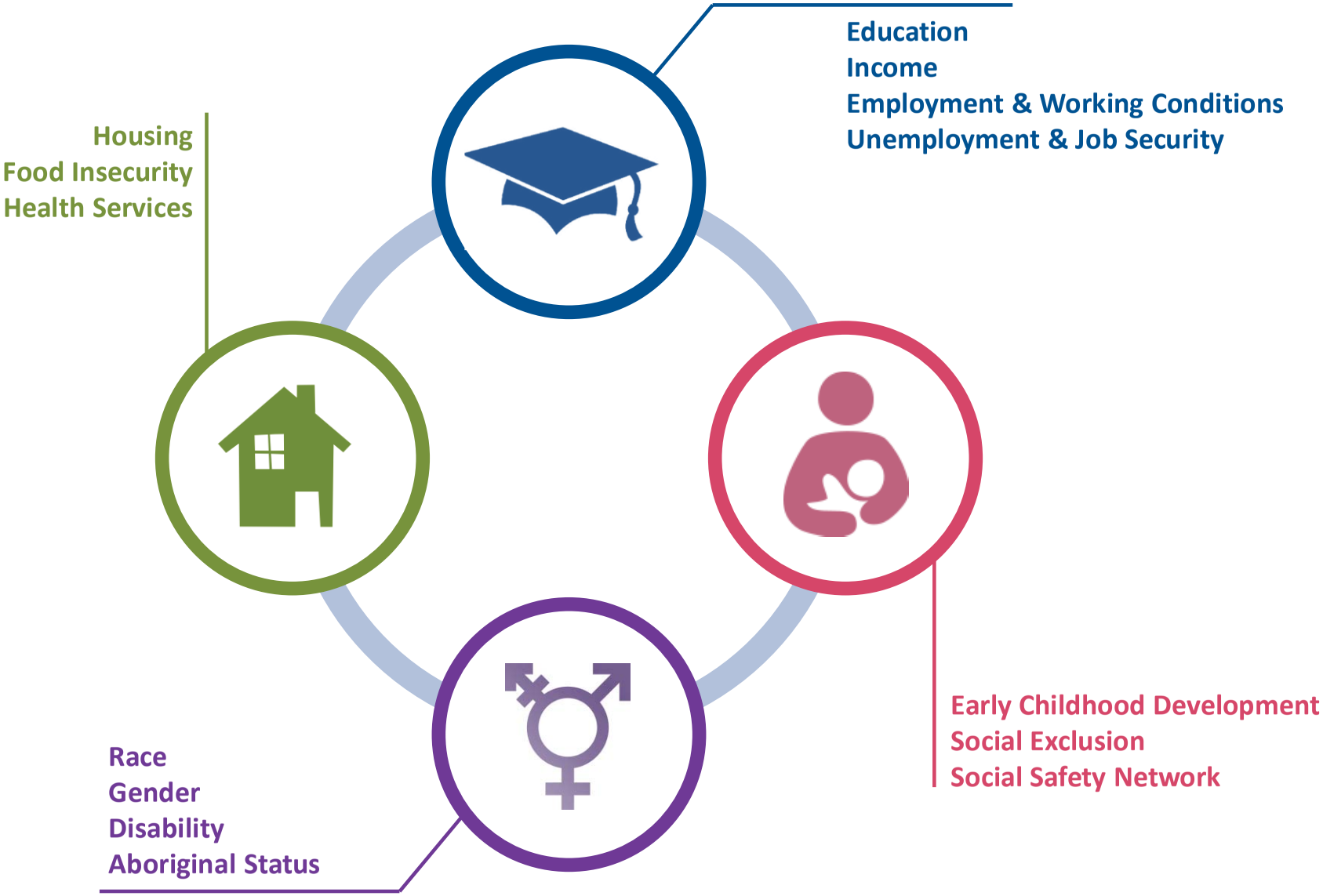
What Conditions Influence Our Health and Well-being?



Source: Dahlgren G, Whitehead M. (1991). *Policies and Strategies to Promote Social Equity in Health*. Stockholm, Swed
Institute for Futures Studies.

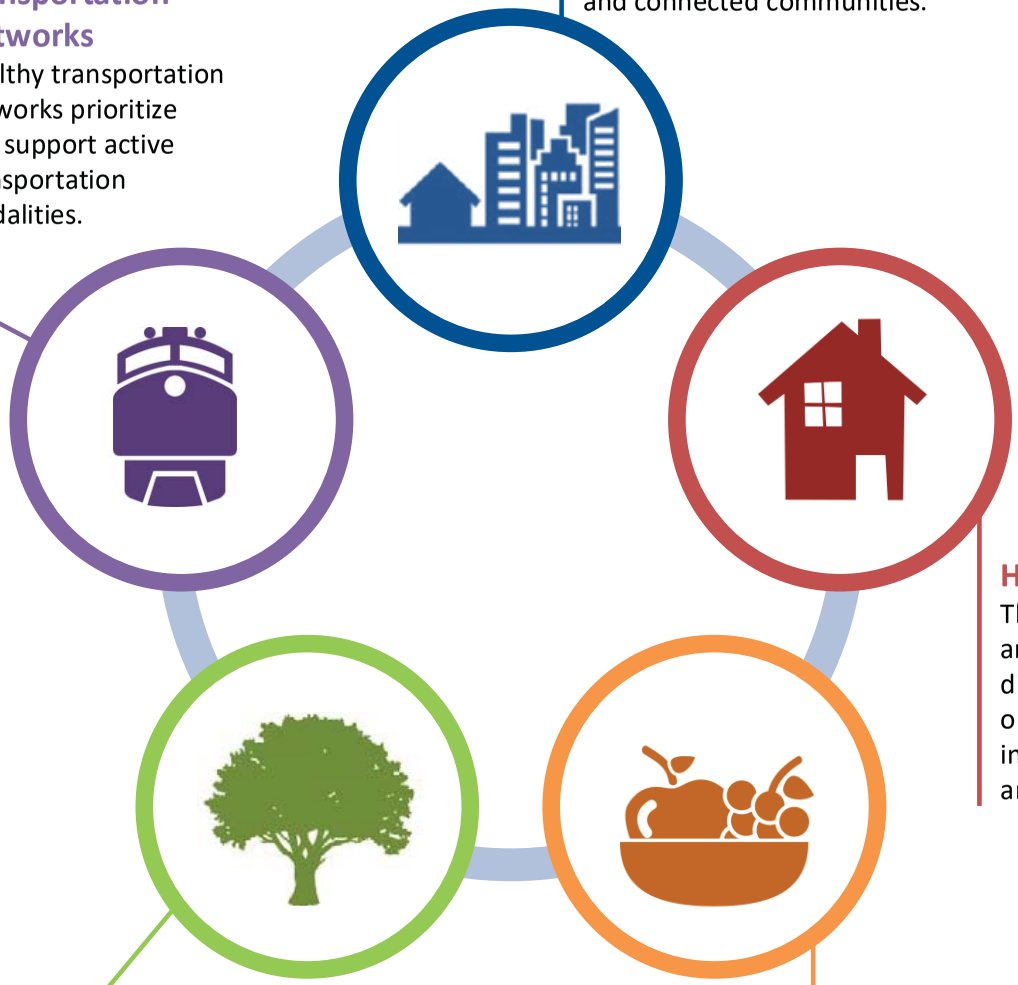
Attachment: Healthy Communities Delegation May 6th 2019 (Fraser Health Authority -

Social Determinants of Health



Source: Mikkonen, J. & Raphael, D. (2010). *Social Determinants of Health: The Canadian Facts.* Toronto, ON: York University School of Health Policy and Management.

Environmental Determinants of Health



Neighbourhood Design
Healthy neighbourhood design is facilitated by land use decisions which prioritize complete, compact and connected communities.

Transportation Networks
Healthy transportation networks prioritize and support active transportation modalities.

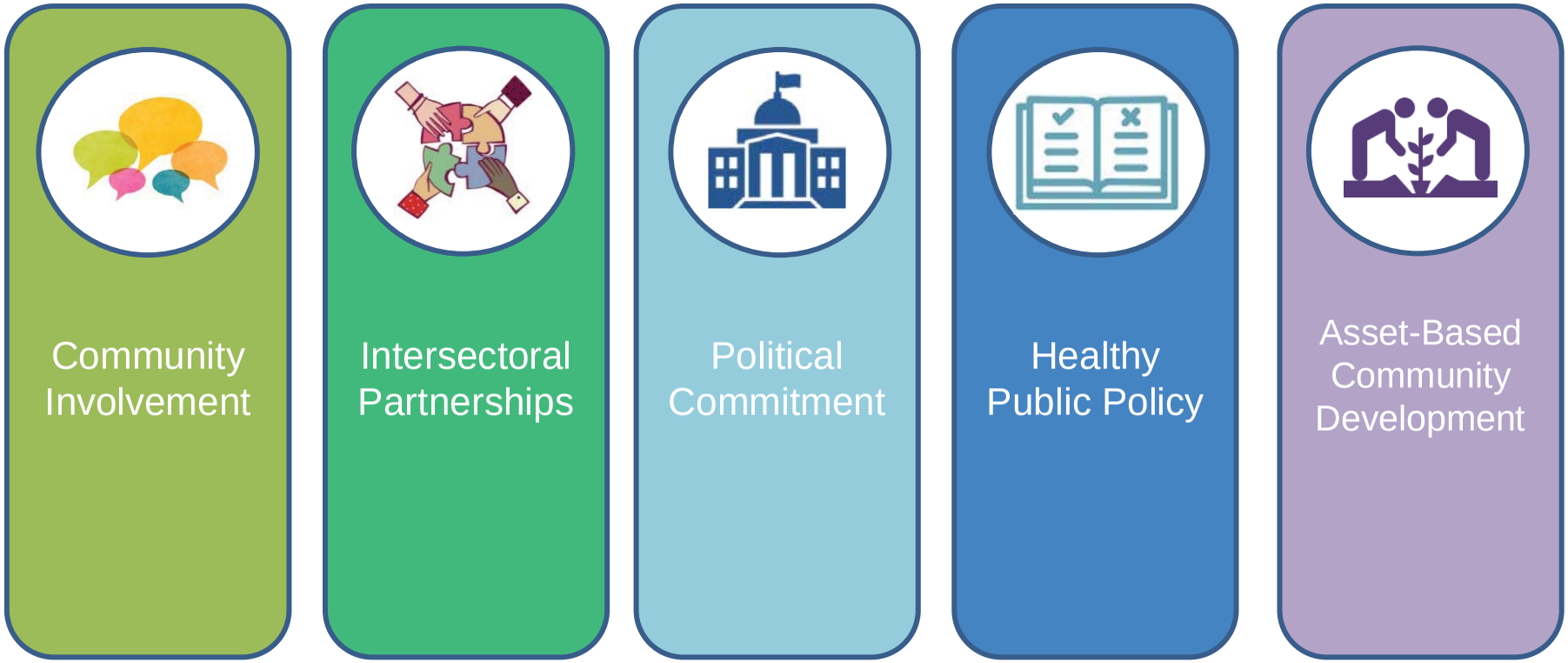
Housing
The design, quality, and affordability of diverse housing options has a critical influence on health and well-being.

Natural Environments
Community planning which preserves and connects the surrounding natural environment can have significant health and well-being impacts.

Food Systems
Accessibility and affordability of healthy foods can be supported through land use planning and design.

Source: BC Centre for Disease Control. (2018). *Healthy Built Environment Linkages Toolkit: making the links between design, planning and health, Version 2.0.* Vancouver, BC: PHSA.

Five Strategies



Source: PlanH. (n.d.) *How to build healthy communities.* Retrieved from: https://planh.ca/big-picture

Attachment: Healthy Communities Delegation May 6th 2019 (Fraser Health Authority -

Desired Outcomes

Vibrant Economy

Complete Communit

Fiscal Discipline

Organizational Alignment

Source: City of Abbotsford – retrieved from:
https://www.abbotsford.ca/Assets/2014+Abbotsford/Communications/Strategic+Vision+Documents/2019-

Healthier Communities Partnerships (HCPs)

fraserhealth
Better health. Best in health care.

Attachment: Healthy Communities Delegation May 6th 2019 (Fraser Health Authority -

Fraser Health's Commitment

Fraser Health is committed to working together with municipalities and community agencies to create Healthier Communities through collaborative partnerships and to embed this priority in our culture.

Fraser Health Executive Directors have a key role as Co-Chairs of the Healthier Community Partnerships Steering Council. Community Health Specialists with community development backgrounds are hired to support them in this role.

Source: Fraser Health. (2010). *Keeping You Informed: Healthier Community Partnerships*. Retrieved from http://www.fraserhealth.ca/media/Healthier%20Community%20PartnershipsJan2010.pdf

Attachment: Healthy Communities Delegation May 6th 2019 (Fraser Health Authority -

HCP Outcomes

Long-Term Outcomes:

1) Decrease chronic disease risk factors
2) Decrease vulnerability
3) Increase complete, compact, connected communities

Ultimate Outcomes:

1) Healthy, vibrant communities
2) Decreased life expectancy gap
3) Increased quality of life

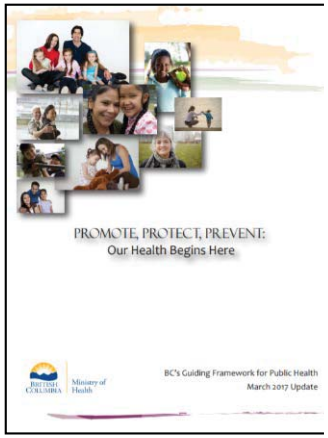
Source: Fraser Health's Healthier Community Partnership Logic Model.

Attachment: Healthy Communities Delegation May 6th 2019 (Fraser Health Authority -

Examples of informal HCP

The Community Health Specialist and Population & Public Health Abbotsford engages with the following community groups:

- Abbotsford Age Friendly working group & *Healthy Abbotsford*
- City Housing, Homelessness, Harm Reduction & Mental Wellness Collective
- Abbotsford Local Immigration Partnership table
- Ag-Refresh
- Abbotsford Opioid Working group (CAT)



Source: Ministry of Health. (2017). *Promote, Protect, Prevent: Our Health Begins Here. BC's Guiding Framework for Public Health.*

Attachment: Healthy Communities Delegation May 6th 2019 (Fraser Health Authority -

OUR ASK:

Consider creating a Healthier Communities Partnerships formal agreement as an organizational objective.

Fraser Health's HCP team can contribute by bringing best practice, expertise and knowledge in the development, implementation and evaluation of their Community Action Plans, and strengthen the City's Strategic Plan 2019-2022 .

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COUNCIL REPORT

Executive Committee

Report No. PDS 044-2019

Date: April 26, 2019
File No: 2210-20

To: Mayor and Council
From: Ryan Beaudry, Planner
Mark Neill, Director, Community Planning
Subject: Planning Process for Cannabis Retail Stores - Stage 3 Update

RECOMMENDATION

1. THAT Council endorse the guiding principles contained within report PDS 044-2019; and

2. THAT Council direct staff to proceed with community engagement on the draft regulatory framework for cannabis retail stores.

REPORT CONCURRENCE	
General Manager The General Manager concurs with the recommendation of this report.	**City Manager** The City Manager concurs with the recommendation of this report.

PURPOSE

This report provides an update on the City's planning process for cannabis retail stores in Abbotsford.

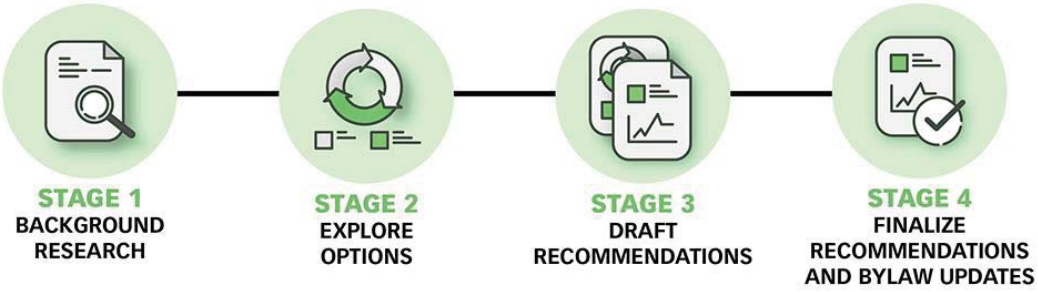
SUMMARY OF THE ISSUE

On August 27, 2018, staff presented a verbal report to Council on the results of the Non-Medical Cannabis Survey. The results indicated that there is community support for cannabis retail stores in Abbotsford, as well as limiting where stores can locate. Given these findings and other considerations, Council directed staff to explore developing a regulatory framework for cannabis retail stores in Abbotsford. This report provides a summary of work completed since August 27.

BACKGROUND

On June 21, 2018 the federal Cannabis Act (Bill C-45) received royal assent, making the consumption and retail sale of non-medical cannabis legal in Canada on October 17, 2018 subject to provincial and local government regulations. Currently, the City of Abbotsford Zoning

Bylaw does not permit cannabis retail stores. Staff are undertaking a planning process to establish a regulatory framework based on Council's direction; this process started in early 2018 and is being undertaken in four stages, detailed below.



Stage 1 – Background Research

Stage 1 consisted of preliminary research and project communications. Staff raised awareness about the federal legalization of cannabis and informed residents about upcoming City of Abbotsford engagement opportunities on related topics. This information was shared using local newspaper advertisements, handouts, social media and the City's web page.

Stage 2 – Explore Options

Stage 2 included an online survey and nine public engagement sessions. The survey was available from June 26 to July 20, 2018 and collected over 5,400 responses, approximately 4,650 (86%) of which were from within the City of Abbotsford. Nine public engagement sessions were held in July, in municipal and commercial venues and at community events across the city. The purpose of these sessions was to raise awareness about the federal legalization of cannabis, promote the online survey and help residents complete the survey using iPads.

The survey feedback indicates that the majority (73%) of respondents think the City should allow cannabis retail stores. Staff presented a verbal update on survey findings to Council on August 27, 2018. Council subsequently directed staff to explore developing a regulatory framework for cannabis retail stores in Abbotsford.

Stage 3 – Draft Recommendations (underway)

Stage 3 is currently underway and has consisted of preparation of guiding principles, research of approaches in other communities, and development of a draft regulatory framework for cannabis retail stores; details about this work are provided in the Discussion section below. Staff are proposing that community engagement on the draft framework be undertaken in spring/summer 2019 to complete Stage 3.

Stage 4 – Finalize Recommendations and Bylaw Updates

In Stage 4, staff will report back on the engagement results and prepare a final regulatory framework for cannabis retail stores. Staff are targeting completion of Stage 4 by fall 2019.

DISCUSSION

As per Council's direction on August 27, 2018, staff have prepared a draft regulatory framework

for cannabis retail stores in Abbotsford. The framework was influenced by Guiding Principles and research of approaches in other municipalities; see Sections 1 and 2 below for more details. A summary of the draft framework is included in Section 3 and next steps are outlined in Section 4.

1. Guiding Principles

Staff have prepared the following Guiding Principles to structure the draft regulatory framework and guide the planning process outlined for Stages 3 and 4.

- *Holistic:* Allow cannabis retail stores across the city, including west, central and east Abbotsford.
- *Measured:* Take a gradual approach and start with a small number of stores.
- *Incremental:* Review the framework in the future and make adjustments, if and when needed, to improve the City's approach to regulating cannabis retail stores.

2. Approaches in other municipalities

Staff have completed a review of different approaches to regulating cannabis retail stores across the province, looking at a total of 60 municipalities. The City of Abbotsford is one of ten municipalities with a regulatory framework underway as of March 2019.

The proposed draft regulatory framework for Abbotsford incorporates elements from various municipalities across the province. For example, some of the municipalities have adopted policy stipulating where stores can locate, which is used to assess rezoning applications for cannabis retail stores on a case-by-case basis. Other municipalities have initiated Zoning Bylaw Amendments to permit cannabis retail stores subject to conditions.

3. Draft framework

Staff have prepared a draft regulatory framework for cannabis retail stores, consisting of three components: Pre-zoning, Cannabis Retail Policy, and a Cannabis Retail License Application Process. Details about each component are provided below.

a. Pre-zoning

The draft regulatory framework proposes to take a streamlined approach to determine potential locations of cannabis retail stores. Rather than considering a number of individual rezoning applications, staff are proposing to pre-zone select sites through an analysis of the Official Community Plan (OCP), zoning, and parcel size, including:

- City Centre, Urban Centres and Neighbourhood Centres in the OCP;
- Existing Commercial (C) zoning; and
- Parcels that are 15,000 m^2 or larger.

This analysis identified 13 potential sites located across the city to be pre-zoned to allow for cannabis retail stores. This approach provides benefits to Council and the broader community, including transparency, certainty and efficiency. Staff are proposing to engage on this approach of pre-zoning and the 13 potential sites specifically (see Appendix A for a map of the 13 sites).

Staff note that pre-zoning a property does not automatically grant permission for a cannabis retail store. A Cannabis Retail License would still be required for each store, subject to Council's approval.

b. Cannabis Retail Policy

Staff are proposing that a Cannabis Retail Policy be established to help guide Council's decisions on Cannabis Retail License Applications. This Policy would consist of criteria including:

- Located on a pre-zoned site;
- No more than 4 stores within the city;
- Geographic equity of proposed stores;
- Consideration of impacts on adjacent land uses; and
- Crime considerations.

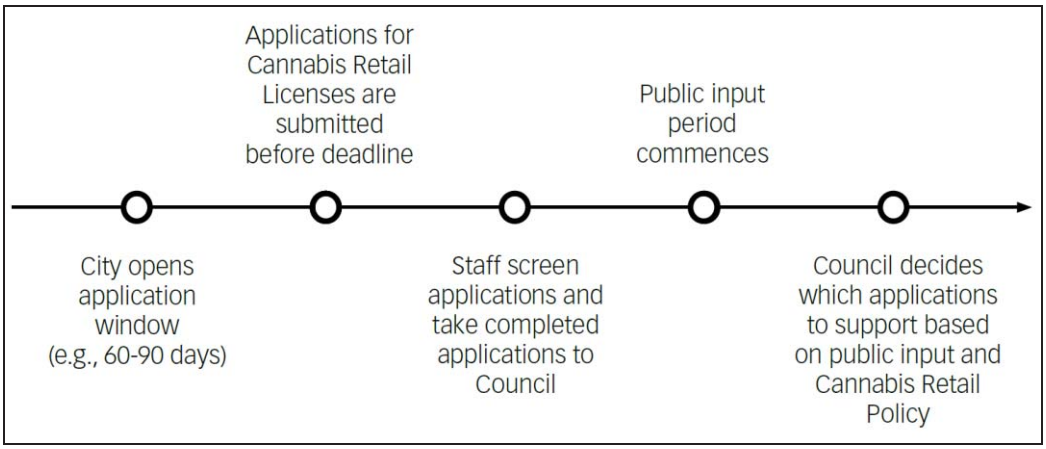
Staff are proposing to review these criteria through engagement in spring/summer 2019. The final Cannabis Retail Policy will accompany the City-initiated Zoning Bylaw Amendment for the selected pre-zoned sites in fall 2019.

c. Cannabis Retail License Application Process

The final component of the draft regulatory framework is to establish a process for Cannabis Retail License Applications. Staff is proposing a comprehensive approach whereby proponents are given the opportunity to submit an application, and those applications are considered by Council collectively with an opportunity for public input. The benefit of this approach is that Council is able to evaluate and compare the applications, and make a decision on preferred stores for the entire city instead of reviewing applications on a case-by-case basis.

A summary of the proposed Application Process is shown in Figure 1 below:

Figure 1 – Cannabis Retail License Application Process



4. Next Steps

The next step in this planning process is community engagement on the draft regulatory framework. This work would include open houses and online engagement via the City's new engagement portal.

The open houses are proposed to be drop-in format, with interactive story boards on display and City staff available to answer questions. The online engagement would be designed to provide a similar experience, asking the same questions as the open house boards.

Community feedback received through engagement would be summarized and presented to Council by late summer. Staff would present a final framework in fall 2019, consisting of a Zoning Bylaw Amendment for selected pre-zoned sites, the Cannabis Retail Policy, and the Cannabis Retail License Application Process. The Application Process could commence thereafter.

FINANCIAL PLAN IMPLICATION

Staff do not anticipate any financial plan implications associated with the planning process for cannabis retail stores, as the work is being completed with existing staff resources. Any cost implications for the City arising from a Cannabis Retail License Application Process will be addressed through an application fee, the amount of which will be determined in Stage 4 of the planning process.

Rajat Sharma

Rajat Sharma
General Manager, Finance and Corporate Services
Signed 4/24/2019 4:16 PM

IMPACTS ON COUNCIL POLICIES, STRATEGIC PLAN AND/OR COUNCIL DIRECTION

The proposal meets the goals and objectives identified in the 2016 Official Community Plan and Council's 2019-2022 Strategic Plan which identifies four cornerstones: vibrant economy, complete community, fiscal discipline and organizational alignment. The proposal is consistent with the four cornerstones of Council's Strategic Plan.

SUBSTANTIATION OF RECOMMENDATION

Staff are recommending that Council endorse the guiding principles, as they are intended to structure the draft regulatory framework for cannabis retail stores and guide the planning process outlined for Stages 3 and 4. Staff are also recommending to proceed with engagement on the draft regulatory framework to complete Stage 3. In Stage 4, staff will report back on the engagement results and prepare a final regulatory framework for cannabis retail stores.

Ryan Beaudry

Ryan Beaudry
Planner
Signed 4/24/2019 1:14 PM

Mark Neill

Mark Neill
Director, Community Planning
Signed 4/24/19 1:16PM

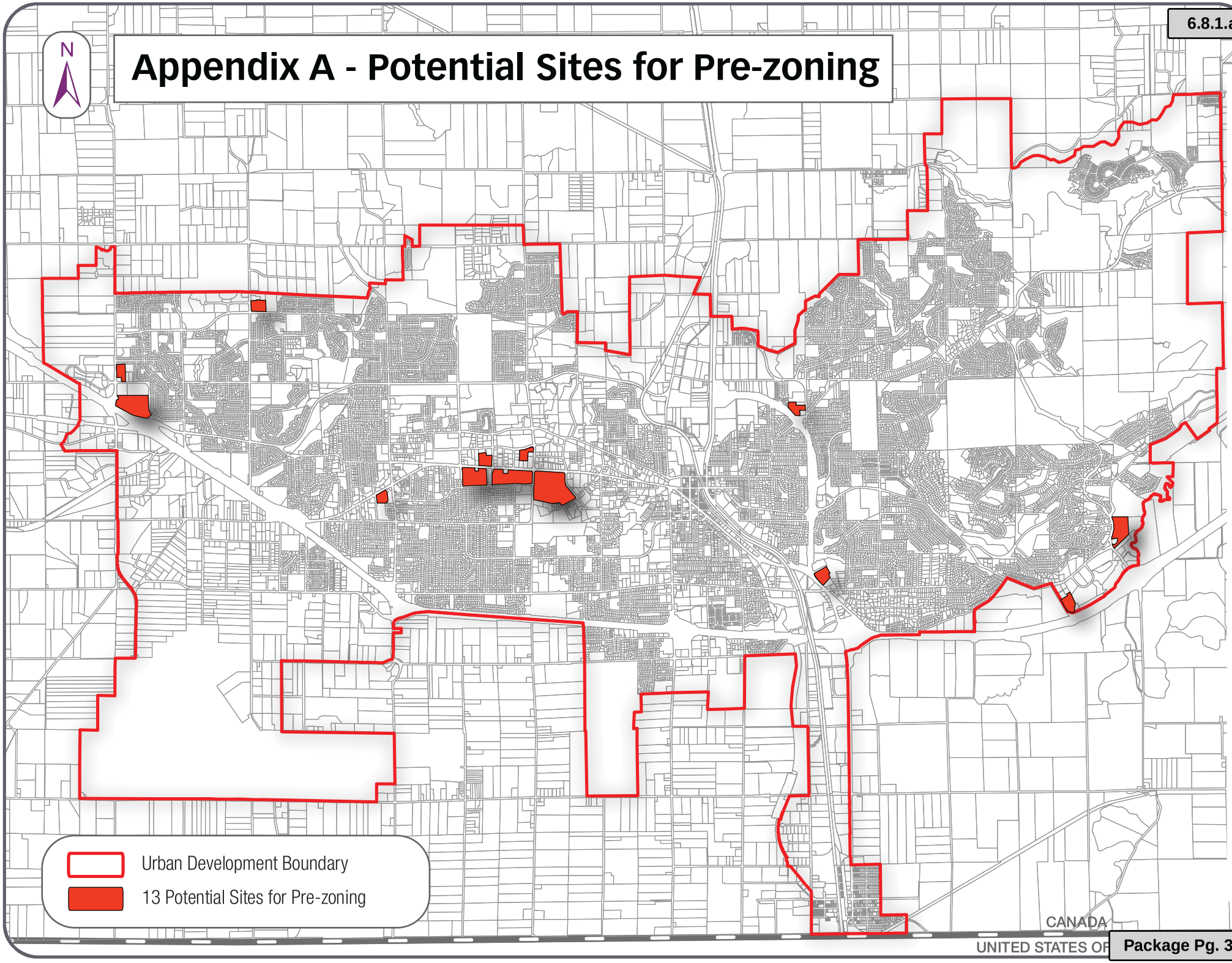
Darren Braun

Darren Braun
Director, Development Planning
for
Siri Bertelsen, General Manager,
Planning and Development Services
Signed 4/24/2019 4:41 PM

ATTACHMENTS:

Appendix A

Appendix A - Potential Sites for Pre-zoning



COUNCIL REPORT

Executive Committee

Report No. PDS 042-2019

Date: April 25, 2019
File No: 6430-20

To: Mayor and Council
From: Ryan Beaudry, Planner
Subject: Urban Infill Study: Stage 3 Update

RECOMMENDATION

THAT staff be directed to prepare Official Community Plan Amendments, and Zoning Amendment Bylaws, based on the contents of this report, to implement the Urban 3-Infill Study.

REPORT CONCURRENCE	
General Manager The General Manager concurs with the recommendation of this report.	**City Manager** The City Manager concurs with the recommendation of this report.

PURPOSE

This report provides an update on Stage 3 of the Urban Infill Study.

SUMMARY OF THE ISSUE

On July 23, 2018, staff presented a first draft of Urban 3-Infill Official Community Plan (OCP) policies and zoning regulations to Council. Given the preliminary nature of the policies and regulations, staff were directed by Council to continue to research, prepare and test the material and report back on the findings. This report summarizes the additional work completed since July 23 and presents a refined set of draft policies and regulations.

BACKGROUND

The Urban Infill Study started in November 2017 and is being undertaken in three stages, detailed below.

Stage 1 (Background)

Stage 1 included research, data collection and analysis of existing conditions. Staff presented Stage 1 findings to Council on February 19, 2018 (PDS 020-2018) and received direction to proceed with the Urban Infill Study.

Stage 2 (Options)

Stage 2 included preparation of infill housing options and community engagement. The options were presented and public feedback was collected during three open houses in mid-May, 2018. A total of 468 people attended the events, with representation from all of the neighbourhoods in the study area. A summary of community input was presented to Council on June 18, 2018 (PDS 072-2018).

Stage 3 (Regulations)

Stage 3 is currently underway and includes preparation of draft OCP policy, zoning regulations and voluntary design guidelines. This work is being led by staff with support from project consultants Urban Systems and Birmingham & Wood. Staff presented a first draft to Council on July 23, 2018 (PDS 080-2018) and were directed to undertake additional work to refine the material. A summary of the additional work and refinements is provided in this report.

DISCUSSION

Staff have completed additional research and testing and have refined the draft Urban 3-Infill policies and regulations as per Council's direction. A summary is included below under the following Sections: (1) stakeholder findings; (2) market study; and (3) technical work. Refined draft policies and regulations are presented in Section 4, voluntary Infill Design Guidelines are discussed in Section 5, and next steps for the Urban Infill Study are outlined in Section 6.

1. Stakeholder findings

Following the Executive Committee meeting on July 23, staff met with the Development Advisory Committee (DAC) on July 26, a group of Realtors on August 30, and the Canadian Home Builder's Association-Fraser Valley (CHBA-FV) on October 9. A range of feedback was collected by staff, including positive comments and concerns about the draft regulations.

The key concerns raised by stakeholders included the proposed basement permissions, density permissions, and upper-storey massing regulations. Staff explored the stakeholder's concerns from late-2018 to early-2019 by undertaking a market study (see Section 2) and additional technical work (see Section 3). Ultimately, refinements were made to the draft policies and regulations (see Section 4) based on the outcomes of the additional work.

Staff are in the process of scheduling follow-up meetings with the CHBA-FV, the group of Realtors, and DAC to present the proposed refinements and discuss next steps. Meetings with these groups are tentatively scheduled to be held after the submission deadline for this Council Report, on April 24, April 26 and May 2 respectively. Staff will present a verbal update as part of the introduction of this report at the Executive Committee meeting on May 6.

2. Market study

A market study was undertaken to follow up on stakeholder concerns and to test the viability of the draft July 23 regulations from a developer's perspective. This work was completed by Urban Systems and consisted of pro-forma analyses for each of the infill housing options.

Urban Systems' findings indicate that the draft July 23 regulations rendered some infill housing options more viable than others in the current market, based on assumed selling prices, land and construction costs and other variables. It was determined that a better balance between housing options could be reached if the following refinements are made to the draft regulations:

- Increase density from 0.45 to 0.5 FSR for all infill housing options; and
- Allow basements in duplexes and narrow houses (i.e., houses on lots 10-11.9m wide).

3. Technical Work

Additional technical work was required to follow up on the concerns raised by stakeholders and to test the feasibility of the draft July 23 regulations. This work included a basement height study and a review of the proposed upper storey massing regulations; details about these tasks are provided below.

a. Basement height study

In the draft July 23 regulations, staff had proposed a basement height limit of 0.8m (2.6ft) above grade. This proposed regulation was based on a recommendation by the City's architectural consultant (Birmingham & Wood), who had advised staff that limiting the extent of basement visible above finished grade is the best way to reduce massing of new dwellings. The 0.8m limit was proposed as it has been used successfully in other jurisdictions and is considered optimal from a massing perspective.

Through the completion of a basement height study in early-2019, staff identified that the proposed 0.8m limit poses a technical challenge with respect to sanitary sewer service in the Infill area, where sewer infrastructure is typically shallower than in newer neighbourhoods. Staff concluded that, in the majority of cases in the Infill area, a 0.8m limit would prevent basements from having gravity-fed sewer service, and instead require pumping.

In order to improve the feasibility of basements with gravity-fed sewer, staff are proposing to refine the proposed basement height limit above grade from 0.8m (2.6ft) to 1.4m (4.6ft).

b. Upper storey massing regulations

In the draft July 23 regulations, staff had proposed a requirement that the upper storey of a dwelling be limited to 80% of the floor area of the lower storey, to be achieved through mandatory upper storey front and side setbacks of 1.2m (4ft). This proposal was based on a review of approaches used in other jurisdictions as well as input from Birmingham & Wood.

Through the first round of stakeholder meetings, staff heard concerns about potential structural complications, reduced building efficiency and added costs associated with mandatory upper storey front and side setbacks. In response to these concerns, staff researched alternative approaches in early-2019 and identified the following refinements to the draft July 23 regulations:

- Change setback requirement from "front <u>and</u> sides" to "front <u>or</u> one or more sides";
- Allow the upper storey setback to be measured from the structural posts of a covered porch or front entry below; and
- Add a storey height limit of 4.3m (14ft).

4. Refined policies and regulations

Staff have refined the draft July 23 OCP policy and zoning regulations based on the additional work completed to date; refinements are discussed below under the appropriate heading. In general, the refined draft policy and regulations are intended to balance community and stakeholder input and incorporate findings from the additional studies and technical work completed since July 23.

a. Official Community Plan Policy

The draft OCP policy supports a range of detached infill housing options, consistent with the intent for the Urban 3-Infill area as outlined in the 2016 OCP: "*existing neighbourhoods which will retain their character while increasing residential density through gentle infill of primarily ground oriented single detached and duplex buildings, as well as accessory units".* These housing options are shown in Figure 1 below and include: rebuilds using existing zoning, duplexes, subdivisions (conventional and narrow lots), and garden suites.

Figure 1: Infill Housing Options

Since July 23, staff have increased the proposed maximum density for rebuilds, duplexes and subdivisions from 0.45 FSR to 0.5 FSR, as per the findings of the market study. Staff have also drafted a policy clarifying that the City's preference for subdivision in the Infill area is conventional street-facing, and that panhandle and bare land strata subdivisions are to be considered only in unique circumstances where they may be appropriate.

Policy details for the infill housing options (e.g., FSR, minimum lot size, minimum frontage, etc.) will align with and support the zoning regulations outlined in Section 4(b) below.

b. Zoning Regulations

Infill Rebuild Regulations

The vast majority of lots in the Urban 3-Infill area are currently zoned RS3. In the July 23 draft, staff proposed changes to the RS3 zone within the Infill area to address input received through community engagement. A summary of the July 23 proposal is included in the left column in Table 1 below.

Refined regulations, based on stakeholder feedback and additional work completed since July 23, are included in the right column of Table 1. Density has increased from 0.45 FSR to 0.5 FSR based on the market study, and maximum basement height visible above ground has increased from 0.8m (2.6ft) to 1.4m (4.6ft) based on the basement height study. The upper-storey setbacks have been adjusted and a maximum storey height of 4.3m (14ft) has been added, based on stakeholder feedback, additional research, and input from the City's architectural consultant.

Table 1 – Draft Infill Rebuild Regulations

	July 23 Draft Regulations (for comparison only)	**Refined Draft Regulations**
Height (max)	8.5 m	No change
Density (max)	0.45 FSR	0.5 FSR
Lot size (min)	540 m^2-interior, 610 m^2-corner	No change
Lot width (min)	15 m-interior, 18 m-corner	No change
Lot depth (min)	25 m	No change
Lot line setbacks (min)	6 m – front and rear 1.5 m-interior, 4.5 m-exterior	No change
Upper storey floor area	Max 80% of lower storey	No change
Upper storey setbacks	1.2 m from lower storey front and sides	1.2 m from lower storey front or one or more side(s) (setback can be measured from structural posts of a lower storey covered porch or entry)
Max storey height	N/A	4.3 m (FSR to be double-counted for portions of floor area with > 4.3m height)
Max. basement height above ground	0.8 m above average finished grade	1.4 m above average finished grade

Infill Duplex Regulations

The City has an existing historical duplex zone (RS4) that applies to a small number of lots within the Urban 3 – Infill area, and elsewhere in the City in other land use designations. In the July 23 draft, staff proposed an infill duplex zone based on RS4, with changes to height, density, setbacks, basements and other provisions to incorporate emerging direction from the Urban Infill Study. Staff have since refined the infill duplex zone based on stakeholder feedback and additional work completed since July 23. Table 2 below provides a comparison between the July 23 draft (left column) and the refined draft (right column).

Table 2 – Draft Infill Duplex Regulations

	July 23 Draft Regulations (for comparison only)	**Refined Draft Regulations**
Height (max)	8.5 m	No change
Density (max)	0.45 FSR	0.5 FSR
Lot size (min)	550 m^2	540 m^2
Lot width (min)	18 m	No change
Lot depth (min)	25 m	No change
Lot line setbacks (min)	6 m – front and rear 1.5 m-interior, 4.5 m-exterior	No change
Basements	Not permitted	Permitted
Max. basement height above ground	N/A	1.4 m above average finished grade
Max. garage and driveway width	4.0 m garage and 3.0 m driveway per duplex dwelling unit; driveway shall be joined with abutting unit's driveway	4.0 m garage and 3.0 m driveway per duplex dwelling unit; driveway shall be joined with abutting unit's driveway unless on a corner lot

Staff are proposing that the same massing controls for the infill rebuild regulations (i.e., 80% upper storey floor area maximum, upper storey setback and max storey height) also apply to infill duplexes as well. This proposed change would ensure equity of regulation across the range of housing options.

Infill Subdivision Regulations

The City does not currently have a standard zone for subdivision in the Urban 3-Infill area. In the July 23 draft, staff proposed two sets of regulations for infill subdivision: one set applied to conventional lots with a width of 12m (39.4ft) or more, and the other set applied to narrow lots with a width of 10-11.9m (32.8ft-39ft). Staff have since refined these regulations based on stakeholder feedback and additional work completed since July 23. Tables 3 and 4 below provide a comparison between the July 23 draft (left column) and the refined draft (right column).

Table 3 – Draft Infill Subdivision Regulations (conventional lot: width of 12m or more)

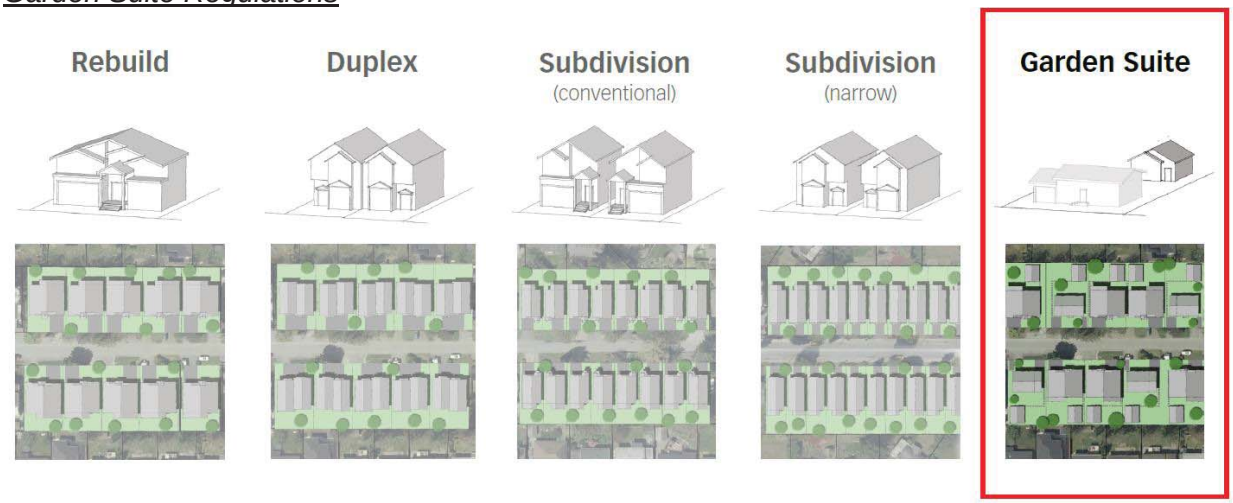
	July 23 Draft Regulations (for comparison only)	**Refined Draft Regulations**
Height (max)	8.5 m	No change
Density (max)	0.45 FSR	0.5 FSR
Lot size (min)	300 m^2-interior 375 m^2-corner	No change
Lot width (min)	12 m-interior 15 m-corner	No change
Lot depth (min)	22.5 m-interior 25.0 m-corner	22.5 m-interior 22.5 m-corner
Lot line setbacks (min)	6 m – front and rear 1.5 m-interior, 4.5 m-exterior	No change
Basements	Permitted	No change
Max. basement height above ground	0.8 m above average finished grade	1.4 m above average finished grade
Max. garage and driveway width	6.0 m garage and 6.0 m driveway	No change

Table 4 – Draft Infill Subdivision Regulations (narrow lot: width of 10-11.9m)

	July 23 Draft Regulations (for comparison only)	**Refined Draft Regulations**
Height (max)	8.5 m	No change
Density (max)	0.45 FSR	0.5 FSR
Lot size (min)	300 m^2-interior N/A - corner	No change
Lot width (min)	10 m-interior N/A-corner	No change
Lot depth (min)	22.5 m-interior N/A-corner	No change
Lot line setbacks (min)	6 m–front and rear 1.2 m-interior, N/A-exterior	No change
Basements	Not permitted	Permitted
Max. basement height above ground	N/A	1.4 m above average finished grade
Max. garage and driveway width	4.0 m garage and 3.0 m driveway	4.0 m garage and 6.0 m driveway

Staff are proposing that the same massing controls for the infill rebuild and duplex regulations (i.e., 80% upper storey floor area maximum, upper storey setback and max storey height) also apply to infill subdivisions as well. This proposed change would ensure equity of regulation across the range of housing options.

Garden Suite Regulations



The City currently has existing zoning regulations for secondary suites and coach houses but no existing garden suite regulations. In the July 23 draft, staff proposed a set of garden suite regulations based on community engagement, research and other work completed in Stage 2. Staff have since refined these regulations based on additional research. Table 5 below provides a comparison between the July 23 draft (left column) and the refined draft (right column).

Table 5 – Draft Garden Suite Regulations

	July 23 Draft Regulations (for comparison only)	Refined Draft Regulations
# of units (max)	1 per eligible lot	No change
Height (max)	4.5 m (one storey)	No change
Floor area (max)	55 m^2	No change
Included in FSR	No	No change
Lot frontage (min)	12 m	No change
Lot size (min)	540 m^2	No change
Lot line setbacks (min)	-	1.5 m-rear 1.5 m-interior, 4.5 m-exterior
Separation distance between garden suite and principal building	-	6 m
Not permitted on	Cul-de-sac bulb, bare land strata lots or arterial roads	No change
Basements	-	Not permitted
Stratification	-	Not permitted

Secondary suites - Staff are proposing that the current secondary suite criteria in the OCP be maintained for the Urban 3-Infill area. These criteria include a minimum lot size of 400 m^2, a minimum lot frontage of 12 m, and restrictions on lots in bare land stratas, on cul-de-sac bulbs and on arterial roads.

Coach houses - Staff are proposing that coach houses should only be considered within the Urban 3-Infill area in cases where a lot has existing municipal lane access. Detailed zoning regulations for coach houses will be established when the first application is received.

Staff note that, while a lot may meet the criteria for more than one accessory unit type, no more than one accessory unit will be permitted.

5. Voluntary Infill Design Guidelines

In the July 23, 2018 report, staff presented draft objectives and topic areas for the voluntary Infill Design Guidelines. It was explained that the Infill Design Guidelines are intended to articulate more clearly what is considered “gentle infill” in the Abbotsford context, as referenced in the OCP’s Urban Structure section. Although voluntary, the guidelines are intended to provide design inspiration to applicants while allowing for creativity in individual projects.

Staff have since completed the guidelines based on the approach and structure outlined in the July 23 report. The guidelines are intended to be presented to Council as part of a complete package of Bylaw Amendments to implement the Urban Infill Study, as explained in the Next Steps section below.

6. Next Steps

Staff are seeking direction from Council on next steps, and are recommending that Council direct staff to prepare OCP Amendment and Zoning Amendment Bylaws based on the contents of this report to implement the Urban 3-Infill Study. Staff would introduce the OCP Amendment and Zoning Amendment Bylaws on May 27, 2019 for Council’s consideration of 1st and 2nd reading. Staff would also introduce the voluntary Infill Design Guidelines on May 27 and seek

endorsement of the Guidelines at the time of Final Reading and Adoption of Bylaws.

Accompanying the Bylaws on May 27 will be a recommendation regarding transition of in-stream rezoning applications to ensure a seamless and uninterrupted process for those who applied up to and including February 19, 2018. Applications received after February 19, 2018 will be processed following adoption of OCP Amendment and Zoning Amendment Bylaws.

FINANCIAL PLAN IMPLICATION

Staff do not anticipate financial plan implications, as the Urban Infill Study is being completed with a combination of existing staff resources and existing budget for consulting services related to the broader Zoning Bylaw Update.

Rajat Sharma

Rajat Sharma
General Manager, Finance and Corporate Services
Signed 4/18/2019 8:48 PM

IMPACTS ON COUNCIL POLICIES, STRATEGIC PLAN AND/OR COUNCIL DIRECTION

The proposal meets the goals and objectives identified in the 2016 Official Community Plan, the Affordable Housing Strategy and Council's 2019-2022 Strategic Plan which identifies four cornerstones: vibrant economy, complete community, fiscal discipline and organizational alignment. The proposal is consistent with the four cornerstones of Council's Strategic Plan

SUBSTANTIATION OF RECOMMENDATION

The Urban Infill Study is intended to clarify the City's objectives and intent for the Urban 3-Infill land use designation in the 2016 Official Community Plan. This work advances and implements the current OCP direction and guidelines for infill development.

Ryan Beaudry

Ryan Beaudry
Planner
Signed 4/18/2019 4:56 PM

Mark Neill

Mark Neill
Director, Community Planning
Signed 4/18/2019 4:57 PM

Darren Braun

Darren Braun
Director, Development Planning
for
Siri Bertelsen, General Manager, Planning and Development Services
Signed 4/22/2019 7:51 AM

ABBOTSFORD

COUNCIL REPORT

Executive Committee

Report No. PDS 036-2019

Date: April 25, 2019
File No: 3100-05 PRJ19-031

To: Mayor and Council
From: Stephanie Allen, Planning Technician
Subject: Lounge Endorsement Application for property, located at 140-2582 Mt. Lehman Road (Owner: Sierra Developments Ltd; Director: Peter Postma)

RECOMMENDATION

1. THAT the Lounge Endorsement application for an existing Manufacturer Licence as detailed in the report from the Planning Technician, for the property located at 140-2582 Mt. Lehman Road, be approved in principle, and proceed for public comment at an upcoming Council Hearing;

2. THAT the Council report, the minutes of the Council Hearing, and any written comments received, be provided to the Liquor and Cannabis Regulation Branch, in accordance with the Liquor and Cannabis Regulations; and

3. THAT the Mayor and Corporate Officer be authorized to execute all documents relating to this matter.

REPORT CONCURRENCE	
General Manager The General Manager concurs with the recommendation of this report.	**City Manager** The City Manager concurs with the recommendation of this report.

PURPOSE

The applicant proposes a Lounge Endorsement for an existing Manufacturer Licence to permit a Microbrewery lounge.

SUMMARY OF THE ISSUE

Loud Mouth Brewing Co. is a Microbrewery located at 140-2582 Mt. Lehman Rd with an occupant load of 30 persons. The applicant is applying for a Lounge Endorsement for an existing Manufacturer Licence from the Liquor and Cannabis Regulation Branch (LCRB). Prior to reviewing the Lounge Endorsement application, the LCRB requires Council to consider this application and provide a resolution. Staff have no concerns with this proposal.

BACKGROUND

Applicant:	Loud Mouth Brewing Co.
Legal Description:	Strata Lot 7 Section 24 Township 13 Plan NWD Strata Plan BCS835
OCP Designation:	General Industrial
Existing Zoning:	General Industrial Zone (I2)
Site Area:	0.17 ha (0.43 acres)
Site Description:	The subject property is a strata unit located in a well-established industrial development which abuts ALR land on the edge of the Urban Development Boundary in the Mt. Lehman and Peardonville neighborhood containing three industrial building and associated parking.
Surrounding Uses:	N: Industrial (zoned I2); S: Simpson Rd. and Agricultural (zoned A1 within ALR) beyond; E: Industrial (zoned I2) with Park space (zoned P2) beyond; and W: Mt. Lehman Rd. and Agricultural (zoned A1 within ALR) beyond

DISCUSSION

In British Columbia, a Microbrewery operator must obtain a Manufacturer Licence from the Liquor and Cannabis Regulation Branch (LCRB). Under a Manufacturer Licence, Loud Mouth Brewing Co., the operator, may have an area for the retail sale and public sampling of their product. Such samples cannot exceed 375 ml per person per day, and food is limited to snack-like offerings, such as cheese and crackers. An Operator may also apply for a variety of Endorsements, including the addition of a Lounge, Special Event Area and/or Picnic Area, in order to further supplement their Manufacturer Licence. A Lounge Endorsement allows for an indoor or outdoor area where the sale and service of liquor for onsite consumption may exceed 375 ml, and requires a more robust offering of food to be available to patrons. Lounge Endorsement applications are subject to Local Government input and public consultation. As such, the LCRB has referred Loud Mouth Brewing's application for a 71.7 m^2 (772 ft^2) Lounge, to the City for comment. As per the 2016 Development Applications Procedure Bylaw, Endorsements for an existing Licence require a Council Resolution for the application to proceed.

Official Community Plan

1. The Official Community Plan (OCP) designates the subject property as General Industrial, which is intended for industrial land uses with varying densities and allowing for accessory commercial uses as well as one accessory dwelling unit. The proposed Microbrewery with a lounge is consistent with this Land Use designation.

Zoning

2. Under the Abbotsford Zoning Bylaw, 2014, the subject property is zoned General Industrial

(I2). Permitted uses include Microbreweries and Restaurants with restrictions.

A Microbrewery is limited to the production of 15,000 barrels per year and the accessory sampling, retail display and sales, are permitted so long as they do not exceed 33% of the gross floor area (GFA). Given that the GFA of the applicants facility is 247.3 m^2 (2,662 ft^2), the permissible area of the lounge is a maximum of 81.6 m^2 (878 ft^2).

A Restaurant is limited to an area of 175 m^2 (1,884 ft^2) per property. The proponent intends to sell and serve brewed products as well as offer a full food menu and non-alcoholic beverages, which falls under a Restaurant use.

3. The proposed area for the lounge is 71.7 m^2 (772 ft^2), and is therefore consistent with the Zoning Bylaw.

Loud Mouth Total Area	Permitted Retail/Sampling Area	Permitted Restaurant Area	Proposed Lounge Area
247.3 m^2 (2,662 ft^2)	81.6 m^2 (878 ft^2)	175 m^2 (1,884 ft^2)	71.7 m^2 (772 ft^2)

4. Parking requirements for the subject property is currently 63 spaces. The change in use resulting from this Lounge Endorsement will require an additional 5 spaces. This increase is accommodated by the current inventory, with 81 parking spaces provided.

Business Licencing

5. The Business Licence Bylaw, 2006, limits liquor service from 9:00am – 1:00am, seven days a week. The proposed hours for the Microbrewery Lounge are consistent with this regulation, and are as follows:

Sunday:	11:00 – 20:30
Monday:	11:00 – 21:00
Tuesday:	Closed
Wednesday:	14:00 – 21:00
Thursday:	11:00 – 21:00
Friday:	11:00 – 23:00
Saturday:	11:00 – 23:00

Lounge Endorsement for an Existing Manufacturer Licence

6. The Liquor and Cannabis Regulation Branch (LCRB) require that the City comment on the following issues:

i. ***The location of the establishment.*** The subject property is mainly surrounded by Industrial property to the North and East, and Agricultural property to the South and West. Beyond this immediate area, High Street shopping centre is located North of Highway 1, as is the Auto Mall and residential properties. There are no formal Parks in the immediate area, as lands owned by the City to the east are environmentally sensitive open space. The nearest school is approximately 1,800 metres to the East.

ii. ***The person capacity and hours of liquor service of the establishment:*** The occupant capacity is 30 persons as per the BC Building Code. The proposed hours of operation for

Loud Mouth Brewing is consistent with the permitted hours of operation set out in the Business Licence Bylaw, which limits Liquor service from 9:00am to 1:00am seven (7) days a week.

iii. ***The impact of noise on nearby residents:*** Noise from the establishment impacting residents within the area is expected to be limited. The nearest urban residential neighborhood is approximately 1,000 metres to the north. Further, according to the applicant, entertainment provided is currently limited to a standard stereo and a free arcade machine with no outdoor entertainment or gathering area. As such, noise levels will continue to be minimal.

iv. ***The impact on the community if the application is approved.*** The operation of a microbrewery lounge at this site will allow for additional offerings in order to benefit locals, as well as attract tourism, contributing to the community and other local breweries and wineries. No significant increase in traffic is anticipated.

Communication Plan

If supported by Council, this Lounge Endorsement application will proceed to a Council Hearing. The City will notify, in writing, the owners and occupiers of land within a 100 meter radius of the property and a 500 meter radius for those properties within the ALR.

FINANCIAL PLAN IMPLICATION

No financial plan implications are anticipated.

Rajat Sharma

Rajat Sharma
General Manager, Finance and Corporate Services
Signed 4/16/2019 11:52 AM

IMPACTS ON COUNCIL POLICIES, STRATEGIC PLAN AND/OR COUNCIL DIRECTION

The proposal meets the goals and objectives identified in the 2016 Official Community Plan and Council's 2019-2022 Strategic Plan which identifies four cornerstones: vibrant economy, complete community, fiscal discipline and organizational alignment. The proposal is consistent with the four cornerstones of Council's Strategic Plan

SUBSTANTIATION OF RECOMMENDATION

Staff recommends support for the proposed Lounge Endorsement application for an existing Manufacturer Licence, as the proposed change is consistent with the Zoning Bylaw and Business Licence Regulation.

Stephanie Allen

Stephanie Allen
Planning Technician
Signed 4/12/2019 5:01 PM

Darren Braun

Darren Braun
Director, Development Planning
Signed 4/16/2019 6:30 AM

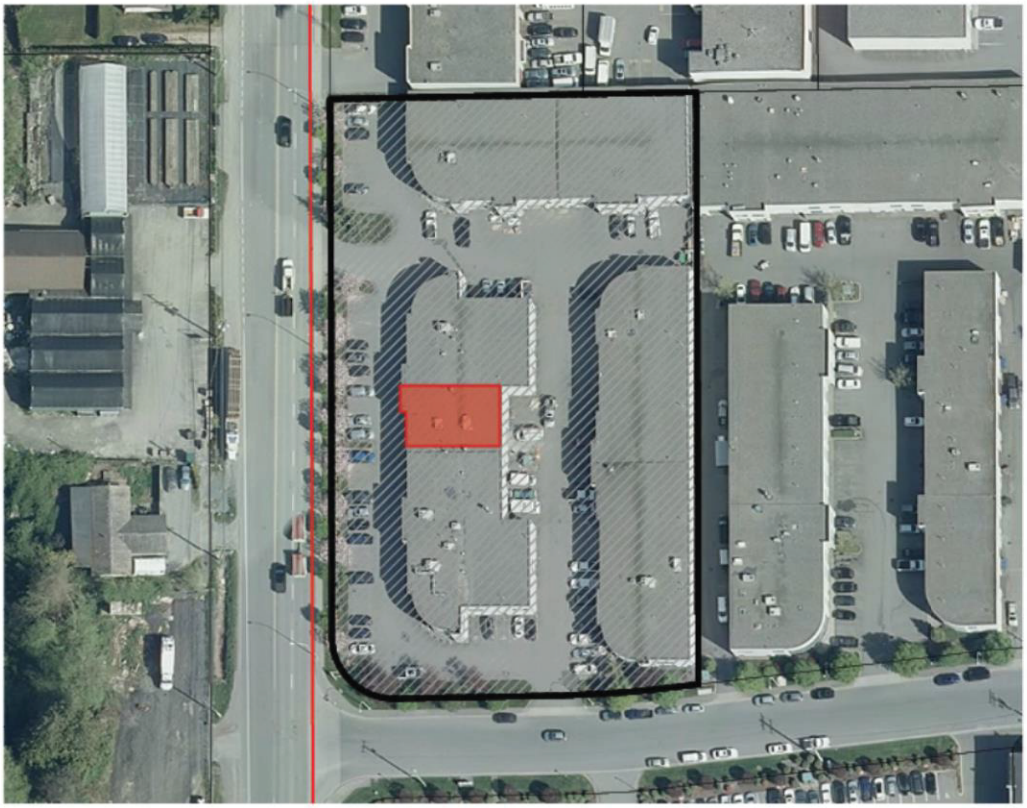
Siri Bertelsen

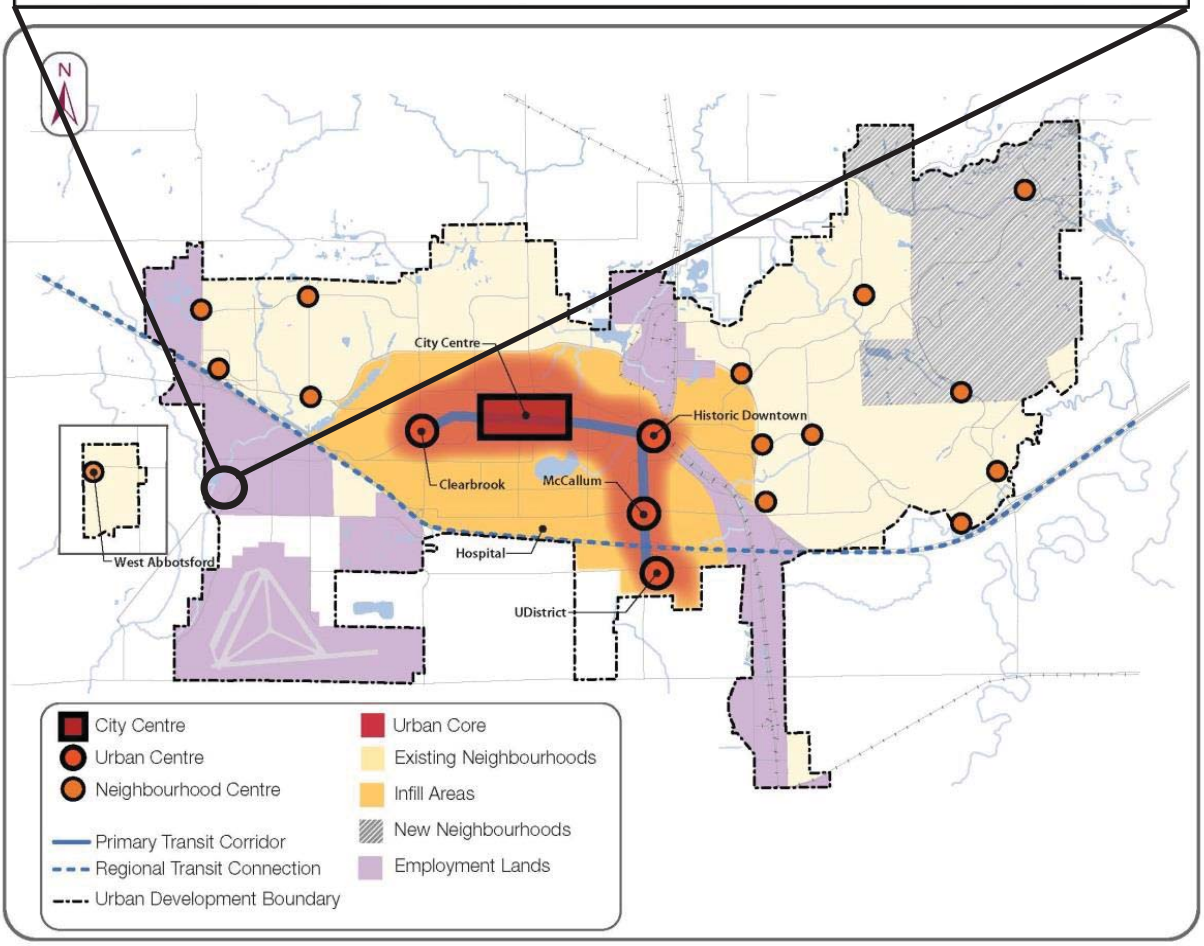
Siri Bertelsen
General Manager, Planning and Development Services
Signed 4/17/19 1:18 PM

ATTACHMENTS

Figures 0-7

City Context Plan
File: PRJ19-031 Location: 140 – 2582 Mt Lehman Rd.





ABBOTSFORD
Planning and Development Services

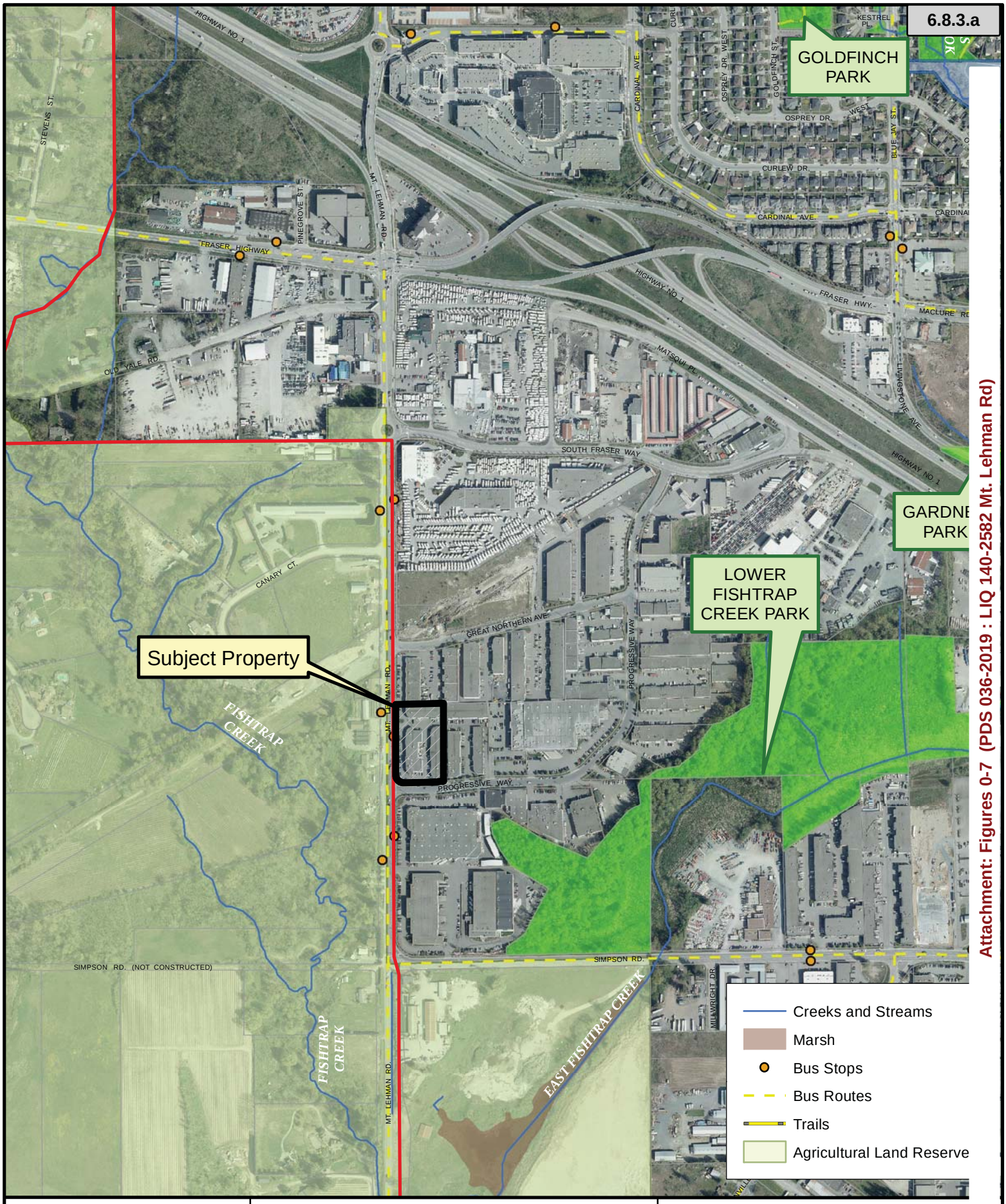
140 - 2582 Mt. Lehman Rd.

Figure 1 - Location Plan
File No.: PRJ19-031

40 0 40
Meters

N

Date



ABBOTSFORD
Planning and Development Services

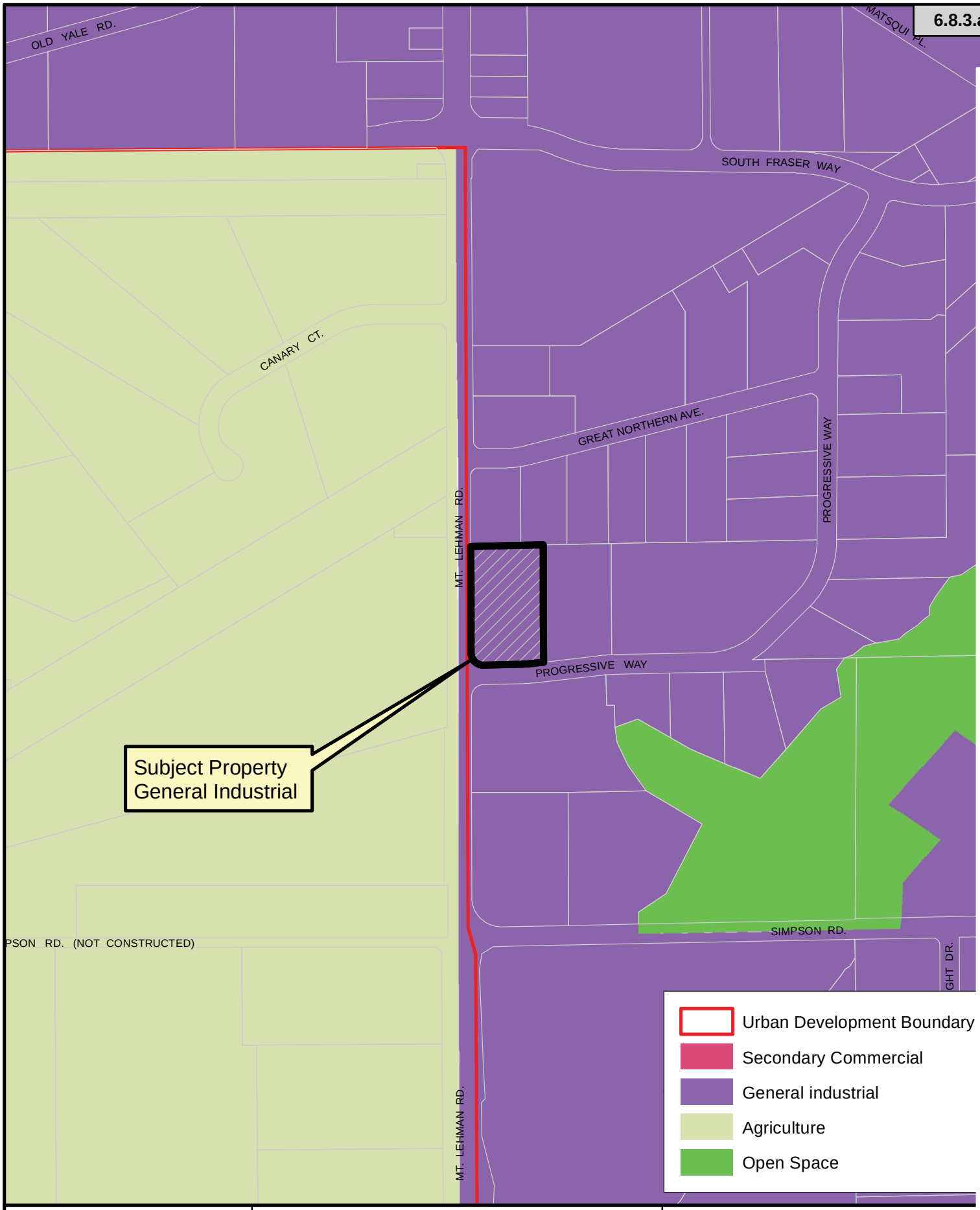
140 - 2582 Mt Lehman Rd.

Figure 2 - Context Plan
File No.: PRJ19-031

50 0 150
Meters

N

Date



ABBOTSFORD
Planning and Development Services

140 - 2582 Mt Lehman Rd.

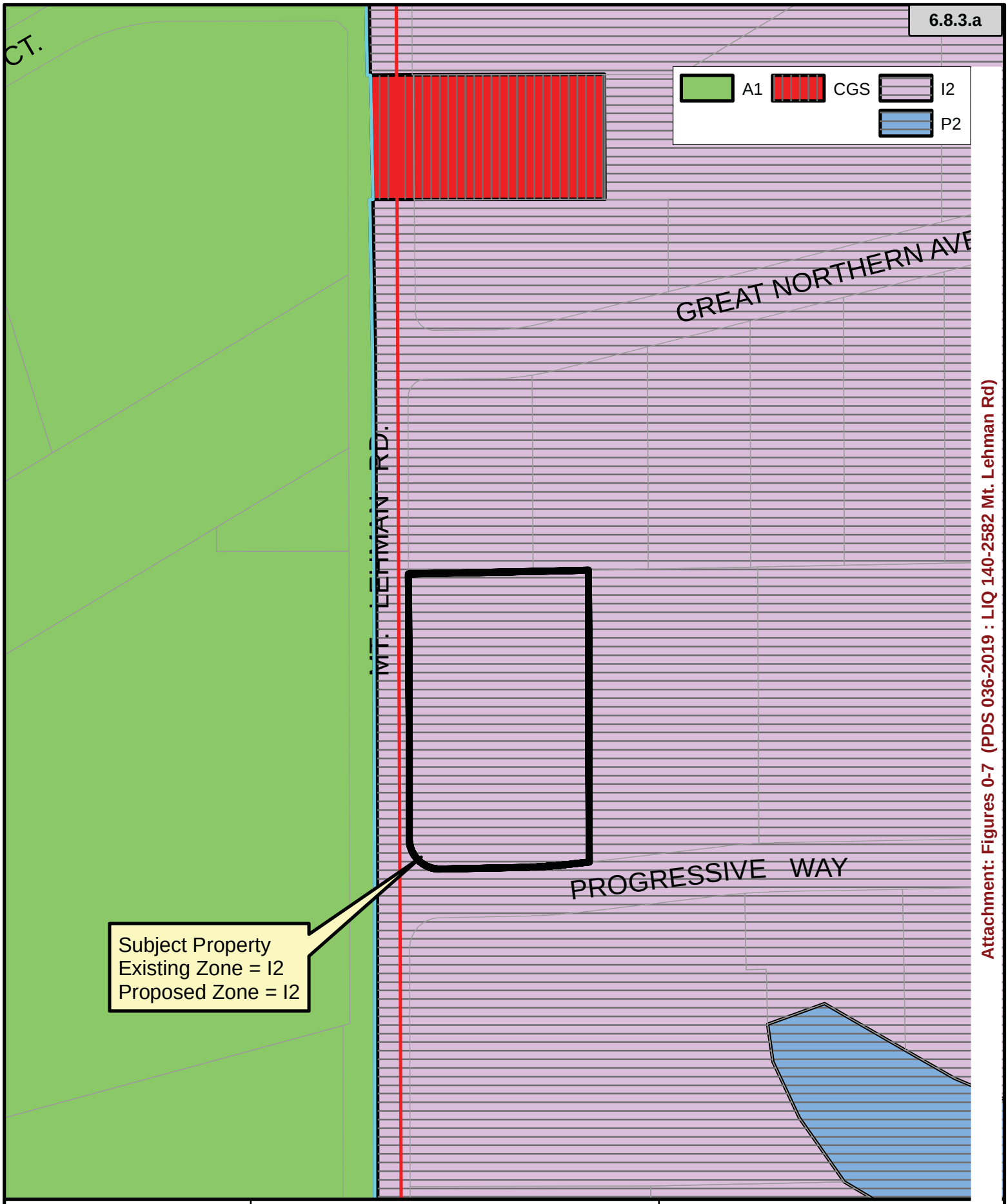
Figure 3 - Official Community Plan
File No.: PRJ19-031

50 0 150 Meters

N

Date

Attachment: Figures 0-7 (PDS 036-2019 : LIQ 140-2582 Mt. Lehman Rd)



ABBOTSFORD
Planning and Development Services

140 - 2582 Mt Lehman Rd.

Figure 4 - Existing & Proposed Zonir
File No.: PRJ19-031

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Meters

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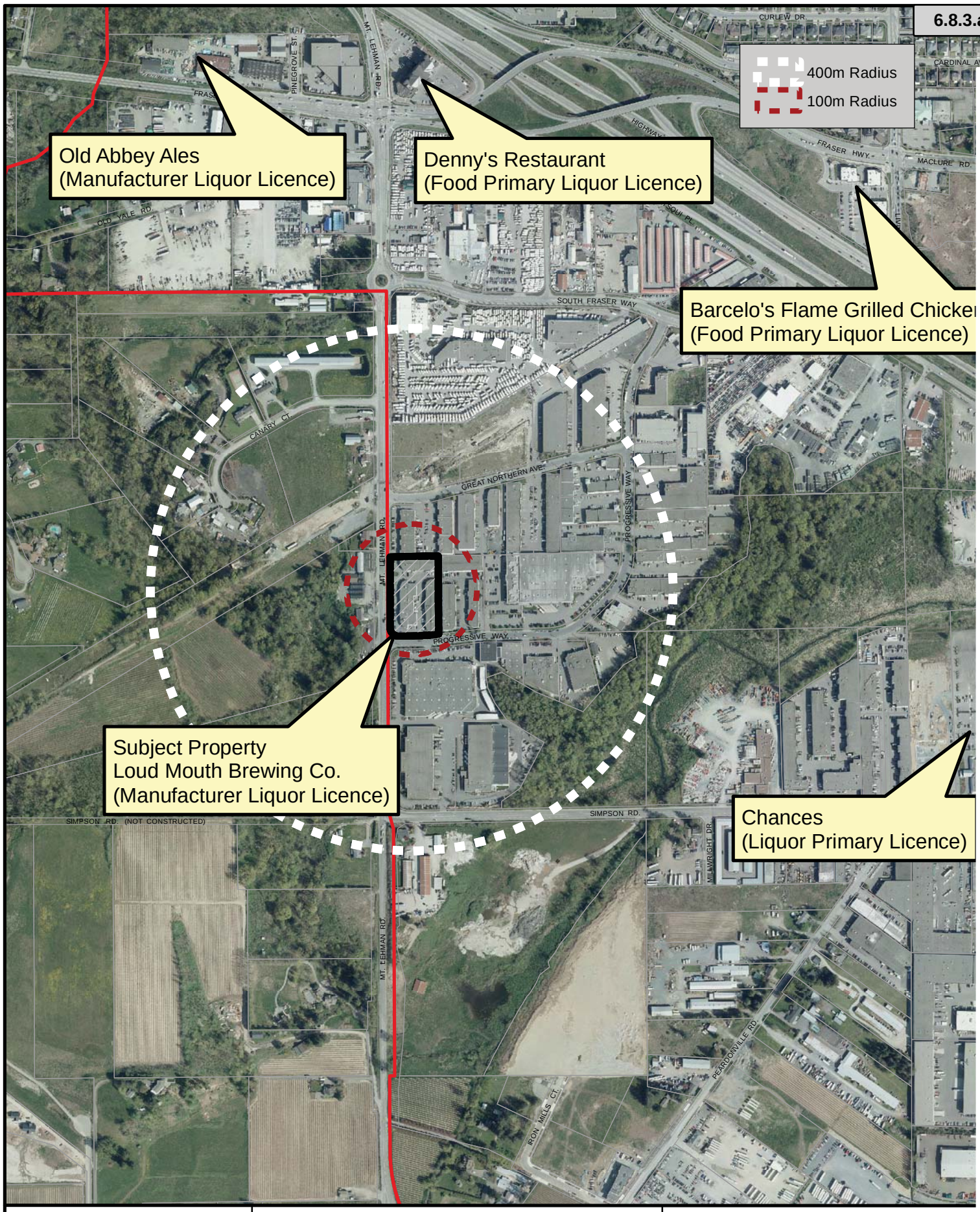
Date



ABBOTSFORD

140 - 2582 Mt Lehman Rd.

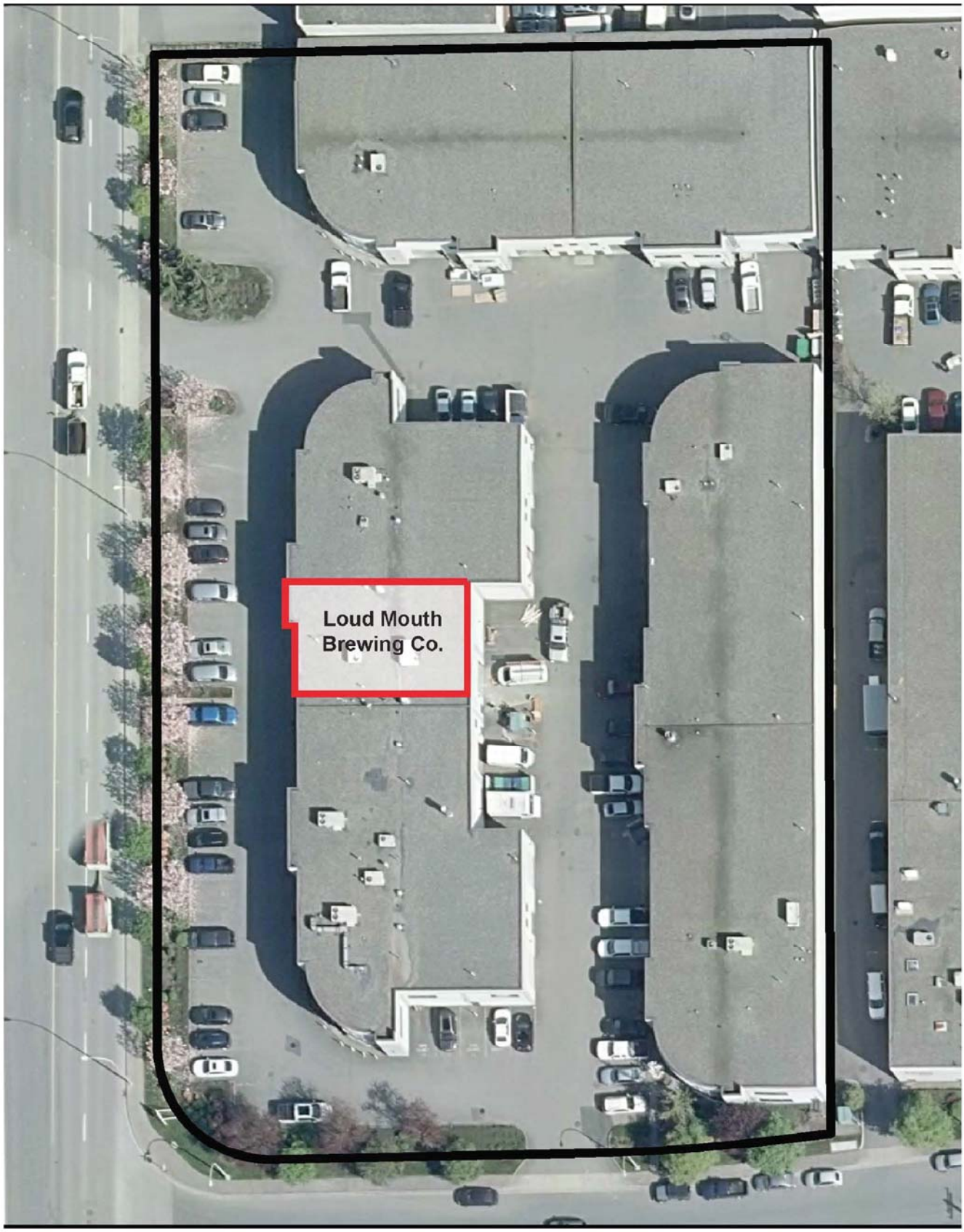
Figure 5 - Existing Liquor Licences
File No.: PRJ19-031

50 0 150
Meters

N

Date

Attachment: Figures 0-7 (PDS 036-2019 : LIQ 140-2582 Mt. Lehman Rd)



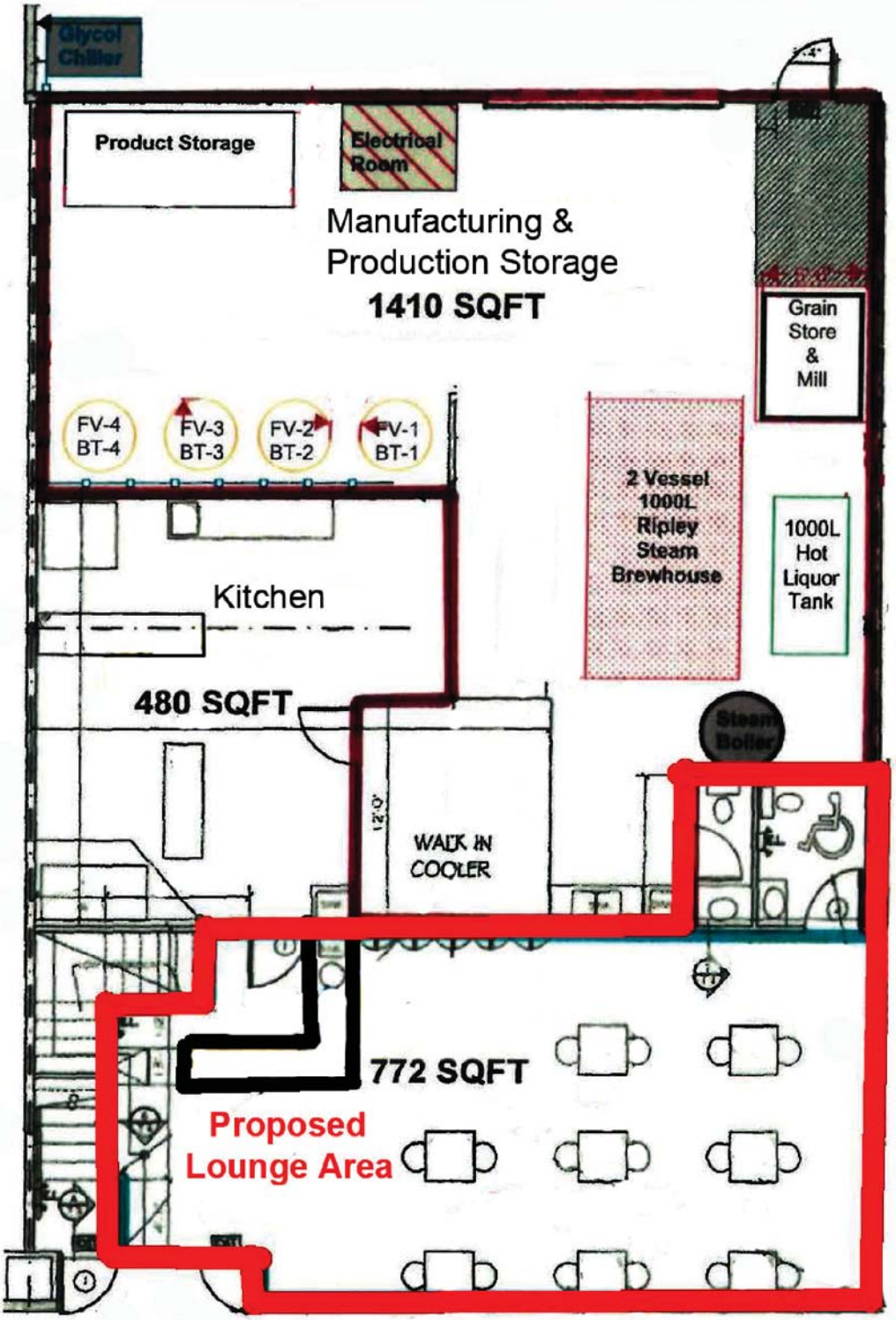
ABBOTSFORD
Planning and Development Services

140 - 2582 Mt Lehman Rd.

Figure 6 - Site Plan
File No.: PRJ19-031

N

Date



*FLOOR PLAN PROVIDED BY APPLICANT

ABBOTSFORD
Planning and Development Services

140 - 2582 Mt Lehman Rd.

Figure 7 - Floor Plan
File No.: PRJ19-031

N

Date

Attachment: Figures 0-7 (PDS 036-2019 : LIQ 140-2582 Mt. Lehman Rd)

ABBOTSFORD

COUNCIL REPORT

Executive Committee

Report No. PDS 040-2019

Date: April 25, 2019
File No: 3100-05 PRJ19-007

To: Mayor and Council
From: Christine Batchelar, Planner
Subject: Rezoning application for the property, located at 2518 West Railway Street, proposing a site specific text amendment to the Historic Downtown Commercial Zone (C7) to permit accessory assembly and accessory manufacturing uses to allow for events, concerts and the use of a kitchen for manufacturing purposes. (Owner: 676517 BC Ltd., Director: A. Shamei)

RECOMMENDATION

1. THAT Bylaw No. 2941-2019, "Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 249", be given first and second readings at the next Regular Meeting of Council and be advanced to an upcoming Public Hearing;

2. THAT, prior to adoption of Bylaw No. 2941-2019, "Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 249", the following conditions be satisfied:

   a) entering into a development agreement to secure the required road dedication and utility upgrades and extensions, in accordance with Development Bylaw, 2011, as detailed in the Works and Services Report;
   b) securing for the construction of a pedestrian crosswalk between Laurel Street and the subject property to the acceptance of the General Manager, Engineering and Regional Utilities; and
   c) resolving all issues of funding for items not budgeted by the City; and

3. THAT the Mayor and Corporate Officer be authorized to execute all documents relating to this matter.

REPORT CONCURRENCE	
General Manager The General Manager concurs with the recommendation of this report.	**City Manager** The City Manager concurs with the recommendation of this report.

PURPOSE

The applicant proposes a site specific text amendment to the Historic Downtown Commercial Zone (C7) to permit accessory assembly and accessory manufacturing uses.

SUMMARY OF THE ISSUE

The applicant, the Rail District Collective, is proposing a site specific text amendment to the Historic Downtown Commercial Zone (C7) to permit accessory assembly and accessory manufacturing uses to allow for events, concerts and the use of a kitchen for manufacturing purposes.

BACKGROUND

Applicant:	Rail District Collective (Joshua Vanderheide)
Owners:	676517 BC Ltd., (A. Shamei)
Legal Descriptions:	Lot 90 Section 22 Township 16 New Westminster District Plan 64113
OCP Designation:	Urban Centre – Mixed Use
Existing Zoning:	Historic Downtown Commercial Zone (C7)
Site Area:	2,050.2m^2 (22,089.7ft^2)
Site Description:	The subject property contains a commercial building with associated parking on either side of the building.
Surrounding Uses:	N: Vacant parking lot (zoned Historic Downtown Commercial Zone - C7) with Essendene Avenue beyond: S: Commercial (zoned Commercial Gas Station Zone - CGS); E: Canadian Pacific and Southern Railway with Gladys Avenue beyond; and W: West Railway Street and commercial (zoned C7) beyond.

DISCUSSION

Context

1. The subject property is located within Historic Downtown and is on the east side of West Railway Street. The surrounding area of Historic Downtown offers numerous services and amenities including the Christmas Tree Park and Jubilee Park. A city owned parking lot is located across the street from the subject property (see Figure 2).

Historic Downtown Neighbourhood Plan

2. The Historic Downtown Neighbourhood Plan (HDNP) is one of many projects launched under the Plan 200K initiative to implement the City's OCP. The HDNP was adopted by Council on April 15, 2019.

3. Under the HDNP the subject property is designated as Urban Centre – Mixed Use (see Figure 3) and is located along a Commercial Street. The Urban Centre – Mixed Use land

use designation is intended to enable a mix of uses to support the Historic Centre with higher residential density and commercial uses. Development within the Urban Centre - Mixed Use land designation is to support main street retail character on certain streets outside of the Historic Centre.

The Commercial Street designation requires commercial retail and services that support ground floor activity along the building edges facing Commercial Streets. Uses other than retail and services may only occur on very limited building frontages.

Official Community Plan

4. The proposed development is in keeping with the broad objectives the OCP by incorporating a mix of uses to function as a distinct neighbourhood. This includes focusing the greatest mix of uses in the Urban and Neighbourhood Centres within individual neighbourhoods.

Zoning

5. The subject property is zoned Historic Downtown Commercial Zone (C7) (see Figure 4), which pre-dates both the 2016 OCP and 2019 HDNP. The applicant is proposing a site specific text amendment to the C7 Zone to permit accessory assembly and accessory manufacturing uses. The applicant would like to use the existing building to host events, including concerts, cultural gatherings, meetings and fundraisers with gatherings of over 60 people. The applicant would further like to construct a kitchen which would allow for individuals to make food products on site that would not necessarily be sold on site. Currently the applicant has interest from individuals looking to make ice cream and roasting coffee.

   Staff recommends the accessory manufacturing use be limited to 33% of the total floor area. This is in keeping with the manufacturing component of the permitted use of Brew-Pub. The building is comprised of three uses: office, manufacturing/kitchen and open assembly (see Figure 5).

6. The applicant currently operates a Thursday farmers market which is a permitted use under the existing C7 Zone. Furthermore the applicant has previously obtained Special Event permits to host events which included concerts and festivals. If the proposed site specific text amendment is adopted, a Special Event Permit will still be required if the use has an outside component with either over 200 participants or if alcohol is served in accordance with the Consolidated Outdoor Special Event, Filming and Activities Bylaw, 2016.

7. The C7 Zone does not currently align with the HDNP in terms of density and height. Following the adoption of the HDNP staff anticipate reviewing the C7 Zone as part of a future initiative to bring forward updates for Council's consideration to bring alignment with 2016 OCP and 2019 HDNP. At that time staff will have a more in-depth look at the permitted uses including accessory assembly and accessory manufacturing uses. In the meantime, staff recommends support for a site specific text amendment for the subject property to permit those uses as described above within the existing building located on the subject property.

Form and Character Development Permit

8. The subject property is subject to the Historic Influence Development Permit guidelines contained within the HDNP Development Permit guidelines. The objectives of these guidelines are to encourage the construction of attractive, livable and animated shopping streets. New Commercial and Mixed Use development in these areas should seek to enhance the public realm and provide ample opportunities for residents and visitors alike to gather and socialize.

   As the applicant is not proposing any changes to the exterior of the building and/or parking lot, a Development Permit is not required in accordance with the exemption criteria outlined within the OCP and HDNP.

Access and Parking

9. The property has two surface parking lots both accessed from West Railway Street. The north parking lot has 12 parking spaces and the south parking lot has 15 parking spaces for a total of 27 parking spaces.

10. In accordance with the Abbotsford Zoning Bylaw the existing building with existing uses of office and retail would have required 17 parking spaces. The new proposed uses would require 38 parking spaces. As the property is located in Historic Downtown the property qualifies for a 20% parking reduction. This reduction has been credited in the required calculations above.

    Furthermore under the 2014 Zoning Bylaw, Section 150.5, new uses or a change of use does not require additional parking if the uses are accommodated in an existing building. Therefore, no additional parking is required to accommodate the proposed uses in accordance with the Zoning Bylaw.

11. The City owns an existing public parking lot across the street from the subject property which visitors to the property may use. Staff are further recommending as a condition of the text amendment that the applicant install a pedestrian crosswalk across West Railway to enhance the walkability and public safety within the neighbourhood.

12. Through the HDNP, staff have identified the need to undertake a Parking Study to understand the overall parking supply, occupancy, duration and turnover. Staff anticipate commencing the study in 2019 with an aim to implement a long term parking strategy which would update existing programs and policies; including the parking provisions of the Zoning Bylaw.

Site Development Considerations

13. A staff review of the works and services requirements necessary to support this application has been completed and is outlined within the enclosed Works and Services report dated February 26, 2019 (see Attachment C), the details of which will be incorporated into the Development Agreement, as a prerequisite for adoption of the rezoning bylaw. Some notable requirements of the attached Works and Services report are:
    - Cash-in-lieu for half road construction for an Urban Arterial standard; and

- Installation of a pedestrian crosswalk located between the subject property and Laurel Street.

14. In addition to the above comments, the developer is responsible to adhere to all other legislation, which may apply to the land, including:

    (a) complying with all applicable City bylaws, such as Official Community Plan, 2016, Development Bylaw, 2011, Tree Protection Bylaw, 2010, Building Bylaw, 2003, Sign Bylaw, 2001, Erosion and Sediment Control Bylaw, 2010, and Development Cost Charges Imposition Bylaw administered by the City; and

    (b) obtaining all other necessary approvals and permits on such terms as they may be issued, including but not limited to a development permit, tree removal permit, subdivision approval, building permit, soil removal/deposit permit, Ministry of Health permit, Ministry of Transportation and Infrastructure approval and Ministry of Environment approval.

Communication Plan

If the zoning amendment bylaw is supported by Council, Bylaw No. 2941-2019, cited as "Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 249" will proceed to a Regular Meeting of Council, where it will be considered for first and second readings. If the development is supported by Council the Bylaws will then proceed to an upcoming Public Hearing. The City will notify, in writing, the owners and occupiers of land within a 100 meter radius of the property and copies of all correspondence received will be provided to Council. Two advertisements for the Public Hearing will be published in the City Page of the local newspaper.

The City received confirmation on April 2nd, 2019, that the applicant installed the required Development Notification Sign in accordance with the Development Application Procedures Bylaw, which requires the sign to be installed a minimum of 3 weeks in advance of Council's consideration of the application.

FINANCIAL PLAN IMPLICATION

No financial plan implications are anticipated. Any capital works implications arising from this application have been addressed through the rezoning process.

Rajat Sharma

Rajat Sharma
General Manager, Finance and Corporate Services
Signed 4/11/2019 6:01 PM

IMPACTS ON COUNCIL POLICIES, STRATEGIC PLAN AND/OR COUNCIL DIRECTION

The proposal meets the goals and objectives identified in the 2016 Official Community Plan and Council's 2019-2022 Strategic Plan which identifies four cornerstones: vibrant economy, complete community, fiscal discipline and organizational alignment. The proposal is consistent with the four cornerstones of Council's Strategic Plan.

SUBSTANTIATION OF RECOMMENDATION

The proposed site specific text amendment to add accessory assembly and accessory manufacturing is consistent with the existing land use designation outlined within the OCP and HDNP, and the proposed uses are well suited to the Urban Centre – Mixed Use designation. Therefore, staff recommends support for the proposed application.

Christine Batchelar

Christine Batchelar
Planner
Signed 4/11/2019 11:48 AM

Darren Braun

Darren Braun
Director, Development Planning
Signed 4/11/2019 5:50 PM

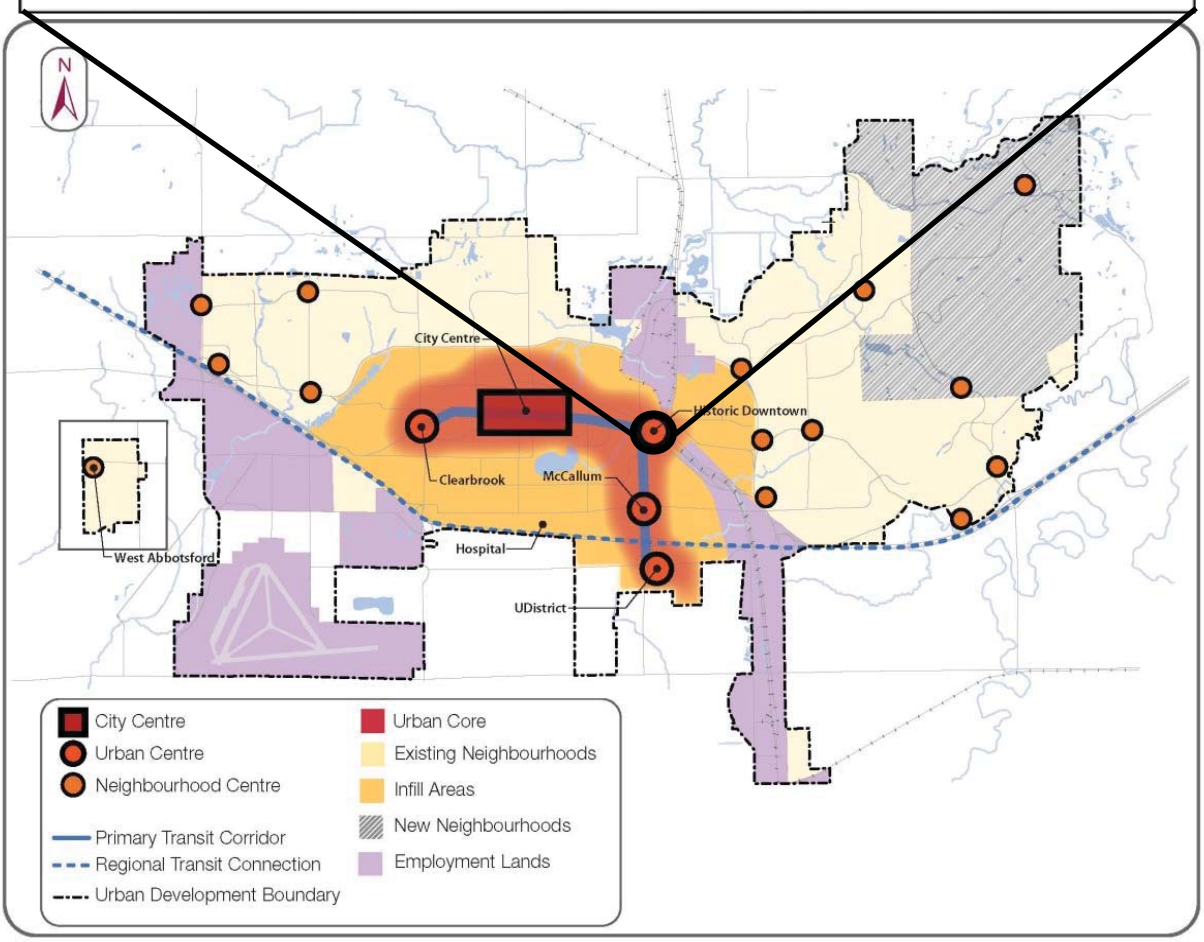
Siri Bertelsen

Siri Bertelsen
General Manager, Planning and Development Services
Signed 4/16/2019 4:18 PM

ATTACHMENTS:

Figures 0 to 6
Attachment A: Letter of Intent
Attachment B: Bylaw No. 2941-2019
Attachment C: Works and Services Report

City Context Plan
File: PRJ19-007 Location: 2518 West Railway Street



ABBOTSFORD
Planning and Development Services

2518 West Railway Street

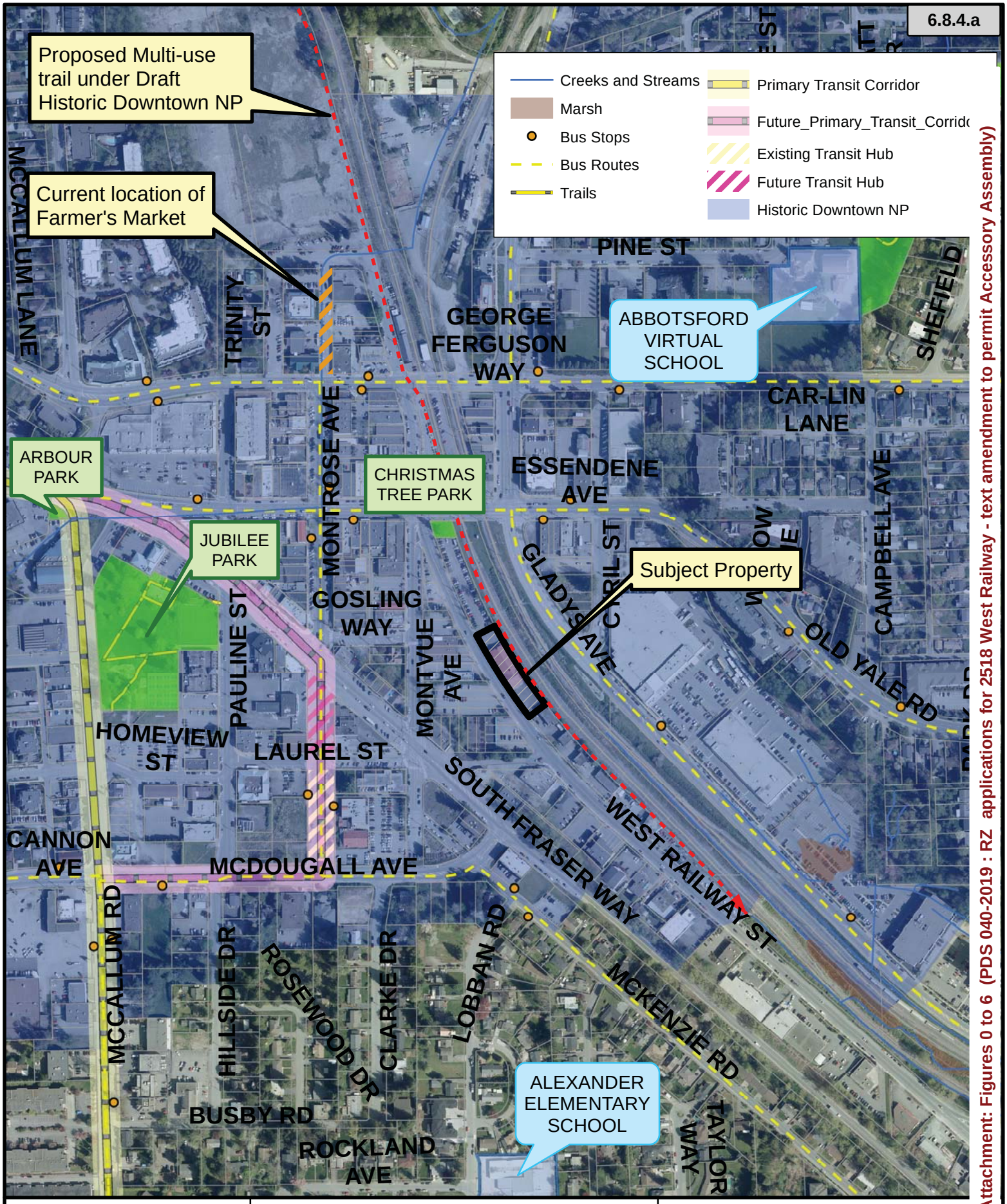
Figure 1 - Location Plan
File No.: PRJ19-007

40 0 40
Meters

N

Date

Attachment: Figures 0 to 6 (PDS 040-2019 : RZ applications for 2518 West Railway - text amendment to permit Accessory Assembly)



ABBOTSFORD
Planning and Development Services

2518 West Railway Street

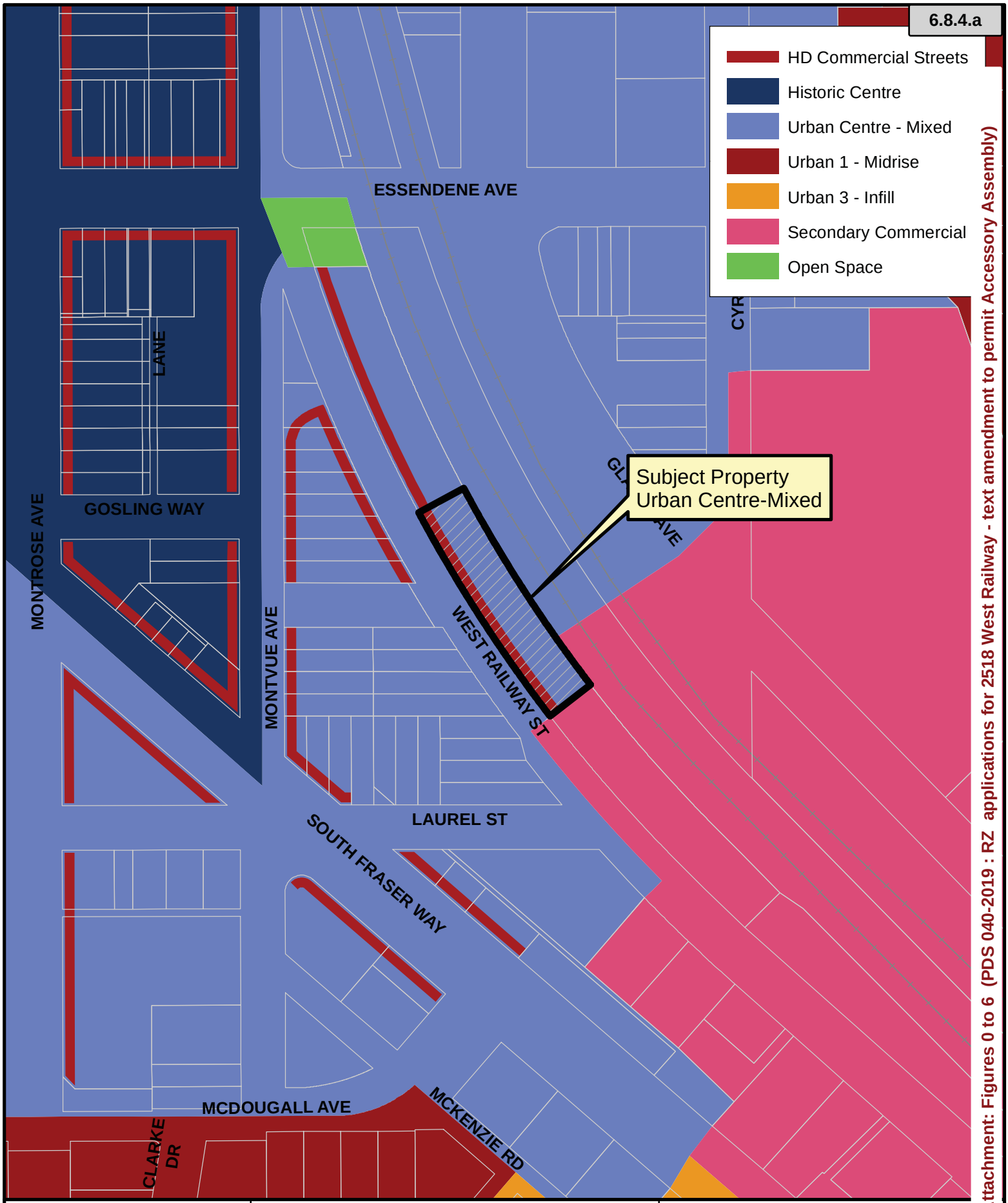
Figure 2 - Context Plan
File No.: PRJ19-007

50 0 150
Meters

N

Date

Attachment: Figures 0 to 6 (PDS 040-2019 : RZ applications for 2518 West Railway - text amendment to permit Accessory Assembly)



Attachment: Figures 0 to 6 (PDS 040-2019 : RZ applications for 2518 West Railway - text amendment to permit Accessory Assembly)

ABBOTSFORD
Planning and Development Services

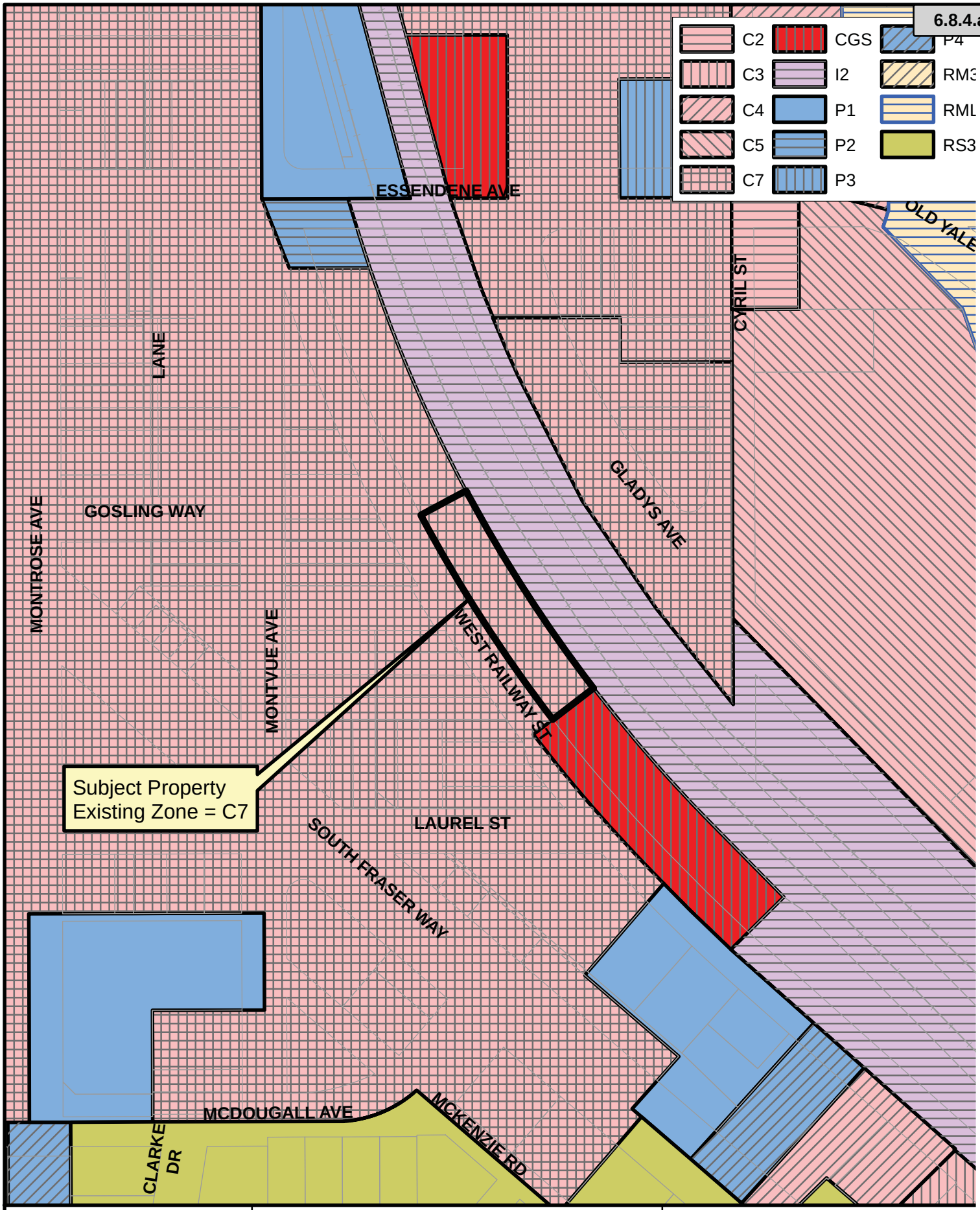
2518 West Railway Street

Figure 3 - Official Community Plan
File No.: PRJ19-007

40 0 40
Meters

N

Date



ABBOTSFORD
Planning and Development Services

2518 West Railway Street

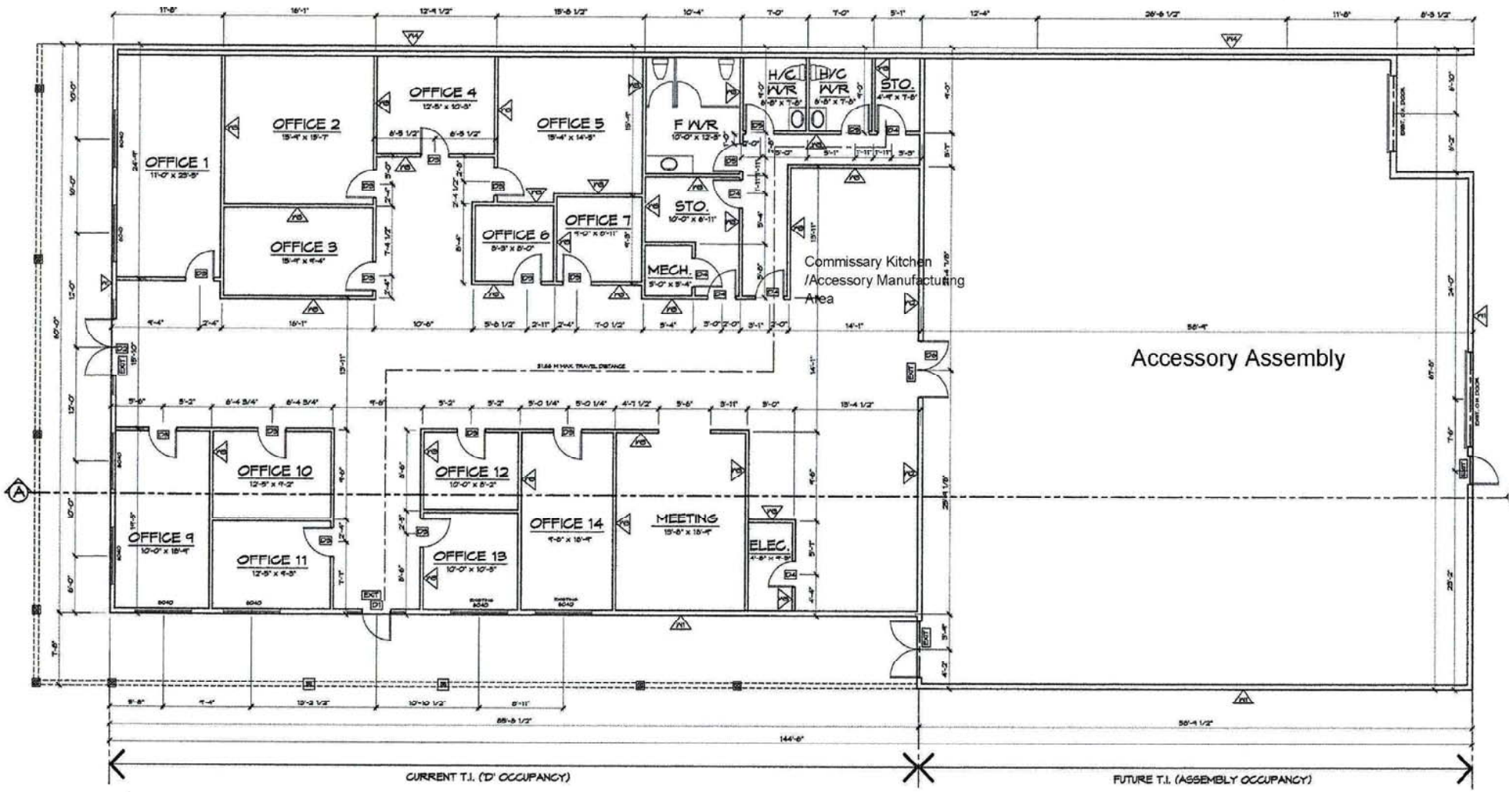
Figure 4 - Existing & Proposed Zoni
File No.: PRJ19-007

40 0 40
Meters

N

Date

Attachment: Figures 0 to 6 (PDS 040-2019 : RZ applications for 2518 West Railway - text amendment to permit Accessory Assembly)



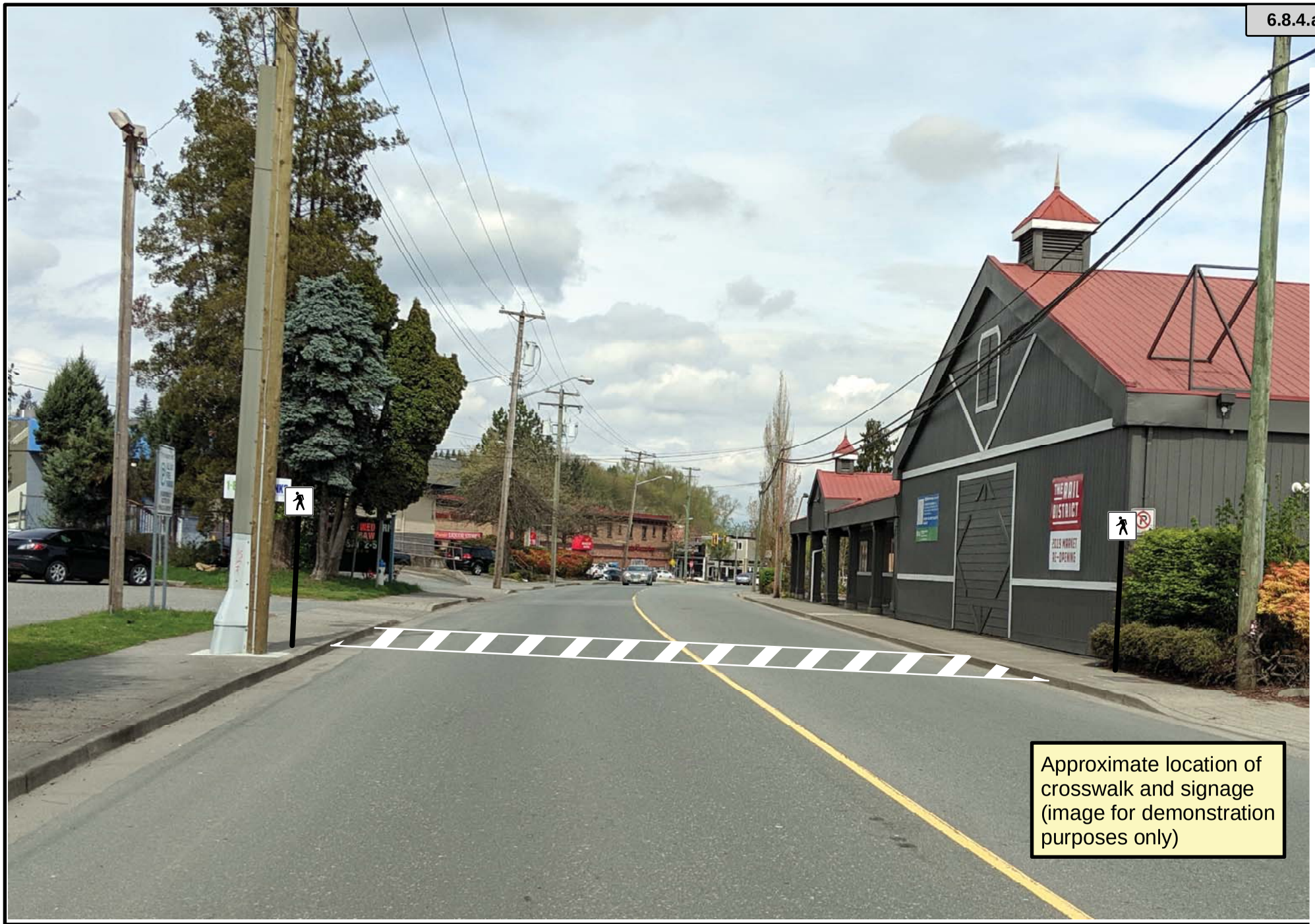
ABBOTSFORD
Planning and Development Services

2518 West Railway Street

Figure 5 - Floor Plan
File No.: PRJ19-007

N	Date

Attachment: Figures 0 to 6 (PDS 040-2019 : RZ applications for 2518 West Railway - text amendment to



ABBOTSFORD
Planning and Development Services

2518 West Railway Street

Figure 6 - Proposed Crosswalk
File No.: PRJ19-007

N	Date

December 18, 2018

PLANNING DEPARTMENT – CITY OF ABBOTSFORD

Letter of Intent:

The intended use of 2518 Railway Street is to build a cultural hub in the Abbotsford community through co-working space, kitchen commissary, and events venue. Having a harmonious working environment bringing different facets of our community members together, allows for higher productivity and creativity. Abbotsford is lacking this type of space which offers all of the OCP under one roof.

The building is centrally located in downtown, which has shown success in other business's including; Field House, Oldhand, Duft and Co. etc. The limitation of the current C7 zoning does not allow for assembly use. Gatherings of over 60 people are an integral component to driving the financial viability of this ambitious project. Allowing for assembly use will open the doors to larger events drawing attention from other partners and investors. Rail District Collective Inc. will be leading the charge on the design, community integration, and finances to drive this project forward. In addition to the Assembly use of the property our project would benefit from a manufacturing allowance under 33% of the total building square footage. Production of product would occur onsite, but no necessarily sold on site.

Our partners have years of experience in curation, implementation, and execution. As the OCP for Abbotsford states; "There are many options for entertainment, culture, recreation, and gathering with others. These include public places like libraries and community centres, and other places like cafes and night spots." Rail District Collective encompasses all of these features, a place where people can conjugate to cultivate Abbotsford's rich Culture, Arts, and Heritage. In conclusion, our project intends to be a corner stone in Abbotsford's move to rejuvenate an expanding community in the heart of the Fraser Valley.

SINCERELY,

CITY OF ABBOTSFORD

ABBOTSFORD ZONING BYLAW, 2014, AMENDMENT BYLAW NO. 249

Bylaw No. 2941-2019 PRJ19-007

The Council of the City of Abbotsford, in open meeting assembled, ENACTS AS FOLLOWS:

1. CITATION

Bylaw No. 2941-2019 may be cited as "Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 249".

2. AMENDS SECTION 570 - SITE SPECIFIC PERMITTED USES

Abbotsford Zoning Bylaw, 2014, as amended, is further amended by

(a) adding a new Section 570.2.2, as follows:

".2 Accessory Assembly shall be a permitted Use on the following Lots:

PID: 003-435-164
Lot 90 Section 22 Township 16 New Westminster District Plan 64113"; and

(b) adding a new Section 570.2.3, as follows:

".3 Accessory Manufacturing, limited to 33% of the Gross Floor Area of each building, shall be a permitted Use of the following Lots:

PID: 003-435-164
Lot 90 Section 22 Township 16 New Westminster District Plan 64113".

READ A FIRST TIME this	day of	, 2019
READ A SECOND TIME this	day of	, 2019
PUBLIC HEARING HELD this	day of	, 2019
READ A THIRD TIME this	day of	, 2019
ADOPTED this	day of	, 2019

I hereby certify this to be a true copy of the original bylaw

Henry Braun
Mayor

Katie Karn
Deputy City Clerk

William Flitton
Corporate Officer

Final Draft – April 10, 2019

Attachment: Attachment B: Bylaw No. 2941-2019 (PDS 040-2019 : RZ applications for 2518 West Railway - text amendment to permit Accessory

ABBOTSFORD DEVELOPMENT ENGINEERING DIVISION

REZONING WORKS AND SERVICES REQUIREMENTS

File No:	PRJ19-007
Planner:	Christine Batchelar, Planner
Prepared By:	Stanley de Haan, Development Technologist II
Approved By:	19/02/28 Sarb Toor, Senior Manager, Development Engineering
Date:	February 26, 2019
Applicant:	Rail District Collective
Development Property:	2518 Wes Railway Street Lot 90 Section 22 Township 16 Plan Nwp64113 Nwd Part Sw1/4

The Local Government Act authorizes local governments to require development to meet current works and services standards as set out in the City's Development Bylaw and Policies.

This report includes the Works & Services **Requirements** to meet the applicable bylaws and policies and **Future Considerations** that may apply to the next phase of development.

Please have your consulting engineer call Stanley de Haan, Development Technologist II at 604-851-4175 in regard to this report and any other servicing matters relating to this application.

Attachment: Attachment C: Works and Services Report (PDS 040-2019 : RZ applications for 2518 West Railway - text amendment to permit

REQUIREMENTS

Additional dedications, SRWs, works, features or limits of construction may be needed as identified through the design and construction phases.

Highways – Dedications and Rights-of-Ways – n/a

Urban Roadways - Construction

On West Railway Street, along the full frontage of the Lands from the north property line to the south property line, provide cash-in-lieu to construct half of an Urban Arterial standard road with Urban Highway design features as per Standard Drawing ES-R-7, including;

- barrier curb and gutter on the east side;
- 9.0 m wide asphalt roadway;
- 1.5 m wide concrete sidewalk on the east side;
- ornamental street lighting;
- Traffic signage;
- Traffic lane markings;
- soil(s) to support street trees;
- boulevard improvements on the east side; and
- associated drainage.

A geotechnical report shall be submitted with any roadway design, confirming the structural adequacy of any existing roadway and/or new roadway being constructed by the Developer.

The above noted works are not eligible for Latecomer Charges. *(900-9-01)*

Transit

Install a pedestrian crosswalk (potentially at the intersection of Laurel Street and West Railway Street) including the required sidewalk letdowns and curb bulges. A report from a qualified traffic engineer is required to confirm crosswalk requirements.

Drainage Collection and Disposal

Provide a storm water management plan showing how onsite drainage will be accommodated offsite. All offsite storm water works and services including new installations and upgrades to existing offsite systems required by the storm water management plan shall be designed and constructed in accordance with said storm water management plan.

Prior to any further development on the Lands, provide an updated storm water management plan showing how drainage on the Lands will be accommodated including detention. All storm water works and services including new installations and upgrades to existing offsite systems required by the updated storm water management plan shall be designed and constructed in accordance with said updated storm water management plan.

The above noted works are not eligible for Latecomer Charges. *(900-9-01)*

Attachment: Attachment C: Works and Services Report (PDS 040-2019 : RZ applications for 2518 West Railway - text amendment to permit

Sewage Collection and Disposal
The subject property is currently serviced to the existing city sewer system.

Review of the record drawings indicate that the sanitary service is at a minimum slope designed for a sanitary load of 30 Fixture Units. A qualified engineer shall evaluate the proposed broadened use of the building and determine if the existing service is sufficiently sized or not. If the existing service is not sufficiently sized a new sewer connection will be required.

The above noted works are not eligible for Latecomer Charges. *(900-9-01)*

Water Distribution Domestic and Fire Fighting
Confirm the required onsite fire flow that is triggered by the proposed building layout, materials and construction methods. In those cases where the City's current grid system cannot provide sufficient flows and volumes to conform to the current version of the Fire Underwriters Survey Guide to Recommended Practice (Water Supply for Public Fire Protection, 1999), alternative construction techniques, materials, or secondary on-site fire suppression system (i.e building sprinklers) may be required for the proposed development to conform to these guidelines.

The above noted works are not eligible for Latecomer Charges. *(900-9-01)*

Power/Telecommunications
Pay the Streetscape Contribution Levy, as per the City of Abbotsford Development Bylaw 2011, Bylaw No. 2070-2011 Schedule "D".

Relocation of telecommunications poles and lines due to road improvements is required to be converted to underground.

Required Covenants, Easements and Rights-of-way

- Restricted Access Covenant (PL-106b)
- Alternate access rights-of-way

Rezoning Development Agreement Preparation Fee
Pay $500 Development Agreement preparation fee.

Works & Services Security & Warranty Deposit
Provide as Security Deposit, the estimated construction cost plus 10% for engineering (min $25,000) and 5% for as-constructed drawings (minimum $15,000) in cash or letter of credit.

Administration & Inspection Fee
Pay 5% of the first $300,000 + 3% of the remainder of the estimated construction cost for administration and inspections.

City Services Fees
Tie-in inspection fee ($50 per inspection) for water, sanitary, and storm sewer services.

Water meters supplied, delivered, and installed by the City's Water Operations Department (per Fees and Charges Bylaw, 2006, Amendment Bylaw No. 32)

Regular Service Meter:
- Up to and including 18mm (3/4") meter *$470.00*

Water and sewer main connections and wet taps are supervised and/or performed by City crews at the developer's expense and payable upon invoice.

Street and traffic signs are supplied and installed by the City at the developer's expense and payable upon invoice.

Pay to energize street lights at $50 per street light.

FUTURE CONSIDERATIONS

Upon further development an additional works and services review will apply related to that application. Listed below are some items to consider.

Bylaws

- the applicant is to be familiar with the Development Bylaw to ensure an understanding of possible future Works and services that may impact the development
- the applicant is to review the Works and Services identified in the Development Agreement and how they may impact the building.

Stormwater Management

- detention and infiltration will be required. Ensure that adequate room and proper placement has been reviewed.

Traffic Management

- the increase in vehicle traffic will be reviewed for its impact on the access and nearest intersections. Access may be restricted.
- road dedications, statutory rights-of-way and easements to accommodate the works and lot grading may require adjustments to the placement or size of the building.

Service Connections

- water, sanitary and storm connections may have specific tie in locations. Review and confirm locations prior to design.
- calculations related to the required domestic and fire water demand will be reviewed. There may be a service, meter or flow restrictions.
- Fire Department review may result in geometric changes to onsite roadways, additional fire hydrants, emergency access and building placement.
- Provide underground power and telecommunications services from the distribution system to the proposed building(s).

Attachment: Attachment C: Works and Services Report (PDS 040-2019 : RZ applications for 2518 West Railway - text amendment to permit

Erosion and Sediment Control

All works shall be performed in substantial conformance with the City's Development By-law, the Provincial 'Land Development Guidelines' and the City's Erosion and Sediment Control Bylaw, in the control and prevention of erosion and sediment during all phases of construction. No release of silt, sediment laden waters or deleterious substances is permitted into any existing City storm or drainage system during any phase of development of the Lands.

The ESC Plan requires 4 drawings, each indicating the ESC methods for that stage of construction;

- site preparation
- site servicing
- building construction
- warranty period

Lot Grading

- A Lot Grading Plan is required. Final lot grading shall conform to City's Lot Grading Policy and Guidelines. Any retaining walls that the Developer or Consulting Engineer consider are necessary to effectively grade the Lands to prevent negative impacts on finished neighbouring Lands, either existing or proposed, shall be constructed by the Developer. The standard "Lot Grading Covenant shall be registered against title to all proposed lots.

- Lot grading shall also provide for the collection of surface runoff and other drainage that will discharge to the City Drainage system. Lot grading may be designed to allow for surface sheet flows or collected in swales and directed to lawn basins as necessary to the satisfaction of the General Manager, Engineering. Any collection of surface flows to a concentrated point discharge location shall include provision for easements or rights-of-way across impacted Lands as necessary. All lot grading shall be designed to take care of surface flows emanating from onsite grading.

Building Permit Submissions

- In order to avoid delays in receipt of building permits, the builder shall be responsible for ensuring that building permit applications on the Lands conform to the intent of the accepted Lot Grading plan(s) prior to submission to the City.
- The developer or his designate shall review and approve building permit applications prior to submission to the City. When submitted, the building permit plans shall provide lot grading information that shall, at time of final inspection for building occupancy or approval, comply with the accepted lot grading plan or the intent of the lot grading design accepted by the General Manager, Engineering prior to construction.

Attachment: Attachment C: Works and Services Report (PDS 040-2019 : RZ applications for 2518 West Railway - text amendment to permit

ABBOTSFORD

COUNCIL REPORT

Executive Committee

Report No. PDS 033-2019

Date: April 16, 2019
File No: 3100-05 PRJ19-019

To: Mayor and Council
From: Nick Crosman, Planner
Subject: Land Use Contract No. 13 Discharge application, to utilize the underlying Urban Residential Hybrid Zone (RSH) to facilitate a conventional single detached dwelling on the property located at 2144 Oakridge Crescent (Owners: S.S., C.S. and M.K. Sidhu)

RECOMMENDATION

1. THAT Bylaw No. 2926-2019, "Land Use Contract No. 13, Discharge Bylaw, 2019", be given first and second readings at the next Regular Meeting of Council and be advanced to an upcoming Public Hearing; and

2. THAT the Mayor and Corporate Officer be authorized to execute all documents related to this matter.

REPORT CONCURRENCE	
General Manager The General Manager concurs with the recommendation of this report.	**City Manager** The City Manager concurs with the recommendation of this report.

PURPOSE

The applicant proposes to discharge Land Use Contract No. 13 from the title of the subject property, to allow the existing underlying Urban Residential Hybrid Zone (RSH) to apply to the property to facilitate the construction of a new conventional dwelling unit.

SUMMARY OF THE ISSUE

On May 28, 2018, Council adopted the new RSH Zone as the underlying Zoning in the neighbourhood, which contains a height restriction to two storeys (7.5m) and does not permit Secondary Suites. The applicant has applied to discharge LUC 13 from the title of their subject property to take advantage of the new underlying RSH Zone to facilitate the construction of a conventional dwelling unit on the property, as LUC 13 currently limits housing to a mobile home.

BACKGROUND

Owners:	Swaranjit S Sidhu, Chamkaur S Sidhu, and Manjit K Sidhu
Legal Description:	Lot 287 Section 18 Township 18 New Westminster District Plan 41865
OCP Designation:	Urban 4 – Detached
Existing Zoning:	Land Use Contract No. 13 (District of Matsqui) (with an underlying zoning of Urban Residential Hybrid Zone (RSH))
Proposed Zoning:	Urban Residential Hybrid Zone (RSH)
Site Area:	621.9 m^2 (6,694 ft^2)
Site Description:	The subject property is located in an established single family residential neighbourhood on the east side of Oakridge Crescent. Housing on many of the existing lots in the neighbourhood are currently limited to a mobile home (including the subject property).
Surrounding Uses:	N: Mobile homes (regulated by LUC No. 13 (District of Matsqui)); S: Mobile homes (regulated by LUC No. 13 (District of Matsqui)); E: Paramount Crescent and industrial zoned properties (regulated by LUC No. 62 (District of Matsqui)) beyond; and W: Oakridge Crescent and mobile homes (regulated by LUC No. 13 (District of Matsqui)) beyond.

DISCUSSION

Context

1. The subject property is located on the east side of Oakridge Crescent. The area immediately surrounding the subject property is an established single family neighbourhood regulated by several Land Use Contracts (13, 42, 49, 59 and 125), which currently limits housing to mobile homes. Within the neighbourhood area are three parks (Oakridge Park, Crystal Park, and Martens Park) and Abbotsford Traditional School (see Figure 2).

Official Community Plan (OCP)

2. The subject site is designated Urban 4 – Detached in the OCP, the purpose of which is to enable low density single detached housing in neighbourhoods. The proposal to discharge Land Use Contract No. 13 to allow the Urban Residential Hybrid Zone (RSH) to regulate the lands and permit the construction of a conventional single detached dwelling conforms to the Urban 4 – Detached designation.

3. The proposed development meets the intent of broader OCP objectives, as follows:
   - Support diverse housing types for a variety of household sizes, incomes, tenures, and preferences (2.1); and
   - Support mixed affordable housing options which can serve as mortgage helpers for owners while providing affordable options for renters or extended family members (2.2).

Zoning

4. At present development for the subject site is regulated by Land Use Contract No. 13 (District of Matsqui), which was created in 1972. Land Use Contract No. 13 limits housing to an approved mobile home, and an LUC discharge is therefore required to facilitate the construction of a conventional two storey dwelling unit on the lands.

5. On May 29th, 2014, *Bill 17: Miscellaneous Statutes Amendment Act, 2014*, was passed by the Province of British Columbia. This Bill requires that all LUCs be terminated by June 30, 2024. Therefore, all municipalities that have LUCs within their jurisdiction must have a zoning designation in place for each property regulated by an LUC by that time. This Bill also enables local governments to pursue early termination of LUCs. Discharging LUC 156 is consistent with the mandate of Bill 17.

6. On May 28th, 2018, Council adopted the new Urban Residential Hybrid Zone (RSH), which was applied as the underlying Zoning of the subject neighbourhood. This new RSH Zone was brought forward for consideration by Council following neighbourhood consultation with residents and property owners of the subject neighbourhood. In accordance with the neighbourhood consultation results, early termination of the LUCs was not pursued by Council for this neighbourhood, meaning individual property owners would need to apply to discharge the existing LUC in order to utilize the new underlying RSH Zone.

7. The RSH Zone permits the construction of either a conventional Single Detached Dwelling or the placement of an approved mobile home, with a condition of use clarifying that Single Detached dwellings have a maximum height of 7.5m or 2 storeys, whichever is less.

8. The RSH Zone does not permit Secondary Suites, and limits building height to ensure mobile homes and conventional homes remain generally compatible in terms of size and scale with existing dwellings.

Affordable Housing Strategy

9. The Affordable Housing Strategy, (endorsed by Council November 7, 2011) similar to the OCP objectives and policies, encourages the development of complete, connected and livable neighbourhoods with diverse housing types (Objective 4). With policies that support affordable housing development close to transit, jobs and services and the creation of a variety of housing types to suit different needs related to household type, tenure and income. The applicant's proposal is consistent with this policy.

Tree Protection, Removal and Replacement

10. The applicant has not indicated a need to remove any trees to facilitate the proposed construction. Should the removal of any trees be required, the applicant will be required to obtain a Tree Cutting Permit and secure for replacements in accordance with the Tree Protection Bylaw, 2010.

Parking Requirements

11. The Zoning Bylaw requires a minimum of two (2) parking spaces for a single family house, with minimum parking stall width of 2.7m and minimum length of 5.5m. In conjunction with a

future Building Permit on the subject property, the property owner will be required to confirm the provision of the required parking spaces.

Site Development Considerations

12. A staff review of the works and services necessary to support this application has been completed and is outlined within Attachment B. No Works and Services are required in conjunction with this application. Any specific servicing related items will be addressed with a future Building Permit.

13. In addition to the above comments, the developer is responsible to adhere to all other legislation, which may apply to the land, including:

    a) complying with all applicable City bylaws, such as Official Community Plan, 2016, Development Bylaw, 2011, Tree Protection Bylaw, 2010, Building Bylaw, 2016, Sign Bylaw, 2001, Erosion and Sediment Control Bylaw, 2010, and Development Cost Charges Imposition Bylaw, 2010 administered by the City; and

    b) obtaining all other necessary approvals and permits on such terms as they may be issued, including but not limited to a development permit, tree removal permit, subdivision approval, building permit, soil removal/deposit permit, Ministry of Health permit, Ministry of Transportation and Infrastructure approval and Ministry of Environment approval.

Communication Plan

If Bylaw No. 2926-2019, "Land Use Contract No. 13 Discharge Bylaw, 2019" is supported by Council, Bylaw No. 2926-2019 will proceed to an upcoming Regular Meeting of Council, where it will be considered for first and second readings. If first and second readings are given, the bylaw will be forwarded to an up-coming Public Hearing. Two advertisements for the Public Hearing will be published in the City Page of the local newspaper. The City will notify in writing the owners and occupiers of land within a 100 meter radius of the property and provide Council with copies of any feedback that is received.

The City received confirmation on April 3, 2019, that the applicant installed the required Development Notification Sign in accordance with the Development Application Procedures Bylaw, which requires the sign to be installed a minimum of 3 weeks in advance of Council's consideration of the application.

FINANCIAL PLAN IMPLICATION

No financial plan implications are anticipated. Any capital works implications arising from this application have been addressed through the rezoning process.

Rajat Sharma

Rajat Sharma
General Manager, Finance and Corporate Services
Signed 4/8/2019 8:27 PM

IMPACTS ON COUNCIL POLICIES, STRATEGIC PLAN AND/OR COUNCIL DIRECTION

The proposal meets the goals and objectives identified in the 2016 Official Community Plan, the Affordable Housing Strategy, and Council's 2019-2022 Strategic Plan which identifies four cornerstones: vibrant economy, complete community, fiscal discipline and organizational alignment. The proposal is consistent with the four cornerstones of Council's Strategic Plan

SUBSTANTIATION OF RECOMMENDATION

Staff recommends support for the proposed discharge of Land Use Contract No. 13 (District of Matsqui) as the proposal to construct a conventional single family home with a maximum height of 7.5m is in keeping with both the RSH Zone and broad objectives of the OCP that encourages densification and the establishment of a variety of housing types within the urban area.

Nick Crosman

Nick Crosman
Planner
Signed 4/5/2019 4:44 PM

Darren Braun

Darren Braun
Director, Development Planning
Signed 4/8/2019 8:22 PM

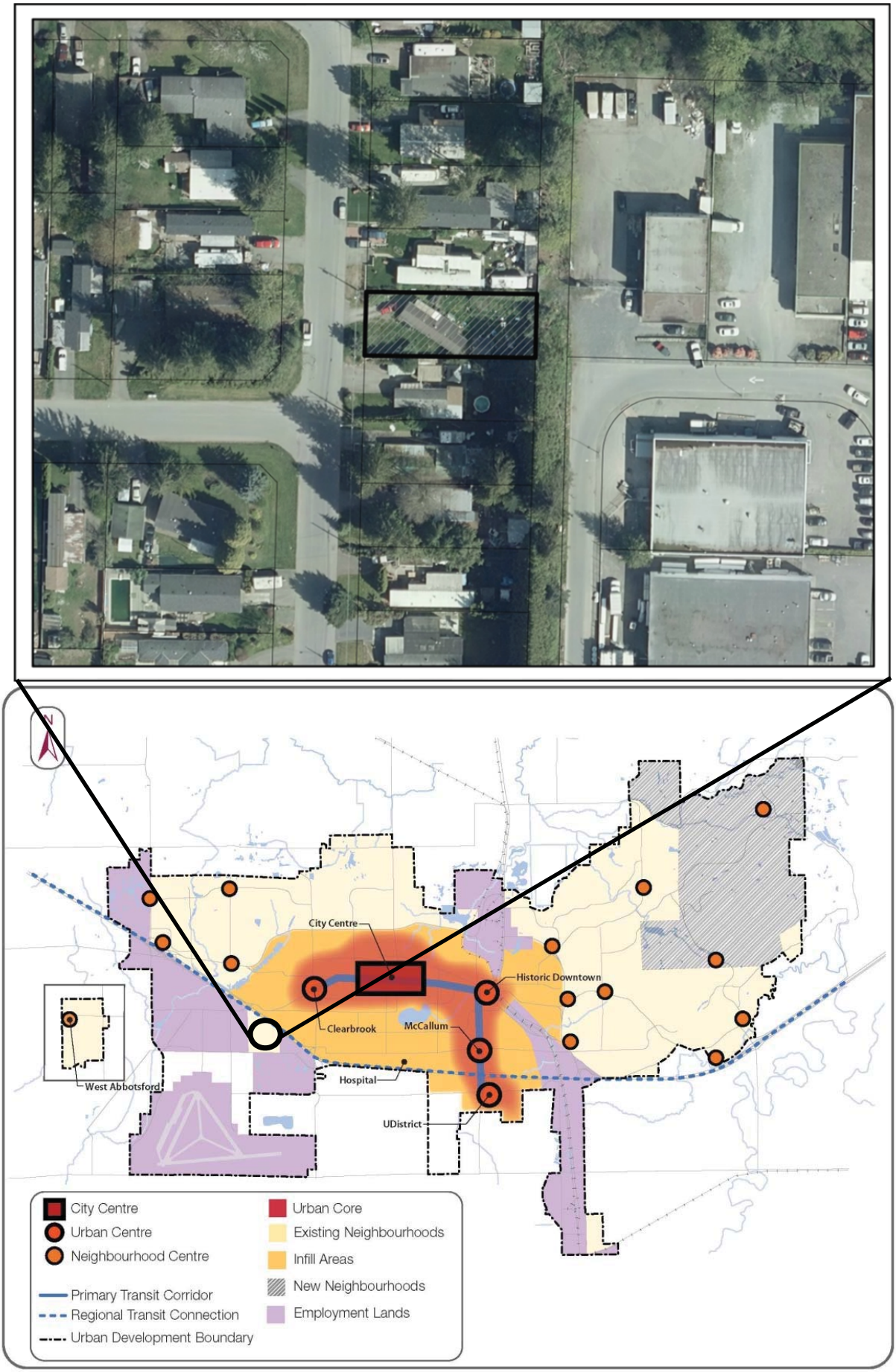
Siri Bertelsen

Siri Bertelsen
General Manager, Planning and Development Services
Signed 4/9/2019 8:19 AM

ATTACHMENTS:

Figures 0 to 4
Attachment A: Land Use Contract Discharge Bylaw 2926-2019
Attachment B: Works and Services Report (March 21, 2019)

City Context Plan
File: PRJ19-019 Location: 2144 Oakridge Crescent



ABBOTSFORD
Planning and Development Services

2144 Oakridge Crescent

Figure 1 - Location Plan
File No.: PRJ19-019

40 0 40
Meters

N

Date

Attachment: Figures 0 to 4 (PDS 033-2019 : LUC Discharge application for 2144 Oakridge Cr)

ABBOTSFORD
Planning and Development Services

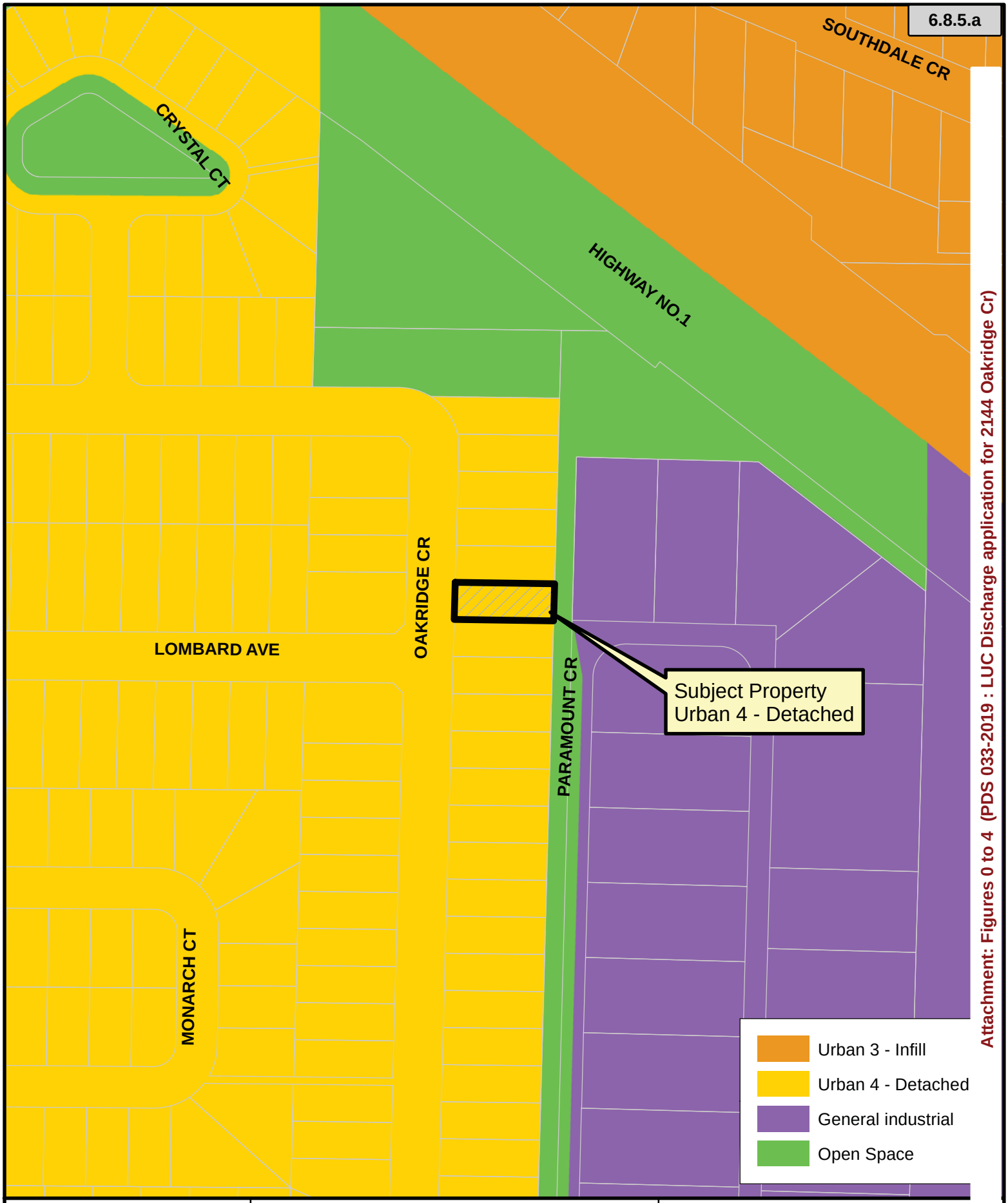
2144 Oakridge Crescent

Figure 2 - Context Plan
File No.: PRJ19-019

50 0 150
Meters

N

Date



ABBOTSFORD
Planning and Development Services

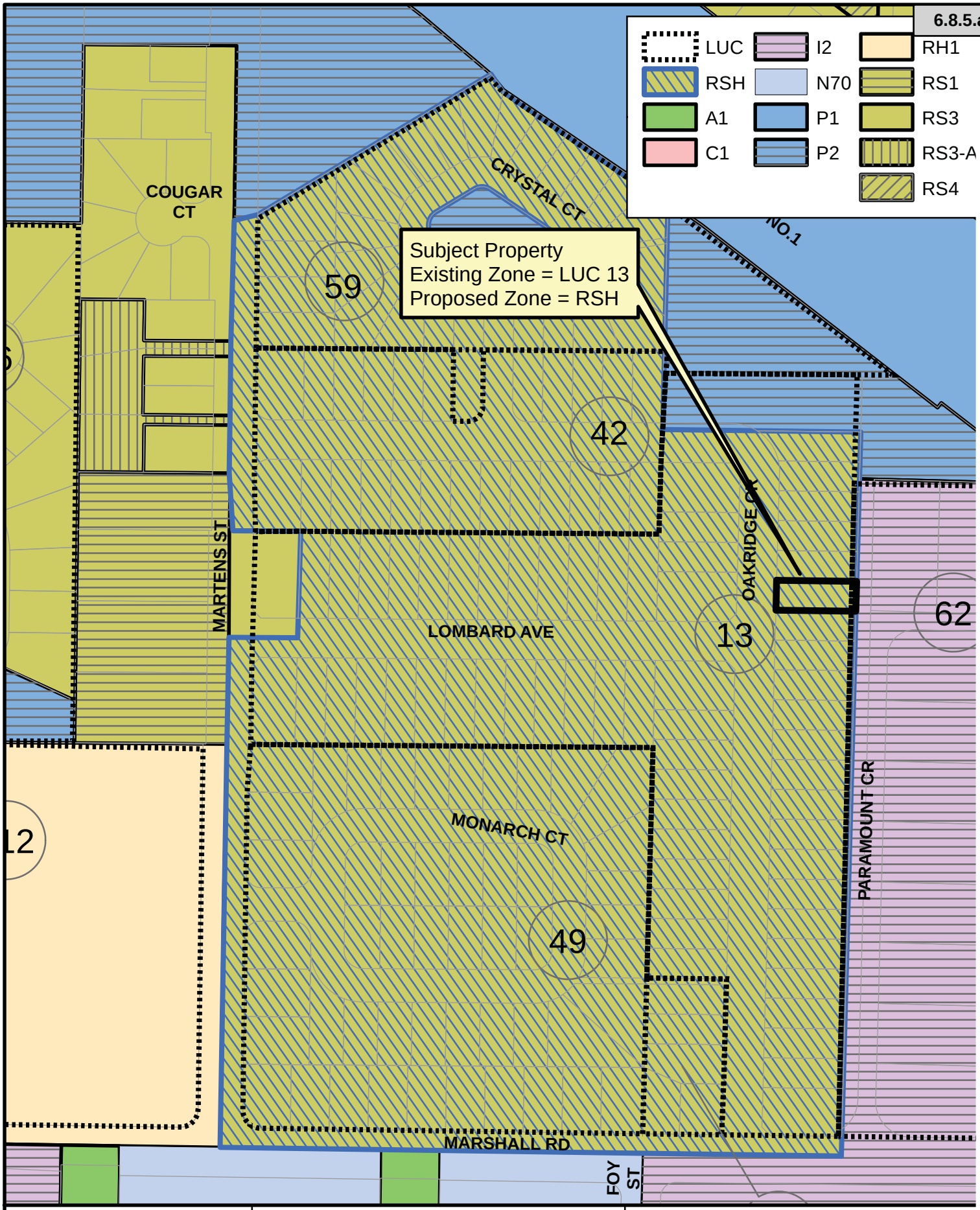
2144 Oakridge Crescent

Figure 3 - Official Community Plan
File No.: PRJ19-019

40 0 40
Meters

N

Date



Attachment: Figures 0 to 4 (PDS 033-2019 : LUC Discharge application for 2144 Oakridge Cr)

ABBOTSFORD
Planning and Development Services

2144 Oakridge Crescent

Figure 4 - Existing LUC & Proposed Zoni
File No.: PRJ19-019

50 0 50
Meters

N

Date

CITY OF ABBOTSFORD

LAND USE CONTRACT NO. 13 DISCHARGE BYLAW, 2019

Bylaw No. 2926-2019 PRJ19-019

WHEREAS Land Use Contract No. 13 (the "Land Use Contract"), authorized by Bylaw No. 1027 cited as Zoning Amendment Bylaw, No.18, was lawfully entered into by the City;

AND WHEREAS the Land Use Contract was registered in the Land Title Office on September 15, 1972, under Filing Number H94952, and modified by Filing Number H98242;

AND WHEREAS the registered owners of the described property have applied to the City for permission to discharge the Land Use Contract;

The Council of the City of Abbotsford, in open meeting assembled, ENACTS AS FOLLOWS:

1. CITATION

Bylaw No. 2926-2019 may be cited as "Land Use Contract No. 13 Discharge Bylaw, 2019".

2. APPROVAL OF LAND USE CONTRACT DISCHARGE AGREEMENT

The Discharge Agreement set out in the attached Appendix "A", to discharge Land Use Contract No. 13 registered against the lands as shown on Appendix "B" and located at: 2144 Oakridge Crescent, is approved.

READ A FIRST TIME this	day of	, 2019
READ A SECOND TIME this	day of	, 2019
PUBLIC HEARING HELD this	day of	, 2019
READ A THIRD TIME this	day of	, 2019
ADOPTED this	day of	, 2019

I hereby certify this to be
a true copy of the original
bylaw

Henry Braun
Mayor

Katie Karn
Deputy City Clerk

William Flitton
Corporate Officer

Final Draft – April 5, 2019

Attachment: Attachment A: Land Use Contract Discharge Bylaw 2926-2019 (PDS 033-2019 : LUC Discharge application for 2144 Oakridge Cr)

APPENDIX "A"

THIS AGREEMENT made this _____day of _____ , 2019.

BETWEEN: CITY OF ABBOTSFORD
32315 South Fraser Way, Abbotsford
in the Province of British Columbia V2T 1W7;

(the "City")

OF THE FIRST PART

AND:

SWARANJIT SINGH SIDHU
CHAMKAUR SINGH SIDHU
MANJIT KAUR SIDHU
2144 Oakridge Crescent, Abbotsford
in the Province of British Columbia V2T 6A8

(the "Owners")

OF THE SECOND PART

WHEREAS:

(A) The Owners are the legal and beneficial owners of a certain parcel of land more particularly known and described as:

2144 Oakridge Crescent (the "Lands")

(B) The City is the registered owner of a certain charge known as Land Use Contract No. 13 pursuant to the *Local Government Act*; and

(C) The Owners wish to discharge Land Use Contract No. 13 registered under Filing Number H94952, modified by H98242; and

(D) The City adopted Bylaw No. 2926-2019 authorizing the discharge of Land Use Contract No. 13 registered against the lands.

Attachment: Attachment A: Land Use Contract Discharge Bylaw 2926-2019 (PDS 033-2019 : LUC Discharge application for 2144 Oakridge Cr)

NOW THEREFORE IN CONSIDERATION of the premises and the payment of the sum of ONE DOLLAR ($1.00) of lawful money of Canada (receipt of which is acknowledged by the City) the parties agree each with the other as follows, that:

1. Pursuant to the *Local Government Act*, Land Use Contract No. 13, dated the 15th day of September, 1972, shall be discharged:

2. Such discharge of Land Use Contract No. 13 shall be registered in the New Westminster Land Title Office in accordance with the *Land Title Act*.

IN WITNESS WHEREOF the parties have set their hands or, in the case of a corporation, the corporate seal was affixed in the presence of its duly authorized officers on the date and year first above written.

THE CORPORATE SEAL OF THE CITY OF ABBOTSFORD was affixed in the presence of:)

_____
Henry Braun
Mayor

_____
William Flitton
Corporate Officer

SIGNED, SEALED, AND DELIVERED in the presence of:)

_____

_____
Swaranjit Singh Sidhu

_____
Chamkaur Singh Sidhu

_____
Manjit Kaur Sidhu

Attachment: Attachment A: Land Use Contract Discharge Bylaw 2926-2019 (PDS 033-2019 : LUC Discharge application for 2144 Oakridge Cr)

APPENDIX "B"

SCHEDULE BYLAW NO. 2926-2019
BEING LAND USE CONTRACT NO. 13
DISCHARGE BYLAW, 2019

Final Draft – April 5, 2019

Attachment: Attachment A: Land Use Contract Discharge Bylaw 2926-2019 (PDS 033-2019 : LUC Discharge application for 2144 Oakridge Cr)

ABBOTSFORD DEVELOPMENT ENGINEERING DIVISION

BUILDING PERMIT
WORKS AND SERVICES REQUIREMENTS

File No:	PRJ19-019
Planner:	Nick Crosman, Planner
Prepared By:	Stanley de Haan, Development Technologist II
Approved By:	14/03/22 Sarb Toor, Senior Manager, Development Engineering
Date:	March 21, 2019
Applicant:	Swaranjit Sidhu
Development Property:	2144 Oakridge Crescent Lot 287 Section 18 Township 16 Plan Nwp41865 Nwd Part Ne 1/4 , Manufactured Home Reg. #99787

The Local Government Act authorizes local governments to require development to meet current works and services standards as set out in the City's Development Bylaw and Policies.

This report includes the Works & Services **Requirements** to meet the applicable bylaws and policies and **Future Considerations** that may apply to the next phase of development.

Please have your consulting engineer call Stanley de Haan, Development Technologist II at 604-851-4175 in regard to this report and any other servicing matters relating to this application.

Attachment: Attachment B: Works and Services Report (March 21, 2019) (PDS 033-2019 : LUC Discharge application for 2144 Oakridge Cr)

ABBOTSFORD DEVELOPMENT ENGINEERING DIVISION

REQUIREMENTS

There are no works and service requirements at this stage of the application.

Additional dedications, SRWs, works, features or limits of construction may be needed as identified through the design and construction phases.

FUTURE CONSIDERATIONS

Upon further development an additional works and services review will apply related to that application. Listed below are some items to consider.

Bylaws

- the applicant is to be familiar with the Development Bylaw to ensure an understanding of possible future Works and services that may impact the development
- the applicant is to review the Works and Services identified in the Development Agreement and how they may impact the building.

Stormwater Management

- detention and infiltration will be required. Ensure that adequate room and proper placement has been reviewed.

Traffic Management

- the increase in vehicle traffic will be reviewed for its impact on the access and nearest intersections. Access may be restricted.
- road dedications, statutory rights-of-way and easements to accommodate the works and lot grading may require adjustments to the placement or size of the building.

Erosion and Sediment Control

All works shall be performed in substantial conformance with the City's Development By-law, the Provincial 'Land Development Guidelines' and the City's Erosion and Sediment Control Bylaw, in the control and prevention of erosion and sediment during all phases of construction. No release of silt, sediment laden waters or deleterious substances is permitted into any existing City storm or drainage system during any phase of development of the Lands.

The ESC Plan requires 4 drawings, each indicating the ESC methods for that stage of construction;

- site preparation
- site servicing
- building construction
- warranty period

Attachment: Attachment B: Works and Services Report (March 21, 2019) (PDS 033-2019 : LUC Discharge application for 2144 Oakridge Cr)

Service Connections

- water, sanitary and storm connections may have specific tie in locations. Review and confirm locations prior to design.
- calculations related to the required domestic and fire water demand will be reviewed. There may be a service, meter or flow restrictions.
- Fire Department review may result in geometric changes to onsite roadways, additional fire hydrants, emergency access and building placement.
- Provide underground power and telecommunications services from the distribution system to the proposed building(s).

Development Cost Charges.

- Development Cost Charges are applicable at Building Permit

Lot Grading

- A Lot Grading Plan is required. Final lot grading shall conform to City's Lot Grading Policy and Guidelines. Any retaining walls that the Developer or Consulting Engineer consider are necessary to effectively grade the Lands to prevent negative impacts on finished neighbouring Lands, either existing or proposed, shall be constructed by the Developer. The standard "Lot Grading Covenant shall be registered against title to all proposed lots.

- Lot grading shall also provide for the collection of surface runoff and other drainage that will discharge to the City Drainage system. Lot grading may be designed to allow for surface sheet flows or collected in swales and directed to lawn basins as necessary to the satisfaction of the General Manager, Engineering. Any collection of surface flows to a concentrated point discharge location shall include provision for easements or rights-of-way across impacted Lands as necessary. All lot grading shall be designed to take care of surface flows emanating from onsite grading.

Building Permit Submissions

- In order to avoid delays in receipt of building permits, the builder shall be responsible for ensuring that building permit applications on the Lands conform to the intent of the accepted Lot Grading plan(s) prior to submission to the City.
- The developer or his designate shall review and approve building permit applications prior to submission to the City. When submitted, the building permit plans shall provide lot grading information that shall, at time of final inspection for building occupancy or approval, comply with the accepted lot grading plan or the intent of the lot grading design accepted by the General Manager, Engineering prior to construction.

Attachment: Attachment B: Works and Services Report (March 21, 2019) (PDS 033-2019 : LUC Discharge application for 2144 Oakridge Cr)

COUNCIL REPORT

Executive Committee

Report No. PDS 034-2019

Date: April 25, 2019
File No: 3100-05 PRJ18-214

To: Mayor and Council
From: Stephanie Allen, Planning Technician
Subject: Land Use Contract (LUC) No. 42 Discharge application, to utilize the underlying Urban Residential Hybrid Zone (RSH) to facilitate a conventional single detached dwelling on the property located at 31540 Oakridge Crescent (Owners: S. Sandhu)

RECOMMENDATION

1. THAT Bylaw No. 2944-2019, "Land Use Contract No. 42, Discharge Bylaw, 2019", be given first and second readings at the next Regular Meeting of Council and be advanced to an upcoming Public Hearing; and

2. THAT the Mayor and Corporate Officer be authorized to execute all documents related to this matter.

REPORT CONCURRENCE	
General Manager The General Manager concurs with the recommendation of this report.	**City Manager** The City Manager concurs with the recommendation of this report.

PURPOSE

The applicant proposes to discharge Land Use Contract No. 42 from the title of the subject property in order to utilize the underlying Urban Residential Hybrid Zone (RSH) to facilitate the construction of a new conventional single family dwelling.

SUMMARY OF THE ISSUE

The newly created RSH zone was adopted by Council on May 28, 2018, as the underlying Zoning for the subject property and its neighborhood. The RSH Zone restricts height to two storeys (7.5m) and does not permit secondary suites. The applicant has applied to discharge LUC No. 42, which limits permitted uses to a mobile home. Discharging LUC No. 42 from the properties title will allow for the RSH Zone to take effect and therefore facilitate the construction of a conventional dwelling unit.

The application is consistent with the Urban 4 – detached land use designation in the Official Community Plan (OCP). The existing mobile home will be demolished in conjunction with the future building permit, if Bylaw No. 2944-2019 is adopted.

BACKGROUND

Owners:	Sukhjinder Kaur Sandhu
Legal Description:	Lot 330 Section 18 Township 16 New Westminster District Plan 44409
OCP Designation:	Urban 4 – Detached
Existing Zoning:	Land Use Contract No. 42 (District of Matsqui) (with an underlying zoning of Urban Residential Hybrid Zone (RSH))
Proposed Zoning:	Urban Residential Hybrid Zone (RSH)
Site Area:	558.14 m^2 (6007.8 ft^2)
Site Description:	The subject property is located in an established single family residential neighbourhood on the south side of Oakridge Crescent. Housing on many of the existing lots in the neighborhood, along with the subject property, are limited to a mobile home.
Surrounding Uses:	N: Mobile home residential (regulated by LUC No. 42 and LUC No. 59 beyond (District of Matsqui)); S: Mobile home residential (regulated by LUC No. 13 (District of Matsqui)) and Lombard Avenue beyond; E: Mobile home residential (regulated by LUC No. 42 (District of Matsqui)); and W: Mobile home residential (regulated by LUC No. 42 (District of Matsqui)) and Martens Street beyond

DISCUSSION

Context

1. The subject property is located on the north-west end of Oakridge Crescent. The area immediately surrounding the subject property is an established single family neighbourhood regulated by several Land Use Contracts (No. 13, 42, 49, 59 and 125), which currently limits housing to mobile homes. Highway No. 1 is located north of the neighborhood, Abbotsford Traditional School is located in within the neighborhood area, along with three parks (Oakridge Park, Crystal Park, and Martens Park) (see Figure 2). Highway No. 1 is located north of the neighborhood.

Official Community Plan (OCP)

2. The subject site is designated Urban 4 – Detached in the OCP, the purpose of which is to enable low density single detached housing in neighbourhoods. The proposed discharge of Land Use Contract No. 42 will employ the underlying Urban Residential Hybrid Zone (RSH)

to regulate the land and permit to the construction of a conventional single detached dwelling, which conforms to the Urban 4 – Detached land use designation.

3. The proposed development meets the intent of broader OCP objectives, as follows:
   - Support diverse housing types for a variety of household sizes, incomes, tenures, and preferences (2.1); and
   - Support mixed affordable housing options which can serve as mortgage helpers for owners while providing affordable options for renters or extended family members (2.2).

Zoning

4. At present development for the subject site is regulated by Land Use Contract No. 42 (District of Matsqui), which was created in 1973. Land Use Contract No. 42 limits housing to an approved mobile home. Therefore, an LUC discharge is required to facilitate the construction of a conventional two storey dwelling unit on the lands.

5. On May 29th, 2014, *Bill 17: Miscellaneous Statutes Amendment Act, 2014*, was passed by the Province of British Columbia. This Bill requires that all LUCs be terminated by June 30, 2024. Therefore, all municipalities that have LUCs within their jurisdiction must have a zoning designation in place for each property regulated by an LUC by that time. This Bill also enables local governments to pursue early termination of LUCs. Discharging LUC 156 is consistent with the mandate of Bill 17.

6. On May 28th, 2018, Council adopted the new Urban Residential Hybrid Zone (RSH), which was applied as the underlying Zoning of the subject neighbourhood. This new RSH Zone was brought forward for consideration by Council following consultation with residents and property owners of the subject neighbourhood. In accordance with the neighbourhood consultation results, early termination of the LUCs was not pursued by Council for this neighbourhood, meaning individual property owners would need to apply to discharge the existing LUC in order to utilize the new underlying RSH Zone.

7. The RSH Zone permits the construction of either a conventional Single Detached Dwelling or the placement of an approved mobile home, with a condition of use clarifying that Single Detached dwellings have a maximum height of 7.5m or 2 storeys, whichever is less.

8. The RSH Zone does not permit Secondary Suites, and limits building height to ensure mobile homes and conventional homes remain generally compatible in terms of size and scale with existing dwellings.

Affordable Housing Strategy

9. The Affordable Housing Strategy, (endorsed by Council November 7, 2011) similar to the OCP objectives and policies, encourages the development of complete, connected and livable neighbourhoods with diverse housing types (Objective 4). With policies that support affordable housing development close to transit, jobs and services and the creation of a variety of housing types to suit different needs related to household type, tenure and income. The applicant's proposal is consistent with this policy.

Tree Protection, Removal and Replacement

10. The applicant has not indicated a need or desire to remove any trees in order to facilitate the proposed construction. In accordance with the 2010 Tree Protection Bylaw, should the removal of any trees be necessary, the applicant will be required to obtain a Tree Cutting Permit and security for replacements.

Parking Requirements

11. A minimum of two (2) parking spaces for a single family house, with the minimum parking stall width of 2.7m and the minimum length is 5.5m is required in accordance with the Zoning Bylaw. In conjunction with a future Building Permit on the subject property, the property owner will be required to confirm the provision of the required parking spaces.

Site Development Considerations

12. A staff review of the works and services necessary to support this application has been completed and is outlined within Attachment B. No Works and Services are required in conjunction with this application. Any specific servicing related items will be addressed with a future Building Permit.

13. In addition to the above comments, the developer is responsible to adhere to all other legislation, which may apply to the land, including:

    a) complying with all applicable City bylaws, such as Official Community Plan, 2016, Development Bylaw, 2011, Tree Protection Bylaw, 2010, Building Bylaw, 2016, Sign Bylaw, 2001, Erosion and Sediment Control Bylaw, 2010, and Development Cost Charges Imposition Bylaw, 2010 administered by the City; and

    b) obtaining all other necessary approvals and permits on such terms as they may be issued, including but not limited to a development permit, tree removal permit, subdivision approval, building permit, soil removal/deposit permit, Ministry of Health permit, Ministry of Transportation and Infrastructure approval and Ministry of Environment approval.

Communication Plan

If Bylaw No. 2944-2019, "Land Use Contract No. 42 Discharge Bylaw, 2019" is supported by Council, Bylaw No. 2944-2019 will proceed to an upcoming Regular Meeting of Council, where it will be considered for first and second readings. If first and second readings are given, the bylaws will be forwarded to an up-coming Public Hearing. Two advertisements for the Public Hearing will be published in the City Page of the local newspaper. The City will notify in writing the owners and occupiers of land within a 100 meter radius of the property and provide Council with copies of any feedback that is received.

The City received confirmation on April 8, 2019, that the applicant installed the required Development Notification Sign in accordance with the Development Application Procedures Bylaw, which requires the sign to be installed a minimum of 3 weeks in advance of Council's consideration of the application.

FINANCIAL PLAN IMPLICATION

No financial plan implications are anticipated. Any capital works implications arising from this application have been addressed through the rezoning process.

Rajat Sharma

Rajat Sharma
General Manager, Finance and Corporate Services
Signed 4/15/2019 7:20 PM

IMPACTS ON COUNCIL POLICIES, STRATEGIC PLAN AND/OR COUNCIL DIRECTION

The proposal meets the goals and objectives identified in the 2016 Official Community Plan, the Affordable Housing Strategy, and Council's 2019-2022 Strategic Plan which identifies four cornerstones: vibrant economy, complete community, fiscal discipline and organizational alignment. The proposal is consistent with the four cornerstones of Council's Strategic Plan.

SUBSTANTIATION OF RECOMMENDATION

Staff recommends support for the proposed discharge of Land Use Contract No. 42 (District of Matsqui or Abbotsford) as the proposal to construct a conventional single family home with a maximum height of 7.5m is in keeping with the broad objectives of the OCP that encourages densification and the establishment of a variety of housing types within the urban area.

Stephanie Allen

Stephanie Allen
Planning Technician
Signed 4/12/2019 6:44 PM

Darren Braun

Darren Braun
Director, Development Planning
Signed 4/15/2019 6:47 PM

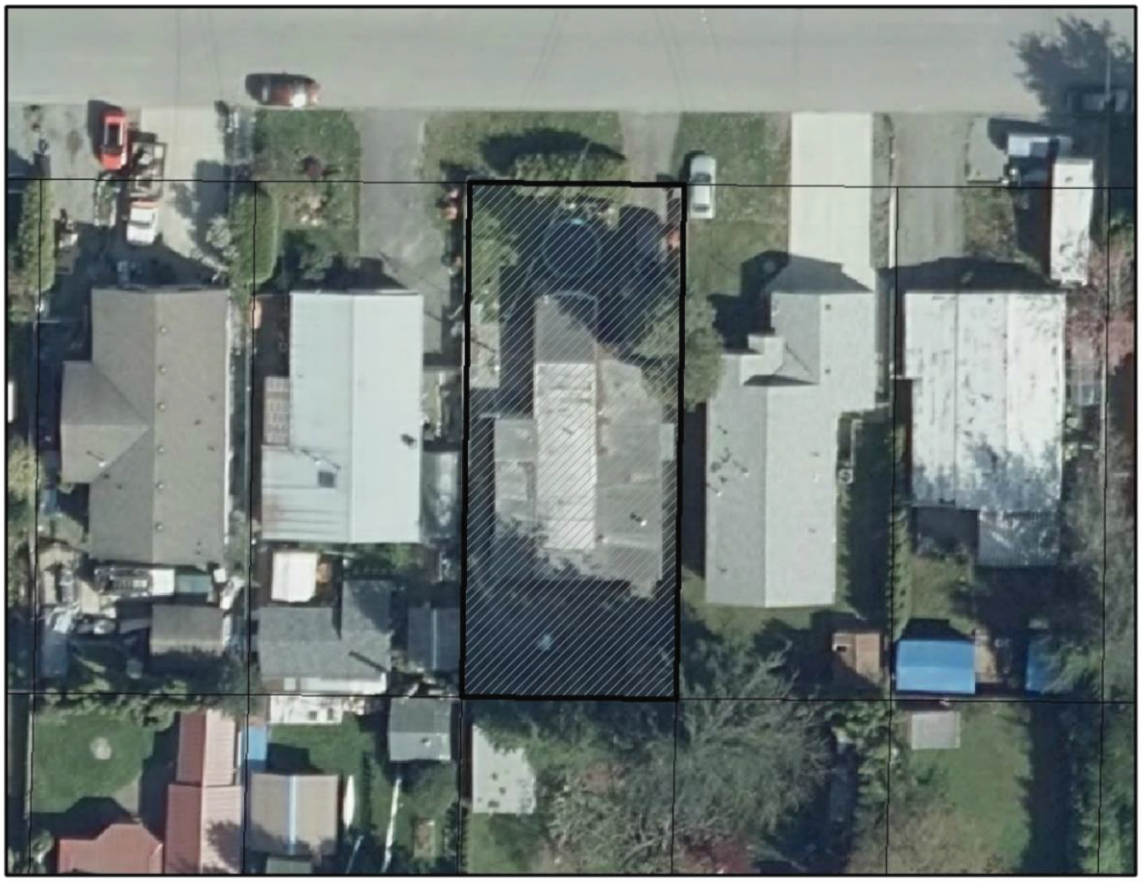
Siri Bertelsen

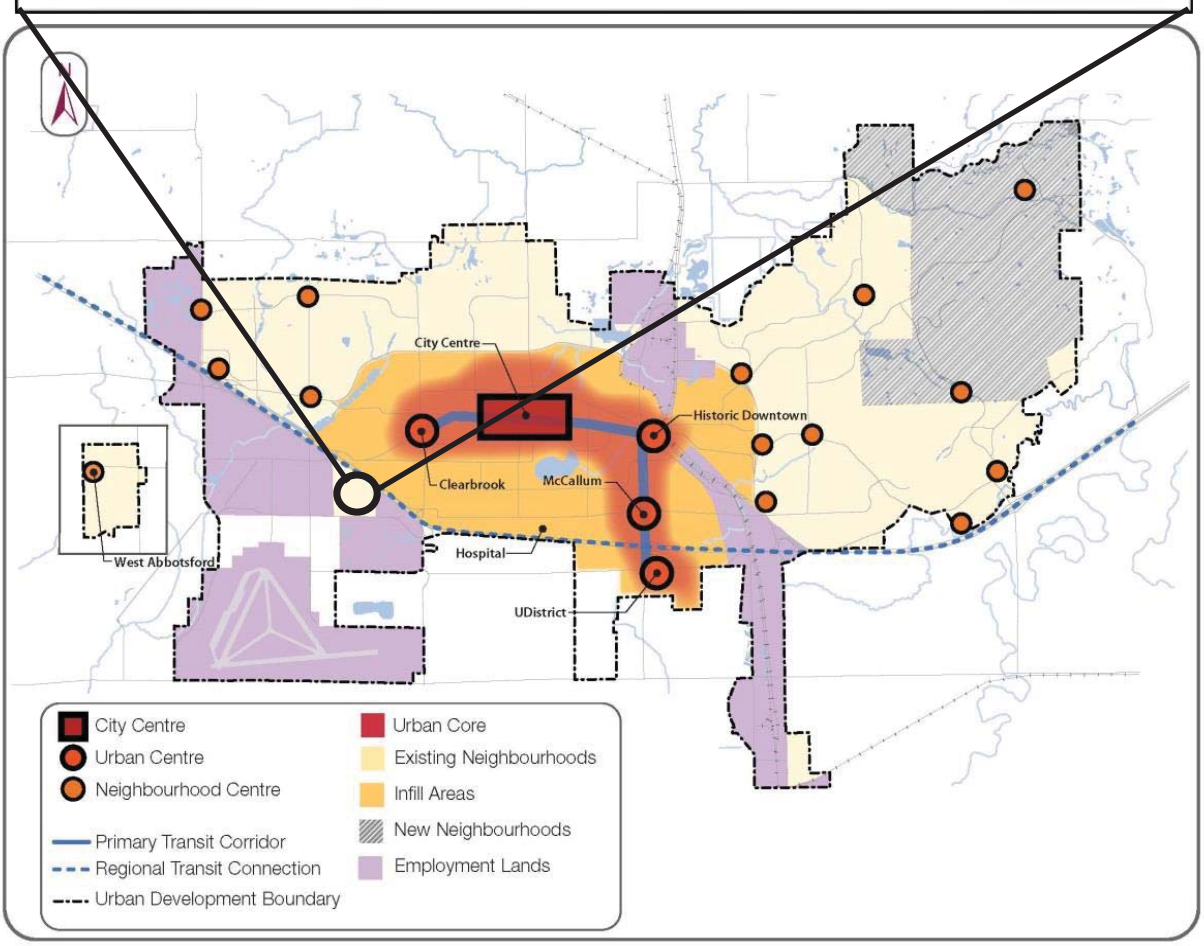
Siri Bertelsen
General Manager, Planning and Development Services
Signed 4/17/2019 1:19 PM

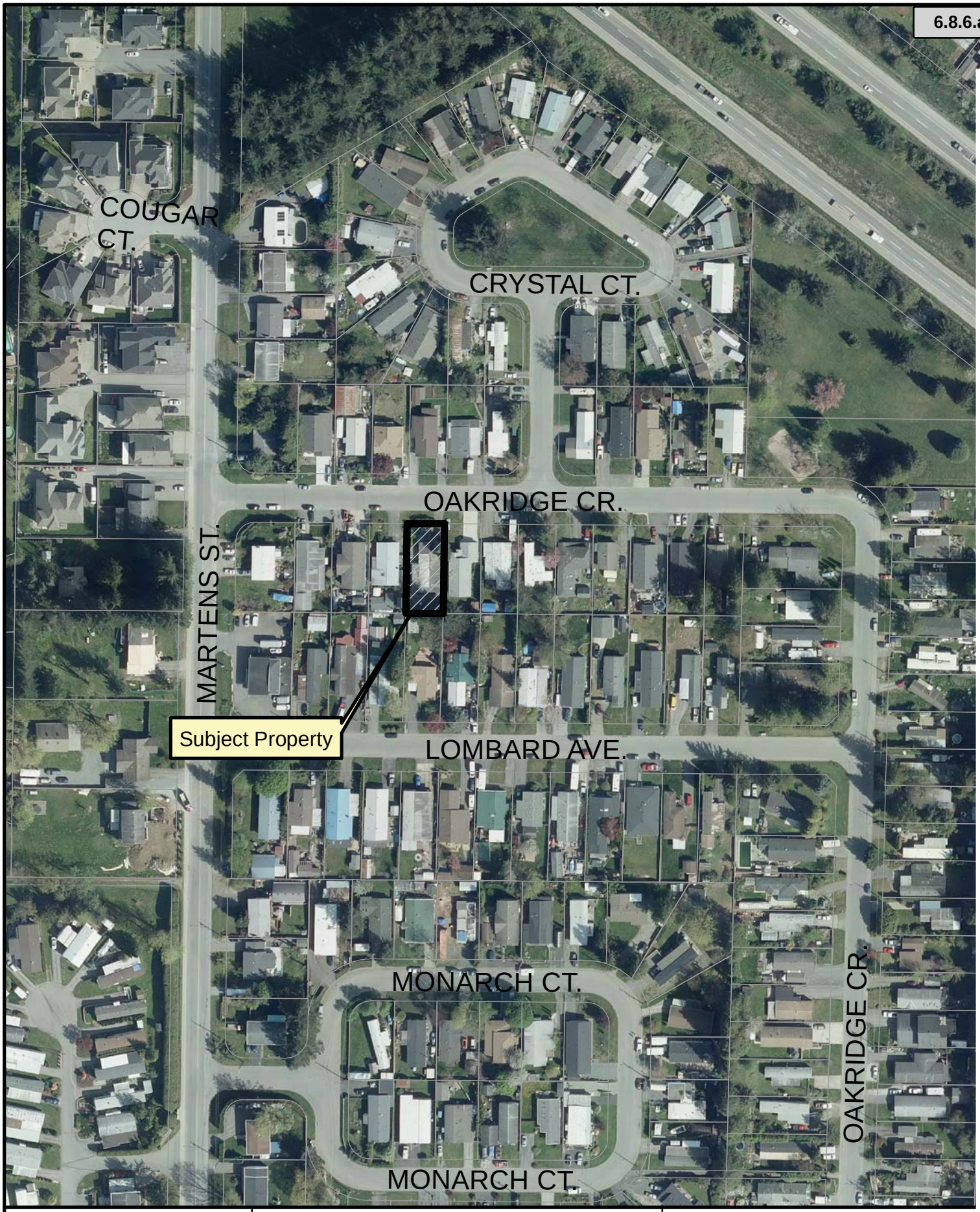
ATTACHMENTS:

Figures 0-4
Attachment A: 2944-2019 Land Use Contract No. 42 Discharge Bylaw 2019 (Final Draft)
Attachment B: Works and Services Report

City Context Plan
File: PRJ18-214 Location: 31540 Oakridge Cr.







ABBOTSFORD
Planning and Development Services

31540 Oakridge Cr.

Figure 1 - Location Plan
File No.: PRJ18-214

40 0 40
Meters

N

Date

Attachment: Figures 0-4 (PDS 034-2019 : LUC Discharge Application for 31540 Oakridge Cr)

ABBOTSFORD
Planning and Development Services

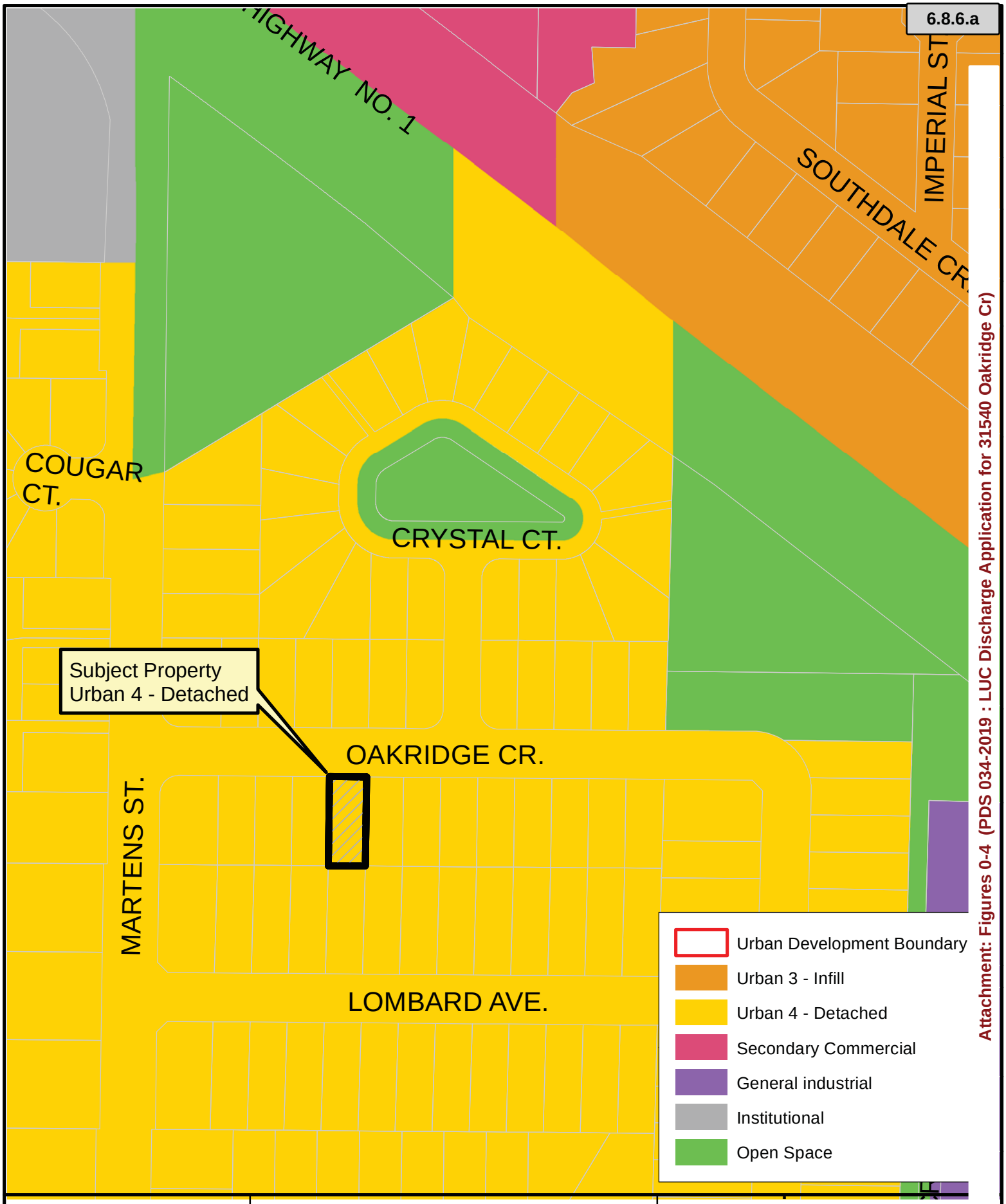
31540 Oakridge Cr.

Figure 2 - Context Plan
File No.: PRJ18-214

50 0 100
Meters

N

Date



ABBOTSFORD
Planning and Development Services

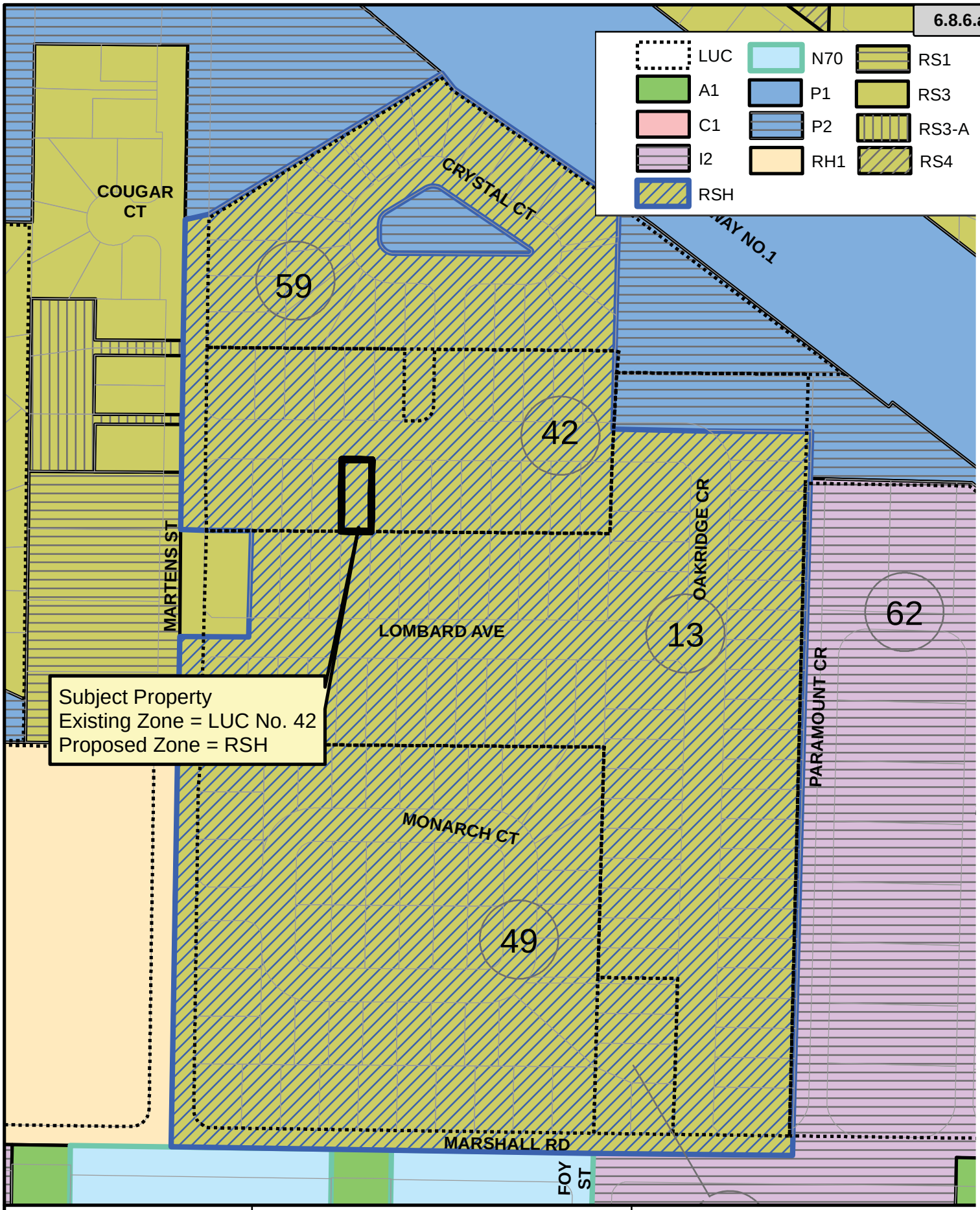
31540 Oakridge Cr.

Figure 3 - Official Community Plan
File No.: PRJ18-214

40 0 40
Meters

N

Date



ABBOTSFORD
Planning and Development Services

31540 Oakridge Cr.

Figure 4 - Existing LUC & Proposed Zor
File No.: PRJ18-214

50 0 50
Meters

N

Date

Attachment: Figures 0-4 (PDS 034-2019 : LUC Discharge Application for 31540 Oakridge Cr)

CITY OF ABBOTSFORD

LAND USE CONTRACT NO. 42 DISCHARGE BYLAW, 2019

Bylaw No. 2944-2019 PRJ18-214

WHEREAS Land Use Contract No. 42 (the "Land Use Contract"), authorized by Bylaw No. 1027 cited as Zoning Amendment Bylaw No. 18, was lawfully entered into by the City;

AND WHEREAS the Land Use Contract was registered in the Land Title Office on July 25, 1973, under Filing Number J98193;

AND WHEREAS the registered owners of the described property have applied to the City for permission to discharge the Land Use Contract;

The Council of the City of Abbotsford, in open meeting assembled, ENACTS AS FOLLOWS:

1. CITATION

Bylaw No. 2944-2019 may be cited as "Land Use Contract No. 42 Discharge Bylaw, 2019".

2. APPROVAL OF LAND USE CONTRACT DISCHARGE AGREEMENT

The Discharge Agreement set out in the attached Appendix "A", to discharge Land Use Contract No. 42 registered against the lands as shown on Appendix "B" and located at: 31540 Oakridge Crescent, is approved.

READ A FIRST TIME this	day of	, 2019
READ A SECOND TIME this	day of	, 2019
PUBLIC HEARING HELD this	day of	, 2019
READ A THIRD TIME this	day of	, 2019
ADOPTED this	day of	, 2019

I hereby certify this to be
a true copy of the original
bylaw

Henry Braun
Mayor

Katie Karn
Deputy City Clerk

William Flitton
Corporate Officer

Final Draft – April 17, 2019

Attachment: Attachment A: 2944-2019 Land Use Contract No. 42 Discharge Bylaw 2019 (Final Draft) (PDS 034-2019 : LUC Discharge Application

APPENDIX "A"

THIS AGREEMENT made this _____day of _____ , 2019.

BETWEEN: CITY OF ABBOTSFORD
32315 South Fraser Way, Abbotsford
in the Province of British Columbia V2T 1W7;

(the "City")

OF THE FIRST PART

AND:

SUKHJINDER KAUR SANDHU
31540 Oakridge Crescent, Abbotsford
in the Province of British Columbia V2T 6A6;

(the "Owners")

OF THE SECOND PART

WHEREAS:

(A) The Owners are the legal and beneficial owners of a certain parcel of land more particularly known and described as:

31540 Oakridge Crescent (the "Lands")

(B) The City is the registered owner of a certain charge known as Land Use Contract No. 42 pursuant to the *Local Government Act*; and

(C) The Owners wish to discharge Land Use Contract No. 42 registered under Filing Number J98193; and

(D) The City adopted Bylaw No. 2944-2019 authorizing the discharge of Land Use Contract No. 42 registered against the lands.

Attachment: Attachment A: 2944-2019 Land Use Contract No. 42 Discharge Bylaw 2019 (Final Draft) (PDS 034-2019 : LUC Discharge Application

NOW THEREFORE IN CONSIDERATION of the premises and the payment of the sum of ONE DOLLAR ($1.00) of lawful money of Canada (receipt of which is acknowledged by the City) the parties agree each with the other as follows, that:

1. Pursuant to the *Local Government Act*, Land Use Contract No. 42, dated the 25th day of July, 1973, shall be discharged:

2. Such discharge of Land Use Contract No. 42 shall be registered in the New Westminster Land Title Office in accordance with the *Land Title Act*.

IN WITNESS WHEREOF the parties have set their hands or, in the case of a corporation, the corporate seal was affixed in the presence of its duly authorized officers on the date and year first above written.

THE CORPORATE SEAL OF THE CITY OF ABBOTSFORD was affixed in the presence of:

_____
Henry Braun
Mayor

_____
William Flitton
Corporate Officer

SIGNED, SEALED, AND DELIVERED in the presence of:

_____

_____
Sukhjinder Kaur Sandhu

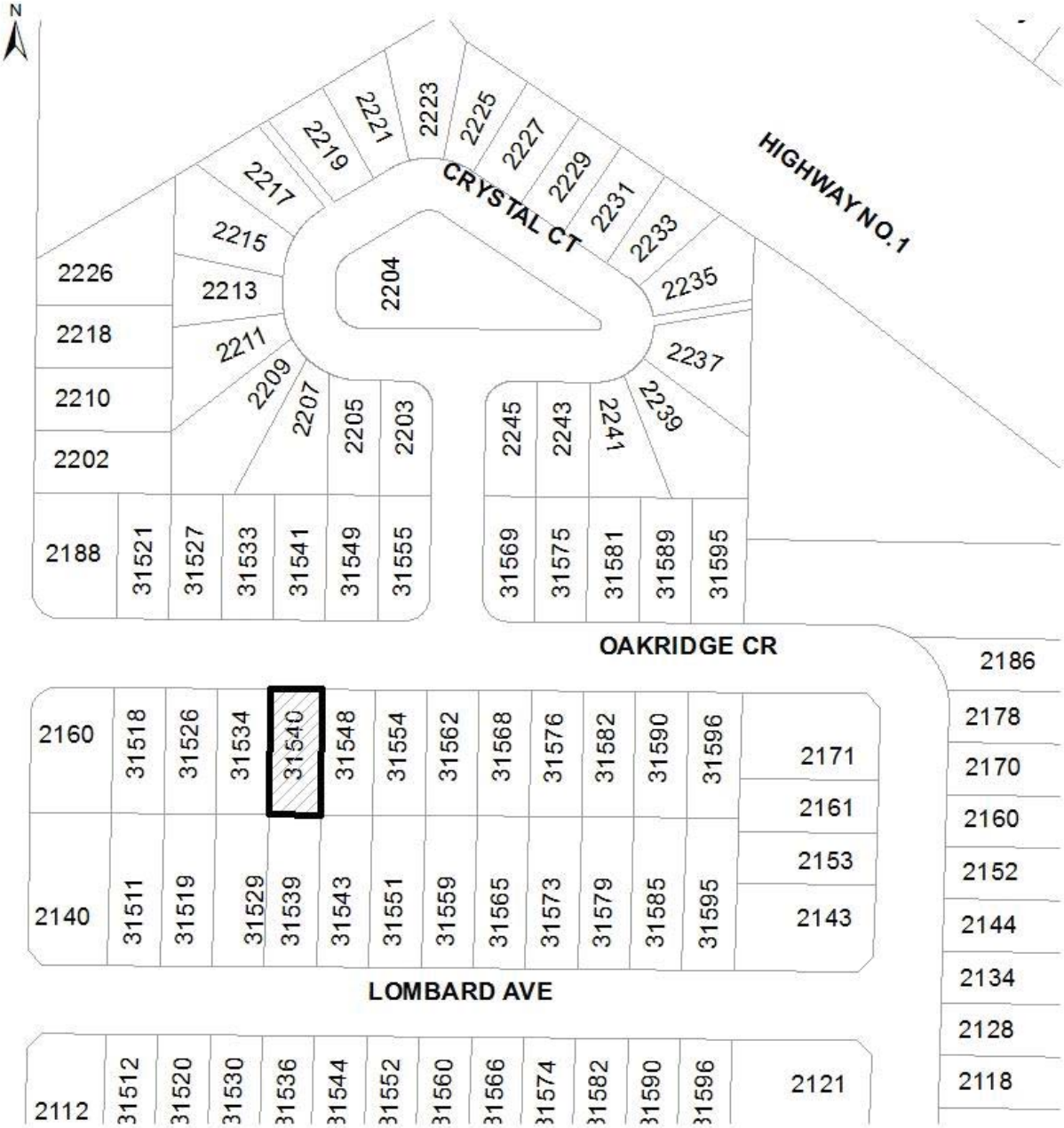
CITY OF ABBOTSFORD

LAND USE CONTRACT NO. 42 DISCHARGE BYLAW, 2019

Bylaw No. 2944-2019 Page 5

APPENDIX "B"

SCHEDULE BYLAW NO. 2944-2019
BEING LAND USE CONTRACT NO. 42
DISCHARGE BYLAW, 2019



Final Draft – April 17, 2019

Attachment: Attachment A: 2944-2019 Land Use Contract No. 42 Discharge Bylaw 2019 (Final Draft) (PDS 034-2019 : LUC Discharge Application

ABBOTSFORD DEVELOPMENT ENGINEERING DIVISION

LAND USE CONTRACT DISCHARGE WORKS AND SERVICES REQUIREMENTS

File No:	PRJ18-214
Planner:	Stephanie Allen, Planning Technician
Prepared By:	Jiamin Ma, Development Technologist I
Approved By:	19/03/06 Sarb Toor, Senior Manager, Development Engineering
Date:	March 4, 2019
Applicant:	Jagsir Sran
Development Property:	31540 Oakridge Crescent LOT 330 SECTION 18 TOWNSHIP 16 PLAN NWP44409 NWD PART NE 1/4, MANUFACTURED HOME REG. # 29566.

The Local Government Act authorizes local governments to require development to meet current works and services standards as set out in the City's Development Bylaw and Policies.

This report includes the Works & Services **Requirements** to meet the applicable bylaws and policies and **Future Considerations** that may apply to the next phase of development.

Please have your consulting engineer email Jiamin Ma, Development Technologist I, at jma@abbotsford.ca in regard to this report and any other servicing matters relating to this application.

Attachment: Attachment B: Works and Services Report (PDS 034-2019 : LUC Discharge Application for 31540 Oakridge Cr)

There are no works and services requirements for this Land Use Contract Discharge application.

FUTURE CONSIDERATIONS

Upon further development an additional works and services review will apply related to that application. Listed below are some items to consider.

Bylaws

- The applicant is to be familiar with the Development Bylaw to ensure an understanding of possible future Works and services that may impact the development.

Requirements

- The portion of proposed surface works that front neighbouring properties require detailed design to ensure their integration with the existing infrastructure.
- Additional dedications, SRWs, works, features or limits of construction may be needed as identified through the design and construction phases.

On-Site Servicing Requirements

- The developer shall enter into the City's standard form of Servicing Agreement and provide the associated payments, securities, fees, dedications and rights-of-way and administration and inspection fee payments to provide for the design, construction and installation of works and services to each proposed lot as required in the Development Bylaw 2011, Bylaw No. 2070-2011, including;
- Each Urban existing parcel or proposed lot shall be provided with separate City services including;
  - water connection and appropriate meter and chamber
  - storm sewer connection and inspection manhole
  - sanitary sewer connection and inspection manhole
  - driveway

Stormwater Management

- Provide a storm water management plan showing how onsite drainage will be accommodated offsite, including onsite detention and/or infiltration. All offsite storm water works and services including new installations and upgrades to existing offsite systems required by the storm water management plan shall be designed and constructed in accordance with said storm water management plan.
- The infrastructure identified on the storm water management plan shall be constructed by the developer prior to receiving the Certificate of Substantial Completion.
- Developer to design & construct detention, infiltration and/or treatment measures identified for individual single family lots.
- Conduct a percolation test to explore options to infiltrate runoff onsite. If a geotechnical engineer indicates that infiltration is not feasible, provide cash-in-lieu contribution for the

Attachment: Attachment B: Works and Services Report (PDS 034-2019 : LUC Discharge Application for 31540 Oakridge Cr)

detention, and a service connection via overflow from a rock pit onsite to the City's drainage system.

- Cash-in- lieu for detention: $349 per m3
- Place 300 mm absorbent soil in landscaping and other pervious area.
- Onsite works outside the Statutory Right of Way are to be dealt with by Building Department in accordance with the B.C. Building Code, through building permit application.

Sewage Collection and Disposal

- The existing sanitary service connection shall be disconnected at the demolition stage.

Water Distribution Domestic and Fire Fighting

- If the current property is occupied by only a mobile home, the water service is required to be capped off when the applicant is removing the mobile home.
- The existing water service was installed in 1978. If a new house is to be built on the subject property in the future, the applicant shall apply for a new water service connection.

Traffic Management

- Road dedications, statutory rights-of-way and easements to accommodate the works and lot grading may require adjustments to the placement or size of the building.

Service Connections

- Water, sanitary and storm connections may have specific tie in locations. Review and confirm locations prior to design.
- Calculations related to the required domestic and fire water demand will be reviewed. There may be a service, meter or flow restrictions.

Development Cost Charges.

- Development Cost Charges are applicable at Building Permit.

Lot Grading

- A Lot Grading Plan is required. Final lot grading shall conform to City's Lot Grading Policy and Guidelines. Any retaining walls that the Developer or Consulting Engineer consider are necessary to effectively grade the Lands to prevent negative impacts on finished neighbouring Lands, either existing or proposed, shall be constructed by the Developer. The standard "Lot Grading Covenant shall be registered against title to all proposed lots.
- Lot grading shall also provide for the collection of surface runoff and other drainage that will discharge to the City Drainage system. Lot grading may be designed to allow for surface sheet flows or collected in swales and directed to lawn basins as necessary to the satisfaction of the General Manager, Engineering. Any collection of surface flows to a concentrated point discharge location shall include provision for easements or rights-of-way across impacted Lands as necessary. All lot grading shall be designed to take care of surface flows emanating from onsite grading.

Attachment: Attachment B: Works and Services Report (PDS 034-2019 : LUC Discharge Application for 31540 Oakridge Cr)

Geotechnical Requirements

- Geotechnical reports are required;
  - Prior to construction - outlining parameters and details of all cuts and fills in excess of 1.5 m in depth, stabilization practices and in-place testing requirements to be implemented during all stages of earthwork, retaining wall design, suitability of existing soil conditions and remedial measures to be employed by contractors and builders.
  - Following construction and prior to release of building permits - certifying that construction practices, methods, procedures noted in the original reports were followed, identifying fills or cuts within proposed building envelope areas, confirming and certifying suitability and stability for building construction and providing guidelines for post-construction slope maintenance.
  - Following construction and prior to release of building permits - certifying that construction practices, methods, procedures required for infrastructure servicing were followed.

Erosion and Sediment Control

- All works shall be performed in substantial conformance with the City's Development By-law, the Provincial 'Land Development Guidelines' and the City's Erosion and Sediment Control Bylaw, in the control and prevention of erosion and sediment during all phases of construction. No release of silt, sediment laden waters or deleterious substances is permitted into any existing City storm or drainage system during any phase of development of the Lands.
- The ESC Plan requires 4 drawings, each indicating the ESC methods for that stage of construction;
  - site preparation
  - site servicing
  - building construction
  - warranty period

Required Covenants, Easements and Rights-of-way

- Lot Grading Control Covenant (PL-109a)
- Infiltration and/or Detention rights-of-way (PL-201)

Works & Services Security & Warranty Deposit

- Provide as Security Deposit, the estimated construction cost plus 10% for engineering (min $25,000) and 5% for as-constructed drawings (minimum $15,000) in cash or letter of credit.

Administration & Inspection Fee

- Pay 5% of the first $300,000 + 3% of the remainder of the estimated construction cost for administration and inspections.

Attachment: Attachment B: Works and Services Report (PDS 034-2019 : LUC Discharge Application for 31540 Oakridge Cr)

City Services Fees

- Tie-in inspection fee ($50 per inspection) for water, sanitary, and storm sewer services.
- Water and sewer main connections and wet taps are supervised and/or performed by City crews at the developer's expense and payable upon invoice.

Building Permit Submissions

- In order to avoid delays in receipt of building permits, the builder shall be responsible for ensuring that building permit applications on the Lands conform to the intent of the accepted Lot Grading plan(s) prior to submission to the City.
- The developer or his designate shall review and approve building permit applications prior to submission to the City. When submitted, the building permit plans shall provide lot grading information that shall, at time of final inspection for building occupancy or approval, comply with the accepted lot grading plan or the intent of the lot grading design accepted by the General Manager, Engineering prior to construction.

Attachment: Attachment B: Works and Services Report (PDS 034-2019 : LUC Discharge Application for 31540 Oakridge Cr)

ABBOTSFORD

COUNCIL REPORT

Executive Committee

Report No. PDS 038-2019

Date: April 25, 2019
File No: 3100-05 PRJ18-035

To: Mayor and Council
From: Howie Choy, Assistant Planner
Subject: Rezoning application for the property located at 31907 Old Yale Road, to allow for a two lot subdivision (Owner: 0725694 BC Ltd., Director: N.S. Sivia)

RECOMMENDATION

1. THAT Bylaw No. 2937-2019, "Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 247", be given first and second readings at the next Regular Meeting of Council, and be advanced to an upcoming Public Hearing;

2. THAT prior to adoption of Bylaw No. 2937-2019, "Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 247", the following conditions be satisfied:

   a) entering into a Development Agreement to secure the required road dedication and utility upgrades and extensions, in accordance with Development Bylaw, 2011, as detailed in the Works and Services Report;
   b) road widening dedication approximately 3.5 m along the full frontage of Old Yale Road, in accordance with Development Bylaw, 2011;
   c) road widening dedication approximately 2.5 m along the full frontage of Countess Crescent, in accordance with Development Bylaw, 2011;
   d) road widening dedication for a corner truncation to a local-to-major arterial standard, in accordance with Development Bylaw, 2011;
   e) registering a Section 219 covenant to prohibit driveway access onto Old Yale Road;
   f) providing a Community Benefit Contribution of $400 per dwelling unit towards future transit and cycle infrastructure;
   g) providing a Community Benefit Contribution of $225 per dwelling unit for park improvements; and
   h) resolving all issues of funding for items not budgeted by the City; and

3. THAT the Mayor and Corporate Officer be authorized to execute all documents relating to this matter.

REPORT CONCURRENCE	
General Manager The General Manager concurs with the recommendation of this report.	**City Manager** The City Manager concurs with the recommendation of this report.

PURPOSE

Rezoning application to rezone the subject property from Urban Residential Zone (RS3) to Comprehensive Development Seventy Five Zone (N75) to permit a two (2) lot subdivision.

SUMMARY OF THE ISSUE

The applicant proposes to rezone the subject property from RS3 to N75 to facilitate a two (2) lot subdivision, as shown in Figure 4. The application is consistent with the Urban 3 – Infill land use designation in the Official Community Plan. The existing single detached dwelling will be demolished in conjunction with a future two (2) lot subdivision, if the current rezoning application is adopted.

This application was submitted on February 19, 2018. Therefore, the application is consistent with Council's February 19, 2018 resolution regarding the interim approach for infill applications while the Urban 3 - Infill study is underway to move forward and be considered by Council on a case by case basis.

BACKGROUND

Applicant:	Central Valley Engineering (2004) Ltd (Rick Celinski)
Registered Owner:	0725694 BC LTD., INC. NO. 0725694
Legal Description:	Lot “A” Except: Firstly: Parcel “One” (Explanatory Plan 22005) Secondly: Part Subdivided by Plan 25696; Section 19 Township 16 New Westminster District Plan 10810
OCP Designation:	Urban 3 – Infill
Existing Zoning:	Urban Residential Zone (RS3)
Proposed Zoning:	Comprehensive Development Seventy Five Zone (N75)
Site Area:	689.66 m^2 (7,423.43 ft^2)
Site Description:	The subject property is located on the northwest corner at the intersection of Old Yale Road (Urban Arterial) and Countess Crescent (Urban Local). There are two (2) trees located on the property. The property contains a single family dwelling.

Surrounding Uses:

N: Single detached and multi-family residential properties (zoned RS3 and RMM);

S: Single detached and multi-family residential properties (zoned RS3, N66, and RML) and commercial properties (zoned C5);

E: Single detached and multi-family residential properties (zoned RS3, RML, RMM, and CHR) and institutional properties (zoned P1 and P3); and

W: Single detached and multi-family residential properties (zoned RS3, RS5-A and RM60).

DISCUSSION

Context

1. The proposed development is located on the northwest corner at the intersection of Old Yale Road and Countess Crescent. The surrounding neighbourhood consists of single-detached dwellings and multi-family residential. Ten-Broeck Elementary School is located approximately 300 m to the west of the proposed development. The proposed development is located approximately 130 m northwest of the Clearbrook Neighbourhood Centre. The proposed development is located along an Urban Arterial and Transit Corridor.

Official Community Plan (OCP)

2. The Official Community Plan (OCP) designates the property as Urban 3 – Infill, refer to Figure 3. The purpose of the Urban 3 – Infill land use category is to enable infill residential with density increases near City and Urban Centres and the Primary Transit Corridor, and includes single detached dwellings with accessory units and ground orientated duplexes. Under the Urban 3 - Infill designation, secondary suites are permitted on lots greater than 400 m^2. The proposed rezoning is consistent with the OCP land use designation.

3. The proposed development meets the intent of broader OCP objectives, as follows:

   - Support diverse housing types for a variety of household sizes, incomes, tenures, and preferences (2.1); and
   - Focus residential intensification around the Urban and Neighbourhood Centres (2.9).

Zoning

4. A rezoning application is proposed to allow for a two (2) lot subdivision with a total lot area of 689.66 m^2 (7,423.43 ft^2), refer to Figure 4. Under the proposed N75 Zone, the minimum lot area is 200 m^2 (2,152.78 ft^2) with a minimum lot frontage of 12.0 m (39.37 ft). The proposed lots all have a lot area greater than 200 m^2, and lot frontages exceeding 12.0 m (39.37 ft). Therefore, the proposed development complies with the N75 Zone.

Secondary Suite Policy

5. As identified in Part 2 of the OCP, secondary suites are supported in single detached dwellings, subject to the following criteria:

   - Not be on a cul-de-sac bulb;
   - Not be in a bare land strata (except where road infrastructure meets City bylaw standards);

- Have a minimum frontage of 12.0 m;
- Have a minimum lot size of 400 m^2; and
- Be located on a Collector or Local road.

Both proposed lots have a lot area of less than 400 m^2, refer to Figure 5. Therefore, the proposed lots would not be permitted to have a secondary suite.

Affordable Housing Strategy

6. The Affordable Housing Strategy, (endorsed by Council November 7, 2011) similar to the OCP objectives and policies, encourages the development of complete, connected and livable neighbourhoods with diverse housing types (Objective 4). With policies that support affordable housing development close to transit, jobs and services and the creation of a variety of housing types to suit different needs related to household type, tenure and income. The applicant's proposal is consistent with this policy.

Tree Protection, Removal and Replacement

7. An Arborist report was submitted in conjunction with this application, which was prepared by Central Valley Arborist Consulting Ltd., dated February 19, 2018 (refer to Attachment D). A total of two (2) mature trees exist on the subject property. According to the Arborist's recommendations, the Birch (Tag #1) and the Maple (Tag #2) are to be removed as they are considered to be in poor structural condition. The Birch (Tag #1) was deemed exempt from requiring any tree replacement. Parks, Culture and Recreation, Urban Forestry Section, has concurred with that assessment. As per the Tree Bylaw Replacement Policy, a total of three (3) replacement trees will be required for this project.

   The applicant will be required to obtain a Tree Cutting Permit and secure for replacements in accordance with the Tree Protection Bylaw.

8. In conjunction with this development, street trees and yard trees (minimum of 1 tree per lot) are required in accordance with the Development Bylaw, 2011, and will be secured at time of subdivision.

Subdivision

9. The proposed preliminary subdivision layout (refer to Figure 5) to create a two (2) lot subdivision will be reviewed for acceptability by the Approving Officer, if the rezoning application receives 3rd reading from Council. At that time, staff will conduct a formal subdivision review and exact dimensions of the proposed lots will be finalized.

Driveway and Parking Requirements

10. The proposed development will be required to comply with the Zoning Bylaw, 2014, and the Development Bylaw, 2011, when constructing a driveway to provide adequate off-street parking. The Zoning Bylaw requires a minimum of two (2) parking spaces for a single family dwelling. As per the Development Bylaw, 2011, the maximum driveway width is 6.0 m. In accordance with the Zoning Bylaw, the minimum parking stall width is 2.7 m and the minimum length is 5.5 m.

11. To ensure driveways are restricted to a Local Road (Countess Crescent) rather than an Arterial Road (Old Yale Road), Staff recommend that an Access Control Covenant be registered to the property title of proposed Lot 2 as a condition of rezoning.

12. The applicant did not submit a legal survey plan, prepared by a BC Land Surveyor (BCLS), at time of application. However, the approximate lot dimensions are shown on Figure 5. The proposed subdivision plan confirms that the proposed lots exceed the Subdivision Regulations pursuant to Section 875.5. Therefore, staff have no concerns in regards to both lots being able to accommodate the required off-street parking.

Site Development Considerations

13. A staff review of the Works & Services requirements (dated June 23, 2017) necessary to support this application has been completed and is outlined within Attachment C, the details of which will be incorporated into the Development Agreement, which is a recommended prerequisite for adoption of the Zoning Bylaw Amendment. Some notable requirements of the attached Works & Services Requirements are as follows:

    - A 3.5 m road widening dedication along the full frontage of Old Yale Road along the full frontage of the Lands from the east property line to the west property line to accommodate an Urban Arterial standard road;
    - A 2.5 m road widening dedication along the full frontage of Countess Crescent along the full frontage of the Lands from the north property line to the south property line to accommodate an Urban Local standard road;
    - Provision of a corner truncation of 4.5 m^2, per the City's Development Bylaw, for an Urban Local to Urban Arterial standard road.

14. In addition to the above comments, the Developer is responsible to adhere to all other legislation, which may apply to the land, including:

    a) complying with all applicable City bylaws, such as Official Community Plan, 2016, Development Bylaw, 2011, Tree Protection Bylaw, 2010, Building Bylaw, 2016, Sign Bylaw, 2001, Erosion and Sediment Control Bylaw, 2010, and Development Cost Charges Imposition Bylaw, 2010, administered by the City; and

    b) obtaining all other necessary approvals and permits on such terms as they may be issued, including but not limited to, a Development Permit, Tree Removal Permit, Subdivision Approval, Building Permit, Soil Removal/Deposit Permit, Ministry of Health permit, Ministry of Transportation and Infrastructure approval, and Ministry of Environment approval.

Communication Plan

If the Zoning Amendment Bylaw is supported by Council, Bylaw No. 2937-2019, "Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 247" will proceed to a Regular Meeting of Council, where it will be considered for 1st and 2nd readings. If supported by Council, the Rezoning Bylaw will proceed to a Public Hearing. The City will notify in writing the owners and occupiers of land within a 100 m radius of the property, and provide Council with copies of any feedback that is received.

The City received confirmation on March 22, 2019, that the applicant installed the required Development Notification Signage in accordance with the Development Application Procedures Bylaw, which requires the signage to be installed a minimum of three (3) weeks in advance of Council's consideration of the application.

FINANCIAL PLAN IMPLICATION

No financial plan implications are anticipated. Any capital works implications arising from this application have been addressed through the rezoning process.

Rajat Sharma

Rajat Sharma
General Manager, Finance and Corporate Services
Signed 4/15/2019 7:20 PM

IMPACTS ON COUNCIL POLICIES, STRATEGIC PLAN AND/OR COUNCIL DIRECTION

The proposal meets the goals and objectives identified in the 2016 Official Community Plan, the Affordable Housing Strategy, and Council's 2019-2022 Strategic Plan which identifies four cornerstones: vibrant economy, complete community, fiscal discipline and organizational alignment. The proposal is consistent with the four cornerstones of Council's Strategic Plan

SUBSTANTIATION OF RECOMMENDATION

Staff supports the rezoning of the subject property from RS3 to N75 to permit a two (2) lot infill residential subdivision, given that the proposed development is consistent with the Urban 3 – Infill land use designation and is in keeping with the broad objectives of the OCP that encourages densification and the establishment of a mix of housing types within the Urban Development Boundary.

Howie Choy

Howie Choy
Assistant Planner
Signed 4/15/2019 11:12 AM

Darren Braun

Darren Braun
Director, Development Planning
Signed 4/15/2019 6:46 PM

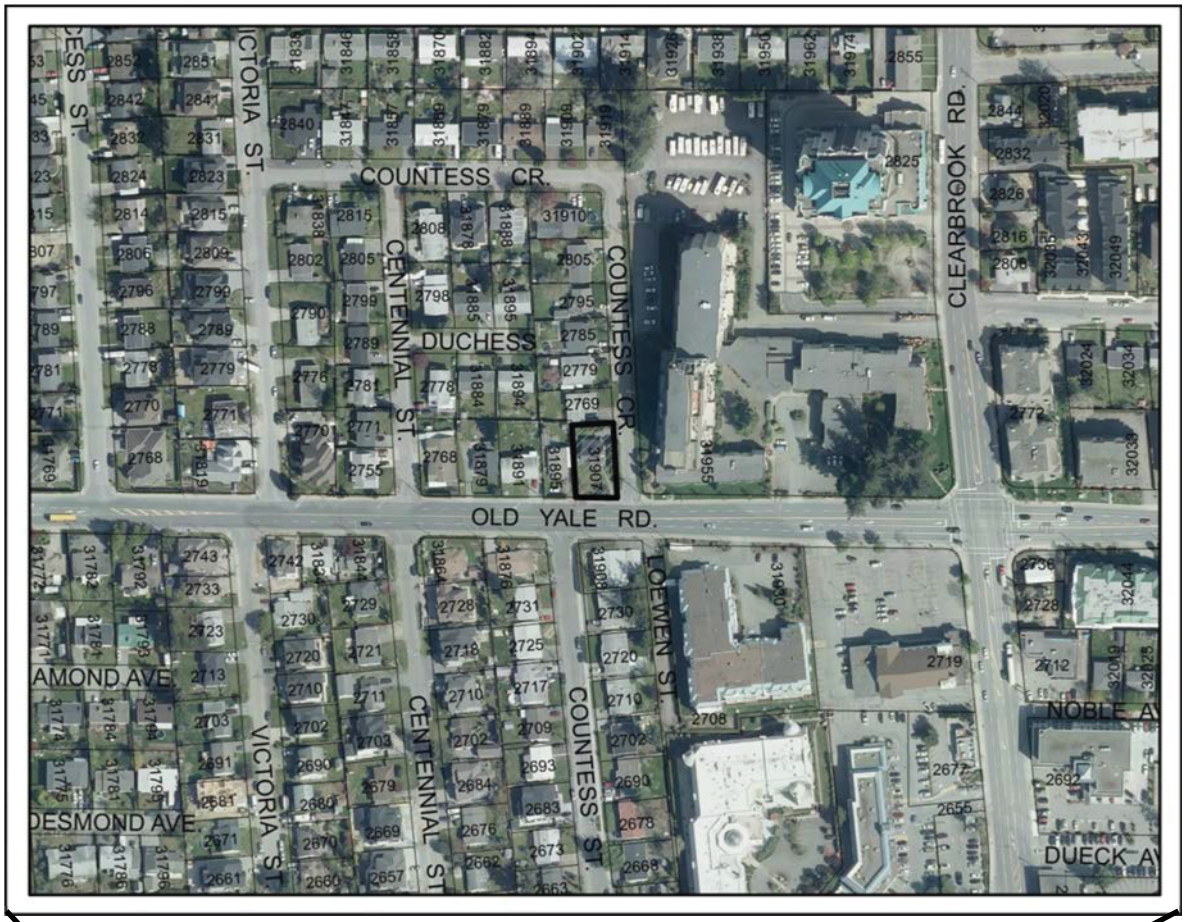
Siri Bertelsen

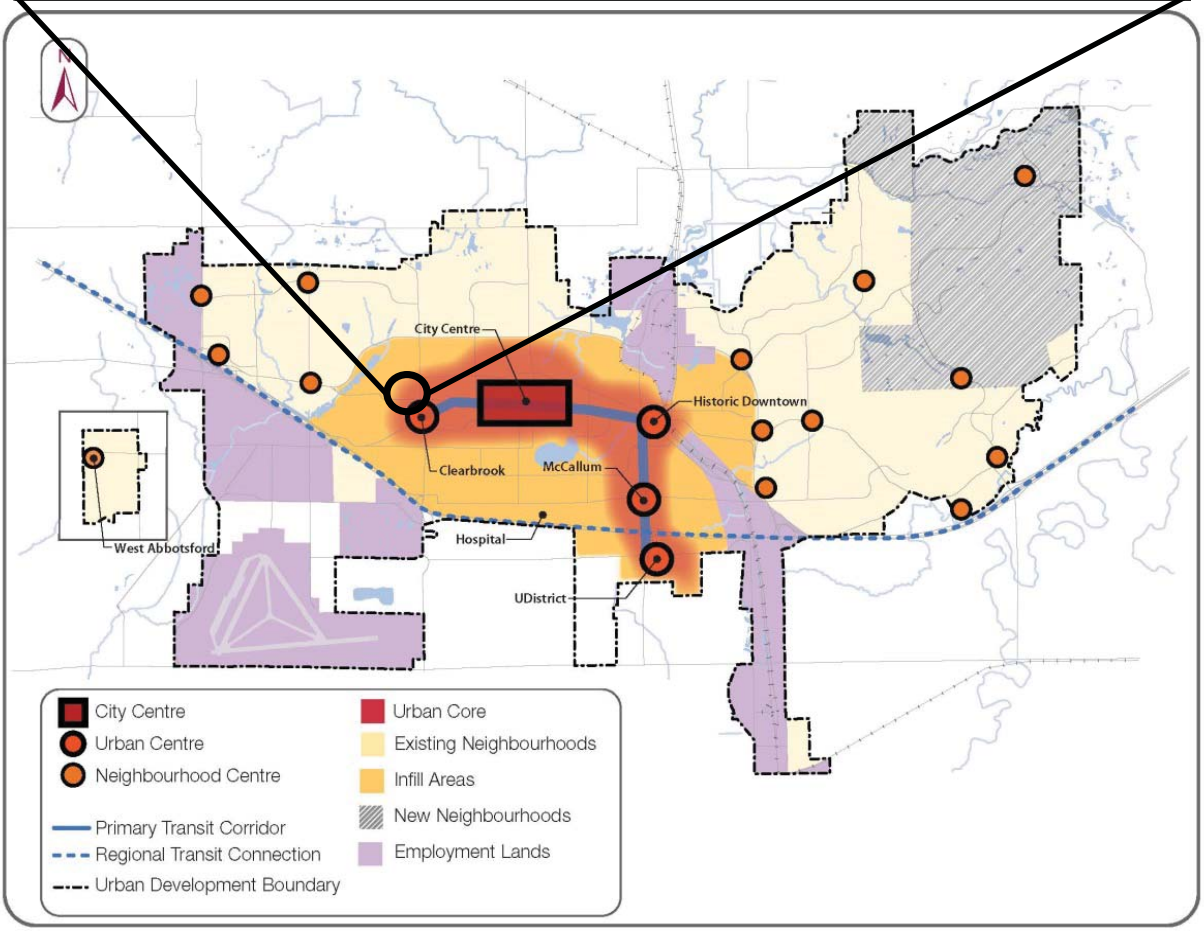
Siri Bertelsen
General Manager, Planning and Development Services
Signed 4/17/2019 1:19 PM

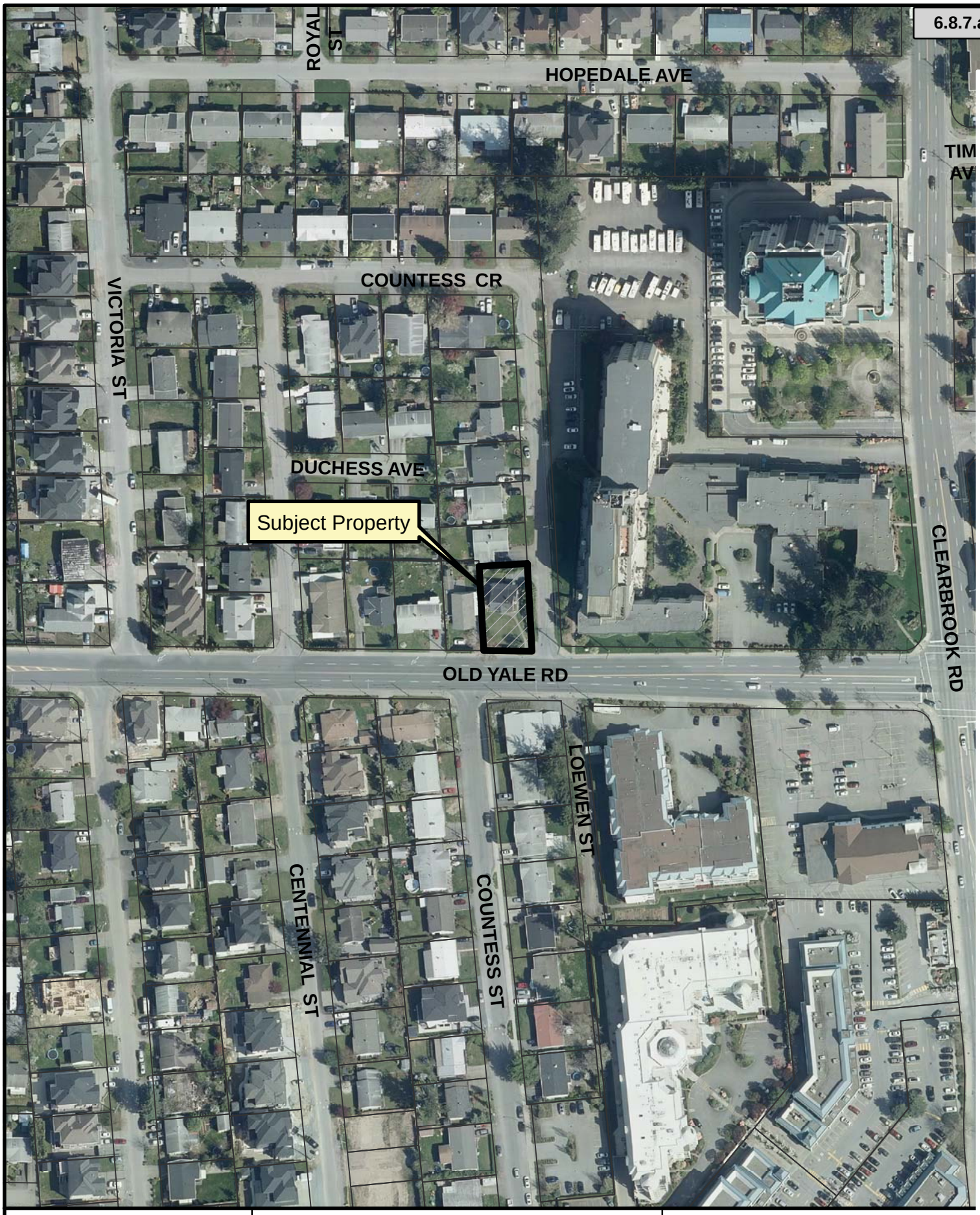
ATTACHMENTS:

Figures 0 to 6
ATTACHMENT A - Letter of Intent (PRJ18-035)
ATTACHMENT B - 2937-2019 Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 247
ATTACHMENT C - Arborist Report, dated February 19, 2018 (PRJ18-035)
ATTACHMENT D - Works & Services Report (PRJ18-035)

City Context Plan
File: PRJ18-035 Location: 31907 Old Yale Road







ABBOTSFORD
Planning and Development Services

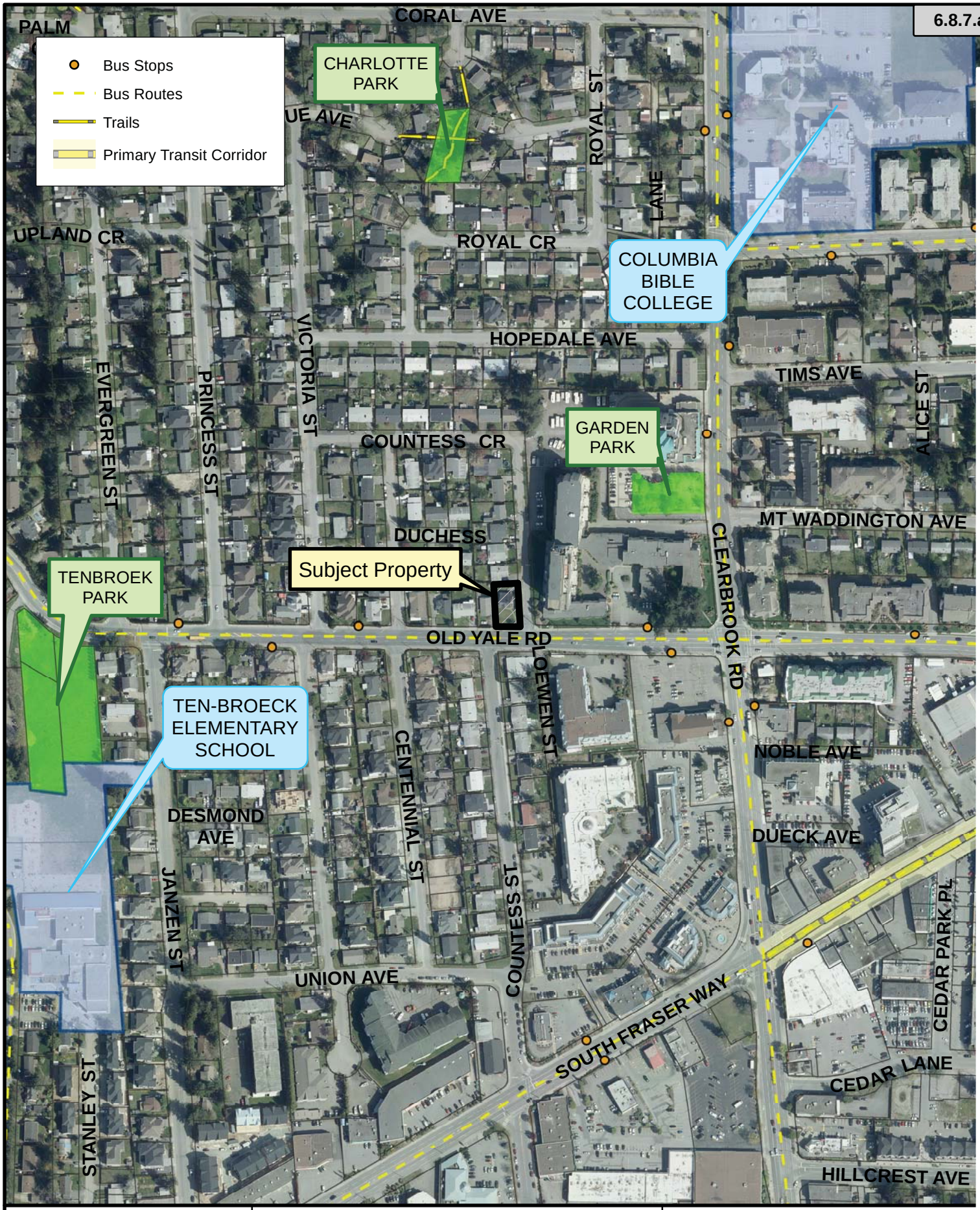
31907 Old Yale Road

Figure 1 - Location Plan
File No.: PRJ18-035

40 0 40
Meters

N

Date



ABBOTSFORD
Planning and Development Services

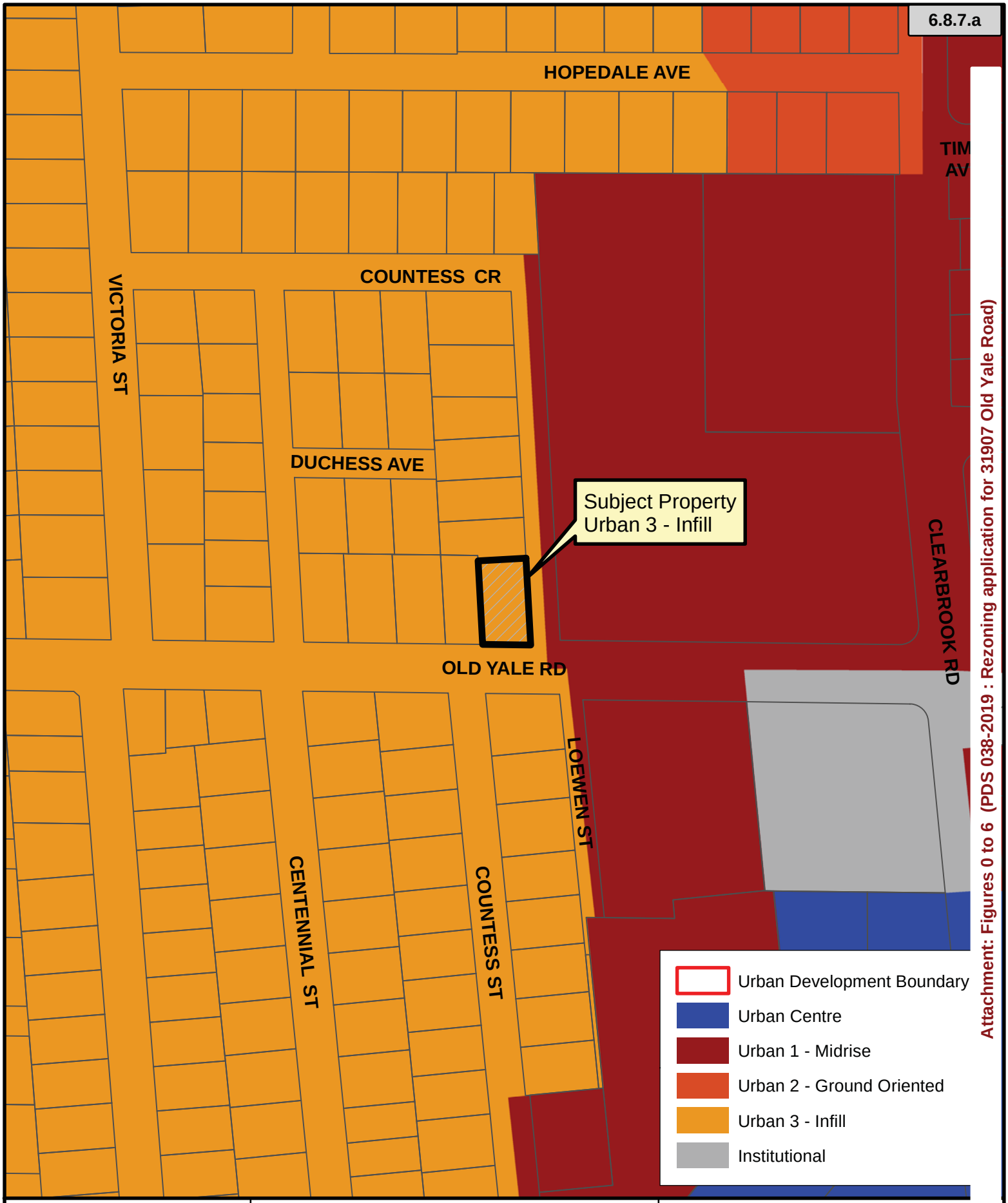
31907 Old Yale Road

Figure 2 - Context Plan
File No.: PRJ18-035

40 0 120
Meters

N

Date



ABBOTSFORD
Planning and Development Services

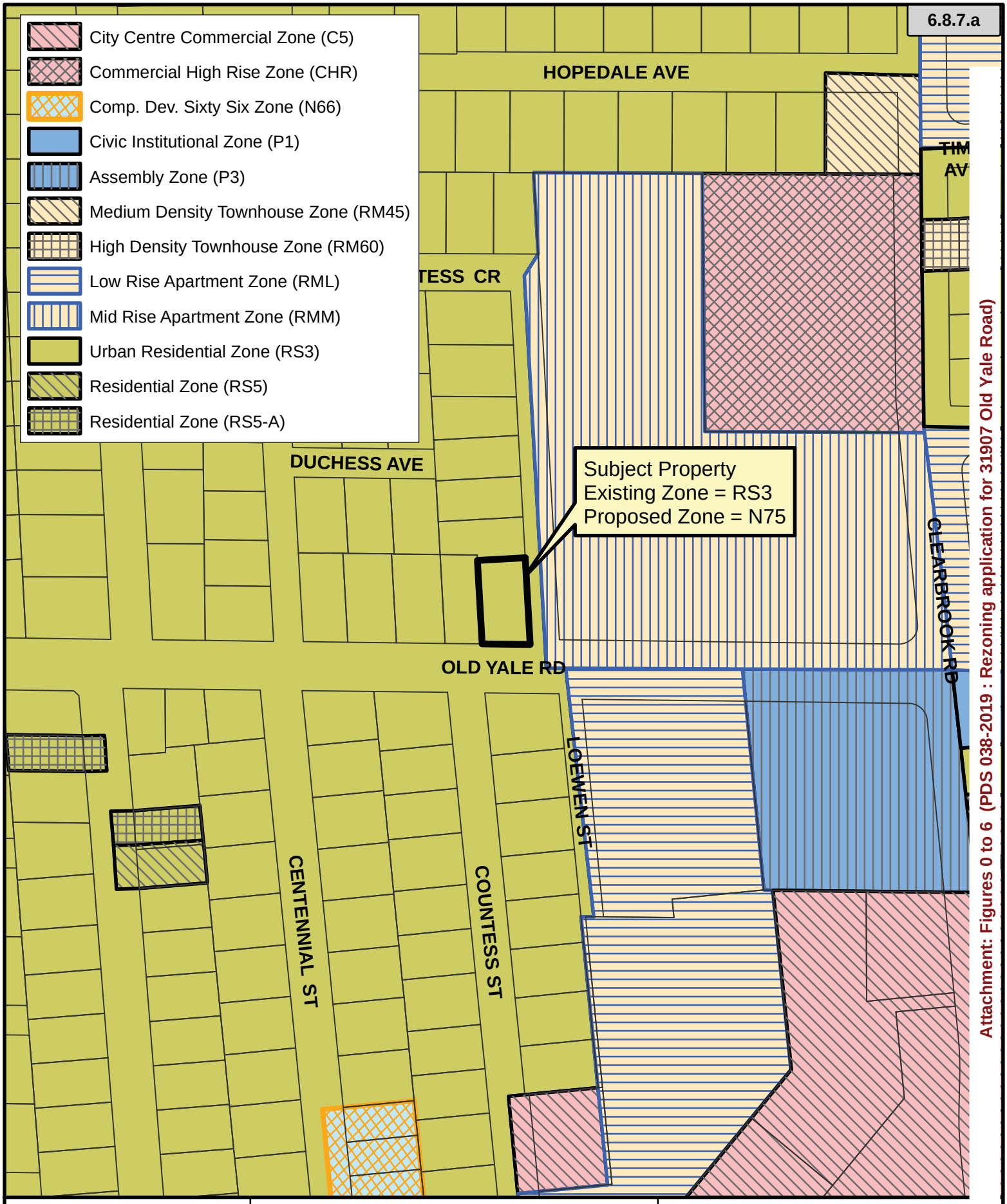
31907 Old Yale Road

Figure 3 - OCP Land Use Designatic
File No.: PRJ18-035

40 0 40
Meters

N

Date



Attachment: Figures 0 to 6 (PDS 038-2019 : Rezoning application for 31907 Old Yale Road)

ABBOTSFORD
Planning and Development Services

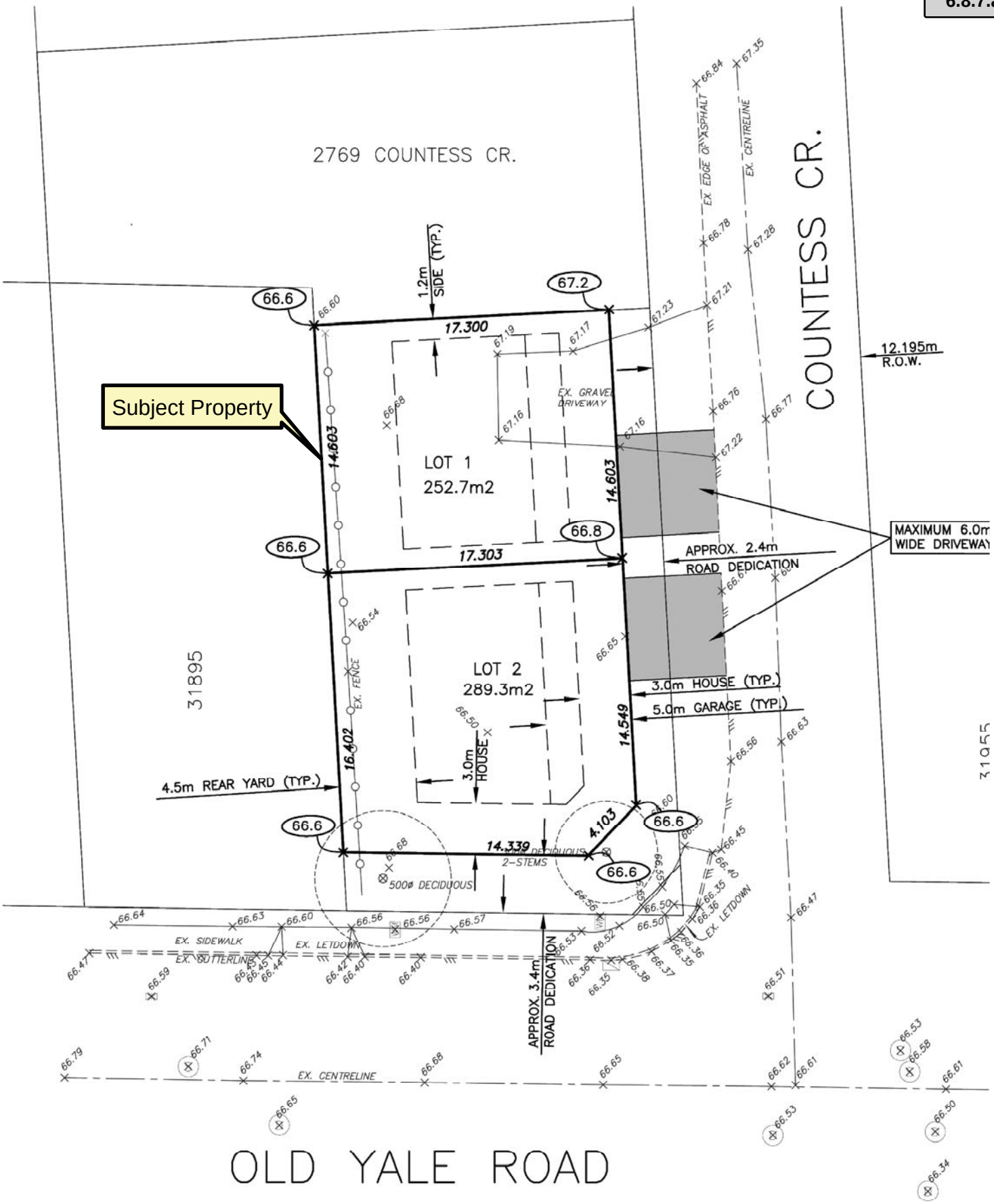
31907 Old Yale Road

Figure 4 - Existing & Proposed Zonir
File No.: PRJ18-035

40 0 40
Meters

N

Date



Attachment: Figures 0 to 6 (PDS 038-2019 : Rezoning application for 31907 Old Yale Road)

ABBOTSFORD
Planning and Development Services

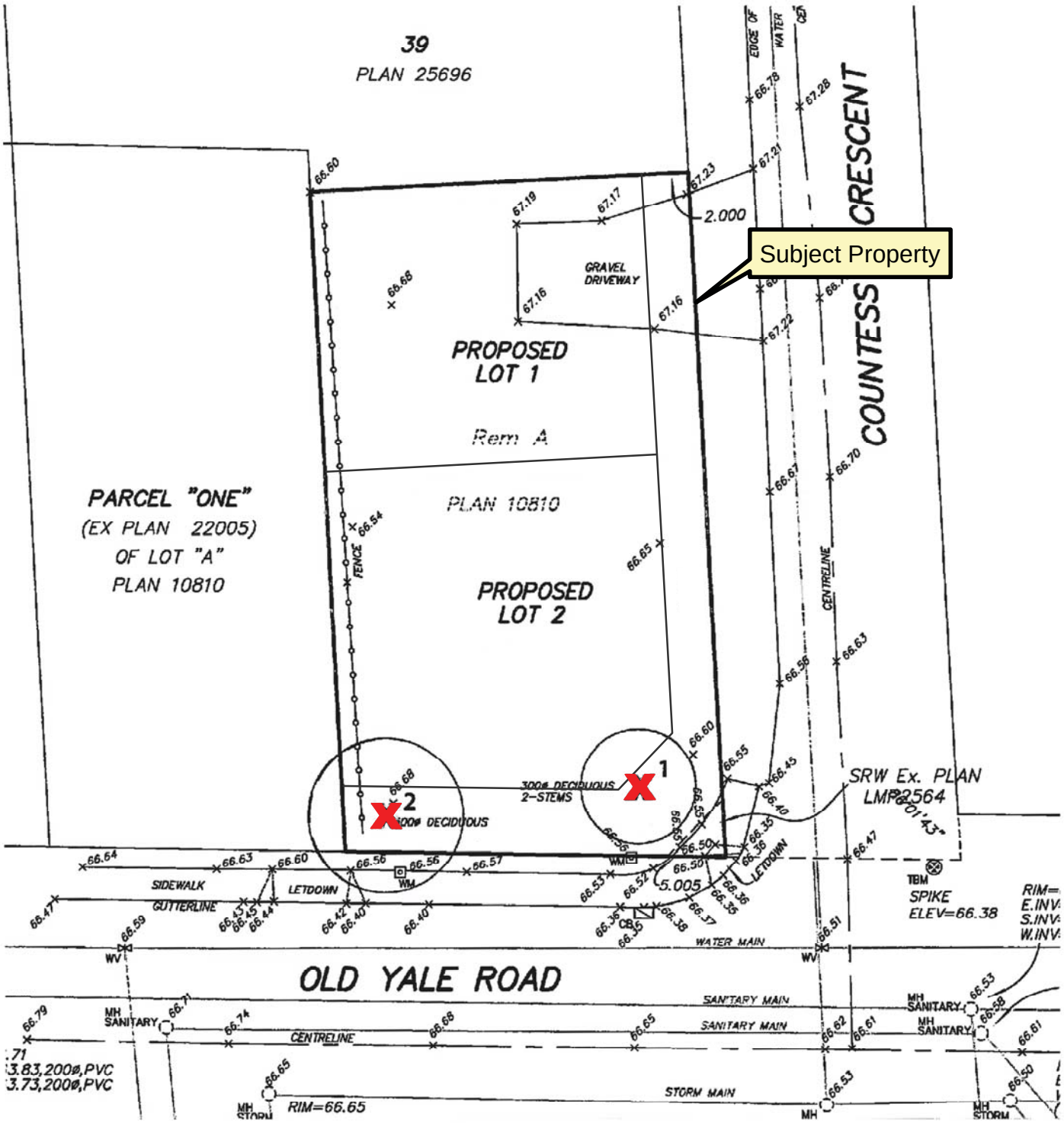
31907 Old Yale Road

Figure 5 - Proposed Subdivision Pla
File No.: PRJ18-035

6 0 6
Meters

N

Date



2	Total tagged trees located on development property 20cm (DBH) or greater
0	Total retained trees 20cm (DBH) or greater
2	Total trees removed 20cm (DBH) or greater

ABBOTSFORD
Planning and Development Services

31907 Old Yale Road

Figure 6 - Tree Management Plan
File No.: PRJ18-035

6 0 6
Meters

N

Date

Attachment: Figures 0 to 6 (PDS 038-2019 : Rezoning application for 31907 Old Yale Road)

CENTRAL VALLEY ENGINEERING (2004) LTD

Consulting

Civil

Engineers

#103-2890
Garden Street
Abbotsford BC
V2T 4W7

Phone:
(604)853-5000

Email:
info@cve2004.ca

Rick Celinski
P.Eng.
rick@cve2004.ca

Teo Bate
Eng. Py.
teo@cve2004.ca

Feb 19, 2018
CVE (2004) File #

Economic Development & Planning Services
City of Abbotsford
32315 South Fraser Way,
Abbotsford, B.C.
V2T 1W7

Attention: *General Manager of Economic Development & Planning Services*

Re: Rezoning and Subdivision of 31907 Old Yale Road

Our client is developing the subject lot, located on Old Yale Road. All adjacent lots have RS3-zoned homes. Our client intends to develop a 2 lot single family residential subdivision, rezoning from RS3 to an N75 CD zone for compact lots.

The proposed building envelopes shown on the application drawings are incorporating the following setbacks:

- 3.0m front yard setbacks
- 4.5m rear yard setbacks
- 1.2m internal side yard setbacks
- 5.0m garage setback

There are trees of notable size on the property and therefore we provide an arborist report, and it relatively flat in grade.

Yours truly,

Rick Celinski, P. Eng.

RC/rc

CITY OF ABBOTSFORD

ABBOTSFORD ZONING BYLAW, 2014, AMENDMENT BYLAW NO. 247

Bylaw No. 2937-2019 PRJ18-035

The Council of the City of Abbotsford, in open meeting assembled, ENACTS AS FOLLOWS:

1. CITATION

Bylaw No. 2937-2019 may be cited as "Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 247".

2. AMENDS ZONING MAPS

Abbotsford Zoning Bylaw, 2014, Schedule "D", Urban Area Zoning, as amended, is further amended by changing the zoning of the lands as shown in the attached Appendix "A" and located at 31907 Old Yale Road:

From: Urban Residential Zone (RS3)
To: Comprehensive Development Seventy Five Zone (N75)

READ A FIRST TIME this	day of	, 2019
READ A SECOND TIME this	day of	, 2019
PUBLIC HEARING HELD this	day of	, 2019
READ A THIRD TIME this	day of	, 2019
ADOPTED this	day of	, 2019

I hereby certify this to be
a true copy of the original
bylaw

Henry Braun
Mayor

Katie Karn
Deputy City Clerk

William Flitton
Corporate Officer

Final Draft – April 10, 2019

Attachment: ATTACHMENT B - 2937-2019 Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 247 (PDS 038-2019 : Rezoning application for

CITY OF ABBOTSFORD

ABBOTSFORD ZONING BYLAW, 2014, AMENDMENT BYLAW NO. 247

Bylaw No. 2937-2019 Page 2

APPENDIX "A"

SCHEDULE BYLAW NO. **2937-2019**
BEING ABBOTSFORD ZONING BYLAW, 2014,
AMENDMENT BYLAW NO. **247**
FROM: **Urban Residential Zone (RS3)**
TO: **Comprehensive Development Seventy Five Zone (N75)**

Final Draft – April 10, 2019

Attachment: ATTACHMENT B - 2937-2019 Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 247 (PDS 038-2019 : Rezoning application for

CENTRAL VALLEY
ARBORIST CONSULTING LTD.

604-850-4938
P.O Box 882 Abbotsford Station A
Abbotsford, BC V2T 7A2

ARBORIST REPORT

For

31907 OLD YALE ROAD

ABBOTSFORD, BC

Prepared for: 0725694 BC Ltd
8136 192nd Avenue
Surrey, BC
Navi Sivia

Prepared by: Brian Kwak
Certified Arborist ISA #PN #7306A
Certified Tree Risk Assessor P#1472

Date: February 19, 2018

Web: www.arborist-tree.com • Email: kwak@shaw.ca

TABLE OF CONTENTS

Page #

- Arborist Letter 1
- Site Plan 2
- Map view aerial photograph 3
- Tree Evaluation Summary..... 4
- Tree Preservation Summary 5
- Protective Fencing 6
- Qualifications of Author 7
- Assumptions and Limiting Conditions 8

CENTRAL VALLEY
ARBORIST CONSULTING LTD.

CERTIFIED ARBORIST

604-850-4938
P.O Box 882 Abbotsford Station A
Abbotsford, BC V2T 7A2

February 19, 2017

0725694 BC Ltd
8136 192nd Avenue
Surrey, BC

The following arborist report has been completed by Brian Kwak (Certified Arborist) for the proposed development located at 31907 Old Yale Road, Abbotsford BC.

On February 19, 2017, I attended the property to review the existing trees and to give a tree inventory with the intent of making recommendations for removal and preservation. The trees on the property were tagged and are numbered 1 to 2. Information was documented with respect to the type of tree, diameter at breast height (DBH), structural condition and health. In total there are 2 trees with a DBH 20 centimeters or greater located on the proposed development property.

The proposed development consists of 2 lots which are accessed from Countess Crescent. The property is flat and has no apparent environmental issues. There is an existing house which will require demolition at a later stage of the development. (See Site Plan for details)

Based on the proposed development the two existing trees require removal. One of the two trees that requires removal has a DBH 30 centimeters or greater the second tree is exempt from requiring tree replacements as it has been assessed to have "No long term future". As per the City of Abbotsford's Tree Bylaw Replacement Policy a total of 3 replacement trees will be required. (See Site Plan and the Preservation Summary for details.)

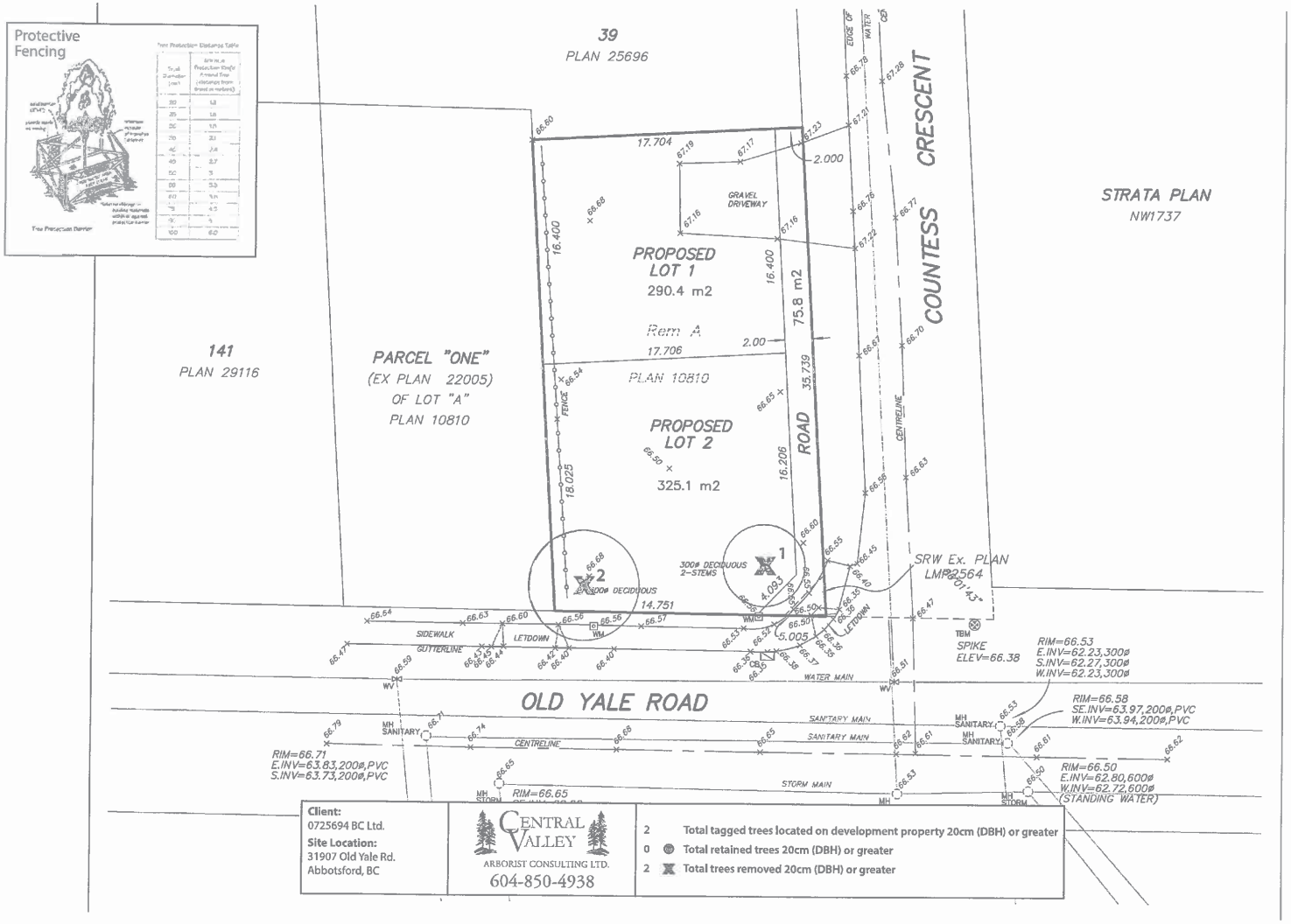
Prior to the commencement of any work, a protective fence must be put in place around all retained trees to just outside the drip line. (See attached fencing instructions) All protective fencing must be inspected by a certified arborist prior to construction. **If there is to be any work within these boundaries a certified arborist must be on site to instruct on proper procedures.** The protective fencing should be inspected weekly to ensure no damage occurs, and it stays in place until all work is completed.

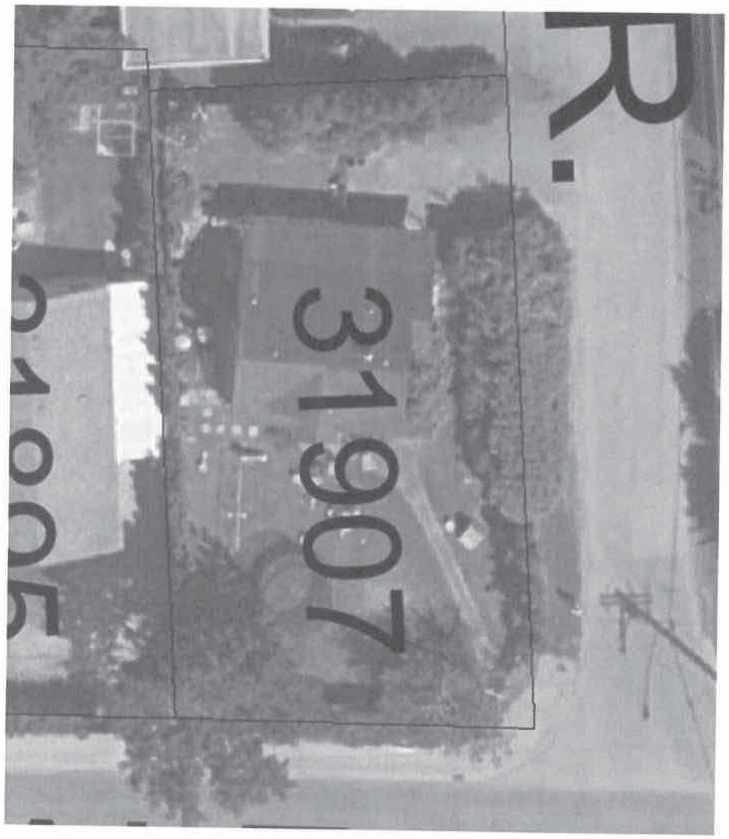
If there are any further questions, please do not hesitate to contact our office.

Respectfully submitted,

Brian Kwak
Certified Arborist PN #7306A
Qualified Tree Risk Assessor

Web: www.arborist-tree.com • Email: kwak@shaw.ca


Protective Fencing
Tree Protection Barrier
39
PLAN 25696
141
PLAN 29116
PARCEL "ONE"
(EX PLAN 22005)
OF LOT "A"
PLAN 10810
PROPOSED LOT 1
290.4 m2
PROPOSED LOT 2
325.1 m2
Rem A
PLAN 10810
ROAD
75.8 m2
35.739
GRAVEL DRIVEWAY
COUNTESS CRESCENT
STRATA PLAN
NW1737
SRW Ex. PLAN
LMP22564
300ø DECIDUOUS
2-STEMS
300ø DECIDUOUS
SIDEWALK
GUTTERLINE
LETDOWN
WATER MAIN
OLD YALE ROAD
SANITARY MAIN
CENTRELINE
STORM MAIN
SPIKE
ELEV=66.38
RIM=66.53
E.INV=62.23,300ø
S.INV=62.27,300ø
W.INV=62.23,300ø
RIM=66.58
SE.INV=63.97,200ø,PVC
W.INV=63.94,200ø,PVC
RIM=66.71
E.INV=63.83,200ø,PVC
S.INV=63.73,200ø,PVC
RIM=66.65
RIM=66.50
E.INV=62.80,600ø
W.INV=62.72,600ø
(STANDING WATER)
Client:
0725694 BC Ltd.
Site Location:
31907 Old Yale Rd.
Abbotsford, BC
CENTRAL VALLEY
ARBORIST CONSULTING LTD.
604-850-4938
2 Total tagged trees located on development property 20cm (DBH) or greater
0 Total retained trees 20cm (DBH) or greater
2 Total trees removed 20cm (DBH) or greater



31907 Old Yale Road Aerial Photo

CENTRAL VALLEY ARBORIST CONSULTING LTD. - TREE EVALUATION SUMMARY

Address: 31907 Old Yale Road, Abbotsford, BC

Date: February 19, 2018

TAG #	SPECIES	LOCATION	# OF TREES	DBH (cm) Diameter at breast height	TREE HEALTH	TREE STRUCTURAL CONDITION	SUGGESTED ACTION	COMMENTS
1	birch	see site plan	1	2 stem >30 cm	poor	poor	remove	**No long term future**
2	maple	see site plan	1	2 stem >30 cm	fair	poor	remove	Past crown reduction due to its location under the power line

TREE PRESERVATION SUMMARY

Project Location:	31907 Old Yale Road Abbotsford, BC
Applicant/Developer: Name, address, telephone:	0725694 BC Ltd 8136 192nd Ave Surrey, BC Navi – 604-825-3762
Consultant: Name, address, telephone:	Central Valley Arborist Consulting Ltd PO Box 882, Station A, Abbotsford, BC, V2T ZA2 Brian Kwak 604-309-4171

Summary of Proposed Trees Retained, Removed and Replaced

This Tree Protection Summary is a quick reference for the Arborist's Evaluation Report submitted for this development and is to be read in conjunction with that report.

A	Number of trees 20 centimeter DBH or greater	2
B	Number of trees retained (0 between 20-30cm DBH and 0 over 30cm DBH)	0
C	Number of trees to be removed (0 between 20-30cm DBH and 1 trees with a 30cm DBH or greater) **plus 1 tree exempt from requiring tree replacements as it has been assessed to have "No long term future"**	2
D	Number of replacement trees required (2 to 1 between 20-30cm and 3 to 1 trees with a 30cm DBH or greater)	3
E	Credit for retained trees, 2 to 1 between 20-30cm and 3 to 1 with a 30cm DBH or greater (0 between 20-30cm DBH and 0 trees 30cm DBH or greater)	0
F	Net total of replacement trees (3 - 0 credits)	3
G	Number of replacement trees proposed to be planted (may differ from number of replacement trees required due to site constraints/opportunities)	*
H	Shortfall of replacement trees to be planted (off-site or provision of cash-in-lieu)	*

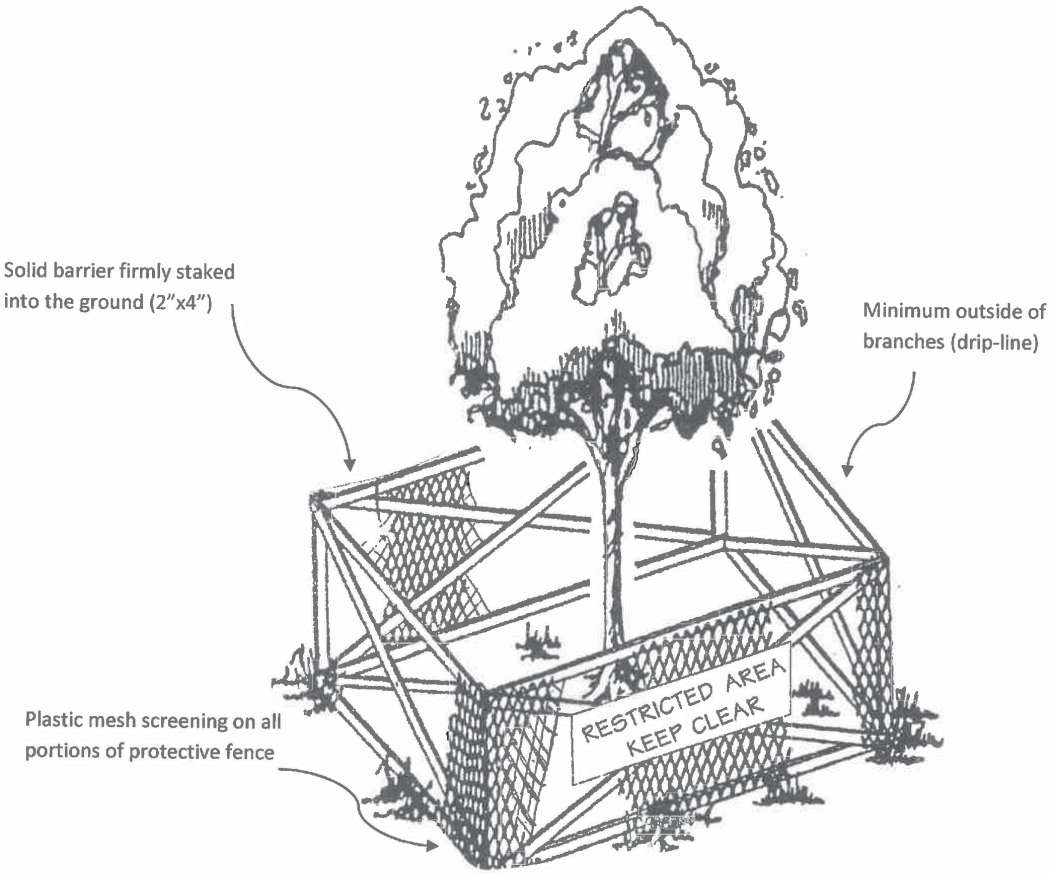
* Unknown at this time (To be advised by City of Abbotsford)

Date: February 19, 2018

Summary Proposed and Submitted by:

Brian Kwak
Certified Arborist PN #7306A
ISA Qualified Risk Assessor

PROTECTIVE FENCING INSTRUCTIONS



Note: No storage of building materials within or against protection barrier and no booms or equipment to enter drip-line at anytime. Barrier is not to be moved once erected.

Qualifications of Author

Brian J. Kwak

P.O Box 882, Station A
Abbotsford, BC
V2T 7A2

Telephone: 604-309-4171
Email: kwak@shaw.ca

- Central Valley Arborist Consulting Ltd; 2015 to present
- Central Valley Tree and Arborist Services Ltd; 2002 to 2015
- Owner of Westland Tree Services 2000 to 2002
- B.K. Tree Services Ltd; 1981 to 1999 (subcontractor)
- International Society of Arboriculture; Certified Arborist PN-7306A
- PNW-ISA, Qualified Tree Risk Assessor
- Consulting Arborist; July 2011 – Present
- Member: International Society of Arboriculture (ISA)
  Pacific Northwest Chapter of Arborist
- Over 30 of years professional work in the tree industry and land clearing business.
- Insurance policy #040149195 ($5,000,000 Liability) – Saxbee Insurance Agencies Ltd.
- Business License: Abbotsford Intra Municipal #128082
- Work Safe BC – 961482-AA
- ISA Qualified Risk Assessor (TRAQ) - November 2016

Assumptions and Limiting Conditions

1. Except as expressly set out in this report and in these Assumptions and Limiting Conditions, Central Valley Arborist Consulting Ltd. (Central Valley) makes no guarantee, representation or warranty (express or implied) with regard to: this report; the findings, conclusions and recommendations contained herein; or the work referred to herein.
2. This report has been prepared, and the work undertaken in connection herewith has been conducted, by Central Valley for **0725694 BC Ltd for 31907 Old Yale Road, Abbotsford BC.** It is intended for the sole and exclusion use by the Client, for the purpose(s) set out in this report. Any use of, reliance on, or decisions made based on this report by any person other than the Client, for any purpose other than the purpose(s) set out in this report, is the sole responsibility of, and at the sole risk of, such other person or the Client, as the case may be. Central Valley accepts no liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm (including without limitation financial or consequential effects on transactions or property values, and economic loss) that may be suffered or incurred by any person as a result of the use of or reliance on this report or the work referred to herein. The copying, distribution or publication of this report (except for the internal use of the Client) without the express written permission of Central Valley (which consent may be withheld in Central Valley's sole discretion) is prohibited. Central Valley retains ownership of this report and all documents related thereto both generally and as instruments of professional service.
3. The findings, conclusions and recommendations made in this report reflect Central Valley's best professional judgment in light of the information available at the time of preparation. This report has been prepared in a manner consistent with the level of care and skill normally exercised by arborists currently practicing under similar conditions in a similar geographic area and for specific application to the trees subject to this report as at the date of this report. Except as expressly stated in this report, the finds, conclusions and recommendations set out in the report are only valid for the day on which the assessment leading to such finds, conclusions and recommendations was conducted. If generally accepted assessment techniques or prevailing professional standards and best practices change at a future date, modifications to the findings, conclusions, and recommendations in this report may be necessary. Central Valley expressly excludes any duty to provide any such modification if generally accepted assessment techniques and prevailing professional standards and best practices change.
4. Conditions affecting the trees subject to this report (the "Conditions", including without limitation structural defects, scares, decay, fungal fruiting bodies, evidence of insect attack, discolored foliage, condition of root structures, the degree and direction of lean, the general condition of the tree(s) and the surrounding site, and the proximity of property and people) other than those expressly addressed in this report may exist. Unless otherwise expressed: information contained in this report covers only those conditions and trees that are expressly stated to be subject to this report and only reflects such Conditions and trees at the time of inspection; and the inspection is limited to visual examination of such Conditions and trees without dissection, excavation, probing, or coring. While every effort has been made to ensure that the trees recommended for retention are both healthy and safe, no guarantees, representations or warranties are made (express or implied) that those trees will remain standing or will not fail. The Client acknowledges that it is both professionally and practically impossible to predict with absolute certainty the behavior of any single tree, or group of trees, in all given circumstances. Inevitably, a standing tree will always pose some risk. Most trees have the potential for failure and this risk can only be eliminated if the risk is removed. If Conditions change or if additional information becomes available at a future date, modifications to the findings, conclusions, and recommendations in this report may be necessary. Central Valley expressly excludes any duty to provide any such modification if Conditions change or additional information becomes available.
5. Nothing in this report is intended to constitute or provide a legal opinion, and Central Valley expressly disclaims any responsibility for matters legal in nature (including, without limitation, matters relating to title to and ownership or real or personal property and matters relating to cultural and heritage values). Central Valley makes no guarantee, representation or warranty (express or implied) as to the requirements of or compliance with applicable laws, rules, regulations, or policies established by federal, provincial, local government or first Nations bodies (collectively, "Governmental Bodies") or as to the availability of licenses, permits or authorizations of any Governmental Body. Revisions to any regulatory standards (including by-laws, policies, guidelines and any similar directions of a Government bodies in effect from time to time) referred to in this report may be expected over time. As a result, modifications to the findings, conclusions and recommendations in this report may be necessary. Central Valley expressly excludes any duty to provide any such modification if any such regulatory standard is revised.
6. Central Valley shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services as described in the fee schedule and contract of engagement.
7. In preparing this report, Central Valley has relied in good faith on information provided by certain persons, Governmental Bodies, government registries and agents and representatives of each of the foregoing, and Central Valley assumes that such information is true, correct and accurate in all material respects. Central Valley accepts no responsibility for any deficiency, misstatement or inaccuracy contained in this report as a result of omissions, misinterpretations or fraudulent acts of or information provided by such persons, bodies, registries, agents and representatives.
8. Sketches, diagrams, graphs, and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys.
9. Loss or alteration of any part of this report invalidates the entire report.

ABBOTSFORD DEVELOPMENT ENGINEERING DIVISION

REZONING WORKS AND SERVICES REQUIREMENTS

File No:	PRJ18-035
Planner:	Allan Campeau, Planner
Prepared By:	Kim Fleming, Development Technologist II
Approved By:	18/04/18 Sarb Toor, Manager, Development Engineering
Date:	April 16, 2018
Applicant:	Rick Celinski
Development Property:	31907 Old Yale Road Lot A, Section 19, Township 16, Nwp 10810 Nwp Subsidy Lot 2, Part Se ¼, Exc: Firstly: Pcl One (Expl Pl 22005) Secondly: Pt Subdivision By Pl 25696.

The Local Government Act authorizes local governments to require development to meet current works and services standards as set out in the City's Development Bylaw and Policies.

This report includes the Works & Services **Requirements** to meet the applicable bylaws and policies and **Future Considerations** that may apply to the next phase of development.

Please have your consulting engineer call Kim Fleming, Development Technologist 2 at 604-864-5689 in regard to this report and any other servicing matters relating to this application.

Attachment: ATTACHMENT D - Works & Services Report (PRJ18-035) (PDS 038-2019 : Rezoning application for 31907 Old Yale Road)

REQUIREMENTS

The portion of proposed surface works that front neighbouring properties require detailed design to ensure their integration with the existing infrastructure.

Additional dedications, SRWs, works, features or limits of construction may be needed as identified through the design and construction phases.

Highways – Dedications and Rights-of-Ways

The OCP designates Old Yale Road as an Urban Arterial standard road which is required to be a minimum 27.0 m wide highway right-of-way.

On Old Yale Road a dedication of approximately 3.5 m is required along the full frontage of the Lands from the east property line to the west property line.

The OCP designates Countess Crescent as an Urban Local standard road which is required to be a minimum 17.0 m wide highway right-of-way.

On Countess Crescent a dedication of approximately 2.5 m is required along the full frontage of the Lands from the north property line to the south property line.

Urban Roadways - Construction

On Old Yale Road, along the full frontage of the Lands from the east property line to the west property line, provide a cash-in-lieu of construct payment for ½ of a(n) Urban Arterial standard road with Urban Highway design features as per Standard Drawing ES-R-7, including;

- barrier curb and gutter on the north side;
- ½ of a 20.4 m wide asphalt roadway;
- 1.5 m wide concrete sidewalk on the north side;
- Curb & gutter, sidewalk, boulevard and pavement tapers at both ends to meet existing;
- ornamental street lighting;
- Traffic signage;
- Traffic lane markings;
- soil(s) to support street trees;
- boulevard improvements on the north side; and
- associated drainage.

A geotechnical report shall be submitted with any roadway design, confirming the structural adequacy of any existing roadway and/or new roadway being constructed by the Developer.

The above noted works are not eligible for Latecomer Charges. *(900-9-01)*

Urban Roadways - Construction

On Countess Crescent, along the full frontage of the Lands from the north property line to the south property line, construct ½ of a Single Family local standard road with Urban Highway design features as per Standard Drawing ES-R-7, including;

- barrier curb and gutter on the west side;
- ½ of a 9.0 m wide asphalt roadway;

Attachment: ATTACHMENT D - Works & Services Report (PRJ18-035) (PDS 038-2019 : Rezoning application for 31907 Old Yale Road)

- Curb & gutter, sidewalk, boulevard and pavement tapers at both ends to meet existing;
- ornamental street lighting;
- Traffic signage;
- Traffic lane markings;
- soil(s) to support street trees;
- boulevard improvements on the west side; and
- associated drainage.

A geotechnical report shall be submitted with any roadway design, confirming the structural adequacy of any existing roadway and/or new roadway being constructed by the Developer.

The above noted works are not eligible for Latecomer Charges. *(900-9-01)*

Traffic/Pedestrian/Cyclist

- The Developer shall provide a cash contribution of $400 per unit for future transit and cycling network improvements in the general area.

The above noted works are not eligible for Latecomer Charges. *(900-9-01)*

Drainage Collection and Disposal
On Countess Crescent, along the full frontage of the Lands from the existing 450 mm Storm main from Old Yale Road to the north property line, construct a storm drainage system to drain the Lands.

Provide a storm water management plan showing how onsite drainage will be accommodated offsite. All offsite storm water works and services including new installations and upgrades to existing offsite systems required by the storm water management plan shall be designed and constructed in accordance with said storm water management plan.

Prior to any further development on the Lands, provide an updated storm water management plan showing how drainage on the Lands will be accommodated including detention. All storm water works and services including new installations and upgrades to existing offsite systems required by the updated storm water management plan shall be designed and constructed in accordance with said updated storm water management plan.

Portions of the above noted works may be eligible for Latecomer Charges. *(900-9-01)*

Sewage Collection and Disposal
On Countess Crescent, along the full frontage of the Lands from the existing sanitary main on Old Yale Road to the north property line, construct a sanitary sewer system.

Portions of the above noted works may be eligible for Latecomer Charges. *(900-9-01)*

Rezoning Development Agreement Preparation Fee
Pay $500 Development Agreement preparation fee.

Works & Services Security & Warranty Deposit

Attachment: ATTACHMENT D - Works & Services Report (PRJ18-035) (PDS 038-2019 : Rezoning application for 31907 Old Yale Road)

Provide as Security Deposit, the estimated construction cost plus 10% for engineering (min $25,000) and 5% for as-constructed drawings (minimum $15,000) in cash or letter of credit.

Administration & Inspection Fee
Pay 5% of the first $300,000 + 3% of the remainder of the estimated construction cost for administration and inspections.

City Services Fees
Tie-in inspection fee ($50 per inspection) for water, sanitary, and storm sewer services.

Sewer main connections are supervised and/or performed by City crews at the developer's expense and payable upon invoice.

Street and traffic signs are supplied and installed by the City at the developer's expense and payable upon invoice.

Pay to energize street lights at $50 per street light.

Attachment: ATTACHMENT D - Works & Services Report (PRJ18-035) (PDS 038-2019 : Rezoning application for 31907 Old Yale Road)

FUTURE CONSIDERATIONS

Upon further development an additional works and services review will apply related to that application. Listed below are some items to consider.

Bylaws

- the applicant is to be familiar with the Development Bylaw to ensure an understanding of possible future Works and services that may impact the development
- the applicant is to review the Works and Services identified in the Development Agreement and how they may impact the building.

Stormwater Management

- detention and infiltration will be required. Ensure that adequate room and proper placement has been reviewed.

Traffic Management

- road dedications, statutory rights-of-way and easements to accommodate the works and lot grading may require adjustments to the placement or size of the building.

Service Connections

- water, sanitary and storm connections may have specific tie in locations. Review and confirm locations prior to design.

Development Cost Charges.

- Development Cost Charges (DCCs) shall be paid in accordance with the DCC Bylaws applicable to this file prior to final subdivision approval.

Lot Grading

- A Lot Grading Plan is required. Final lot grading shall conform to City's Lot Grading Policy and Guidelines. Any retaining walls that the Developer or Consulting Engineer consider are necessary to effectively grade the Lands to prevent negative impacts on finished neighbouring Lands, either existing or proposed, shall be constructed by the Developer. The standard "Lot Grading Covenant shall be registered against title to all proposed lots.

- Lot grading shall also provide for the collection of surface runoff and other drainage that will discharge to the City Drainage system. Lot grading may be designed to allow for surface sheet flows or collected in swales and directed to lawn basins as necessary to the satisfaction of the General Manager, Engineering. Any collection of surface flows to a concentrated point discharge location shall include provision for easements or rights-of-way across impacted Lands as necessary. All lot grading shall be designed to take care of surface flows emanating from onsite grading.

Attachment: ATTACHMENT D - Works & Services Report (PRJ18-035) (PDS 038-2019 : Rezoning application for 31907 Old Yale Road)

ABBOTSFORD

COUNCIL REPORT

Executive Committee

Report No. PDS 039-2019

Date: April 25, 2019
File No: 3100-05 PRJ17-111

To: Mayor and Council
From: James Bryndza, Planner
Subject: Rezoning application for the property located at 1684 McKenzie Road, proposing a new Comprehensive Development Ninety Two Zone (N92) and to rezone the subject property from Urban Residential Zone (RS3) to a new N92 Zone for a 5 lot development (Owners: M & P Development Ltd.; Directors: P. Dhillon and M. Nareg)

RECOMMENDATION

1. THAT, in accordance with the City's Appeal Procedure Bylaw, 2016, Council extend the deadline for Application No. 3100-05/PRJ17-111 until Council has considered first and second readings of Bylaw No. 2921-2019, "Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 243", as under the City's Development Application Procedures Bylaw, 2016, the application has lapsed;

2. THAT Bylaw No. 2921-2019, "Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 243", be given first and second readings at the next Regular Meeting of Council, and be advanced to an upcoming Public Hearing;

3. THAT prior to adoption of Bylaw No. 2921-2019, "Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 243", the following conditions be satisfied:

   a) entering into a development agreement to secure the required road dedication and utility upgrades and extensions, in accordance with Development Bylaw, 2011, as detailed in the Works and Services Report;
   b) providing road widening dedication sufficient to accommodate half of a residential cul-de-sac as per City of Abbotsford Standard ES-R-1 drawing, in accordance with Development Bylaw, 2011 to the acceptance of the General Manager, Engineering and Regional Utilities and the Ministry of Transportation and Infrastructure;
   c) registering a Section 219 covenant for building design control measures addressing building massing;
   a) providing $5,000 cash-in-lieu towards transportation updates for the area;
   b) providing a community benefit contribution of $400 per dwelling unit towards future transit and cycling infrastructure;
   c) providing a community benefit contribution of $225 per dwelling unit towards park improvements;
   d) obtaining Ministry of Transportation and Infrastructure approval of Bylaw No. 2921-2019, "Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 243"; and

e) resolving all issues of funding for items not budgeted by the City; and

4. THAT the Mayor and Corporate Officer be authorized to execute all documents relating to this matter.

REPORT CONCURRENCE	
General Manager The General Manager concurs with the recommendation of this report.	**City Manager** The City Manager concurs with the recommendation of this report.

PURPOSE

The applicant proposes to rezone the subject property from Urban Residential Zone (RS3) to a new Comprehensive Development Ninety Two Zone (N92) to permit a five (5) lot subdivision.

SUMMARY OF THE ISSUE

The applicant proposes to rezone the subject property from Urban Residential Zone (RS3) to a new Comprehensive Development Ninety Two Zone (N92) to facilitate a five (5) lot subdivision. The application is consistent with the Urban 3 – Infill land use designation in the Official Community Plan. The existing single detached dwelling will be demolished in conjunction with a future 5 lot subdivision if the current rezoning application is adopted (see Figures 1-11 and Attachments A-C).

This application was submitted on July 20, 2017, therefore it is consistent with Council's February 19, 2018 resolution regarding the interim approach for infill applications while the Urban 3 – Infill study is underway to move forward and be considered by Council on a case by case basis.

BACKGROUND

Applicant:	D&D Design Ltd (Darren Hall)
Registered Owners:	M & P Development Ltd. (Directors: Paramjit Dhillon and Manjjyet Nareg)
Legal Description:	Lot A Sec 15 TWP 16 Plan LMP21075
UDistrict Neighbourhood Plan Designation:	Urban 3 – Infill
Existing Zoning:	Urban Residential Zone (RS3)
Proposed Zoning:	Comprehensive Development Ninety Two Zone (N92)
Site Area:	2,146.47m^2 (23,104ft^2)

Site Description: The subject property is located in the UDistrict on the east side of McKenzie Road and backs onto single detached dwellings within an established single family neighbourhood. Highway No. 1 is located to the north just across a lane and the property contains a single family residence with an attached garage.

Surrounding Uses:
- N: residential lane (zoned RS3) and Highway No. 1 beyond;
- S: single family dwellings (zoned RS3);
- E: single family dwellings (zoned RS3); and
- W: McKenzie Road and single family dwellings beyond (zoned RS3 but designated Urban 2 – Ground Oriented).

DISCUSSION

Context

1. The proposed development is located within the UDistrict, on the east side of McKenzie Road. The surrounding neighbourhood consists of single detached dwellings. University of the Fraser Valley is located approximately 500m away and Amblewood Park is approximately 220m to the east.

UDistrict Neighbourhood Plan

2. The UDistrict Neighbourhood Plan, which forms part of the Official Community Plan (OCP) designates the property as Urban 3 – Infill (see Figure 3). The purpose of the Urban 3 – Infill land use category is to enable infill residential with density increases near City and Urban Centres and the Primary Transit Corridor, and includes single detached dwellings with accessory units and ground orientated duplexes. Under the Urban 3 – Infill designation, secondary suites are permitted on lots greater than 400m^2.

3. The proposed development meets the intent of broader OCP objectives, as follows:
   - Support diverse housing types for a variety of household sizes, incomes, tenures, and preferences (2.1); and
   - Focus residential intensification around the Urban and Neighbourhood Centres (2.9).

Zoning

4. A rezoning application is proposed to rezone the subject property from RS3 to a new Comprehensive Ninety Two Zone (N92), to permit a five (5) lot subdivision with individual lot areas between approximately 359m^2 (3,862ft^2) and 498m^2 (5,356ft^2), see Figure 6. Based on the proposed lot configuration, none of the proposed lots will be permitted secondary suites as the lots do not meet the current Secondary Suite Policy contained within the OCP.

   The proposed new N92 Zone is based on the existing N75 Zone but includes slightly wider front and rear yard setbacks for the proposed panhandle lots in order to help bring consistency with the setbacks of existing adjacent dwellings to the east and south as redevelopment of those lands appears unlikely in the short/medium term. The Approving Officer has indicated that these setback requirements will be secured through building envelope covenants through the subdivision stage. A condition of use has also been added to the proposed N92 zone to redefine the front lot line in a way that orients the panhandle

lots in a north-south direction, consistent with the 3 existing panhandle lots to the east of the subject property (See Figure 6 and Attachment A).

Secondary Suite Policy

5. As identified in Part 2 of the OCP, secondary suites are supported in single detached dwellings, subject to the following criteria:

- Not be on a cul-de-sac bulb;
- Not be in a bare land strata (except where road infrastructure meets City bylaw standards);
- Have a minimum frontage of 12.0 m;
- Have a minimum lot size of 400m^2; and
- Be located on a Collector or Local road.

As discussed in Item #4 above, based on the proposed lot configuration none of the proposed lots will be permitted secondary suites as the lots do not meet the OCP's Secondary Suite Policy.

Design Control Covenant

6. In this instance staff recommends that a Section 219 covenant for design control be registered against the title of the subject property. In essence, the covenant will provide for design control measures that ensure any potential impact on adjacent properties form the massing of new buildings are mitigated and generally limited to two storeys along the south property lines of Lots B, C, D and E. The applicant has provided a site plan and site elevations and adherence to these general designs will be included within the design control covenant (see Figures 6-9).

Affordable Housing Strategy

7. The Affordable Housing Strategy, (endorsed by Council November 7, 2011) similar to the OCP objectives and policies, encourages the development of complete, connected and livable neighbourhoods with diverse housing types (Objective 4). With policies that support affordable housing development close to transit, jobs and services and the creation of a variety of housing types to suit different needs related to household type, tenure and income. The applicant's proposal is consistent with this policy.

Steep Slopes Development Permit

8. As per the OCP, the subject property is located within the Steep Slope Development Permit area, as shown on Figure 5. The Steep Slope Development Permit area guidelines are intended to allow land to be used for its intended purpose, while also protecting residents and property from the potential risk of natural hazards. The steep slope that is adjacent to the property is a berm constructed to reduce the noise and visual impacts of Highway No. 1. As this is an intentionally constructed berm, a Steep Slope DP exemption was approved by the Director, Development Planning at the time when the exemption was requested.

Parks/Tree Protection

9. An Arborist report was submitted in conjunction with this application, which was prepared by Central Valley Arborist Consulting Ltd. (dated June 22, 2017; revised February 24, 2019) (see Attachment C). The report identifies 7 mature trees (tree nos. 1-7), which are subject to

the Tree Protection Bylaw and a group of 4 cedar hedge trees (tree stand no. 8), which are not subject to the Tree Protection Bylaw. One of the 4 cedar hedges and 2 of the 7 mature trees have been removed since the arborist's first visit on the property (see Tree Evaluation Summary in Attachment C – Arborist report). The owner has stated that these trees degraded into a hazardous condition from inclement weather and were removed for safety reasons. Staff from Parks, Recreation and Culture confirmed that many similar cases have occurred in the City due to winter windstorms over the last couple years.

According to the Arborist's recommendations, 4 of the 5 remaining bylaw sized trees and the remaining trees of the cedar hedge—not subject to the Tree Protection Bylaw—are proposed to be removed as they are either located within the proposed building envelopes or are in poor condition. One tree is proposed to remain, which is a 46cm pine tree (tree no. 7). The applicant will be required to obtain a tree cutting permit and secure for replacements in accordance with the Tree Protection Bylaw.

In addition to the trees identified in the arborist report, there are several existing cedar hedges along the south property line and within or partially within the south adjoining properties. These hedges were not included in the arborist report as they are all below the minimum bylaw size of 20cm DBH, as stipulated by the Tree Protection Bylaw. However, these cedar hedges do provide substantial screening and privacy between the subject property and the south adjoining properties (see Figure 11). The Owner of the subject property has stated that these hedges are planned to remain to help ensure continued screening and privacy between lots.

Finally, there is one tree (Tree #1) that is at least partially within the City's road right of way (see Figure 10). This tree is required to be removed to accommodate the proposed development. Staff from Parks, Recreation and Culture have reviewed the Arborist report and stated that this tree is not desirable for retention due to significant, uncorrectable structural weaknesses; therefore staff supports the arborist's recommendation to remove the tree.

10. Consistent with similar applications, staff recommends that a community benefit contribution of $225 per unit be provided by the applicant/owner as a condition of rezoning towards park improvements in support of the proposed rezoning.

11. In conjunction with this development, street trees and yard trees (minimum of 1 tree per lot) are required in accordance with the Development Bylaw, 2011 and will be secured at the subdivision stage.

Subdivision

12. The proposed preliminary subdivision layout (see Figure 6) to create a five (5) lot subdivision will be reviewed for acceptability by the Approving Officer, if the rezoning application receives 3rd reading from Council. At that time, staff will conduct a formal subdivision review and exact dimensions of the proposed lots will be finalized.

Driveway and Parking Requirements

13. The proposed development will be required to comply with the Zoning Bylaw, 2014 and the Development Bylaw, 2011 when constructing driveways. The Zoning Bylaw requires a minimum of two (2) parking spaces for a single family house. As per the Development

Bylaw, 2011, the maximum driveway width is 6.0m and the minimum is 2.7m. In accordance with the Zoning Bylaw, the minimum parking stall width is 2.7m and the minimum length is 5.5m.

Three (3) of the 5 lots are proposed to be panhandle lots, accessed via a 6m wide shared driveway that covers all three of the panhandle portions of the lots. A 1m wide landscape buffer is also included to separate the subject driveways from the driveways to the north (see Figures 1 and 6). A covenant to secure the shared driveway and landscape buffer will be addressed through the subdivision application. Staff are satisfied with this configuration as it matches the configuration of adjoining lots to the east and provides additional separation and buffering from the highway.

The applicant has not submitted a proposed subdivision survey prepared by a BC Land Surveyor at this stage, however, the approximate lot dimensions are shown on Figure 6. The proposed subdivision plan confirms that the proposed lots exceed the minimum required lot width and depth; therefore staff have no concerns with both lots being able to accommodate the required parking spaces.

Site Development Considerations

14. A staff review of the Works and Services (dated September 12, 2017) necessary to support this application has been completed and is outlined within Attachment B, the details of which will be incorporated into the Development Agreement, which is a recommended prerequisite for adoption of the Zoning Bylaw amendment. Some notable requirements of the attached Works and Services Requirements are:

- on McKenzie Road dedicate sufficient land and construct half of a residential cul-de-sac as per City of Abbotsford Standard ES-R-1 drawing;
- on McKenzie Road, along the full frontage of the Lands from the south property line to the north property line, construct half of a Single Family Local standard road with Urban Highway design features as per Standard Drawing ES-R-7;
- providing cash-in-lieu of $5,000 towards transportation updates for the area;
- providing a community benefit contribution of $400 per dwelling unit towards future transit and cycling infrastructure;

15. In addition to the above comments, the developer is responsible to adhere to all other legislation, which may apply to the land, including:

a) complying with all applicable City bylaws, such as Official Community Plan, 2016, Development Bylaw, 2011, Tree Protection Bylaw, 2010, Building Bylaw, 2016, Sign Bylaw, 2001, Erosion and Sediment Control Bylaw, 2010, and Development Cost Charges Imposition Bylaw, 2010 administered by the City; and

b) obtaining all other necessary approvals and permits on such terms as they may be issued, including but not limited to a development permit, tree removal permit, subdivision approval, building permit, soil removal/deposit permit, Ministry of Health permit, Ministry of Transportation and Infrastructure approval and Ministry of Environment approval.

Ministry of Transportation and Infrastructure Approval

16. The proposed rezoning bylaw amendment includes the creation of a new N92 Zone, applicable to the whole City. As such, proposed Bylaw No. 2921-2019, “Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 243” requires approval from the Ministry of Transportation and Infrastructure.

Development Application Procedures Bylaw and Adoption Timelines

17. In March of 2016 City Council adopted Development Application Procedures Bylaw, 2016, which among other things established timelines for closing development applications. In this case, the application was to be advanced to Council for consideration on or before March 24, 2019; however, this deadline was not met and staff is not able to provide an additional extension under the bylaw. Despite the application not proceeding on time but recognizing the applicant's recent efforts to submit and revise the outstanding items in a timely manner, the applicant and staff are requesting that Council, utilizing the City's Appeal Procedure Bylaw, 2016, grant an extension to allow this application to be considered and move through the Council consideration and public hearing process.

Communication Plan

If the zoning amendment bylaw is supported by Council, Bylaw No. 2921-2019, "Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 243" will proceed to a Regular Meeting of Council, where it will be considered for 1st and 2nd readings. If supported by Council, the Rezoning Bylaw will proceed to a Public Hearing. The City will notify in writing the owners and occupiers of land within a 100 meter radius of the property and provide Council with copies of any feedback that is received.

The City received confirmation on March 19, 2019, that the applicant installed the required Development Notification Signage in accordance with the Development Application Procedures Bylaw, which requires the signage to be installed a minimum of three weeks in advance of Council's consideration of the application.

FINANCIAL PLAN IMPLICATION

No financial plan implications are anticipated. Any capital works implications arising from this application have been addressed through the rezoning process.

Rajat Sharma

Rajat Sharma
General Manager, Finance and Corporate Services
Signed 4/11/2019 8:17 PM

IMPACTS ON COUNCIL POLICIES, STRATEGIC PLAN AND/OR COUNCIL DIRECTION

The proposal meets the goals and objectives identified in the 2016 Official Community Plan, the Affordable Housing Strategy, and Council's 2019-2022 Strategic Plan which identifies four cornerstones: vibrant economy, complete community, fiscal discipline and organizational alignment. The proposal is consistent with the four cornerstones of Council's Strategic Plan.

SUBSTANTIATION OF RECOMMENDATION

Staff supports the creation of a new Comprehensive Development Ninety Two Zone (N92) and rezoning of the subject property from RS3 to N92 to permit a five (5) lot residential subdivision, given that the proposed development is consistent with the Urban 3 – Infill land use designation and is in keeping with the broad objectives of the OCP that encourages densification and the establishment of a mix of housing types within the Urban Development Boundary.

James Bryndza

James Bryndza
Planner
Signed 4/2/2019 3:25 PM

Darren Braun

Darren Braun
Director, Development Planning
Signed 4/11/2019 7:53 PM

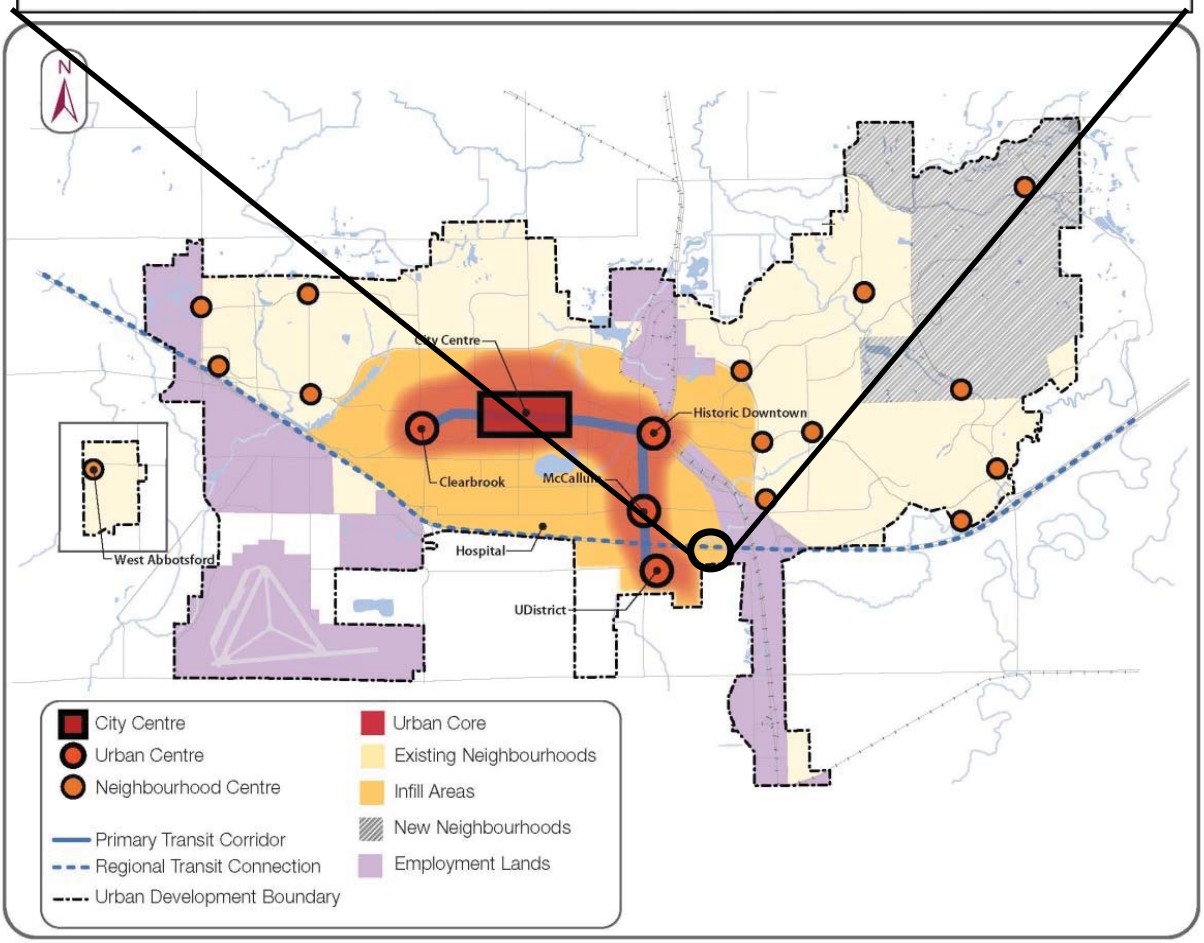
Siri Bertelsen

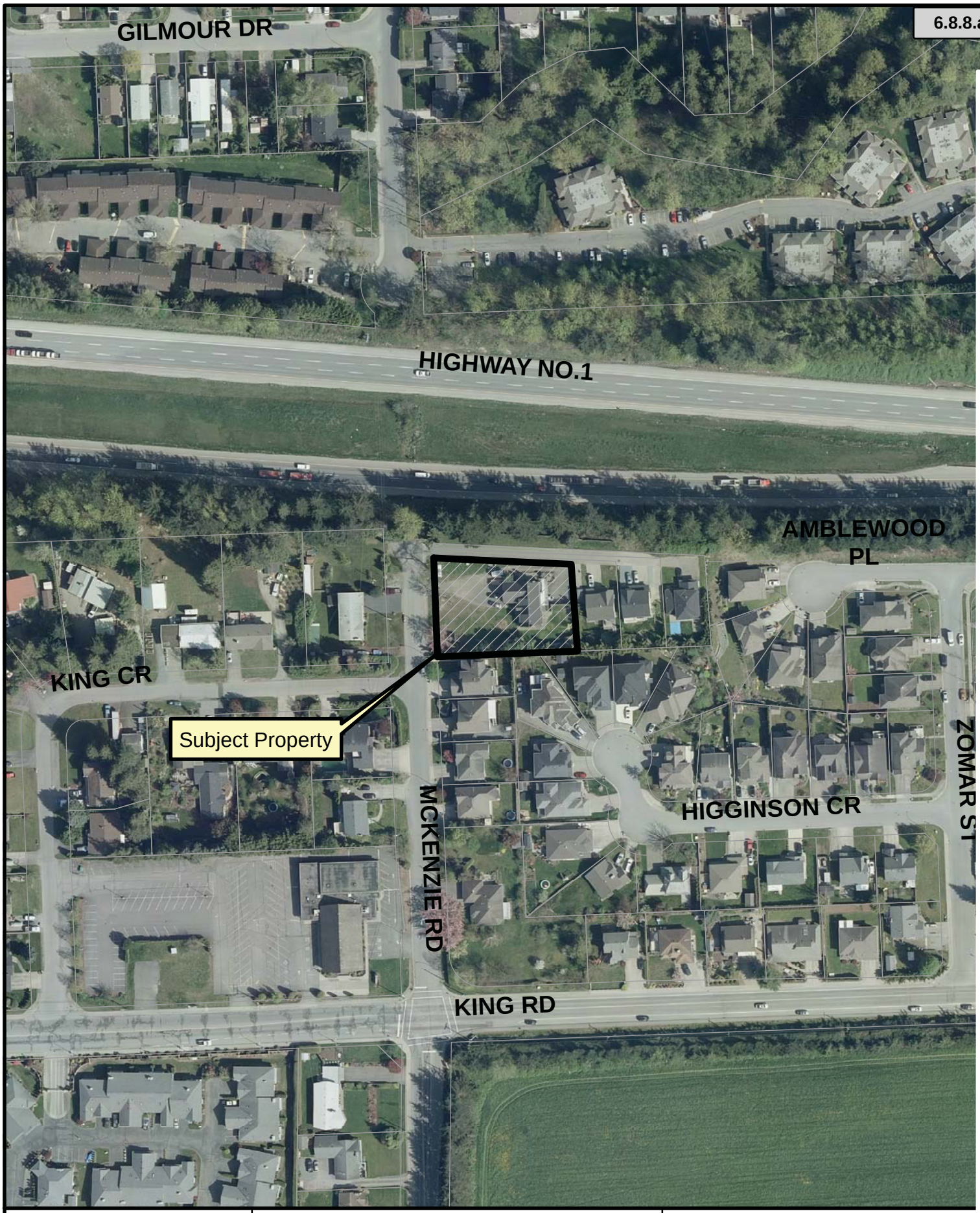
Siri Bertelsen
General Manager, Planning and Development Services
Signed 4/16/2019 4:16 PM

ATTACHMENTS:

Figures 1 to 11
Attachment A - Bylaw 2921-2019
Attachment B - Works and Services Report
Attachment C - Arborist Report

City Context Plan
File: PRJ17-111 Location: 1684 McKenzie Road





Attachment: Figures 1 to 11 (PDS 039-2019 : RZ application for 1684 McKenzie Road proposing to rezone from RS3 to N92)

ABBOTSFORD
Planning and Development Services

1684 McKenzie Road

Figure 1 - Location Plan
File No.: PRJ17-111

40 0 40
Meters

N

Date

Attachment: Figures 1 to 11 (PDS 039-2019 : RZ application for 1684 McKenzie Road proposing to rezone from RS3 to N92)

ABBOTSFORD
Planning and Development Services

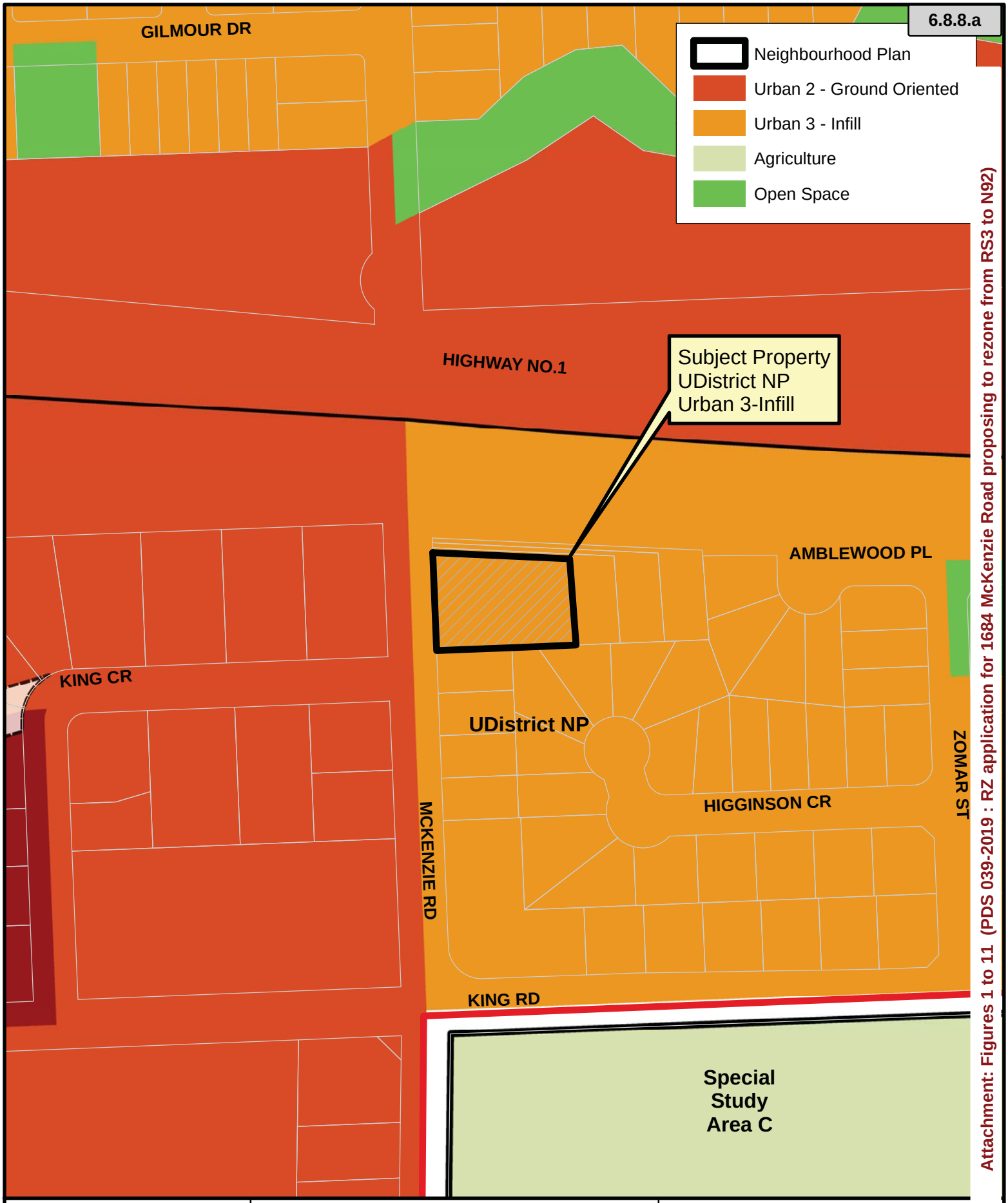
1684 McKenzie Road

Figure 2 - Context Plan
File No.: PRJ17-111

50 0 150
Meters

N

Date



Attachment: Figures 1 to 11 (PDS 039-2019 : RZ application for 1684 McKenzie Road proposing to rezone from RS3 to N92)

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Planning and Development Services

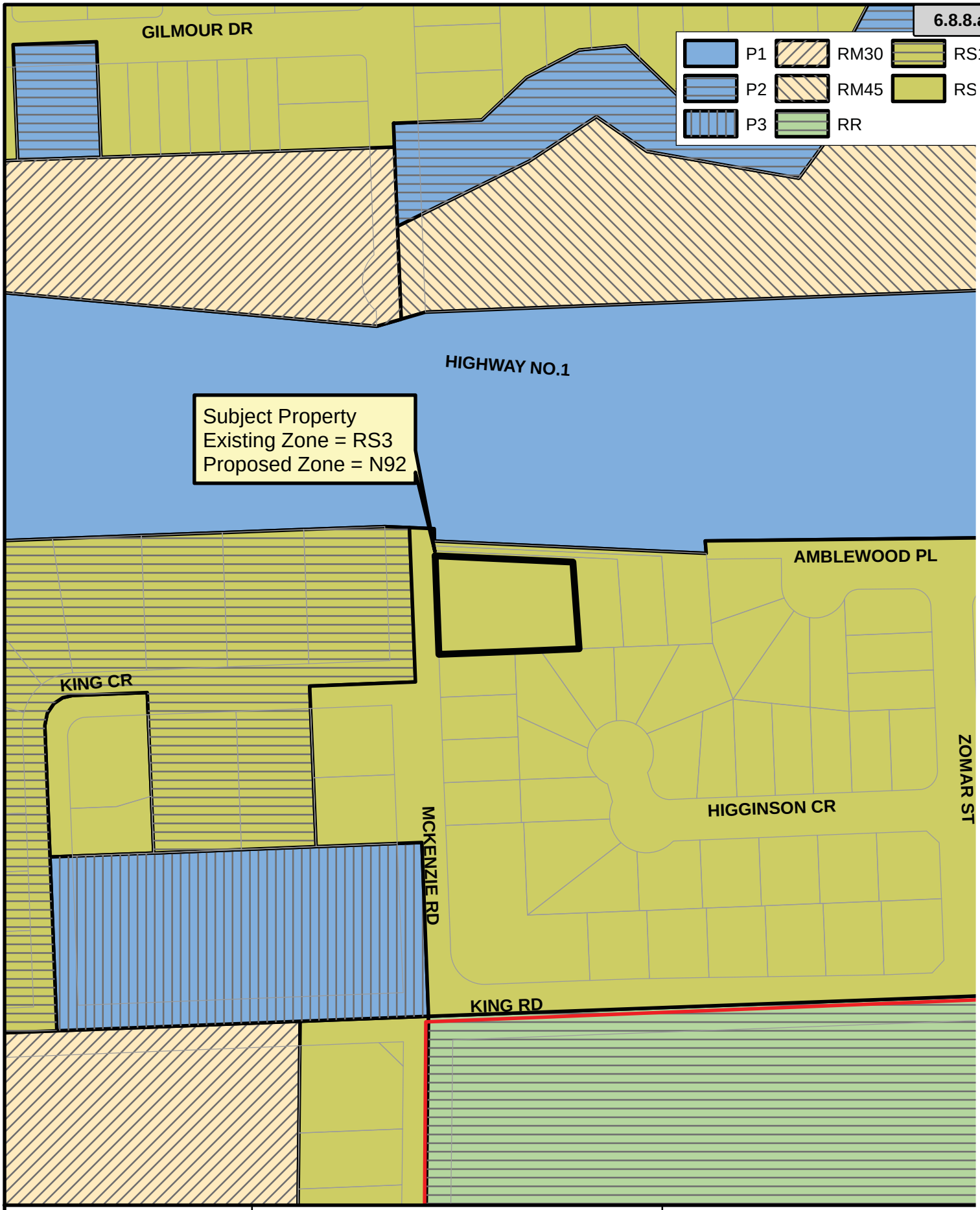
1684 McKenzie Road

Figure 3 - Official Community Plan
File No.: PRJ17-111

40 0 40
Meters

N

Date



ABBOTSFORD
Planning and Development Services

1684 McKenzie Road

Figure 4 - Existing & Proposed Zonir
File No.: PRJ17-111

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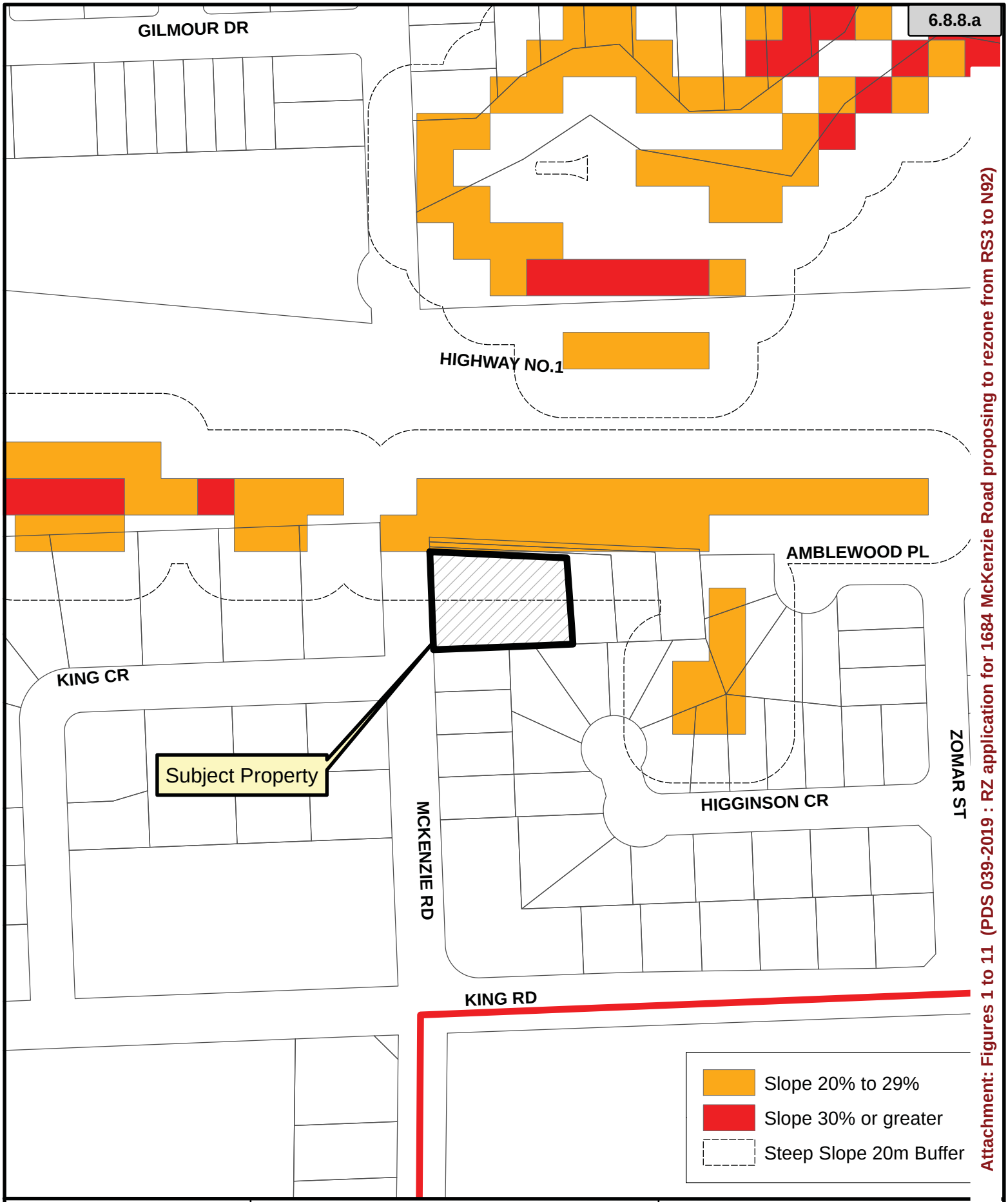
Meters

N

Date



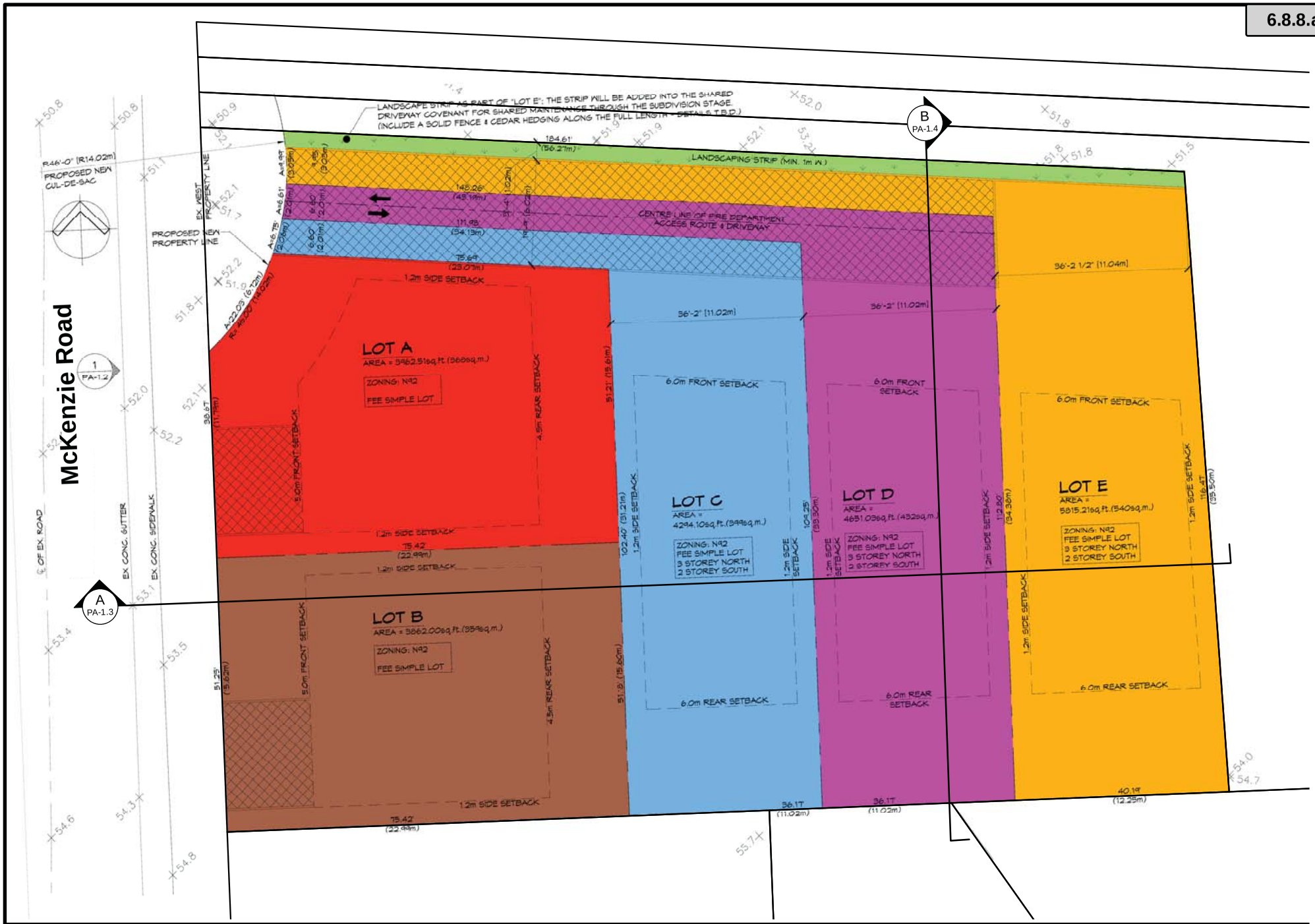
ABBOTSFORD
Planning and Development Services

1684 McKenzie Road

Figure 5 - Steep Slope
Development Permit
File No.: PRJ17-111

40 0 Meters

Attachment: Figures 1 to 11 (PDS 039-2019 : RZ application for 1684 McKenzie Road proposing to rezone from RS3 to N92)

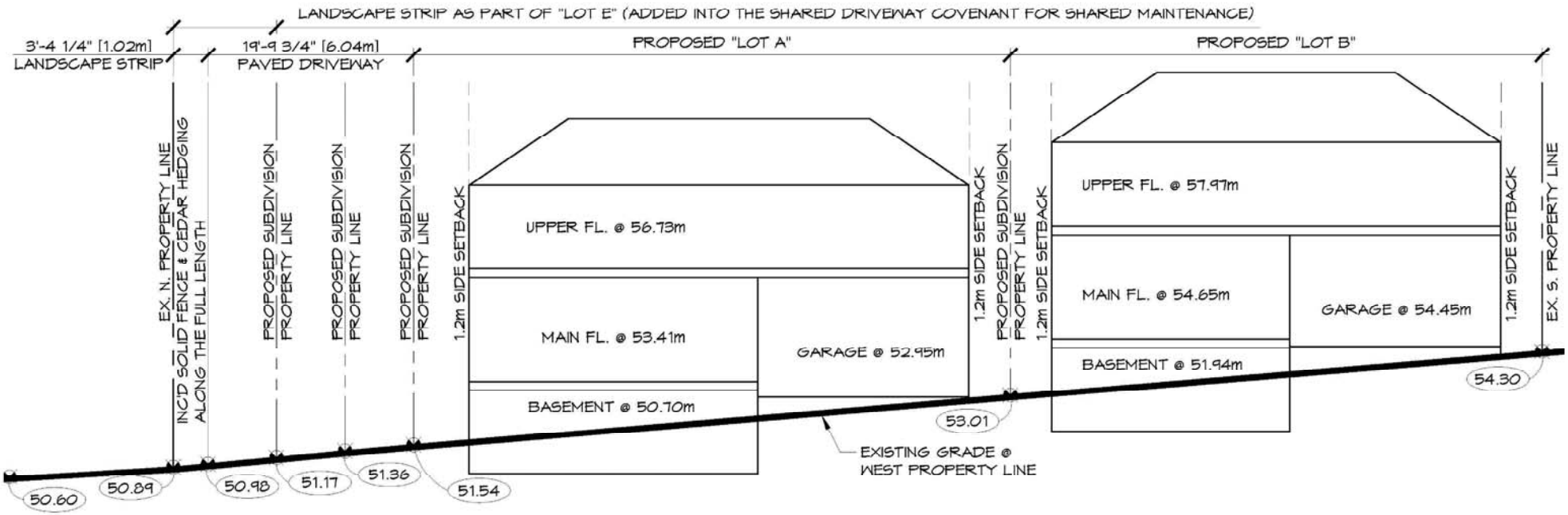


ABBOTSFORD
Planning and Development Services

1684 McKenzie Road

Figure 6 - Site Plan
File No.: PRJ17-111

N | Date



1
PA-1.2

SITE ELEVATION - McKENZIE ROAD

SCALE: 3/32" = 1'-0"

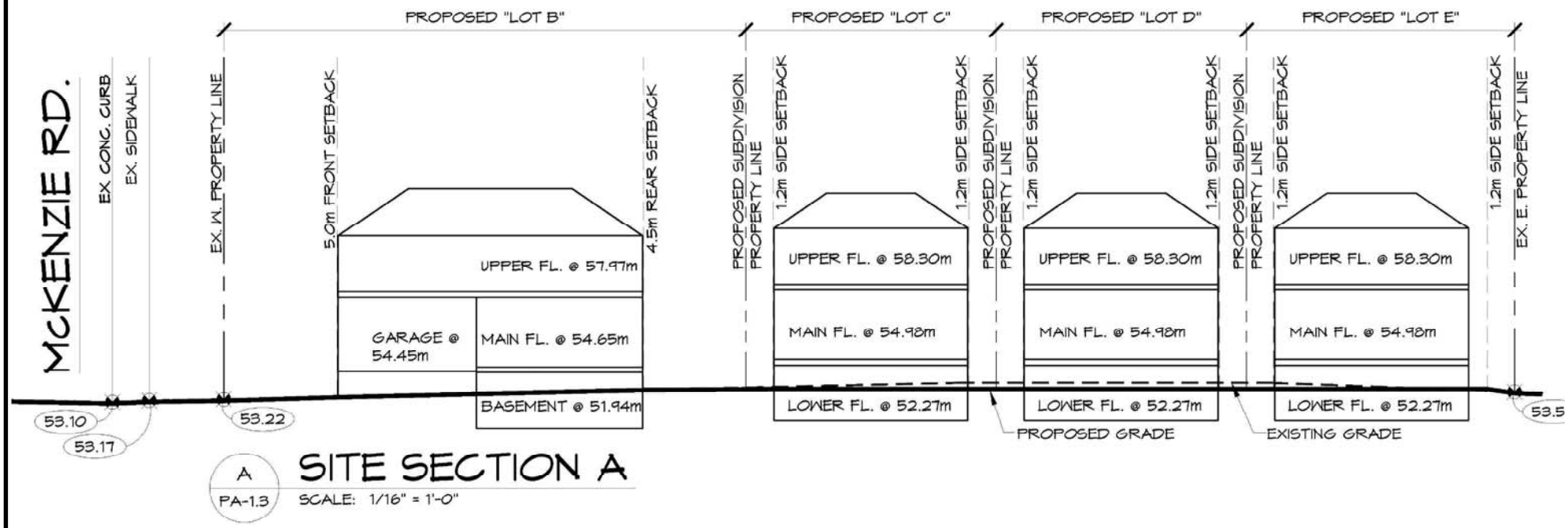
ABBOTSFORD
Planning and Development Services

1684 McKenzie Road

Figure 7 - Site Elevation 1
File No.: PRJ17-111

N | Date

Attachment: Figures 1 to 11 (PDS 039-2019 : RZ application for 1684 McKenzie Road proposing to rezone



A
PA-1.3

SITE SECTION A

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

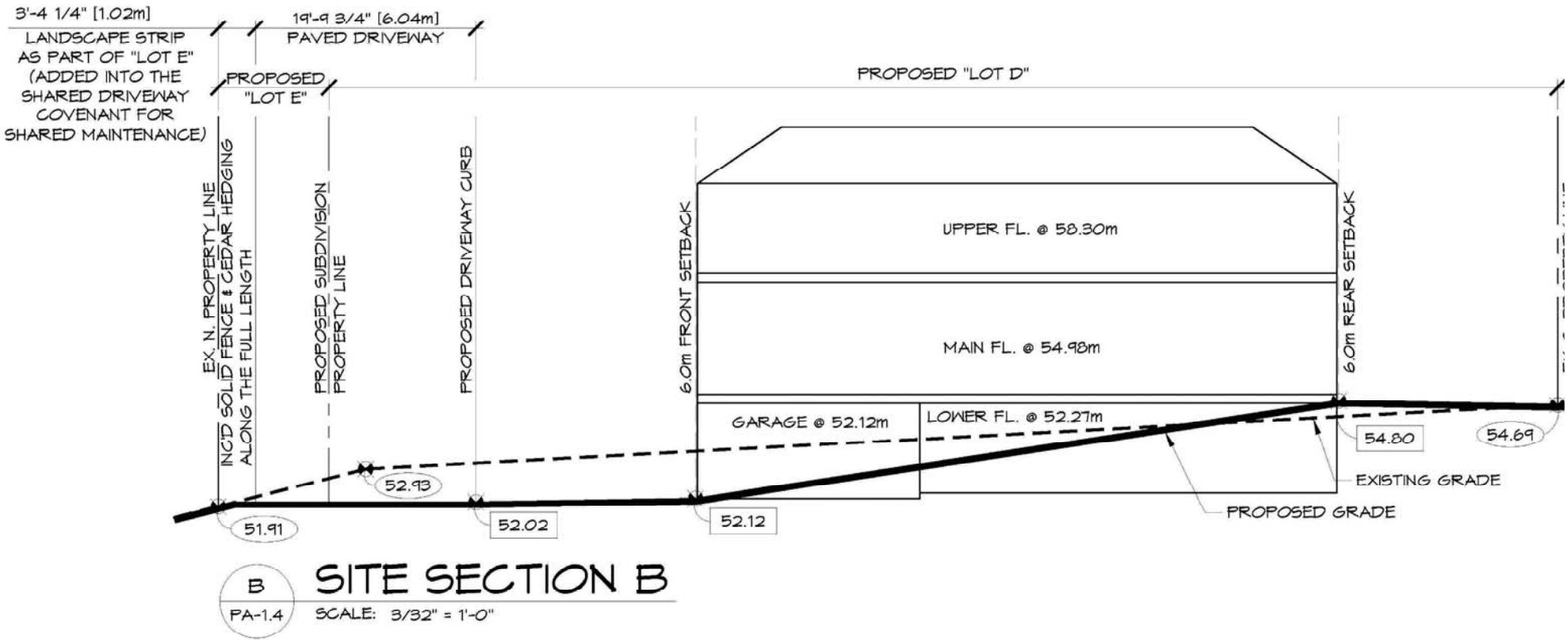
ABBOTSFORD
Planning and Development Services

1684 McKenzie Road

Figure 8 - Site Cross-Section A
File No.: PRJ17-111

N	Date

Attachment: Figures 1 to 11 (PDS 039-2019 : RZ application for 1684 McKenzie Road proposing to rezone



B
PA-1.4

SITE SECTION B

SCALE: 3/32" = 1'-0"

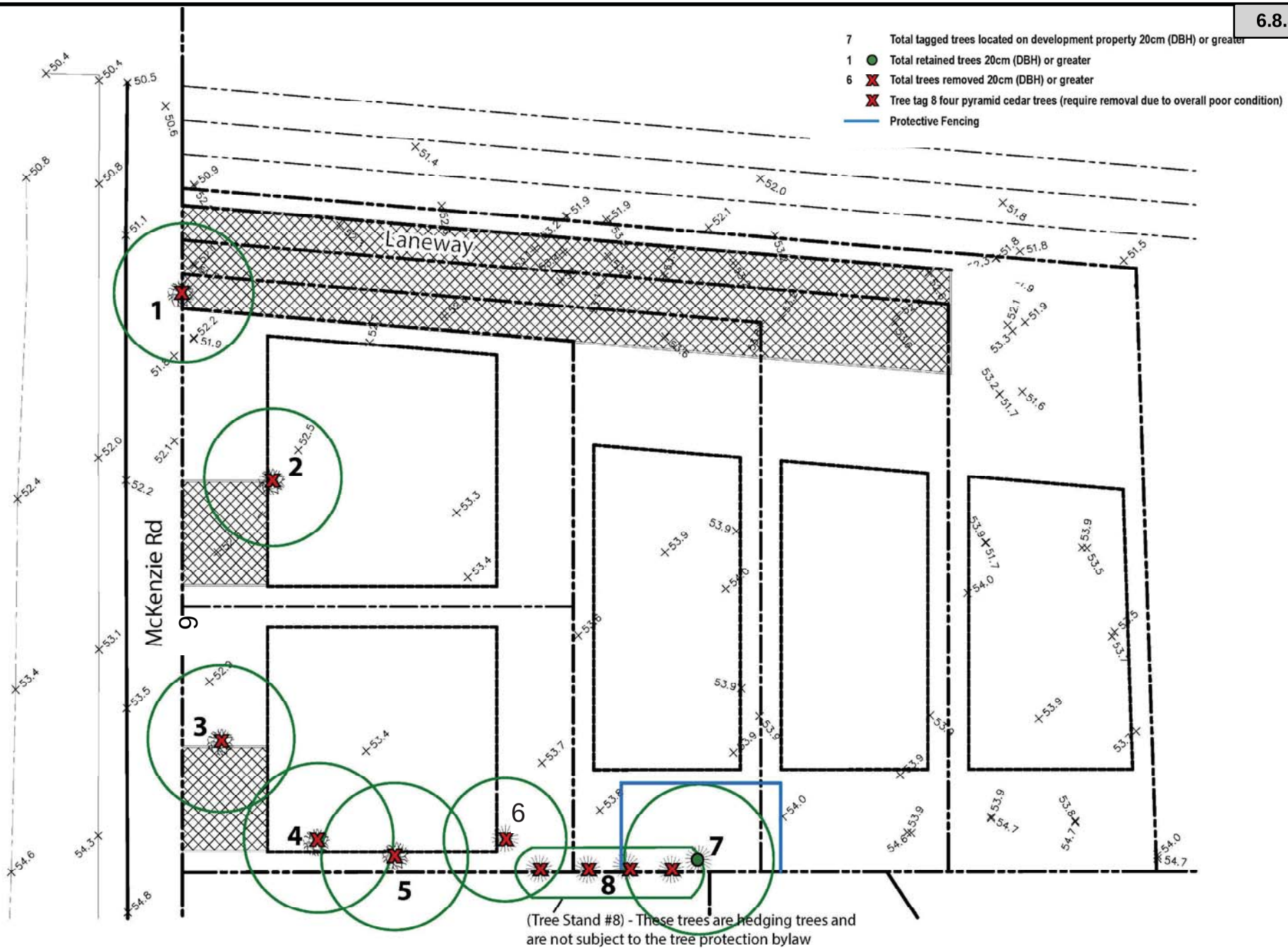
ABBOTSFORD
Planning and Development Services

1684 McKenzie Road

Figure 9 - Site Cross-Section B
File No.: PRJ17-111

N | Date

Attachment: Figures 1 to 11 (PDS 039-2019 : RZ application for 1684 McKenzie Road proposing to rezone



ABBOTSFORD
Planning and Development Services

1684 McKenzie Road

Figure 10 - Tree Management Plan
File No.: PRJ17-111

N | Date

N

Existing privacy hedges - north view

N

Existing privacy hedges - south view

ABBOTSFORD
Planning and Development Services

1684 McKenzie Road

Figure 11 - Tree Retention
File No.: PRJ17-111

N	Date

CITY OF ABBOTSFORD

ABBOTSFORD ZONING BYLAW, 2014, AMENDMENT BYLAW NO. 243

Bylaw No. 2921-2019 PRJ17-111

The Council of the City of Abbotsford, in open meeting assembled, ENACTS AS FOLLOWS:

1. CITATION

Bylaw No. 2921-2019 may be cited as "Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 243".

2. CREATES NEW COMPREHENSIVE DEVELOPMENT NINETY TWO ZONE (N92)

Abbotsford Zoning Bylaw, 2014, Section 800, Comprehensive Development Zones, as amended, is further amended by adding the following new zone, in numerical sequence as per Appendix "A", 892-Comprehensive Development Ninety Two Zone (N92).

3. AMENDS ZONING MAPS

Abbotsford Zoning Bylaw, 2014, Schedule "D", Urban Area Zoning, as amended, is further amended by changing the zoning of the lands as shown in the attached Appendix "B" and located at 1684 McKenzie Road:

From: Urban Residential Zone (RS3)
To: Comprehensive Development Ninety Two Zone (N92)

READ A FIRST TIME this	day of	, 2019
READ A SECOND TIME this	day of	, 2019
PUBLIC HEARING HELD this	day of	, 20<>
READ A THIRD TIME this	day of	, 20<>
APPROVED by the Minister of Transportation and Infrastructure this	day of	, 20<>
ADOPTED this	day of	, 20<>

I hereby certify this to be a true copy of the original bylaw

Henry Braun
Mayor

Katie Karn
Deputy City Clerk

William Flitton
Corporate Officer

Final Draft – April 12, 2019

Attachment: Attachment A - Bylaw 2921-2019 (PDS 039-2019 : RZ application for 1684 McKenzie Road proposing to rezone from RS3 to N92)

APPENDIX "A"

892 – Comprehensive Development Ninety Two Zone (N92)

N92

Intent: To accommodate a five (5) lot development of single detached dwellings on compact lots, in the Urban 3 – Infill Land Use Designation.

892.1 Permitted Uses

Permitted Uses Table for N92 Zone
Principal Uses
.1 Residential Care
.2 Single Detached Dwelling
.3 Supportive Recovery
Accessory Uses
.4 Boarding
.5 Home Occupation – Level 2
.6 Secondary Suite

892.2 Site Specific Permitted Uses

n/a

Last modified

Attachment: Attachment A - Bylaw 2921-2019 (PDS 039-2019 : RZ application for 1684 McKenzie Road proposing to rezone from RS3 to N92)

APPENDIX "A" (cont'd)

892 – Comprehensive Development Ninety Two Zone (N92)

N92

892.3 Development Regulations

Development Regulations Table for N92 Zone	
Column I	Column II
.1 Density (maximum)	a. Floor Space Ratio for Lots less than 400 m^2 – 0.65 b. Floor Space Ratio for Lots greater than 400 m^2 and less than 599 m^2 – 0.55 c. Floor Space Ratio for Lots greater than 600 m^2 – 0.45
.2 Minimum setbacks (front lot line)	a. Principal Building and Accessory Building or Structure – 5.0 m b. Principal Building on a Panhandle Lot and Accessory Building or Structure on a Panhandle Lot – 8 m
.3 Minimum setbacks (rear lot line)	a. Principal Building – 4.5 m b. Principal Building on a Panhandle Lot – 6 m c. Accessory Building or Structure – 1.0 m
.4 Minimum setbacks (interior side lot line)	a. Principal Building – 1.2 m b. Accessory Building or Structure – 1.0 m
.5 Minimum setbacks between buildings	a. Between Principal Building and Accessory Building or Structure – 1.5 m
.6 Height (maximum)	a. Principal Building – 9.5 m or three storeys, whichever is less b. Accessory Building or Structure – 4.5 m
.7 Lot coverage (maximum)	a. 45%

892.5 Subdivision Regulations

Subdivision Regulations Table for N92 Zone	
Column I	Column II
.1 Lot size (minimum)	a. 300 m^2
.2 Lot width (minimum)	a. 11.0 m

892.6 Landscaping and Off-Street Parking

Refer to Sections 140 and 150 for requirements pertaining to landscaping and off-street parking.

Attachment: Attachment A - Bylaw 2921-2019 (PDS 039-2019 : RZ application for 1684 McKenzie Road proposing to rezone from RS3 to N92)

APPENDIX "A" (cont'd)

892 – Comprehensive Development Ninety Two Zone (N92)

N92

892.7 Conditions of Use

.1 A Secondary Suite shall:

a. be limited to one such use per lot and to a maximum floor area of 90 m^2 or 40% of the net floor area of the Single Detached Dwelling to which it is accessory, whichever is less;
b. not be permitted where there is a Residential Care use, Supportive Recovery use or Boarding use on the lot;
c. not be located on a lot on a cul-de-sac bulb;
d. not be on a lot in a bare land strata (except where road infrastructure meets City bylaw standards);
e. be located on a lot with a minimum frontage of at least 12 m;
f. be located on a lot with a minimum lot size of at least 400 m^2;
g. be located on a collector or local road; and
h. not be permitted on a Panhandle Lot.

.2 For the purposes of a Panhandle Lot, "Lot Line, Front" shall mean the lot line or lines closest to and approximately perpendicular to the street from which access to the lot is provided and opposite to the Rear Lot Line.

Attachment: Attachment A - Bylaw 2921-2019 (PDS 039-2019 : RZ application for 1684 McKenzie Road proposing to rezone from RS3 to N92)

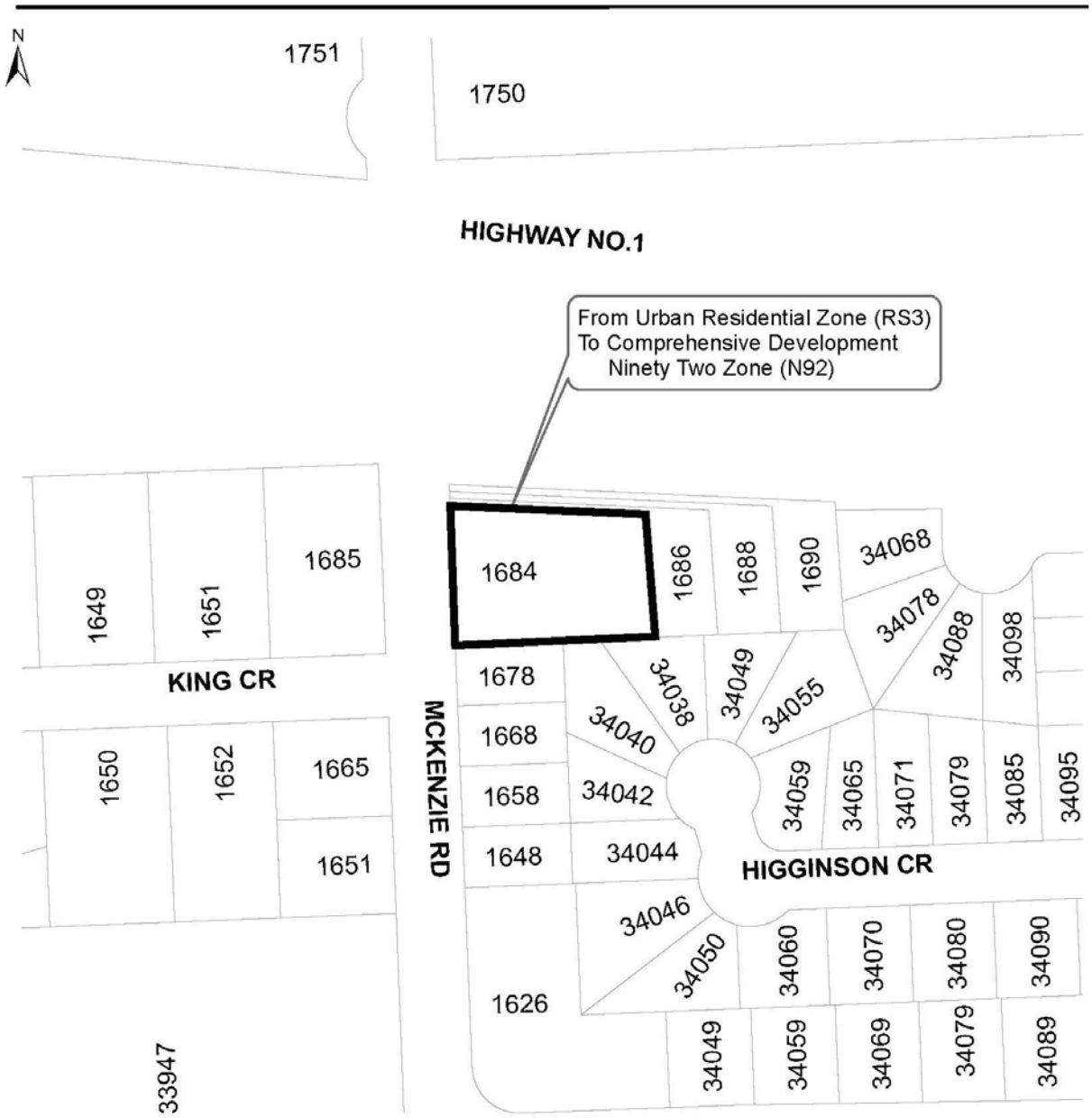
CITY OF ABBOTSFORD

ABBOTSFORD ZONING BYLAW, 2014, AMENDMENT BYLAW NO. 243

Bylaw No. 2921-2019 Page 5

APPENDIX "B"

SCHEDULE BYLAW NO. 2921-2019
BEING ABBOTSFORD ZONING BYLAW, 2014,
AMENDMENT BYLAW NO. 243
FROM: Urban Residential Zone (RS3)
TO: Comprehensive Development Ninety Two Zone (N92)



Final Draft – April 12, 2019

Attachment: Attachment A - Bylaw 2921-2019 (PDS 039-2019 : RZ application for 1684 McKenzie Road proposing to rezone from RS3 to N92)

ABBOTSFORD DEVELOPMENT ENGINEERING DIVISION

REZONING WORKS AND SERVICES REQUIREMENTS

File No:	PRJ17-111
Planner:	James Bryndza, Planner
Prepared By:	Stanley de Haan, Development Technologist II
Approved By:	17/09/18 Sarb Toor, Manager, Development Engineering
Date:	September 12, 2017
Applicant:	Darren Hall, D&D Design Ltd.
Development Property:	1684 McKenzie Road LOT A SECTION 15 TOWNSHIP 16 PLAN LMP21075 NWD

The Local Government Act authorizes local governments to require development to meet current works and services standards as set out in the City's Development Bylaw and Policies.

This report includes the Works & Services **Requirements** to meet the applicable bylaws and policies and **Future Considerations** that may apply to the next phase of development.

Please have your consulting engineer call Stanley de Haan, Development Technologist II at 604-851-4175 in regard to this report and any other servicing matters relating to this application.

Attachment: Attachment B - Works and Services Report (PDS 039-2019 : RZ application for 1684 McKenzie Road proposing to rezone from RS3

REQUIREMENTS

Additional dedications, SRWs, works, features or limits of construction may be needed as identified through the design and construction phases.

Highways – Dedications and Rights-of-Ways

On McKenzie Road dedicate sufficient land to accommodate half of a residential cul-de-sac as per City of Abbotsford Standard ES-R-1 drawing.

Urban Roadways - Construction

At the dead end of McKenzie Road construct half of a standard residential cul-de-sac with Urban Highway design features as per Standard Drawing ES-R-1.

On McKenzie Road, along the full frontage of the Lands from the south property line to the north property line, construct half of a Single Family Local standard road with Urban Highway design features as per Standard Drawing ES-R-7, including;

- Roll over curb and gutter on the east side;
- 9.0 m wide asphalt roadway;
- 1.5 m wide concrete sidewalk on the east side;
- ornamental street lighting;
- Traffic signage;
- Traffic lane markings;
- soil(s) to support street trees;
- boulevard improvements on the east side; and
- associated drainage.

The above noted works are not eligible for Latecomer Charges. *(900-9-01)*

Transit

Contribute $5,000 towards transportation updates in the general area and provide a cash-in-lieu payment of $2,000 towards future bike lanes and transit stop improvements in the general area.

The above noted works are not eligible for Latecomer Charges. *(900-9-01)*

Drainage Collection and Disposal

Provide a storm water management plan showing how onsite drainage will be accommodated offsite. All offsite storm water works and services including new installations and upgrades to existing offsite systems required by the storm water management plan shall be designed and constructed in accordance with said storm water management plan.

Prior to any further development on the Lands, provide an updated storm water management plan showing how drainage on the Lands will be accommodated including detention. All storm water works and services including new installations and upgrades to existing offsite systems required by the updated storm water management plan shall be designed and constructed in accordance with said updated storm water management plan.

The above noted works are not eligible for Latecomer Charges. *(900-9-01)*

Water Distribution Domestic and Fire Fighting
On McKenzie Road, relocate the existing fire hydrant to facilitate the dedication and construction of the standard residential cul-de-sac.

The above noted works are not eligible for Latecomer Charges. *(900-9-01)*

Power/Telecommunications
Service Connection:
Provide underground power and telecommunications services from the distribution system to the property line.

Distribution System:
Pay the Streetscape Contribution Levy, as per the City of Abbotsford Development Bylaw 2011, Bylaw No. 2070-2011 Schedule "D".

Required Covenants, Easements and Rights-of-way

- Restricted Access Covenant (PL-106b)
- Lot Grading Control Covenant (PL-109a)
- Shared Driveway Easement with Section 219 Covenant (PL-101b)
- Servicing Easement with Section 219 Covenant (PL-100b)
- Temporary turn-around rights-of-way (PL-201)
- Infiltration and/or Detention rights-of-way (PL-201)
- On-site water meters rights-of-way (PL-202)
- On-site fire hydrant and mains rights-of-way (PL-202)

Rezoning Development Agreement Preparation Fee
Pay $500 Development Agreement preparation fee.

Works & Services Security & Warranty Deposit
Provide as Security Deposit, the estimated construction cost plus 10% for engineering (min $25,000) and 5% for as-constructed drawings (minimum $15,000) in cash or letter of credit.

Administration & Inspection Fee
Pay 5% of the first $300,000 + 3% of the remainder of the estimated construction cost for administration and inspections.

City Services Fees
Tie-in inspection fee ($50 per inspection) for water, sanitary, and storm sewer services.

Water meters supplied, delivered, and installed by the City's Water Operations Department (per Fees and Charges Bylaw, 2006, Amendment Bylaw No. 32)

Regular Service Meter:
- Up to and including 18mm (3/4") meter *$470.00*

Water and sewer main connections and wet taps are supervised and/or performed by City crews at the developer's expense and payable upon invoice.

Attachment: Attachment B - Works and Services Report (PDS 039-2019 : RZ application for 1684 McKenzie Road proposing to rezone from RS3

Street and traffic signs are supplied and installed by the City at the developer's expense and payable upon invoice.

Pay to energize street lights at $50 per street light.

FUTURE CONSIDERATIONS

Upon further development an additional works and services review will apply related to that application. Listed below are some items to consider.

Bylaws

- the applicant is to be familiar with the Development Bylaw to ensure an understanding of possible future Works and services that may impact the development
- the applicant is to review the Works and Services identified in the Development Agreement and how they may impact the building.

Stormwater Management

- detention and infiltration will be required. Ensure that adequate room and proper placement has been reviewed.

Traffic Management

- the increase in vehicle traffic will be reviewed for its impact on the access and nearest intersections. Access may be restricted.
- road dedications, statutory rights-of-way and easements to accommodate the works and lot grading may require adjustments to the placement or size of the building.

Service Connections

- water, sanitary and storm connections may have specific tie in locations. Review and confirm locations prior to design.
- calculations related to the required domestic and fire water demand will be reviewed. There may be a service, meter or flow restrictions.
- Fire Department review may result in geometric changes to onsite roadways, additional fire hydrants, emergency access and building placement.
- Provide underground power and telecommunications services from the distribution system to the proposed building(s).

Building Permit Submissions

- In order to avoid delays in receipt of building permits, the builder shall be responsible for ensuring that building permit applications on the Lands conform to the intent of the accepted Lot Grading plan(s) prior to submission to the City.
- The developer or his designate shall review and approve building permit applications prior to submission to the City. When submitted, the building permit plans shall provide lot grading information that shall, at time of final inspection for building occupancy or approval, comply with the accepted lot grading plan or the intent of the lot grading design accepted by the General Manager, Engineering prior to construction.

Attachment: Attachment B - Works and Services Report (PDS 039-2019 : RZ application for 1684 McKenzie Road proposing to rezone from RS3

Erosion and Sediment Control

All works shall be performed in substantial conformance with the City's Development By-law, the Provincial 'Land Development Guidelines' and the City's Erosion and Sediment Control Bylaw, in the control and prevention of erosion and sediment during all phases of construction. No release of silt, sediment laden waters or deleterious substances is permitted into any existing City storm or drainage system during any phase of development of the Lands.

The ESC Plan requires 4 drawings, each indicating the ESC methods for that stage of construction;

- site preparation
- site servicing
- building construction
- warranty period

Lot Grading

- A Lot Grading Plan is required. Final lot grading shall conform to City's Lot Grading Policy and Guidelines. Any retaining walls that the Developer or Consulting Engineer consider are necessary to effectively grade the Lands to prevent negative impacts on finished neighbouring Lands, either existing or proposed, shall be constructed by the Developer. The standard "Lot Grading Covenant shall be registered against title to all proposed lots.

- Lot grading shall also provide for the collection of surface runoff and other drainage that will discharge to the City Drainage system. Lot grading may be designed to allow for surface sheet flows or collected in swales and directed to lawn basins as necessary to the satisfaction of the General Manager, Engineering. Any collection of surface flows to a concentrated point discharge location shall include provision for easements or rights-of-way across impacted Lands as necessary. All lot grading shall be designed to take care of surface flows emanating from onsite grading.

Attachment: Attachment B - Works and Services Report (PDS 039-2019 : RZ application for 1684 McKenzie Road proposing to rezone from RS3

CENTRAL VALLEY
ARBORIST CONSULTING LTD.

604-850-49
P.O Box 882 Abbotsford Station
Abbotsford, BC V2T 7A

REVISED
ARBORIST REPORT
1684 McKenzie Road,
ABBOTSFORD, BC

Prepared for: Parm Dhillon
1684 McKenzie Road
Abbotsford, BC

Prepared by: Brian Kwak
Certified Arborist ISA #PN #7306A
Qualified Tree Risk Assessor

Date: March 29, 2019

Attachment: Attachment C - Arborist Report (PDS 039-2019 : RZ application for 1684 McKenzie Road proposing to rezone from RS3 to N92)

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- Tree Preservation Summary 4
- Photographs 5
- Protective Fencing 6
- Qualifications of Author 7
- Assumptions and Limiting Conditions 8

Attachment: Attachment C - Arborist Report (PDS 039-2019 : RZ application for 1684 McKenzie Road proposing to rezone from RS3 to N92)

CENTRAL VALLEY
ARBORIST CONSULTING LTD.

604-850-49
P.O Box 882 Abbotsford Statio
Abbotsford, BC V2T 7

March 29, 2019

Parm Dhillon
1684 McKenzie Road
Abbotsford, BC

The following arborist report has been completed by Brian Kwak (Certified Arborist) for the proposed development located at 1684 McKenzie Road, Abbotsford, BC.

On June 12, 2017, I attended the property to review the existing trees and to give a tree inventory with the intent of making recommendations for removal and preservation. The trees on the property were tagged, and are numbered 1 to 7. Information was documented with respect to the type of tree, diameter at breast height (DBH), structural condition and health. In total there are 7 trees with a DBH 20 centimeters or greater located on the proposed development property.

On November 5, 2018 I re-attended the property to update the report due to a concern from D & D Design that the original tree survey showed more trees on the property than what was indicated in the June 22, 2017 Arborist Report. In the original tree survey there were 4 additional trees that were shown on the site plan. They are referred to in this report as Tree Tag #8. These trees were not included in the original report because they are hedging cedars and are in very poor overall health and structural condition. As such these trees are not included in calculating the number of tree replacements. (See Site Plan, Preservation Summary and Photographs for details).

On February 20, 2019 I received the final site layout from Darren Hall of D & D Design Ltd. The following details the subsequent changes to the site layout.

Based on the proposed development 6 trees require removal; of the 6 trees that require removal there are 0 trees with a DBH between 20 and 30 centimeters and 6 trees with a DBH 30 centimeters or greater. This leaves 1 tree to be retained (Tree Tag #7). See Site Plan for details

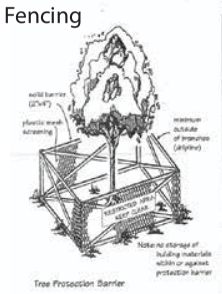
Prior to the commencement of any work, a protective fence must be put in place around the drip line of any neighboring trees located along the south property line that extend into the development property. (See attached Fencing Instructions). All protective fencing must be inspected by a certified arborist prior to construction. If there is to be any work within these boundaries a certified arborist must be on site to instruct on proper procedures.

If there are any further questions, please do not hesitate to contact our office. Respectfully submitted,

Brian Kwak
Certified Arborist PN #7306A/Qualified Tree Risk Assessor

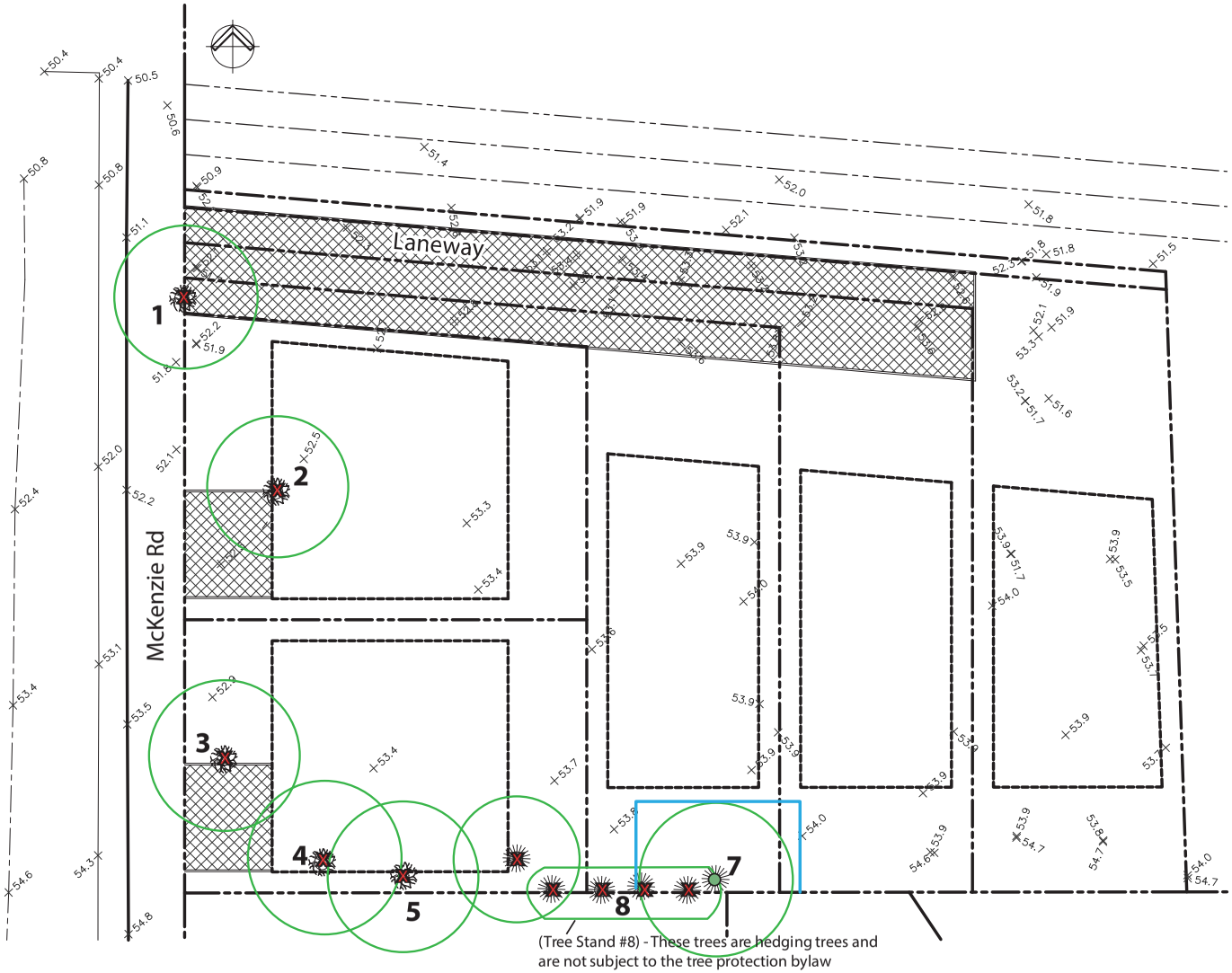
Web: www.arborist-tree.com • Email: kwak@shaw.ca

Protective Fencing



Tree Protection Distance Table

Trunk Diameter (cm)	8x DBH Minimum Protection Rad's Around Tree (distance from trunk in metres)
20	1.6
25	2.0
30	2.4
35	2.8
40	3.2
45	3.6
50	4.0
55	4.4
60	4.8
75	6.0
90	7.2
100	8.0



Client:
Parm Dhillon

Site Location:
1684 McKenzie Road
Abbotsford, BC

CENTRAL VALLEY
ARBORIST CONSULTING LTD.
604-850-4938

7	Total tagged trees located on development property 20cm (DBH) or greater
1	Total retained trees 20cm (DBH) or greater
6	Total trees removed 20cm (DBH) or greater
	Tree tag 8 four pyramid cedar trees (require removal due to overall poor condition)
	Protective Fencing

CENTRAL VALLEY TREE & ARBORIST SERVICES - TREE EVALUATION SUMMARY

Address: 1684 McKenzie Road, Abbotsford, BC **Date: March 29, 2019**

TAG #	SPECIES	LOCATION	# OF TREES	DBH (cm) Diameter at breast height	TREE HEALTH	TREE STRUCTURAL CONDITION	SUGGESTED ACTION	COMMENTS
1	oak	West property line	1	74	fair	poor	remove	Previously topped, multi stemmed upper crown at 4 meters above ground, large decay cavity at base of tree
2	walnut	West property line	1	77	fair	fair	remove	Multi stemmed at 2 meters above ground
3	cherry	West property line	1	71	poor	poor	remove	Multi stemmed at 1.5 meters above ground, dead and broken limbs. **NOTE: This tree has been removed since the completion of the original arborist report, dated June 22, 2017.**
4	cherry	South property line	1	75	poor	poor	remove	Multi stem at 1.7 meters above ground, dead and broken limbs. **NOTE: This tree has been removed since the completion of the original arborist report, dated June 22, 2017.**
5	cherry	South property line	1	70	poor	poor	remove	Multi stem at 3 meters above ground, dead and broken limbs, decay at trunk
6	holly	South property line	1	19/27 (2 stem)	good	fair	remove	2 stem, previously topped, multi stem upper crown
7	pine	South property line	1	46	fair	fair	retain	Previously topped, multi stem upper crown
8	pyramid cedar hedging trees	South property line	4	various	poor	poor	remove	NOTE: These trees are pyramid cedar hedging trees and are not to be included in the total tree count. Note: Two of the four trees have recently been removed.

TREE PRESERVATION SUMMARY

Project Location:	1684 McKenzie Road Abbotsford, BC
Applicant/Developer: Name, address, telephone:	Parm Dhillon 1684 McKenzie Road Abbotsford, BC
Consultant: Name, address, telephone:	Central Valley Arborist Consulting PO Box 882, Station A, Abbotsford, BC, V2T ZA2 Brain Kwak 604-309-4171

Summary of Proposed Trees Retained, Removed and Replaced

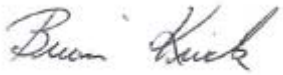
This Tree Protection Summary is a quick reference for the Arborist's Evaluation Report submitted for this development and is to be read in conjunction with that report.

A	Number of trees greater than 20 centimeters DBH	7
B	Number of trees retained (0 between 20-30cm DBH and 1 over 30cm DBH)	1
C	Number of trees to be removed (0 between 20-30cm DBH and 6 over 30cm DBH) Note: Please refer to the Evaluation Summary detailing the health, structural condition and status of the noted trees when determining the total number of replacement trees.	6
D	Number of replacement trees required (2 to 1 between 20-30cm and 3 to 1 over 30cm DBH)	*
E	Credit for retained trees at 2:1 and 3:1	*
F	Number of replacement trees proposed to be planted (may differ from number of replacement trees required due to site constraints/opportunities)	N/A
G	Shortfall of replacement trees to be planted (off-site or provision of cash-in-lieu)	N/A

* Unknown at this time (To be advised by City of Abbotsford)

Date: March 29, 2019

Summary Proposed and Submitted by:



Brian Kwak
Certified Arborist PN #7306A
ISA Qualified Risk Assessor

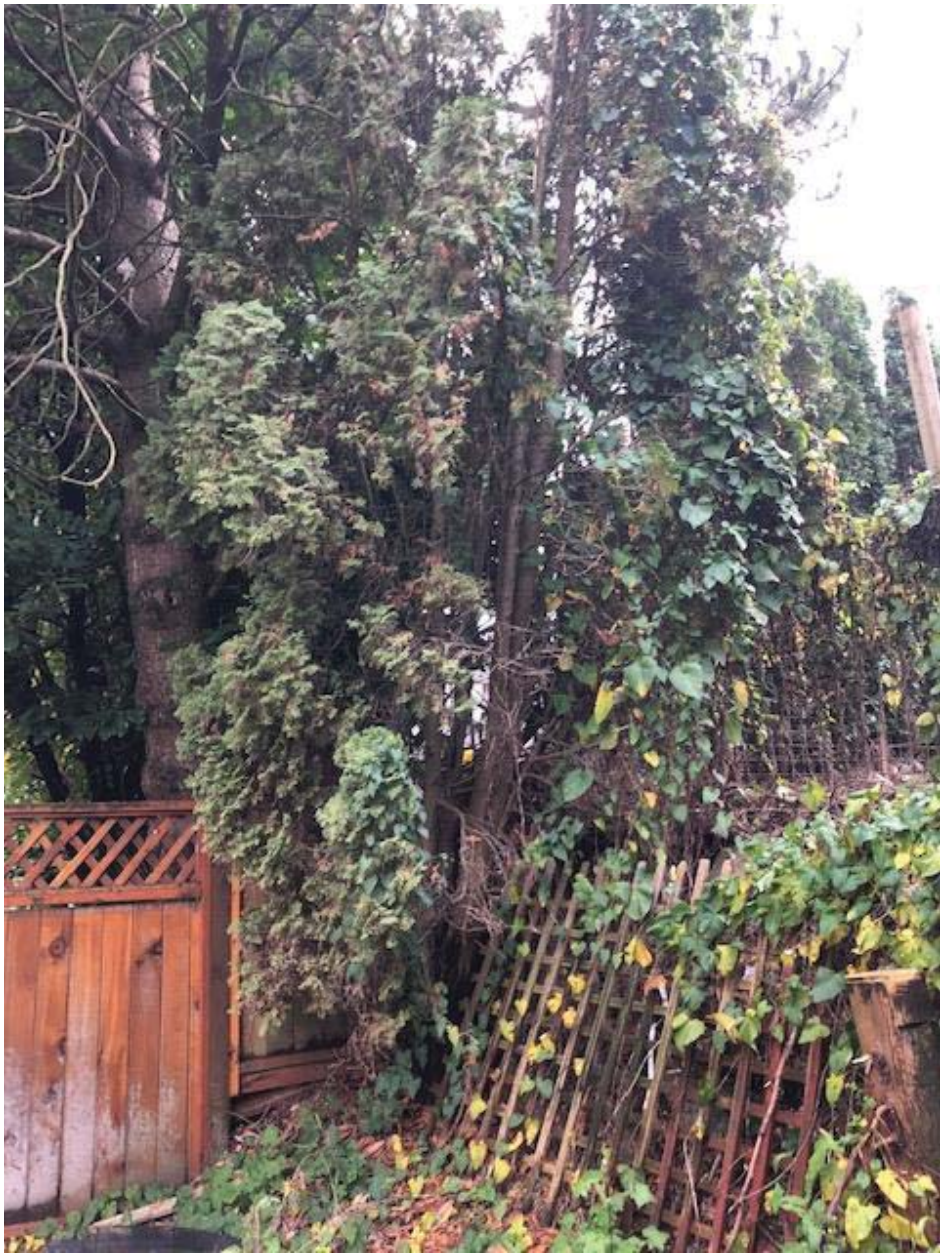
Attachment: Attachment C - Arborist Report (PDS 039-2019 : RZ application for 1684 McKenzie Road proposing to rezone from RS3 to N92)

View of Tree Stand #8: Hedging Cedar trees – Note: Two of the four cedar trees have since been removed.

Attachment: Attachment C - Arborist Report (PDS 039-2019 : RZ application for 1684 McKenzie Road proposing to rezone from RS3 to N92)

Photograph of the pyramid cedar hedging tree that is not included in the total number of trees located on the development property

Photograph of the pyramid cedar hedging tree that is not included in the total number of trees located on the development property



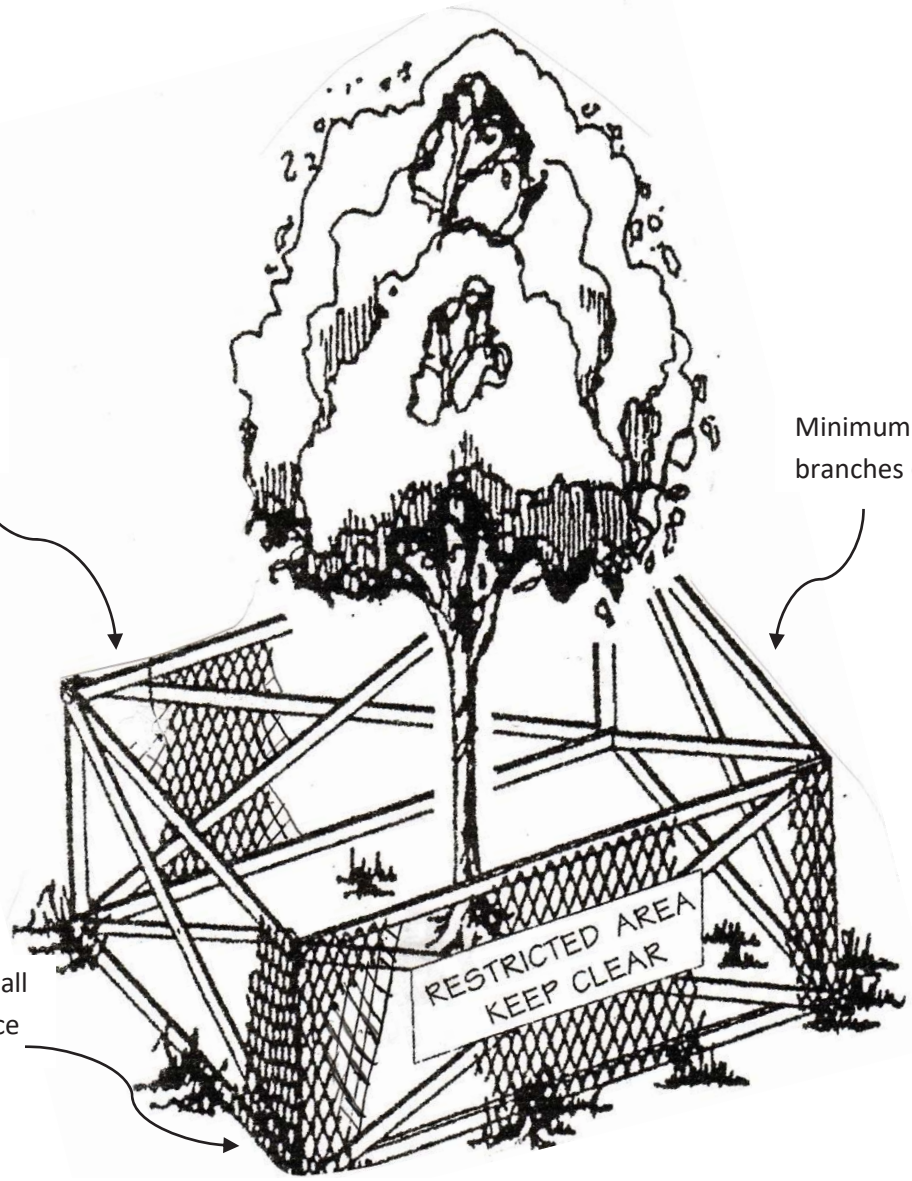
Photograph of the pyramid cedar hedging tree that is not included in the total number of trees located on the development property

NOTE: The fourth pyramid cedar hedging tree has been cut down.

PROTECTIVE FENCING INSTRUCTIONS

Solid barrier firmly staked into the ground (2”x4”)

Minimum outside of branches (drip-line)



Plastic mesh screening on all portions of protective fence

Note: No storage of building materials within or against protection barrier and no booms or equipment to enter drip-line at anytime. Barrier is not to be moved once erected.

Attachment: Attachment C - Arborist Report (PDS 039-2019 : RZ application for 1684 McKenzie Road proposing to rezone from RS3 to N92)

Qualifications of Author

Brian J. Kwak

P.O Box 882, Station A
Abbotsford, BC
V2T 7A2

Telephone: 604-309-4171
Email: kwak@shaw.ca

- Central Valley Arborist Consulting Ltd; 2015 to present
- Central Valley Tree and Arborist Services Ltd; 2002 to 2015
- Owner of Westland Tree Services 2000 to 2002
- B.K. Tree Services Ltd; 1981 to 1999 (subcontractor)
- International Society of Arboriculture; Certified Arborist PN-7306A
- PNW-ISA, Qualified Tree Risk Assessor
- Consulting Arborist; July 2011 – Present
- Member: International Society of Arboriculture (ISA)
  Pacific Northwest Chapter of Arborist
- Over 30 of years professional work in the tree industry and land clearing business.
- Insurance policy #040149195 ($5,000,000 Liability) – Saxbee Insurance Agencies Ltd.
- Business License: Abbotsford Intra Municipal #128082
- Work Safe BC – 961482-AA
- ISA Qualified Risk Assessor (TRAQ) - November 2016

Attachment: Attachment C - Arborist Report (PDS 039-2019 : RZ application for 1684 McKenzie Road proposing to rezone from RS3 to N92)

Assumptions and Limiting Conditions

1. Except as expressly set out in this report and in these Assumptions and Limiting Conditions, Central Valley Arborist Consulting Ltd. (Central Valley) makes no guarantee, representation or warranty (express or implied) with regard to: this report; the findings, conclusions and recommendations contained herein; or the work referred to herein.
2. This report has been prepared, and the work undertaken in connection herewith has been conducted, by Central Valley for **Parm Dhillon at 1684 McKenzie Road, Abbotsford, BC.** It is intended for the sole and exclusion use by the Client, for the purpose(s) set out in this report. Any use of, reliance on, or decisions made based on this report by any person other than the Client, for any purpose other than the purpose(s) set out in this report, is the sole responsibility of, and at the sole risk of, such other person or the Client, as the case may be. Central Valley accepts no liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm (including without limitation financial or consequential effects on transactions or property values, and economic loss) that may be suffered or incurred by any person as a result of the use of or reliance on this report or the work referred to herein. The copying, distribution or publication of this report (except for the internal use of the Client) without the express written permission of Central Valley (which consent may be withheld in Central Valley's sole discretion) is prohibited. Central Valley retains ownership of this report and all documents related thereto both generally and as instruments of professional service.
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9. Loss or alteration of any part of this report invalidates the entire report.

COUNCIL REPORT

Executive Committee

Report No. PDS 032-2019

Date: April 26, 2019
File No: 3100-05 PRJ17-121

To: Mayor and Council
From: Allan Campeau, Planner
Subject: Supportive Recovery Use application for the property located at 1880 Eagle Street (Owners: A. and P. Kataria)

RECOMMENDATION

1. THAT the Supportive Recovery Use application for the property located at 1880 Eagle Street (Bylaw No. 2927-2019, "Abbotsford Housing Agreement No. 2185 Bylaw, 2019" – Application No. PRJ17-121), be denied;
2. THAT if the Supportive Recovery Use application for the property located at 1880 Eagle Street (Bylaw No. 2927-2019, "Abbotsford Housing Agreement No. 2185 Bylaw, 2019" – Application No. PRJ17-121) is denied by Council, a letter be mailed to all properties who received notification of the Neighbourhood Information Meeting informing them of Council's decision; and
3. THAT if the Supportive Recovery Use application for the property located at 1880 Eagle Street (Bylaw No. 2927-2019, "Abbotsford Housing Agreement No. 2185 Bylaw, 2019" – Application No. PRJ17-121) is denied, a coordinated effort involving Bylaw Services, the Housing and Homelessness Coordinator and the Coordinated Intake and Referral (CIR) program will be implemented to attend to the welfare of individuals currently residing at the facility.

REPORT CONCURRENCE	
General Manager The General Manager concurs with the recommendation of this report.	**City Manager** The City Manager concurs with the recommendation of this report.

PURPOSE

The applicant proposes to enter into a Housing Agreement with the City in order to continue operation of a 10 bed Supportive Recovery facility for both men and women on the subject property.

SUMMARY OF THE ISSUE

The applicant is proposing to continue operation of a Supportive Recovery facility for men and women which would occupy the existing house on the subject property. An unauthorized co-ed supportive recovery facility has been operating on the property without a Housing Agreement or business licence since 2017. Staff does not recommend support for the proposed supportive recovery facility/Housing Agreement.

BACKGROUND

Applicant: Vancouver Recovery Centre Society (Kyle Walker)

Owners: Pavandeep S. Kataria and Anil Deep Kataria

Legal Description: Lot 84 Section 16 Township 16 New Westminster District Plan 39336

OCP Designation: Urban 3 - Infill

Existing Zoning: Urban Residential Zone (RS3)

Site Area: 730 m^2 (7858 ft^2)

Site Description: The subject property is an interior residential lot, occupied by an existing single family house.

Surrounding Uses:
- N: Single family residential (zoned RS3);
- S: Single family residential (zoned RS3); beyond Westbury Avenue
- E: Single family residential (zoned RS3); and
- W: Eagle Street; beyond single family residential (zoned RS3)

DISCUSSION

Context

1. Beyond the immediate surrounding area of the subject property, Highway 1 is located to the south and Marshall Road to the north. Hoon Park is located approximately 90 meters to the northeast. Godson Elementary School is located approximately 455 meters to the north.

Official Community Plan

2. The Official Community Plan (OCP) designates the property as Urban 3 – Infill which is intended to enable infill residential with density increases while retaining neighborhood character.

3. OCP Policy 2.6 ‘Non Market Housing’ supports an increase to the amount of affordable and adequate accommodation for lower income households via:
   - Increasing the supply of non-profit rental housing through partnership and collaboration;

- Identifying City-owned land with opportunities for non-profit housing, housing demonstration projects, and supportive housing for individuals with special needs; and
- Supporting a range of affordable housing options using a housing first approach along the housing spectrum, including shelters and safe houses, transitional/temporary housing, supportive housing, and independent living options, especially in transit-accessible areas.

Zoning

4. The subject property is zoned Urban Residential Zone (RS3). Abbotsford Zoning Bylaw, 2014 permits Supportive Recovery (SR) facilities in all single family residential zones with the exception of Urban Residential Hybrid Zone (RSH) and Residential Corner Store (RCS).

   Supportive Recovery is defined in the Zoning Bylaw as:

   'means a residential use providing a supportive and structured environment for individuals recovering from drug or alcohol addiction, which is governed by a Housing Agreement'.

   General regulations for a supportive recovery use are outlined in the Zoning Bylaw, as follows:

   a. *be subject to a Housing Agreement that specifies the terms and conditions regarding eligibility, occupancy and other provisions as set out in the Local Government Act;*
   b. *not be operated where there is a coach house, secondary suite, residential care use, boarding use, or a home occupation on the lot;*
   c. *be restricted to a maximum of ten residents within the dwelling unit;*
   d. *not be operated within 200 m of an existing supportive recovery use or a school, excluding supportive recovery uses for which a business license has been issued prior to April 1, 2008; and*
   e. *have no indication that the building is used for a purpose other than a residential use.*

5. Supportive Recovery Homes address a critical affordable housing need and provide support to vulnerable residents. At the same time, the City's policies protect neighbourhoods and residents to ensure Supportive Recovery Homes operate legally and safely and with minimal impact to existing neighbourhoods in which they are located. There are currently 10 approved Supportive Recovery Homes in Abbotsford. The Housing Agreement and Business Licence of the Supportive Recovery Use can be revoked at any time if the terms and conditions are not met.

6. The operator and applicant for this proposal, Vancouver Recovery Centre Society, has been leasing the property from the land owner since the house has been utilized for the unauthorized supportive recovery use.

Bylaw Services

7. Bylaw Services has provided the following comments with respect to this application:

   In April 2017 Bylaw Services conducted an investigation/inspection of the property and confirmed that the tenant of the property, Vancouver Recovery Society ("the operator") is operating an unauthorized "recovery house" at this location. The subject property is

currently zoned RS3, which permits a Supportive Recovery Use, however a Housing Agreement must be registered through a Planning process to be permitted to operate. At that time there was one service requestor on file. Bylaw Services provided notice to the operators and the owners of the property to cease the unauthorized use. In addition, in keeping with the City's approach with respect to education, Bylaw Services also provided information and a Supportive Recovery application package to the owners and operators. In August 2017 the operator submitted development application PRJ17-121 that could potentially address the unauthorized use, if approved. During this time, further enforcement action was placed in abeyance, subject to the outcome of the process. In July 2018 after receiving concerns related to noise and fighting amongst clientele, Bylaw Services resumed enforcement action and met with the operator to request that they mitigate the concerns. Since that time, at the request of the operator, numerous good faith extensions have been granted to coincide with deadlines for the completion of their development application. The extensions were contingent on Bylaw Services not receiving any further concerns from the neighbourhood. Up until recently (February 2019) Bylaw Services had one service requestor on record. There are currently six associated service requestors on file. The deadline for expected compliance is March 26, 2019.

Abbotsford Police Department

8. The Abbotsford Police Department (APD) has provided a summary of the calls for service to the subject property (Attachment E). The APD has reported that between January 2017 and the end of January 2019, there have been 32 calls for APD to attend the subject property for a number of circumstances.

Abbotsford Fire Rescue

9. Abbotsford Fire Rescue Service (AFRS) conducted a site inspection on September 18, 2018. The site inspection identified a number of hazards and deficiencies (Attachment F). In light of the existing deficiencies, AFRS is unable to approve occupancy of the house for purposes of a supportive recovery facility at this time.

Housing and Homelessness Coordinator

10. The City's Housing and Homelessness Team has reviewed the application, the applicable City requirements and comments received regarding the supportive recovery use proposal and has provided the following recommendations:

    Based on a number of factors revealed through this review, we do not recommend approval for this application at this time. The Abbotsford Homelessness Prevention and Response System and Homelessness in Abbotsford Action Plan call for the enhancement of the Recovery Home application process that aligns with Standards of Practice and Provincial requirements for group homes. There are a number of concerns related to this application that we require further verification that the provider is adhering to the Practice Standards that are set forth through the health, housing and community integration standards and requirements that the City's Housing and Homelessness Unit is administering closely in partnership with Provincial Statutory Agencies, including: Fraser Health, Ministry of Social Development-Poverty Reduction, and Ministry of Children and Family Development.

11. Should this application not receive Council support, staff is cognizant that adequate support systems need to be in place for the relocation of current residents. A coordinated effort involving Bylaw Services, the Housing and Homelessness Coordinator and the Coordinated Intake and Referral (CIR) program will be utilized to attend to the welfare of individuals residing at the facility.

Neighbourhood Information Meeting

12. The City mailed 95 letters to adjacent property owners and tenants within a 100 m radius around the subject property advising of the Neighbourhood Information Meeting (NIM). Ads were placed in the City Page of the Abbotsford News on January 18, 23 and 25, 2019 and a notice of the meeting was also placed on the Meetings and Open Houses page on the City of Abbotsford website.

13. On January 31, 2019, a Neighbourhood Information Meeting (NIM) was conducted at Abbotsford Senior Secondary School from 6:00 pm to 8:00 pm. The meeting was held in an open house format with display boards and handouts. The handouts available included:
    - a sample Housing Agreement (see Attachment I for the completed Housing Agreement);
    - Background Information Sheet (see Attachment C):
    - Comment Sheets (see Attachment H); and
    - proposed operator's Residential Occupancy Agreement (see Attachment A).

14. Twenty-Nine (29) members of the public were in attendance (refer to Sign-In Sheets Attachment G) to find out more information about what was being proposed in the neighbourhood. Of the twenty-six (26) comment sheets, emails and letters received (see Attachment H) by the City, there was unanimous opposition expressed towards the proposal citing a number of topics of concern. Concerns included, but were not limited to: property value, crime, location of facility in relation to adjacent uses (schools, park, businesses), as well as specific trepidation/concerns towards the logistics of the operation and how it is managed. Several comments cited a number of instances where residents of neighboring properties observed and/or experienced criminal activity, and expressed a significant sense of unease. A Deputy Chief from the APD was in attendance at this meeting answering questions from the residents in the area.

15. Subsequent to the Neighbourhood Information Meeting (NIM), the applicant submitted a letter to the City (Attachment D) questioning the relevance/requirement of a NIM for his proposal and how the meeting was conducted. Staff conducted a follow-up meeting with the applicant and afforded him the opportunity to respond to the comments/emails that were received as a result of the NIM, the Abbotsford Police Department's summary of calls for service and the referral comments provided by Bylaw Services and the Housing and Homelessness Coordinator. The applicant advised staff that he had no additional comments to provide to staff related to his application.

Housing Agreement

16. A Housing Agreement is required by the Zoning Bylaw to operate any Supportive Recovery House in Abbotsford. The Housing Agreement includes a "zero tolerance" attitude to any illegal activity of the residences of the Supportive Recovery House, which means the resident or resident(s) involved with such activity will be evicted. The Housing Agreement is attached to this report (see Attachment I).

The Housing Agreement contains a clause (5.3(d)) which specifies that the Housing Facility will be required to obtain a licence from the Province under the Community Care and Assisted Living Act. The inclusion of this clause into the Housing Agreement was predicated upon the recommendation of the Housing and Homelessness Coordinator. This requirement will provide an additional compliance mechanism that will serve as a further safeguard for residents of a supportive recovery facility.

17. The Housing Agreement also allows the City to revoke the Housing Agreement and Business Licence of the Supportive Recovery Use if the terms and conditions are not met. The neighbourhood can contact the Business Licensing Department at any time to file a complaint about the operation of the Supportive Recovery House.

COMMUNICATION PLAN

If denied by Council, the Supportive Recovery facility will be required to cease operation. As outlined on the Recommendations section, staff recommend that if the application is denied, a letter be mailed to all properties that previously received the notification of the Neighbourhood Information Meeting, and the implications related to timing associated with the Residential Tenancy Act, and the coordinated effort of Bylaw Services, the Housing and Homelessness Coordinator and the Coordinated Intake and Referral (CIR) program to attend to the welfare of the residents living at the facility.

If the application is supported by Council, the Housing Agreement is to be authorized by Bylaw at an open meeting of Council. Pursuant to the Local Government Act, an advertisement in the newspaper of notification of surrounding owners and occupiers of land is not required.

FINANCIAL PLAN IMPLICATION

No financial plan implications are anticipated.

Rajat Sharma

Rajat Sharma
General Manager, Finance and Corporate Services
Signed 4/11/2019 1:58 PM

IMPACTS ON COUNCIL POLICIES, STRATEGIC PLAN AND/OR COUNCIL DIRECTION

The proposal falls within the parameters of the City of Abbotsford Official Community Plan Policy 2.6 for the provision of Non Market housing and the Strategic Plan 2019-2022/Complete Community Cornerstone achieved through Council's principle of facilitating action to mitigate social issues that impact our community.

SUBSTANTIATION OF RECOMMENDATION

Planning staff do not recommend support for this application for a Housing Agreement to allow for a Supportive Recovery facility for women and men located at 1880 Eagle Street based upon the feedback received from surrounding residents, the Abbotsford Police Department, Provincial health agencies and the Housing and Homelessness Coordinator.

Allan Campeau

Allan Campeau
Planner
Signed 4/8/2019 1:53 PM

Darren Braun

Darren Braun
Director, Development Planning
Signed 4/9/2019 10:27 AM

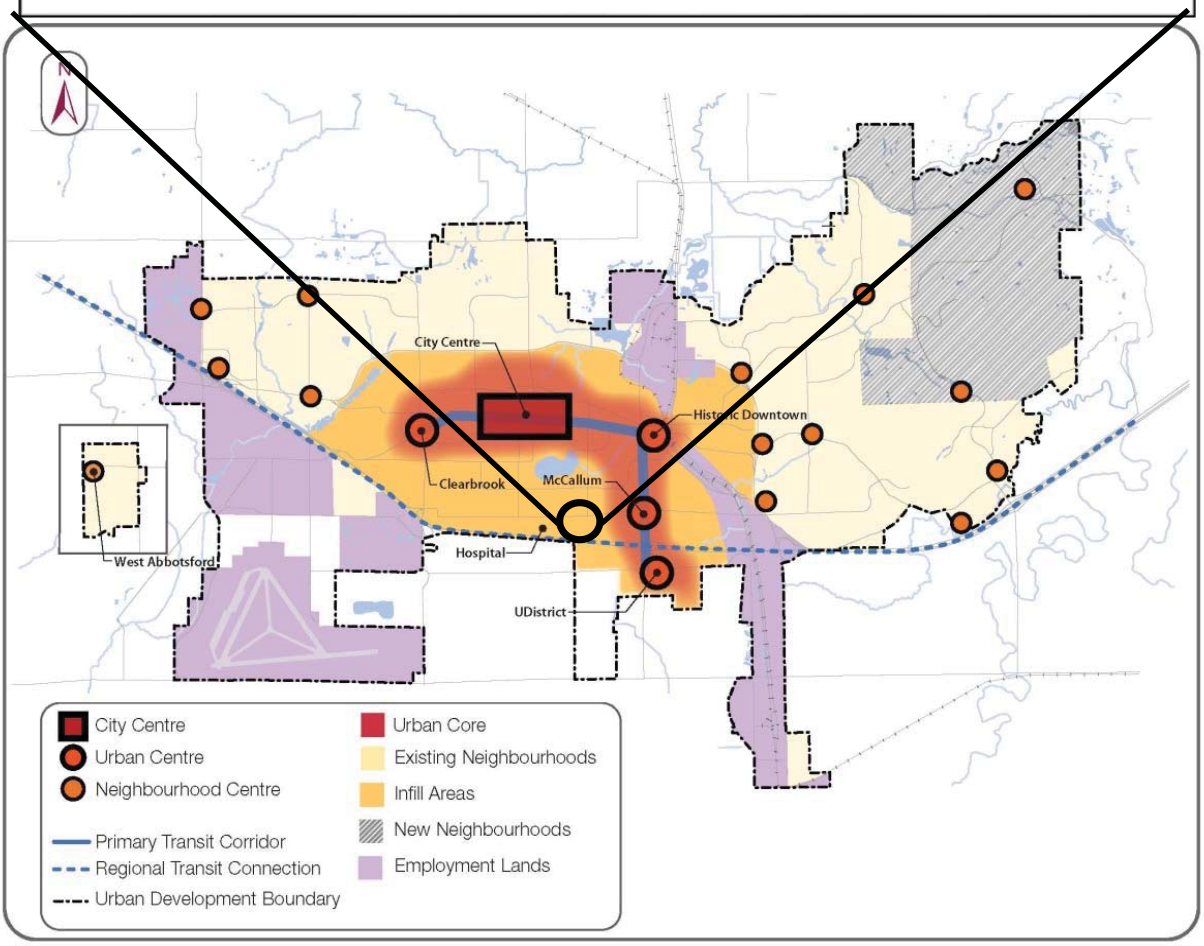
Siri Bertelsen

Siri Bertelsen
General Manager, Planning and Development Services
Signed 4/16/2019 4:18 PM

ATTACHMENTS:

Figures 0 to 5
Attachment A - Proposed Operator's Residential Occupancy Agreement
Attachment B - Background Information Sheet (About Us) provided by applicant at Neighbourhood Information Meeting
Attachment C - Background Information Sheet
Attachment D - Letter from applicant received February 25, 2019
Attachment E - Abbotsford Police Department Calls to 1880 Eagle Street
Attachment F - Abbotsford Fire Rescue Service Inspection Report for 1880 Eagle Street
Attachment G - Neighbourhood Information Meeting Sign-In Sheets
Attachment H - Neighbourhood Information Meeting Comment Sheets, Emails and Letters
Attachment I - Bylaw No. 2927-2019 - Abbotsford Housing Agreement Authorization No. 2185 Bylaw, 2019

City Context Plan
File: PRJ17-121 Location: 1880 Eagle Street



Attachment: Figures 0 to 5 (PDS 032-2019 : Supportive Recovery Use application for the property located at 1880 Eagle Street)

ABBOTSFORD
Planning and Development Services

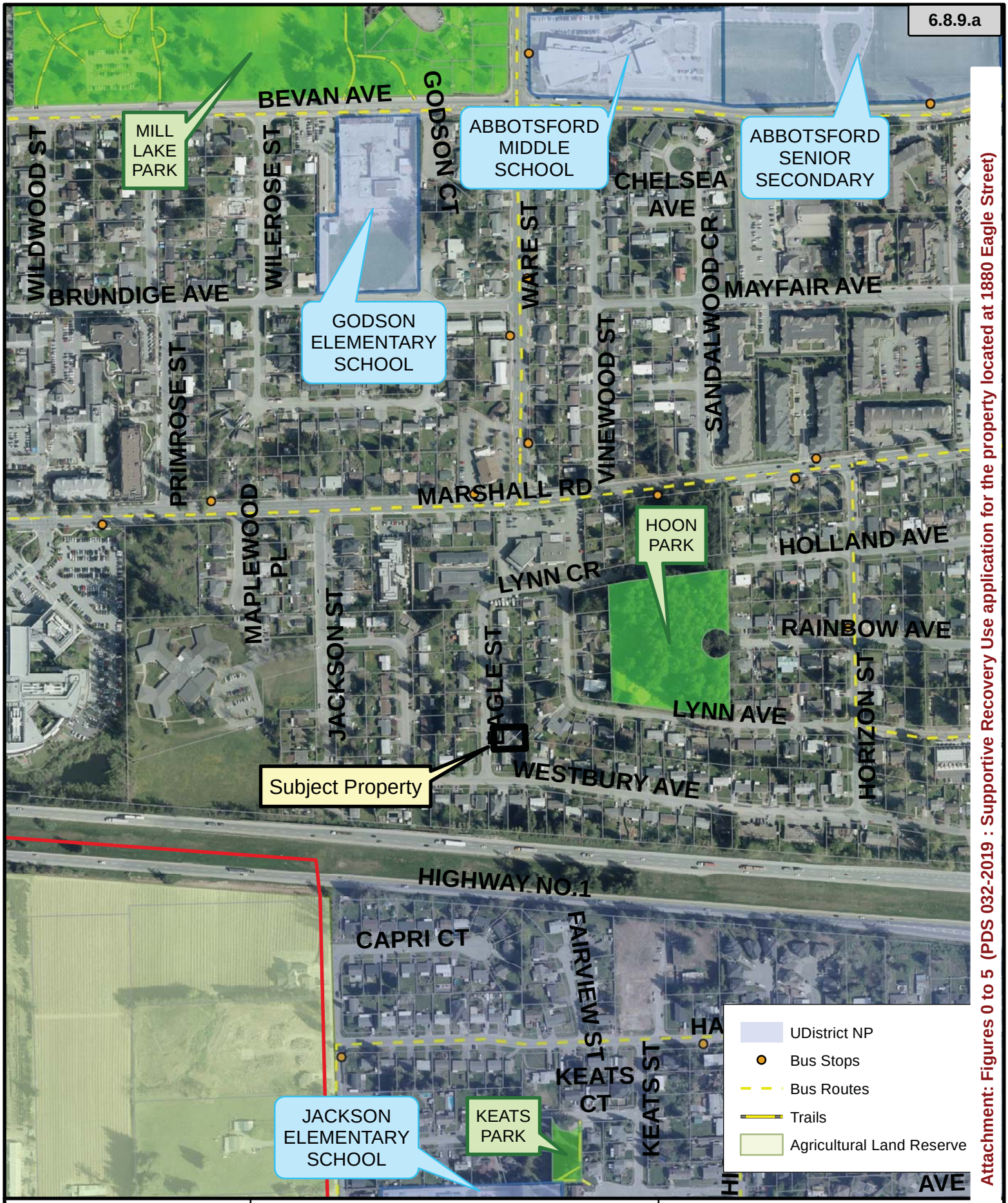
1880 Eagle Street

Figure 1 - Location Plan
File No.: PRJ17-121

40 0 40
Meters

N

Date



Attachment: Figures 0 to 5 (PDS 032-2019 : Supportive Recovery Use application for the property located at 1880 Eagle Street)

ABBOTSFORD
Planning and Development Services

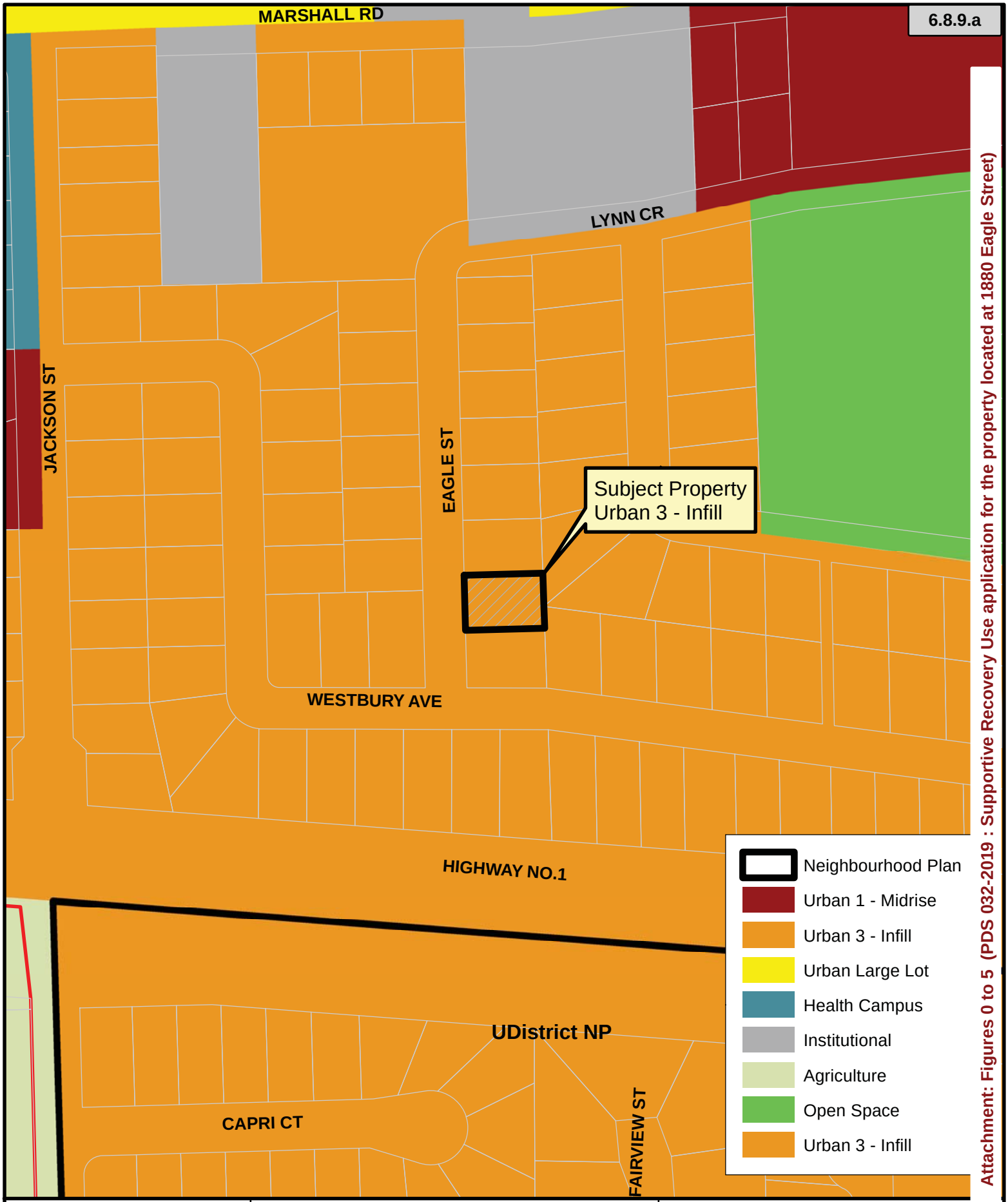
1880 Eagle Street

Figure 2 - Context Plan
File No.: PRJ17-121

50 0 150
Meters

N

Date



Attachment: Figures 0 to 5 (PDS 032-2019 : Supportive Recovery Use application for the property located at 1880 Eagle Street)

ABBOTSFORD
Planning and Development Services

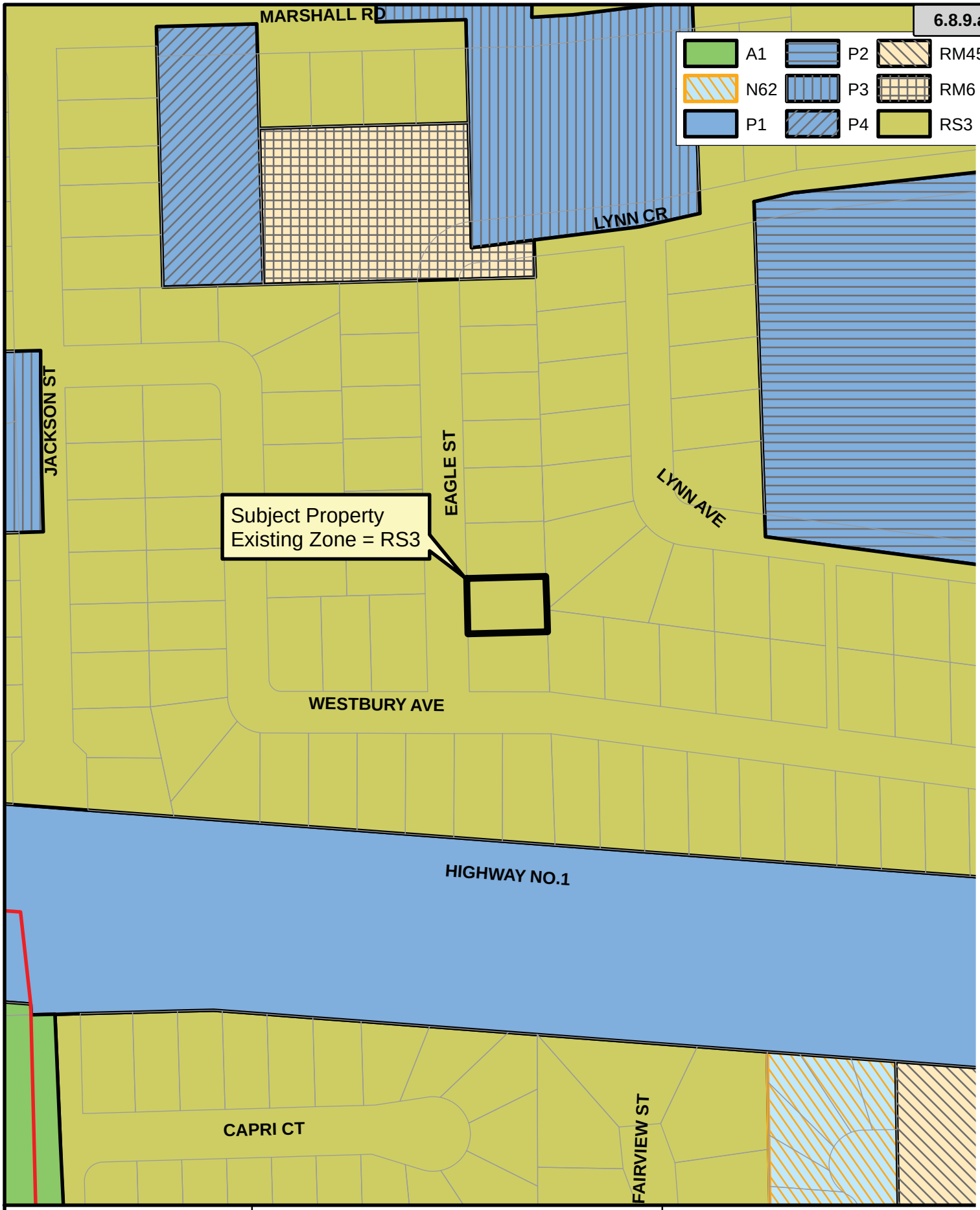
1880 Eagle Street

Figure 3 - Official Community Plan
File No.: PRJ17-121

40 0 40
Meters

N

Date



ABBOTSFORD
Planning and Development Services

1880 Eagle Street

Figure 4 - Existing & Proposed Zoni
File No.: PRJ17-121

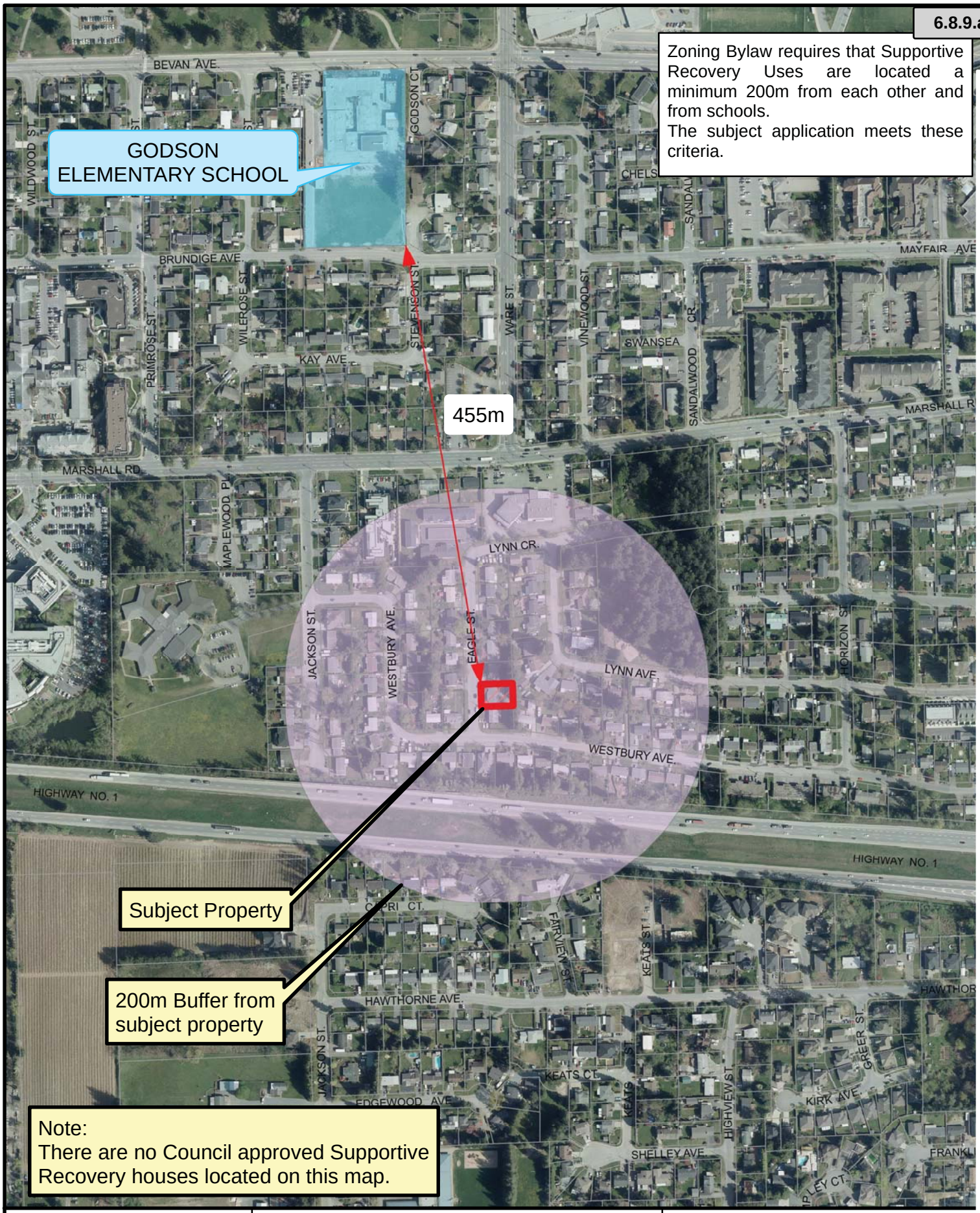
40 0 40
Meters

N

Date

Attachment: Figures 0 to 5 (PDS 032-2019 : Supportive Recovery Use application for the property located at 1880 Eagle Street)

Zoning Bylaw requires that Supportive Recovery Uses are located a minimum 200m from each other and from schools.
The subject application meets these criteria.



Note:
There are no Council approved Supportive Recovery houses located on this map.

ABBOTSFORD
Planning and Development Services

1880 Eagle Street
Vancouver Recovery Centre Society

Figure 5 - Distance from Schools
File No.: PRJ17-121

50 0 150
Meters

N

Date

Vancouver
Recovery Centre

CITY OF ABBOTSFORD
RECEIVED
AUG 02 2017
Planning & Development
Service Department

Residential Occupancy Agreement

Residents Name:_____. **Staff Members Name:**_____.

Our Mission

We provide those in need of addictions-recovery with a safe, community-based, living environment. Our focus is to teach others how to live a balanced, and most importantly, healthy lifestyle. VRC reintroduces its residents back into the community with recovery and a better way of living. People leave Paladin feeling focused, productive, and most importantly crime and substance free.

More About Our Program

We are an addictions-recovery oriented, assisted-living accommodation. We look at all areas of life in our recovery plan. Focusing on people as a whole, we include the mental, emotional, spiritual, physical and social aspects of ones life. We can assist you in "getting to where you want to go", with personal goal-setting and one-on-one counselling. The VRC community is about accomplishing goals. We help you create goals and help you to achieve those goals on a regular basis. VRC also offers important life skills training and access to a variety of Mental Health and Substance Abuse community services. Our core-values are aimed at helping others in everything we do. We are actively involved in NA step-work and focusing on helping others through their NA step-work too.

We understand that everyone is different, so we have made our program flexible. We offer a recovery plan based on "Phases" of recovery. The different "Phases" are worked through on an individual level. This means the maximum length of stay with VRC is as long as you need to adjust. We ensure that by the end of our Recovery "Phases", you will have learned the skills you need to succeed in life and will be able to continue to live life clean and sober, while reintegrating back into society.

Intake

All potential new candidates for our program must be interviewed, and approved, by either "Kyle Walker" or "Paul Walker", prior to beginning their stay with us. We do not accept new applicants without first being seen by a Physician or Psychiatrist. Seeing a Doctor will ensure you receive the proper medical attention you need, which is a mandatory part of our program. Please address any immediate concerns with the Doctor and verify that all of your medications are up to date. We will require a Doctors note

Attachment: Attachment A - Proposed Operator's Residential Occupancy Agreement (PDS 032-2019 : Supportive Recovery Use application for

indicating that this has been done prior to your stay with us. If you need to be taken to a Doctors office to complete this, please let us know, and we will organize this for you as soon as possible.

Residents are required to review and sign all paperwork, including the following mandatory forms:

"VRC - Resident Rental Agreement and Consent", "Ministry - Direct Deposit", and "Ministry - Intend to rent" forms.

A company Manager, or "Elvira Mckillop", will sign this paper work with you, and provide it to our Administrative Manager: "Sasha Snow" upon completing your intake.

We are unable to house any guests prior to the mandatory forms are completed.

"Elvira Mckillop" or the Administration Department will help you with contacting the ministry, and filling out your papers, to ensure you are eligible to stay with us for a long-term period. Please read the following for more information about payment options:

For self paying Residents, funds payable are addressed to: "Vancouver Recovery Centre CCC", for the amount of: $800.00 monthly. Payment arrangements in the form of post-dated cheques will be required for any future payments. Arrangements to pay immediately using cash, can be made with director "Kyle Walker". Directors, either "Kyle Walker" or "Paul Walker", must be present during payment for cash exchanges, and a receipt must be supplied. Please ensure you are getting cheques made for future payment.

For Income Assisted Residents, funds payable are addressed to: "Vancouver Recovery Centre CCC", for the total amount of: $550.00 monthly. **This must be filled out on an intend to rent form; Residents should have rent cheques mailed out to: "PO BOX 73103 EVERGREEN RPO, Surrey bc, V3R-0J2".**

As of July. 2, 2016 We are using direct deposit forms for all Income Assistant Residents. Please be sure that a direct deposit form has been filled out along with the Intend to rent form. These papers must be given to Administrative manager "Sasha Snow" upon completion of Intake.

If a client is unable to provide their SIN#, or any other information that Identifies them, prior to their stay, they will need to contact the ministry for their "Ministry File number" so that we are able to locate you in the ministry systems. This must be done prior to a new clients stay with our society.

We do not allow residents to obtain more than: one medium-sized suitcase, or two small bags of belongings, during your stay with us. We require all bags to be checked by staff members prior to your stay. After you have completed proper intake with us, we will assist you with obtaining clean clothing, bedding and toiletries. We ask that you shower, and change into the clean clothing you are provided. After showering, it is mandatory that all clothing items brought with you are washed in the laundry room. A monitor, or roommate, will help you in setting up your new bed.

Group meetings, Doctors Appointments, House chores and any appointment necessary to ensure you eligibility for Income Assistance from the Ministry, will be mandatory starting the next immediate day of your stay with us.

Month One

Your First Month with VRC
The Meditation Phase. This is "Phase 1" of your recovery. The first month with VRC is about stabilization and sets the foundation for your recovery.

From your "Welcome Package", a personal plan is made with a focus on goal setting in the **"Personal Service Plan"** form. This month you will be focusing on: The recovery Program, Personal Goals, Starting NA steps 1 and working on the **"Recovery Workbook"** Binder.

Please see the "Program and Psycho-Social Support" form for more information about the steps involved during your first month of stay.

All new residents will be on a one month restriction from leaving the house. We do not allow cellphones, or unmonitored internet access, during the first week of stay. **You will be allowed to make quick phone calls on the house phone, as long as you are monitored by a staff member.** In order to get off restrictions, **you will also be required to complete an assigned amount of step work or worksheets,** which will be determined by staff prior to being able to leave the house.

Once you have completed your first month, you will continue with the remainder of "Phase 1" until you have successfully graduated to "Phase 2". Please see the "Program and Psycho-Social Support" form for more information about the different "Phases" of Recovery at VRC.

Weekly Schedule

Monday
We start our weeks off with a group outdoor walk. Once this is done, we reassemble and continue with a group morning meeting. The group discussion is on encouragement and support with achieving this weeks goals. Residents can reflect on how they managed to stay clean over the weekend, and talk about how they're feeling. Goals and planning is made around each individuals NA Step-Work. Recovery Support and relapse prevention strategies are discussed. We also review topics relating to the morning discussion using the S.M.A.R.T. Recovery workbook or do a reading from "The Big Book".

Tuesday
We start today off with a group outdoor walk. Once this is done, we reassemble and continue with a group morning meeting, outlined in the group guideline. The group discussion will be an open topic discussion for healthy recovery. We educate ourselves on Tuesday mornings with "TedTalk's", or watch/listen to motivational speakers such as: Anthony Robbins or Dr. Wayne Dyer. Or we listen to N.A. or A.A. speakers.

Wednesday
Today we get together for group and start with stretching. The Wednesday group discussion is on life skills teachings. Some examples of topics include: hygiene, cleanliness, cooking skills, how to shop on a budget, looking for work, job interviews, staying organized, time management.

Thursday
The Thursday group discussion will be a review of the "Chore Checklist". We encourage others and offer to help or trade certain chores with others. When chores have been completed to satisfactory levels, we congratulate each other on a job well done. We integrate the topics of "positive thinking" and "constructive criticism" to help us understand why it is necessary to follow the rules in the house.

Friday
The Friday group discussion will be focused on relapse prevention, topics like adjusting to uncomfortable situations and identifying triggers. On Friday, we also practice a "random act of kindness" exercise and Positive affirmations. We then review topics using the S.M.A.R.T. Recovery workbook.

Saturday
Volunteer day. Today we focus on volunteer work like picking up garbage in the surrounding neighbourhoods and parks.

Sunday
"Big Chore Day". Today we focus on chores and the entire house participates in a major house clean.

Group Guidelines

We encourage everyone to take a turn running group meetings. Taking turns to run a group meeting lets us step out of our comfort zone. It feels good to be able to take on a leadership role in a group setting. All group discussions are arranged by **staff** members using current Addiction Recovery, and Mental Health support information, Narcotics Anonymous, Alcoholics Anonymous, and S.M.A.R.T Recovery.

Enjoy having your morning coffees, cigarettes and use the washroom before group begins.
Takes place on Weekdays: 8:00AM -10:00AM, Weekends & Holidays: 10:00AM – 12:00PM

Some points on running Group Successfully:
- Group does not start until everyone is present.
- Everyone is to participate and remain in the group until finished.
- Everyone is to attend the Morning Meeting unless you are at work.
- You must be cleared through a staff member if you are unable to attend.
- You're encouraged to keep a log/journal of key points discussed.

- Please remember to turn off all cellphones and house phones.

Steps on running a Group meeting:

Meditation
Music incorporated with breathing Relaxation exercises/techniques.

Alcoholic Anonymous or Narcotics Anonymous literature
Step guide, or anything positive that anyone wants to share with the house.

Share the morning reading
Read the "How it works" AA Morning Reading. Go around the room and individually share on the reading. Was there anyone that heard anything in the morning reading that they could relate to or that brought up any feeling for anyone? How they can apply what they heard to their own life.

House Guidelines, and Personal Responsibilities Guideline
Read out the house guidelines & personal responsibilities every morning.

Group Discussion/ Guest Speaker
Review different areas of interest. Using N.A., A.A, and S.M.A.R.T Recovery resources. Review any written assignments you have. A guest may visit to offer a variety of services, and it is mandatory that everyone participates.

Gratitude List
List 3 things that you are grateful for and why. What are some positive things that are going on for you right now. Share any goals or any major achievements you've been accomplishing. Talk about goal setting strategies.

CLOSE GROUP
Serenity prayer/closing prayer.

Personal Development

Meals/Nutrition

Weekdays:
Breakfast: 7:00AM - 8:00AM, Lunch: 12:00PM – 1:00PM, Dinner: 5:00PM – 6:00PM
Weekends & Holidays:
Breakfast: 10:00AM-11:00AM, Lunch: 1:00PM–2:00PM, Dinner: 5:00PM–6:00PM

We serve 3 balanced meals daily, plus snacks and beverages. Meals are served during the designated times pasted above and snacks are available 24/7. Milk and juice is prepared in the evenings for the next

day. 1 glass of milk is served in the morning with breakfast. Juice is also available with three glasses maximum per day. Coffee and tea is always available unlimited.

The kitchen meal-plan binder can be found beside the microwave. Please note, we do not allow food in bedrooms. If you wish to buy your own food, an additional fridge can be accessed in the basement for your own use.

Everyone must take turns cooking and cleaning. When cooking meals cook for the entire house ensure there is enough for everyone.

The fridge is only unlocked during scheduled meal times described above this is secured to ensure proper distribution. If you are unable to join us for a meal, please let us know before-hand so we can make a "Meal-Save" for you.

Cooking is always overseen by someone who is Food Safe Certified.

Laundry Schedule

Laundry will be done only on designated days, which is dependent on your room number.

Laundry is designated to only one person each day. The laundry schedule cycles through each room number and each person in a rotating order. **You can find the Laundry Schedule on the whiteboard in the meeting room for more information on which times you are able to use the Laundry Facility.**

When you are in need of laundry services outside of this schedule, please arrange it with your house Monitor. Laundry soap is provided by VRC and can be found in the laundry room. Clean bedding and towels that are provided to you, must be returned when you complete the program, or if you are discharged.

Cleaning & Hygiene Products

Basic cleaning chemicals and supplies will be provided which can be accessed upon request. All purpose cleaner, bleach, windex, brooms, dustpans, mops, mop buckets and spray bottles. As for your personal hygiene products, only Toilet paper and bathing soaps will be provided. They can be found in the washrooms or accessed to upon request. It is up to you to supply any extra toiletries/personal products or specialty cleaning products. Please use the products responsibly.

House & Room Chores

As a house-hold we all work together to keep the house clean and tidy, with the exception. All residents are required to take part in a chore routine weekly. These chores will be distributed in group every Tuesday. If you have a chore you would like to volunteer for, you are more than welcome to do so in group. **A chore check list can be found in the group meeting room.**

Personal Hygiene Requirements

Attachment: Attachment A - Proposed Operator's Residential Occupancy Agreement (PDS 032-2019 : Supportive Recovery Use application for

Personal hygiene is important for your health and the health of others around you. Please let us know if you require items such as soap, toothbrushes or any other grooming or care items. If necessary, reminders about hygiene will be made by staff member, in a discreet manner, as part of our program. **Please make sure you leave the bathroom the way you found it.** To prevent the spread of germs and viruses, It is important to wash your hands constantly throughout the day using hot water and soap. Washing of hands will be required before the preparation of any meals or handling of food.

Bedrooms

All bed linens and furnishings will be supplied to you during your stay with us. Whatever we supply you, please return when you leave so we can re-use these them for future residents. Familiarize yourself with your room number and emergency exit plan in the event of an emergency. You are required to keep your room clean, tidy and organized.

Bedroom Rules are as follows:

- If you are awake at night disrupting the house, and those sleeping, the house monitor will "pick a day" in which you will complete all the residents chores.
- Sleeping all day will not be permitted in our residence, you can have a mid day nap after lunch is served, unless you are sick, which requires a doctors note.
- Please make your bed each morning before group. Please keep your living space clean and be respectful of your other roommate.
- When entering a room, both roommates must be present. Knock before entering.
- Please do not re-arrange the furniture. Keep all doorways clear of objects in case of emergency.
- Smoking and eating is not permitted in bedrooms at anytime.

Prescription Medications

For your convenience, VRC offers you use of a Pharmacy. You may use whichever Pharmacy you choose. If you choose to use our Pharmacist, prescription medication will be dispensed through the Pharmacy on a daily dispense method. Each morning, the Pharmacy's technician will require you to be present upon receiving your medication, you will be required to sign to confirm you have received your medication. This process is to help eliminate medication abuse.

We do not store, or dispense, any prescription medications on site.

Methadone

VRC can refer you to a methadone doctor, again this is your personal choice, but this is something we offer out of convenience to you. Once you have obtained a prescription for methadone, we can also provide you with a ride to and from the pharmacy of your choice to pick up your medication.

Methadone shuttles are daily: Monday-Friday: 7:30AM, Weekends & Holidays: 9:00AM.

Rules and Regulations

Electronic Devices

Phone services will be provided 24/7 for emergency purposes. Phone and internet services are provided for Recovery and are intended to be used within a healthy nature. A phone list of Addiction Recovery and Mental Health Support Services can be found beside the telephone. Sponsors and mentors can be accessed upon request.

Telephone and Electronic Rules:

- Telephone ringer's will be shut off after 10:00PM.
- Long distance telephone calls are not permitted using VRC phones. If it's necessary to make a long distance call, please arrange this with a staff member.
- If you are on Restrictions you will not be allowed to use the phone and you will be required to turn in all electronics. If you must make a quick call, we can arrange this with a monitor. The conversation will be supervised. If you are on restrictions and need to use the internet, you may also do so as long as it is within a reasonable amount of time and monitored by a staff member.
- The T.V. will be allowed on only after Morning Group. Prior to group, only music from the Spa or Nature channel is permitted.
- Please be mindful of others if you wish to listen to other music. You may listen to your own personal music as long as the device you are using allows you to use headphones. Please keep your headphone volume level low-moderate so that it does not bother others around you.
- T.V. is shut off at 10:00PM for respect for others sleeping. If you want to watch T.V. or listen to a stereo in your room be mindful of your roommate, there must be a mutual agreement and this must not disrupt your neighbour.
- Bedroom T.V's are to be off at 12:00AM. We reserve the right to suspend television and stereo's use at anytime.

Guest & Visitors

Guests must report to staff when arriving to the house. All visitors and guests have to be cleared through staff, and must be respectful and not disruptive to the rest of the house. Visiting hours are between 12:00PM-4:00PM, 7 days and week. **No visitors will be allowed for the first month of your stay, or if you are on restrictions.**

Sick Days

If you are unable to attend group meetings or events, a doctors note will be required. If there is a consistency of being sick a doctor's note is required and follow-up medical attention will be offered to ensure proper medical attention. If you are sick, it is up to you to stay in bed until you are better.

Smoking

Smoking is permitted in the backyard designated smoking area. Smoking will not be permitted in the front yard or anywhere in front of the house. Please smoke responsibly, ash and dispose of your cigarettes in the provided "cigarette butt cans". **Absolutely no smoking indoors under any circumstance**.
If you roll cigarettes, it is to be done outside only. Please clean up after yourself. No rolling cigarettes indoor. If you collect cigarette butts, please store them appropriately in a sealed container. If you want to quit smoking we can offer your assistance with quitting smoking programs.

"Pick-A-Day"

Residents who are continually struggling with following the requirements of the house, will be subject to disciplinary action. Disciplinary action may require you to complete everyones chores for the day. This will be done with the company of a staff member, and is issued to the resident to help them learn new skills and how to be responsible and accountable for their actions. This also gives the resident time to think about what their original commitment was to the program.

Restrictions

Residents who are continually struggling with following their commitment to our program will be assigned to a certain length of restrictions anywhere from a week to one month.

You may find yourself faced with restrictions if you:

- Your chore is not completed and you have not had someone cover your chore.
- Are found to be dishonest, or misleading, to staff or clients.
- Have reoccurring patterns with your bedroom not being maintained.
- Leave without signing out on a regular basis.
- Leave and fail to come home without notice
- Screen positive for drug-use during a urine test.

If a client is breaching any of the house guidelines, with a chance to correct their behaviour, and there is no drastic or immediate change, an "Incident Report" will be documented. There will also be disciplinary actions for your behaviour such as: Restrictions or "Pick-A-Day". In extreme scenarios, discharge from VRC may result, this is dependant on the circumstances.

While on restrictions, you will only be allowed to leave the property in the company of a staff member. If you leave the property while on restrictions, and without a staff member, your belongings will be packed, and put in our storage area. You will be asked to leave permanently upon your arrival home. If you are unable to take your belongings at this time, you can arrange a time to pick up your belongings at a later date.

Requirement to share a room

Residents residing in the same room must be of the same gender, unless they are a couple. Residents can store their belongings in the storage space provided in their bedroom. It is required that all residents be respectful and courteous to their roommates personal space and belongings. Damages to another persons belongings will be subject to disciplinary action. We may ask you to replace the item(s) for the resident/roommate. Restriction, as mentioned above, will be apart of the disciplinary actions taken, or a "Pick-A-Day", a day where you are in charge of completing all house chores. **It is prohibited to have guests sleepover in bedrooms or visiting with the door closed.**

Recreational Activities

Volunteer Work Requirements

Some volunteer duties may include:

- Neighbourhood snow shovelling, leaf clean-up and garbage pickup

- Serving food at homeless shelter and folding clothing
- Volunteering time to Churches, The Salvation Army, Recovery Centres and The Food Bank of Surrey

When volunteering it's important to be mindful of smoking and language use.
Any Inappropriate behaviour will not be tolerated.

Transportation Services

Transportation will be provided in the event of the following:
Medical Emergencies, Recovery Support Meetings - N.A. or A.A., Recreational Events, Skill-building Programs, Government Programs, Volunteer Activities, Legal Appointments, Medical and Financial Related Appointments, Income-Assistance Appointments (obtaining documentation for Income Assistance related circumstances), to Obtain Identification, and for the purposes of opening a bank account.

Transportation is organized on an individual level and also as a group. If there are multiple individuals in need of these services, we will do our best to get everything done as a group. **VRC does not offer Vehicle transportation for personal or recreational use.** If you have something personal to do, public transportation is available to you.

Vehicle Rules:

- Smoking and the use of cell phones will not be permitted.
- Music and conversation must be of healthy nature.
- **Everyone must be wearing their seat belt at all times.**
- **We can only transport the number of people to the amount of seats in the vehicle.**

Emergency Procedure

Emergency exit plans are located throughout the house. Please familiarize yourself with all exits and fire extinguisher locations. Make sure you are familiar with the location of the house telephone.

In the event of an emergency, fire, or in the sounding of the fire alarm, everyone is required to evacuate the house in a calm and safe manner.

Residents will assemble in the following emergency gathering places:

12446 72nd Avenue, Surrey BC, V3W 2M6

For a more detailed Emergency Plan, which includes the events of natural disasters, please see the "Paladin Emergency Plan" information form.

Discontinuation Of Services

A discontinuation of service may result if a resident refuses to abide by any of the terms and conditions outlined in this agreement.

Other situations that may result in termination include:

- Failure of a urine screening while on a recommitment contract.
- Continued lack of program participation, after being spoken to about issues several times.
- Absence from the house while on restrictions.
- Absence, without making contact with staff members, for over a 72 hour period.

In the event of a discontinuation of service, the following will take place:

- The resident will be asked to depart with their belongings. Relocation and transportation within city limits may be provided. You may also make plans to pick up belongings at a later date.
- Terminated residents are unable to communicate with the residents still living at the house.
- Phone calls will not be permitted inside the house. You may arrange to borrow a staff members cell phone to use outside while supervised.
- If you have been on restrictions and not present for over a 72 hour period, your belongings will be packed and stored for 3 days, after that period we will take these items to a charity for donation. At this time, you will not be permitted inside the house. Any arrangements can be made with a staff member outside of the house.

Client Signature:_____. Staff Signature:_____.

ABOUT US

WHAT WE DO AND WHY WE DO IT!

Letters from our Directors

Kyle

Hi my name is Kyle Walker,

I am the Director of Vancouver Recovery Centre.

I became interested in Recovery after being on the other side of a close family members addiction. My brother Steve came to me and told me that he wanted to start a recovery house. I had seen what these types of programs had done for his own recovery and how they had helped bring us back together as a family. That is where we began "Paladin Recovery Centre". I knew that if I could help those in addiction get their sobriety back, I could indirectly help the family members that suffer because of addiction, and ultimately give people another chance at life. I think that's my favourite part about recovery, seeing the families reconnect again. Paladin Recovery was a great learning opportunity for me, I was able to learn how to help people in addictions recover by teaching Step Work and life skills to those in need.

Attachment: Attachment B - Background Information Sheet (About Us) provided by applicant at Neighbourhood Information Meeting (PDS 032-

Unfortunately, after two years of operating that business with my brother, things came to an end due to our own personal differences. During those two years my desire to continue helping people became quite strong, and that's why I have decided to started a new venture on my own, which is now "Vancouver Recovery Centre".

My experience with helping those in need began when I was a teenager. I volunteered a lot of my time with "The Harvest Project" in North Vancouver. Here I would collect food donations and create relief packages for the less fortunate families living on the north shore.

At Vancouver Recovery, I would say my role has more of an Administrative focus. I am in charge of the financials, house-hold budgeting, bills and accounting. I also organize registering our houses with the assisted living registrar, and I have been the main investor for Vancouver Recovery. When I am at work, I ensure there is enough food for everyone, while organizing our weekly meal planning and grocery shopping trips. I also created our "Recovery Binder Workbooks" that everyone works with on a daily basis.

Sincerely,
Kyle Walker

Paul

My name is Paul Walker,

I am one of the directors at Vancouver Recovery Centre.

I became interested in recovery after seeing my brothers working together at Paladin Recovery for quite sometime. Growing up with someone that has an addiction-problem has influenced me to want to help

those still suffering in addiction. I believe that recovery houses give people the training wheels to be able to live on their own after recovery. I like to be able to help people get back to living their daily lives and I am a firm believer in the structure and routine that these programs offer. I enjoy witnessing the positive changes that take place in peoples lives when they come into our program. My roles at Vancouver Recovery Centre include: taking clients to appointments and organizing outings like going to church and volunteering. As of recently, I have started organizing the volunteer schedules and in our spare time, we like to help out at the local food-bank.

Sincerely,
Paul Walker

Christine Lasko

My name is Chrisitne Lasko and working to help the recovering addict has always been my passion.

I began this field of work because I want to bring real change in helping individuals less fortunate realize their potential. Growing up I was surrounded by the dysfunction of substance abuse stemming from close friends and family members cycling within their own substance abuse problems. The results of this childhood have been tragic and filled with heartache. Fortunately, able to remain sober throughout this time of my life reaching adulthood I was able to take with me a unique kind of clarity and intuition that is just not received in school.

Beginning in 1995 I embarked upon a journey of education seeking my bachelors degree studying in religion with a concentration in youth at the Canadian Bible College. From there I went on to working with adults that struggle in substance abuse issues whom also have a diagnosis of FASD (Fetal Alcohol Spectrum Disorder).

Attachment: Attachment B - Background Information Sheet (About Us) provided by applicant at Neighbourhood Information Meeting (PDS 032-

Package Pg. 214

Gaining reputable job field experience I took this knowledge to the next level. Winning a position within the Paladin Recovery Society as their acting House Manager and Supervisor I was able to personally take part in the lives of those seeking a healthy functional lifestyle. Using my first professional job position I applied my knowledge and intuition where I created positive impacts on the lives of others. Witnessing real change taking place before my eyes and experiencing the rewards of seeing someone actually break their cycle and help them to understand that they do matter, that they can do this and most importantly help them to not just know but feel that they are worth the effort is truly rewarding. By establishing a reputable name and having clients continue to write and keep in contact to share with me their new achievements at life brought recognition from the Vancouver Recovery Society offering me a position as On-Site House Manager and Supervisor. Achieving this goal as my sought after profession I am solely responsible for administering the daily workings of the recovery home and managing the progress of client care. Carrying the responsibilities for administrative procedures involving intakes of new clients, discharge, budgeting, meal planning and shopping; transportation and scheduling appointments, peer mentorship, communicating between probation officers, lawyers and court officers, emergency intakes, crisis prevention, enrollment in counselling sessions and professional therapy. As House Manager and Supervisor I assist clients with support such as emergency clothing resources, money management, budgeting, thrifty shopping, job training, and continuing certifications. I have also worked with the families of our clients and educating them on addiction and recovery ultimately reuniting them with loved ones. By helping everyone understand the struggles of addiction and recovery creates a connection that instills natural fuel for encouragement. By working with the Vancouver Recovery Society I was able to create custom life skills workshops in such a way that promotes health and achievement by using my skills as a former hairdresser I have been able to help those rediscover their confidence by developing healthy self-esteem issues and teaching the basics of life that some of us were just never taught. My long time experience in this field has also conditioned me with attributes in conflict resolution, critical thinking and problem solving skills. Managing a house of ten plus individuals each on their own different paths from many walks of life, problems sometimes do arise that requires a person able to safely handle and diffuse the situation. As of February 2017 I am now happily part of the Vancouver Recovery Society as a Director where I plan to continue my progress in the development of the lives of others and myself.

My work is my passion. Being able to assist with such amazing change is a remarkable experience that I find I am passionate about. Meeting a person at a very difficult time in their lives and pass along knowledge and skills in such a way that sparks desire towards betterment and functionality to live a healthier happy life is just such an amazing gift to give to a person which is why I plan to continue to make a difference in the world, in our communites and our neighborhoods.

Attachment: Attachment B - Background Information Sheet (About Us) provided by applicant at Neighbourhood Information Meeting (PDS 032-

Background Information

ABBOTSFORD

January 31, 2019 – Neighbourhood Information Meeting
for a proposal to establish the operation of a *Supportive Recovery* use for the property located at:
1880 Eagle Street
Applicant: **Vancouver Recovery Centre Society**

- The Zoning Bylaw defines ***"Supportive Recovery"*** as: "a *residential use* providing a supportive and structured environment for individuals recovering from drug or alcohol addiction, which is governed by a Housing Agreement."

- A Housing Agreement Bylaw (which is a legal agreement to regulate the conditions of occupancy and operation, a sample is available) to legally operate a *Supportive Recovery* use in Abbotsford is required, which is the purpose of this application.

- The Housing Agreement requires that an onsite caregiver provides 24 hour 7 day a week supervision of the Housing Facility.

- a Business Licence and a Housing agreement for *Supportive Recovery* **can be revoked** by the City if the provisions of the Housing Agreement are not met (this can also be dealt with through complaints by the neighbourhood to the Business Licence Department).

- This property is 93 m away from Hoon Park and 455 m away from Godson Elementary School. There are not any other Supportive Recovery uses in the neighbourhood. The Zoning Bylaw requires that Supportive Recovery uses are located a minimum 200 m from each other and from schools. Therefore, this application is in compliance with the locational requirements set out by the Zoning Bylaw.

- Vancouver Recovery Centre Society is proposing to house a maximum of 10 occupants (consisting of women and men), the Zoning Bylaw permits a maximum of 10 people in care (including 1 on site caregiver).

Attachment: Attachment C - Background Information Sheet (PDS 032-2019 : Supportive Recovery Use application for the property located at

Vancouver
Recovery Centre

Dear Mr. Campeau:

Thank you very much for yourself and the staff of the City of Abbotsford for holding the "Information Meeting" for the residence in the surrounding area.

I understand there were several comments from residents in the surrounding area speaking about how there has been an increase in theft and crime in the area.

If you are not aware; there is a Mens Mental Health and Substance abuse facility that houses 100 residents at 33134 Marshal Road, Abbotsford. This facility is no more then a block away, which opened in August of 2016. This is approximately the same time that we started operating our Society at 1880 Eagle Street, Abbotsford. (This residence is 10 times the size of ours)

We do not feel that the increase in crime in the area is solely due to our Society. We are not saying that we have not been an contributor to crime in the area. If we find residents to be using drugs or involved in criminal activity they are asked to leave our Society, and what they do when they are outside of our Society/house is not our responsibility.

As I had noted to you when you had come to our Society to do the inspection at 1880 Eagle Street, Abbotsford ,we had to remove a deck in the rear of the property due to it being a safety hazard to the residence. The debris that the neighbours are complaining about was due to the demolition of the deck, and we were in a dispute with the landlord about the remove of the debris, as it was his responsibility to remove the garbage, this is why it took an extended time.

We were also notified at the meeting that the police officer was informing neighbours that we had large amount of arrests and police incidents at the house. This is false information, as a large quantity of the police activity in our house has been due to the police coming to our house to do curfew check, or to check to see if a resident is still residing at our Society.

I would like to comment on how unprofessional it was for a worker from The City of Abbotsford to make statements about our Society. Stating that we did not show up (When we were sitting right in front of the individual), and how it shows red flags about our Society.

We recently had Christine Lasko leave our Society, whom was the site manager for 1880 Eagle Street. When Christine Lasko left she had vandalized our property and stole all our furniture and residents. This is why the window was broken to the front of the house, we have ordered a new front window, which takes 6-8 weeks to be fabricated and arrive at our property.

My brother Paul Walker is now living at the property and overlooking the new residents at the house, he has been working along side with me in the business for the previous 5 years, and am confident the house is in good hands.

Attachment: Attachment D - Letter from applicant received February 25, 2019 (PDS 032-2019 : Supportive Recovery Use application for the

I heard one of the Abbotsford workers saying that they heard negative things about our Society, I just want to inform you that we have 15+ residents currently in our Society that have been long term residents, and if you wish; can show letters from each of the residents showing how we have helped there lives drastically, and that we are an honorable Society. We have also numerous residents that have been with our Society; obtained a job, and moved into there own residents, due to our Society helping them get back on there feet.

Finally we do not see the relevance of a Neighbourhood information meeting for a Recovery Society as ours, if I was notified or any other normal personal about a recovery society opening near my residence I would disapprove the opening as well.

The fact of matter is; these houses are direly needed, many people are dying daily due to overdoses, and we as a Society need to fight back against the drug crisis, by resisting houses like ours, you are allowing this drug crisis to continue.

We have been waiting for an extended period of time to hear about the approval of this application, and we would appreciate a finalized answer as soon as possible, as we would like to continue our application with the assisted living to obtain our Perdium licensing.

Thank you,

Kyle Walker
Director
(604)781-7785

1880 Eagle St, Abbotsford

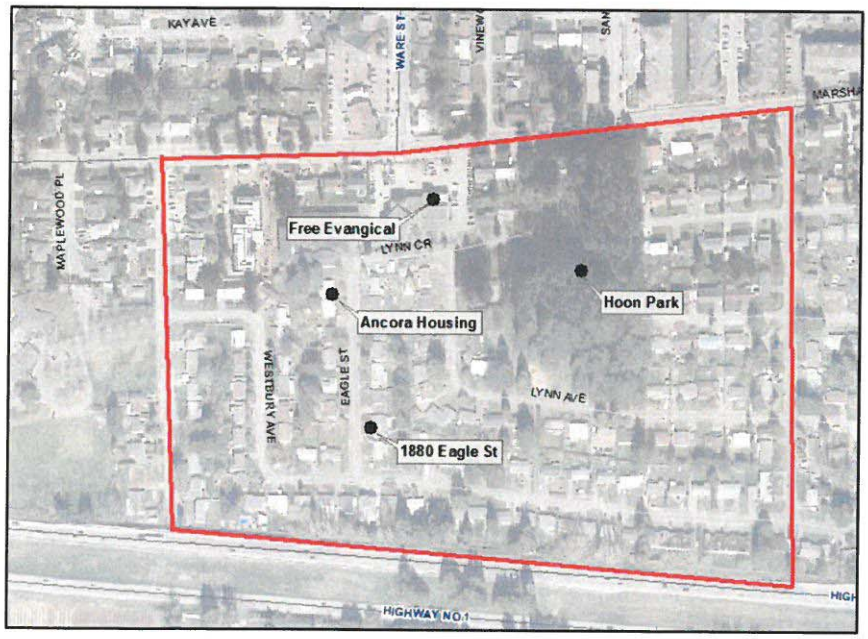
Prepared by: T. Van Asseldonk, Crime Analyst
Requested by: D/C B. Crosby-Jones

CALLS FOR SERVICE TO 1880 EAGLE ST

CAD CALL TYPE	COUNT
ASSIST POLICE / FIRE / AMBULANCE	11
ASSIST OTHER AGENCY	6
BREACH	3
SUSPICIOUS CIRCUMSTANCES/PERS	3
UNWANTED PERSON	2
PROPERTY	1
ASSIST GENERAL PUBLIC	1
ASSAULT SEXUAL	1
THREATS	1
KEEP THE PEACE	1
CHECK WELLBEING	1
DOMESTIC IN PROGRESS	1
Grand Total	**32**

- Between 2017-01-01 and 2019-01-29 there were 32 Calls for Service to 1880 Eagle St.
  - 2017 = 11 Calls for Service
  - 2018 = 19 Calls for Service
  - 2019 (to Jan 29) = 2 Calls for Service
- The majority of calls to this location are for Assist files. These Assist files include:
  - Other Agency Curfew/Confirm address checks
  - Assisting EHS (self-inflicted wound)
  - Assist other agencies with arrests
  - Locate Missing Person requests
  - K-file notifications
  - Subpoena/Summons service
  - Assist Fire after mattress was set on fire
  - Locate individual with outstanding warrant
  - Serve VT

CALLS FOR SERVICE IN ATOM AB0016



- In 2017, 1880 Eagle St had the third highest Calls for Service in AB0016 with 11 incidents.
- In 2018, this jumped to 19 Calls for Service and remained with the third highest Calls for Service in the area.
- In 2017, 1880 Eagle St accounted for 5% of all Calls for Service in this area; in 2018 this increased to 6.3% of all Calls for Service in the area.
- The chart below, on page 2 demonstrates addresses within AB0016 that have 15 or more Calls for Service.

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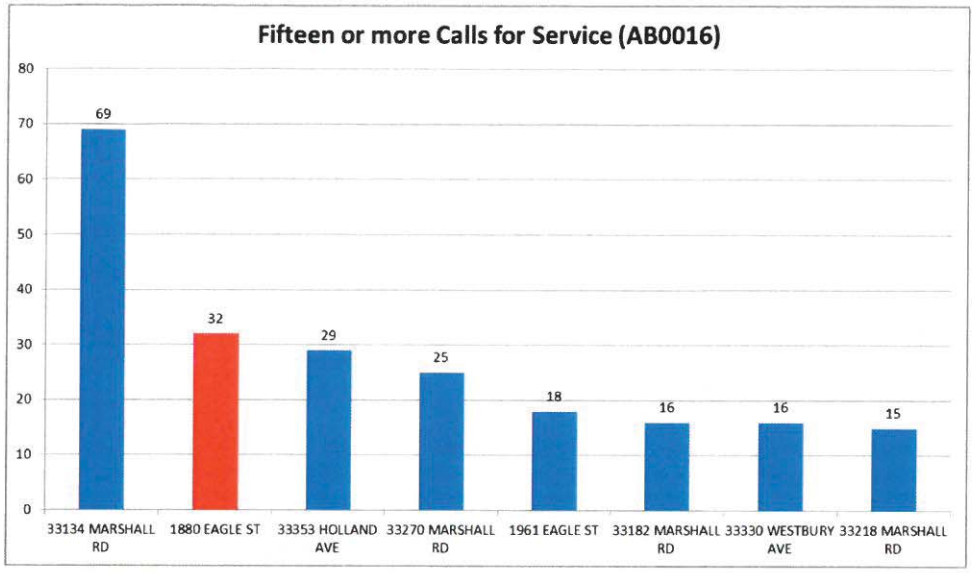
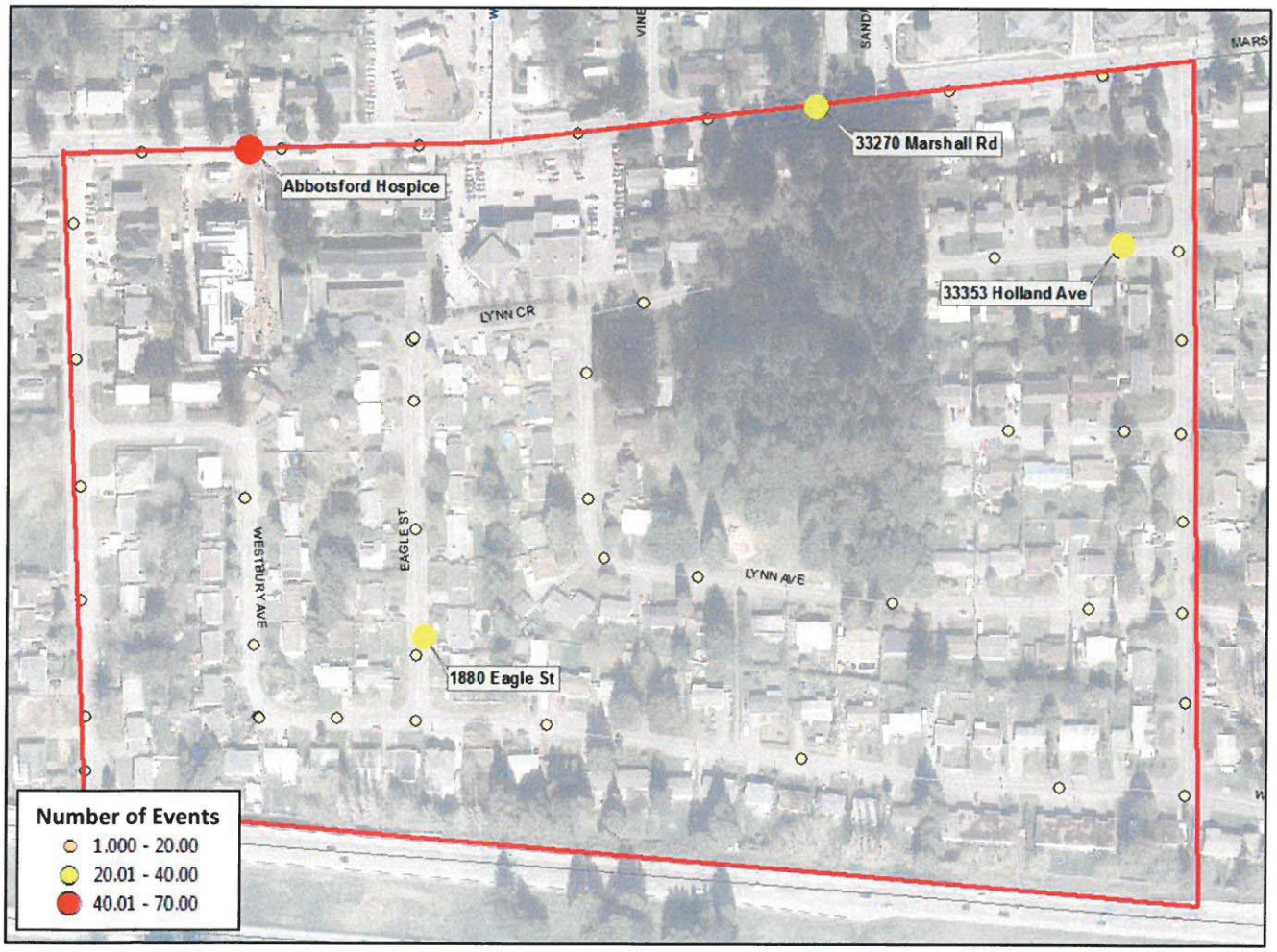
Attachment: Attachment E - Abbotsford Police Department Calls to 1880 Eagle Street (PDS 032-2019 : Supportive Recovery Use application for



ADDRESS	PLACE
33134 MARSHALL RD	Abbotsford Hospice
1880 EAGLE ST	Recovery Home
33353 HOLLAND AVE	Residence
33270 MARSHALL RD	Residence
1961 EAGLE ST	Ancora Housing Society
33182 MARSHALL RD	Group Home
33330 WESTBURY AVE	Apartments
33218 MARSHALL RD	Evangical Free Church

In the area of AB0016, 1880 Eagle St has the second highest number of Calls for Service between 2017-01-01 and 2019-01-29 with 32 Calls for Service.

CRIME OVERVIEW MAP *(2017-01-01 to 2019-01-29)*



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RECOVERY HOUSE

6.8.9.g

CITY OF ABBOTSFORD FIRE RESCUE SERVICE

32270 George Ferguson Way • Abbotsford, B.C. • V2T 2L1 • Tel: (604)853-3566 • 0830 To 1630 Hours • Fax: (604)853-8452

PROPERTY FIRE INSPECTION

Under the B.C. Fire Services Act

Date: 2018 YY/ 09 MM/ 18 DD Shift: FPO Business Name: RECOVERY HOUSE

Suite: _____ House: 1880 Street: EAGLE STREET Postal Code: _____

Phone: _____ Fax: _____ E-mail: _____

The BC Fire Code Division C 2.2.1.1 (1) states: "Unless otherwise specified, the owner or the owner's authorized agent shall be responsible for carrying out the provisions of this Code." The following hazards/deficiencies are dangerous to life and property and shall be corrected within 30 days or by the re-inspection date shown below. Charges may be laid under the Fire Prevention Bylaw for failure to comply with code requirements after the re-inspection date. **There may be fees associated with any additional inspections after the first re-inspection.**

CHECKLIST	Sat/ Unsat	N/A	COMMENTS – (Number Matches Checklist Item Found Unsatisfactory)
EXITING			
1. Access to Exits / Pathways			
2. Doors			
3. Stairwells			
4. Exit Signs	U		PROVIDE PROOF THAT EMERGENCY
5. Exterior Lights			LIGHTS AND EXIT SIGNAGE HAVE
6. Emergency Lights			MINIMUM 30 MINUTE RUNTIME.
FIRE ALARMS			
7. Annunciator / Alarm Panel			"HARDWIRED" SMOKE ALARMS INSTALLED
8. Fire Detection	U		OCCUPANCY OVER 10 PERSONS
9. Pull Stations			REQUIRED A FIRE ALARM SYSTEM.
10. Test Date / ASTT Tag			
EXTINGUISHERS			
11. Portable / Cabinet			
12. Special Suppression Systems			
13. Test Date / ASTT Tag			
SPRINKLERS/STANDPIPES	U		SMOKING AREA SHOULD BE MINIMUM
14. Valves / Gauges			7 METRES FROM STRUCTURE
15. Standpipe / Hose Connections			
16. FD Connections			
17. Sprinklers			
18. Test Date / ASTT Tag			
DANGEROUS GOODS	U		REMOVE COMBUSTIBLE DEBRIS PILE
19. Product / Room Labeled			(WOOD) FROM BELOW PATIO DECK
20. Storage			(FIRE HAZARD) DUE TO SMOKING
21. Compressed Gas			ACTIVITIES
22. Spray Booth / Paint Storage			
MISCELLANEOUS			
23. Fire Safety Plan			
24. Business License	U		FIRE SAFETY PLAN REQUIRED. POSTED
25. Emergency Contacts			EVACUATION ORDERS MUST BE
26. FD Access Route / Signs			PERMANENTLY MOUNTED ON WALL.
27. Exterior / Address			
28. Lockbox & Keys	U		REMOVE COMBUSTIBLES FROM FURNACE/
29. Fire Separations			HOT WATER TANK CLOSET.
30. Indoor / Outdoor Storage			
31. General Housekeeping			
32. Electrical Safety	NOTE:		OCCUPANCY AND BUSINESS
33. Service Rooms			LICENSE APPROVAL TO BE
34. Commercial Kitchen			GRANTED BY CITY OF ABBOTSFORD
35. Dust Collection Systems			PRIOR TO OCCUPANCY.
36. F.F. Elevators / Labels			
37.		*	AFRS DOES NOT APPROVE OCCUPANCY

Received By: SENT TO ALAN CAMPEAU AT DEVELOPMENT PLANNING. (Please print) Signature: _____

Inspection Officer: U. MIKE KEARNEY (please print) Satisfactory: NO Re-inspection Date: TBA. Page: 1 of 1

White - Occupant Copy Yellow - Admin File Copy

Attachment: Attachment F - Abbotsford Fire Rescue Service Inspection Report for 1880 Eagle Street (PDS 032-2019 : Supportive Recovery Use

ABBOTSFORD

NEIGHBOURHOOD INFORMATION MEETING
SIGN IN SHEET

Date/Location: **January 31, 2019** at Abbotsford Senior Secondary School – 6:00 p.m. - 8:00 p.m.

Re: Supportive Recovery Application (File No.: PRJ17-121)

Property: 1880 Eagle Street

Name	Address	Phone No.
Anita	Eagle St.	996-0661
Ilona	Eagle St.	859-7558
Carol	Westbury Ave	604-302-5222
Trish	Eagle St.	604-870 8831
BENTÉ	Eagle St	604-859-4554
Gretha	Eagle St	604 859 1666
C. Mattern	Westbury Ave	604-852-3741
S Mattern	Westbury Ave	604-852-3741
Kyle Walker	Eagle St	6047817735
Wendy Schienink	Westbury Ave.	604 807 0528
Tanya Oakes	Eagle St.	604.855.9605
Chris Dirksen	Westbury Ave	604-615-6729
Catherine Trigg	Lynn Ave	604-859-0711
Greg Trigg	Lynn Ave	604-859-0711
SANDRA BEELEN	Eagle Ave	778 808 7393
Brett Oostenbrug	Westbury Ave	604-855-6552

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Page 1 Abb Police Officer answered ques from 6-7pm.

Attachment: Attachment G - Neighbourhood Information Meeting Sign-In Sheets (PDS 032-2019 : Supportive Recovery Use application for the

ABBOTSFORD

NEIGHBOURHOOD INFORMATION MEETING
SIGN IN SHEET

Date/Location: **January 31, 2019** at Abbotsford Senior Secondary School – 6:00 p.m. - 8:00 p.m.

Re: Supportive Recovery Application (File No.: PRJ17-121)

Property: 1880 Eagle Street

Name	Address	Phone No.
Robert McLean	33206 Westbury	604853-63[illegible]3
Lara Courvoisier	1911 Eagle St	604 850-8538
Eric Courvoisier	1911 Eagle St.	604 850-8538
Paul Valler	1880 Eagle	778-235-8663
[illegible]		604-823-1534
RANDY JAMIESON	1868 Eagle St	604-855-9605
Audrey DIRKSEN	1889 Westbury Ave.	604-866-6720
Al Wiebe	1901 Eagle St.	604-495-1804
Suzanne Wiebe	1901 Eagle St	604-495-1804
HARRY SHARMA	1891 Eagle St	6048071723
Sid Bordpeau	33217 - Westbury Ave	604-250-812[illegible]
Rhonda Oostenbrug	1942 Westbury Ave	604-855-6552
Tom Oostenbrug	1942 Westbury Ave	604-855-6552

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COMMENT SHEET

ABBOTSFORD

January 31, 2019– Neighbourhood Information Meeting
for a proposal to operate a *Supportive Recovery* use for the property located at:
1880 Eagle Street
Application No.: PRJ17-121 | Applicant: Vancouver Recovery Centre Society

Thank you for attending this neighbourhood information meeting. We would appreciate your comments on the proposed *Supportive Recovery* use application. (Please note that all comments received become public and will be included in the Report to Council)

1) Do you support the proposed 10 bed (women and men - including 1 on-site caregiver) Supportive Recovery application?

☐ Yes ☒ No ☐ Undecided

Comments:
We have owned our house on Eagle St since 199
We are strongly opposed to the proposed Supportive Rec facilit

2) Do you have any other comments or concerns regarding the proposed Supportive Recovery use for the subject property? (if insufficient space, please attach a separate sheet)

The house at 1880 Eagle St has wreaked havoc in this formerly quiet-family oriented neighborh the house is in disrepair, there is obvious drug activity by people living & visiting this propert Since this property has been a recovery house, crime has become a regular occurence in the neighborhoo

Name: Al Wiebe

Address: 1901 Eagle St, Abbotsford, BC

Phone: 604-992-0722 E-mail: wiebeal@telus.net

Please place your completed comment sheet in the comment box or return it by **Thursday, February 7, 2019 at 4:30 pm** to the attention of:

Allan Campeau, Planner
Planning and Development Services
City of Abbotsford, 32315 South Fraser Way, Abbotsford, BC V2T 1W7
or send by e-mail to **acampeau@abbotsford.ca** or by Fax: 604-853-4981

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1) Do you support the proposed 10 bed (women and men - including 1 on-site caregiver) Supportive Recovery application?

☐ Yes ☒ No ☐ Undecided

Comments:
I do not feel this is a facility which is nothing more than a flop house which has significantly increased the crime rate in this area. Our vehicles have been broken into, property theft has increased significantly. Upon speaking to the two gentlemen who lease the building, their answers to questions were evasive and uninformative. There is minimal supervision in the house →

2) Do you have any other comments or concerns regarding the proposed Supportive Recovery use for the subject property? (if insufficient space, please attach a separate sheet)

Name: AUDREY DIRKSEN

Address: 1889 Westbury Ave

Phone: 604-866-6720 E-mail: thedirksens@shaw.ca

Please place your completed comment sheet in the comment box or return it by **Thursday, February 7, 2019 at 4:30 pm** to the attention of:

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Planning and Development Services
City of Abbotsford, 32315 South Fraser Way, Abbotsford, BC V2T 1W7
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which consists of a manager (Kyle Walker - one of the leasees) who is there four times a week and ~~a~~ one person on site monitor ~~(2 monitors co~~ at a time (2 monitors covering a 24 hour day - each working 12 hours)
These monitors are in my opinion new in recovery themselves - approx 1 year clean - The Clients are stage one in recovery with a 5% success rate to go long term recovery - so very minimal.
There are no programs in place at the house for recovery support.

What this appears is two guys taking advantage of people in addiction.
Basically they are providing a place for vulnerable people and collecting their monthly social assistance cheques.
The fact this house has been operational for two years is disgusting and these two guys taking advantage of vulnerable people dealing with addiction is even more disgusting. Upon speaking to these guys, their only interest is monetary, not an interest in the well being of their clients/residents.
This "flop house" should be closed immediately!

Attachment: Attachment H - Neighbourhood Information Meeting Comment Sheets, Emails and Letters (PDS 032-2019 : Supportive Recovery

COMMENT SHEET

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1) Do you support the proposed 10 bed (women and men - including 1 on-site caregiver) Supportive Recovery application?

☐ Yes ☒ No ☐ Undecided

Comments:

2) Do you have any other comments or concerns regarding the proposed Supportive Recovery use for the subject property? (if insufficient space, please attach a separate sheet)

This Property is running ILegal
& has been for 2 year. Broken Picture wind
More thef in area. Property is disc
Park within 200 meter - Do Not Want to

Name: Robert McLean

Address: 33206 Westbury

Phone: 604-853-6383 E-mail:

Please place your completed comment sheet in the comment box or return it by **Thursday, February 7, 2019 at 4:30 pm** to the attention of:

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COMMENT SHEET – Page 2

ABBOTSFORD

January 31, 2019 – Neighbourhood Information Meeting
Application No.: PRJ17-121

Should Not be coed Trouble
monitoring inside Not Outsid
from all Neighbour around I have
heard only Negitive Comments

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1) Do you support the proposed 10 bed (women and men - including 1 on-site caregiver) Supportive Recovery application?

☐ Yes ☒ No ☐ Undecided

Comments:
I feel that it will bring increased crime into our neighbourhoo
reduce property values,

2) Do you have any other comments or concerns regarding the proposed Supportive Recovery use for the subject property? (if insufficient space, please attach a separate sheet)

- with a "revolving door" for occupants it will be very difficult to determine who actually belongs in the neighbourhood.
- drug paraphernaila laying around
-

Name: Carol Schurmann

Address: 1920 Westbury Ave

Phone: 604 302-5222 E-mail: keyboarder101@hotmail.com

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☐ Yes ☒ No ☐ Undecided

Comments:

2) Do you have any other comments or concerns regarding the proposed Supportive Recovery use for the subject property? (if insufficient space, please attach a separate sheet)

Name: BENTE GARBERSITH

Address: #6 - 1961 Eagle St. Abbotsford.

Phone: E-mail: bentegr@telus.net.

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1) Do you support the proposed 10 bed (women and men - including 1 on-site caregiver) Supportive Recovery application?

☐ Yes ☒ No ☐ Undecided

Comments:
I don't believe this is the right location for this. The schools are inner city schools with many at risk kids. This type of activity isn't a good idea for these kids. Not at all. They deserve better.

2) Do you have any other comments or concerns regarding the proposed Supportive Recovery use for the subject property? (if insufficient space, please attach a separate sheet)

I didn't know it was a recovery centre – I did know it was a "drug dealer" house. I walk there all the time and it is run down and sketchy. I am always nervous when I walk by. I am glad my kids are older. I worry about young families being subjected to this

Name: Wendy Schievink

Address: 33237 Westbury Avenue

Phone: 6048070528 E-mail: wendyschievink@gmail.com

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1) Do you support the proposed 10 bed (women and men - including 1 on-site caregiver) Supportive Recovery application?

☐ Yes ☒ No ☐ Undecided

Comments: See attached letter

2) Do you have any other comments or concerns regarding the proposed Supportive Recovery use for the subject property? (if insufficient space, please attach a separate sheet)

I represent a 25 unit housing society on Eagle Street.

Name: Trish Ennis

Address: #20-1961 Eagle St

Phone: 604-870-8831 E-mail: trishennis90@telus.net

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The Ancora Housing Society
1961 Eagle Street
Abbotsford, B. C.

January 29, 2019

City of Abbotsford

Attention: Allan Campeau, Planner

Dear Sir,

Re: Vancouver Recovery Centre Society's Application for a recovery house at 1880 Eagle Street

My thoughts and questions for the Neighbourhood Information Meeting regarding the above:

For previous owner:

1. How long have you been operating a recovery house at this address?
2. During this time what kind of supervision was there? Is your staff trained?
3. Was there always both men and women occupying the house?
4. Did you have a curfew in place?
5. Were you aware that occupants of your home were seen peering in your neighbors windows?
6. Were you aware that the Abbotsford Police were seen dropping off a naked lady at your house?
7. Were you aware that a male occupant of your house was seen trespassing on the property of the Ancora Housing Society several times. Some of these trespasses were in the middle of the night and caught on camera. This male was accompanied by either one or two women pulling a wagon. The male was often on a bicycle. The police were called and pictures filed, although nothing seemed to be done about it.
8. Were you aware that your neighbors think your property has devalued their property due to the following:
   1. back yard was full of junk and debris and visible from the road
   2. broken never washed windows, old sheets for partial curtains
   3. garage door left open with garage packed full, **maybe** even some of the stolen property taken by wagon from our property at 3:00 a.m.
9. **WHY DO YOU THINK YOU SHOULD BE PERMITTED A LICENCE TO OPERATE AFTER OPERATING THIS HOUSE ILLEGALLY FOR SUCH A LONG PERIOD?**

To the City:

1. Have the police made you aware that there is already a drug problem in our neighborhood that operates a the back of the Free Evangelical Church and at Hoon Park?
2. Can you share the report from Greg Perkins of Liahona Security Consortium Inc. who was hired by the City to assess the crime risk in our neighborhood?

3. We strongly oppose the licensing and re-zoning of this property to allow a recovery house in our neighborhood. The police have been unable to stop the illegal activity around the church and in the Hoon Park area.

Furthermore you cannot trust an organization who has been illegally operating in our neighbourhood to change their spots only because they we caught. We do not believe that they will be able to operate a recovery house and not negatively impact our neighbourhood.

Most of the residents in our complex are now over 80 years old and you need to do what you can to make them feel safe.

If you must license a recovery house in Abbotsford please find another neighborhood. Maybe one of Abbotsford's Councilmen/women would volunteer to have this recovery house on their street.

Respectfully yours,

Trish Ennis, President
The Ancora Housing Society

cc Henry Braun, Mayor

COMMENT SHEET

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☐ Yes ☑ No ☐ Undecided

Comments:

2) Do you have any other comments or concerns regarding the proposed Supportive Recovery use for the subject property? (if insufficient space, please attach a separate sheet)

Name: Grethe Jonghind

Address: #19 1961 EAGLE St

Phone: 604 8591660 E-mail: —

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1) Do you support the proposed 10 bed (women and men - including 1 on-site caregiver) Supportive Recovery application?

☐ Yes ☑ No ☐ Undecided

Comments:

Definately not they do not belong in the residential area.

2) Do you have any other comments or concerns regarding the proposed Supportive Recovery use for the subject property? (if insufficient space, please attach a separate sheet)

We don't want any crime in our area!

Name: Flora Szabo

Address: 1931 Eagle. St.

Phone: 604-859-7558. E-mail:

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☐ Yes ☒ No ☐ Undecided

Comments: Definately NOT
SHLD NOT BE IN RESIDENTIAL Area

2) Do you have any other comments or concerns regarding the proposed Supportive Recovery use for the subject property? (if insufficient space, please attach a separate sheet)

- Property value Decline
- Crime Rate Up. Police coming Week
- unsightly Premise (mattresses furniture etc
- Garbage (always some left @ curb) etc

Name: A. Night

Address: 1898 Eagle

Phone: 604-996-0661 E-mail: nightk@shaw.ca

Please place your completed comment sheet in the comment box or return it by **Thursday, February 7, 2019 at 4:30 pm** to the attention of:

Allan Campeau, Planner
Planning and Development Services
City of Abbotsford, 32315 South Fraser Way, Abbotsford, BC V2T 1W7
or send by e-mail to **acampeau@abbotsford.ca** or by Fax: 604-853-4981

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Information & Privacy Coordinator at 604-864-5575

Attachment: Attachment H - Neighbourhood Information Meeting Comment Sheets, Emails and Letters (PDS 032-2019 : Supportive Recovery

COMMENT SHEET

ABBOTSFORD

January 31, 2019– Neighbourhood Information Meeting
for a proposal to operate a *Supportive Recovery* use for the property located at:
1880 Eagle Street
Application No.: PRJ17-121 | Applicant: Vancouver Recovery Centre Society

Thank you for attending this neighbourhood information meeting. We would appreciate your comments on the proposed *Supportive Recovery* use application. (Please note that all comments received become public and will be included in the Report to Council)

1) Do you support the proposed 10 bed (women and men - including 1 on-site caregiver) Supportive Recovery application?

☐ Yes ☒ No ☐ Undecided

Comments:
We are building new home
and are concerned about crime

2) Do you have any other comments or concerns regarding the proposed Supportive Recovery use for the subject property? (if insufficient space, please attach a separate sheet)

Property Value Decrease
- Safety of children
- Garbage

Name: HARRY SHARMA

Address: 1891 Eagle Street

Phone: 6048071723 E-mail: harrysharma9@gmail.com

Please place your completed comment sheet in the comment box or return it by **Thursday, February 7, 2019 at 4:30 pm** to the attention of:

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1) Do you support the proposed 10 bed (women and men - including 1 on-site caregiver) Supportive Recovery application?

☐ Yes ☑ No ☐ Undecided

Comments:
I Live Right next Door. It's been operating like This for About 2 year's Allready, How does that work (No proposal Before.)

2) Do you have any other comments or concerns regarding the proposed Supportive Recovery use for the subject property? (if insufficient space, please attach a separate sheet)
The Place Has never been looked After since New ~~owner~~ owner. The Place is run down (Deck & Pool collapsed) Never Noticed caregiver Ever. Lot's of fighting And swearing outside. Garbage bags outside for Crow And Animal's to make A mess

Name: Randy Jamieson

Address: 1868 Eagle St

Phone: 604 855-9605 E-mail:

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1) Do you support the proposed 10 bed (women and men - including 1 on-site caregiver) Supportive Recovery application?

☐ Yes ☑ No ☐ Undecided

Comments: This house has been operating for 2 years No lisence? Police have been there twice this m

2) Do you have any other comments or concerns regarding the proposed Supportive Recovery use for the subject property? (if insufficient space, please attach a separate sheet)

We live right next door. There is always garbage everywhere, swearing, fighting, police, ambulances whole deck fell off, fence is falling down, big hole in front window (new) Not impressed!!! rats, racoons...

Name: Tanya Oakes

Address: 1868 Eagle St

Phone: 604.855.9605 E-mail: toakes@live.ca.

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I realize these houses have to go somewhere, but this is so shady! We have never been spoke to for 2 years

I have had interactions with some of the residents & feel they are decent people for the most part trying to get help, but the pig sty that has been occuring for 2 years really brings down our property value! Plus the fighting, swearing, etc. I'm not in favor at all. If this process had happened before it got going, I may have had a different attitude, but we have had enough! I never wanted to complain & be the fink neighbor but this is my opportunity to speak & I say "No!"

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1) Do you support the proposed 10 bed (women and men - including 1 on-site caregiver) Supportive Recovery application?

☐ Yes ☑ No ☐ Undecided

Comments:
IT WAS opened with no licence FOR TWO YEA
with Anyone nowing Its not SAFE FOR OUR house

2) Do you have any other comments or concerns regarding the proposed Supportive Recovery use for the subject property? (if insufficient space, please attach a separate sheet)

we Get People in our yard at Time
And looking around our Places

Name: Sue Boudreau

Address: 33217- Westbury Ave

Phone: 604-250-8122 E-mail:

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1) Do you support the proposed 10 bed (women and men - including 1 on-site caregiver) Supportive Recovery application?

☐ Yes ☒ No ☐ Undecided

Comments:
Before our neighbours told us that 1880 Eagle st was a halfway house, we referred to it as the drug property. I am home on maternity leave and have witnessed frequent foot traffic back and forth in front of our house. They often travel in large groups, stopping frequently to smoke in the street in front of our house. I have been approached by a group of men

2) Do you have any other comments or concerns regarding the proposed Supportive Recovery use for the subject property? (if insufficient space, please attach a separate sheet)

Name: Val Meyer

Address: 1920 Eagle St

Phone: 604-349-2015 E-mail: vanderson11@hotmail.ca

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COMMENT SHEET – Page 2

ABBOTSFORD

January 31, 2019 – Neighbourhood Information Meeting
Application No.: PRJ17-121

while loading my infant daughter into my car. It made me feel quite anxious and uneasy. We also have security cameras and have seen men going to every car in the neighbourhood checking for open doors. I have mistakenly forgot to lock my car on two occasion and sure enough, it had been rumaged through that night. If it were not for our two large and protectiv dogs, I would not feel safe being home alone with my baby.

We do not support another recovery / halfway house on our street. With the drug and gang issues our city is having, the last thing we want is to welcome that sort of activity where our children are trying to grow up.

Sincerely,
Val Meyer

ABBOTSFORD
RECEIVED
FEB 07 2019
Planning & Development Services Department

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1) Do you support the proposed 10 bed (women and men - including 1 on-site caregiver) Supportive Recovery application?

☐ Yes ☒ No ☐ Undecided

Comments:

SEE ATTACHED

2) Do you have any other comments or concerns regarding the proposed Supportive Recovery use for the subject property? (if insufficient space, please attach a separate sheet)

ABBOTSFORD RECEIVED FEB 07 2019 Development Department

Name: LARA + ERIC COURVOISIER

Address: 1911 EAGLE ST.

Phone: 604-850-8538 E-mail: pelican99@telus.net

Please place your completed comment sheet in the comment box or return it by **Thursday, February 7, 2019 at 4:30 pm** to the attention of:

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Mr. Allen Campeau
Planner
Planning and Development Services
Abbotsford, B.C.

February 2, 2019

Re: 1880 Eagle St. - 10 Bed Supportive Recovery Facility

Dear Mr. Campeau,

Further to our previous letter, we attended the information meeting and having spoken with not only neighbours, city staff and said applicants we have more comments to add.

The applicant stated that he was going to be the primary support staff although he himself has only been sober for nine months, which does not seem long enough to us. Not to mention his lack of success to date. He seemed oblivious to any of our comments regarding theft, loitering, vandalism, and drug use. We were not the only ones from our nieghbourhood posing these questions to the applicants.

The applicants, seemed dumbfounded of all our comments, they claimed their window got broken by someone leaning against the window, and was subsequently pushed into it. This seems unrealistic, in our opinion, it would take a lot more force especially with a double paned window. They assured us the window would be replaced this week, which I don't think any of us believed.

According to city staff, children are not to be present at this house, yet we have seen children playing in the front yard on numerous occasions.

Although this house was supposed to be a halfway home that was helping people, we have viewed it more the complete opposite. To someone oblivious to the fact of what it was supposed to be, it appears to be more of a drug flop house. People loitering out front, walking towards local church and/or park so frequently that it looked more like drug dealing. My husband has even found one individual sleeping at the end of our driveway between our neighbour's house and ours.

Our neighbours beside us rent their home out to a single mother and her daughter, she not only did not want to attend the meeting, she was fearful of writing any comment for fear of repercussions. I told my neighbor she should write one, as the applicants will NOT see it.

It also came to our attention that only one complaint was made to the city in the past regarding 1880 Eagle St., I believe our home has been affected the most, from what I've heard, and we did not think that contacting the city regarding this would have got us anywhere, or we would have complained a lot more. One neighbor said she called the police on multiple occasions and she thought that would be enough. She assumed the communication would extend to the city as well. The police officer mentioned they had been called to 1880 Eagle St. thirty-two times

in the past year. Should the police themselves inform the city, for these types of police calls?

After attending this information meeting we would like it noted in writing that we request to be notified when this proposal meeting will take place and we would like to be notified as to the outcome of this meeting.

Thank you for considering our comments for this proposal, as you can clearly tell we are very much against this proposal going through.

Sincerely,

Eric and Lara Courvoisier
E-mail: pelican99@telus.net

RECEIVED
FEB 07 2019
Planning & Development Services Department

COMMENT SHEET

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1) Do you support the proposed 10 bed (women and men - including 1 on-site caregiver) Supportive Recovery application?

☐ Yes ☒ No ☐ Undecided

Comments: PLEASE SEE ATTACHED LETTER

2) Do you have any other comments or concerns regarding the proposed Supportive Recovery use for the subject property? (if insufficient space, please attach a separate sheet)

Name: DARREN STURCH

Address: 33157 WESTBURY AVE

Phone: 604-807-7855 E-mail: DARREN_31@HOTMAIL.COM

Please place your completed comment sheet in the comment box or return it by **Thursday, February 7, 2019 at 4:30 pm** to the attention of:

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Planning and Development Services
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CITY OF ABBOTSFORD RECEIVED FEB 07 2019 Planning & Development Services Department

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Information & Privacy Coordinator at 604-864-5575

Allan Campeau

From: Darren Struch <darren_31@hotmail.com>
Sent: Wednesday, February 06, 2019 12:25 PM
To: Allan Campeau
Subject: 1880 Eagle Street Supportive Recovery Application No. PRJ17-121
Attachments: 20190131_122338.jpg

RE: 1880 Eagle Street Supportive Recovery Application No. PRJ17-121

Dear Mr. Allan Campeau,

My name is Darren Sturch and I live at 33157 Westbury Ave, Abbotsford BC. I contacted you by telephone on January 30th and we chatted briefly as I had a number of concerns but I would not be able to attend the information meeting on January 31st so I'm sending you my list of concerns by email.

I have owned my house listed at the above address on Westbury Avenue since April of 1991 and have lived here as my principal residence since June of 1998. In the 20 plus years that I have lived here it has been a fairly quiet neighbourhood with decent neighbours and very little drama. There has been the occasional rental house that has it's problems but nothing compared to the past year to 18 months that I have noticed directly related to the people coming and going from the subject house located at 1880 Eagle Street. Whoever is running this recovery house has absolutely no control over the men and women that have attended this facility. On or before January 31st the large front window of the house was smashed in from occupants creating drama and is still not repaired as of February 6th. See attached photo.

With the high number of police calls, fire department calls, ambulances and by-law enforcement officers that have attended this house on a regular basis, this house should have been shut down a long time ago. The fact that the City of Abbotsford has let this supposed recovery house continue for any period of time is absolutely unacceptable considering the amount of drama and crime for everyone living in this area. Also the fact that I have to waste my own time to send this information for something that should have never been allowed to get to the application stage.

Here are a list of the many incidents that have occurred in the past year which I feel are directly related to this subject property at 1880 Eagle Street:

- A number of neighbourhood cars have been broken into and have had personal property stolen, gas siphoned, gas caps stolen, etc. In July/August of this past summer, I found personal items from two different neighbour's that had their cars broken into. One person located directly across the street (stolen fishing license) from 1880 Eagle Street and the other person was from the senior's complex at 1961 Eagle Street. (stolen GPS unit and sunglasses). Some neighbours have stopped locking their vehicles because their windows have been smashed so many times.
- Occupants from the house flying drone over my house and other neighbouhood houses in the area.
- Constant fighting and yelling from occupants in the house on a regular basis.
- On January 13th 2019 at around 11pm or so, there was a a bunch of yelling and screaming from occupants outside of the subject house. A little while later I went outside to get something from my vehicle and noticed some of my lawn furniture was missing from the front area of my house by my palm tree. While I was out there another neighbour was out on the street and informed me that

Attachment: Attachment H - Neighbourhood Information Meeting Comment Sheets, Emails and Letters (PDS 032-2019 : Supportive Recovery

approximately 10-12 cars had the gas caps removed from their vehicles and also one gas flap ripped off from a vehicle. The neighbour said there was a woman from the subject house that was intoxicated or on drugs who had taken off the gas caps and then left them under a car.

To sum it all up, I am absolutely 100% not in support of the application for the Supportive Recovery house at 1880 Eagle Street. I feel my concerns are quite valid and can be substantiated by many of the neighbours in this area. Please contact me if you have any questions or need any further details regarding my email.

Regards,

Darren Sturch
33157 Westbury Avenue
Abbotsford, BC
604-807-7855

1880

Allan Campeau

From: Colleen Coulter <c_coulter73@yahoo.ca>
Sent: Tuesday, February 05, 2019 1:21 PM
To: Allan Campeau
Cc: c-coulter73@yahoo.ca
Subject: Supportive Recovery Facility 1880 Eagle St
Attachments: Neighbourhood Meeting Supportive Recovery Center.pdf

Hello Mr Campeau,

We are definitely NOT in favour of having this facility in our Family oriented neighbourhood! I've been told that they have been running it illegally for 2 years! We received a Neighbourhood Meeting notice for what I thought was to establish a new facility 2 weeks ago. If they have been doing so illegally for 2 years, why would the city even consider "establishing a facility" now? Why weren't we notified or even asked about this 2 years ago? It is not fair that the people who have worked hard & purchased a home in our neighbourhood, do not even have a choice as to what happens in it. We do not want our property to depreciate or for our neighbourhood to turned into what is known as a "bad or sketchy area". We want our neighbourhood to be safe and to be able to feel safe in our own home! Although I know the people in recovery are trying to get better, more often than not, it will take them more than few times to finally get it right. In the mean time the citizens have to put up with it? If the people in recovery do not abide by the rules, they get kicked out of the house but it has to be proven that they did something wrong first. Meanwhile we have had our cars broken into, people sneaking around in our yards, people screaming & fighting on the way back to the facility and squatters in the house next door to me? We have to fear for our children's safety as they walk to school every day. We have to secure ourselves now with video cameras and alarm systems which will cost upwards of $2500.00 just to feel safe in our own homes. This just doesn't seem like a well thought out plan, it also seems like the owners of the "facility" are just trying to make money off of the less fortunate which is really sad because we are the ones who have to pay for it.

Please see attached Neighbourhood Information meeting.

Sincerely,

Christopher Page & Colleen Coulter

Sent from my iPad

COMMENT SHEET

ABBOTSFORD

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1) Do you support the proposed 10 bed (women and men - including 1 on-site caregiver) Supportive Recovery application?

☐ Yes ☑ No ☐ Undecided

Comments:
This is a family residential area with a lot of seniors, children and teenagers. The proposed site is 2 minutes away from our park (Hoon Park)

2) Do you have any other comments or concerns regarding the proposed Supportive Recovery use for the subject property? (if insufficient space, please attach a separate sheet)

The site is only 5 minutes away from Abbotsford Middle School, Godson Elementary and Abbotsford Senior Secondary School. Our 15 yr old daughter walks past that site everyday on her way to school. We were not aware that for the past 2 years, they were running the Supportive Recovery Center at that location! → See sheet attached.

Name: Christopher Page & Colleen Coulter

Address: 33222 Westbury Ave, Abbotsford, BC, V2S-1C2

Phone: 604-897-7986 E-mail: c-coulter73@yahoo.ca

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COMMENT SHEET – Page 2

ABBOTSFORD

January 31, 2019 – Neighbourhood Information Meeting
Application No.: PRJ17-121

We purchased our house 5 years ago and it has always fel like a safe neighbourhood until about 2 years ago. We started noticing a lot more vagrants walking up and down our street at all hours of the night, a lot of vehicle break-ins and police incidents/disturbances on Eagle St. On many occasions we have witnessed a couple of people walk down Eagle St to Westbury Ave, stand in front of our neighbours house, smoke their drugs and then go back to the "facility". There have been many occasions where we were startled awake by people fighting & screaming outside at times between 11pm and 4am, when we lo outside to see whats going on, we see the people fighting all the way to Eagle St. Obviously, none of the occupants are being monitored at all. One on site care giver is not enough to moni track and report 24 hours, 7 days a week on 10 adults with serious issues. It obviously hasn't worked so far. We now have to consider installing security cameras along with our alarm system in order to feel safe in our own home (cost $2500.00 or more). This facility has already had huge negative impact on this neighbourhood! If you allow this facili to continue operating, we will continue to see a decline. It wil also depreciate the value of our homes due to problems in the area.

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Allan Campeau

From: Belal Laura (PAC) <Laura.Belal@CSC-SCC.GC.CA>
Sent: Thursday, February 07, 2019 1:28 PM
To: Allan Campeau
Cc: 'Peterson, Jennifer HLTH:EX'; Bylaw Services
Subject: Proposed Supportive Recovery facility - 1880 Eagle Street (Application PRJ17-121)

Good afternoon Allan,

I have a number of concerns related to the proposal of a Supportive Recovery Facility at 1880 Eagle Street. I have owned my home for 12 years in this area and have seen a drastic increase in violence since May 2017, around the time this residence became an illegal recovery house. There has been NO supervision, leaving the occupants to run wild. Children have lived at this residence during this time. I have been informed by the bylaw officer that ***children are not to live or visit this residence***. I asked the recovery house operators directly to which they denied having children live in the house, stating the children have visited – which still is not within the law.

As they have handed out at the meeting in their "house rules" occupants are to abide by the curfew (time not stated) and are not to be involved in illegal activity. Neighbours have video of occupants wandering the street at night with wagons, peering in windows, and stealing items. How have they dealt with these occupants? It is the perception and belief of the neighbourhood that there are no actions taking place to deter the illegal activity their occupants are engaged in.

At the meeting held by the city the two individuals running this home stated they are paid by the Ministry. I have contacted the Assisted Living Registry Ministry of Health and they confirmed this is an unregistered house and these people are not paid by them.

Ministry of Health Confirmed Unregistered Residence:
https://connect.health.gov.bc.ca/sites/connprox-prod.health.gov.bc.ca/files/files/ccala/assisted-living/residence-web-posting-vancouver-recovery-centre.pdf

It is clear they are not meeting the following obligations of an operator:

- Protect residents from abuse and neglect by complying with the Criminal Records Review Act to ensure that owners, site managers, employees, contractors and volunteers have a current criminal record review (within 5 years).
- Maintain a "watchful eye" over residents' health and safety.
- Report serious incidents to the registrar within 24 hours.

As noted in the Assisted Living Registrar Registrant Handbook "A person must not operate an assisted living residence that is not registered."
https://www2.gov.bc.ca/mwg-internal/de5fs23hu73ds/progress?id=_GTRN7Hz4A6B6AZpEi4HfHYm8h8gs5ouGcu-jO_r3oA,&dl

As stated below the facility is to operate in a manner that will promote the health, safety and dignity of persons in care. This facility has not run with any supervision or regulation which has a direct negative impact on the individuals in their care.
http://www.bclaws.ca/Recon/document/ID/freeside/00_02075_01

Standards to be maintained

7 (1) A licensee must do all of the following:

(a) employ at a community care facility only persons of good character who meet the standards for employees specified in the regulations;

(b) operate the community care facility in a manner that will promote

(i) the health, safety and dignity of persons in care, and

Since May of 2017 we have observed the following:

- Increase in theft and drug use in the neighbourhood
- Increase in violence, in the neighbourhood
- Incident involving an occupant with a bat attacking other occupants – police made an arrest
- Screaming and yelling on the street at all hours of the night
- Occupants from the house flying a drone over my house/backyard and other neighbours property
- Children living at this residence
- Constant traffic of individuals at all hours of the night
- Frequent involvement of Abby Police at this residence

It is clear they do not have the values and ethics to run this facility in accordance with the rules and regulations put out by the province, by the city, or the Ministry of Health. It is in the best interest of any future occupants to be placed in a recovery house that is run to promote and support their recovery, not hinder by placing them in a residence that does not provide the supervision needed to ensure success.

I ask why the City of Abbotsford would support such disregard for policy and rules, and believe there will be a different result?

They have shown they are not qualified to run this type of facility, and are not willing to comply with the law. I ask that this proposal be denied.

Laura Belal

Attachment: Attachment H - Neighbourhood Information Meeting Comment Sheets, Emails and Letters (PDS 032-2019 : Supportive Recovery

Allan Campeau

From: Wiebe, Suzanne <Suzanne.Wiebe@fraserhealth.ca>
Sent: Thursday, February 07, 2019 4:04 PM
To: Allan Campeau
Cc: 'suziwiebe1962@gmail.com'
Subject: 1880 Eagle St. Supportive Recovery

Hello I attended the neighbourhood information meeting on Jan.31/19 about the illegal Supportive Recovery house at 1880 Eagle St. in Abbotsford, BC. I am NOT in support of the proposed 10 bed recovery house at that address. I am the owner of the house at 1901 Eagle st. which is across from the proposed house. We have owned this property since 1992 and lived there while raising my children. At that time the house at 1880 Eagle st. was clean kept, with beautiful gardens, manicured lawn and pleasant occupants an no complaints from neighbours or police. At this time that same house, at 1880 Eagle st. has had various broken windows covered with cardboard pieces taped up as covering, indoor furniture such as stuffed chairs on the lawn, numerous visits by both Abbotsford Police as well as ambulance visits. This house is in grave disrepair. The neighbours I have spoken to, as well as my own tenants, have witnessed the on-going drug activity at the house in question. The increase in crime in our neighbourhood has also increased since this house has been in operation. Our tenants have had to place extra locks as there have been things taken off the property. We have always loved this location when raising our children it was a friendly quiet neighbourhood with no real need to lockup anything. I know from my conversations with neighbours that they do not feel safe walking in their own neighbourhood. I was approached by someone at that house that wanted to look around in my backyard. A permission that I did not give, yet the minute I pulled out he was in the yard and had to be asked to leave by my tenant. The way I see it these people have a blatant disregard for the law, and for other people's property. The men at the meeting that were running the "Supportive recovery" told me that the only ONE person that was "in charge" of the residents had to be clean for 9 months. As someone who has worked in health care for 35 years I know that a person that is 9 months clean is fragile at best and therefore should NOT be running a recovery home with 10 people. The men at the meeting that were associated with the house were evasive and vague with their answers. I do not believe this facility would be run to the standards for which anyone should be paying to be recovering in. It is a drug flop house at present and needs to be shut down. We pay taxes in the community and should feel save in our neighbourhood.
Again I DO NOT support the proposed supportive recovery facility!
Thank you

Suzanne Wiebe
Owner
1901 Eagle St.
Abbotsford, BC
V2S 3A7

I can be reached at: 604-495-1804 or 604-308-9230
Email: suziwiebe1962@gmail.com

To: Allan Campeau, Planner
City of Abbotsford
acampeau@abbotsford.ca
604-864-5540

I/we are writing to advise you of two problems in our neighborhood that we wou
City Hall.

1. I/we are opposed to the 10 bed Supportive Recovery facility for both me
the property at 1880 Eagle Street. This house has been operating for almost t
without proper supervision and I/we do not want them to receive permission to
house legally when it is obvious they no regard for the law or for their neighbors

2. I/we want the City to address the issue of the illegal drugs being used a
the rear of the Free Evangelical Free Church on Marshall Road and in Hoon Pa

I/we and our neighbors have a right to live in a safe environment.

Yours truly,

Allan Campeau

From: ???????????? ...? <Harvir.Padda@hotmail.com>
Sent: Wednesday, January 23, 2019 4:50 PM
To: Allan Campeau
Subject: File no PRJ17-121

Hello Mr.Campeau,

I reside on eagle street and I also disagree with the recovery facility you want to put in my neighbourhood. I live here and want my neighbourhood to be peaceful. I want to let kids play without fear of who is living here. Why can this not be on your street?

This can not happen!

Allan Campeau

From: ???????????? ...? <Harvir.Padda@hotmail.com>
Sent: Thursday, January 31, 2019 5:48 PM
To: Allan Campeau
Subject: NIM

Hello Allen,

I can not make it to todays meeting. I have read and educated myself about this recovery home but I still disagree. I do not want this recovery home on my street. Please take your project somewhere else. I have spoke to a few people on my street we all do not want this recovery home. I will protest,call media do whatever I need to do but the recovery home will not be on my street.

Allan Campeau

From: JOHN MATTERN <j_mattern@shaw.ca>
Sent: Wednesday, January 23, 2019 7:45 PM
To: Allan Campeau
Subject: 1880 eagle

Importance: High

Hello Allan I would ask you how I can formally state that I disagree against this project that is being planned for a rehab center on Eagle Street . I live right around the corner from this proposed place and their back yard backs on to mine. They have virtually an unobstructed view on my yard and belongs. We already have enough trouble in this area with homeless people and crimes against our personal property . I feel with the type of people that will be going through that house will put my neighbors and my property at even a greater risk. If you have 10 people in there is there going to be proper security ? With all the counselors and the rehab people where will they all park ? Where will all their garbage go ? Are these people being forced to attend this place by the law ? or are they going there on there on free will ? I think if the law is putting them there it will even be worse. This type of place should not be in a residential area with families and children. We do not need this element here , Why aren't the funds that are going to this project being put towards King Haven or Peardonville house . Please let me know what we can do to put a stop to this plan.
Regards
John Mattern
33207 Westbury Ave
Abbotsford

Allan Campeau

From: JOHN MATTERN <j_mattern@shaw.ca>
Sent: Monday, February 04, 2019 6:30 PM
To: Allan Campeau
Subject: Re: 1880 eagle
Attachments: abbotsford comment sheet.pdf

Importance: High

Hi Allan please submit my attached comment form to the Abbotsford city council for review . I have now noticed another broken window in the front of the basement . Does not look like they operators have much concern about this house. Can you please send me an update about this situation asap. Thanks for your help

---

From: "acampeau" <acampeau@abbotsford.ca>
To: "JOHN MATTERN" <j_mattern@shaw.ca>
Sent: Thursday, January 24, 2019 8:33:46 AM
Subject: RE: 1880 eagle

Good morning Mr. Mattern,

Thank you for your e-mail.

I would encourage you to attend the Neighbourhood Information Meeting (NIM) being conducted next Thursday evening at Abbotsford Senior Secondary School at 6:00 pm. The proponent will be in attendance and you can pose your questions to him. There will comment sheets available for people attending the meeting to express their opinions on the supportive recovery proposal. You can also submit a letter to the City expressing your concerns. Subsequent to the NIM, a report will be prepared for Council consideration, and I will be attaching any comment forms or letters I receive concerning this application.

I look forward to meeting you next Thursday evening, and I can discuss the timelines and processes related to this proposal.

Thank you.

Allan G. Campeau
Planner
Tel: 604-864-5540 Fax: 604-853-4981
ABBOTSFORD
32315 South Fraser Way
Abbotsford, BC V2T 1W7
www.abbotsford.ca

From: JOHN MATTERN [mailto:j_mattern@shaw.ca]
Sent: Wednesday, January 23, 2019 7:45 PM
To: Allan Campeau
Subject: 1880 eagle
Importance: High

Hello Allan I would ask you how I can formally state that I disagree against this project that is being planned for a rehab center on Eagle Street . I live right around the corner from this proposed place and their back yard backs on to mine. They have virtually an unobstructed view on my yard and belongs. We already have enough trouble in this area with homeless people and crimes against our personal property . I feel with the type of people that will be going through that house will put my neighbors and my property at even a greater risk. If you have 10 people in there is there going to be proper security ? With all the counselors and the rehab people where will they all park ? Where will all their garbage go ? Are these people being forced to attend this place by the law ? or are they going there on there on free will ? I think if the law is putting them there it will even be worse. This type of place should not be in a residential area with families and children. We do not need this element here , Why aren't the funds that are going to this project being put towards King Haven or Peardonville house . Please let me know what we can do to put a stop to this plan.

Regards

John Mattern

33207 Westbury Ave

Abbotsford

Attachment: Attachment H - Neighbourhood Information Meeting Comment Sheets, Emails and Letters (PDS 032-2019 : Supportive Recovery

COMMENT SHEET

ABBOTSFORD

January 31, 2019– Neighbourhood Information Meeting
for a proposal to operate a *Supportive Recovery* use for the property located at:
1880 Eagle Street
Application No.: PRJ17-121 | Applicant: Vancouver Recovery Centre Society

Thank you for attending this neighbourhood information meeting. We would appreciate your comment on the proposed *Supportive Recovery* use application. (Please note that all comments received become public an will be included in the Report to Council)

1) Do you support the proposed 10 bed (women and men - including 1 on-site caregiver) Supportiv Recovery application?

☐ Yes ☒ No ☐ Undecided

Comments:

2) Do you have any other comments or concerns regarding the proposed Supportive Recovery use for the subject property? (if insufficient space, please attach a separate sheet)

See Attached

Name: John and Cathy Mattern

Address: 33207 WESTBURY AVE ABBOTSFORD

Phone: 604-852-3741 E-mail: j_mattern@shaw.ca

Please place your completed comment sheet in the comment box or return it by **Thursday, February 7, 2019 at 4:30 pm** to the attention of:

Allan Campeau, Planner
Planning and Development Services
City of Abbotsford, 32315 South Fraser Way, Abbotsford, BC V2T 1W7
or send by e-mail to **acampeau@abbotsford.ca** or by Fax: 604-853-4981

The City of Abbotsford appreciates your input. Thank you for completing this important comment sheet.
Names and contact information of attendees given at public meetings are considered to be in the public domain. Public comment sheets may be appended to Council documents, reports, etc. If you have any questions about the collection and use of your personal information, please contact:
City of Abbotsford 32315 South Fraser Way, Abbotsford, BC V2T 1W7
Information & Privacy Coordinator at 604-864-5575

COMMENT SHEET – ~~Page 2~~ Page 2 of 3

ABBOTSFORD

January 31, 2019 – Neighbourhood Information Meeting
Application No.: PRJ17-121

After a meeting on Jan 31 the residents of our area have learned many thing. for the last couple of years we have been noticing more then normal activity of transient, drug user types of people in our neighborhood. There has been more theft from vehicles, yards, recylables and people trespasing. So after the meeting we learned there has been a recovery house operating at 1880 eagle for the last 2 years illeagaly. This place is located directly west of my house looking directly into my back yard. Now all the extra crime and trespasing makes sense as to where it is starting from. The house @ 1880 Eagle has become more run down, garbag all over the place, mattresses laying on ground in back yard, broken front window and broken basement window, We have noticed load people past 11:00 pm, fights and police coming to the house with sirens on. Now on Jan 31 we have heard many other complaints from other neighbors and how none of us feel safe with this going on in our neighborhood. There is a park with young children there all the time, lots of children in the neighborhood a Sunday school all with in 150 meters of the house.

see next page

The City of Abbotsford appreciates your input. Thank you for completing this important comment sheet.

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Attachment: Attachment H - Neighbourhood Information Meeting Comment Sheets, Emails and Letters (PDS 032-2019 : Supportive Recovery

COMMENT SHEET – Page 3 of 3

ABBOTSFORD

January 31, 2019 – Neighbourhood Information Meeting
Application No.: PRJ17-121

My question to Abbotsford city council is how did this place start up and operate without a permit or buisness license. This place is in a disgracefull state contrary to bylaws of Abbotsford. Why is this place not shut down immediatly to protect the citizens of our neighbor hood. The residents break multiply laws while they are there, the operators have broken many laws setting this place up and it does not look like there has been a site inspection from any level of government. ~~If the~~ The police have been there multiply times to address many different things. If the operators truly were concerned about the people there and not the money they are receiving from the government they would have abided by the laws and saftey of resident and Neighbors before opening up. The operators will probably say they can't shut down because of where will the residents go but in my opinion if they get transferred to another place they will receive better care espically if they are fully licensed and permitted. This place needs to be shut down immediatly for breaking the law. If they can prove that they can operate to every letter of the law then maybe people

The City of Abbotsford appreciates your input. Thank you for completing this important comment sheet.

Names and contact information of attendees given at public meetings are considered to be in the public domain. Public comment sheets may be appended to Council documents, reports, etc. If you have any questions about the collection and use of your personal information, please contact:
City of Abbotsford 32315 South Fraser Way, Abbotsford, BC V2T 1W7
Information & Privacy Coordinator at 604-864-5575

would consider having in ~~Page 2 of 2~~ the neighbor hood. but when they start off illegal its not likely they even care.

Attachment: Attachment H - Neighbourhood Information Meeting Comment Sheets, Emails and Letters (PDS 032-2019 : Supportive Recovery

Allan Campeau

From: Joyce Janzen <joycejanzen@gmail.com>
Sent: Thursday, January 24, 2019 1:11 PM
To: Allan Campeau
Subject: Fwd: Notice of Neighbourhood Information Meeting File # PRJ17-121

Dear Sir, Yesterday I received two notices of the above Neighbourhood Information Meeting - one for me as a homeowner and one as a business owner.

As a home owner who pays taxes and as a business owner who works out of my home with a current business license (2018 119134), I have serious concerns about the plan to allow Vancouver Recovery Centre Society to operate a recovery house at 1880 Eagle St.

This is not a good location for a recovery house with easy access to a large and isolated park, three schools as well as a business mere houses away that caters to children and teens. My business license should carry some weight in terms of priority. Put bluntly, I was here first. For the peace of mind of my clientele, I undergo a Criminal Records check as I deal with a vulnerable sector. I don't appreciate another level of risk being sanctioned by the city in such close proximity. This has potential to affect my ability to attract parents to entrust their children to me for lessons.

It is my understanding that Vancouver Recovery currently operates this house unlicensed. They do not have a good track record on this street. There is a lot of foot traffic back and forth - often loud and rowdy. The outside area often smells strongly of marijuana. Currently, part of the large plate glass window in the front of the house is boarded up due to a breakage.

I am part of a church that is supportive of recovery and am personally involved in a group supporting individuals who are incarcerated (often for crimes which involve substance abuse). I am strongly in favor of recovery houses. I do believe however, that careful attention needs to be given to the placement of these facilities and that Eagle St does not meet the criteria.

Unfortunately, I am unable to attend the meeting due to prior work commitments. I would appreciate any handouts or information that you are able to send digitally.

Sincerely,

Phone 604.859.1502

To no longer receive email from Joyce Janzen and *Harmony Music Studio*, click unsubscribe. For delivery to your inbox (and not junk or bulk mail folders), add joycejanzen@gmail.com to your address book.

Mr. Allen Campeau
Planner
Planning and Development Services
Abbotsford, B.C.

February 6, 2019

Re: 1880 Eagle St. - 10 Bed Supportive Recovery Facility

Dear Mr. Campeau,

We were unable to attend meeting as we were on a family vacation. We are very much against this proposal! We would trust that our comments are to remain confidential from the applicants as we have young children whose safety is our main concern.

This proposal is not acceptable for a family neighbourhood. There are constant groups and individuals walking back and forth, while using drugs, to the park/church. I have had to ask them numerous times to not loiter and smoke up in front of our house.

My cars and truck have been broken into a handful of times, not to mention the back door of our garage have been attempted to break into.

The broken windows and garbage left up and down the street and overall cleanliness of the neighbourhood, combined with theses individuals, make this now an unsafe environment for our kids to even play in the front yard of our own house! The police presence is constant; in fact they were there again today!

We have lived on this street for 8 years and have never had any problems until 1880 Eagle St. became a halfway house. We now have an unsafe feeling in what is supposed to be the comfort of our own house. Will our family and things we work hard for, ever be safe? Will this place affect our home value for future buyers having to declare this recovery house in the neighbourhood?

We are 100 percent against this proposal and find it completely unfair to the people who have lived here and built up our neighbourhood community all these years!

Please notify us as to the outcome of this meeting.

Yours Sincerely,

Ryan and Jackie Towson
1910 Eagle St. Abbotsford
(604) 835-2551
ryantowson73@gmail.com

ABBOTSFORD
RECEIVED
FEB 07 2019
Planning & Development Services Department

Allan Campeau

From: Anita Nightingale <nightk@shaw.ca>
Sent: Monday, February 04, 2019 7:36 PM
To: Allan Campeau
Cc: Les Barkman
Subject: 1880 Eagle Street,Abbotsford,B.C. Drug & Alcohol Supportive &Structured Recovery residence.

Good Morning Mr. Campenau,

On the notice we received in the mail it stated ...that the meeting was to establish a 10 bed Supportive Recovery for MEN and WOMEN.

This home has already been in operation for over 1 1/2 yrs Without a licence,without any concern about our neighbourhood. No one was notified that recovering addicts were in our neighbourhood. You already were permitting this centre to operate.We used to have our children and Grandchildren playing on our street. Now you will not see kids playing on our street. We all have safety concerns.Most of the people living on our street are residents who have owned their property and have lived on Eagle St for 15 yrs plus,also residents on Westbury and Lynn Ave.
are concerned and own their homes. This has always been a quiet ,friendly,law abiding neighbourhood,with schools and 2 churches, Hoon Park with playground and Daycare.
After reading letter from Ancora Housing most residents are over 80 yrs young at 1961 Eagle ,they informed everyone that there is drug dealing at the back of church right beside their property ,they have cameras mounted that have recorded trespassers.
-
-when I take our dog to Hoon Park for a walk I have noticed people from 1880 Eagle behind church huddling. Now I am not walking to Hoon Park, I see residents walking and meeting others (friends?)on bikes with backpacks.

- As you are aware the Recidivism Rate is Very High.
What crimes have these residents previously committed? We should be aware!

-police have attended this residence 32-33 times in 2018.
I have witnessed A.P.D. at res at a least 4 times in Jan. 2019.

-in the last 20yrs+ I haven't seen the Police in our neighbourhood on many calls ,now in 2018 there have been 32 -33 calls to ONE residence 1880 Eagle Street. This residence already has had 4 visits from A.P.D. in 2019. Very worrisome.

-there is a new home being built at 1891 Eagle Street, now the owner is nervous to move in. The owners are a young couple, it will be nice to have another family residence on our street. Not a business that makes money for the owner. The residents are NOT law abiding citizens, this is proven by Police calls and ambulance calls to this house.

-incidents that have happened that I have witnessed since home has had this Recovery House Operating.(without a licence.)Keep in mind we basically live in the back of our home as our kitchen and family room are in the back of our home. How many incidents have we NOT witnessed?

-neighbours have had money stolen from their vehicles

-neighbour was on holiday and when she returned her vehicle had scratches on Jeep by window, rubber moulding was damaged. Same resident has had men hiding around her trailer in her driveway, smoking and then circling her Jeep. When she confronted them they just said "nice Jeep".

Attachment: Attachment H - Neighbourhood Information Meeting Comment Sheets, Emails and Letters (PDS 032-2019 : Supportive Recovery

-the residents at Ancora Housing at 1961 Eagle St.
Ancona have had many thefts
and have photos with pics of perps.

-I have witnessed male residents from 1880 Eagle go across Street to 1891 Eagle St.
Property was vacant, I witnessed them removing metal and other items from outside of this resident. This happened on two occasions that I witnessed. I asked them what they were doing,they said they had permission from owner. I contacted Owner,he said he had NOT given permission to these people to remove items. Another day I saw 4 residents going over to 1891 Eagle ,3 males, 1 female. They went around back of res and remained there for about 4-5min. When they came to front of house ,the female approached me while I was gardening and told me their Supervisor had told them to check out res to open another Rehab Home. They had no fear going onto property, no respect for residence. She informed me women were on top floor & the men where in the basement. Are there presently two supervisors on site as the house is evidently divided?

-bottom window was broken,(over a yr ago) shortly after residence was open, a male was leaving res by this broken window. WHO was looking after this male Resident? They were going through opening at the side of our home. I saw a male looking into our dining room window which is in the front of our property. Very unnerving. I constructed a fence to close off the opening. (2ft). to stop residents coming onto our property,from broken lower window to go onto the road. Sneaking out like unsupervised teens. I saw male coming out of window. The next day I noticed the fence had been ripped down. I again constructed a metal fence that attached to our existing wire fence. I had to secure it with metal poles that I dug into the ground.

-since this residence has been in operation it has adversely affected our neighbourhood.

-unfortunately I live beside this house.

-in the summer I found 2 empty liquor bottles in our backyard,orange peels,cigarette butts or joints on our grass in our backyard. This residence has a porch that is enclosed with open lattice work,except for an opening the size of a window that over looks our yard. Easy access to throw garbage on our property. I am fearful for our Westie ,as the news informed everyone that dogs cld die from ingesting marijuana.

-I have smelled marijuana coming from the back porch since this residence was opened 1 1/2 - 2 yrs ago. Very strong odour.

-I used to park our vehicle in our driveway but had to remove our boat from garage so I cld park our vehicle in our garage. (Safety Concern)

-why should we live in fear so a Slum Landlord can lease his property for a large sum of money and have the house in disrepair. This house has eves troughs missing,mould under front of house by eves troughs.
This hse has not been painted in years.

-residents walking in our neighbourhood night and day.

-currently this house has a broken picture window and a broken window in the basement ,these windows have been broken for approximately 3-4 wks. What kind of residence has broken windows over and over?

-A sign of violence. Saw A.P.D.attend. Windows still not repaired. (Feb 2019)

Garbage has always been on side of home,broken green bags. The back yard has been used as a dump,currently (Feb 2019) there is a mattress ,furniture ,plastic buckets,an old barbecue,rotten wood pcs.,etc etc, I have contacted Bylaws many times. They are very helpful but have their hands tied sometimes)

Attachment: Attachment H - Neighbourhood Information Meeting Comment Sheets, Emails and Letters (PDS 032-2019 : Supportive Recovery

-Neighbours have seen an increase in rodent population. Every week AFTER garbage collection this house still has garbage remaining. Currently they have 2 full tins outside res. WITHOUT LIDS. These tins have been on road since last pick up. Garbage is strewn around cans because something is going through garbage . No one picks up the garbage on the ground. This is the only home with garbage all over and extra garbage sitting on side of home and in front of home.

-when Spring and Summer is here, this res has overgrown weeds and grass. No upkeep on yard. I phoned Bylaw because grass was over a foot high. No other home on Eagle looks like this!

-the value of our homes will certainly decrease. Our street has always been known as an older quiet neighbourhood. Now it will be known as a street with a rehab house that has 10 residents who are free to walk the streets of our community,leaving cigarette butts and food wrappers on our front properties. I have spoken to many residents on Eagle and Westbury who clean their yards daily. A neighbour who lives on Westbury works long shifts and told me she is fearful for her safety and her son's safety.

-She said she cld see the garbage on side of 1880 Eagle green bags ripped and backyard with mattress.

-the last few months I have found cigarette butts close to our home 3/4 way up our driveway. Our family are non smokers so where are these butts coming from and why are they in front of our home ,on the street and also by our garage.

-There wld be no reason for anyone to be on our driveway by our garage smoking unless they are checking our residence.

2017-2018 We have been nervous to sit on our patio and enjoy our backyard.

--why is there no standard? This is a Business making money WITHOUT a licence why has there been no thought for the safety of residents on Eagle Street?

-Burnt mattress on the side of the house, this is the 2nd Mattress that has been discarded. Fire started by resident, certainly this could have affected our homes.. This mattress remained on side of the house for at least 2-3 wks until I phoned Bylaws, along with many broken green garbage bags and broken furniture.

-we were in front yard and noticed A.P.D. parking on other side of street 1880 Eagle. We saw a naked woman with blanket partially covering her get out of police vehicle entering Rehab Residence. Why should our children and neighbours be subjected to this ? If they are supervised ,why are the police at res weekly? If not more!

-when they first were at res (1 1/2) yrs ago I saw children on premise. They were about 6-7 yrs old. The only reason we were aware this was a rehab home,someone who had contacted City was told they had applied for a licence to open a rehab home and wld have about 8-9 res.

-for the past 2yrs I have noticed a revolving door,different faces all the time. This is very unnerving.
I don't think there has ever been 10 Residents. What will it be like when facility is at Full capacity?

-late summer of 2018 I was taking down our patio umbrella,in our backyard. I observed a male in the backyard of 1880 Eagle,he had red hair ,in his 20's yelling at our dog, then yelling at me asking my name, saying he was in recovery, then again yelling asking my name, I did not give my name, he threw dirt at our dog through our wire fence and charged the fence,he did this twice. He then got a stick and started digging in the soft dirt ,like a 3-4 yr old might do.
I called our dog inside. I can honestly say this is the first time I have been afraid in our home. I cld see how easy it wld be in his state to jump over our fence. He was definitely impaired by alcohol or drugs. I reported this incident to Police at 859 non Emerg #.

Attachment: Attachment H - Neighbourhood Information Meeting Comment Sheets, Emails and Letters (PDS 032-2019 : Supportive Recovery

- I have been alone with our boys for many midnight shifts etc. because of my husbands 12 hr shifts. I have never feared being on my own,until now,seeing so many face changes at this resident .

- I had parcel opened on my front porch and items removed from parcel. I reported incident to 859-5225 again.(Nov 2018)

-we all notice residents walking or riding bikes always with cigarette in mouth and phone in their hand.

-I must say Councillor Les Barkman has taken our concerns to heart. He has taken his time to listen to our concerns. A very caring Councillor ,he is definitely an asset to our Municipality.

-When I arrived at meeting on Jan.31st I was greeted by you Allan, very personable. You explained to me that there has only been 1 complaint since residence opened their business. I explained I know of at least 10+ complaints to Bylaws. I know others have also complained.
. I have had help from Sue Avery, Rob and I spoke to Magda in Bylaw Department. After so many complaints I asked why they are not fined for infractions. When I heard that they only had 1 complaint recorded by Bylaws Department I was dismayed. I immediately spoke to Magda,explaining I know I have made at least 10 complaints. She said they opened a separate file on 1880 Eagle Street. Doesn't make sense that when Planning and Development asked Bylaws how many complaints were received they were told 1. Breakdown in communication, certainly to the neighbours detriment.

-I think this meeting needs to be revamped. All the neighbours we spoke to expected to sit and listen to all Department Heads and A.P.D. Very impressed everyone was there.
After each presentation everyone was prepared to tell their experiences and feelings and ask questions regarding this 10 Bed Recovery Facility. It wld be beneficial to hear from others. You are missing a great opportunity to hear our grievances ,we were all sitting there but were expected to approach Dept. Heads ourselves. This was very disappointing to our neighbours who took time to come to meeting and wanted to speak. The Lessee Vancouver Recovery Centre, should have spoken and we should have been permitted to ask questions as a group so we all cld hear their answers. I must tell you Allan you are a Schmoozer. I enjoyed your knowledge about this residence.

-of course Deputy Crosby Jones was well prepared to receive questions and to answer them. We needed to hear his views on this res that has had 32-33 calls in 2018. So many resources are being used.
We Definitely do not want this Recovery Facility in our Neighbourhood. We have experienced so many negative experiences since they moved to our neighbourhood 1 1/2 yrs ago. Crime Rate and violence has sky rocketed ,why should our quiet neighbourhood have this? I have heard retired officers say these facilities should not be permitted in residential areas,where children and older people live. This house has made many neighbours fear for their safety.
-
-Our HOME value will decrease, I certainly would Not buy a home on a street with a Rehab Facility . Pls do NOT approve this application.

Respectfully submitted

Anita Nightingale

CITY OF ABBOTSFORD

ABBOTSFORD HOUSING AGREEMENT AUTHORIZATION NO. 2185 BYLAW, 2019

Bylaw No. 2927-2019

The Council of the City of Abbotsford, in open meeting assembled, ENACTS AS FOLLOWS:

1. CITATION

Bylaw No. 2927-2019 may be cited as "Abbotsford Housing Agreement Authorization No. 2185 Bylaw, 2019".

2. ENTER INTO HOUSING AGREEMENT

The Housing Agreement between the City of Abbotsford, the Vancouver Recovery Centre Society, Pavandeep Kataria and Anil Kataria, substantially in the form set out in Schedule "A", attached to and forming part of this Bylaw, is approved.

READ A FIRST TIME this	day of	, 2019
READ A SECOND TIME this	day of	, 2019
READ A THIRD TIME this	day of	, 2019
ADOPTED this	day of	, 2019

I hereby certify this to be a true copy of the original bylaw

Henry Braun
Mayor

Katie Karn
Deputy City Clerk

William Flitton
City Clerk

Final Draft – April 1, 2019

Attachment: Attachment I - Bylaw No. 2927-2019 - Abbotsford Housing Agreement Authorization No. 2185 Bylaw, 2019 (PDS 032-2019 :

SCHEDULE "A"

HOUSING AGREEMENT No. 2185

THIS AGREEMENT is dated for reference the _____ day of _____, 2019;

BETWEEN:

CITY OF ABBOTSFORD
City Hall
32315 South Fraser Way
Abbotsford, British Columbia
V2T 1W7

(the "City")

OF THE FIRST PART

AND:

VANCOUVER RECOVERY CENTRE SOCIETY
P.O. Box 73103 Evergreen RPO
Surrey, British Columbia
V3R 0J2

(the "Operator")

OF THE SECOND PART

AND

PAVANDEEP AND ANIL KATARIA
31483 Legacy Court
Abbotsford, British Columbia
V2T 6W5

(the "Owner")

OF THE THIRD PART

WHEREAS:

A. The Operator proposes to provide Supportive Recovery, as defined herein, within the Housing Facility, as defined herein, in accordance with the requirements of this Agreement and the City's *Zoning Bylaw, 2014*.

Attachment: Attachment I - Bylaw No. 2927-2019 - Abbotsford Housing Agreement Authorization No. 2185 Bylaw, 2019 (PDS 032-2019 :

B. The Operator, the Owner and the City each recognize that the personal behaviour of residents of the Housing Facility must be regulated and supervised so as to ensure the protection, convenience and safety of other residents of the Housing Facility and of residents and users of neighbouring properties, streets and public places.

C. The parties have reached agreement as to certain reasonable and necessary measures to be undertaken by the Operator in the management and operation of the Housing Facility and now wish to enter into this Agreement in order to ensure compatibility between the use of the Housing Facility and that of the immediately adjoining properties.

D. The Owner is the registered owner of those Lands defined herein;

E. The City adopted Bylaw No. 2927-2019 authorizing the City to enter into this Housing Agreement on the terms and conditions contained herein.

THIS AGREEMENT is evidence that in consideration of the mutual promises contained in it, and in consideration of the payment of TEN ($10.00) DOLLARS by each of the parties to the other (the receipt and sufficiency of which is acknowledged by each party), the parties covenant and agree with each other as follows, both as a Housing Agreement under Section 483 of the *Local Government Act* and as a contract and a deed under seal between the parties:

1. Interpretation

1.1 In this Agreement the following definitions apply:

"**Agreement**" means this Housing Agreement.

"Drugs" means any substance regulated under the *Controlled Drugs and Substances Act* or *Cannabis Act* of Canada, but excludes any substance possessed in accordance with an authorization issued under the *Controlled Drugs and Substances Act*.

"Housing Facility" means the Lands and the improvements located on the Lands wherein the Operator intends to carry out Supportive Recovery under the terms and conditions of this Housing Agreement and the City's Zoning Bylaw.

"**Lands"** means Parcel Identifier: 008-646-422

and known municipality as 1880 Eagle Street.

"**Resident**" means a male or female over 18 years of age.

"Resident Contract" means a written agreement between the Operator and each resident of the Housing Facility, in a form satisfactory to the City and in accordance with Section 4 of this Agreement, establishing the conditions of residency.

Attachment: Attachment I - Bylaw No. 2927-2019 - Abbotsford Housing Agreement Authorization No. 2185 Bylaw, 2019 (PDS 032-2019 :

"Supportive Recovery" means a residential use providing a supportive and structured environment for individuals recovering from drug or alcohol addiction, which is governed by a Housing Agreement.

2. Obligations of the Owner

2.1 The Owner covenants and agrees with the City:

(a) that the Lands and the Housing Facility shall only be used for Supportive Recovery in compliance with the terms, conditions, requirements and restrictions of this Agreement;

(b) to take all reasonable measures to require the Operator to operate the Housing Facility in compliance with the terms, conditions, requirements and restrictions of this Agreement; and

(c) that the obligations and responsibilities of the Operator under this Agreement relating to the operation of the Housing Facility also bind the Owner in the operation of the Housing Facility.

3. Requirements of the Housing Facility

3.1 CPTED. The design and construction of the Housing Facility shall implement the Crime Prevention through Environmental Design (CPTED) criteria for residential housing to the satisfaction of the City and, for this purpose, the Operator shall, at the design stage and from time to time thereafter, consult with officials of the City regarding the implementation of such criteria. At a minimum, exterior security lighting and fencing of rear yards is required.

3.2 Maintenance. The Operator shall, at all times, ensure that both the interior and exterior of the Housing Facility are well maintained in a neat, tidy and clean condition.

3.3 Security. The Operator shall ensure that all exterior doors and windows to the Housing Facility are closed and locked when occupants of the residential premises are absent from the Housing Facility.

3.4 Storage. The Operator shall ensure that all personal belongings, furniture, goods, materials, supplies or other things are only stored within properly designated storage areas located within the interior of the Housing Facility. For greater certainty, nothing may be stored or allowed to accumulate around the exterior of the Housing Facility.

3.5 Outdoor Activities. The Operator shall ensure that barbecues and other outdoor activities are carried out in a safe and considerate manner and that the exterior of the Housing Facility is maintained in a neat and tidy condition. Barbecues shall be kept a minimum of 0.6 metres away from any building when in use.

3.6 Building and Fire Codes. The Operator shall ensure that the Housing Facility is, at all times, in compliance with the health, life safety and fire protection requirements of the British Columbia Building Code and Fire Code and the City's *Fire Service Bylaw, 2006*.

3.7 Parking. The Operator shall ensure that adequate on-site parking for staff, residents and visitors is provided and that there are no unlicensed vehicles on the Housing Facility property.

4. Conditions of Residency

4.1 The Operator shall ensure that, prior to occupying a residential premise within the Housing Facility, each resident enters into a written agreement with the Operator regulating the personal behaviour and responsibilities of the resident while residing at the Housing Facility. The agreement shall be in a form satisfactory to the City and, without limiting the generality of the foregoing, shall provide that every resident, as a condition of residency:

(a) must attend a minimum of one (1) counselling or therapy AA-NA meeting each week;

(b) may not possess, hold, store, trade, barter, sell, buy or use any alcohol or Drugs anywhere within or on the premises of the Housing Facility;

(c) must agree to voluntarily allow random urinalysis or other drug testing to be carried out by or on behalf of the Operator while residing at the Housing Facility;

(d) must acknowledge and agree that if he or she is discovered in the possession of, consuming or under the influence of alcohol or Drugs, either on or off the premises of the Housing Facility, they will be discharged from the Housing Facility;

(e) will be subject to specified curfew times having regard to the work schedules of the resident;

(f) must not carry out or be involved in any criminal activities, either on or off the Housing Facility premises, while in residence;

(g) must be considerate of other residents, employees and staff of the Housing Facility and of neighbouring premises;

(h) must respect the prescribed visiting hours restrictions and ensure that visitors are only present on the Housing Facility premises between the hours of 12:00 noon and 9:00 p.m., daily;

Attachment: Attachment I - Bylaw No. 2927-2019 - Abbotsford Housing Agreement Authorization No. 2185 Bylaw, 2019 (PDS 032-2019 :

(i) must ensure that any person invited onto the premises of the Housing Facility by the resident does not engage in any criminal conduct or activity. Proof of such violation will not require criminal conviction but will be determined by a preponderance of evidence;

(j) must agree that information relating to any incident of criminal or unlawful conduct which is investigated by the City of Abbotsford Police Department may be disclosed to officials of the City in accordance with the requirements of the *Freedom of Information and Protection of Privacy Act;*

(k) shall ensure that they and any persons invited onto the premises of the Housing Facility by the resident, do not engage in any conduct or behaviour which unreasonably disturbs or harasses other residents of the Housing Facility or persons in the neighbourhood and must maintain quiet between the hours of 10:00 p.m. and 8:00 a.m., daily;

(l) must be in a work training program, employed, enrolled in school, actively searching for work, or engaged in recovery activities in accordance with a documented recovery program; and

(m) must agree to allow a criminal record check to be conducted prior to their acceptance as a resident of the Housing Facility and to additional background reference checks, from time to time during residency, at the discretion of the Operator and City of Abbotsford Police Department, and such checks must not reveal any evidence of violent offences, sexual offences or outstanding warrants.

5. Obligations of the Operator

5.1 The Operator shall, at all times, be responsible for the proper management and operation of the Housing Facility and shall provide 24 hour, seven (7) day a week supervision of the Housing Facility when occupied by any resident.

5.2 Neither the Operator nor any employee of the Housing Facility shall have a criminal record of violent or sexual offences committed within the last two years.

5.3 The Operator covenants and agrees with the City that:

(a) the Operator is a non-profit organization and a business licence is required;

(b) the maximum number of residents that shall be permitted to reside within the Housing Facility at any one time shall be nine (9) along with one (1) staff member;

(c) the composition of the residents of the Housing Facility, by gender and age group, shall be male and female over eighteen (18) years of age; and

Attachment: Attachment I - Bylaw No. 2927-2019 - Abbotsford Housing Agreement Authorization No. 2185 Bylaw, 2019 (PDS 032-2019 :

(d) the Housing Facility will be required to obtain a licence from the Province under the Community Care and Assisted Living Act.

5.4 The Operator shall be responsible for enforcing the conditions of residency contained in each Resident Contract and shall discharge any resident who violates the conditions of residency contained in the Resident Contract.

5.5 No Drugs or alcohol shall be permitted in, on or about the premises of the Housing Facility and the Operator shall impose a "zero tolerance" policy regarding the possession or use of Drugs or alcohol by residents.

5.6 The Operator shall not display or permit the display of any exterior sign or any interior sign which is visible from outside of the Housing Facility premises.

5.7 The Operator shall maintain an up-to-date registry, including date of birth, of all residents and staff of the Housing Facility. This up-to-date registry will be submitted to the City of Abbotsford each month, by the first of each month. In addition, the Operator shall immediately disclose this up-to-date registry to the City and/or City of Abbotsford Police Department upon request and provide City of Abbotsford Police Department and City of Abbotsford Fire Rescue Service and other emergency services with a current 24 hour, seven (7) day a week emergency contact telephone number.

5.8 The Operator may only use the Housing Facility for Supportive Recovery in accordance with the requirements of the City's *Zoning Bylaw, 2014,* and this Agreement and, for greater certainty, the Operator may not use, or cause the Housing Facility to be used, for short-term emergency housing, detox or other health services requiring Provincial licensing.

5.9 Neither this Agreement nor any right hereunder to provide Supportive Recovery within the Housing Facility may be assigned or transferred by the Operator to any other person or party, in whole or in part. If the Operator makes any such assignment, or transfers, sells or otherwise disposes of the Operator's company, business or non-profit organization to another party, or ceases to operate the Housing Facility for Supportive Recovery, this Agreement shall immediately terminate.

5.10 The Operator shall prepare, obtain approval by the City of Abbotsford Fire Rescue Services and implement a fire safety plan, that in addition to the requirements of the BC Building Code and the Fire Code, includes, at a minimum, requirements that interconnected smoke alarms be installed in all bedrooms and that emergency lighting be installed.

5.11 The Operator shall not request a security deposit from the residents. If a resident is discharged from the Housing Facility, the Operator will refund the rent received for that month on a pro-rated basis.

Attachment: Attachment I - Bylaw No. 2927-2019 - Abbotsford Housing Agreement Authorization No. 2185 Bylaw, 2019 (PDS 032-2019 :

5.12 The Operator shall submit to the City an exiting plan, in a form satisfactory to the City, for any resident discharged from the Housing Facility. A minimum requirement of the exiting plan is that the City and City of Abbotsford Police Department be notified in writing immediately.

5.13 The Operator shall provide a minimum of two meals a day to residents.

5.14 The Operator shall submit to the City written approval on a case by case basis from the Provincial Ministry of Children and Family Development prior to any children, under nineteen (19) years of age, visiting overnight at the Housing Facility, and must be in compliance with the *Child, Family and Community Service Act*.

5.15 The Operator shall attend and participate in all neighbourhood meetings scheduled by the City.

6. Termination

6.1 The City may, on 30 days prior written notice to the Operator and the Owner, terminate this Agreement where:

(a) the Operator fails to comply with, satisfactorily perform or meet any of the terms, conditions or requirements of this Housing Agreement and fails to remedy such non-compliance or unsatisfactory performance when and as requested to do so by the City;

(b) the Operator, at any time, ceases to provide Supportive Recovery within the Housing Facility, or carries out, permits or causes to be carried out, any detox or other health service requiring Provincial licensing or any short-term emergency housing use or other similar use within the Housing Facility which is not authorized by the City's *Zoning Bylaw, 2014*; or

(c) the goods and chattels of the Operator are at any time seized or taken in execution or attachment or the Operator makes an assignment for the benefit of creditors or becomes bankrupt or insolvent or makes a proposal to creditors.

6.2 This Agreement may be terminated at any time by mutual agreement of the parties.

6.3 Upon the expiry or earlier termination of this Agreement, Supportive Recovery shall no longer constitute a permitted use within the Housing Facility under the provisions of the City's *Zoning Bylaw, 2014* and shall thereupon cease.

6.4 Should the Lands cease being used as a Housing Facility, the City, will execute a registrable discharge of this Agreement or file the appropriate notice in the Land Title Office, upon:

(a) receipt of same from the Owner; and

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(b) confirmation, to the satisfaction of the City that the Lands are no longer being used as a Housing Facility.

7. Indemnity

7.1 The Owner and the Operator, each on their own behalf, releases, indemnifies and saves harmless the City, its elected officials, officers, employees, servants, agents, successors and assigns from and against any and all liabilities, actions, causes of action whether in contract or in tort, claims, damages, expenses, costs, debts, demands, or losses suffered or incurred by the City, at any time, either before or after the expiration or termination of this Agreement by the City, arising or resulting from the performance or non-performance of the terms and conditions of this Agreement by the Operator, its employees, volunteers or agents.

8. Miscellaneous

8.1 **Time** - Time will be of the essence of this Agreement and will remain of the essence notwithstanding the extension of any of the dates under this Agreement.

8.2 **Waiver** - No failure or delay on the part of either party in exercising any right, power or privilege under this Agreement shall operate as a waiver thereof, nor will any single or partial exercise of any right, power or privilege preclude any other or further exercise thereof or the exercise of any other right, power or privilege. Except as may be limited in this Agreement, any party may, in its sole discretion, exercise any and all rights, powers, remedies and recourses available to it under this Agreement or any other remedy available to it and such rights, powers, remedies and recourses may be exercised concurrently or individually without the necessity of making any election.

8.3 **Release** - The Owner hereby releases and forever discharges the City, its elected officials, officers, employees, servants and agents, successors and assigns from and against all claims, demands, damages, actions or causes of actions, losses suffered or costs or expenses incurred, by reason of or arising in any way from the existence or enforcement of this Agreement or out of any advice or direction respecting the ownership, lease, operation or management of the Facility which has been or hereafter may be given to the Owner by all or any of them.

8.4 **Entire Agreement** - This Agreement and the agreements, instruments and other documents entered into under this Agreement set forth the entire agreement and understanding of the parties with respect to the subject matter of this Agreement and supersede all prior agreements and understandings among the parties with respect to the matters herein and there are no oral or written agreements, promises, warranties, terms, conditions, representations or collateral agreements, express or implied, other than those contained in this Agreement.

8.5 **No Severability** - It is the intent of the parties that in case any one or more of the provisions contained in this Agreement shall be held to be invalid or unenforceable in

Attachment: Attachment I - Bylaw No. 2927-2019 - Abbotsford Housing Agreement Authorization No. 2185 Bylaw, 2019 (PDS 032-2019 :

any respect, such invalidity or unenforceability shall affect the other provisions of this Agreement and this Agreement shall thereupon terminate.

8.6 **Amendment** - This Agreement may be altered or amended only by an agreement in writing signed by the parties and by the filing of a notice of amendment in the *Land Title Office*.

8.7 **Further Assurances** - Each of the parties shall at all times and from time to time and upon reasonable request do, execute and deliver all further assurances, acts and documents for the purpose of evidencing and giving full force and effect to the covenants, agreements and provisions in this Agreement.

8.8 **Notices** - Any demand or notice which may be given under this Agreement shall be in writing and delivered or faxed addressed to the parties as follows:

The City:
City of Abbotsford
City Hall
32315 South Fraser Way
Abbotsford, British Columbia
V2T 1W7

Attention: Siri Bertelsen, General Manager, Planning and Development Services (or designate)

The Operator:

Vancouver Recovery Centre Society
P.O. Box 73103 Evergreen RPO
Surrey, British Columbia
V3R 0J2

Attention: Kyle Walker

The Owner:

Pavandeep and Anil Kataria
31483 Legacy Court
Abbotsford, British Columbia
V2T 6W5

Attention: Pavandeep Kataria

or at such other address as any party may specify in writing to the other. The time of giving and receiving any such notice shall be deemed to be on the day of delivery or transmittal.

Attachment: Attachment I - Bylaw No. 2927-2019 - Abbotsford Housing Agreement Authorization No. 2185 Bylaw, 2019 (PDS 032-2019 :

8.9 This Agreement shall be governed and construed in accordance with the laws of the Province of British Columbia.

9. Specific Performance

9.1 The Owner agrees that because of the public interest in ensuring that all of the matters described in this Agreement are complied with, the public interest strongly favours the award of a prohibitory or mandatory injunction, or an order for specific performance or other specific relief, by the Supreme Court of British Columbia at the instance of the City, in the event of an actual or threatened breach of this Agreement.

10. Notice of Housing Agreement

10.1 For clarity, the Owner acknowledges and agrees that:

(a) this Agreement constitutes a Housing Agreement entered into under section 905 of the *Local Government Act*;

(b) the City is required to file a notice of this Housing Agreement and any amendment of this Housing Agreement in the *Land Title Office* against title to the Land; and

(c) once such a notice is filed, this Agreement binds all persons who acquire an interest in the Land as a Housing Agreement under section 905 of the *Local Government Act*.

11. AUTHORIZING BYLAW ADOPTED BY Abbotsford City Council on the ____ day of _____, 2019.

CITY OF ABBOTSFORD

ABBOTSFORD HOUSING AGREEMENT AUTHORIZATION NO. 2185 BYLAW, 2019

THE TERMS AND CONDITIONS UPON WHICH THIS HOUSING AGREEMENT IS ISSUED ARE HEREBY ACKNOWLEDGED BY:

The OPERATOR, Vancouver Recovery Centre Society
by its authorized signatories:

_____
Print Name:

_____
Print Name:

The OWNERS, Pavandeep Singh Kataria and Anil Deep Kataria:

_____
PAVANDEEP SINGH KATARIA

_____
ANIL DEEP KATARIA

THIS HOUSING AGREEMENT IS ISSUED this day of , 2019

CITY OF ABBOTSFORD)
by its authorized signatories:)
)
)
_____)
Mayor, Henry Braun) C/S
)
)
_____)
City Clerk, William Flitton)

Final Draft – April 1, 2019

Attachment: Attachment I - Bylaw No. 2927-2019 - Abbotsford Housing Agreement Authorization No. 2185 Bylaw, 2019 (PDS 032-2019 :

ABBOTSFORD

COUNCIL REPORT

Executive Committee

Report No. PDS 041-2019

Date: April 26, 2019
File No: 3100-05 PRJ18-122

To: Mayor and Council
From: Christine Batchelar, Planner
Subject: Rezoning and Development Permit with Variances applications for the properties, located at 32154, 32162 and 32182 George Ferguson Way, 2879 and 2869 Tims Street and 32181 Tims Avenue for a 97 unit apartment building (Owner: 1115646 BC Ltd.; Director: J. Jurinak)

RECOMMENDATION

1. THAT Bylaw No. 2932-2019, "Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 246", be given first and second readings at the next Regular Meeting of Council and be advanced to an upcoming Public Hearing;

2. THAT, prior to adoption of Bylaw No. 2932-2019, "Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 246", the following conditions be satisfied:

   a) entering into a development agreement to secure the required road dedication and utility upgrades and extensions, in accordance with Development Bylaw, 2011, as detailed in the Works and Services Report;
   b) road widening dedication approximately 3.5m along the full frontage of George Ferguson Way, and approximately 2.5m along the full frontage of Tims Avenue in accordance with Development Bylaw, 2011;
   c) providing cash-in-lieu for half road construction along Tims Street;
   d) releasing Covenant BB258162, which is a previous development agreement;
   e) registering a Statutory Right-of-Way for a bus stop along George Ferguson Way;
   f) constructing a bus stop and shelter along George Ferguson Way;
   g) providing cash-in-lieu of $47,500 to be directed towards a future fully signalized intersection at George Ferguson Way and Tims Street;
   h) consolidating the six properties into one legal lot;
   i) demolishing the existing dwellings and accessory buildings with the required demolition permits;
   j) providing a letter provided by Clearbrook Water District demonstrating that sufficient domestic and fire flows are available for the proposal;
   k) providing a community benefit contribution of $400 per dwelling unit for future transit and cycling infrastructure;
   l) providing a community benefit contribution of $225 per dwelling unit for park improvements; and
   m) resolving all issues of funding for items not budgeted by the City;

3. THAT Development Permit with Variances No. 2186, proceed for public comment at an upcoming Public Hearing, in conjunction with the rezoning application;

4. THAT prior to Development Permit with Variances No. 2186 being issued following conditions being satisfied:

   a) adoption of Bylaw No. 2932-2019, “Abbotsford Zoning Bylaw 2014, Amendment Bylaw No. 246”;
   b) providing a cash-in-lieu payment of $12,900 for the shortfall of 43 replacement trees, in accordance with the Tree Protection Bylaw, 2010;
   c) providing a $309,396.20 landscaping security, in accordance with the Development Application Procedures Bylaw, 2016;
   d) providing a $2,500 landscaping inspection fee, in accordance with the Development Application and Service Fee Bylaw, 2010;
   e) providing a construction management plan to the satisfaction of Engineering and Regional Utilities;
   f) owners providing written acknowledgement of the terms and conditions of the permit; and
   g) providing three sets of signed, sealed development permit plans and documents; and

5. THAT the Mayor and Corporate Officer be authorized to execute all documents relating to this matter.

REPORT CONCURRENCE	
General Manager The General Manager concurs with the recommendation of this report.	**City Manager** The City Manager concurs with the recommendation of this report.

PURPOSE

The applicant proposes to rezone the subject properties from Urban Residential Zone (RS3) and Duplex Residential Zone (RS4) to Mid Rise Apartment Zone (RMM) to permit a six (6) storey apartment building containing 97 units. The applicant further proposes a Development Variance Permit to reduce the minimum setback for surface parking, to reduce the minimum exterior lot line setback for the underground parkade, to reduce the minimum drive aisle width, to permit the common outdoor amenity area within a building setback and to increase the maximum distance from the transit corridor to permit a maximum 10% parking reduction.

SUMMARY OF THE ISSUE

The applicant is proposing to rezone the subject properties from Urban Residential Zone (RS3) and Duplex Residential Zone (RS4) to Mid Rise Apartment Zone (RMM) to facilitate the construction of a 97 unit six (6) storey apartment building with one level of underground parkade with 153 parking spaces (see Figures 5 to 15).

The proposal includes the issuance of a Multi-family Form and Character Development Permit with Variances. The proposed Zoning Bylaw variances include:

- Reduce the minimum exterior setback for surface parking from 3.0m to 1.2m;
- Reduce the minimum exterior lot line setback for the underground parkade from 1.0m to 0.0m;
- Reduce the minimum drive aisle width from 7.5m to a minimum of 6.5m;
- Permit the common outdoor amenity area within a building setback;
- Increase the maximum distance from 122m to 240m from the transit corridor to permit a maximum 10% parking reduction.

Staff recommends support for the rezoning, the variances requests and the issuance of the Form and Character Development Permit.

BACKGROUND

Applicant/Owner:	1115646 BC Ltd. (Contact: John Jurinak)
Legal Descriptions:	Lot 126 and 127 Except: Part Road on Plan 87413, Section 20 Township 16 New Westminster District Plan 36372 Lot 153 Except: Part Road on Plan 87413, Section 20 Township 16 New Westminster District Plan 40078 Lot 154 Section 20 Township 16 New Westminster District Plan 40078 North Half of the South Half Lot 14 Section 20 Township 16 New Westminster District Plan 9804 Parcel “A” (G76491E) South Half Lot 14 Section 20 Township 16 New Westminster District Plan 9804
OCP Designation:	Urban 1 – Midrise
Existing Zoning:	Urban Residential Zone (RS3) and Duplex Residential Zone (RS4)
Proposed Zoning:	Mid Rise Apartment Zone (RMM)
Site Area:	0.45ha (1.1 acre)
Site Description:	The site is currently made up of five single family lots and one duplex lot. Two of the single family lots still contain a single family dwelling while the remaining lots are vacant. Mature trees are located throughout the site.
Surrounding Uses:	N: George Ferguson Way and single family beyond (RS3): S: Tims Avenue and apartment (under LUC 101) beyond; E: Tims Street and single family beyond; and W: Townhouses (zoned: comprehensive development) and single family beyond.

DICUSSION

Context

1. The proposed development is located at the corner of Tims Street and George Ferguson Way. The properties are located within a neighbourhood in transition and contains a mix of single family lots, townhouses and apartment buildings. The surrounding area offers numerous services and amenities such as parks (Civic Centre, Matsqui Recreation Centre and Garden Park), schools (Columbia Bible College, Colleen and Gordie Howe Middle and W.J. Mouat Secondary), and a Primary Transit Corridor (South Fraser Way), refer to Figure 2. The proposed development considered in this report will likely set a strong precedent for future redevelopment in the neighbourhood.

Official Community Plan

2. The Official Community Plan (OCP) designates the site Urban 1 – Midrise, see Figure 3. This land use designation is intended for enabling multifamily housing to strengthen and support Mixed Use Centres, and Primary Transit Corridor. This land use designation allows for multi-storey buildings including low and mid rises. Heights are initially limited to 6 storeys (taller and varied building heights and ground floor commercial, may be possible through a neighbourhood plan). The density range is from a minimum of 1.0 Floor Space Ratio (FSR) to a maximum of 2.0 FSR. The proposal to develop the property into an apartment complies with the land use designation of Urban 1 – Midrise as the proposed development has a FSR of 2.0.

3. The proposed development is in keeping with the broad objectives of the Urban Structure of the OCP by:
    - *Urban Core* – Redevelopment within the Urban Core that is served by the primary transit corridor that connect the mixed use centres; and
    - *Focused Residential Growth* – Focusing on overall 75% of new residential growth in centres and existing neighbourhoods, with the most intensification in the Urban Core.

Zoning

4. The subject properties are currently zoned Urban Residential Zone (RS3) and Duplex Residential Zone (RS4). The existing zoning does not comply with the OCP land use designation of Urban 1 – Midrise. The applicant proposes to rezone the subject properties to Mid Rise Apartment Zone (RMM) to permit the development of a 97 unit apartment building (refer to the Applicant's Letter of Intent, Attachment A and Figures 5 through 15). The RMM Zone currently permits apartment uses with a maximum density of 2.0 FSR and a maximum height of up to six storeys.

Development Permit

5. The proposed development is subject to a Multifamily form and character development permit (DPT) in accordance with OCP guidelines. The objectives of the multi-family and DPT guidelines are to encourage the construction of well designed, attractive and livable residential streets. New multifamily residential development should seek to enhance the public realm and contribute to neighbourhoods where residents of all ages feel safe.

6. The proposed apartment building consists of a range of unit types and unit sizes. The proposal includes 97 units with:
    - 35 - one bedroom units; and
    - 62 - two bedroom units.

The proposed units range in size from 55m^2 (592ft^2) to 111.5m^2 (1200ft^2).

7. The proposed development meets the multifamily Development Permit (DP) guidelines as outlined below:
    - Hierarchy of Spaces - defines the spaces that are public and private by using low profile landscaping along George Ferguson Way and Tims Street and different types of paving surfaces for pathways and patios to differentiate between the public sidewalk and the development's walkways;
    - Private Amenity Space - provides child and adult friendly amenity space (refer to Figures 14);
    - Parking Location and Design - provides an underground parkade for residents with surface parking located behind the outdoor amenity area (see Figure 5 and 9);
    - Underground Parking - provides an underground parkade below grade, which is well incorporated into the development;
    - Building Entrances - the main front entrance is architecturally distinct entrance that has direct access to George Ferguson Way;
    - Corner Sites – The building is designed to front both George Ferguson Way and Tims Street and exhibits a visually prominent architecture;
    - Architectural Interest - the proposed exterior finishes incorporates a variety of articulation, colours and materials (refer to Figures 12 and 13);
    - Ground Oriented Units - the ground floor units have pathways that have direct access to either George Ferguson Way or Tims Street; and
    - Long Term and Short Term Bike Parking - the proposed building includes secured and weather protected bike parking in the form of locked rooms (refer to Figures 9 and 10). Short term bike parking is located at both entrances of the building.

Variances

8. The following variances are requested in conjunction with the proposed five storey development.

    8.1 Reduce the exterior lot line setback for an underground parkade from 1.0m to 0.0m (see Figure 9).

    Staff believes that the proposed variance to the exterior lot line setback for an underground parkade is reasonable based on the following assessment of the site and proposal:

    - Along Tims Avenue the underground parkade is located 0m from the exterior lot line in one location due to the angled lot line;
    - Along Tims Street the underground parkade is located 0.77m along the full exterior lot line;
    - Along George Ferguson Way the underground parkade is located 0.55m along the majority of the exterior lot line;
    - The underground parkade walls can be situated 0.0m along an interior lot line in accordance with the Zoning Bylaw. The required 1.0m exterior setback is to protect City infrastructure during the construction of the underground;

Staff recommends that prior to Development Permit with variances issuance the applicant provide a construction management plan detailing the construction of the underground parkade to the satisfaction of Engineering and Regional Utilities.

8.2 Reduce the exterior lot line setback for surface parking from 3.0m to 1.2m (see Figure 5).

Staff believes that the proposed variance to the exterior lot line setback for surface parking is reasonable based on the following assessment of the site and proposal:

- the variance allows for a better internal site layout with pedestrian connections through the site; and
- the surface parking area along the exterior lot line is adequately screened with plantings.

8.3 Reduce maneuvering aisle width from 7.5m to 6.5m (see Figure 9)

Staff believes that the proposed minor reductions to the required minimum maneuvering aisle width is reasonable, given that the proposed width still maintains a wide enough vehicular maneuvering aisle to allow two vehicles to pass each other, and that narrower maneuvering aisles are common in other neighbouring Lower Mainland municipalities (typically 6.0 metres).

8.4 Increase the minimum distance from 122m to 240m from the primary transit corridor to permit a maximum parking reduction of 10%.

Staff believes that the proposed increase to the minimum distance from the primary transit corridor to permit a parking reduction is reasonable based on the following assessment of the site and proposal:

- The subject properties are less than a 5 minute walk from South Fraser Way, the primary transit corridor;
- The applicant is proposing a parking reduction of 11 parking spaces (7%);
- The site is located directly adjacent to both the City Centre and the future Tims Bike Way; and
- The properties are well serviced with numerous amenities including recreation, commercial and educational.

8.5 Permit the outdoor amenity area to be located within a building setback (see Figure 14).

In accordance with the Abbotsford Zoning Bylaw the applicant is required to provide 291m^2 (3,132.3ft^2) of outdoor amenity area. The outdoor amenity area is not to be located within a building setback area or have a dimension less than 6.0m. The applicant is proposing 650m^2 (7,001ft^2) in outdoor amenity area within two areas of the site. A total of 197m^2 (2,122ft^2) complies with the Zoning Bylaw setbacks.

Staff believes that the proposed variance to permit the outdoor amenity area to be located within a building setback is reasonable based on the following assessment of the site and proposal:

- The applicant is providing an additional 359m^2 (3,868.7ft^2) of outdoor amenity area than what is required under the Zoning Bylaw;
- The outdoor area is located behind the building and in front of the surface parking area. Both outdoor areas have south exposure and are in a highly visible area which are overlooked by many of the apartment units; and
- The outdoor area is well programed with a child play area, outdoor seating and lawn area.

Amenity Contribution

9 In accordance with a 2008 Council resolution E008-2008, staff is negotiating public amenities for development variance requests on a case-by-case basis. In conjunction with this proposal, the developer is requesting variances as described in Section 8 above, to allow for the development of the proposed building and associated parking. In this case the developer is required to provide off-site improvements including a bus shelter and contribute to traffic signalization at the intersection of George Ferguson Way and Tims Street, therefore staff recommends no additional amenity contribution be provided.

Landscaping/Tree Removal and Replacement

10 Street trees will be provided along the full frontage of George Ferguson Way, Tims Street and Tims Avenue in accordance with the Development Bylaw, 2011.

11 An Arborist report was submitted in conjunction with this application, which was prepared by M2 Landscape Architecture. dated October 10, 2018 (see Attachment D). A total of 27 mature trees exist on the subject site. According to the Arborist's recommendations all 27 trees are proposed to be removed as they are located within the proposed building envelope and underground parkade location.

12 As calculated by the Arborist, the removal of 27 trees will require 78 replacement trees, as required by the Tree Protection Bylaw, 2010. The landscaping plan displays 35 trees to be planted on site, as shown in Figure 15. Therefore, there is a deficiency of 43 replacement trees. The developer will be required to provide cash-in-lieu in the amount of $12,900 ($300.00 per tree), as required by the Tree Protection Bylaw, 2010. The required cash-in-lieu will be collected prior to issuance of the Multifamily Form and Character with variances for the proposed apartment building.

Access and Parking

13 The proposed development will be accessed via Tims Avenue. In accordance with the Zoning Bylaw, the proposed development requires 165 parking spaces. The applicant is providing 154 parking spaces in accordance with the requested variance as mentioned above. Of the 154 parking spaces, 127 are located in the underground parkade and 26 are located on the surface.

14 The applicant is further proposing to provide 48 secured bike stalls, consistent with the minimum required under the Zoning Bylaw, along with 15 roughed in electric vehicle stations (see Figures 5 and 9).

Lot Consolidation

15 Consolidating the three subject properties into one lot is required as a condition of the completion of the rezoning. Once the lots are consolidated the new legal property will receive a new civic address.

Legal Document Review

16 Covenant BB258162 is registered on the title of the subject properties. The covenant is an old Development Agreement from 2007 when the previous owner was rezoning the subject properties to Low Rise Apartment Zone (RML). The rezoning was never completed but a development agreement was registered on title at that time. As the conditions of this rezoning includes a updated Development Agreement to be registered on title, staff is of the opinion that the covenant is no longer required and therefore recommends that Council authorize the discharge of this registration in conjunction with this application.

Site Development Considerations

17. Through the 2018 Transportation and Transit Master Plan the City has identified the corridor along Parkview Street and Tims Street as a high priority walking and cycling route. As part of the identified route the Tims Street and George Ferguson Way intersection is proposed for realignment. This realignment will create a surplus width of road on the west side of Tims Street (see Figure 16). Staff have had discussions with the applicant to see if the applicant would be interested in purchasing the surplus width of road and incorporating the surplus land into their development proposal. Unfortunately, due to timing the applicant was unable to pursue the purchase.

18. A staff review of the Works and Services Requirements necessary to support this application has been completed and is outlined within Attachment E (dated April 4, 2019), the details of which will be incorporated into the Development Agreement, a prerequisite for adoption of the rezoning bylaw. Some notable requirements of the attached Works and Services Requirements are:

- An approximate 3.5m road widening dedication along the full frontage of George Ferguson Way along the full property frontage is required to accommodate an Urban Arterial with Left Turn Lane road standard;
- An approximate 2.5m road widening dedication along the full frontage of Tims Avenue is required to accommodate an Urban Local road standard;
- Construct along George Ferguson Way half of an Urban Arterial with Left Turn Lane road standard including asphalt roadway, sidewalk and boulevard;
- Cash-in-lieu for half road construction along Tims Street, a Multifamily Local road standard including, asphalt roadway, 1.5m sidewalk and boulevard;
- Construct along Tims Avenue half of a Multifamily Local road standard including, asphalt roadway, 1.5m sidewalk and boulevard;
- Cash-in-lieu of $47,500 (approximately 25%) for George Ferguson Way and Tims Street traffic signalization improvements;

- Along George Ferguson Way provide a 1.65m wide by 10m long Statutory Right of Way for a bus shelter/stop;
- Construct an urban transit stop and shelter along George Ferguson Way;
- Provide $400 per unit as a Community Benefit Contribution to be directed towards transit, cycling and pedestrian improvements; and
- Provide $225 per unit as a Community Benefit Contribution to be directed towards park improvements.

Staff recommends using the $400 per unit to offset the costs for the required bus stop improvements along the property's frontage as the bus stop improvement is a direct transit improvement.

19. The property lies within the jurisdiction of the Clearbrook Water District (CWD). The proposal shall comply with the requirements set out by CWD. Refer to the attached Works and Services Requirements report for more information (refer to Attachment E). A report from a registered professional engineer experienced in water distribution analysis is required to determine the available domestic and fire flows to this development site is required. A copy of this report must be submitted for review by the Engineering and Regional Utilities and Fire Rescue Service Departments of the City (refer to Attachment E). This report has not yet been submitted to the City for review.

20. In addition to the above comments, the developer is responsible to adhere to all other legislation, which may apply to the land, including:

    (a) complying with all applicable City bylaws, such as Official Community Plan, 2016, Development Bylaw, 2011, Tree Protection Bylaw, 2010, Building Bylaw, 2016, Sign Bylaw, 2001, Erosion and Sediment Control Bylaw, 2010, and Development Cost Charges Imposition Bylaw, 2010 administered by the City; and

    (b) obtaining all other necessary approvals and permits on such terms as they may be issued, including but not limited to a development permit, tree removal permit, subdivision approval, building permit, soil removal/deposit permit, Ministry of Health permit, Ministry of Transportation and Infrastructure approval and Ministry of Environment approval.

Communication Plan

If the zoning amendment bylaw is supported by Council, Bylaw No. 2932-2019, "Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 246" will proceed to a Regular Meeting of Council, where it will be considered for first and second readings. If the development is supported by Council the Bylaw and Development Permit with Variances will then proceed to an upcoming joint Public Hearing. The City will notify, in writing, the owners and occupiers of land within a 100 meter radius of the property and copies of all correspondence received will be provided to Council. Two advertisements for the Public Hearing will be published in the City Page of the local newspaper.

The City received confirmation on September 13, 2018, that the applicant installed the required Development Notification Signs in accordance with the Development Application Procedures Bylaw, which requires the sign to be installed a minimum of 3 weeks in advance of Council's consideration of the application.

FINANCIAL PLAN IMPLICATION

No financial plan implications are anticipated. Any capital works implications arising from this application have been addressed through the rezoning process.

Rajat Sharma

Rajat Sharma
General Manager, Finance and Corporate Services
Signed 4/17/2019 10:47 PM

IMPACTS ON COUNCIL POLICIES, STRATEGIC PLAN AND/OR COUNCIL DIRECTION

The proposal meets the goals and objectives identified in the 2016 Official Community Plan, the Affordable Housing Strategy, and Council's 2019-2022 Strategic Plan which identifies four cornerstones: vibrant economy, complete community, fiscal discipline and organizational alignment. The proposal is consistent with the four cornerstones of Council's Strategic Plan.

SUBSTANTIATION OF RECOMMENDATION

The proposed rezoning to Mid Rise Apartment Zone (RMM) is consistent with the OCP land use designation of Urban 1 - Midrise. A multifamily form and character development permit with variances is required for the development and will be reviewed concurrently with the rezoning application. The density, scale and built form are well suited to a City Centre context, and the increase in residential density is very well placed in close proximity to a primary transit route and within a very walkable and amenity rich neighbourhood. The proposal will create a high quality urban design and public realm precedent for the area, which may likely influence future redevelopment in the area. Staff recommends support for the proposed applications.

Christine Batchelar

Christine Batchelar
Planner
Signed 4/16/2019 8:45 AM

Darren Braun

Darren Braun
Director, Development Planning
Signed 4/17/2019 9:29 PM

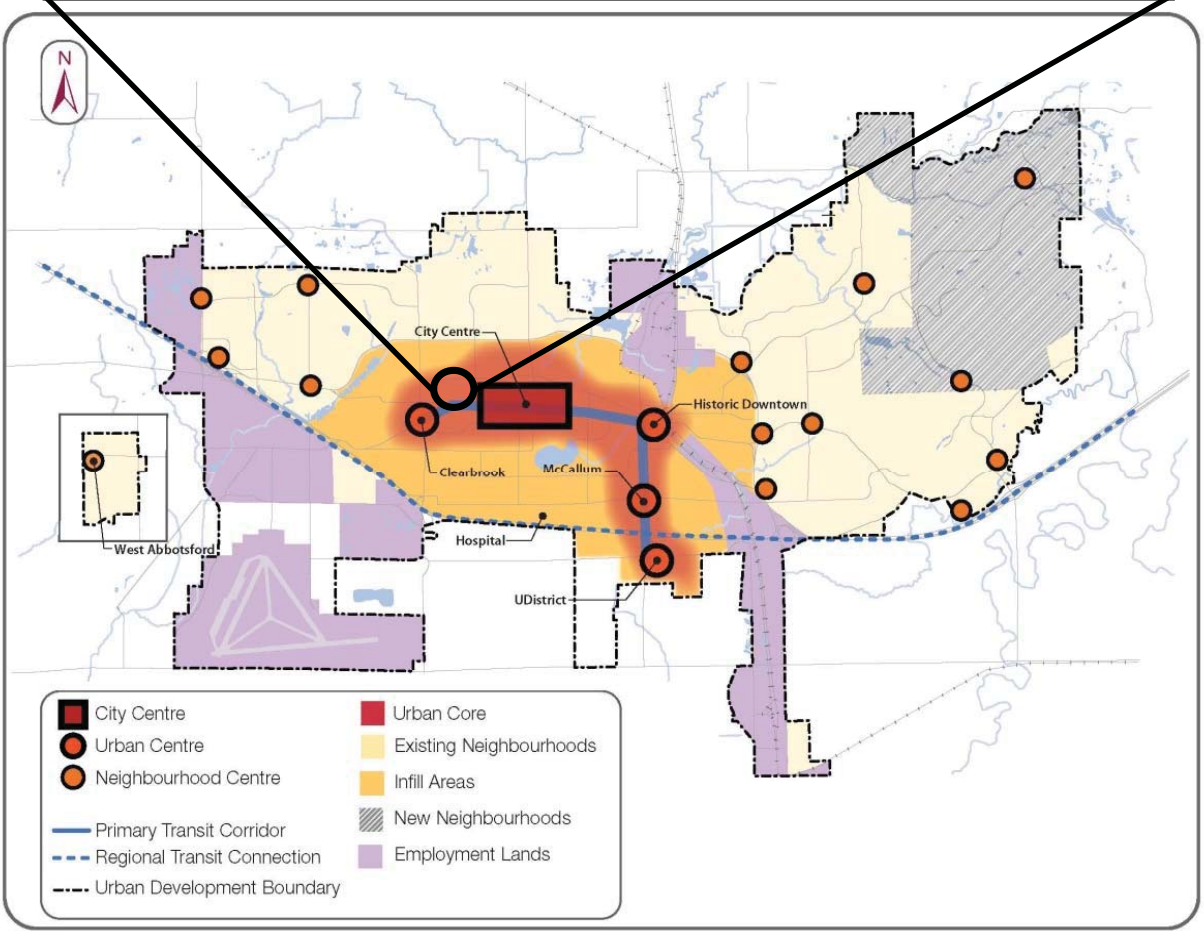
Darren Braun

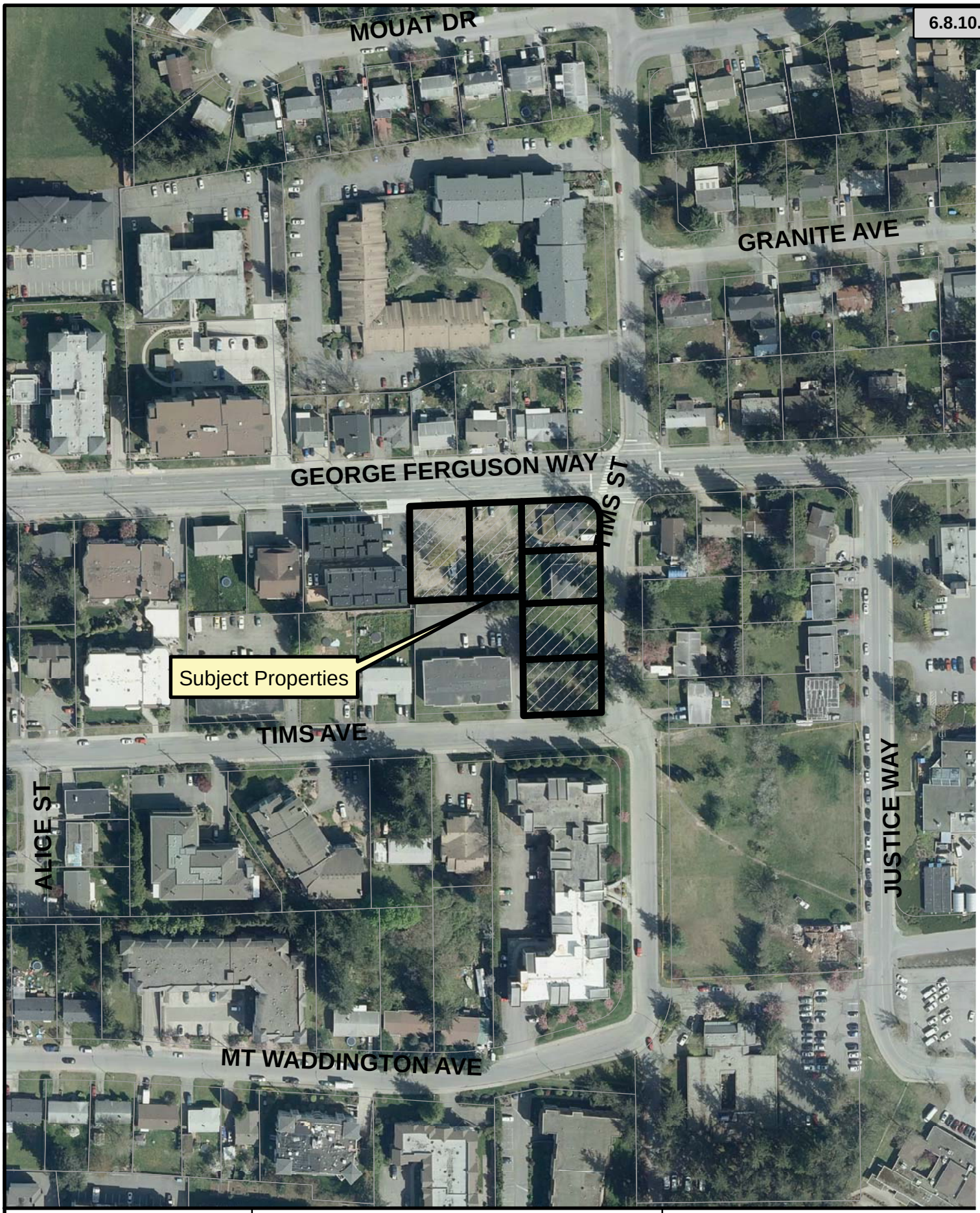
Darren Braun
Director, Development Planning
for
Siri Bertelsen, General Manager
Planning and Development Services
Signed 4/22/2019 7:51 AM

ATTACHMENTS:

Figures 0 to 16
Attachment A: Letter of intent
Attachment B: Bylaw No. 2932-2019 Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 246
Attchment C: Development Permit with Variances
Attachment D: Arborist Report Oct. 10, 2018
Attachment E: Works & Services Report

City Context Plan
File: PRJ18-122 Location: 32154, 32162, 32182 George Ferguson Way & 2879, 2869, 32181 Tims Ave.





ABBOTSFORD
Planning and Development Services

32154, 32162, 32182 George Ferguson Way & 2879, 2869, 32181 Tims Avenue

Figure 1 - Location Plan
File No.: PRJ18-122

40 0 40
Meters

N

Date

Attachment: Figures 0 to 16 (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69 Tims St and 32181 Tims Ave)

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Planning and Development Services

32154, 32162, 32182 George Ferguson Way & 2879, 2869, 32181 Tims Avenue

Figure 2 - Context Plan
File No.: PRJ18-122

50 0 150 Meters

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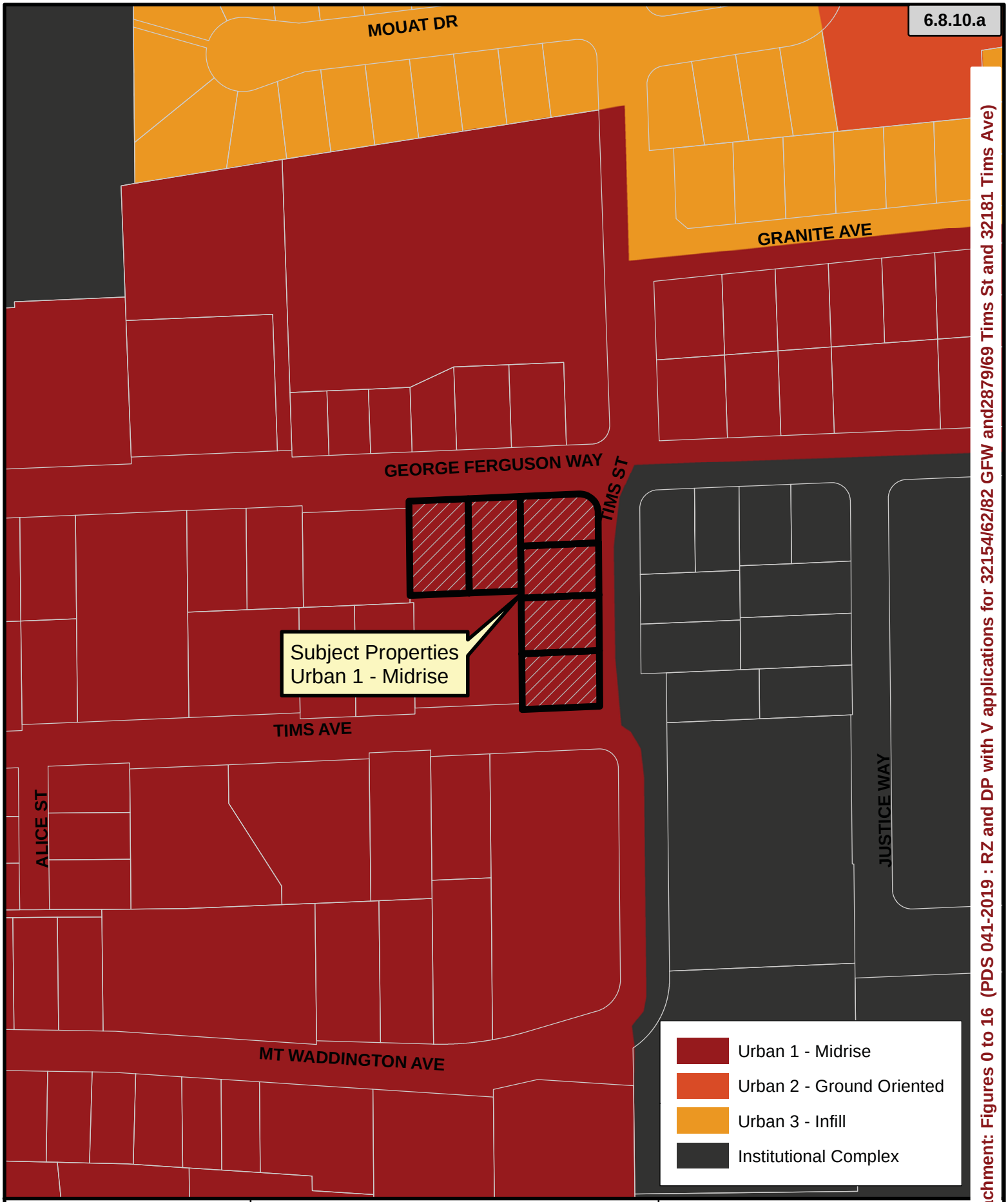
Date

Attachment: Figures 0 to 16 (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69 Tims St and 32181 Tims Ave)



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Planning and Development Services

32154, 32162, 32182 George Ferguson Way & 2879, 2869, 32181 Tims Avenue

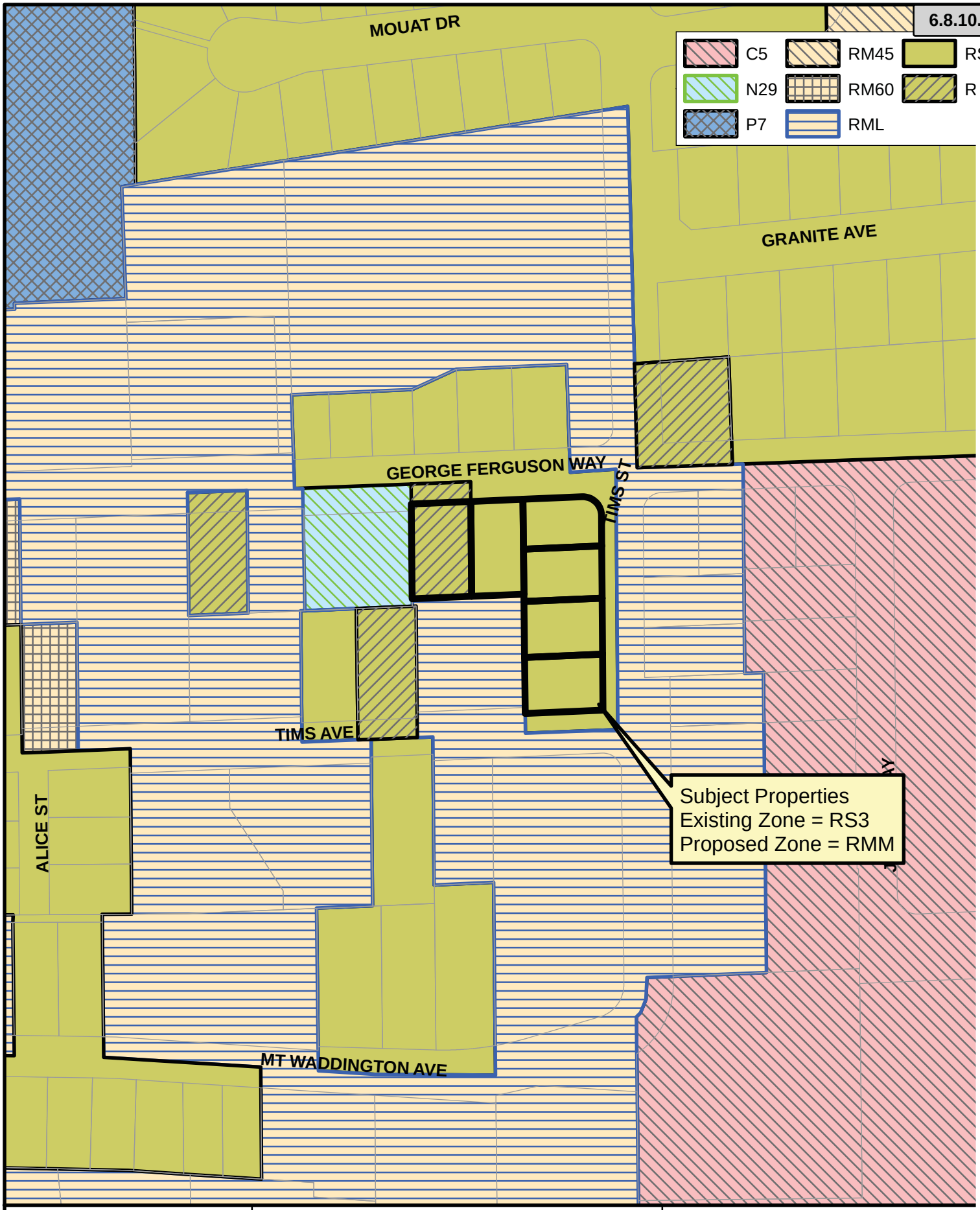
Figure 3 - Official Community Plan
File No.: PRJ18-122

40 0 40
Meters

N

Date

Attachment: Figures 0 to 16 (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69 Tims St and 32181 Tims Ave)



ABBOTSFORD
Planning and Development Services

32154, 32162, 32182 George Ferguson Way & 2879, 2869, 32181 Tims Avenue

Figure 4 - Existing & Proposed Zoni
File No.: PRJ18-122

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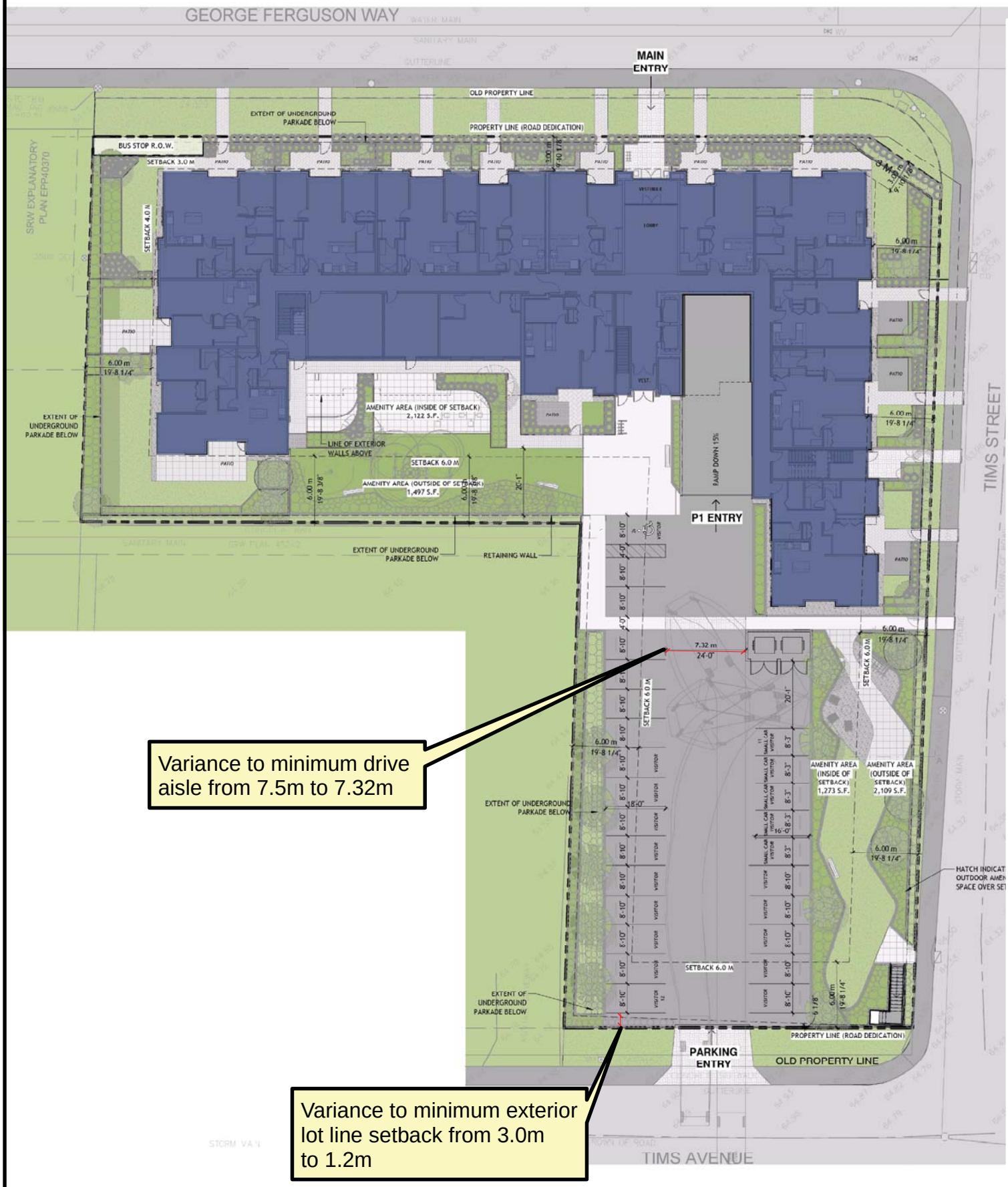
Meters

N

Date



ABBOTSFORD
Planning and Development Services

32154, 32162, 32182 George Ferguson Way & 2879, 2869, 32181 Tims Avenue

Figure 5 - Site Plan
File No.: PRJ18-122

N

Date

Attachment: Figures 0 to 16 (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69 Tims St and 32181 Tims Ave)

north-east corner

south-west corner

north-west corner

south-east corner

Attachment: Figures 0 to 16 (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW

ABBOTSFORD
Planning and Development Services

32154, 32162, 32182 George Ferguson Way
& 2879, 2869, 32181 Tims Avenue

Figure 6 - Building Elevations
File No.: PRJ18-122

N	Date

east elevation (Tims Street)

3/32" = 1' 0"

north elevation (George Ferguson Way)

3/32" = 1'-0"

Attachment: Figures 0 to 16 (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW

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Planning and Development Services

32154, 32162, 32182 George Ferguson Way
& 2879, 2869, 32181 Tims Avenue

Figure 7 - East & North Building Elevatio
File No.: PRJ18-122

N	Date

south elevation (Tims Avenue)
3/32" = 1'-0"

south-west elevation
3/32" = 1' 0"

south-east elevation
3/32" = 1' 0"

west elevation
3/32" = 1' 0"

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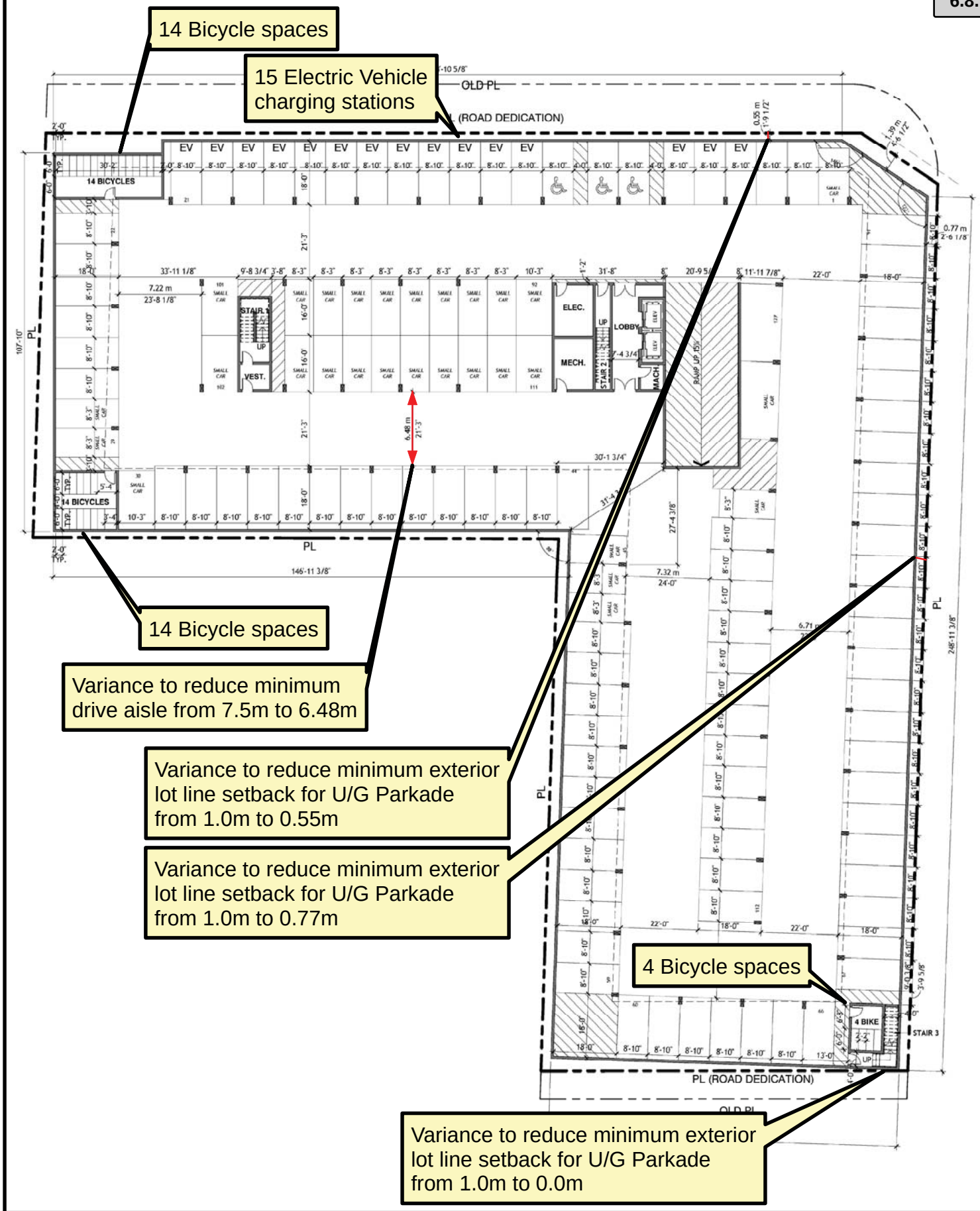
32154, 32162, 32182 George Ferguson Way
& 2879, 2869, 32181 Tims Avenue

Figure 8 - South & West Building Elevati
File No.: PRJ18-122

N	Date

Attachment: Figures 0 to 16 (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW



ABBOTSFORD
Planning and Development Services

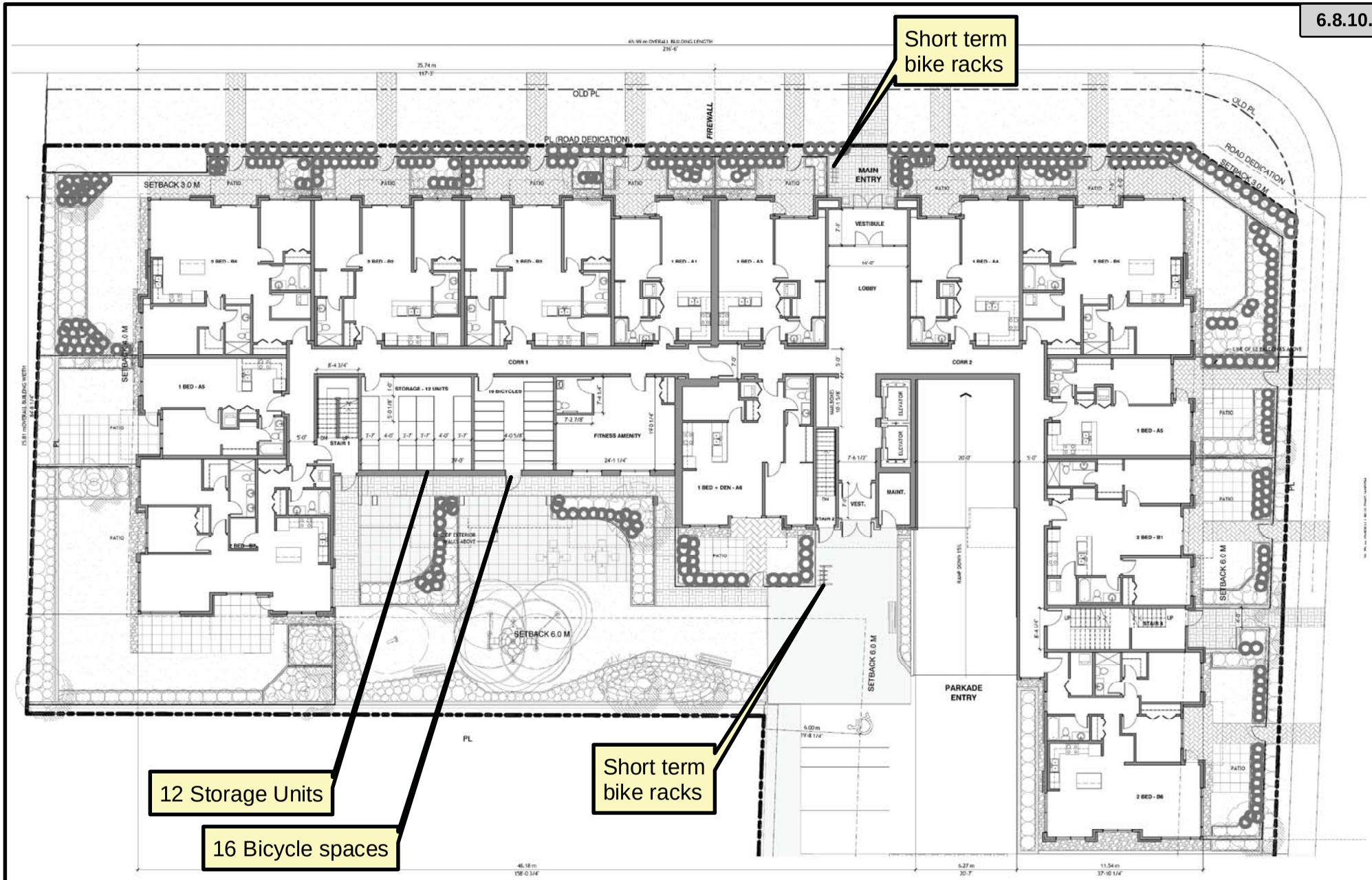
32154, 32162, 32182 George Ferguson Way & 2879, 2869, 32181 Tims Avenue

Figure 9 - Parkade Plan
File No.: PRJ18-122

N

Date

Attachment: Figures 0 to 16 (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69 Tims St and 32181 Tims Ave)



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Planning and Development Services

32154, 32162, 32182 George Ferguson Way
& 2879, 2869, 32181 Tims Avenue

Figure 10 - First Floor Plan
File No.: PRJ18-122

N	Date

Attachment: Figures 0 to 16 (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW

george ferguson way - streetscape
1/16" = 1'-0"

tims street - streetscape
1/16" = 1'-0"

Attachment: Figures 0 to 16 (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW

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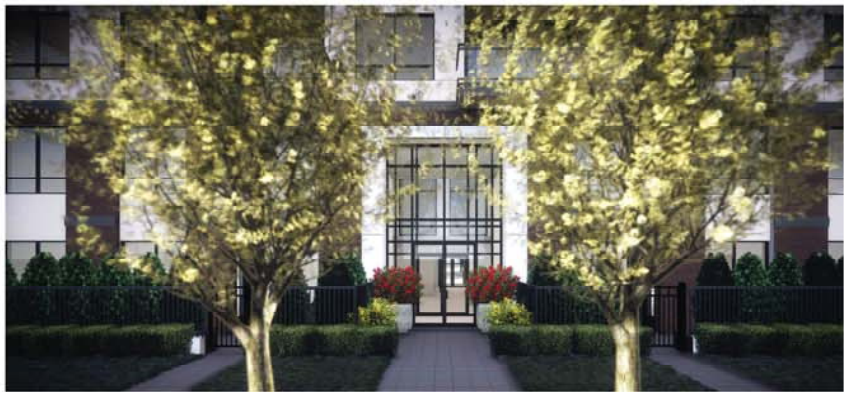
Planning and Development Services

32154, 32162, 32182 George Ferguson Way
& 2879, 2869, 32181 Tims Avenue

Figure 11 - Streetscapes
File No.: PRJ18-122

N	Date

OUTH-EAST CORNER - SITE ENTRY



MAIN ENTRY

BACK ENTRY / PARKADE ENTRY

Attachment: Figures 0 to 16 (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW

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Planning and Development Services

32154, 32162, 32182 George Ferguson Way
& 2879, 2869, 32181 Tims Avenue

Figure 12 - Renderings
File No.: PRJ18-122

N	Date

Site Statistics
No. of Units = 97
Floor Space Ratio (FSR) = 2.0
Total Parking Spaces = 153

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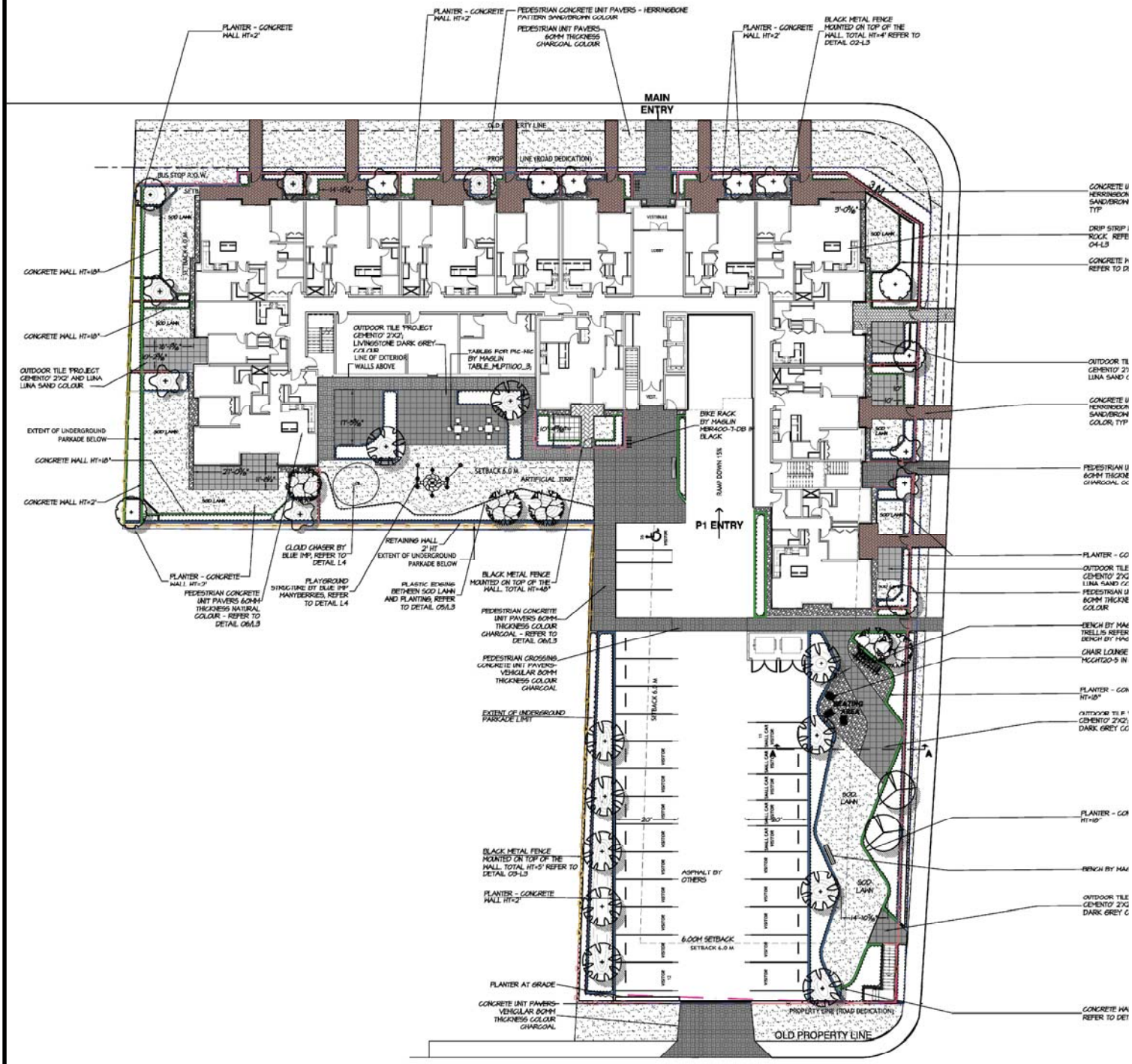
Planning and Development Services

32154, 32162, 32182 George Ferguson Way
& 2879, 2869, 32181 Tims Avenue

Figure 13 - Rendering
File No.: PRJ19-122

N	Date

Attachment: Figures 0 to 16 (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW



Attachment: Figures 0 to 16 (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69 Tims St and 32181 Tims Ave)

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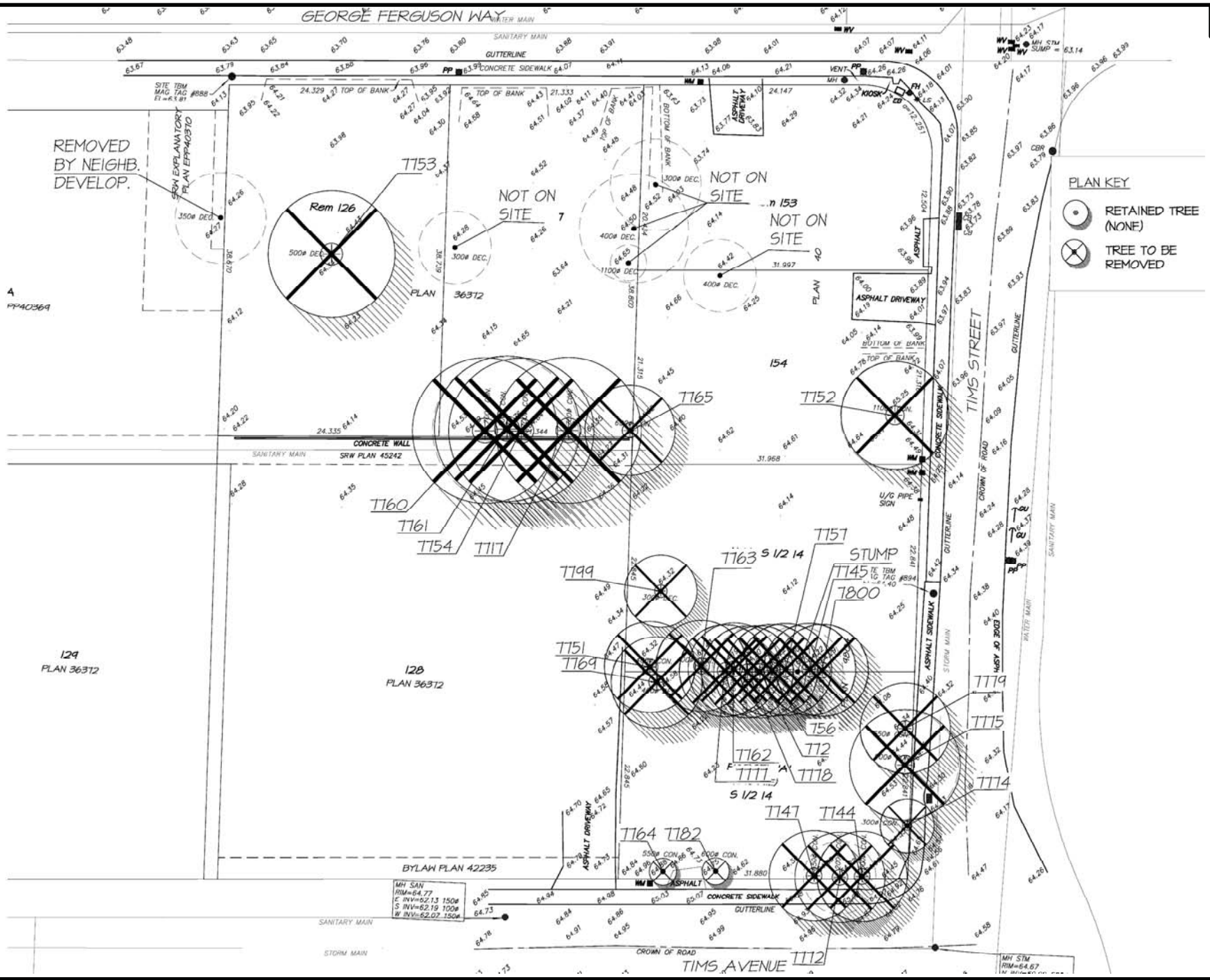
Planning and Development Services

32154, 32162, 32182 George Ferguson Way & 2879, 2869, 32181 Tims Avenue

Figure 14 - Landscape Plan
File No.: PRJ18-122

N

Date



Attachment: Figures 0 to 16 (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW

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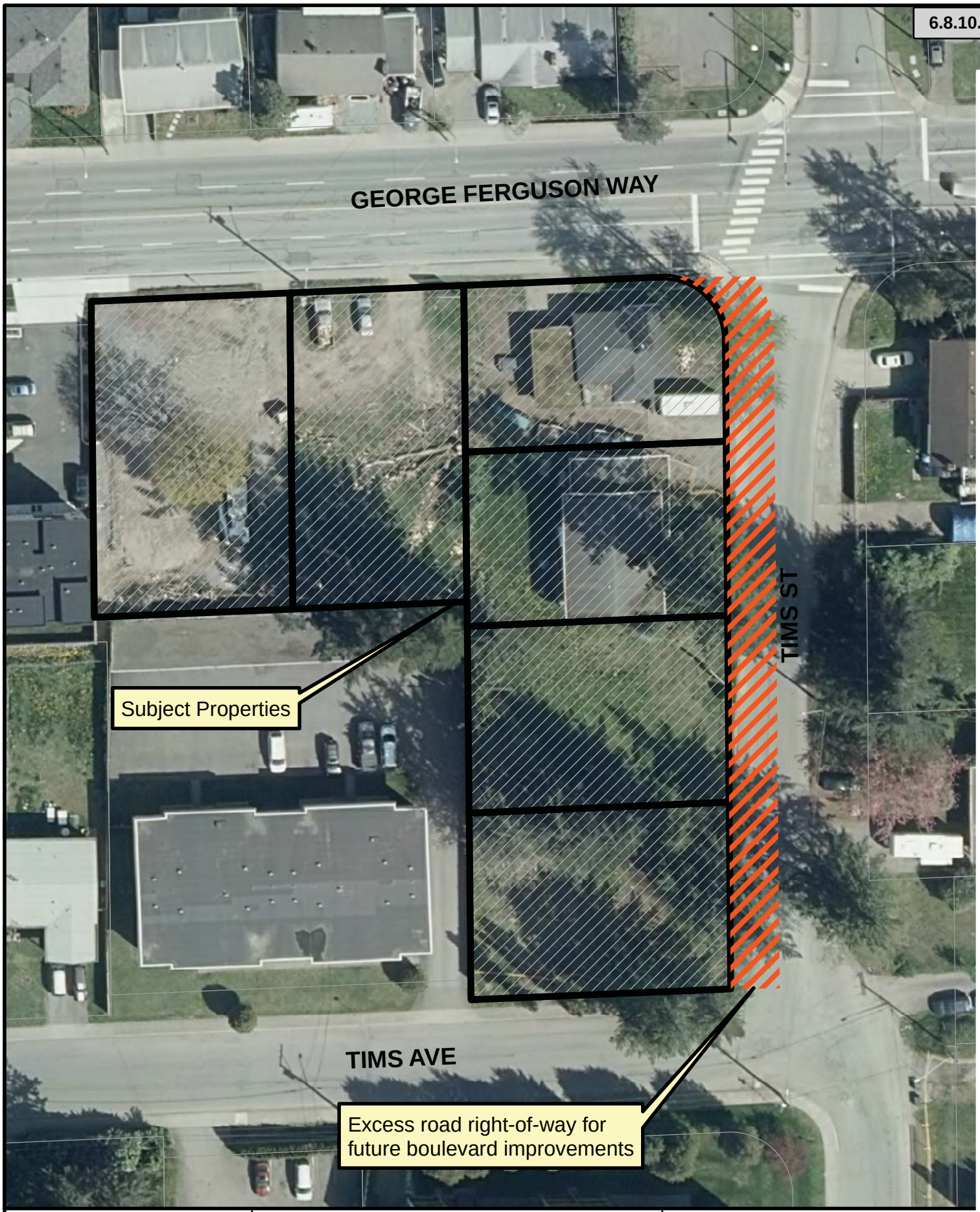
Planning and Development Services

32154, 32162, 32182 George Ferguson Way
& 2879, 2869, 32181 Tims Avenue

Figure 15 - Tree Management Plan
File No.: PRJ18-122

N	Date



ABBOTSFORD
Planning and Development Services

32154, 32162, 32182 George Ferguson Way & 2879, 2869, 32181 Tims Avenue

Figure 16 - Tims St Road Dedicatior
File No.: PRJ18-122

10 0 10
Meters

N

Date

Attachment: Figures 0 to 16 (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69 Tims St and 32181 Tims Ave)

KEYSTONE
ARCHITECTURE

March 25, 2019

City of Abbotsford (Economic Development & Planning Services)
32315 South Fraser Way
Abbotsford, BC V2T 1W7

Attention: Darren Braun BBA, MCIP, RPP, Director of Development Planning

Re: Development Variance Permit/Rezoning Application – Lexus Apartments – 32152, 32162, 32182 George Ferguson Way & 2869, 2879 Tims Street & 32181 Tims Avenue, Abbotsford, BC

LETTER OF INTENT

Please find enclosed this Development Permit application for the *Lexus Apartment* project consisting of a 97 unit – 6 storey apartment building to be located at the addresses listed above. The existing sites are zoned RS (Single Family Residential) and we are proposing to rezone them to a CD zone due to the irregular shape of the property.

Site/Building Access:

Pedestrian access is provided into the main entry lobby off George Ferguson Way. This lobby connects through the building to provide access to the visitor parking stalls along the south of the building. Vehicular access is provided off Tims Ave to the south which leads to the surface stalls as well as the underground parkade ramp which is located on the site.

Setbacks:

Are proposed setbacks for the building are as follows:

North (George Ferguson Way) – 3.0 m
East (Tims Street) – 6.0 m
West (Neighboring Site) – 6.0 m
Southwest (Neighboring Site) – 6.0m

Attachment: Attachment A: Letter of intent (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69 Tims St and 32181

KEYSTONE ARCHITECTURE & PLANNING LTD Eric Poxleitner Architect AIBC, AAA, MRAIC, LEED® AP BD+C, Principal | Ron Martens Managing Principal
300 – 33131 South Fraser Way, Abbotsford, BC V2S 2B1 | Phone 604 850 0577 or 604 853 1528 | Fax 1 855 398 4578 | Email mail@keystonearch.ca | W

KEYSTONE
ARCHITECTURE

Parking:

The on-site parking is provided on 1 level of parkade and on the surface of the site. The parking requirement for the building is 165 vehicle stalls while we are providing 153 stalls. 127 of the stalls are provided in the U/G parkade while the remainder are provided on the surface. In addition, we will also be providing rough-ins for 15 EV stalls in the underground parkade.

Amenity Space:

The outdoor amenity space required for the building is 3,131 SF. We have provided 3,395 SF located on the surface of the site inside the setbacks and an additional 3,606 SF outside the setbacks. The amenity programing includes walking paths, benches & a child play structure. We have also provided an amenity space on the 1st floor of the building which is 509 SF in size.

Road Dedications:

We have provided 2 separate road dedications on this property as requested by city staff in our initial DIM. We are providing a 2.44 m +/- dedication along Tims Avenue at the south end of our site to align with the neighboring property line. We are also providing a 2.8 m +/- dedication along George Ferguson Way at the north property line to align with the neighboring property.

Landscape/Arborist:

The landscape plan and arborist report was prepared by M2 Landscape Architecture.

Proposed Variances:

We are proposing the following variances:

- Surface parking in some areas is less than 1.5 m from property line.
- Underground parkade walls in some areas are less than 1.0 m from property line.
- Drive aisles have been narrowed to 21'-3" (6.48 m).
- A 7.2% reduction of parking to 153 stalls

Attachment: Attachment A: Letter of intent (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69 Tims St and 32181

KEYSTONE ARCHITECTURE & PLANNING LTD
Eric Poxleitner Architect AIBC, AAA, MRAIC, LEED® AP BD+C, Principal | Ron Martens Managing Principal
300 – 33131 South Fraser Way, Abbotsford, BC V2S 2B1 | Phone 604 850 0577 or 604 853 1528 | Fax 1 855 398 4578 | Email mail@keystonearch.ca | W

KEYSTONE
ARCHITECTURE

Exterior Design:

Lexus apartment's elevational composition looks to achieve a stepping of massing to reduce the building scale to the surrounding streetscape, while providing prominent corner features to frame the development within the neighbourhood context. A two-storey brick podium helps ground the building and give visual strength to support the upper level feature elements. The long George Ferguson Way building exposure has been given a unique entry to balance the building and act as natural wayfinding to users. The contemporary materials and colours additionally encourage this visual stepping of the building by providing an opportunity for depth and balance.

Regards,

Lukas Wykpis
Keystone Architecture & Planning Ltd.

Attachment: Attachment A: Letter of intent (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69 Tims St and 32181

KEYSTONE ARCHITECTURE & PLANNING LTD
Eric Poxleitner Architect AIBC, AAA, MRAIC, LEED® AP BD+C, Principal | Ron **Martens** Managing Principal
300 – 33131 South Fraser Way, Abbotsford, BC V2S 2B1 | **Phone** 604 850 0577 or 604 853 1528 | **Fax** 1 855 398 4578 | **Email** mail@keystonearch.ca | W

CITY OF ABBOTSFORD

ABBOTSFORD ZONING BYLAW, 2014, AMENDMENT BYLAW NO. 246

Bylaw No. 2932-2019 PRJ18-122

The Council of the City of Abbotsford, in open meeting assembled, ENACTS AS FOLLOWS:

1. CITATION

Bylaw No. 2932-2019 may be cited as "Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 246".

2. AMENDS ZONING MAPS

Abbotsford Zoning Bylaw, 2014, Schedule "D", Urban Area Zoning, as amended, is further amended by changing the zoning of the lands as shown in the attached Appendix "A" and located at 32154, 32162, and 32182 George Ferguson Way, 2879 and 2869 Tims Street, and 32181 Tims Avenue:

From: Urban Residential Zone (RS3) and Duplex Residential Zone (RS4)
To: Mid Rise Apartment Zone (RMM)

READ A FIRST TIME this	day of	, 2019
READ A SECOND TIME this	day of	, 2019
PUBLIC HEARING HELD this	day of	, 2019
READ A THIRD TIME this	day of	, 2019
ADOPTED this	day of	, 2019

I hereby certify this to be a true copy of the original bylaw

Henry Braun
Mayor

Katie Karn
Deputy City Clerk

William Flitton
Corporate Officer

Final Draft – April 10, 2019

Attachment: Attachment B: Bylaw No. 2932-2019 Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 246 (PDS 041-2019 : RZ and DP with V

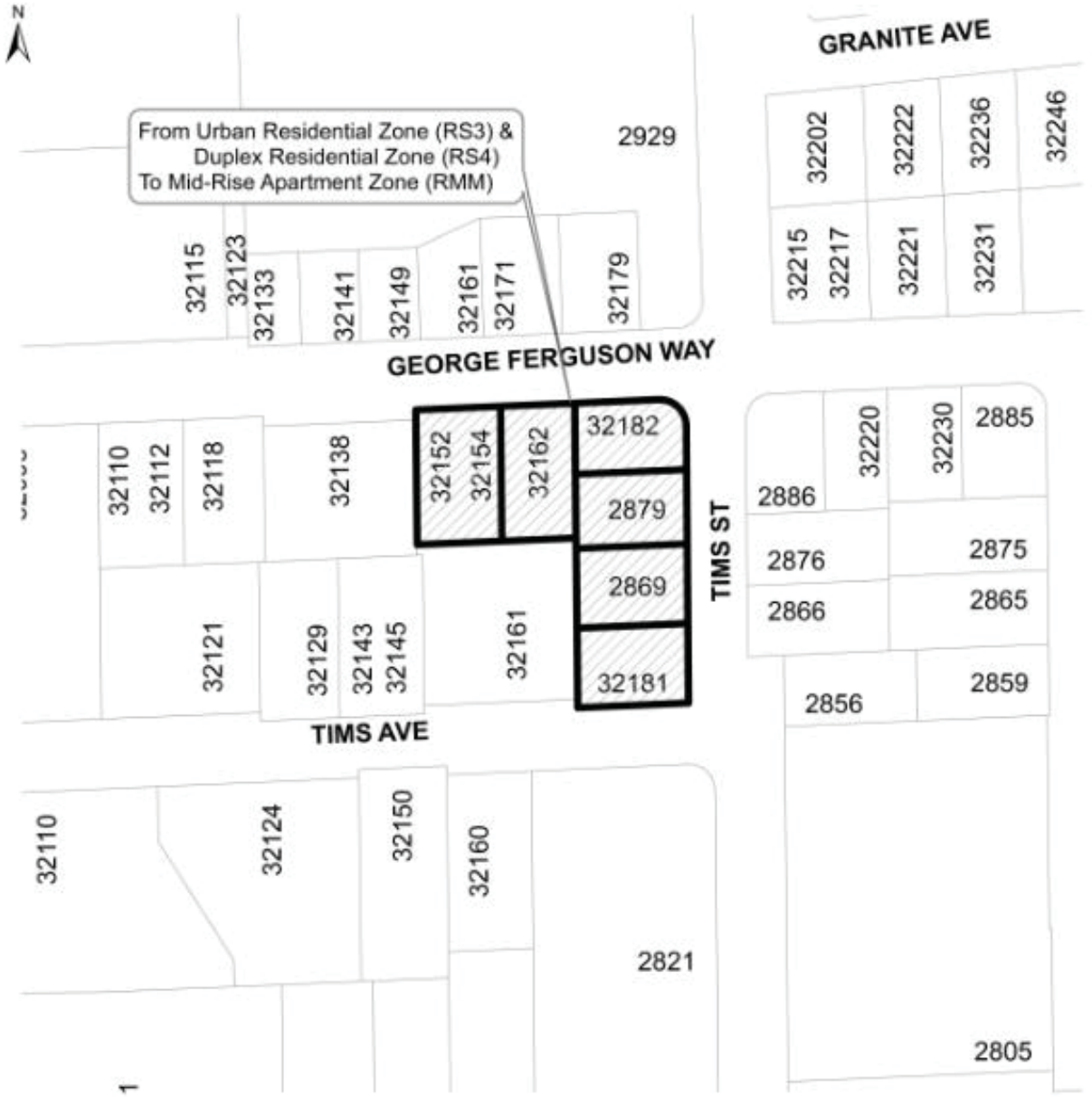
CITY OF ABBOTSFORD

ABBOTSFORD ZONING BYLAW, 2014, AMENDMENT BYLAW NO. 246

Bylaw No. 2932-2019 Page 2

APPENDIX "A"

SCHEDULE BYLAW NO. 2932-2019
BEING ABBOTSFORD ZONING BYLAW, 2014,
AMENDMENT BYLAW NO. 246
FROM: Urban Residential Zone (RS3) & Duplex Residential Zone (RS4)
TO: Mid-Rise Apartment Zone (RMM)



Final Draft – April 10, 2019

Attachment: Attachment B: Bylaw No. 2932-2019 Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 246 (PDS 041-2019 : RZ and DP with V

ABBOTSFORD

DEVELOPMENT PERMIT NO. 2186 WITH VARIANCES

1. This Development Permit No. 2186 with variances as applied for under File No. PRJ18-122 is issued to the owner (the "Permittee") and shall apply only to that certain parcel or tract of land within the City of Abbotsford (the "City") described below, and any and all buildings, structures, and other development thereon and shall be binding on a purchaser of the Permittee's interest in the Lands, or portion thereof:

   Parcel Identifier: TBD
   Legal Description: TBD

   (the "Lands")

2. This Development Permit with variances ("DP") is issued pursuant to the *Local Government Act* and the City of Abbotsford Official Community Plan and in accordance with the applicable bylaws of the City, except as specifically varied or supplemented by this Permit.

Development Permit

3. The following DP works, terms and conditions ("DP Measures") shall apply to the Lands:

   .1 Buildings, structures and off-street parking shall be sited and constructed in conformance with Schedules A, D and E and the elevation drawings shown as Schedules B, C, F, G and H as attached;

   .2 Landscaping shall be established in conformance with the Landscape Plan shown as Schedules I to M (the "Landscape Measures");

   .3 Tree removal and protective fencing shall be undertaken in accordance with the Arborist Report dated October 10, 2018 prepared by M2 Landscape Architecture attached as Schedule N (the "Tree Removal Measures");

Development shall occur strictly in accordance with the Crime Prevention Through Environmental Design report prepared by Liahona Security Consortium Inc., dated October 16, 2018 and November 9, 2018 attached as Schedule O.

Fees and Securities

4. For the due and proper completion of the DP Measures the following fees and securities are required:

   .1 For the due and proper completion of the Landscape Measures as set forth in Section 3.2 of this Permit, the Permittee shall deposit and maintain with the City security in the form of an irrevocable, auto-renewing letter of credit in the sum of $309,396.20, or provide cash in the same amount (the "Security"), until all the Landscaping Measures are certified as complete by a qualified Landscape Architect. The Security may be reduced proportionately as areas of the Lands are landscaped and certified complete by a qualified Landscape Architect.

Attachment: Attchment C: Development Permit with Variances (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69

.2 In the event that the Landscaping Measures are not completed as provided for in this Permit, the City may, at its option, enter upon the Lands to carry out, and complete the Landscaping Measures, and recover the costs of so doing, including the costs of administration and supervision, from the Security deposited by the Permittee.

.3 In accordance with the Development Application and Service Fee Bylaw pay to the City, upon execution of this agreement, the sum of $2,500 in payment of all landscape inspection and administration costs associated with the Landscape Measures.

Development Variances

5. Abbotsford Zoning Bylaw, 2014 shall be varied as follows:

   .1 Section 150.5.2 - to increase the minimum distance from a primary transit corridor from 122m to 280m to permit a maximum of a 10% parking reduction and in accordance with Schedules A and D;

   .2 Section 150.6.1 to reduce the minimum setback from an exterior lot line for an underground parkade from 1.0m to 0.0m and in accordance with Schedule D;

   .3 Section 150.6.1 to reduce the minimum setback from an exterior lot line for surface parking from 3.0m to 1.2m and in accordance with Schedule A;

   .4 Section 150.7 to reduce the minimum drive aisle from 7.5m to 6.5m and in accordance with Schedules A and D; and

   .5 Section 460.5.1 to permit an common outdoor amenity area within a required setback and in accordance with Schedules A, I and J.

Permit Limitations

6. This Permit does not constitute subdivision approval, a Soil Removal/Deposit Permit, a Building Permit or Sign Permit and does not entitle the Permittee to undertake any work without the necessary approvals or permits. Site work must be in compliance with the Soil Deposit/Removal Bylaw, the Erosion and Sediment Control Bylaw and the Blasting Regulation Bylaw; other works must be constructed in accordance with engineering plans and specifications acceptable to the City's General Manager of Engineering; and buildings and structures can only be altered, changed in occupancy or constructed in accordance with the B.C. Building Code following issuance of a Building Permit.

7. This Permit does not constitute an approval under, or relieve the Permittee from complying with, any and all federal, provincial or municipal statute, regulation or bylaw governing the Permittee's use and development of the Lands.

8. If trees on the Lands are proposed to be felled during the critical bird breeding windows:

   - General: March 1st to August 31st;

DRAFT

Attachment: Attachment C: Development Permit with Variances (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69

- Bald Eagle: January 1st to August 31st;
- Osprey: April 1st to September 14th;
- Heron: January 16th to September 14th;
- Other Raptors: March 1st to September 31st;

then an appropriately qualified environmental professional (QEP) must monitor compliance with all applicable provisions of the:

- *Wildlife Act*;
- *Migratory Birds Convention Act, 1994*;
- any other federal or provincial environmental legislation governing the Permittee's use and development of the Lands;
- the recommendations of the Provincial document, *Develop with Care 2014: Environmental Guidelines for Urban and Rural Land Development in British Columbia (2014)*; and
- The recommendations of the Provincial document, *Guidelines for Raptor Conservation during Urban and Rural Land Development in BC (2013)*.

The nests of an eagle, peregrine falcon, gyrfalcon, osprey, heron, or burrowing owl are protected under the *Wildlife Act*, regardless of nest activity (i.e. active or inactive) and as such, even if trees are proposed to be felled outside the critical bird breeding window, it is recommended that a QEP undertake an assessment of the trees onsite to ensure that there are no nests of the aforementioned species.

Issuance / Expiry

9. This Permit expires if the permit holder does not substantially start any construction within two years from the date of issuance, in accordance with Section 504 of the *Local Government Act*.

AUTHORIZING RESOLUTION PASSED by Abbotsford City Council on the <> day of <>, 2019.

THIS PERMIT IS ISSUED this day of , 2019.

The Corporate Seal of the CITY OF ABBOTSFORD was hereunto affixed in the presence of:

_____
Mayor, Henry Braun

_____
Corporate Officer, William Flitton

DRAFT

Attachment: Attchment C: Development Permit with Variances (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69

Attachments:

Schedule A: SD1-3 Site Plan, prepared by Keystone Architecture, dated March 8, 2019

Schedule B: SD1-4 Massing, prepared by Keystone Architecture, dated March 8, 2019

Schedule C: SD1-5 Sections, prepared by Keystone Architecture, dated March 8, 2019

Schedule D: SD1-6 P1 Floor Plan, prepared by Keystone Architecture, dated March 8, 2019

Schedule E: SD1-7 1st Floor Plan, prepared by Keystone Architecture, dated March 8, 2019

Schedule F: SD1-14 Building Elevations (East and North), prepared by Keystone Architecture, dated March 8, 2019

Schedule G: SD1-15 Building Elevations (South and West), prepared by Keystone Architecture, dated March 8, 2019

Schedule H: SD1-16 Perspectives, prepared by Keystone Architecture, dated March 8, 2019

Schedule I: L1 Landscape Site Plan, prepared by M2 Landscape Architecture, dated March 8, 2019

Schedule J: L2 Landscape Planting Plan, prepared by M2 Landscape Architecture, dated March 8, 2019

Schedule K: L3 Landscape Details, prepared by M2 Landscape Architecture, dated March 8, 2019

Schedule L: L4 Landscape Details (2), prepared by M2 Landscape Architecture, dated March 8, 2019

Schedule M: L5 Landscape Specifications, prepared by M2 Landscape Architecture, dated March 8, 2019

Schedule N: Arborist Report, prepared by M2 Landscape Architecture, dated October 10, 2018

Schedule O: CPTED Review Report and Addendum, prepared by Liahona Security Consortium Inc., dated October 16, 2018 and November 9, 2018

DRAFT

M2 LANDSCAPE ARCHITECTURE

A B O R I C U L T U R A L M E M O R A N D U M

Date: October 10, 2018

Project File No: 18-043

Attention:
Lukas Wykpis / Elena Topisirovic

Project Name:
Lexus Properties Development
George Ferguson Way & Tims St.
Abbotsford, BC.

Firm Name:
Keystone Architecture & Planning LTD.

Address / Fax:
110 – 2881 Garden Street
Abbotsford, BC V2T 4X1

From: Eryn Buzza
ISA Certified Arborist ON-1538A

x as requested x for your information ___ for your comment x for your use
___ for your estimate ___ for your approval

The arborist was asked by the client to provide an update to the June 27, 2018 Arboricultural Assessment Report, which assesses the health and condition of the trees to aid in the justification for the removal of trees as per the form of development.

The arborist visited the site on Oct. 4, 2018 and notes the updated health and condition of the trees in a revised report dated Oct. 10, 2018, attached. In response to Sept 10, 2018 City's review comments, provided by Keystone Architecture & Planning Ltd, the project arborist notes the following:

31. All updated tree health conditions are contained within the tree table, on page 3-5 of the report. The arborist notes that the majority of trees on site were in poor to moderate condition, with minimal viability for retention given the extent of construction.

32. The arborist made note of the cash-in-lieu payment within the updated report.

33. As noted in the report, the semi-mature Douglas Fir hedgerow is in poor to moderate condition, with suppression of branch structure in proximity to neighbouring trees and some wind throw damage visible on lateral branches from exposure to prevailing winds. Along with others, the following trees are not viable for retention: Tree #7744 is completely dead; #7747 is in decline with a thin canopy, pruning wounds and shows signs of poor pruning practices in the past; #7772 is nearly dead; #7764 and #7782 are in poor condition (severe decline), with significant lean to the east, dead wood and thin canopy growth.

See tree table, photos and plans attached (in the October 10, 2018 Arborist Report).

#220, 26 Lorne Mews, New Westminster, British Columbia, V3M 3L7, Tel. (604)553-0044, Fax: (604)553-0045
Email: office@m2la.com

Attachment: Attachment D: Arborist Report Oct. 10, 2018 (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69 Tims

M2 LANDSCAPE ARCHITECTURE

Arboricultural Assessment Report

Date of Review: June 18, 2018 | Project File No.: 18-043

Date of Report: June 27, 2018
*Revised October 10, 2018

Project Name: Lexus Properties Development

Weather: Sunny 26C

Arborist: Eryn Buzza
ISA Certified Arborist ON-1538A, TRAQ

We completed review of site conditions on date of review and note the following:

Re: Arboricultural services at George Ferguson Way and Tims Street, Abbotsford, BC. *Revised October 10, 2018, as per City Comments*.

1.0 Introduction:

A site visit was requested by the agent to review the quality of existing significant and bylaw protected trees at the site associated with the proposed development of a multi family residence. We were provided with a copy of the topographical survey plan for reference as well as a plan showing the proposed form of development. Only the trees detailed in this report were assessed. The purpose of this review is to determine the existing conditions of the subject trees, including health and structure, and to determine the trees viability based on the proposed form of development. This report will be submitted to meet municipal permitting requirements.

Tree inspection and analysis used the standardized VTA (Visual Tree Assessment) to identify species, size, condition, outward signs of structural defect(s), health deficiencies, and environmental conditions potentially impacting the health or structural integrity of the tree(s). Trees have been tagged showing numbers for inventory and reference purposes and photos have been taken for file and report reference purposes. A detailed inspection including aerial inspection, decay mapping, excavation explorations and root mapping was not performed.

2.0 Scope of Work:

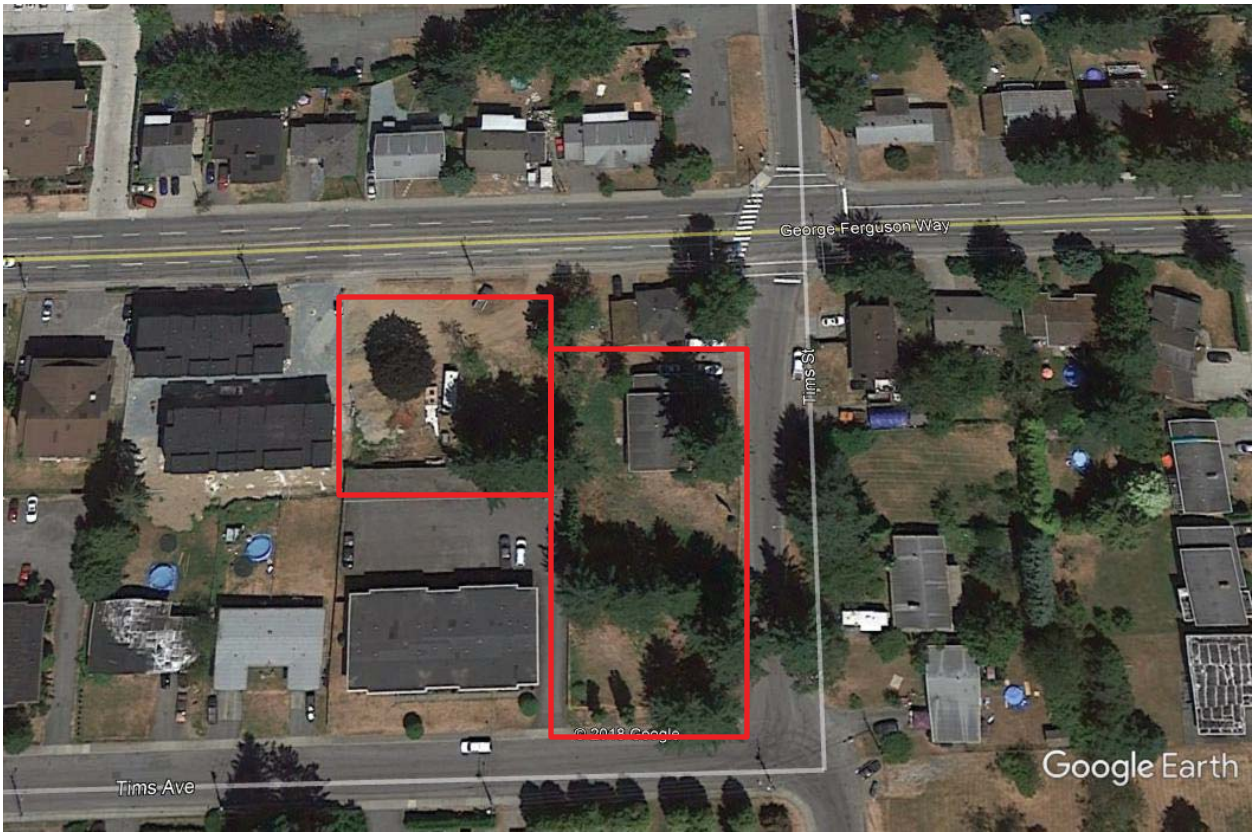
Our scope of work is defined by the owner as follows:

a) Assess bylaw size trees within the site and 5m of property line and of neighbouring properties'
b) Assess the feasibility of retaining trees on the site, on neighboring properties and on city property in association with the form of development proposed.
c) Provide mitigation/protection comments.

Attachment: Attachment D: Arborist Report Oct. 10, 2018 (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69 Tims

3.0 Observation:

The image above is taken from Google and the subject site is shown outlined in red.



The property is open area with one house. The property is otherwise surrounded by single family housing and apartments.

Street Trees

A total of zero street trees.

Environmental, Drainage and Wildlife Comments

There are no observed birds' nests and no significant wildlife values noted of the site.

Existing Trees / Vegetation

The existing on-site trees are a total of 27 trees, including 20 Douglas firs, one Crimson King maple, one Apple, one Cherry, two Lodgepole pines and two hedging cedars. All trees are in poor to moderate condition. See the tree table and comments, below.

Attachment: Attachment D: Arborist Report Oct. 10, 2018 (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69 Tims

Tree #	Type	DBH	Height	Condition	Comments	Evaluation
7764	*Thuja occ*. Spp., Hedge Cedar	25	14	poor	Significant lean to east; codominant stems at .5m; included bark noted; thin canopy on east side; poor pruning in past; in decline; see photo 8; 2 replacement trees req'd	Remove
7782	*Thuja occ*. Spp., Hedge Cedar	26	10	poor	Lean to east; codominant stems at .5m; crack at union; centre stem in severe decline; included bark noted; thin canopy on east side; poor pruning in past; in decline; see photo 8; 2 replacement trees req'd	Remove
7747	*Pseudotsuga mensiezii,* Douglas Fir	61	22	moderate	Broken branches and thin canopy; poor pruning in past; pruning wounds noted; in decline; CRZ 6m; 3 replacement trees req'd	Remove to accommodate development
7772	*Pinus contorta,* Lodgepole Pine	32	14	poor	Suppressed growth; nearly dead; see photo 1; 3 replacement trees req'd	Remove
7744	*Pseudotsuga mensiezii,* Douglas Fir	52	20	moderate	Majority of branches on NW side dead; poor pruning practice in past; moss on exposed roots; see photo 1; CRZ 6m; 3 replacement trees req'd	Remove to accommodate development
7774	*Pinus contorta,* Lodgepole Pine	40	10	n/a	Dead; incorrect pruning in past; see photo 1; 3 replacement tree s req'd	Remove
7775	*Pseudotsuga mensiezii,* Douglas Fir	76	28	moderate	Tearing on lower branches prone to decay; canopy thin (non-existent) at approx. 18m; dead and broken lower scaffold branches; CRZ 7m; 3 replacement tree s req'd	Remove to accommodate development
7779	*Pseudotsuga mensiezii,* Douglas Fir	45	24	poor	Suppressed growth (by #7775); in decline; 50% deadwood; can only be retained as a row; see photo 2; 3 replacement trees req'd	Remove
7800	*Pseudotsuga mensiezii,* Douglas Fir	41	17	moderate	Thin canopy; canopy biased to SE; sparse on NW side; healthy terminal growth; can only be retained as a row; see photo 2; 3 replacement trees req'd	Remove to accommodate development
7745	*Pseudotsuga mensiezii,* Douglas Fir	33	14	poor	Suppressed growth; codominant at 3m; only 1of 3 stems surviving; included bark; in decline; can only be retained as a row; see photo 2; 3 replacement trees req'd	Remove
7757	*Pseudotsuga mensiezii,* Douglas Fir	36	16	poor	Topped at 7m; dead; can only be retained as a row; see photo 2; 3 replacement trees req'd	Remove
7756	*Pseudotsuga mensiezii,* Douglas Fir	39	18	poor	Suppressed growth; thin canopy; sparse growth; canopy biased to north; can only be retained as a row; see photo 2; 3 replacement trees req'd	Remove
772	*Pseudotsuga mensiezii,* Douglas Fir	48	18	poor	In decline; base covered in ivy; thin and dead branches to 12m; can only be retained as a row; see photo 2; 3 replacement trees req'd	Remove

Attachment: Attachment D: Arborist Report Oct. 10, 2018 (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69 Tims

Tree #	Type	DBH	Height	Condition	Comments	Evaluation
7778	*Pseudotsuga mensiezii,* Douglas Fir	27	15	poor	Thin canopy; suppressed; bend to NW self-correcting at 2m; included bark; weak attachments; dead lower scaffold; only top appears health; can only be retained as a row; see photo 2; 2 replacement trees req'd	Remove
7762	*Pseudotsuga mensiezii,* Douglas Fir	42	18	poor	Active Ganoderma; 50% deadwood; mostly dead and broken branches; some sparse growth at top; included bark; decay at pruning wounds; part of hedge row; see photo 2; 3 replacement trees req'd	Remove
7777	*Pseudotsuga mensiezii,* Douglas Fir	40	18	poor	Suppressed growth; thin; 60% deadwood; part of hedge row; see photo 3; 3 replacement trees req'd	Remove
7763	*Pseudotsuga mensiezii,* Douglas Fir	43	18	poor	Lean to north, self-correcting at 4m; canopy biased to north; canopy thin/sparse on south side; included bark; part of hedge row; see photo 3; 3 replacement trees req'd	Remove
7769	*Prunus* spp., Fruiting Cherry	48	10	poor	Codominant stems at 6m; included bark, prone to failure; wound at base on north west side; see photo 3; 3 replacement trees req'd	Remove
7551	*Pseudotsuga mensiezii,* Douglas Fir	45	12	poor	Topped; base covered in ivy; lean to north; canopy biased to north; sparse; in decline; 3 replacement trees req'd	Remove
7799	*Malus* spp., Fruiting Apple	31	7	poor	Poor structure; not well-maintained; lean to east; included bark at codominant attachment; weak attachments; lopped branches; epicormic growth; 30% deadwood; CRZ 4m; 3 replacement trees req'd	Remove
7752	*Pseudotsuga mensiezii,* Douglas Fir	116	28	moderate	Thin canopy; in decline; lopped branches (poor pruning practice in past); 20% deadwood; soil & debris piled on south side over roots; see photo 4; CRZ 9m; 3 replacement trees req'd	Remove to accommodate proposed development
7765	*Pseudotsuga mensiezii,* Douglas Fir	69	26	moderate	Canopy biased to west; in decline; wound on SE side of trunk; seeping wound on NW side at 1.2m; broken scaffold branches; should only be retained as a row; see photo 5; CRZ 6m; 3 replacement trees req'd	Remove to accommodate underground parkade
7717	*Pseudotsuga mensiezii,* Douglas Fir	71	26	poor-moderate	Thin canopy; lean to SW, self-correcting at 5m; in decline; should only be retained as a row; see photo 5; CRZ 5m; 3 replacement trees req'd	Remove to accommodate underground parkade

Attachment: Attachment D: Arborist Report Oct. 10, 2018 (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69 Tims

Tree #	Type	DBH	Height	Condition	Comments	Evaluation
7754	*Pseudotsuga mensiezii,* Douglas Fir	59	27	poor	Topped/ broken top; sparse; no growth on north side; in decline; 20% deadwood; should only be retained as a row; see photo 5; CRZ 5m; 3 replacement trees req'd	Remove to accommodate underground parkade
7761	*Pseudotsuga mensiezii,* Douglas Fir	71	27	poor	Topped/ broken top; sparse; no growth on north side; in decline; 10% deadwood; should only be retained as a row; see photo 5; CRZ 5m; 3 replacement trees req'd	Remove to accommodate underground parkade
7760	*Pseudotsuga mensiezii,* Douglas Fir	68	28	poor	Codominant leader at top prone to failure; no growth on north side; canopy sparse, biased to west, sparse terminal growth; lean to west, self-correcting at 5m; in decline; should only be retained as a row; see photo 5; CRZ 5m; 3 replacement trees req'd	Remove to accommodate underground parkade
7753	Acer platanoides 'Crimson King', Crimson King maple	63	14	moderate	Codominant leader at 4.5m, weak attachments (3-stems); attachment on west side at base (.5m) and included bark to root crown; decay suspected; poor pruning practices in past; dead lower scaffold branches; suckering at base from previous pruning site – reverting to green species; dead fine twigs; see photo 6; CRZ 4m; 3 replacement trees req'd	Remove to accommodate development

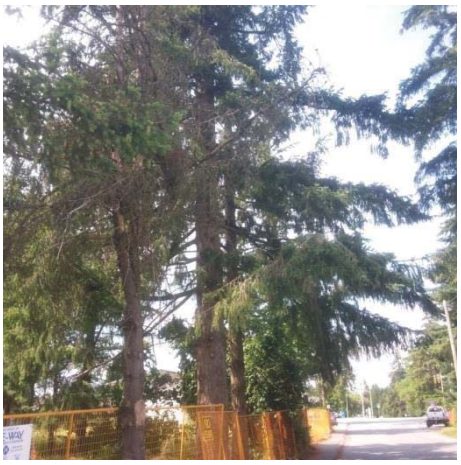


Photo 1: Tree #7747-7744

Photo 2 Douglas fir hedgerow in p-m condition

Attachment: Attachment D: Arborist Report Oct. 10, 2018 (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69 Tims

Photo 3: Douglas fir hedge row in p-m condition

Photo 4: Tree #7752 Douglas fir

Photo 5: Tree #7765-7760 hedge row

Photo 6: Tree #7753 Crimson King maple

Photo 7: Tree #7774, dead

Photo 8: Tree #7764 and 7782 in decline

Attachment: Attachment D: Arborist Report Oct. 10, 2018 (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69 Tims

3.1 Recommendation:

The mandate from the client to the Arborist was to review the existing trees on site and within 5m of the property line for their overall health and quality and to provide comments to their ongoing viability.

We note the proposed form of development includes underground parking. It is anticipated that the extensive re-grading of the property will preclude retention of any trees on site.

Two trees on site were of potential retention quality, but are too large to relocate:

- Tree #7753 (Crimson King maple) is in moderate condition. See tree table.
- Tree #7752 is a semi-mature Douglas fir, in moderate condition and structurally strong, with a 9m Critical Root Zone and Tree Protection Zone. Any changes to the hydrology or grade would significantly impact the tree.

The semi-mature Douglas Fir hedgerow is in poor to moderate condition, with suppression of branch structure in proximity to neighbouring trees and some wind throw damage visible on lateral branches from exposure to prevailing winds. Along with others, the following trees are not viable for retention: Tree #7744 is completely dead; #7747 is in decline with a thin canopy, pruning wounds and shows signs of poor pruning practices in the past; #7772 is nearly dead; #7764 and #7782 are in poor condition (severe decline), with significant lean to the east, dead wood and thin canopy growth.

We note the survey showed 4 off-site trees that appear to have been removed prior M2 arborist site visit. The development to the west of the subject site has recently completed construction, and we understand they were potentially involved in the removal of at least one shared tree (on the west property line).

Replacement tree requirements as per the City of Abbotsford Tree Protection Bylaw, 2011, are as follows:

Size of Tree to be Cut (DBH)	Number of Replacement Trees Required for Each Tree Cut
< 20 cm	0
20 – 30 cm	2
> 30 cm	3

<u>Tree Replacement Summary:</u>

Required replacement trees: 78 trees
Proposed Trees (as per landscape plans)**:** 23 trees
Deficit: 55 trees
Cash-in-lieu payment in the amount of $300 per tree will be required for any trees that cannot be accommodated on site, provided prior to DP issuance.

We recommend the client should develop the site and install suitable replacement trees on and off site as necessary or required to re-establish a reasonable level of tree cover in the area that will grow to a mature stature and not outgrow the space in which they will be planted. This approach will allow for suitable tree species to be installed in the optimal locations for the best long term solution to the specific urban forestry requirements of this site.

Attachment: Attachment D: Arborist Report Oct. 10, 2018 (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69 Tims

4.0 Limitations

We attach the following clauses to this document to ensure you are fully aware of what is technically and professionally realistic in the assessment and preservation of trees.

This Arboricultural field review report is based only on site observations on the date noted. Effort has been made to ensure that the opinions expressed are a reasonable and accurate representation of the condition of all trees reviewed. The assessment was completed based on visual review only. None of the trees were dissected, cored, probed or climbed. All trees or groups of trees have the potential to fail. No guarantees are offered or implied by M2 Landscape Architecture or their employees that the trees are safe given all conditions. Trees can be managed, but they cannot be controlled. To live, work or play near trees is to accept some degree of risk.

The assessment provided was based on preliminary information only.

The opinions expressed in this report are valid for a period of one year only. Any trees retained should be reviewed on a regular basis to ensure reasonable safety.

The information provided in this report is for the exclusive use of our client and may not be reproduced or distributed without permission of M2 Landscape Architecture.

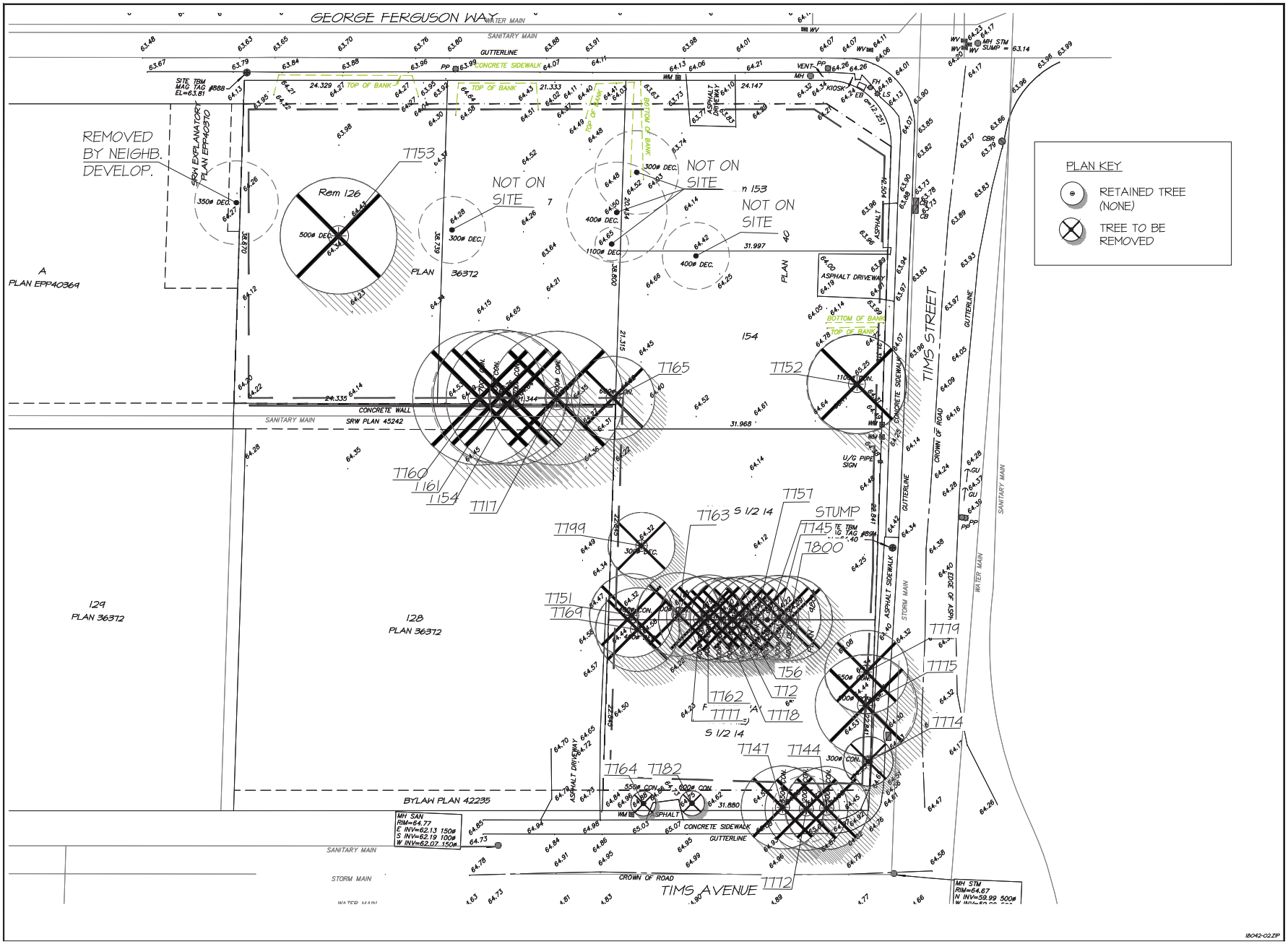
Please contact the undersigned if you have any questions or concerns regarding this matter.

Yours Truly,

Eryn Buzza
ISA Certified Arborist ON-1538A, TRAQ
M2 Landscape Architecture

For:
Meredith Mitchell
ISA Certified Arborist PN-6089A
M2 Landscape Architecture

Attachment: Attachment D: Arborist Report Oct. 10, 2018 (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69 Tims



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NO.	DATE	REVISION DESCRIPTION	DR.
2	2018.10.11	AS PER CITY COMMENTS	JK
1	2018.08.21	ISSUED ARBORIST PLAN	JK

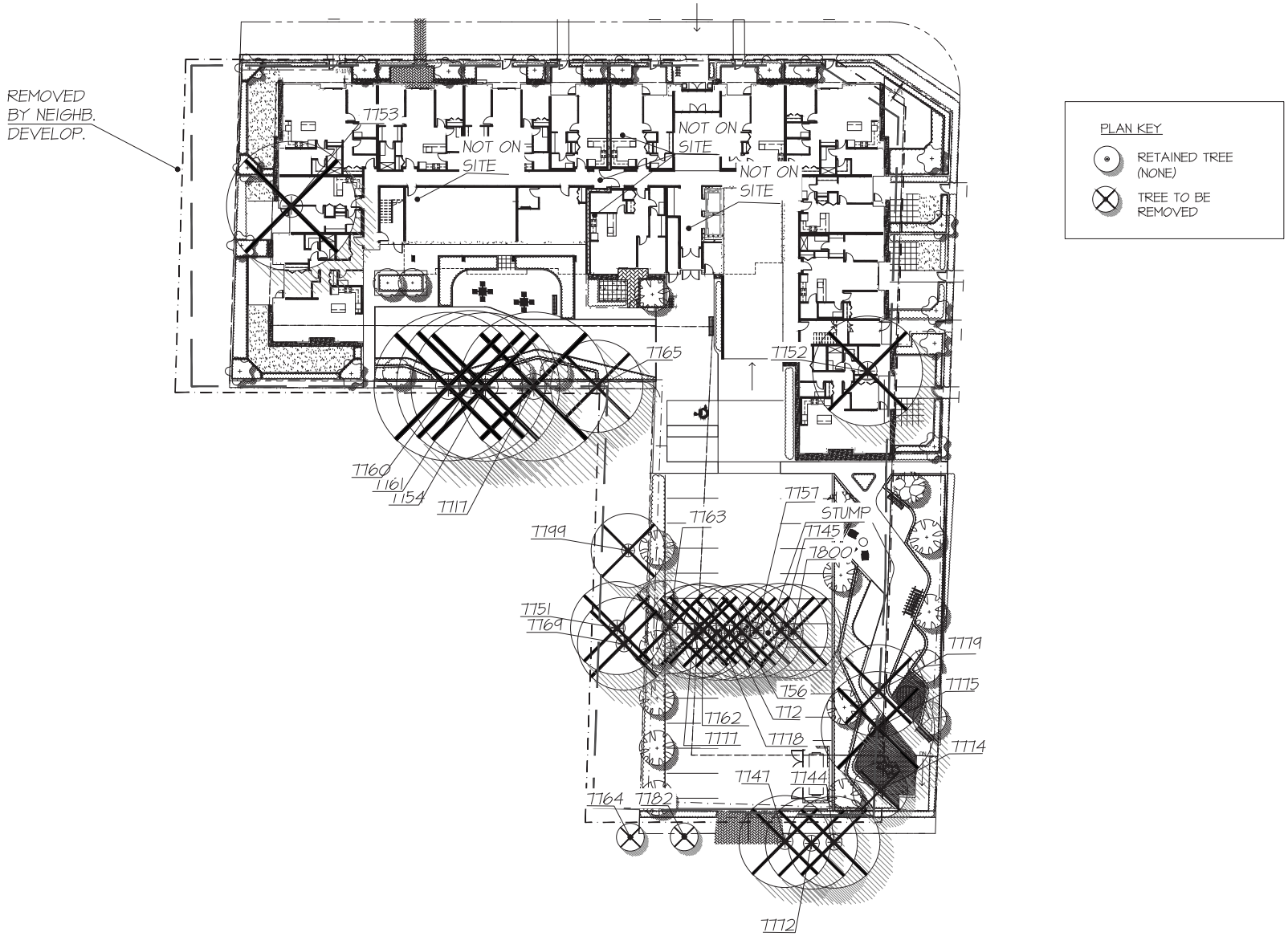
SEAL:

PROJECT:
LEXUS PROPERTIES DEVELOPMENT
GEORGE FERGUSON WAY
TIMS STREET
ABBOTSFORD, BC

DRAWING TITLE:
ARBORIST PLAN

DATE: 18.OCT.11	DRAWING NUMBER:
SCALE: 1/16"=1'-0"	A1
DRAWN: JG	
DESIGN: JG	
CHK'D: MM	
M2LA PROJECT NU	

Attachment: Attachment D: Arborist Report Oct. 10, 2018 (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69 Tims



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NO.	DATE	REVISION DESCRIPTION	DR.
2	2018.10.11	AS PER CITY COMMENTS	JS
1	2018.08.17	ISSUED ARBORIST PLAN	JS

SEAL:

PROJECT:
LEXUS PROPERTIES DEVELOPMENT
GEORGE FERGUSON WAY, TIMS STREET
ABBOTSFORD, BC

DRAWING TITLE: **TREE MANAGEMENT PLAN**

DATE:	18.OCT.11
SCALE:	1/16"=1'-0"
DRAWN:	JS
DESIGN:	JS
CHK'D:	MM
M2LA PROJECT NUMBER:	

DRAWING NUMBER: A2 OF 2

Attachment: Attachment D: Arborist Report Oct. 10, 2018 (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69 Tims

ABBOTSFORD DEVELOPMENT ENGINEERING DIVISION

REZONING WORKS AND SERVICES REQUIREMENTS

File No:	PRJ18-122
Planner:	Christine Batchelar, Planner
Prepared By:	Kelsey Baldwin, Development Technologist I
Approved By:	19/04/08 Sarb Toor, Manager, Development Engineering
REVISED Date:	April 4, 2019
Applicant:	John Jurinak, Lexus Properties
Development Property:	32154 George Ferguson Way, Lot 126, Sec 20, Twp 16, NWP36372 32162 George Ferguson Way, Lot 127, Sec 20, Twp 16, NWP36372 32182 George Ferguson Way, Lot 153, Sec 20, Twp 16, NWP40078 2879 Tims Street, Lot 154, Sec 20, Twp 16, NWP40078 2869 Tims Street, Lot 14, Sec 20, Twp 16, NWP09804 32181 Tims Ave, Lot 14, Sec 20, Twp 16, NWP09804

The Local Government Act authorizes local governments to require development to meet current works and services standards as set out in the City's Development Bylaw and Policies.

This report includes the Works & Services **Requirements** to meet the applicable bylaws and policies and **Future Considerations** that may apply to the next phase of development.

Please have your consulting engineer email kbaldwin@abbotsford.ca in regard to this report and any other servicing matters relating to this application.

Attachment: Attachment E: Works & Services Report (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69 Tims St

REQUIREMENTS

Highways – Dedications and Rights-of-Ways

The OCP designates George Ferguson Way as an "Urban Arterial" road which is required to be a minimum 27 m wide highway right-of-way.

On George Ferguson Way a dedication of 3.5 m is required along the full frontage of the Lands from the west property line to the east property line, to achieve the future "Urban Arterial with Left Turn Lane" road standard.

At the west end of the proposed development site, along George Ferguson Way, provide a 1.65 m wide by 10 m long SROW behind the future property line for a bus shelter site. The ultimate location of the bus shelter site is to be approved by Engineering.

The OCP designates Tims Street as an "Urban Local" road which is required to be a minimum 20 m wide highway right-of-way.

No road dedication is required on Tims Street along the full frontage of the Lands from the north property line to the south property line.

The OCP designates Tims Avenue as an "Urban Local" road which is required to be a minimum 20 m wide highway right-of-way.

On Tims Avenue provide sufficient dedication to align with 32161 Tims Avenue.

Provide a standard 5.0m x 5.0m chamfer corner truncation at the George Ferguson Way/Tims Street intersection and a standard 3.0m x 3.0m chamfer corner truncation at the Tims Street/Tims Avenue intersection.

Urban Roadways – Construction

On George Ferguson Way, along the full frontage of the Lands from the west property line to the east property line, construct half of an "Urban Arterial with Left Turn Lane" standard road with Urban Highway design features as per Standard Drawing ES-R-7, including;

- barrier curb and gutter on the south side;
- 9.3 m wide asphalt roadway;
- 1.5 m sidewalk on the south side;
- Curb & gutter, sidewalk, boulevard and pavement tapers at the west end to meet existing;
- ornamental street lighting;
- Traffic signage;
- Traffic lane markings;
- soil(s) to support street trees;
- boulevard improvements on the south side; and
- associated drainage works.

Attachment: Attachment E: Works & Services Report (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69 Tims St

On George Ferguson Way, along the full frontage of the Lands from the west property line to the east property line provide a cash-in-lieu payment for half of a 4.0 m wide concrete median complete with standard barrier curb and gutter.

On Tims Street, along the full frontage of the Lands from the north property line to the south property line, provide a cash in lieu payment for half of a "Multi-Family Local" standard road with Urban Highway design features as per Standard Drawing ES-R-7, including;

- barrier curb and gutter on the west side;
- 4.7 m wide asphalt roadway;
- 1.5 m sidewalk on the west side;
- ornamental street lighting;
- Traffic signage;
- Traffic lane markings;
- soil(s) to support street trees;
- boulevard improvements on the west side; and
- associated drainage works.

On Tims Avenue, along the full frontage of the Lands from the east property line to the west property line, construct half of a "Multi-Family Local" standard road with Urban Highway design features as per Standard Drawing ES-R-7, including;

- barrier curb and gutter on the north side;
- 4.7 m wide asphalt roadway;
- 1.5 m sidewalk on the north side;
- ornamental street lighting;
- Traffic signage;
- Traffic lane markings;
- soil(s) to support street trees;
- boulevard improvements on the west side; and
- associated drainage works.

A geotechnical report shall be submitted with any roadway design, confirming the structural adequacy of any existing roadway and/or new roadway being constructed by the Developer.

Transportation

Within the newly dedicated SROW for a bus stop, construct an urban transit stop as per the City of Abbotsford's standard drawing CS-R-17.

The Developer shall provide a Community Benefit Contribution of $400 per unit for future transit and cycling network improvements in the general area.

Provide a cash in lieu contribution toward a fully signalized intersection at George Ferguson Way and Tims Street. The Developer shall contribute 25% of the overall cost of the upgrade in the amount of $47,500.

Attachment: Attachment E: Works & Services Report (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69 Tims St

Drainage Collection and Disposal

Provide a storm water management plan showing how onsite drainage will be accommodated offsite. All offsite storm water works and services including new installations and upgrades to existing offsite systems required by the storm water management plan shall be designed and constructed in accordance with said storm water management plan.

Prior to any further development on the Lands, provide an updated storm water management plan showing how drainage on the Lands will be accommodated including detention. All storm water works and services including new installations and upgrades to existing offsite systems required by the updated storm water management plan shall be designed and constructed in accordance with said updated storm water management plan.

Sewage Collection and Disposal

This development shall connect to the 200 mm diameter sanitary sewer main on Tims Street.

Water Distribution Domestic and Fire Fighting

There is no City water supply to the Lands. The water supply to the Lands is provided by Clearbrook Water District (CWD). A computer modelling analysis of the CWD system to determine and validate the available domestic and fire flows to this development site is required. A copy of this report must be submitted for review to both the Engineering and Fire Department. The computer modeling analysis report must be sealed by a registered professional engineer experienced in water distribution analysis.

Power/Telecommunications

Service Connection:
Provide underground power and telecommunications services from the distribution system to the property line.

Distribution System:
Pay the Streetscape Contribution Levy, as per the City of Abbotsford Development Bylaw 2011, Bylaw No. 2070-2011 Schedule "D".

Relocation of telecommunications poles and lines due to road improvements is required to be converted to underground.

Attachment: Attachment E: Works & Services Report (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69 Tims St

Erosion and Sediment Control
All works shall be performed in substantial conformance with the City's Development By-law, the Provincial 'Land Development Guidelines' and the City's Erosion and Sediment Control Bylaw, in the control and prevention of erosion and sediment during all phases of construction. No release of silt, sediment laden waters or deleterious substances is permitted into any existing City storm or drainage system during any phase of development of the Lands.

The ESC Plan requires 4 drawings, each indicating the ESC methods for that stage of construction;

- site preparation
- site servicing
- building construction
- warranty period

Access
Prior to fourth reading, an access management plan to the satisfaction of the General Manager, Engineering providing a detailed review of the access location and turning movements and confirming that it meets or exceeds the minimum TAC design and safety requirements for existing and future traffic volumes.

No direct access onto George Ferguson Way will be permitted.

Access on to Tims Avenue can be supported by Transportation if the Developer can locate the access as far west as possible.

Increase the width of the access onto Tims Avenue to 7.5 m plus the standard driveway flaring to provide sufficient width for concurrent turning movements.

Rezoning Development Agreement Preparation Fee
Pay $500 Development Agreement preparation fee.

Works & Services Security & Warranty Deposit
Provide as Security Deposit, the estimated construction cost plus 10% for engineering (min $25,000) and 5% for as-constructed drawings (minimum $15,000) in cash or letter of credit.

Administration & Inspection Fee
Pay 5% of the first $300,000 + 3% of the remainder of the estimated construction cost for administration and inspections.

City Services Fees
Tie-in inspection fee ($50 per inspection) for water, sanitary, and storm sewer services.

Water meters supplied, delivered, and installed by the City's Water Operations Department (per Fees and Charges Bylaw, 2006, Amendment Bylaw No. 32)

Regular Service Meter:

- Up to and including 18mm (3/4") meter	*$470.00*
- 25 mm (1") meter	*$635.00*

Attachment: Attachment E: Works & Services Report (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69 Tims St

Water and sewer main connections and wet taps are supervised and/or performed by City crews at the developer's expense and payable upon invoice.

Street and traffic signs are supplied and installed by the City at the developer's expense and payable upon invoice.

Pay to energize street lights at $50 per street light.

Development Cost Charges
Development Cost Charges (DCCs) shall be paid in accordance with the DCC Bylaws applicable at time of Building Permit.

FUTURE CONSIDERATIONS AT TIME OF BUILDING PERMIT

Upon further development an additional works and services review will apply related to that application. Listed below are some items to consider.

Bylaws

- the applicant is to be familiar with the Development Bylaw to ensure an understanding of possible future Works and services that may impact the development

Stormwater Management

- detention and infiltration will be required. Ensure that adequate room and proper placement has been reviewed.

Traffic Management

- the increase in vehicle traffic will be reviewed for its impact on the access and nearest intersections. Access may be restricted.
- road dedications, statutory rights-of-way and easements to accommodate the works and lot grading may require adjustments to the placement or size of the building.

Service Connections

- water, sanitary and storm connections may have specific tie in locations. Review and confirm locations prior to design.
- calculations related to the required domestic and fire water demand will be reviewed. There may be a service, meter or flow restrictions.
- Fire Department review may result in geometric changes to onsite roadways, additional fire hydrants, emergency access and building placement.
- Provide underground power and telecommunications services from the distribution system to the proposed building(s).

Lot Grading

- A Lot Grading Plan is required. Final lot grading shall conform to City's Lot Grading Policy and Guidelines. Any retaining walls that the Developer or Consulting Engineer consider are necessary to effectively grade the Lands to prevent negative impacts on finished neighbouring Lands, either existing or proposed, shall be constructed by the Developer. The standard "Lot Grading Covenant shall be registered against title to all proposed lots.

Attachment: Attachment E: Works & Services Report (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69 Tims St

- Lot grading shall also provide for the collection of surface runoff and other drainage that will discharge to the City Drainage system. Lot grading may be designed to allow for surface sheet flows or collected in swales and directed to lawn basins as necessary to the satisfaction of the General Manager, Engineering. Any collection of surface flows to a concentrated point discharge location shall include provision for easements or rights-of-way across impacted Lands as necessary. All lot grading shall be designed to take care of surface flows emanating from onsite grading.

Building Permit Submissions

- In order to avoid delays in receipt of building permits, the builder shall be responsible for ensuring that building permit applications on the Lands conform to the intent of the accepted Lot Grading plan(s) prior to submission to the City.
- The developer or his designate shall review and approve building permit applications prior to submission to the City. When submitted, the building permit plans shall provide lot grading information that shall, at time of final inspection for building occupancy or approval, comply with the accepted lot grading plan or the intent of the lot grading design accepted by the General Manager, Engineering prior to construction.

Attachment: Attachment E: Works & Services Report (PDS 041-2019 : RZ and DP with V applications for 32154/62/82 GFW and2879/69 Tims St

ABBOTSFORD

COUNCIL REPORT

Executive Committee

Report No. PDS 045-2019

Date: April 25, 2019
File No: 3100-05 PRJ18-145

To: Mayor and Council
From: Sarah Yusuf, Planner
Subject: Development Permit with Variances application for the property located at 3182 Gladwin Road (and a portion of 3172 Gladwin Road, for the Streamside Protection Bylaw variance only), for a 73 unit apartment development (Owners: Horn Park Place Developments Ltd.; Director: B. Jury and Strata Plan LMS 1495)

RECOMMENDATION

1. THAT Development Permit with Variances No. 2178 proceed for public comment at an upcoming Council Hearing;

2. THAT, prior to issuance of Development Permit with Variances No. 2178, the following conditions be satisfied:

   a) providing $268,342.25 landscaping security, in accordance with the Development Application Procedures Bylaw, 2016;
   b) providing a $2,500 landscaping inspection fee, in accordance with the Development Application and Service Fee Bylaw, 2010;
   c) providing a $85,156 security for habitat enhancement, maintenance, and monitoring, and installation of a permanent fence along the future north property line, in accordance with the Development Application Procedures Bylaw, 2016;
   d) providing a $14,599.20 security for site clearing, grading, and erosion and sediment control in accordance with the Development Application Procedures Bylaw, 2016;
   e) providing a payment of a $4,987.76 environmental inspection fee, in accordance with the Development Application and Service Fee Bylaw, 2010;
   f) providing a $15,000 cash-in-lieu towards purchase of easement machine;
   g) providing a $2,000 cash-in-lieu towards a future median on Gladwin Road;
   h) providing a $13,648.80 cash-in-lieu for wetland planting;
   i) registering a Section 219 Geotechnical Covenant to ensure that buildings are sited and constructed in accordance with the geotechnical report;
   j) registering a Section 219 Covenant to require pairs of tandem parking spaces to be assigned to one residential unit;
   k) registering a Section 219 Covenant for spatial separation along the north side of future north property line;
   l) registering a Section 219 Covenant for private garbage and recycling collection;
   m) registering an easement agreement with 3172 Gladwin Road to secure parking stalls #17 and #18, and garbage enclosure offsite;

n) discharging sanitary statutory right-of-way (Plan L27265) from title of subject property;
o) discharging detention tank statutory right-of-way (Plan L24538) and registering an amended statutory right-of-way plan for the existing detention tank;
p) registering a statutory right-of-way over the proposed gravel path for the purpose of access and maintenance of the existing sanitary line at the northeast corner of the property;
q) registering all necessary easements for access to the site and parking areas;
r) registering all necessary servicing easements and statutory right-of-ways for onsite servicing;
s) making all necessary final revisions to the Environmental Assessment Report;
t) the owners providing written acknowledgment of the terms and conditions of the permit in accordance with the Development Application Procedures Bylaw, 2016; and
u) submitting three full sets of signed and sealed development permit plans and reports along with digital unsecured copies; and

3. THAT the Mayor and Corporate Officer be authorized to execute all documents relating to this matter.

DREPORT CONCURRENCE	
General Manager The General Manager concurs with the recommendation of this report.	**City Manager** The City Manager concurs with the recommendation of this report.

PURPOSE

To issue a Multifamily Residential Form and Character, Natural Environment, and Steep Slope Development Permit with Variances that, if approved, will allow for the construction of a five (5) storey, 73-unit apartment building. Variances to the Zoning Bylaw and to the Streamside Protection Bylaw have been requested. Further, amendments have been requested to legal documents registered on title of the property. The applicant is also proposing to voluntarily transfer the Streamside Protection and Enhancement Area contained within the subject property to the City for long term environmental stewardship.

SUMMARY OF THE ISSUE

The applicant is requesting the issuance of a Multifamily Residential Form and Character, Natural Environment, and Steep Slope Development Permit with Variances that, if approved, will facilitate the construction of a five (5) storey, 73-unit apartment building with one level of partially underground parkade (see Attachment A and Figures 0-29).

The following variances to the Abbotsford Zoning Bylaw have been requested:

- to reduce the minimum setback from interior lot lines from 6.0m to approximately 3.5m from the west property line and to approximately 1.5m from the south property line, for storeys 1-4;

- to reduce the minimum setback from interior lot lines from 10.0m to approximately 3.5m from the west property line, to approximately 5.0m from the south property line, and to 8.1m from the east property line for the building face on 5th storey;
- to increase the permitted balcony projection into the required minimum setback areas from 0.6m to approximately 2.2m for the south property line for storeys 1-5, and from 1.2m to 1.7m for the east property line for the stair along the east side of the proposed building;
- to increase the permitted balcony projection into the required minimum setback areas from 1.2m to approximately 2.1m for the east property line for 5th storey;
- to reduce the minimum drive aisle width for all surface and underground parking areas from 7.5m to 6.5m; and
- to permit 11 pairs of tandem parking spaces in the underground parkade;

A variance to the Streamside Protection Bylaw (SPB) includes a 2,954 m^2 encroachment into the 30m Streamside Protection and Enhancement Areas (SPEAs) of Horn Creek and an unnamed tributary to Horn Creek (see Figure 10).

In conjunction with the permit application, the applicant further requests the discharge of a sanitary right-of-way (Plan L27265) from the title of the subject property, which is a statutory right-of-way registered for access and maintenance of sanitary line along the east property line that is no longer required for the original intent. Further, the applicant proposes to amend the legal plan of the right-of-way over the existing private detention tank along the west property line (Figure 8).

Staff recommend support for the proposed Development Permit with Variances, and legal document discharge and amendments.

BACKGROUND

Applicant:	Horn Park Place Developments Ltd. (Contact: B. Jury)
Owner:	3182 Gladwin Road: Horn Park Place Developments Ltd. Inc No. BC1125030 3172 Gladwin Road: Strata Plan LMS 1495 (Contact: M. Friesen)
Legal Description:	3182 Gladwin Road: Lot 1 Section 21 Township 16 NWD Plan EPP72237 3172 Gladwin Road: Section 21 Township 16 Plan NWD, Plan LMS01495
OCP Designation:	Urban 1 – Midrise
Zoning:	3182 Gladwin Road: Low Rise Apartment Zone (RML) 3172 Gladwin Road: Midrise Apartment Zone (RMM)
Site Area:	3182 Gladwin Road: 1.2 ha (3 acres) 3172 Gladwin Road: 1.6 ha (4 acres)
Description:	The subject property is located west of Horn Creek on the south side of Maclure Road and east of Gladwin Road. The land is forested and contains several mature trees as well as a watercourse.

Surrounding Uses:
- N: Low density townhouses (zoned RM16) and Maclure Road beyond;
- S: Multifamily apartments (zoned RML);
- E: Horn Creek, parkland (zoned P2) and medium density apartments zoned RM45) beyond; and
- W: Multifamily (existing and under construction) apartments (zoned RML) and Gladwin Road beyond.

DISCUSSION

Context

1. The subject property is accessed off of Gladwin Road via easements through the Regency Park Complex and located immediately east of Regency Park Towers and another low-rise apartment site, west of Horn Creek Park. The subject property is the last remaining undeveloped multifamily site within the general proximity. Further south of the site is the Central Park Village development and neighbourhood centre. While the two sites are not connected by road ways, the Horn Creek Park trail system connects these multifamily communities (refer to City Context Plan and Figure 2). In addition to the park, the area is serviced by numerous institutional uses and Exhibition Park is located approximately 600 m to the west of the lands.

Official Community Plan (OCP)

2. The Official Community Plan (OCP) designates the site Urban-1 Midrise (see Figure 3). This land use designation is intended to enable multifamily housing to strengthen and support the Mixed Use Centres, and transit corridors in low and mid-rise buildings. This land use designation allows for multi-storey buildings including low and mid rises. Heights are initially limited to 6 storeys (taller and varied building heights and ground floor commercial, may be possible through a neighbourhood plan). Permitted densities range from a minimum of 1.0 Floor Space Ratio (FSR) to a maximum of 2.0 FSR and 2.5 FSR on existing or consolidated properties that are 2,500m^2 or less. The proposed development provides an ultimate FSR of 1.52, which is consistent with the land use designation.

3. The proposed development is in keeping with the broad objectives of the Urban Structure of the OCP by focusing 75% of the new residential growth within existing residential neighbourhoods. It also aligns with the broader OCP Policy which promotes residential intensification around neighbourhood centres, connecting neighbourhoods, neighbourhood commercial, park amenities and trails; and management of parks in an environmentally sensitive manner.

Affordable Housing Strategy

4. The Affordable Housing Strategy, (endorsed by Council November 7, 2011) similar to the OCP objectives and policies, improves people's ability to afford housing and encourages the development of complete, connected and livable neighbourhoods with diverse housing types (Objective 4). The proposed development is consistent with the policies that support affordable housing development close to transit, jobs and services and the creation of a variety of housing types to suit different needs related to household type, tenure and income.

Zoning

5. The subject property is currently zoned Low Rise Apartment Zone (RML), which is intended to accommodate low-rise developments up to six (6) storeys in height, including residential buildings at a maximum lot coverage of 40% and a maximum density of 1.4 FSR (Figure 4). Further, the RML zone has a minimum setback requirement of 6 metres for the principal building from an interior lot line for storeys 1-4 and 10 metres for storeys above floor four. Staff note that, typically, new apartment developments elsewhere in the city are utilizing the RMM zone, which fully aligns with the OCP and land use designation with a 6.0m setback for all storeys.

6. The development has a proposed height of five (5) storeys at an initial density of 0.84 FSR and 29.83% lot coverage. The proposed use, building height and density conform to the existing RML Zone; however several variances to the Abbotsford Zoning Bylaw and Streamside Protection Bylaw are proposed as described in detail in further sections.

Access and Parking

7. Under the Zoning Bylaw, parking must be provided at 1 parking space for studio units and 1.5 parking spaces for all other units with an additional 0.2 spaces required per unit for visitors. With 73 units proposed, the proposed development must provide a total of 124 parking spaces, of which 109 must be provided for the residents and 15 must be provided for visitors. The applicant is proposing to provide a total of 124 parking spaces. 106 of the parking spaces for the residents will be located within the parkade where the remaining 3 spaces for residents and 15 visitor parking spaces will be provided on the surface (Figures 11 and 12). The applicant has indicated they will provide two electric charging stations for the proposed development as well as for the adjacent stratas.

   Two of the proposed surface parking spaces are located along the southwest corner of the property and are partly within the neighbouring property. Staff recommend that an easement agreement be required to be registered over the neighbouring property to secure parking stalls 17 and 18 (Figure 12). The applicant has indicated that the adjacent land owner has already provided agreement to permit this. Staff recommend that the City be a party to this agreement.

8. The subject property is a panhandle lot accessed off of Gladwin Road through Regency Park Towers and the adjacent low-rise apartment site. The proposed building will be accessed using the existing driveway constructed in conjunction with the development of Regency Park Towers and other apartments, which does not exactly fall within the boundaries of the panhandle portion of the subject property. Therefore, staff recommend that the applicant be required to register an easement agreement to secure access to the subject site and to the proposed underground parkade over the existing driveway. The applicant has indicated that the adjacent stratas have already provided agreement to permit this. Staff recommend that the City be a party to this agreement.

Density

9. The density of the proposed development is 0.84 based on total site area, which is consistent with the RML Zone. The applicant is proposing to voluntarily transfer the Streamside Protection and Enhancement Area (SPEA) contained on the northern portion

of the subject parcel to the City upon completion of the 3-year environmental restoration and monitoring period (see Figure 7). Once this portion of the subject property has been transferred to the City, the density for the remaining parcel will be 1.52 FSR. The resulting FSR will not be consistent with the RML Zone, however will be consistent with the density provisions of the Urban 1- Midrise designation within the OCP; therefore, staff have no concerns with the resulting FSR.

Existing Legal Documents Modifications

10. The applicant proposes to discharge a statutory right-of-way registered against the title of the subject property, for the purpose of access and maintenance of sanitary line along the east property line (Plan L27265) (Figure 8). The proposed discharge of right-of-way has been reviewed by Engineering and staff worked with the applicant to secure an alternative access over the proposed gravel path north of the proposed building for the purpose of accessing the sanitary manhole on the northeast corner of the subject property within Horn Creek Park (Figure 7). Further, the applicant has agreed to provide a $15,000 cash-in-lieu contribution towards the purchase of an easement machine, which will be used by the City, to access hard-to-reach manholes throughout the city.

11. The proposed underground parkade encroaches into a right-of-way registered against the title of the property for the purpose of access and maintenance of an existing private detention tank along the east property line, which was built in conjunction with the development of the adjacent apartment buildings (Figure 8). Staff have no concerns with the proposed encroachment into the detention tank right-of-way as it is private infrastructure, and according to the applicant, both parties have agreed to the revisions. The applicant will be required to register a new right-of-way to reflect the changes.

Steep Slopes Development Permit (SSDP)

12. As per the OCP, the subject site is located within the Steep Slope Development Permit (SSDP) area (see Figure 6). The Steep Slope Development Permit area guidelines are intended to allow land to be used for its intended purpose, while also protecting residents and property from the potential risk of natural hazards. In some cases, development on or near steep slopes is unavoidable and requires measures during site and building design, construction, and long term maintenance to minimize the associated risks.

13. In conjunction within this development proposal, the applicant has provided a Geotechnical Report and a Technical Memo, prepared by WSP, dated February 8, 2019 (see Attachment B); which confirms that the land may be used safely for the use intended. The Geotechnical Report also provided the recommendations for the siting, construction and development of the proposed building. As such, staff recommend registration of a Section 219 covenant to ensure that all buildings or structures are constructed in accordance with the geotechnical report.

Horn Creek Slope Failure

14. In Fall 2018, Horn Creek Sediment Trap was full and subsequent investigations found that significant erosion was occurring upstream at the location above the pedestrian bridge. Based on information available to date, it was speculated that wood debris / log jam caused the creek to be pushed up against the western bank. At higher flows, the

creek started to erode the bank, and eventually undermine the toe of the slope causing the bank to slide down into the creek and be washed downstream.

A portion of slope failed adjacent to the park trail, bringing the eroded face of the slope (scarp edge) into the existing trail by roughly 0.5 metres (1.6 feet). Parks then closed the trail and re-directed trail users around the closure. The applicant granted a temporary trail easement, through the subject property at no cost to the City until the trail maintenance is completed (see Attachment C).

15. The City engaged the services of a geotechnical engineering consultant and an environmental consultant. Recommendations were incorporated into a Water Sustainability Act (WSA) application for emergency instream work. A contractor was retained to complete immediate repairs to stop the creek from continuing to erode the toe of the bank. This phase of the work was complete in early March 2019.

16. Engineering and Parks have developed a bank slope remediation concept plan that will retain the trail and remaining trees, especially the western red cedars. Detailed design is underway by a geotechnical consultant for submission as part of the WSA change approval required for the non-emergency portion of the work. Work will include re-shaping the slopes in southern areas to be stable and will require the top-of-bank be moved back. In the northern area, shot rock will be used to backfill to provide a stable slope and allow for retention of the trail and several critical root zones at the top of the bank. The City is working with the Province to obtain the WSA approvals in a timely manner. The City is targeting the remediation work to be undertaken in the next instream work window of August-September 2019; however, the ultimate timing is subject to when the approvals are granted by the Province.

17. The geotechnical assessment indicated that Horn Creek has generally medium risk erosion sites, with some high risk sites. Moving forward, preliminary recommendations in the draft Integrated Stormwater Management Plan (ISMP) include:

    - Explore candidate sites for communal ponds that may arrest erosion in Horn Creek;
    - Adopt the Stormwater Source Control Bylaw City-wide (this is being reviewed as part of the Development Bylaw Update);
    - Further develop a mitigation strategy for high risk erosion sites in ravines; and
    - Conduct annual observation and evaluation of ravines for geotechnical stability.

18. Based on the bank stabilization work Engineering and Parks are conducting, staff anticipate the work underway will address the recent slope failure. Staff have no concern that the proposed multifamily development would contribute to further slope failure provided that the recommendations within the geotechnical assessment are followed.

Natural Environment Development Permit (NEDP)

19. The subject property is located within a Natural Environment Development Permit (NEDP) area, and as such, is subject to the issuance of a NEDP (see Figure 5). The objectives of the NEDP are to allow land to be used for its intended purposes, while also protecting, enhancing and/or restoring the City's natural environmental areas; prevent the introduction and spread of invasive species and protect water quality and quantity. The NEDP also notes that new development should use the mitigation hierarchy to

protect and improve the integrity, ecological health and biodiversity of Abbotsford's natural features and ecosystems.

In conjunction with the proposed development, the applicant has submitted an Environmental Assessment Application, dated April 17, 2019 (see Attachment D), which has been reviewed by the City's Environmental Coordinator. Staff recommend that the report be revised as follows prior to issuance of the permit:

- Revisions to the text and figures in order to align the variance request with the request included in this Council report;
- revisions to the cross-sections to show the area where and what depths the soil will be deposited within the existing city park land, and
- revisions to the cross sections to show a comparison between existing and final grades.

Staff note that the requested revisions will not impact the proposed variance to the SPB as outlined in this Council report.

20. The Environmental Assessment was conducted per the City of Abbotsford's Streamside Protection Bylaw (SPB). The report also includes a Riparian Areas Regulation (RAR) Detailed Assessment Report to evaluate watercourses at the subject property in regards to the RAR Assessment Methods. The Environmental Assessment report identifies three watercourses: Watercourse 1 (Horn Creek), UT1 and UT2. The applicant is proposing variances to the Streamside Protection Bylaw, for Horn Creek and UT1 (see Figure 10). The following table summarizes the classification of the watercourses, the required setback from top of bank under the SPB, as well as the required setback from high water mark under the RAR.

Watercourse	Classification	SPB Width	RAR Width
Horn Creek	permanent fish bearing	30 m	23.7 m
UT1	permanent, non-fish bearing	30 m	10 m
UT2	non-permanent, non-fish bearing	15 m	10 m

21. The Environmental Assessment Application included an assessment of wildlife habitat, including species at risk utilizing the subject property and the adjacent properties. The report concluded that through the protection of the mature riparian forest within the SPEA and through the implementation of mitigation measures outlined in the report, it is anticipated that the majority of wildlife and wildlife habitat features will be protected from potential adverse effects due to the development.

Proposed Variances to the Streamside Protection Bylaw

22. The proposed development will create a permanent impact to the Streamside Protection and Enhancement Area (SPEA) largely within the development site (3182 Gladwin Road) and partly within the adjacent apartment site (3172 Gladwin Road); as such the applicant is requesting a variance to the Streamside Protection Bylaw (SPB).

23. The Environment Assessment report (Attachment D) notes that, based on the nature of proposed development, wholly avoiding encroachment of the SPB SPEA was not considered feasible. However, the proposed development was located within the subject

property and configured such that there would be the lowest extent of encroachment into the SPEA. As encroachment into the SPEA was not avoided, mitigation measures and compensation measures were applied.

24. In order to comply with NEDP policy NE3 (where loss of habitat is unavoidable, replace the value of lost habitat at a ratio of 2:1), the applicant proposes to undertake 4,832 m^2 of restoration within the SPEA of UT1 in order to offset the permanent loss of 2,954 m^2 of SPEA. Further, the applicant will add 549 m^2 of compensation within UT1 in the form of wetland plantings. Given that the applicant still does not achieve the 2:1 ratio specified in NEDP policy NE3, the applicant is proposing to voluntarily dedicate the SPEA to the City. This portion of the SPEA is contiguous to Horn Creek Park and will form a natural addition to the habitat contained within the park.

    The following table summarizes the proposed area of temporary and permanent encroachment into the SPEA and the associated area of compensation.

Permanent Impacts to the SPEA	-2,954 m^2 (9,587 ft^2)
Area within the SPEA to be enhanced and/or restored	+4,832 m^2 (15,853 ft^2)
Wetland Plantings within UT1	+549 m^2 (1,801 ft^2)
Ratio of Enhancement/ Restoration to Encroachment	1.82 : 1

25. The development will also result in 847m^2 of temporary impacts to the SPEA resulting from building construction and re-grading of the adjacent Horn Creek Park. Of this 847m^2, 163m^2 is associated with building construction along the northern parkade wall, and 684m^2 is associated with re-grading an existing soil berm located along the eastern property boundary. This re-grading will create a more consistent slope and help to reduce the amount of parkade wall visible from the trail located parallel to the proposed building. This area will be restored with native plantings after development.

26. None of the permanent and temporary impacts result in impacts to mature conifer trees; rather, the proposed variance area contains only young forest and the only trees proposed for removal are cottonwoods with a DBH of 20-30cm. There is one mature Western Red Cedar with a 105cm DBH located on the property, which the developer is retaining and has undertaken significant effort to ensure it is protected.

Habitat Mitigation and Compensation

27. A variance to the Streamside Protection Bylaw is typically accompanied by a habitat mitigation and compensation plan to offset the impacts resulting from the development, as well as an associated maintenance and monitoring program to ensure the restoration works are successful.

28. The City's current Streamside Protection Bylaw (SPB) does not currently contain language regarding specific compensation ratios. However, the guidelines contained within the City's OCP NEDP indicate where loss of riparian habitat is unavoidable the value of lost habitat should be replaced at a ratio of 2:1.

29. The proposed compensation plan includes the removal of invasive plants (e.g. Blackberry and Lamium), installation of native riparian and wetland plantings, and installation of additional habitat features for habitat complexing. The compensation planting plan achieves a ratio of 1.82:1 compensation to encroachment based on areal

extent. Given the applicant has indicated that they will also voluntarily transfer the SPEA to the City, staff are supportive of the proposed 1.82:1 compensation ratio and feel that the intent of the NEDP policy is being achieved.

30. As private developers are not authorized to conduct instream wetland planting under a WSA notification (rather they require a Change Approval, which is a much longer provincial approval process), staff recommend the City conduct this wetland planting once the SPEA has been transferred to the City's ownership. Staff also recommend the developer provide cash-in-lieu for conducting wetland planting works within UT1 as a condition of the issuance of the Development Permit with Variance.

31. The new building is proposed to be located a minimum of 3m from the proposed boundary of the SPEA. The Environmental Assessment report provides support that this buffer will ensure there is adequate space for tree retention/establishment within the SPEA, landscaping around the building, access for building maintenance, etc. The proposed SPEA boundary will be fenced with a 1.8m tall permanent fence upon the completion of the building construction.

32. The applicant has submitted a Construction Environmental Management Plan (CEMP), dated April 9, 2019, as part of the Environmental Assessment, which includes written procedures and specifications that advise the developer and contractors on how to proceed in compliance with relevant streamside and wildlife legislation, guidelines, Best Management Practices, etc. (Attachment E). The City's Environmental Coordinator has reviewed the CEMP and has no concerns.

33. The applicant proposes to complete environmental works including enhancement and restoration works during the course of building construction. Once the restoration works are complete, the applicant proposes to undertake 3 (three) years of monitoring and maintenance to ensure the success of the planting. Staff recommend support for this proposed monitoring and maintenance program.

34. Staff further recommend that the SPEA area be transferred to the City as a condition of issuance of the Development Permit with Variances. Once transferred, the new SPEA area will be zoned to P2 as a City initiative to rezone that portion of land from its existing RML zone to P2 zone. This will allow for long term preservation and stewardship of the land by the City and to increase the natural corridor around the Horn Creek Park system.

35. The environmental consultant has provided a cost estimate for the proposed compensation works, which include the enhancement work of removal of invasive plant species, native riparian plantings, habitat complexing and wetland planting, installation of protective fencing, installation of plants, follow up arborist report, invasive plant removal and vegetation and monitoring and maintenance for 3 (three) years. In accordance with the Development Application Procedures Bylaw, these works will be secured through either a letter of credit or cash security. Staff recommend that the security be a condition of the issuance of the Development Permit with Variances.

36. Staff support the proposed variances to the SPEA, as the implementation of the proposed restoration plan will result in improved habitat values within the SPEA and the transfer of the land to the City will allow for long term stewardship by the City.

Site Grading and ESC Measures

37. The proposed development includes excavation for the underground parkade and minor associated grading for site development. All retaining walls exceeding 1.2m in height require geotechnical approval. Grading and site sections are shown in Figures 19 through 22. Prior to any site works including tree clearing, site clearing, grubbing and grading, staff recommend that the clearing boundary be clearly delineated with high visibility snow fencing and tree protection fencing, where applicable.

38. Erosion and sediment control (ESC) measures for the Stage 1 DP works (site mass grading) are provided in accordance with the City's Erosion and Sediment Control Bylaw. Staff recommend that all ESC measures be installed by the developer and inspected for acceptance by the City prior to any site works.

39. In accordance with the Development Application Procedures Bylaw, these works will be secured through a letter of credit or cash security prior to the issuance of development permit in the amount of $14,599.20.

Multifamily Residential Form and Character Development Permit

40. The proposed development is subject to the Multifamily Residential Form and Character Development Permit guidelines contained within the OCP. The objectives of these guidelines are to encourage the construction of well designed, attractive and livable residential streets. New Multifamily Residential development should seek to enhance the public realm and contribute to neighbourhoods where residents of all ages feel safe.

41. The proposed apartment building consists of unit types and sizes ranging from 41 m^2 (444 ft^2) to 135 m^2 (1,458 ft^2). The proposal includes 73 units with:

    - 1 studio;
    - 17 one bedroom units;
    - 49 two bedroom units; and
    - 6 three bedroom unit;

42. In conjunction with this application, the applicant has provided plans and renderings that demonstrate the proposed development meets the intent of the Multifamily Form and Character Development Permit (DP) guidelines as outlined below, but not limited to:

    - Design Compatibility: the development is designed to be compatible, in terms of scale and design, with adjacent developments;
    - Hierarchy of Spaces: design defines spaces that are public and private by using fencing along the future north property line to visually separate private and public space along the proposed gravel path;
    - Public Overlook: housing units are designed to overlook public spaces including trail, Horn Creek Park, and strata road to ensure they have views over activity areas;
    - Site Grading – the design works largely with existing grades and provides minimal walls along the east property line to terrace the grade changes and visually conceal the underground parkade with varied landscaping;
    - Parking Location and Design: proposal provides provides the majority of the required parking in an underground parkade, with limited parking at the surface for all visitor parking and limited resident parking (Figures 11 and 12);

- Landscape Integration: the development is sited and designed with existing significant natural features including Horn Creek Park on the east, and the forested vegetation north of the development;
- Architectural Interest: the building has varying building materials, colours, and balconies; and
- Long Term Bike Parking: the proposed building includes 18 secured and weather protected bike parking in the form of locked room in the underground parkade (Figure 11).

Common Outdoor Amenity Area

43. Consistent with the RML Zone, the developer is required to provide 219 m^2 (2,357 ft^2) of common outdoor amenity space. In conjunction with this development, the applicant has proposed a total of 600 m^2 (6,458 ft^2) of amenity space on the main and top floors (Figures 12 and 15). Further, the proposal incorporates a community garden for residents of the proposed apartment. Staff note that the developer is proposing providing amenity spaces that significantly exceed the minimum zoning requirements.

Proposed Variances to the Zoning Bylaw

44. The applicant is proposing several variances to the Zoning Bylaw to reduce building setbacks, increase permitted projections into setbacks, reduce drive aisle width, and allow tandem parking stalls, which will enable the development of the proposed five (5) storey apartment building on the subject property. The proposed variances are outlined with rationale below and further illustrated in Figures 9 through 15.

44.1 Section 450.3.4.a and b to reduce the minimum interior lot line setback for Principal Building :

The RML Zone requires a minimum 6.0m setback from interior lot lines for storeys 1-4 and 10.0m for storeys above 4. The submitted drawings propose the following variances to the minimum setback from the west and south lot lines (interior lot lines):

- to reduce the minimum setback from the interior lot line for the west property line from 6.0m to 3.5m to allow balcony posts at the northwest corner on floors 1-4;
- to reduce the minimum setback from the interior lot line for the south property line from 6.0m to approximately 1.5m to allow parkade wall exposed more than 1.0m;
- to reduce the minimum setback from the interior lot line for the south property line from 6.0m to approximately 5.0 m for building face on floors 1-4;
- to reduce the minimum setback from the interior lot line for the west property line from 10.0m to approximately 3.5m to allow balcony post for 5th storey;
- to reduce the minimum setback from the interior lot line for the south property line from 10.0m to approximately 5.0m to allow building face for 5th storey;
- to reduce the minimum setback from the interior lot line for the east property line from 10.0m to approximately 8.1m to allow the building face for 5th storey;

44.2 Section 140.4.2.b – to increase the permitted projections into the required minimum setbacks:

This variance is requested to accommodate the balconies that are projecting into the setback areas. Section 140.4.2.b.i of the Zoning Bylaw permits cantilevered balconies

and unenclosed porches to project beyond the building face no more than 1.2m into the required minimum front, rear or exterior side lot setback.

Section 140.4.2.b.ii of the Zoning Bylaw permit cantilevered balconies and unenclosed porches to project beyond the building face no more than 0.6m into the required minimum interior side lot line setback.

The proposed development proposes the following variances to increase the permitted projections into the required minimum front, rear and interior setback areas:

- to increase the permitted projections into the interior side lot line (south property line) from 0.6m to approximately 2.2m for storeys 1-5 to allow balcony projections;
- to increase the permitted projection into the rear lot line (east property line) from 1.2m to approximately 1.7m for the steps along the east side of the building;
- to increase the permitted projection into the rear lot line (east property line) from 1.2m to approximately 2.05m for the 5th storey for to allow balcony projection;

44.3 Section 150.7.1 - to reduce the minimum drive aisle width for both surface and underground parking from 7.5m to 6.5m;

This variance is requested given the lot configuration, size of the developable area of the property, and the required number of off-street parking spaces. The provided parking layout requests a 6.5m drive aisle width permitted rather than the 7.5m required under the Zoning Bylaw. Staff support this variance given the size challenges on the subject property and given that this variance has been previously supported numerous times.

44.4 Section 150.7.2 – to permit tandem parking stalls in the underground parkade;

The proposal includes 11 pairs of parking spaces in a tandem configuration. Section 150.7.2 of the Zoning Bylaw requires all parking spaces be unobstructed for vehicular access by means of a maneuvering aisle and be designed in single-loaded or double-loaded modules in accordance with the parking arrangements shown in Section 150.7.1. The applicant's proposal for 11 pairs of tandem parking spaces is not consistent with this provision of the Zoning Bylaw. However, given the unavailability of on-street parking and the site environmental challenges, staff support the proposed tandem parking as a means of achieving a full allotment of parking onsite. Staff recommend that a Section 219 covenant be registered against title of the subject property to restrict each pair of the proposed tandem parking spaces be assigned to a single residential unit. Staff anticipate that the covenant will allow for the most efficient use of the configuration, which functions similar to a townhouse with a tandem garage.

45. Given the limited developable land available and the challenging features on the subject property, staff recommend support for the proposed variances to the setbacks, permitted projections into the setbacks, drive aisle width and to permit tandem parking stalls.

Community Amenity Contribution (CAC)

46. In accordance with a 2008 Council resolution E008-2008, staff is negotiating public amenities for development variance requests on a case-by-case basis. In conjunction with this proposal, the developer is requesting variances as described in the Proposed

Variances section above, to allow for the development of the proposed building and associated parking. In this case, the developer has proposed the following items for their CAC:

- provide cash-in-lieu $15,000 towards the purchase of an easement machine, which will be used by the Operations Yard to access and maintain services in difficult locations;
- voluntarily dedicate a portion of the road frontage along Gladwin Road to the City, which will allow the subject property to align with existing neighbouring road frontages on Gladwin Road; and
- transfer the environmental area to the City (shown in Figure 7a). Given that following the transfer of environmental lands to the City, the building will be located 3.0m from the future property line, staff recommend that a no-build covenant be registered along the north property line within the environmental lands to reinforce spatial separation requirements. The exact dimension for the no-build covenant is to be determined by the architect prior to registration. Both Parks, Recreation and Culture (PRC) and Building staff have endorsed this approach.

Landscaping/Tree Removal and Replacement

47. An Arborist report was submitted in conjunction with this application, which was prepared by Central Valley Arborist Consulting Ltd., dated March 21, 2018 (Attachment F). A total of 56 mature trees exist on the developable area of the subject site. According to the Arborist's recommendations, 30 trees are proposed to be removed as they are located within the proposed building envelope. 22 of these trees are between 20cm and 30cm diameter at breast height (DBH) while 8 are 30cm or greater DBH.

    Therefore, the removal of 30 trees will require 68 replacement trees, as required by the Tree Protection Bylaw, 2010. The landscaping plan shows 68 trees to be planted on site, as shown in Figure 23. Therefore, the proposal is consistent with the Tree Protection Bylaw replacement requirements and no additional cash-in-lieu is required.

48. The proposed garbage enclosure is proposed to be located partly within the neighbouring property at southwest corner of the subject property. Staff recommend that the applicant secure an easement over a portion of 3172 Gladwin Road for the purpose of placing the garbage enclosure, and that the City be party to this agreement. The applicant has indicated that the adjacent landlords have already provided agreement to permit this.

Site Development Considerations

49. A staff review of the Works and Services Requirements necessary to support this application has been completed and is outlined within Attachment G (dated March 21, 2019), the details of which will be incorporated into the Servicing Agreement, a prerequisite for issuing Building Permit. Some of the notable requirements of the attached Works and Services report include:

    - a $2,000 cash-in-lieu contribution towards a future access improvements on Gladwin Road;

- voluntary road dedication of approximately 3m on Gladwin Road, as outlined in the Community Amenity Contribution section above; and
- securing an access easement with the neighbouring property owners to utilize the existing access onto Gladwin Road.

Staff recommend that the above requirements be conditions for the issuance of the proposed Development Permit No. 2178 with Variances.

50. The developer is responsible to adhere to all other legislation, which may apply to the land, including:

    a) complying with all applicable City bylaws, such as Official Community Plan, 2016, Development Bylaw, 2011, Tree Protection Bylaw, 2010, Building Bylaw, 2016, Sign Bylaw, 2001, Erosion and Sediment Control Bylaw, 2010, and Development Cost Charges Imposition Bylaw, 2010 administered by the City; and

    b) obtaining all other necessary approvals and permits on such terms as they may be issued, including but not limited to a development permit, tree removal permit, subdivision approval, building permit, soil removal/deposit permit, Ministry of Health permit, Ministry of Transportation and Infrastructure approval and Ministry of Environment approval.

Communication Plan

If the proposed variance is supported by Council, the City will notify in writing the adjacent and abutting property owners and occupiers of the date and time of the Council Hearing.

FINANCIAL PLAN IMPLICATION

No financial plan implications are anticipated.

Rajat Sharma

Rajat Sharma
General Manager, Finance and Corporate Services
Signed 4/24/2019 5:30 PM

IMPACTS ON COUNCIL POLICIES, STRATEGIC PLAN AND/OR COUNCIL DIRECTION

The proposal meets the goals and objectives identified in the 2016 Official Community Plan, the Affordable Housing Strategy, and Council's 2019-2022 Strategic Plan; which identifies four cornerstones: vibrant economy, complete community, fiscal discipline and organizational alignment. The proposal is consistent with the four cornerstones of Council's Strategic Plan.

SUBSTANTIATION OF RECOMMENDATION

The proposed Multifamily Residential Development Permit with Variances is consistent with the OCP land use designation of Urban 1 – Midrise. A Steep Slope and Natural Environment Development Permit required for the development have been reviewed concurrently with the Multifamily Residential Development Permit with Variances application. The proposed development will create a high quality development. Staff recommend support for the requested

Development Permit with Variances to permit the construction of a 73 unit apartment with one level of partially underground parkade given the proposal aligns with the Strategic Plan 2019-2022, and is consistent with the objectives of the OCP, including both the Multifamily Residential Development Permit Guidelines, the Natural Environment DP Guidelines and the Steep Slope DP Guidelines.

Sarah Yusuf

Sarah Yusuf
Planner
Signed 4/23/2019 10:40 AM

Darren Braun

Darren Braun
Director, Development Planning
Signed 4/24/2019 5:03 PM

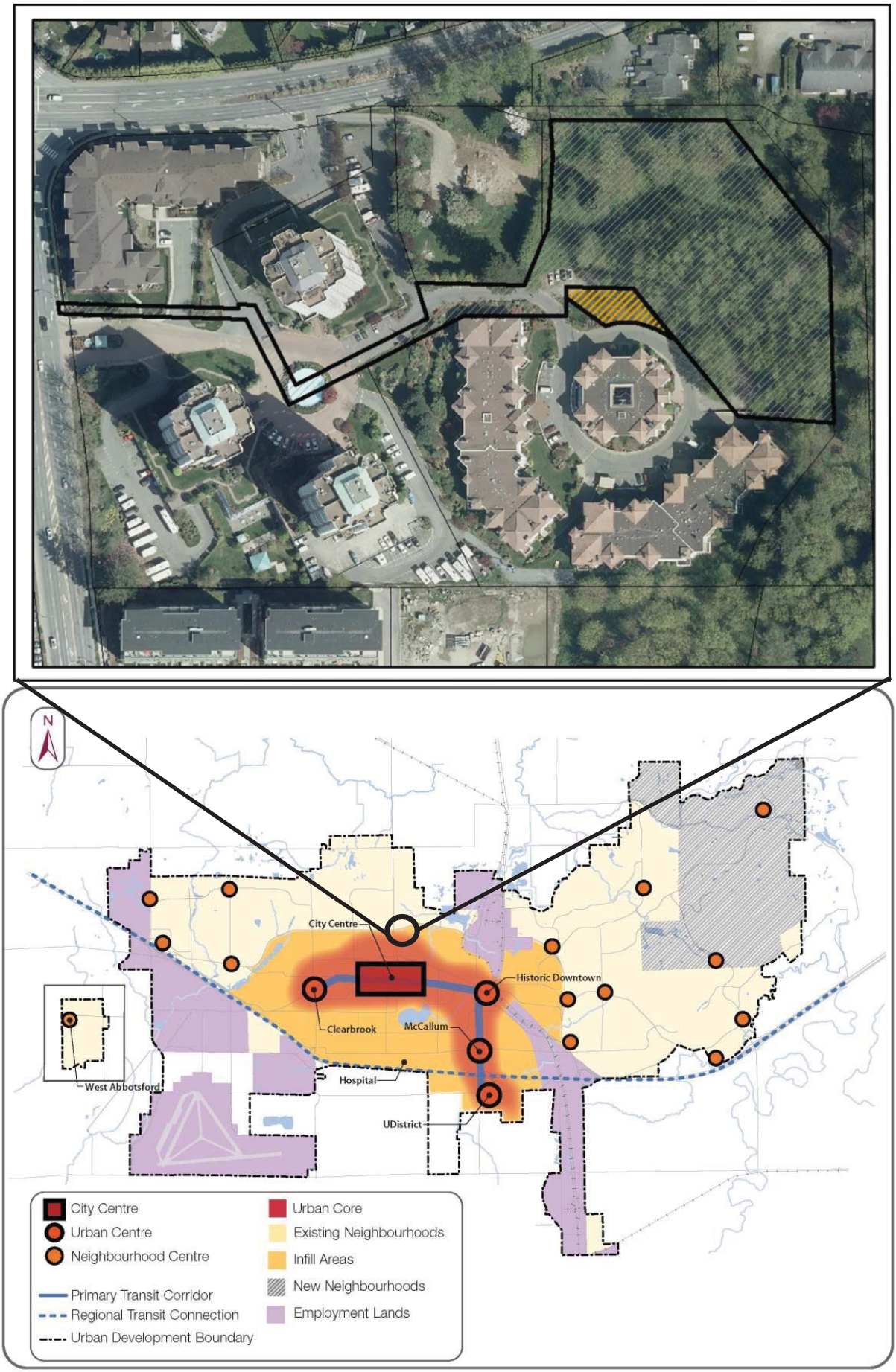
Darren Braun

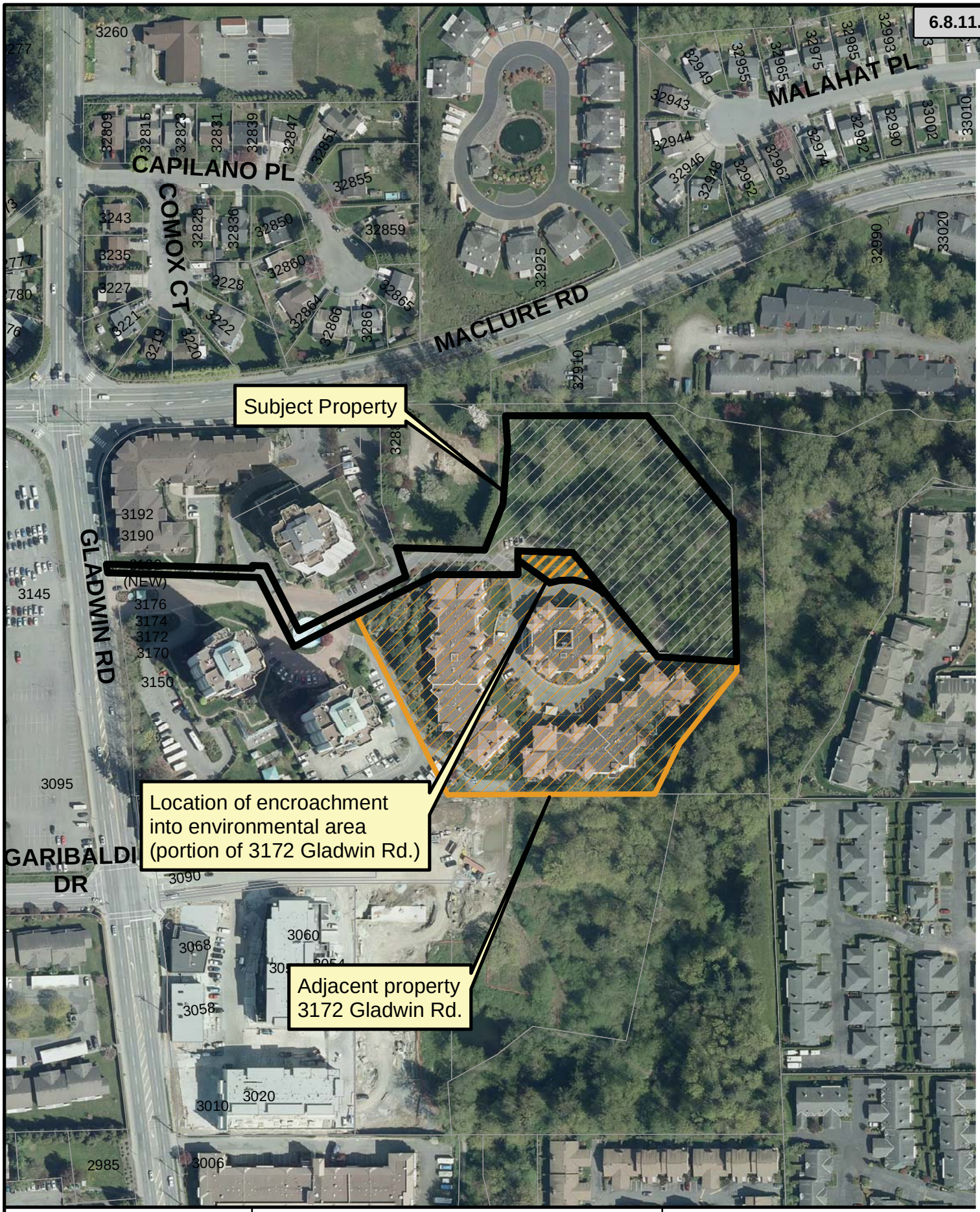
Darren Braun
Director, Development Planning
for
Siri Bertelsen, General Manager, Planning and Development Services
Signed 4/24/2019 5:31 PM

ATTACHMENTS:

Figures 0 to 29
Attachment A: Letter of Intent (dated April 15, 2019)
Attachment B: Geotechnical Report, prepared by WSP (dated February 8, 2019)
Attachment C: Horn Creek Slope Failure (prepared by PRC and Engineering)
Attachment D: Environmental Assessment Application, prepared by Pinchin (dated April 17, 2019)
Attachment E: CEMP (dated March 21 2019)
Attachment F: Arborist Report, prepared by Central Valley Arborist Consulting Ltd. (dated March 21, 2018)
Attachment G: Works and Services Report (dated March 21, 2019)
DP No. 2178 with Variances DRAFT

City Context Plan
File: PRJ18-145 Location: 3182 Gladwin Road





Attachment: Figures 0 to 29 (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion of 3172 Gladwin Road)

ABBOTSFORD
Planning and Development Services

3182 Gladwin Road
& portion of 3172 Gladwin Road

Figure 1 - Location Plan
File No.: PRJ18-145

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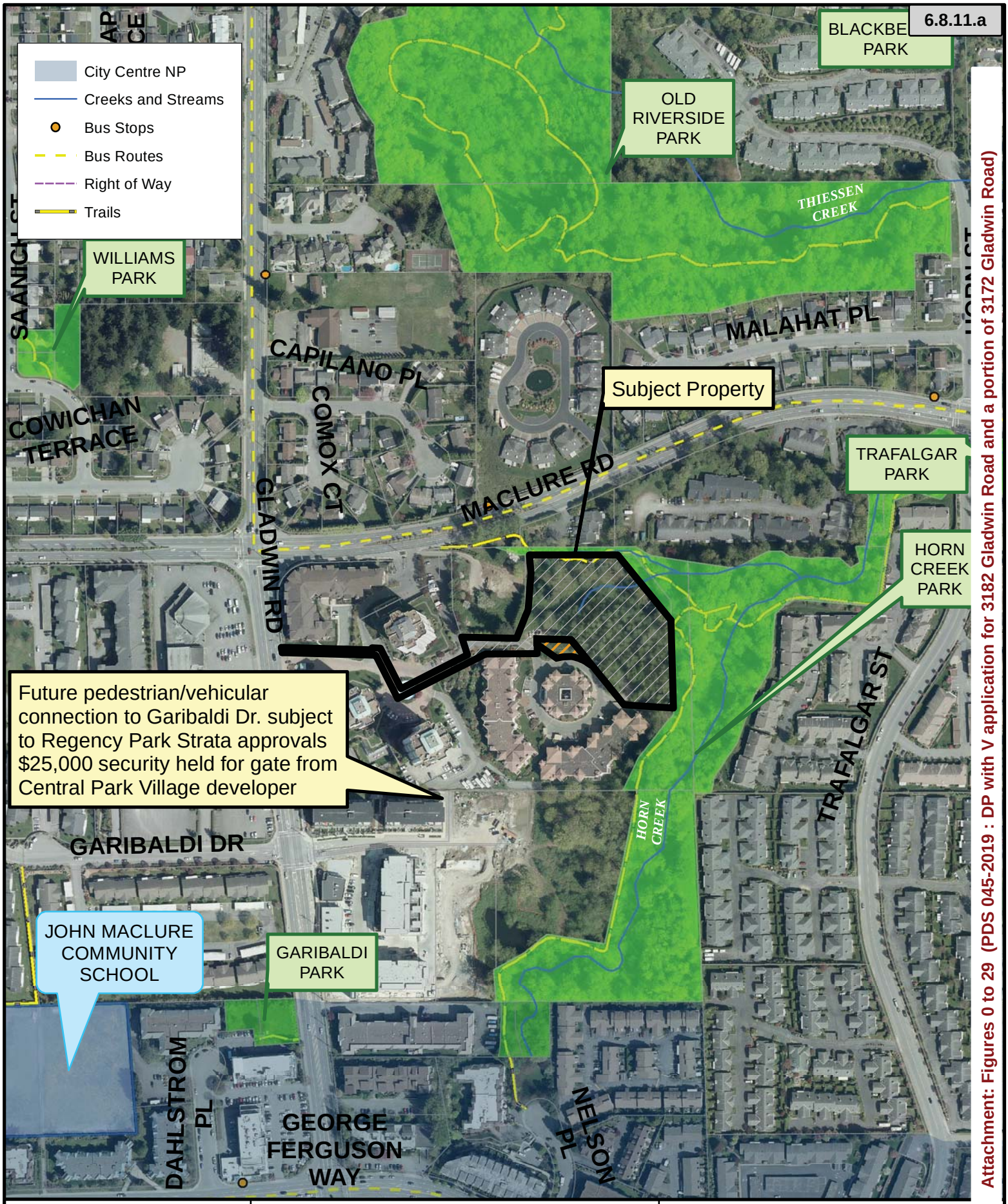
Date



ABBOTSFORD
Planning and Development Services

3182 Gladwin Road
& portion of 3172 Gladwin Road

Figure 2 - Context Plan
File No.: PRJ18-145

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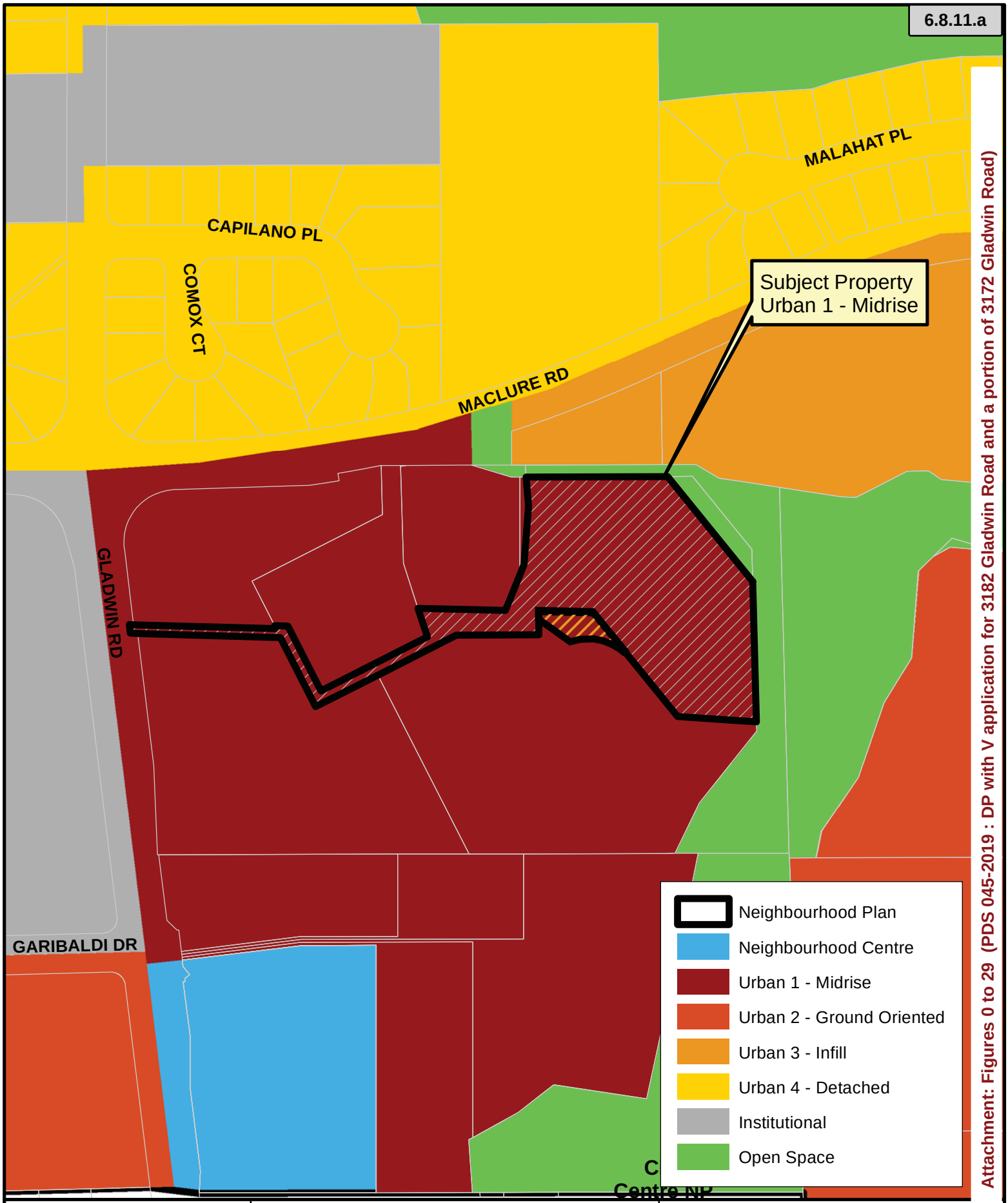
Date



Attachment: Figures 0 to 29 (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion of 3172 Gladwin Road)

ABBOTSFORD
Planning and Development Services

3182 Gladwin Road
& portion of 3172 Gladwin Road

Figure 3 - Official Community Plan
File No.: PRJ18-145

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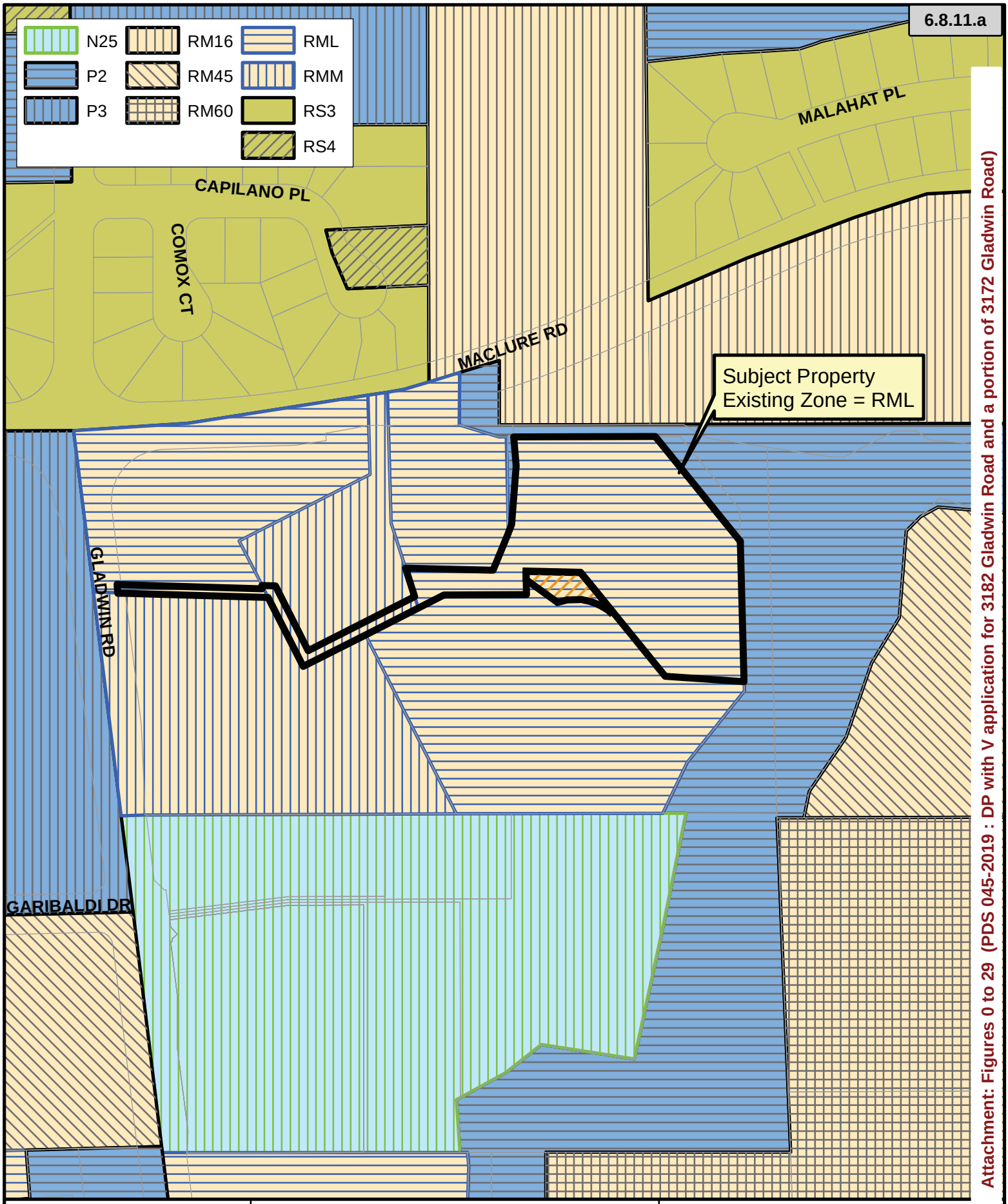
Date



ABBOTSFORD
Planning and Development Services

3182 Gladwin Road
& portion of 3172 Gladwin Road

Figure 4 - Existing Zoning
File No.: PRJ18-145

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Meters

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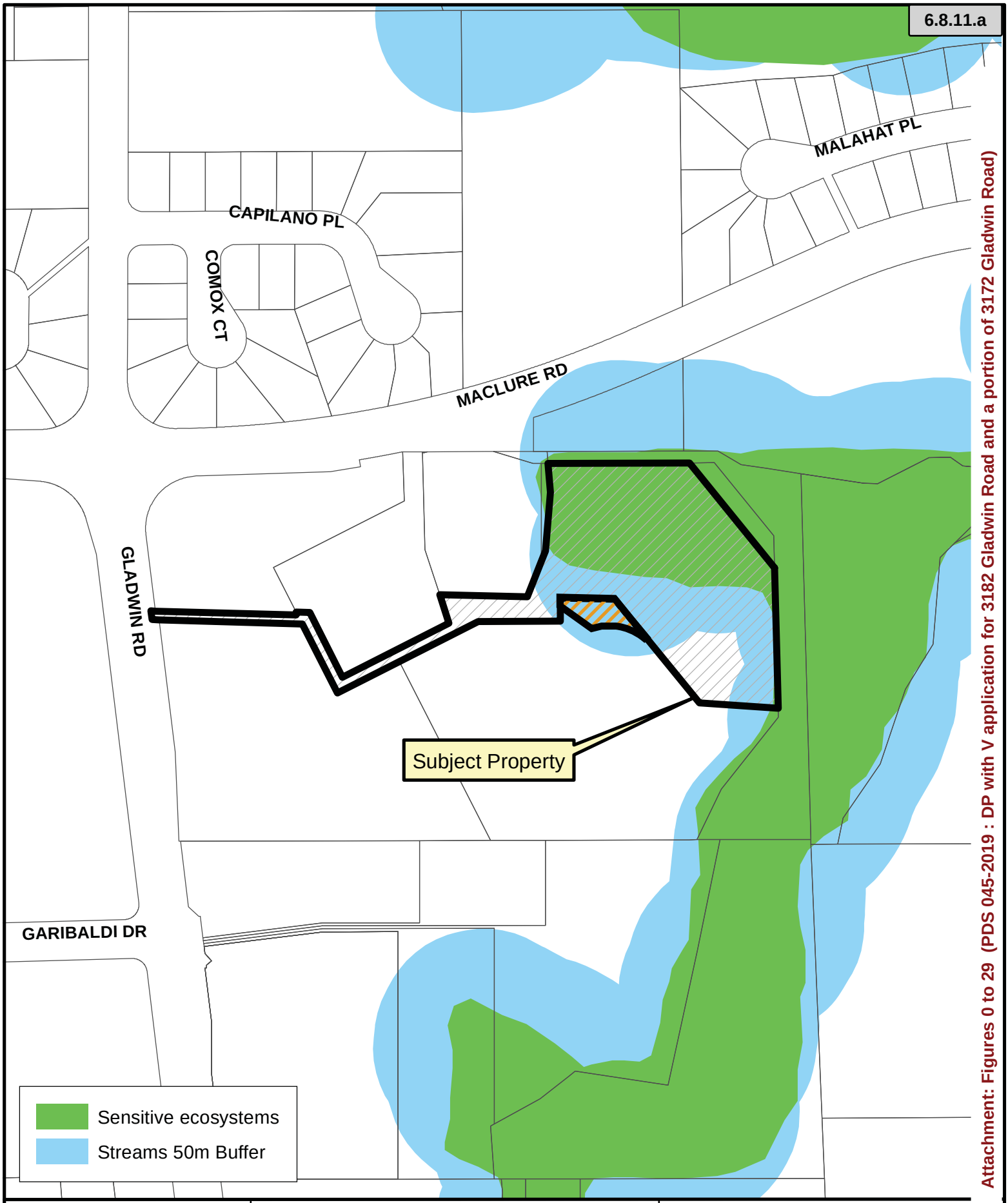
Date



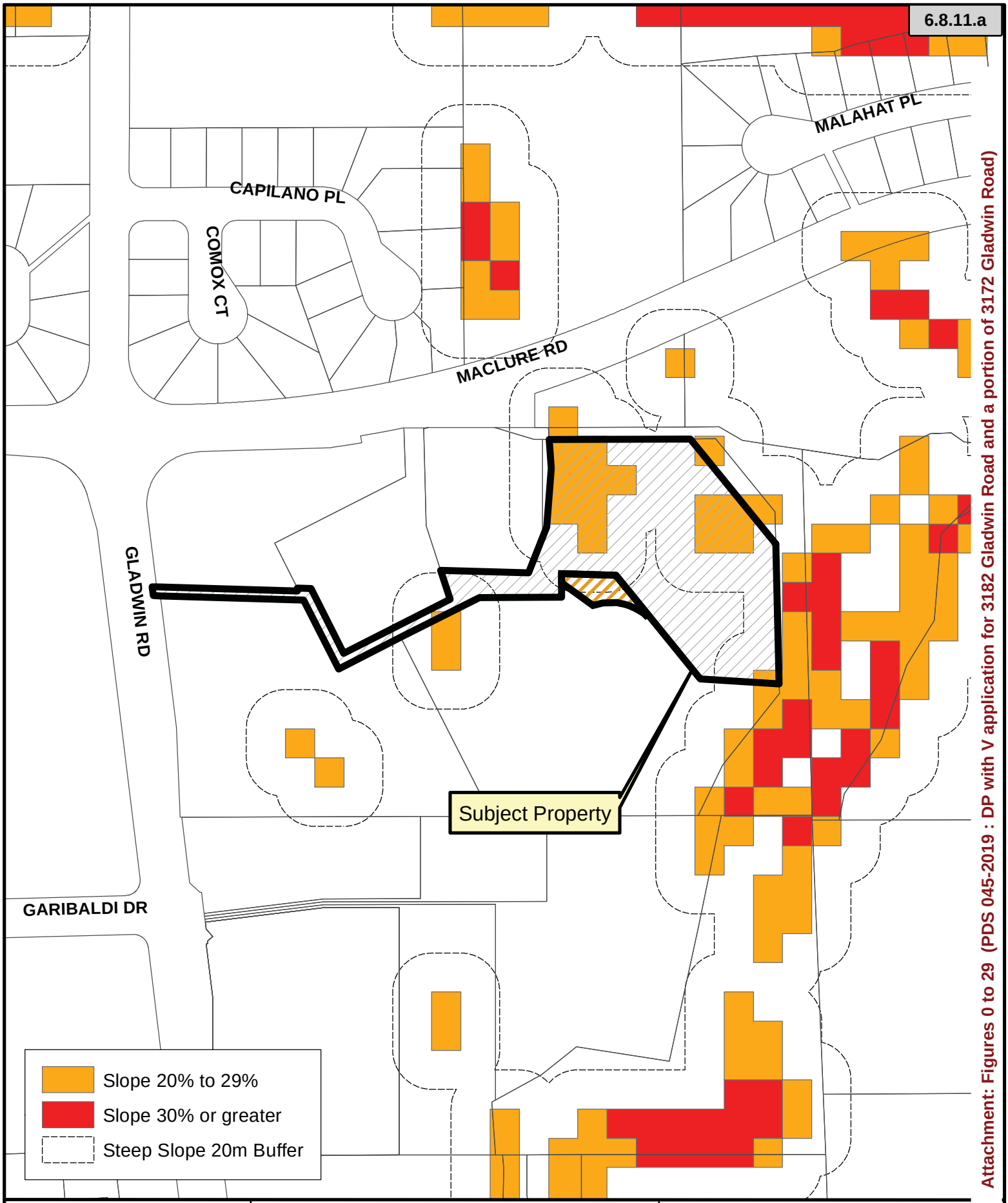
ABBOTSFORD
Planning and Development Services

3182 Gladwin Road
& portion of 3172 Gladwin Road

Figure 5 - Natural Environment
Development Permit
File No.: PRJ18-145

50 0 Meters

Attachment: Figures 0 to 29 (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion of 3172 Gladwin Road)



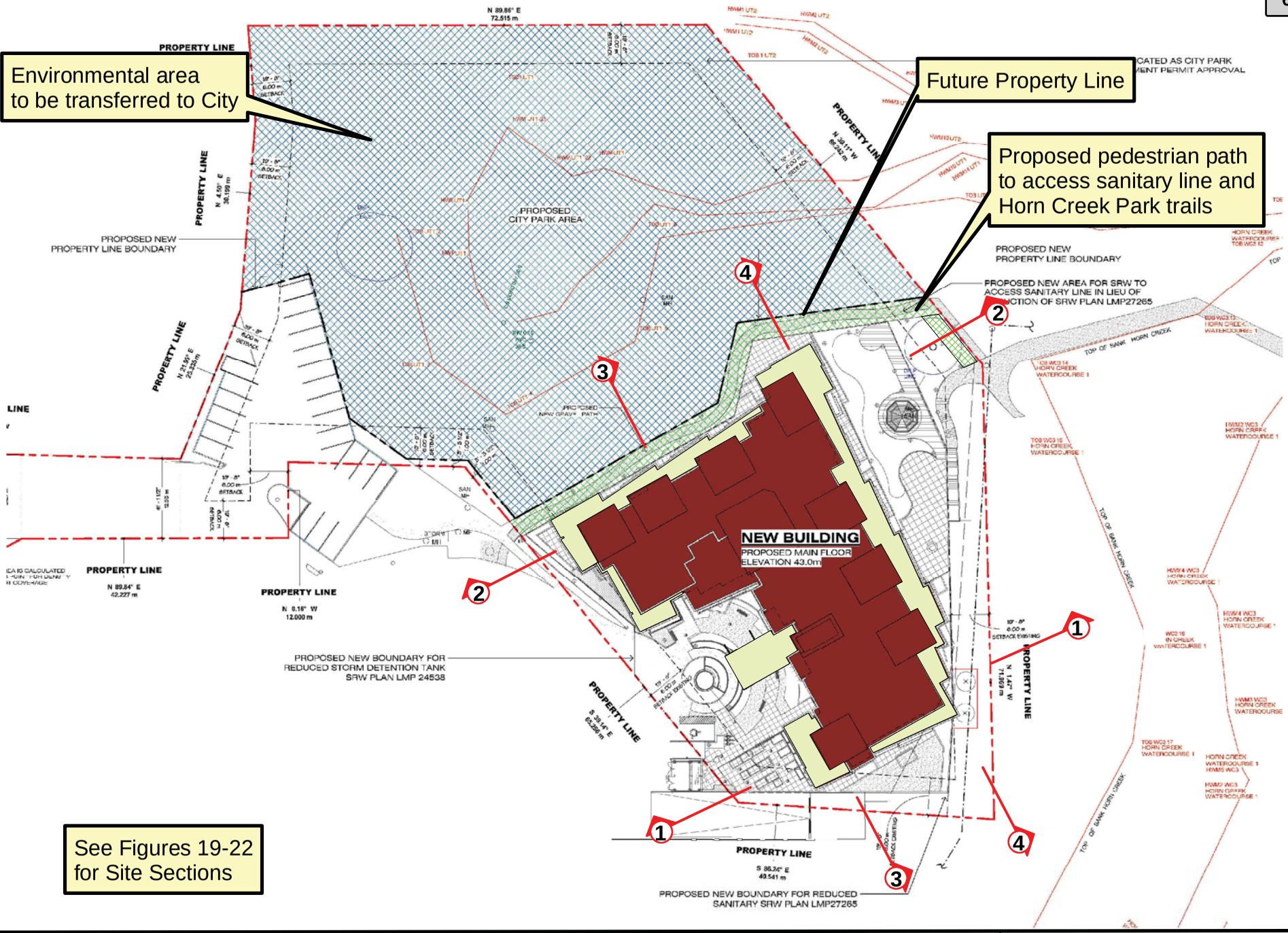
ABBOTSFORD
Planning and Development Services

3182 Gladwin Road
& portion of 3172 Gladwin Road

Figure 6 - Steep Slope
Development Permit
File No.: PRJ18-145

50 0 Meters

Attachment: Figures 0 to 29 (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion of 3172 Gladwin Road)



See Figures 19-22 for Site Sections

ABBOTSFORD
Planning and Development Services

3182 Gladwin Road
& portion of 3172 Gladwin Road

Figure 7a - Site Plan
File No.: PRJ18-145

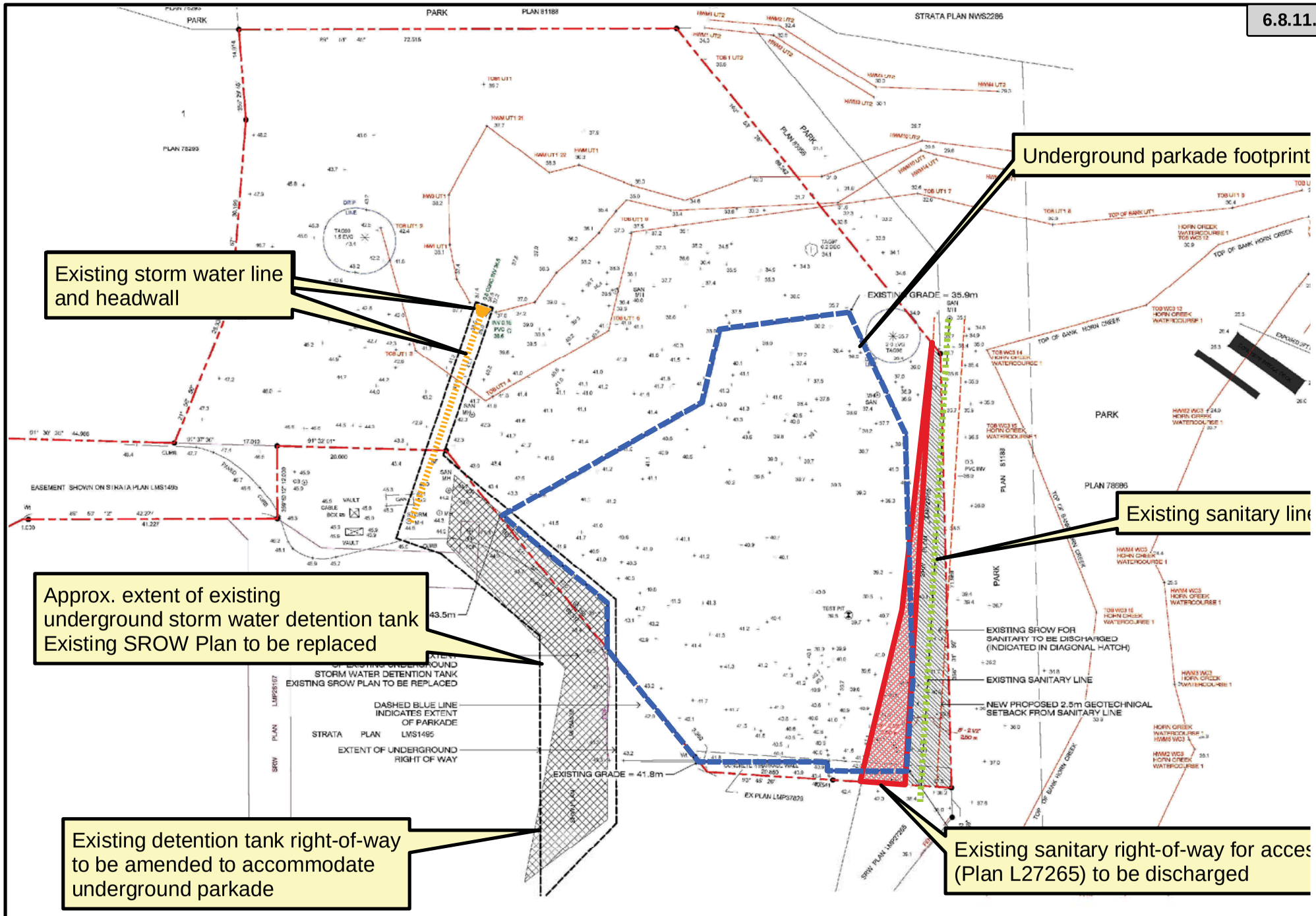
N	Date

ABBOTSFORD
Planning and Development Services

3182 Gladwin Road
& portion of 3172 Gladwin Road

Figure 7b - Site Plan
File No.: PRJ18-145

N | Date



ABBOTSFORD
Planning and Development Services

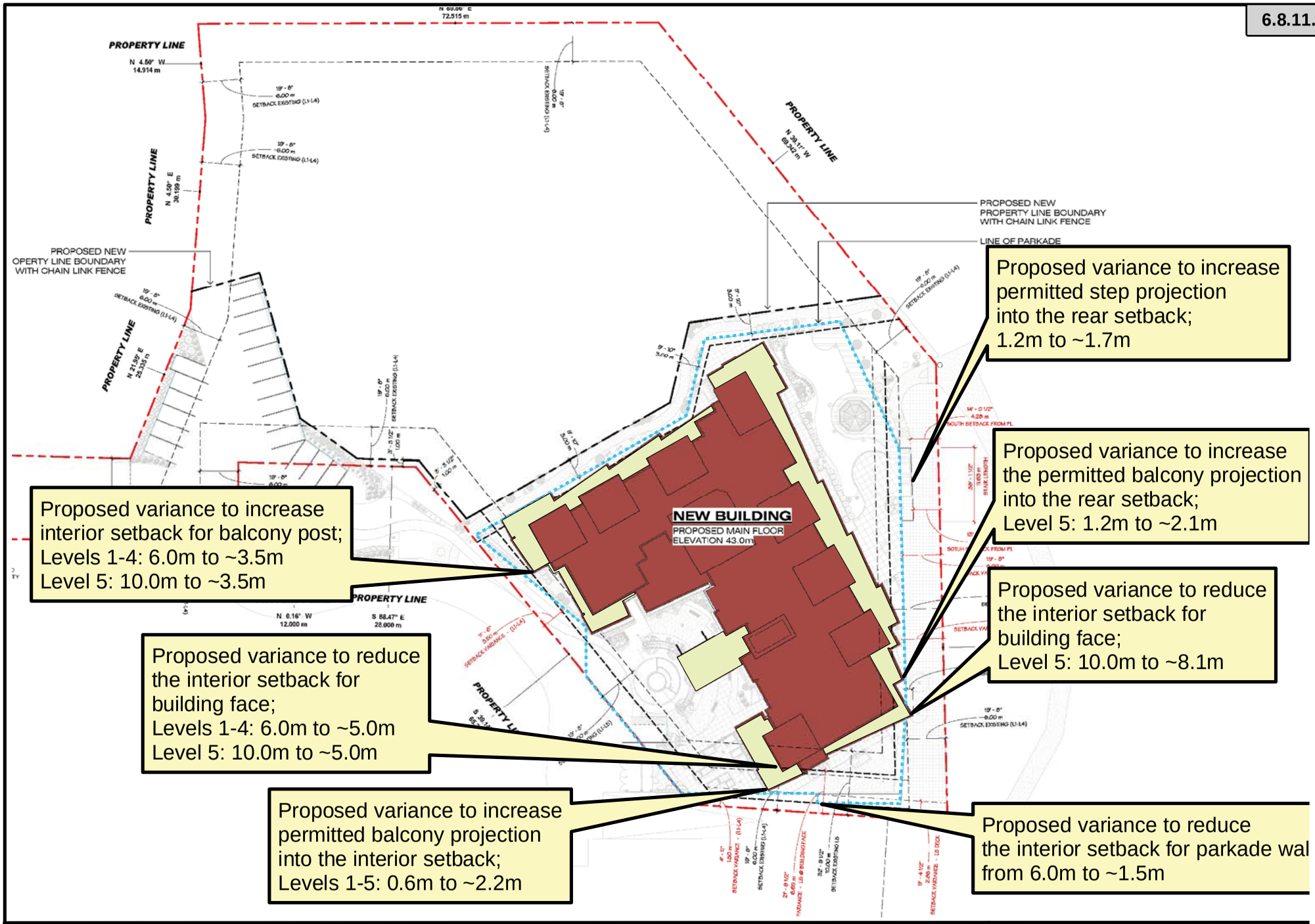
3182 Gladwin Road
& portion of 3172 Gladwin Road

Figure 8 - Rights-of-way Proposed to Discharged and Amended

File No.: PRJ18-145

N	Date

Attachment: Figures 0 to 29 (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion



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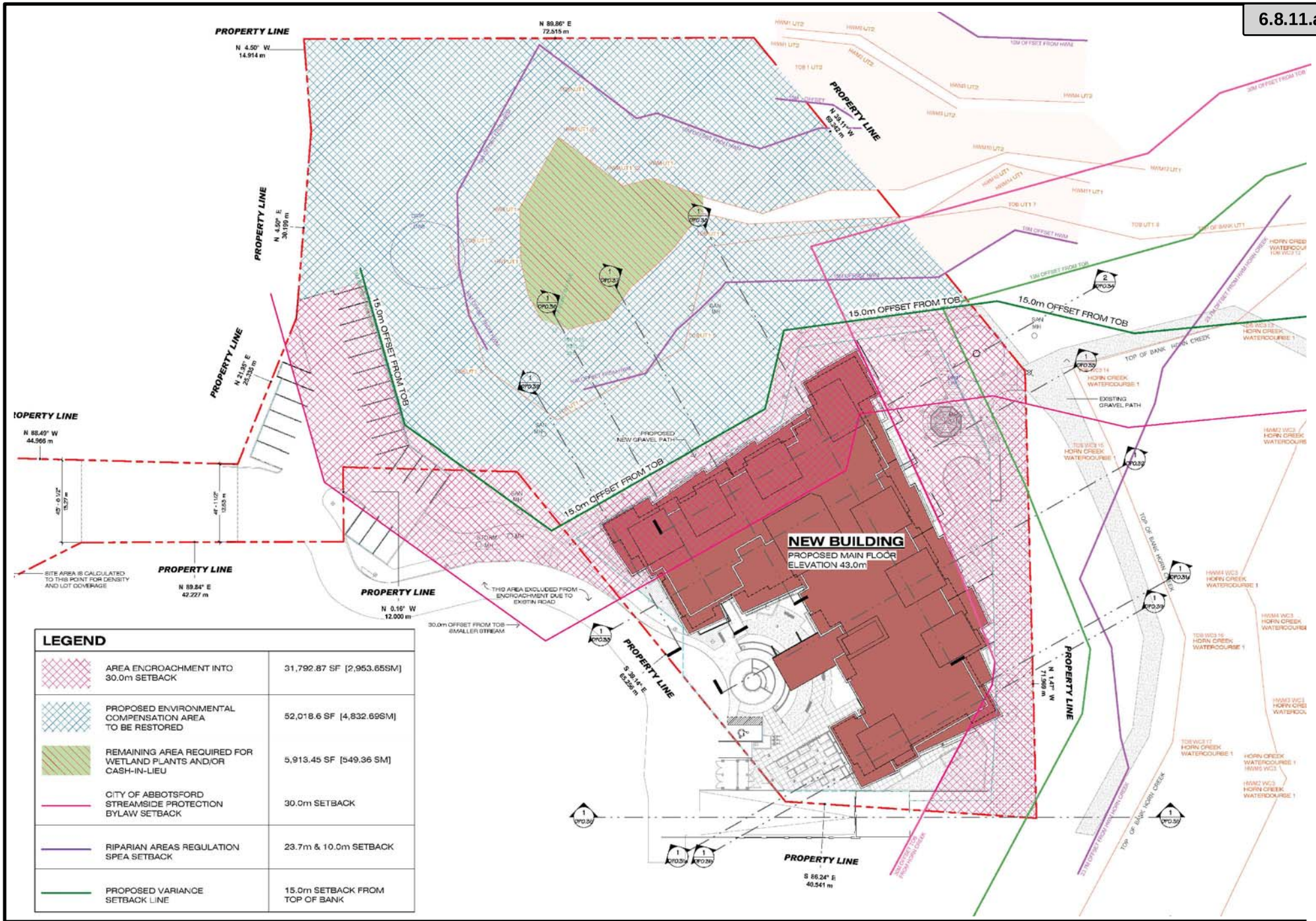
3182 Gladwin Road
& portion of 3172 Gladwin Road

Figure 9 - Proposed Variances to the Zoning Bylaw

File No.: PRJ18-145

N | Date

Attachment: Figures 0 to 29 (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion



ABBOTSFORD
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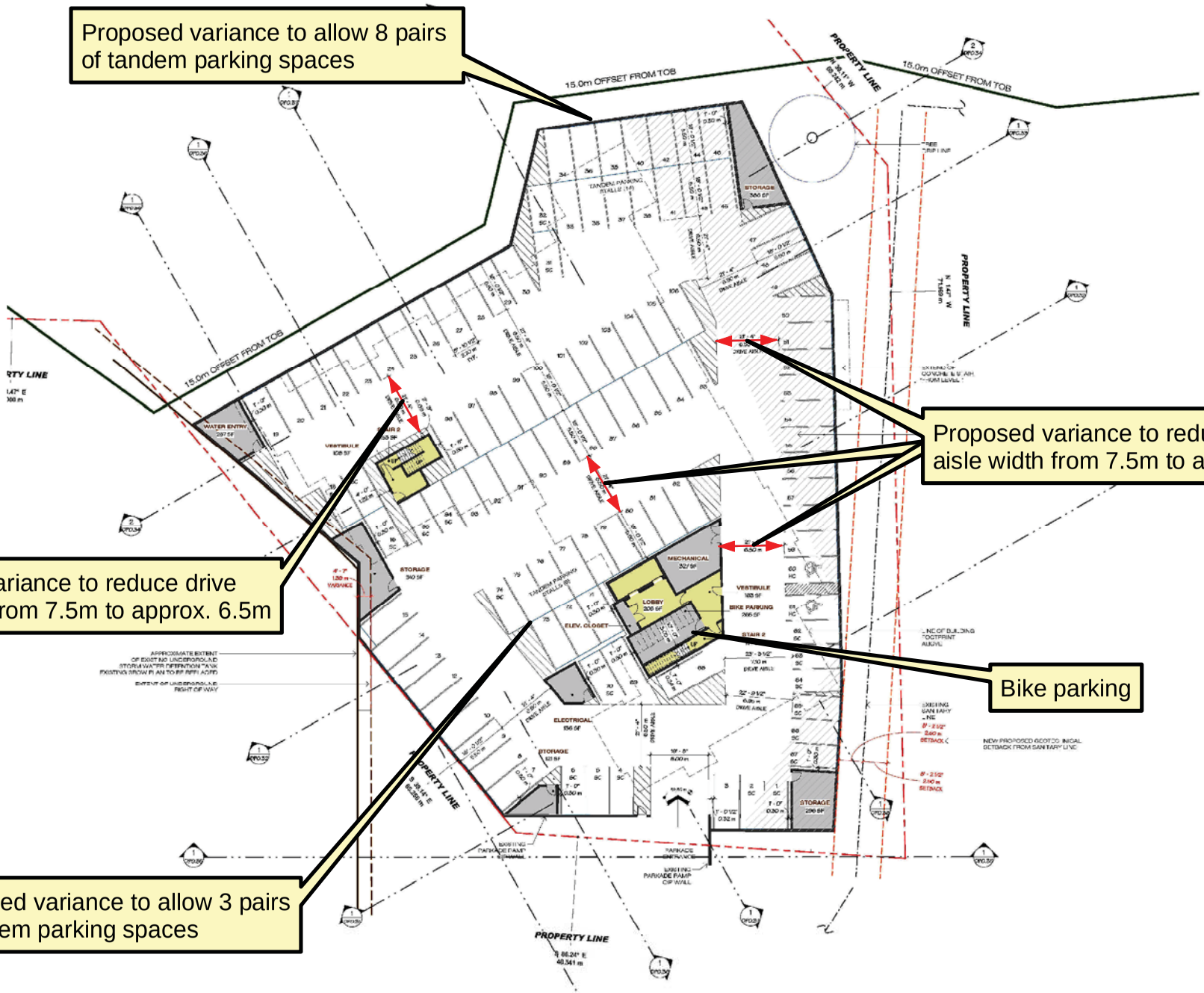
3182 Gladwin Road
& portion of 3172 Gladwin Road

Figure 10 - Proposed Environmental Encroachment

File No.: PRJ18-145

N	Date



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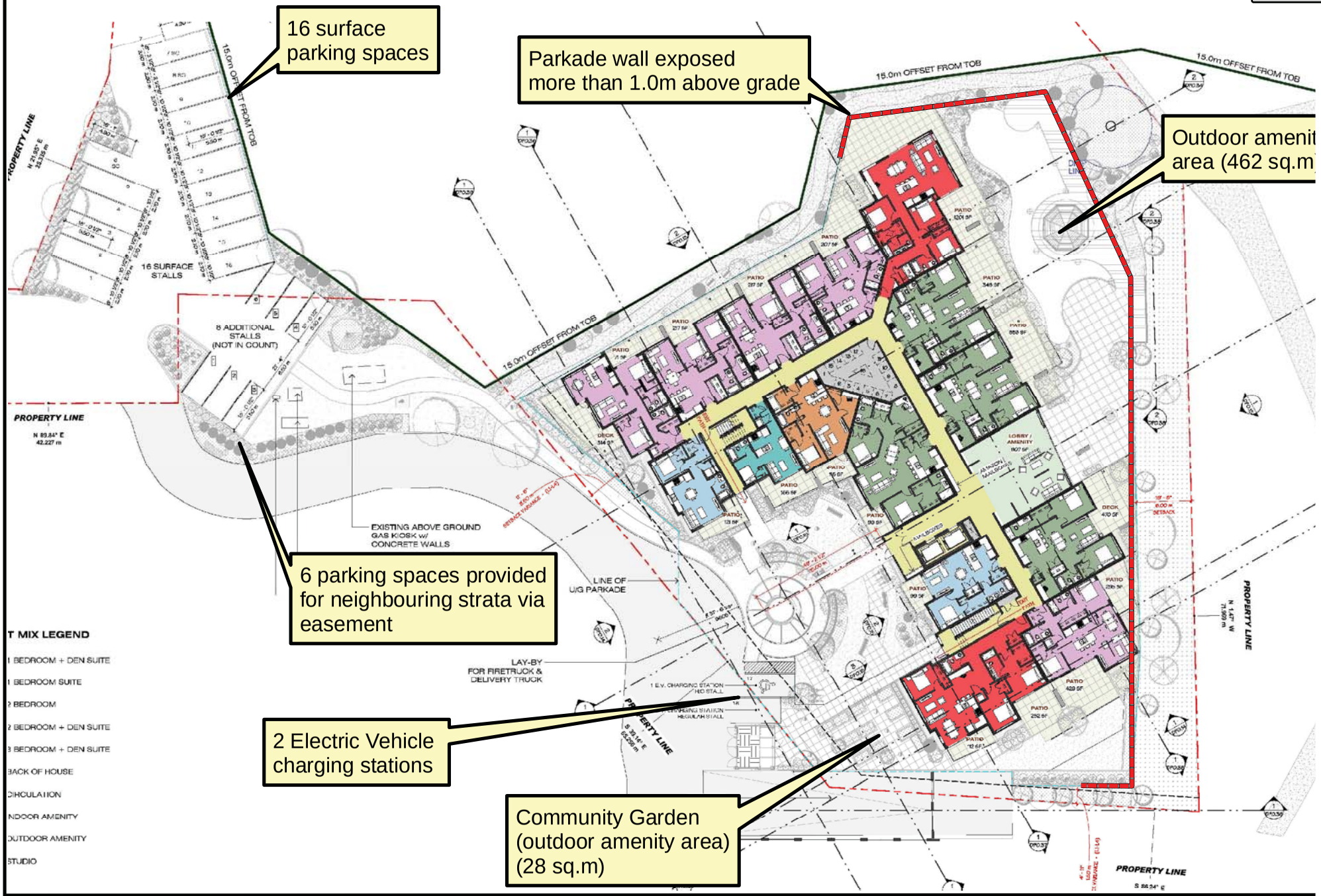
3182 Gladwin Road
& portion of 3172 Gladwin Road

Figure 11 - Parkade Plan
File No.: PRJ18-145

N | Date

Attachment: Figures 0 to 29 (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion



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& portion of 3172 Gladwin Road

Figure 12 - Site Plan - Level 1
File No.: PRJ18-145

N	Date

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& portion of 3172 Gladwin Road

Figure 13 - Floor Plan - Level 1
File No.: PRJ18-145

N	Date

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& portion of 3172 Gladwin Road

Figure 14 - Floor Plan - Levels 2-4
File No.: PRJ18-145

N	Date

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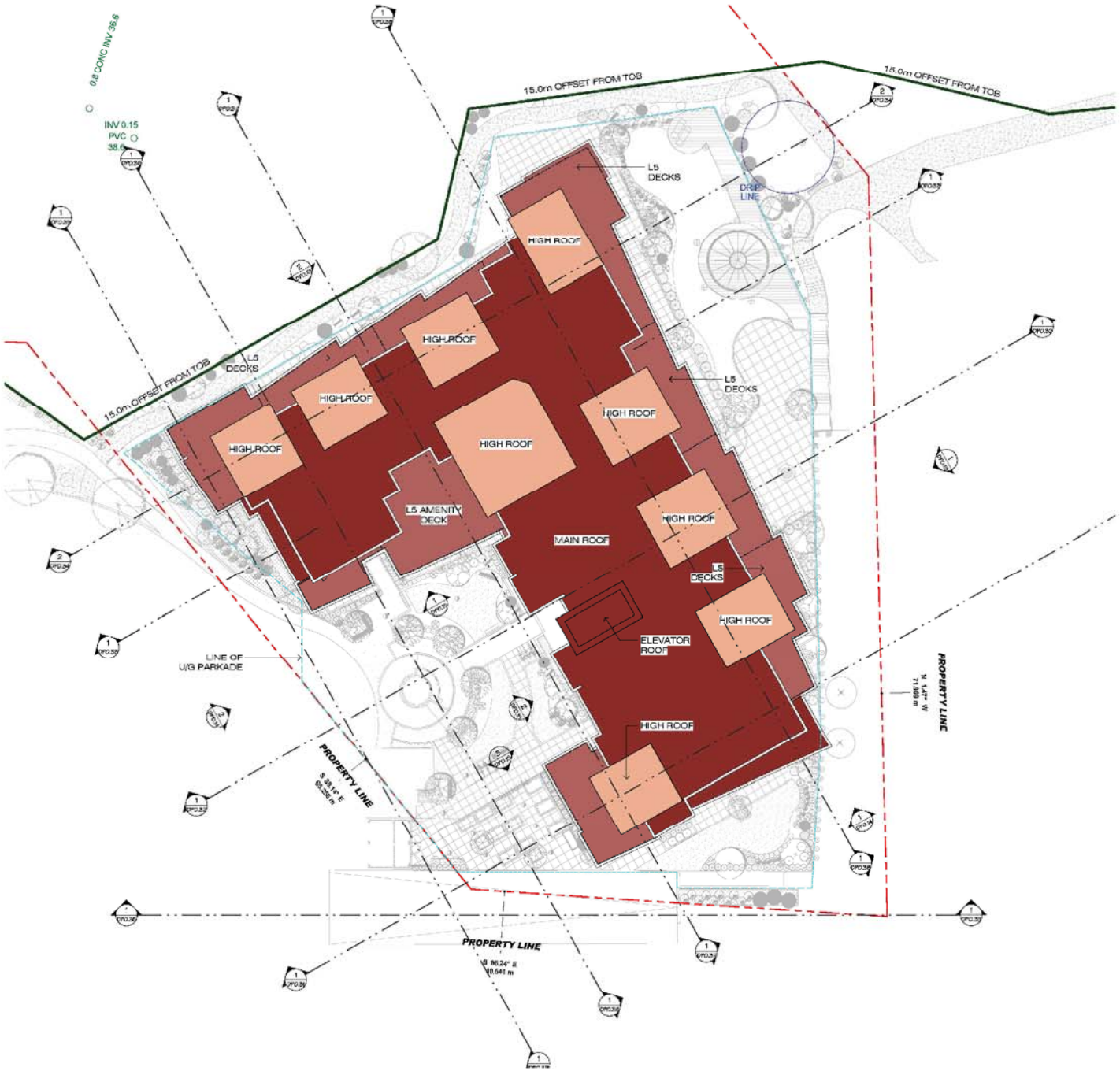
3182 Gladwin Road
& portion of 3172 Gladwin Road

Figure 15 - Floor Plan - Level 5
File No.: PRJ18-145

N	Date

Attachment: Figures 0 to 29 (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion



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3182 Gladwin Road
& portion of 3172 Gladwin Road

Figure 16 - Roof Plan
File No.: PRJ18-145

N	Date

Northeast Elevation

Northwest Elevation

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3182 Gladwin Road
& portion of 3172 Gladwin Road

Figure 17 - Elevations (Northeast & Northwest)

File No.: PRJ18-145

N	Date

Attachment: Figures 0 to 29 (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion

Southwest Elevation

Southeast Elevation

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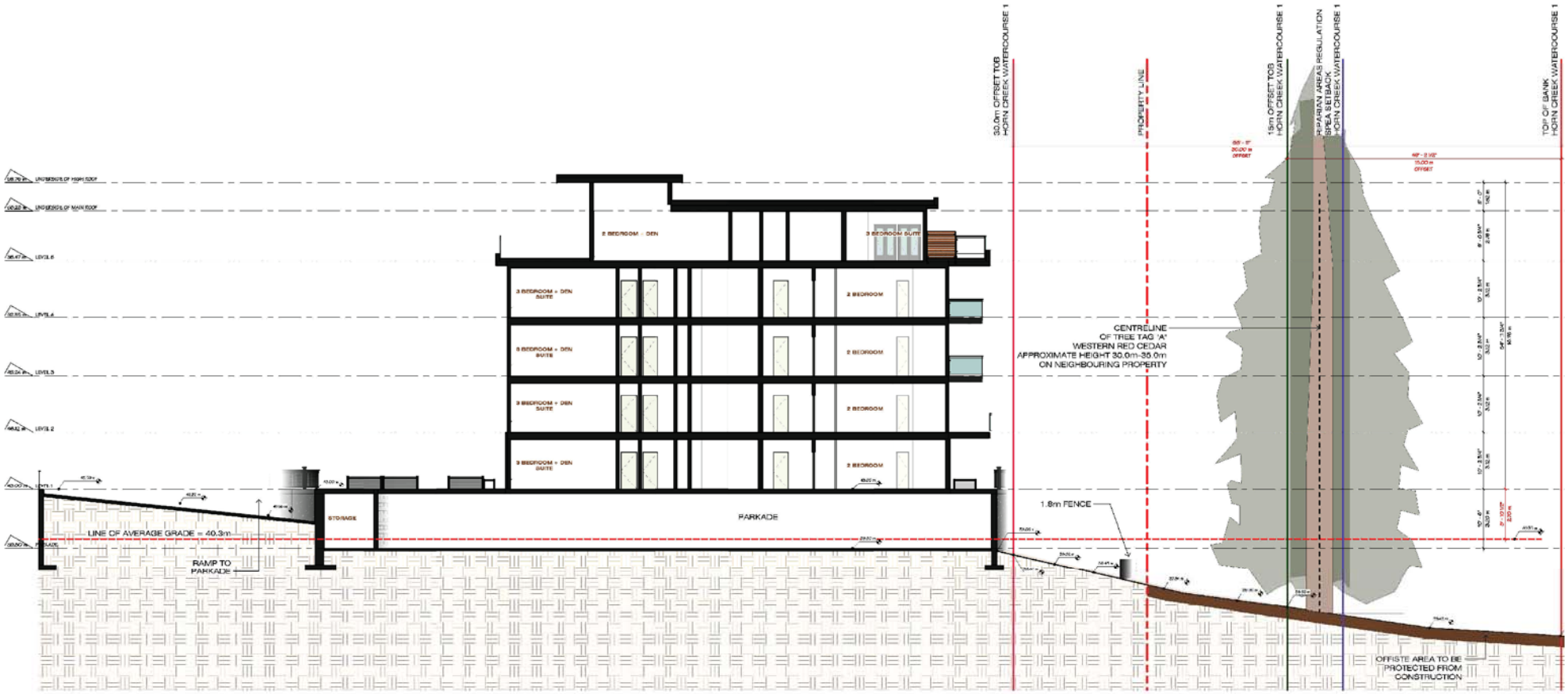
& portion of 3172 Gladwin Road

Figure 18 - Elevations (Southwest & Southeast)

File No.: PRJ18-145

N	Date

Attachment: Figures 0 to 29 (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion



1

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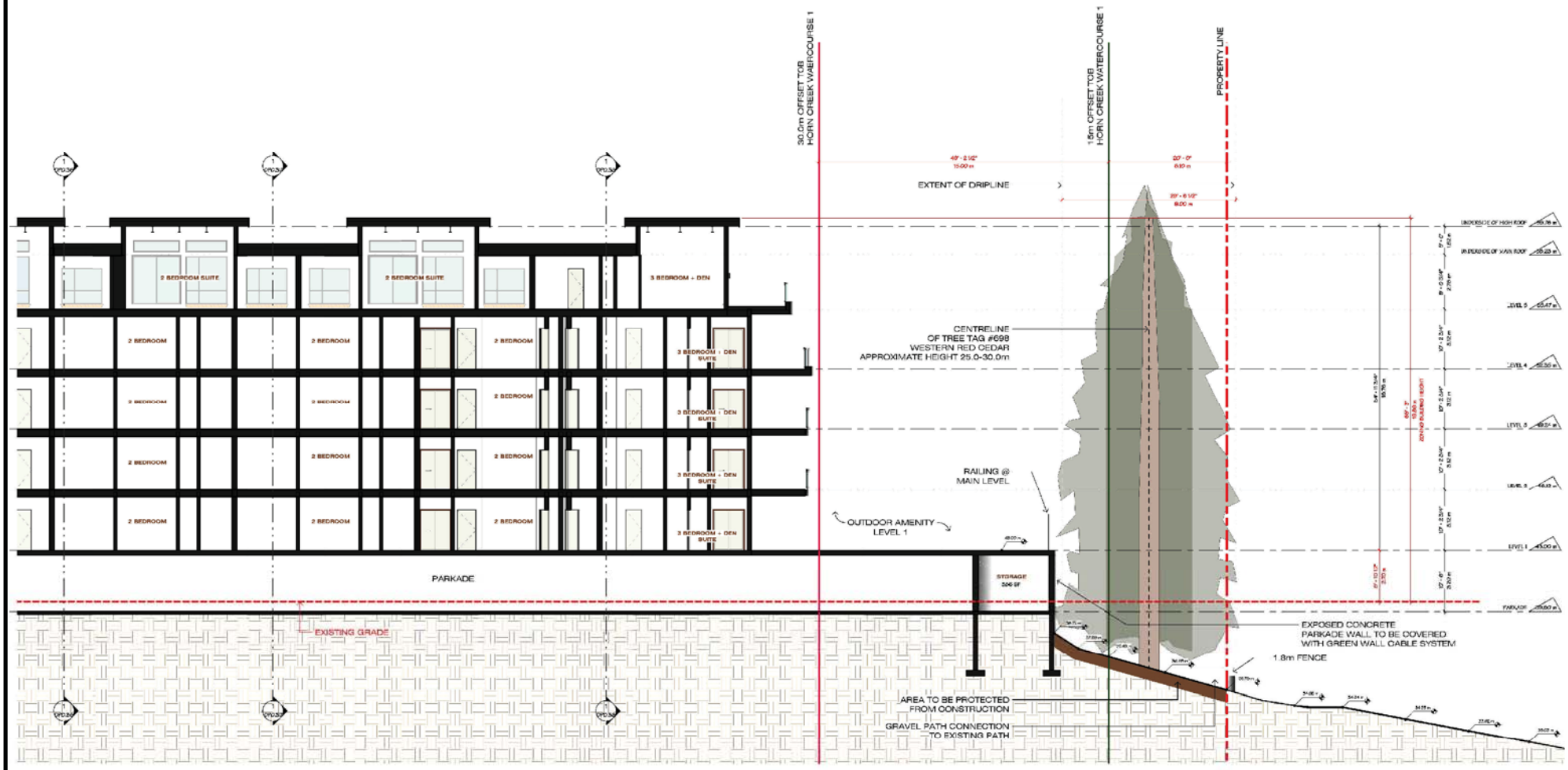
& portion of 3172 Gladwin Road

Figure 19 - Site Section (East to Wes
File No.: PRJ18-145

N	Date

Attachment: Figures 0 to 29 (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion



2

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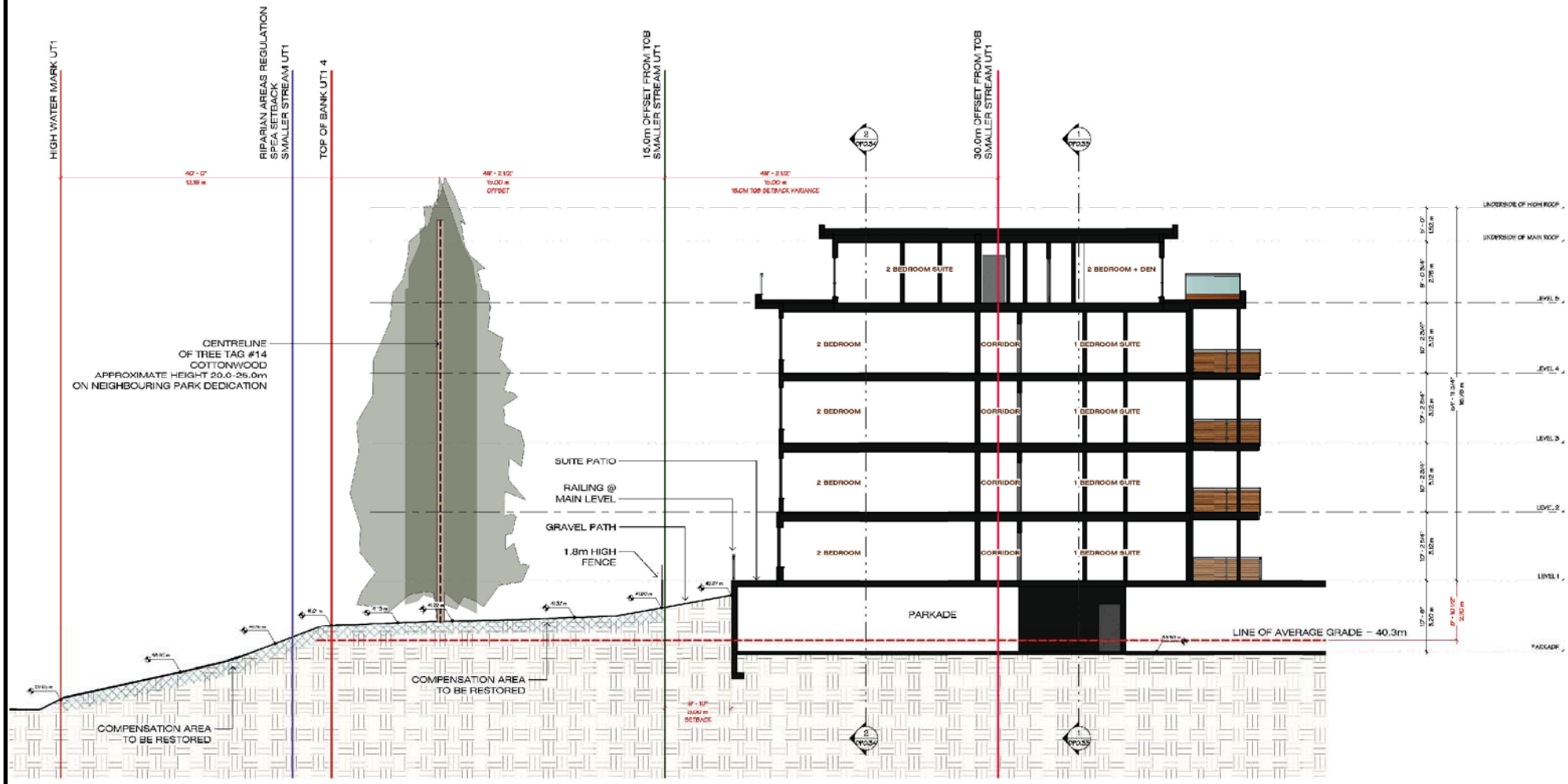
& portion of 3172 Gladwin Road

Figure 20 - Site Section (East to Wes
File No.: PRJ18-145

N	Date

Attachment: Figures 0 to 29 (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion

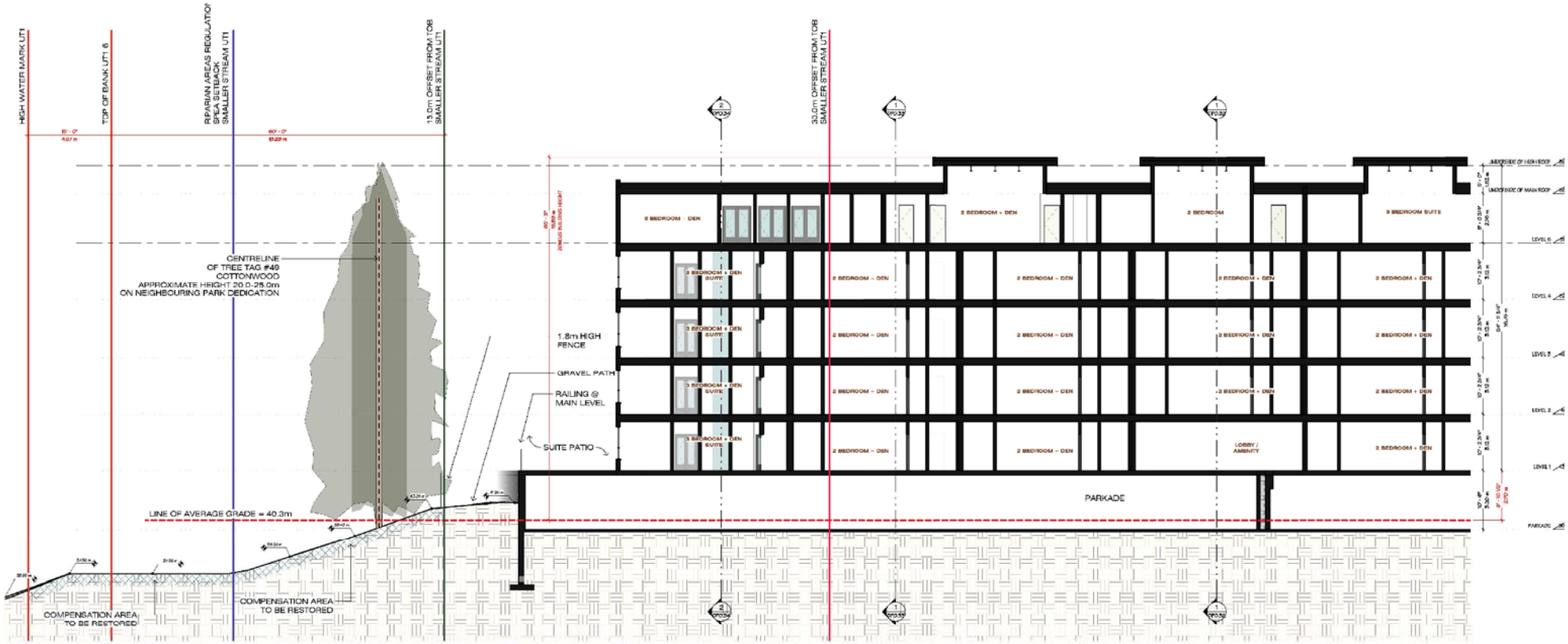


3182 Gladwin Road
& portion of 3172 Gladwin Road

Figure 21 - Site Section (North to So
File No.: PRJ18-145

N	Date

Attachment: Figures 0 to 29 (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion



4

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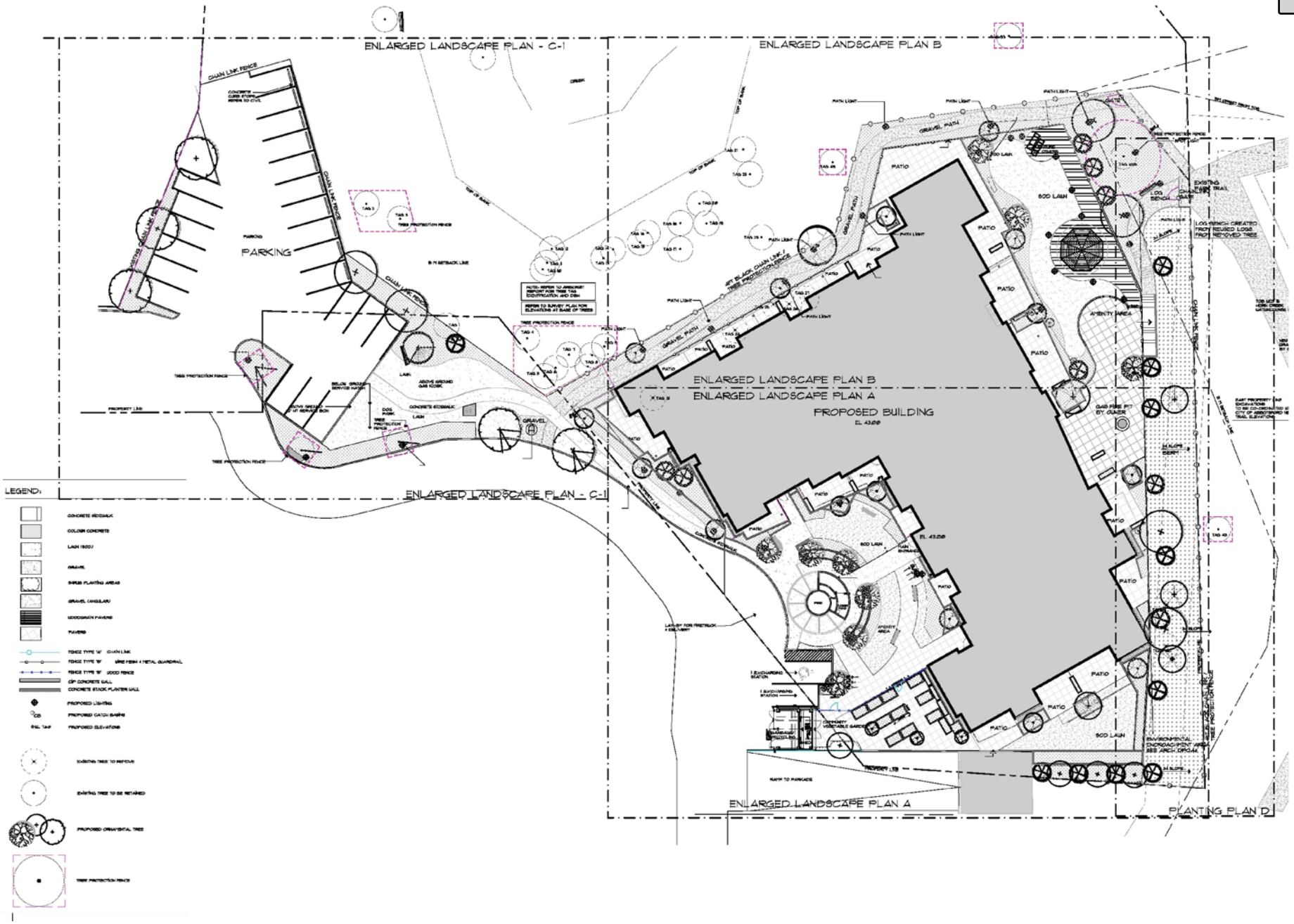
3182 Gladwin Road
& portion of 3172 Gladwin Road

Figure 22 - Site Section (North to So
File No.: PRJ18-145

N	Date

Attachment: Figures 0 to 29 (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion



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3182 Gladwin Road
& portion of 3172 Gladwin Road

Figure 23 - Landscape Plan
File No.: PRJ18-145

N	Date

Attachment: Figures 0 to 29 (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion

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3182 Gladwin Road
& portion of 3172 Gladwin Road

Figure 24 - Rendering (South Perspective)

File No.: PRJ18-145

N | Date

Attachment: Figures 0 to 29 (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion

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Figure 25 - Rendering (Northwest Perspective)

File No.: PRJ18-145

N | Date

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Figure 26 - Rendering (Level 5 Suite
File No.: PRJ18-145

N	Date

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Figure 27 - Rendering
File No.: PRJ18-145

N	Date

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3182 Gladwin Road
& portion of 3172 Gladwin Road

Figure 28 - Rendering
File No.: PRJ18-145

N	Date

Site Statistics
No. of Units = 73
Floor Space Ratio (FSR) = 0.84
Total Parking Spaces = 124 (2 EV

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3182 Gladwin Road
& portion of 3172 Gladwin Road

Figure 29 - Rendering
File No.: PRJ18-145

N	Date

9355 Young Road
Chilliwack, British Columbia
Canada V2P 4S3

Telephone: 604|793|9445
Facsimile: 604|793|9446
E-mail: chp@chparchitects.com

Craven| Huston| Powers| Architects CHPA

• Ryan Huston Architect A.I.B.C.
• Alvin Bartel Architect A.I.B.C.
• Justin Dyck Architect A.I.B.C.

TO:	City of Abbotsford	DATE:	April 15th, 2019
OWNER:	Horn Park Place Developments LTD. Incorporation Number: BC1125030	FROM:	Alvin Bartel
PROJECT:	Natura, On Forest's Edge	PROJECT #:	17104
RE:	Project Letter of Intent		

This letter is intended to accompany the Development Permit Application for the Natura project in Abbotsford BC located at 3182 Gladwin Road. The property is being proposed for development to facilitate the construction of a 5-storey wood frame residential building.

There will be 73 residential units, ranging from studio to three-bedroom condominium units located on floors 1-5. There will also be 1 level of underground parking to accommodate the required parking for the development. The underground parking will account for the required parking as well as storage & bicycle parking. The entrance to the building is transitioned by a reflective pond adjacent to a concrete paver walkway & sod lawn incorporating up lighting. A garden adjacent to the front entrance facing south allows residents to connect with nature and grow their own vegetables. The main floor also includes a large indoor amenity space which opens out to a large outdoor amenity deck facing a riparian forested area. As a connection to the existing Horn Creek trail a stairway has been provided to transition from the exterior deck to this lower area.

Every residential unit has an enlarged outdoor deck/patio to provide a better connection to the natural surroundings of the site. Moreover, each unit has its own storage room located at a separate, central location on each floor. The 5th floor is set back from the typical floors below to reduce the visual impact of the building and allow for larger deck spaces. It also includes an indoor amenity space with washroom facilities and opens to an outdoor amenity space.

The site surrounding the building has been designed to provide livable outdoor amenity areas for residents and visitors in order to have a better connection to the surrounding natural terrain. The underground parking will be accessed via an existing shared parkade ramp to the adjacent residential building. The front entrance of the building will have two designated electric charging stalls including one accessible parking. Visitor parking will be accommodated at the northwest end of the site.

This unique site is nestled within the existing gated community of Regency Park. Neighbouring properties include other multi-family residential buildings. A sense of community and connectivity between the residents will be fostered by using a strategic design path for both indoor and outdoor spaces. Human-scale living will be provided by featuring warm, natural high-quality materials on all floors and by sheltering the main entrances and exits with canopies that lead to outdoor amenity spaces. Ground floor units are screened with landscaping to provide privacy for the residents. The proposed development fits the OCP designation for this area. This

Attachment: Attachment A: Letter of Intent (dated April 15, 2019) (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion of

development will be cohesive with the surrounding land uses which are designated as multi-family residential. This unique building provides architectural interest to the surrounding area and visually connects with its natural surroundings through West Coast contemporary design.

It is proposed to use the RML (Low Rise Apartment) zone to accommodate this project. The following variances will be requested as necessitated by this site's unique nature:

1. Environmental Setback TOB UT-1 from 30.0m to 15.0m **(15.0m Variance)**. Refer to Environmental Report.
2. Encroachment in 30.0m Environmental setback from TOB Watercourse-1. (Refer to DP0.4a indicating encroachment area and proposed compensation area).
3. **1.0m** reduction in drive aisle width is requested (from 7.5m to 6.5m) for the underground and surface parking areas to accommodate parking efficiencies as indicated on site.
4. South Property Line – Setback reduction for the parkade from the South and West property lines.
5. South Property Line - Level 5 Building Face Setback Variance Required from 10.0m to 7.65m **(2.35m Variance)**.
6. South Property Line - Level 5 Balcony Projection from 10.0m to 2.85m **(7.15m Variance)**.
7. East Property Line – Level 5 Building Face Setback Variance Required from 10.0m to 8.05m **(1.95m Variance)**.
8. East Property Line – Level 5 Balcony Projection from 10.0m to 6.24m **(3.76m Variance)**.
9. South Property Line – Levels 1-4 Building Face from 6.0m to 1.5m **(4.5m Variance)**.
10. West Property Line – Levels 1-4 & 5 Building Face & Balconies from 6.0m to 3.50m **(2.50m Variance)**.
11. East Property Line – Stair Projection from 6.0m to 4.18m **(1.82m Variance)**.
12. Environmental Setback TOB UT-1 from 30.0m to 15.0m **(15.0m Variance)**. Refer to Environmental Report.

Due to sloping grades on the site, some of the parkade walls will be exposed. As a solution, a berm and vegetated area is proposed to conceal the concrete wall facing the forested area. No large retaining walls will face the existing neighbouring residential buildings adjacent to the site on the south side.

This innovative building is uniquely designed, sustainable and forward thinking. The developers will aim to achieve Step 3 of the BC Energy Step Code, pushing for a new standard in residential construction in the Fraser Valley. It is also intended to 'future-proof' the building by including preparations and rough-ins to install solar panels and/or electric charging stations at the parkade. The design will aim to improve accessibility and include aging-in-place features for the residents.

Parking is largely accommodated in the underground parkade- 106 parking stalls underground & 3 above ground for residents; 15 above ground visitor stalls for a total of 124 stalls. The total amount of stalls required is 124. We are also indicating 23 Small Car stalls (31 maximum allowable) & 22 Tandem stalls in the parkade. We are also providing 6 additional surface stalls (off project property) as part of a community contribution to the neighbourhood (These stalls are **not** included in the overall parking count).

This project will provide quality housing and amenity space for families and singles in Abbotsford. More than 75% of the total unit mix is comprised of 2-bedroom units and larger. Although the site is large, a reduction in setbacks from the creek and Statutory Right of Ways (as noted above), are required for this project to be viable. An Updated Architectural Drawing Package including sections, Updated Landscaping Drawings with Updated Landscape Cost Estimate, an Updated Site Grading Plan, an Updated Site Servicing Plan, an Updated Environmental Assessment (EA) report, a new Construction Environmental Management Plan (CEMP), a new Erosion and Sediment Control Plan (ESC), a new Environmental Restoration Plan, an Updated Geotechnical report, and 8 legal agreements between HPPD and the Strata next door have been provided and submitted with this re-submission.

Community Amenity Contribution Proposal

The project will enhance the entire community by providing extra tree planting, dedicating a large portion of the land to a public park, resurfacing the existing trail network and providing cash-in-lieu for an easement machine and transit improvements. Residents from the neighbouring strata will have access to 6 new visitor parking stalls as well as a couple of EV charging stations in front of the main entrance of the building. In addition, Natura will improve the access and safety of the Horn Park Trail system and the surrounding trails with a bench (made from wood from a large Douglas- fir tree donated by the project located at 32888 Maclure Rd), new fencing, park signage and even a dog drinking fountain and dog bag dispenser for the whole community to enjoy.

The developers are fully committed to improve the natural environment and leave a legacy for future generations to appreciate. Their motto is *"Living in harmony with Nature"*. They see this project as a wonderful opportunity to walk the talk. As such, the developers are proposing the following important actions and items as Community Amenity Contribution for the Project:

1.- Tree & Shrub Planting, Wetland Improvements
The developer will provide a **Cash-in Lieu contribution of $13,648.30 for Wetland planting** . In addition, they will plant several extra trees and in the proposed compensation area in the SPEA, exceeding the minimum required amount by the CoA Tree Protection Bylaw. Please refer to the Environmental Report for more details.

2.- Land Dedication
After the riparian areas adjacent to the building have been fully restored with hundreds of new plants, shrubs and trees, the developer will dedicate the SPEA to the City of Abbotsford instead of maintaining it as private property. (Refer to DP0.4b for details of the area to be dedicated). In that way the area will contribute to the City's goals of long term preservation and stewardship of the lands by the City and to increase the natural corridor around the Horn Creek Park system.
The **total area to be dedicated to the CoA is 59,019.19 SF (5,483.06 SM)**, based on the 2019 Property Assessment Notice the value of the dedicated land would be a staggering **$1.925 Million**. However, considering the value of the CoA Park Land at $90,000 per Acre, the value of the dedicated land is **approximately $122,250**. Regardless of the land valuation, the developer believes that the land dedication itself is more than enough to compensate for the Streamside Protection Bylaw Variance, as this project does not require rezoning.

In addition to that, the Developer will voluntarily **dedicate approximately 3.0m along Gladwin Road frontage to align with existing neighbouring dedications** on Gladwin Road.

3.- Cash-in-Lieu for Easement Machine
As per agreement with the CoA Engineering Department, the developer will create a 3m SROW for the access of an Easement Machine for sewer flushing and maintenance (Refer to DP0.4b). In addition to granting access, a Cash-in-Lieu contribution will be provided towards the purchase of a small easement machine. Total Cash-in Lieu contribution **$15,000**.

4.- Cash-in-Lieu Contribution for Transit.
The Developer agrees to provide a cash-in-lieu contribution of **$2,000** towards the City's installment of future access improvements on Gladwin Road.

7.-Dog drinking fountain, dog bag dispenser and new Horn Creek Park Sign with trail map.
The above items will be provided as per the details in the landscape drawings. The approximate cost is **$8,250**

8.- **EV Charging Stations**
Finally, the developer will install two public EV charging stations in front of the main entrance of the proposed building. These charging stations will be accessible to the neighbouring strata's for their use as well.
The total cost for two EV charging stations is: **$9,500**

Attachment: Attachment A: Letter of Intent (dated April 15, 2019) (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion of

We trust this re-submission meets all the City of Abbotsford requirements.

Sincerely,

Alvin Bartel Architect A.I.B.C., M. Arch.
LEED Accredited Professional
CHP Architects
9355 Young Road
Chilliwack, BC, Canada V2P 4S3
Tel. 604-793-9445

Attachment: Attachment A: Letter of Intent (dated April 15, 2019) (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion of

Attachment: Attachment B: Geotechnical Report, prepared by WSP (dated February 8, 2019) (PDS 045-2019 : DP with V application for 3182

February 8, 2019

WSP File No: 171-00950-01

Horn Park Place Development Ltd.
8 Boulderwood Place
Port Moody, BC V3H 4G5

Attention: Mr. Bruno Jury, P.Eng., MBA, LEED, President

Dear Sir,

Project: Proposed Multi-Storey Residential Building, 3182 Gladwin Road, Abbotsford, BC
Geotechnical Hazard & Site Assessment Report- Revision 2

1 INTRODUCTION & BACKGROUND

In general accordance with our Proposal P17-11005-34 dated April 04, 2017, WSP Canada Inc. (WSP) has prepared this geotechnical hazard and site assessment report for the proposed residential development to be located at the above-referenced address.

Written authorization to proceed with the scope of work described in the proposal was received from Horn Park Place Development Ltd. (the "Client") on April 04, 2017. Detailed geotechnical engineering recommendations for design and construction of retaining walls at the site are beyond our current scope of work. WSP would be pleased to provide a proposal for the design of retaining structures at the site when detailed site grading information is available. Our scope of work also did not include assessment of the site soil or groundwater with respect to environmental considerations, or provision of recommendations for any off-site work required as part of the proposed development.

This report was prepared in general accordance with the APEGBC "Guidelines for Legislated Landslide Assessments for Proposed Residential Developments in BC (revised May 2010)" and the City of Abbotsford Steep Slope Development Permit Guidelines "Bylaw 2600-2016". This report was also prepared in accordance with the guidelines for geotechnical hazard assessments presented in the paper entitled "Hazard Acceptability Thresholds for Development Approvals by Local Government" Revised November 1993, by Dr. Peter Cave (1993 Cave Paper).

This report was originally updated and revised (Revision 1) with minor changes to address the Client name, Property Number and proposed number of stories (increased from 4 to 5) and parkade location as the Client requested.

This most recent revision (Revision 2) of the report addresses the comments received from the City of Abbotsford regarding the Revision 1 report they have received and also the technical memorandum prepared by WSP dated August 1, 2018 (attached). Specifically, the City of Abbotsford requested the following items be completed as follows:

100 - 20339 - 96 Avenue
Langley, BC V1M 0E4

Tel.: 604-533-2992
Fax: 604-533-0768
wsp.com

- Review and approval of the lot grading plan by WSP;
- Re-examine the storm water infiltration by the geotechnical engineer if the development proposal involves it;
- Amending the address of the property to 3182 Gladwin Road in the completed Appendix D WSP previously provided;
- Amending the Appendix D to reflect the landslide assessment report in reference to Development Permit and Building Permit; and
- Review to determine if the assessments made and recommendations provided in the Bank Stabilization Report prepared by Golder Associates (dated May 14, 2009) address the current conditions of the bank.

Also, the seismic consideration in this revision has been updated for the slope stability analysis and site classification to address changes in the 2018 BC Building Code 2018 which came into effect in December of 2018.

2 SITE & PROJECT DESCRIPTION

The subject site is located east of Gladwin Road, west of Trafalgar Street and south of Maclure Road, in Abbotsford, BC. The approximate location of the site is illustrated on the attached Figure 1. Based on City of Abbotsford webmap imagery, the subject site is irregular in shape and encompasses a total area of approximately 1.22 ha.

Horn Creek and Horn Creek Park are located adjacent to the east side of the site. An unnamed watercourse, a tributary to Horn Creek, is situated to the north of the site. A gravel surfaced municipal walking trail, within Horn Creek Park, runs immediately east of the site. An access trail runs through the middle portion of the property, where it intersects with the municipal walking trail. A manhole for a sanitary sewer is located on this trail. The Abbotsford webmap also indicates that a sanitary sewer main is situated along the eastern boundary of the site. Three existing multi-storey residential buildings with underground parking structures are located to the west and southwest of the site.

The ground surface on the majority of the subject site includes slopes generally in the range of 10 and 15%. Two large fill stockpiles are located within the eastern portion of the site. Steep slopes (ranging between 60% and near vertical) are located adjacent to Horn Creek approximately 20 to 30 m to the east of the site. The unnamed watercourse is situated within a relatively shallow gully, with sidewalls inclined up to 50%, within the northern portion of the site.

Based on our discussions with and drawings provided by the Client, the proposed development at the site will consist of a five-storey wood-framed residential building with a one-level underground parkade. The proposed development is shown on the attached conceptual drawing (Figure 2).

Information regarding building loads for the proposed development at the site was not provided to us when this report was prepared.

Attachment: Attachment B: Geotechnical Report, prepared by WSP (dated February 8, 2019) (PDS 045-2019 : DP with V application for 3182

3 SCOPE OF WORK

The geotechnical scope of work included the following:

- Review of the Geological Survey of Canada (GSC) surficial geology map covering Abbotsford;
- Review of existing reports for sites in the vicinity of the subject site, the City of Abbotsford webmap, and topographic survey and building development concept plans;
- Review of historical aerial photographs covering the site;
- Site reconnaissance;
- Subsurface investigation;
- Analysis of the collected geotechnical information
- Slope stability Analysis (Original ground and proposed site grading plan); and
- Preparation of this report.

Further details regarding the scope of work are provided below.

3.1 REVIEW OF EXISTING INFORMATION

The following maps and documents were reviewed for this report:

- Geological Survey of Canada (GSC), Surficial Geology Map 1485A, Abbotsford;
- Levelton Consultants Ltd. (Levelton - a WSP acquisition) – Geotechnical Engineering Assessment Report – Proposed Multi-family Residential Building, 32888 Maclure Road, Abbotsford, BC, File # 806-0657, dated December 15, 2006;
- Tunbridge & Tunbridge BCLS – Topographic Survey Plan – Proposed Lot 1 Sec 21 Township 16 NWD Plan EPP72237, 3176 Gladwin Road, Abbotsford, BC, File # G459TOPSK2, dated May 17, 2017;
- Naturbana Properties Ltd. – Conceptual Architectural Sketch – Proposed Multi-Storey Building and Underground Parkade, Received on May 16, 2017;
- Envirowest Environmental Consultants – Proposed Setbacks – 32888 Maclure Road and 3176 Gladwin Road, Abbotsford, BC, Drawing No. 1392-02-01 dated June 19, 2008;
- City of Abbotsford – Steep Slope Development Permit Guidelines, Bylaw 2600-2016;
- APEGBC - Guidelines for Legislated Landslide Assessments for Proposed Residential Developments in BC (revised May 2010);
- Golder Associates, Phase II and Phase III Report, Bank Stabilization Marshall Creek and Horn Creek Erosion Sites, Abbotsford, BC, Report# 07-1450-0007, dated May 14, 2009;

Attachment: Attachment B: Geotechnical Report, prepared by WSP (dated February 8, 2019) (PDS 045-2019 : DP with V application for 3182

- Google Earth satellite imagery dated 2016;
- City of Abbotsford online webmap;
- Site Grading Plan-KMCivil Consultants Ltd., Drawing 3 of 4, Re-issued for development permit on January 9, 2019; and
- Natura Condos, drawings package, CHPA, DPO.0 DPO-35 (Revised December 20, 2018).

3.2 REVIEW OF HISTORICAL AERIAL PHOTOGRAPHS

Stereo pairs of historical aerial photographs covering the subject site and surrounding area were obtained from the Geographic Information Centre of the University of British Columbia. The reviewed photographs were taken in the following years: 1940, 1949, 1963, 1969, 1974, 1980, 1983, 1988, 1994, 1999 and 2004. The scale of the aerial photographs ranged from approximately 1:10,000, to 1:30,000.

3.3 SITE RECONNAISSANCE

The site reconnaissance was conducted by a WSP Geotechnical Engineer on January 26, 2017. The site reconnaissance included a foot traverse of the gentle and steeply sloping areas of the site and the west and north banks of Horn Creek and the unnamed watercourse, respectively. Slope angles were measured from the horizontal with a hand-held inclinometer. Some areas with very steep slopes (60% up to vertical) limited access for visual review. Site photographs taken during the site reconnaissance are attached to this report.

A WSP Geotechnical Engineer also visited the site on January 23, 2019 with the Client. This included a foot traverse of the exiting trails and the area affected by the recent slope failure. We understand that the slope failure occurred in November 2018.

3.4 SLOPE STABILITY ANALYSIS

Pseudo-static limit equilibrium slope stability analyses was conducted to assess the stability of the steep slopes on the east and northeast areas of the site under both static and seismic loading conditions, with respect to potential impacts on the proposed development. The analyses were conducted using RocScience Slide 5.0 software employing the Bishop Simplified method with circular slip surfaces. The slope geometry was modeled based on topography illustrated on City of Abbotsford Webmap and measurements gathered during our site reconnaissance. Soil and groundwater conditions used for the modeling were based on the findings of the subsurface investigation discussed below.

Also, the slope stability analyses was updated to reflect the information in the recently received proposed grading plan.

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3.5 SUBSURFACE INVESTIGATION

WSP conducted subsurface investigations at the site on April 18, and 20, 2017. The investigations included advancing four auger holes (AH17-01 to AH17-04) using a track-mounted drill rig and five test pits (TP17-01 to TP17-05) using a tracked excavator. The approximate locations of the test holes are shown on Figure 3. The auger holes extended to depths ranging from about 4.5 to 18 m below existing grade, and the test pits extended to depths of about 3.0 to 3.3 m below existing grade. The purpose of the test pits was to assess the quality of fill observed within two relatively large stockpiles situated on the site.

Dynamic Cone Penetration Tests (DCPTs) were conducted at AH17-01 and AH17-03 to assess the *in-situ* relative density / consistency of the soil. The DCPT is widely used by local geotechnical practitioners and involves advancing a cone into the ground using an automatic trip hammer with a weight of 63 kg and a free-fall drop of 750 mm. The number of blows required for each 305 mm interval of depth of advancement of the cone is recorded. The DCPT blow counts provide an indication of the consistency / relative density of the soils. While the DCPT N-value data can sometimes provide a general 1:1 correlation with Standard Penetration Test N-values to a depth of about 10 m in sand, it is not universally accepted as a reliable alternative to the Standard Penetration Test, and care should be taken when interpreting the DCPT N-values in engineering design. The DCPTs extend to about 18 and 9 m below existing grade at AH17-01 and AH17-03, respectively.

The soil and groundwater conditions encountered at the test holes were logged in the field by a member of our geotechnical staff. Disturbed samples were collected from the test holes for visual classification and moisture content determination purposes. The test holes were closed in conformance with provincial groundwater protection requirements upon completion of the investigation.

Description of the soil and groundwater conditions observed at the test holes is provided on the attached soil logs. The soil logs also graphically illustrate the moisture content of the disturbed soil samples obtained from the test holes, and the soil logs for AH17-01 and AH17-03 show the results of the DCPTs. A summary description of the conditions observed at the test holes is provided in the following section of this report. The descriptions provided on the soil logs should be used in preference to the summary description provided below.

4.0 FINDINGS

4.1 SOIL AND GROUNDWATER CONDITIONS

The surficial geology map (Map 1485A) covering the subject site indicates that the site soils consist of Pleistocene Sumas drift pitted outwash deposits laid down by proglacial streams, comprised of gravel and sand up to 40 m thick, normally ranging from 5 to 25 m thick. Aeolian deposits comprised of windblown sand and silt ranging from 1 to 8 m thick are mapped immediately east of the site within the Horn Creek ravine complex.

The native soils encountered at the test holes were generally consistent with those described on the surficial geology map, typically consisting of granular soils. Similar deposits of granular soils have been encountered at nearby sites where we have conducted subsurface investigations. The following generalized soil profile was observed at the boreholes:

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- **Fill Stockpiles** – TP17-01 and TP17-02, within the northern stockpile adjacent to the unnamed watercourse, and TP17-03 and TP17-05, within the eastern portion of the site, encountered fill comprised of soft / loose sandy silt to sand and gravel fill to depths ranging between 0.7 and 2 m below existing ground surface. The moisture content of samples of the stockpile fill ranged between 12 and 35%.

- **Fill** – a surface deposit of fill consisting of loose to dense / soft to firm silty sand / sandy silt to sand and gravel some silt some organics was encountered at AH17-01 to AH17-04. The fill typically extended to depths ranging between 0.6 and 1.5 m below existing grade. The moisture content of samples of the fill ranged between 4 and 38%.

- **Sandy Silt / Silty Sand / Silt** – a deposit of sandy silt / silty sand / silt was encountered underlying the fill in all of the test holes. This layer typically extended to depths ranging between 3 and 11.5 m below the ground surface. Based on the DCPTs and drilling effort, the upper 3 to 4 m of this deposit was judged to be loose to compact / firm, but became compact to dense / very stiff to hard with increased depth. The moisture content of samples from this deposit ranged between about 15 and 38%. All of the test pits, and AH17-04, were terminated in this stratum at depths ranging between approximately 3 and 8.4 m below grade.

- **Sand / Sand & Gravel** – a deposit of sand with varying gravel content and trace silt was encountered below the sand and silt stratum. AH17-01 and AH17-02 were terminated in this deposit at depths of about 18 and 12 m below the surface, respectively. Based on the DCPTs and drilling effort, this deposit was judged to be compact to dense, increasing in density with depth. The moisture content of samples obtained from this stratum ranging between 13 and 23%.

Groundwater seepage was encountered in the test holes at depths ranging from 3 to 8.5 m below existing ground surface during the time they remained open. We anticipate that the depth to the groundwater table at the site fluctuates on a seasonal basis, and that perched groundwater conditions develop atop the fine-grained soils during and following periods of sustained precipitation.

4.2 REVIEW OF EXISTING INFORMATION

Review of the geotechnical assessment report prepared by Levelton for a proposed development located immediately to the northwest of the current site was completed. Additionally, the City of Abbotsford guidelines for development on steep slopes (Bylaw 2600-2016) were reviewed for the purpose of this assessment. A summary of the reviewed information follows:

4.2.1 LEVELTON CONSULTANTS LTD. DECEMBER 2006 GEOTECHNCIAL ASSESSMENT REPORT

Levelton advanced six (6) auger holes to depths ranging from 6.1 to 15.2 m below existing grade. DCPTs were conducted in three (3) of the auger holes to depths ranging from 9.3 to 9.6 m below grade to assess the *in-situ* relative density / consistency of the soils. Levelton encountered approximately 0.3 to 0.45 m of topsoil underlain by firm to very stiff silt / sandy silt that extended to depths of approximately 1.5 to 3 m below grade. The test holes were terminated in compact to very dense granular soils located below the silt / sandy silt layer.

Levelton did not encounter groundwater seepage at their test holes while they remained open.

4.2.2 CITY OF ABBOTSFORD STEEP SLOPE DEVELOPMENT PERMIT GUIDELINES BYLAW 2600-2016

This Official Community Plan bylaw provides guidelines on development on or near steep slopes, while aiming to protect residents and property from the potential risk of natural hazards.

The following measures pertain to the subject site:

- Avoid developing on land with slopes greater than 30%;
- Ensure all developments, in addition to septic fields, swimming pools, hot tubs, ponds, or other uses at or near the top or base of steep slopes, are set back a minimum of 10 m from the top or base of any steep slope except as otherwise recommended by a qualified professional. Where development is near slopes greater than 30%, increase the setback to a minimum of 15 m;
- Design a project to fit the site rather than altering the site to fit the project;
- Align roads to follow natural site contours, conforming to existing topographic conditions rather than cutting across contours;
- Provide site grading that is smooth and stable. Finished slopes of all cuts and fills should not exceed 33% grade (3:1) unless the applicant can demonstrate that steeper slopes can be stabilized and maintained adequately;
- Avoid undercutting the base of steep slopes for building, landscaping or other purposes;
- Ensure fill is not located within 10 m of the top of a steep slope;
- Site drainage including roof and landscaping to convey surface water away from slopes and avoid ponding near slopes;
- Maintain and / or reinstall vegetation on the slopes and within any required setback above the slopes in order to absorb water and minimize erosion; and
- Avoid tree removal on steep slopes and retain trees as much as possible elsewhere.

4.2.3 BANK STABILIZATION MARSHALL CREEK AND HORN CREEK EROSION SITES

A report has been prepared by Golder Associates Ltd., to design works to stabilize stream banks and mitigate potential geotechnical hazards at several sites in the Horn and Marshall Creek areas in Abbotsford, BC. WSP has been provided with a copy of the Golder report.

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- Based on the report, two sites (G and H) have been rated for the potential risk of bank instability and consequences failure as low and moderate priority (Figure 4). In site G, oversteepend slopes have the potential to retrogress. Stabilization strategies for this area include placement of rock riprap as required, if significant erosion continues. At site H, bank erosion is a significant sediment source for the creek and the bank instability may affect the adjacent walking path. Stabilization strategies for this area include installation of gabions along the creek bank combined with backfilling of the erosion scarp behind the gabions. This area is also considered suitable to install a boulder cluster to form a riffle structure and dissipate flow energy to reduce flow velocities.

- We understand that the Client has an agreement with the City of Abbotsford to allow pedestrians to use the client's property as a walkthrough while City's crews repair and stabilize the bank areas by May 2019.

4.3 AERIAL PHOTOGRAPH REVIEW

The site was covered with pasture and scattered trees on the aerial photographs from 1949 to 1988. A building was observed on the site on the aerial photographs from 1949 to 1963.

Fill stockpiles were observed within the southeastern portion of the site on the 1994 air photographs. The site was recently graded and a partially constructed building was observed immediately to the west. Recent buildings immediately to the west and south were observed on the 1999 aerial photographs.

No slope instability was observed on the reviewed aerial photographs or on online imagery within or in the vicinity of the site (along Horn Creek ravine).

4.4 SITE RECONNAISSANCE OBSERVATIONS

The southeastern portion of the site is generally inclined between about 10 and 15% for 50 to 80 m down to a sharp break (Top of Bank - TOB) along Horn Creek (Photograph 1). The site was generally covered with immature alder and cottonwood trees that were about 20 years old. Two large fill stockpiles up to about 3 m high with side slopes of about 35 degrees were observed on the site (Photographs 2 and 3). No slope instability was observed along the perimeter of these stockpiles. See the attached Figure 3 for the approximate locations of the site features.

A gravel access road about 5 m wide was observed within the middle portion of the site. Horne Creek Trail is situated immediately to the east of the site within Horn Creek Park.

A landslide scarp was observed immediately below the TOB and east of Horn Creek Trail (Photograph 4). The scarp was about 30 years old based on vegetation cover and some recent raveling. The dimensions of the scarp were approximately 15 m wide, 8 m long and 2.5 m high. The landslide impacted Horn Creek about 20 m downslope. No undercutting of the slope was observed from Horn Creek. The steep slope down to Horn Creek was covered with mature conifer trees with minimal leaning or curved trunks observed (Photograph 4). WSP also visited this location on January 24, 2019 to review the recent slope failure along the Horn Creek Trail at this location (Photograph 5).

A second landslide scarp was observed along the Horn Creek ravine slope about 50 m to the south (Photograph 6). Based on vegetation cover, the landslide was estimated to be greater than 100 years old. The scarp dimensions were approximately 15 m wide and 3 m high. No recent instability was observed around the scarp.

Below the site, the Horn Creek stream channel was about 3 to 6 m wide, contained sediment in storage wedges up to about 150 mm in diameter and occasional small and large woody debris, which indicates a moderate to high water transport potential (Photographs 7 and 8). A log jam was also observed with this reach of the stream. The channel gradient averaged about 8%. Angular rip rap up to 0.7 m in diameter was observed along the east channel bank.

A small unnamed watercourse was observed within a shallow gully, less than 3 m deep, in the northern portion of the site (Photograph 9). The slopes below the TOB adjacent to the proposed building site ranged between about 30 and 50% for about 3 to 8 m (Photograph 10). The watercourse channel was about 1 m wide; sediment comprised of sand was observed in storage wedges and no woody debris was evident. This indicates a low water transport potential. The gradient of the watercourse ranged between about 15 and 25%. No slope instability was observed along the sidewalls of the gully. The slopes within the headwall of the watercourse gully ranged between 20 and 50%. The area was generally poorly drained with several areas of seepage observed.

4.5 SLOPE STABILITY ANALYSIS

WSP conducted a preliminary limit equilibrium stability analysis for the slope cross section, A-A', and C-C' using the original ground profile and also the proposed site grading plan provided by KMCivil Consultants Ltd (see Figures 3 and 5 for the approximate location). Based on the Site Section Drawings (DWG DPO.28 to DPO.35) the average grade at the proposed development would be El 40.3m. The analysis was completed using RocScience Slide 5.0 software, which employs various methods of slices with circular arcs to assess stability. The limit equilibrium stability analysis computes a minimum Factor of Safety (FoS) for a given position on the slope being modeled based on the boundary conditions input into the program. The FoS represents the ratio of moments and forces resisting sliding failure to the moments and forces acting to induce failure. A FoS less than 1.0 represents unstable conditions. Conversely, a FoS 1.0 or greater indicates stable conditions. To meet design standards considered typical for this nature of project, a minimum FoS of 1.5 is required for the slope under static loading conditions, and a minimum FoS of 1.0 is required for the slope under design basis seismic loading conditions.

The slope stability analyses was completed using soil parameters shown in Table 1 estimated from the conditions encountered at the test holes, visual review of the slopes during the site reconnaissance, and engineering judgement. The proposed slope configuration within the site for static and seismic loading is shown on the attached slope stability models for Section A and C on Figures 6 to 13. The results of the analyses under static loading conditions indicated the presence of slip surfaces with a FoS less than 1.5 within the upper 1 m of loose to compact sand and gravel. However, these slip surfaces do not extend into the compact to dense sand and gravel below.

The stability of the slope under seismic loading was conducted using a seismic coefficient of 0.296 associated with the 1:2,475-year return period design ground motion obtained from Natural Resources Canada Earthquakes Canada website for the site longitude and latitude. The results of the

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analyses under seismic loading conditions indicate that no slip surfaces with a FoS less than 1.0 are present within the steep slope areas of the site slopes when considering deep seated slope stability.

Table 1: Soil Parameters for Slope Stability Analyses

Soil Layers	Elevations from Existing Ground Surface (m)	Unit Weight (kN/m^3)	Cohesion (kPa)	Friction Angle (°)
Compact to dense Silty Sand	0 to 8	19	0	36
Dense Sand some Gravel	8 to 18	20	0	40

5 GEOTECHNICAL HAZARDS

5.1 GENERAL

The 1993 Cave Paper identifies the following geotechnical hazards that could impact proposed residential developments:

1. Debris flows and debris torrents;
2. Debris floods;
3. Inundation by flood waters;
4. Snow avalanche;
5. Rock fall;
6. Large catastrophic landslides;
7. Small-scale landslides; and
8. Mountain stream erosion / avulsion;

It is our opinion that the hazards 1 through 6 above are not present on the subject site due to the following:

- There are no gullies or mountain streams on site that could be a source of debris flow or debris flood;
- The site is not within a flood plain;
- There are no steep slopes or rock bluffs above the site that could be a source for a snow avalanche or rock fall;

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- The deep borehole (AH17-01) did not encounter soils associated with large, deep seated landslides. Furthermore, we did not observe evidence of large landslides on air photos or during the site reconnaissance.

It is our opinion that a stream erosion hazard could be present along the toe of the steep slope along Horn Creek. This is evidenced by two existing slope failures at the toe of the slope along the Horn Creek ravine side slope. It is also our opinion that small-scale landslide hazards are present on the slopes below the TOB east of the site based on two landslide scarps observed during the site reconnaissance.

The 1993 Cave Paper provides a series of tables that determine the acceptability of a development, based on the type of hazard, the type of development / construction proposed, and the estimated annual return frequency. Table 2 below provides WSP's estimate of annual return frequencies for the natural hazards discussed above.

Table 2: Annual Return Frequency

Geotechnical Hazard	Estimated Annual Return Frequency	
	Safe Building Area	*Geotechnical Setback Area*
Inundation by flood waters	Not a Consideration	Not a Consideration
Mountain stream erosion and avulsion	<1:500	1:10 – 1:100
Debris flows and debris torrents	Not a Consideration	Not a Consideration
Debris floods	Not a Consideration	Not a Consideration
Small-scale localized landslides	< 1:10,000	1:50 – 1:200
Large massive catastrophic landslides	Not a Consideration	Not a Consideration
Snow Avalanche	Not a Consideration	Not a Consideration
Rock fall small scale detachment	Not a Consideration	Not a Consideration

The estimated annual return frequencies identified in Table 2 were expressed based on the annual return frequencies in accordance with the 1993 Cave Paper and Guidelines for Legislated Landslide Assessments. The annual return frequencies are complex to define in quantitative terms. Consequently, the annual return frequencies estimated in Table 2 were established primarily on engineering judgment, using the information available when this report was prepared, and are based on the current site conditions. The annual return frequencies are subject to change should activities such as deforestation within setback areas occur, as such activity can increase slope instability.

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5.2 ACCEPTABILITY OF PROPOSED CONSTRUCTION

As introduced above, the acceptability of a proposed development is dependent on the type of hazard, degree of hazard (expressed as the estimated annual return frequencies in Table 2), and type of development being considered. Using the 1993 Cave Paper as a guideline for assessing the acceptability and the above quantitative occurrence frequencies, WSP considers the site of the proposed residential development approvable but with siting requirements (geotechnical setback) to avoid the hazard, or with requirements for protective works to mitigate the hazard. Based on the topographic survey, and the property line and sanitary sewer main locations, the east property line is setback a safe distance from the TOB along Horn Creek. The only building setback required is from the sanitary sewer main. An addendum (Rev 1) regarding the review of the required building foundation setback from the sanitary sewer main has been attached to this report.

Recommendations for geotechnical building setbacks from TOB are based on the results of our field work and the numerical slope stability analyses discussed above.

WSP also considers that the "land may be used safely for the use intended" provided the recommendations provided herein are implemented. The statement "land may be used safely for the use intended" is defined here in accordance with acceptable annual return frequencies defined in the 1993 Cave study. It should be noted that the recommended siting requirements, as provided in this report, are intended to minimize the risk of death or injury to the occupants of the proposed building. The proposed mitigative measures are not intended to prevent property damage in an event of a natural hazard impacting the site. The owners/occupants of the property should be aware that slope failures and subsequent loss of property may occur within the recommended geotechnical setback area during an earthquake. Recommendations for mitigative measures are discussed in Section 6.1 of this report.

6 DISCUSSION & RECOMMENDATIONS

6.1 GENERAL

The test holes conducted at the site indicate the soils generally comprise 0.6 to 2 m of granular fill (overlain by topsoil) that is underlain by approximately 3 to 16 m of compact to dense / firm to hard sand and silt underlain by dense sand and gravel. The groundwater table is located about 6 to 8.5 m below grade (depending on ground surface elevation).

It is our opinion that development of the site as proposed is geotechnically feasible and that the proposed building and the underground parkade can be supported on foundations bearing on the compact to dense / firm to hard undisturbed native subgrade or on compacted engineered fill placed over Geotechnical Engineer approved subgrade.

The following recommendations are provided to mitigate the identified geotechnical hazards on the site:

1. A minimum geotechnical building setback of 2 m from the existing sanitary sewer right-of-way (RoW) along the east side of the proposed development property line. A minimum geotechnical building setback of 8 m is recommended from the TOB along the unnamed watercourse adjacent to the north side of the proposed development. The TOB is defined herein as a line where the inclination of the slope exceeds 20 degrees (36%) from the horizontal. The geotechnical setbacks are shown on Figure 3.

2. The geotechnical building setbacks should be surveyed and marked on site. WSP should be given the opportunity to review the surveyed TOB and the required geotechnical building setback prior to start of construction and provide further recommendations, as required.

3. Construction of retaining walls and excavations can change the estimated annual return frequency for the small-scale landslide hazard.

4. Infiltration of storm water can change the groundwater regime and de-stabilize the slopes. We understand that the client is planning on using and tying in to the existing Storm Water Detention tank (The City's Engineering Department has confirmed that the tank has enough capacity to hold the development stormwater flow).

The following best practices should be followed on the site during and after construction with respect to steep slopes:

- Avoid construction of any structures (e.g. retaining walls), paths / trails, ponds, pools, or placing fill, within the geotechnical setback zones without prior written approval of a Geotechnical Engineer;

- Regularly inspect structures for damage and ponds or pools for leakage;

- Yard waste or fill (soil) should NOT be disposed on top of, or along steep slopes; and

- Healthy trees and other vegetation should NOT be removed from the steep slopes along Horn Creek.

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6.2 SEISMIC CONSIDERATIONS

6.2.1 LIQUEFACTION

Seismic ground motions can cause saturated, loose to compact granular soils, and low to non-plastic fine-grained soils, to temporarily lose their strength and behave like a heavy viscous fluid. This is referred to as liquefaction and can result in rapid differential settlement and lateral spreading. The liquefiable soils represent an increased hazard to developments in comparison to areas with non-liquefiable soils. Currently, available research indicates that the behaviour of fine-grained soils in response to seismic loading is quite different from the behaviour of sands. While generally less susceptible to liquefaction, soft, non-plastic to low plastic silt can undergo strength loss, and even full liquefaction, in response to strong earthquake shaking[1].

The National Building Code of Canada 2015 Peak Ground Acceleration (PGA) for the site, obtained from the Natural Resources Canada Earthquake Hazard Calculator using the site's UTM coordinates, is 0.305g for the design basis earthquake (two percent probability of exceedance in 50 years (2475-year return period).

A preliminary geotechnical seismic evaluation was conducted to assess the liquefaction susceptibility of the site soils using the design basis earthquake. The site soils generally consist of loose to compact silty sand and sandy silt underlain by compact to dense sand and gravel deposits. Based on our assessment and engineering judgement, site soils are judged to be non-liquefiable during a design basis seismic event.

6.2.2 SITE CLASS

Based on the findings from the subsurface investigations, it is our opinion that the design of the proposed building can be based on Site Class "D" conditions in accordance with the 2018 British Columbia Building Code (BCBC 2018).

6.3 UNSUPPORTED TEMPORARY EXCAVATIONS

The unsupported slopes of temporary excavations greater than 1.2 m in depth that require worker access should not be steeper than 1H:1V (Horizontal:Vertical) for stability purposes. Flatter unsupported temporary excavation slopes may be required depending on the soil and groundwater seepage conditions encountered during excavation. Temporary excavation slopes should be protected against erosion by surface water runoff by covering them with polyethylene sheeting securely fastened at the crest and toe of the temporary slopes.

The Geotechnical Engineer should be provided with the opportunity to review the unsupported slopes of excavations more than 1.2 m deep if worker access is required, as they are developed, to confirm the recommended inclination provided above is suitable for the encountered conditions, or to provide additional recommendations as necessary.

[1] Peter Byrne, "Liquefaction Resistance and Post Liquefaction Response of Soils for Seismic Design of Buildings in Greater Vancouver", 59th Canadian Geotechnical Conference, Sea to Sky Geotechnique, October 2006.

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6.4 TEMPORARY EXCAVATION DEWATERING

At this stage, based on the available geotechnical information, we anticipate that surface water and groundwater seepage entering excavations at the site could be adequately controlled using sumps and pumping. Discharge of water pumped from excavations should be conducted in accordance with City of Abbotsford requirements.

6.5 SITE PREPARATION

Site preparation in the area of the proposed building should consist of the removal of the existing fill stockpiles, surficial fill, any vegetation, topsoil, and any softened or disturbed surficial soil. Based on the test holes, excavation to grade for building construction is expected to be in the order of 3 to 6 m from the existing grade, depending on the number of levels of underground parking. The exposed subgrade is expected to consist of native compact to dense / firm to hard silty sand/sandy silt or compact to dense sand/ sand and gravel. The Geotechnical Engineer should review the exposed subgrade prior to placement of any fill or construction of foundations, slabs or retaining walls.

The exposed native soils will be susceptible to softening and weakening if disturbed by construction activity or surface water. Stripping and excavation should be conducted using an excavator equipped with a smooth mouthed clean out bucket that progressively retreats from excavated area. If construction will take place during the fall and winter months, we recommend that the subgrade be graded to perimeter drainage ditches or sumps to avoid having surface water ponding on the exposed subgrade. Fill should be placed by end dumping and be spread with light weight tracked equipment.

Construction traffic should not travel directly on the exposed native subgrade. For temporary construction vehicle access, we recommend that the native subgrade be covered with a minimum of 450 mm of Geotechnical Engineer approved granular material.

In areas of on-site pavement, it will only be necessary to excavate to a sufficient depth to allow for construction of the pavement structure discussed in Section 6.13 of this report. We recommend that all subgrade for on-site pavement areas be proof-rolled with a loaded dump truck, under the review of the Geotechnical Engineer, prior to the placement of any fill. Any areas that exhibit excessive deflection or rutting should be sub-excavated as directed by the Geotechnical Engineer and grade reinstated with compacted engineered fill as described below.

6.6 FOUNDATIONS

It is our opinion that the proposed building can be supported on strip and pad footings bearing on the native compact to dense / firm to hard sandy silt / silty sand/ sand / sand and gravel. The foundations can be designed based on a serviceability limit state (SLS) soil bearing resistance of 125 kPa and a factored ultimate limit state (ULS) soil bearing resistance of 175 kPa.

The underside of foundations should be at least 450 mm below exterior grade for frost protection and confinement purposes. The recommended minimum footing width is 450 mm and 600 mm for continuous and spread footings, respectively.

Footings should be stepped at no steeper than 2H:1V. The underside of foundations should be located below a 2H:1V line projected up from the base of adjacent deeper excavations for underground services, other footings, toe of steep slopes, etc. or the SLS and factored ULS soil bearing resistances provided above may need to be revised.

The Geotechnical Engineer should review the conditions at foundation grade prior to the installation of foundation formwork.

6.7 SETTLEMENT

Based on the WSP test holes, and assumed building loads typical for the type of construction proposed (one to two below-grade levels of parkade construction and four to six levels of wood-frame construction), it is our opinion that potential total post-construction settlement of the building foundations constructed in accordance with the recommendations in this report will not exceed 25 mm. Differential post-construction foundation settlement may be on the order of 20 mm over a horizontal distance of 10 m. These settlements are based on the SLS soil bearing resistance of 125 kPa provided above.

When available, actual building loads information should be provided to WSP so that we can refine the estimates of potential post-construction building foundation settlement.

6.8 INTERIOR SLAB ON GRADE

The following geotechnical recommendations are provided for the building interior slab-on-grade:

1. The concrete floor slab-on-grade should be underlain with a minimum 150 mm thick layer of 19 mm minus crushed sandy gravel or sand, with a maximum 5% material passing the 0.075 mm sieve by weight, compacted to not less than 100% of the material's Standard Proctor maximum dry density (SPD). Compaction of the under-slab fill should be confirmed by in-place soil density tests conducted by the Geotechnical Engineer.

2. A vapour barrier, such as 6-mil polyethylene sheeting, may be considered under the slab to reduce the potential for slab dampness. Any tears or punctures in the vapour barrier should be patched with duct tape prior to pouring the slab. The requirement for a vapour barrier should be assessed by the engineer designing the concrete slab.

3. The slab should be provided with sufficient joints for control of cracks from slab settlement and from thermal expansion and contraction.

6.9 ENGINEERED FILL

Engineered fill is defined in this report as fill material used to develop site grades beneath foundations, slabs, sidewalks, and other hard surfaced areas (including asphalt pavement). Imported engineered fill should consist of free draining, well graded, 75 mm minus pit run sand and gravel with a maximum 5% fines (material passing the 0.075 mm sieve) by weight, or equivalent approved by the Geotechnical Engineer. The Geotechnical Engineer should be given the opportunity to approve candidate sources of engineered fill, prior to their delivery to the site, to assess their suitability for use.

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Engineered fill should be placed in loose lifts not exceeding 300 mm in thickness when a self-propelled vibratory smooth drummed roller is used to compact the material. The maximum lift thickness should be reduced to 150 mm where a walk behind plate tamper is used for compaction. Engineered fill in and adjacent to the building area should be compacted to not less than 100% of its SPD. Engineered fill used to develop the desired site grades for on-site pavement areas should be compacted to not less than 95% of the material's Modified Proctor maximum dry density (MPD). The Geotechnical Engineer should conduct in-place soil density testing on the engineered fill, as it is being placed, to confirm that adequate compaction is achieved.

It is our opinion that the existing near surface sand and gravel fill and stockpiled fill encountered at the test holes is unsuitable for use as engineered fill. The native soils encountered at the test holes are, in our opinion, unsuitable for use as engineered fill.

Fill in the building and on-site pavement areas should be placed as early as possible in the construction schedule.

6.10 RETAINING WALLS

"At-rest" earth pressure theory is considered applicable to non-yielding top and bottom restrained foundation (basement) walls. It is recommended that the unfactored lateral earth pressure be computed using an equivalent fluid unit weight of 8 kPa/m for the design of the perimeter foundation walls based on an "at-rest" lateral earth pressure. "Active" earth pressure conditions are expected to develop against foundation walls and retaining walls during strong earthquake shaking. The active pressure combines with the incremental seismic pressure computed using the Mononobe-Okabe[2] (M-O) equations, with a seismic coefficient equal to 60 percent of the PGA. An inverted triangular pressure distribution of 8 kPa/m should be used to model the incremental seismic load, with the resultant acting at 2/3H above the base of the retaining wall, where H is the total height of the retaining wall.

A factored coefficient of friction of 0.45 may be used to estimate the sliding resistance along the soil-footing interface, provided that a minimum of 150 mm of crushed gravel is placed at the underside of the foundation. An equivalent fluid unit weight of 38.5 kPa/m may be used to estimate the factored ultimate passive resistance of permanently in-place soil above the front of the retaining wall footing.

The lateral earth pressures provided above assume that drained conditions prevail behind the retaining walls.

6.11 PERIMETER FOUNDATION DRAINAGE

A perimeter foundation drainage system should be provided on the exterior of the building foundations. The perimeter drainage system should consist of rigid perforated PVC pipe. The invert of the pipe should be located 300 mm below the top of the interior slab-on-grade. The pipe should be covered with not less than 150 mm of drain rock, and the drain rock covered with a non-woven geotextile. The pipe should drain by gravity flow to the municipal storm sewer.

[2] Mononobe, N. and Matsuo M. (1929). "On the Determination of Earth Pressures During Earthquakes." Proc. World Eng. Congress, 9, pp 179 -187.

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Roof drains should not be connected to the perimeter foundation drain. Roof drains should discharge via non-perforated lines connected to the municipal storm sewer.

Finished grade surrounding the building should be sloped so as to direct surface water away from the foundation.

6.12 UNDERGROUND UTILITY CONSTRUCTION

Temporary excavations for the construction of underground services should conform to the requirements of the WorkSafe BC Health and Safety Regulations. The side slopes of temporary trench excavations deeper than 1.2 m should not be steeper than 1H:1V where worker access is required. Alternatively, suitable trench shoring cages can be used to protect workers. It is anticipated that groundwater seepage entering excavations for the construction of on-site underground utilities could be adequately controlled using sumps and pumping.

Granular pipe bedding and surround material should conform to the specification provided in the MMCD Volume II Article 02226.2.7 (Gold Edition) for "Type 1" material and the applicable City of Abbotsford requirements. It is recommended that backfill for utility trenches comply with the BC Master Municipal Construction Documents (MMCD) and City of Abbotsford requirements. The trench backfill should consist of clean, free-draining granular material. The backfill should be placed in discrete lifts and compacted to not less than 95% of its MPD within paved areas or other settlement-sensitive areas and to not less than 90% of its MPD within landscaped areas.

6.13 ON-SITE ASPHALT PAVEMENT

We recommend the following structure for on-site asphalt pavement parking areas and driveways:

- 75 mm of asphaltic concrete; underlain by
- 100 mm of 19 mm minus crushed gravel base course which has been compacted to not less than 95% of the material's MPD; underlain by
- 300 mm of 75 mm minus pit run sand and gravel subbase course which has been compacted to not less than 95% of the material's MPD; underlain by
- Geotechnical Engineer approved subgrade or compacted engineered fill placed over Geotechnical Engineer approved subgrade.

We recommend that the granular base and subbase materials meet the gradation requirements for these materials contained in MMCD Volume II.

It is recommended that the Geotechnical Engineer review and approve candidate subbase and base materials prior to their placement at the site. This should include sieve analysis and Modified Proctor testing of representative samples of the candidate fill materials.

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7 GEOTECHNICAL ENGINEERING REVIEW

When available, information regarding building loads should be provided to WSP so that we can determine if additional or modified geotechnical recommendations are required.

During site preparation and construction, WSP should be provided with the opportunity to review the following:

- Surveyed TOB and geotechnical building setbacks;
- Stripped subgrades prior to placement of any fill or construction of foundations or slabs;
- Unsupported temporary excavation slopes for excavations greater than 1.2 m in depth that require worker access;
- Engineered fill and under-slab fill materials and compaction;
- Soil conditions at foundation grade prior to construction of foundation formwork;
- Proof-rolling of subgrade in on-site pavement areas; and
- Pavement granular subbase and base course materials and compaction.

8 CLOSURE

This geotechnical assessment report has been prepared by WSP Canada Inc. exclusively for Horn Park Place Developments Ltd. and their appointed agents. We acknowledge that the City of Abbotsford may use and rely on the information in this report for permitting purposes. The opinions and recommendations provided in this report reflect our judgement in light of the information available to us at the time that it was prepared.

Any use of this report by third parties, or any reliance on or decisions made based on it, are the responsibility of such third parties. WSP does not accept responsibility for damages suffered, if any, by a third party as a result of their use of or reliance on this report.

The soil logs attached to this report provide description of the soil and groundwater conditions encountered at discrete test hole locations. Actual soil conditions at the site may vary from those encountered at the test holes.

Contractors should make their own interpretation of the soil logs and site conditions for the purposes of bidding and performing work at the site.

The attached Terms of Reference are an integral part of this report.

Attachment: Attachment B: Geotechnical Report, prepared by WSP (dated February 8, 2019) (PDS 045-2019 : DP with V application for 3182

We trust the information provided herein meets your immediate requirements. If you have any questions or require further information, please contact the undersigned.

Sincerely,

WSP CANADA INC.

PROFESSIONAL
PROVINCE OF
R. BERRY-DIZAJI
46185
BRITISH COLUMBIA
ENGINEER

Per: Reza Berry, M.Sc, P.Eng.
Senior Geotechnical Engineer

Reviewed by:

Paul R. Ell, P.Eng.
Senior Geotechnical Engineer

Attachments:
- Terms of Reference
- Figures 1 to 5
- Slope Stability Analyses – Figures 6 to 13
- Soil Logs
- Photographs 1 to 10
- Appendix D: Landslide Assessment Assurance Statement
- Technical Memorandum dated February 08, 2019

Attachment: Attachment B: Geotechnical Report, prepared by WSP (dated February 8, 2019) (PDS 045-2019 : DP with V application for 3182

TERMS OF REFERENCE FOR GEOTECHNICAL REPORTS ISSUED BY WSP CANADA INC.

1 STANDARD OF CARE

WSP Canada Inc. ("WSP") prepared and issued this geotechnical report (the "Report") for its client (the "Client") in accordance with generally-accepted engineering consulting practices for the geotechnical discipline. No other warranty, expressed or implied, is made. Unless specifically stated in the Report, the Report does not address environmental issues.

The terms of reference for geotechnical reports issued by WSP (the "Terms of Reference") contained in the present document provide additional information and caution related to standard of care and the use of the Report. The Client should read and familiarize itself with these Terms of Reference.

2 COMPLETENESS OF THE REPORT

All documents, records, drawings, correspondence, data, files and deliverables, whether hard copy, electronic or otherwise, generated as part of the services for the Client are inherent components of the Report and, collectively, form the instruments of professional services (the "Instruments of Professional Services"). The Report is of a summary nature and is not intended to stand alone without reference to the instructions given to WSP by the Client, the communications between WSP and the Client, and to any other reports, writings, proposals or documents prepared by WSP for the Client relative to the specific site described in the Report, all of which constitute the Report.

TO PROPERLY UNDERSTAND THE INFORMATION, OBSERVATIONS, FINDINGS, SUGGESTIONS, RECOMMENDATIONS AND OPINIONS CONTAINED IN THE REPORT, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. WSP CANNOT BE RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT AND ITS VARIOUS COMPONENTS.

3 BASIS OF THE REPORT

WSP prepared the Report for the Client for the specific site, development, building, design or building assessment objectives and purpose that the Client described to WSP. The applicability and reliability of any of the information, observations, findings, suggestions, recommendations and opinions contained in the Report are only valid to the extent that there was no material alteration to or variation from any of the said descriptions provided by the Client to WSP unless the Client specifically requested WSP to review and revise the Report in light of such alteration or variation.

4 USE OF THE REPORT

The information, observations, findings, suggestions, recommendations and opinions contained in the Report, or any component forming the Report, are for the sole use and benefit of the Client and the team of consultants selected by the Client for the specific project that the Report was provided. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION OR COMPONENT WITHOUT THE WRITTEN CONSENT OF WSP. WSP will consent to any reasonable request by the Client to approve the use of this Report by other parties designated by the Client as the "Approved Users". As a condition for the consent of WSP to approve the use of the Report by an Approved User, the Client must provide a copy of these Terms of Reference to that Approved User and the Client must obtain written confirmation from that Approved User that the Approved User will comply with these Terms of Reference, such written confirmation to be provided separately by each Approved User prior to beginning use of the Report. The Client will provide WSP with a copy of the written confirmation from an Approved User when it becomes available to the Client, and in any case, within two weeks of the Client receiving such written confirmation.

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5 INTERPRETATION OF THE REPORT

a. **Nature and Exactness of Descriptions:** The classification and identification of soils, rocks and geological units, as well as engineering assessments and estimates have been based on investigations performed in accordance with the standards set out in Paragraph 1 above. The classification and identification of these items are judgmental in nature and even comprehensive sampling and testing programs, implemented with the appropriate equipment by experienced personnel,

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may fail to locate some conditions. All investigations or assessments utilizing the standards of Paragraph 1 involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and all persons making use of such documents or records should be aware of, and accept, this risk. Some conditions are subject to changes over time and the parties making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. Where special concerns exist, or when the Client has special considerations or requirements, the Client must disclose them to WSP so that additional or special investigations may be undertaken, which would not otherwise be within the scope of investigations made by WSP or the purposes of the Report.

b. **Reliance on information**: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site investigation and field review and on the basis of information provided to WSP. WSP has relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, WSP cannot accept responsibility for any deficiency, misstatement or inaccuracy contained in the report as a result of misstatements, omissions, misrepresentations or fraudulent acts of persons providing information.

c. **Additional Involvement by WSP**: To avoid misunderstandings, WSP should be retained to assist other professionals to explain relevant engineering findings and to review the geotechnical aspects of the plans, drawings and specifications of other professionals relative to the engineering issues pertaining to the geotechnical consulting services provided by WSP. To ensure compliance and consistency with the applicable building codes, legislation, regulations, guidelines and generally-accepted practices, WSP should also be retained to provide field review services during the performance of any related work. Where applicable, it is understood that such field review services must meet or exceed the minimum necessary requirements to ascertain that the work being carried out is in general conformity with the recommendations made by WSP. Any reduction from the level of services recommended by WSP will result in WSP providing qualified opinions regarding adequacy of the work.

6 ALTERNATE REPORT FORMAT

When WSP submits both electronic and hard copy versions of the Instruments of Professional Services, the Client agrees that only the signed and sealed hard copy versions shall be considered final and legally binding upon WSP. The hard copy versions submitted by WSP shall be the original documents for record and working purposes, and, in the event of a dispute or discrepancy, the hard copy versions shall govern over the electronic versions; furthermore, the Client agrees and waives all future right of dispute that the original hard copy signed and sealed versions of the Instruments of Professional Services maintained or retained, or both, by WSP shall be deemed to be the overall originals for the Project.

The Client agrees that the electronic file and hard copy versions of Instruments of Professional Services shall not, under any circumstances, no matter who owns or uses them, be altered by any party except WSP. The Client warrants that the Instruments of Professional Services will be used only and exactly as submitted by WSP.

The Client recognizes and agrees that WSP prepared and submitted electronic files using specific software or hardware systems, or both. WSP makes no representation about the compatibility of these files with the current or future software and hardware systems of the Client, the Approved Users or any other party. The Client further agrees that WSP is under no obligation, unless otherwise expressly specified, to provide the Client, the Approved Users and any other party, or any or all of them, with specific software and hardware systems that are compatible with any electronic submitted by WSP. The Client further agrees that should the Client, an Approved User or a third party require WSP to provide specific software or hardware systems, or both, compatible with the electronic files prepared and submitted by WSP, for any reason whatsoever included but not restricted to an order from a court, then the Client will pay WSP for all reasonable costs related to the provision of the specific software or hardware systems, or both. The Client further agrees to indemnify and hold harmless WSP, its officers, directors, employees, agents, representative or sub-consultant, or any or all of them, against any claim or any nature whatsoever brought against WSP, whether in contract or in tort, arising or related to the provision or use or any specific software or hardware provided by WSP.

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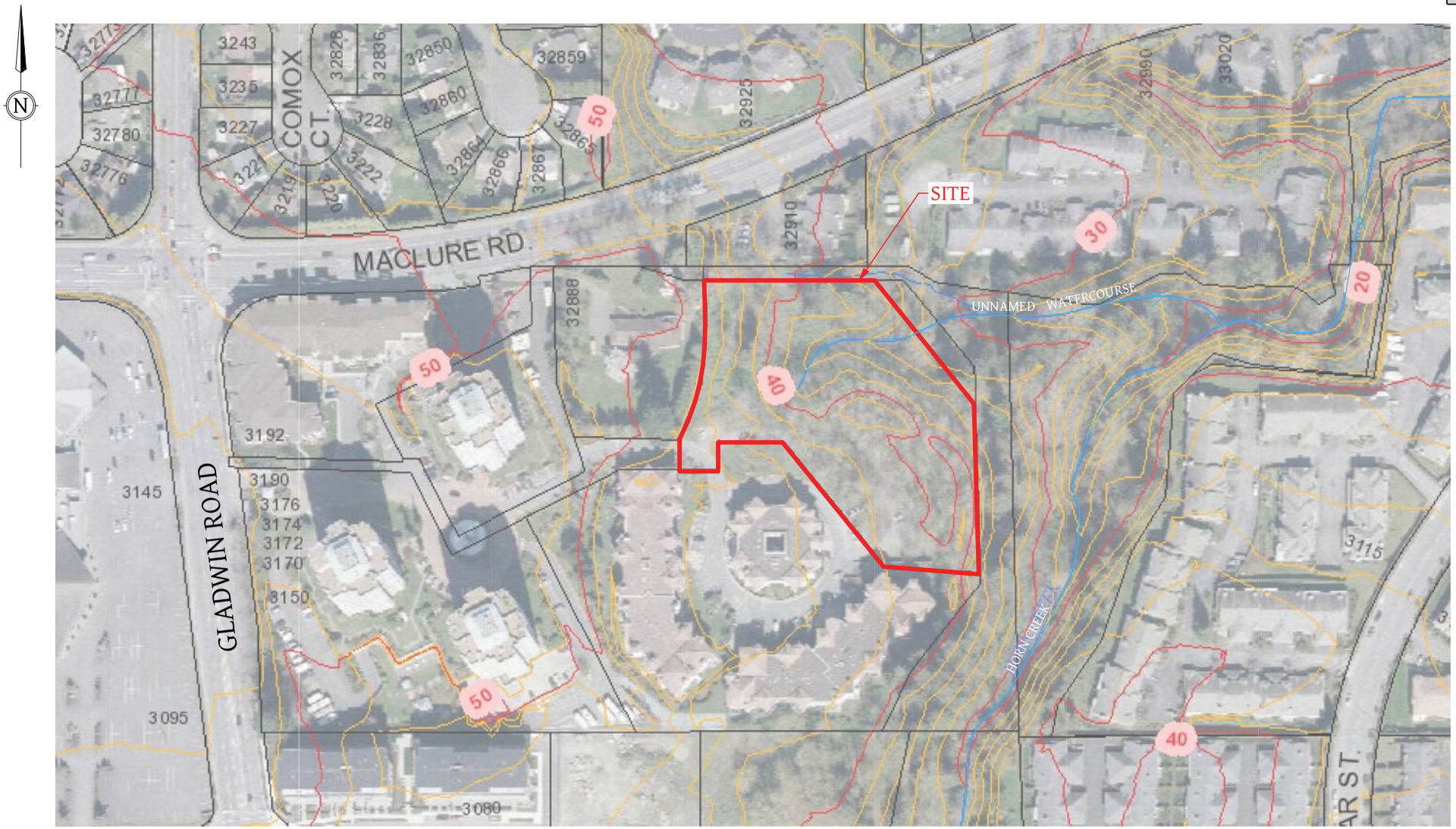

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1	FEB 06, 2019	RE-ISSUED FOR DEVELOPMENT PERMIT	KTD	RB
0	JUNE 2017	ISSUED FOR REVIEW	BO	JM
REV	Date	Issue/Revision Description	Drawn	Check

ADAPTED FROM: COA WEBMAP

PROJECT/DWG. NO: N/A

DATE: FEB 2019

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TITLE: **SITE LOCATION MAP**

PROJECT: GEOTECHNICAL HAZARD AND SITE ASSESSMENT

ADDRESS: 3182 GLADWIN ROAD, ABBOTSFORD, BC

CLIENT: NATURBANA PROPERTIES LTD.

SEAL:

DESIGN: NA	DATE: FEB 2019
CHECK: RB	SCALE: NTS
DRAWN: KTD	FILE NO: 171-00950-01
FIG. NO: 1	

REVISIONS				
1	FEB 06, 2019	RE-ISSUED FOR DEVELOPMENT PERMIT	KTD	RB
0	JUNE 2017	ISSUED FOR REVIEW	BO	JM
REV	Date	Issue/Revision Description	Drawn	Check

ADAPTED FROM: NATURBANA

PROJECT/DWG. NO: N/A

DATE: FEB 2019

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TITLE: **PROPOSED BUILDING CONCEPT PLAN**

PROJECT: GEOTECHNICAL HAZARD AND SITE ASSESSMENT

ADDRESS: 3182 GLADWIN ROAD, ABBOTSFORD, BC

CLIENT: NATURBANA PROPERTIES LTD.

SEAL:

DESIGN: NA	DATE: FEB 2019
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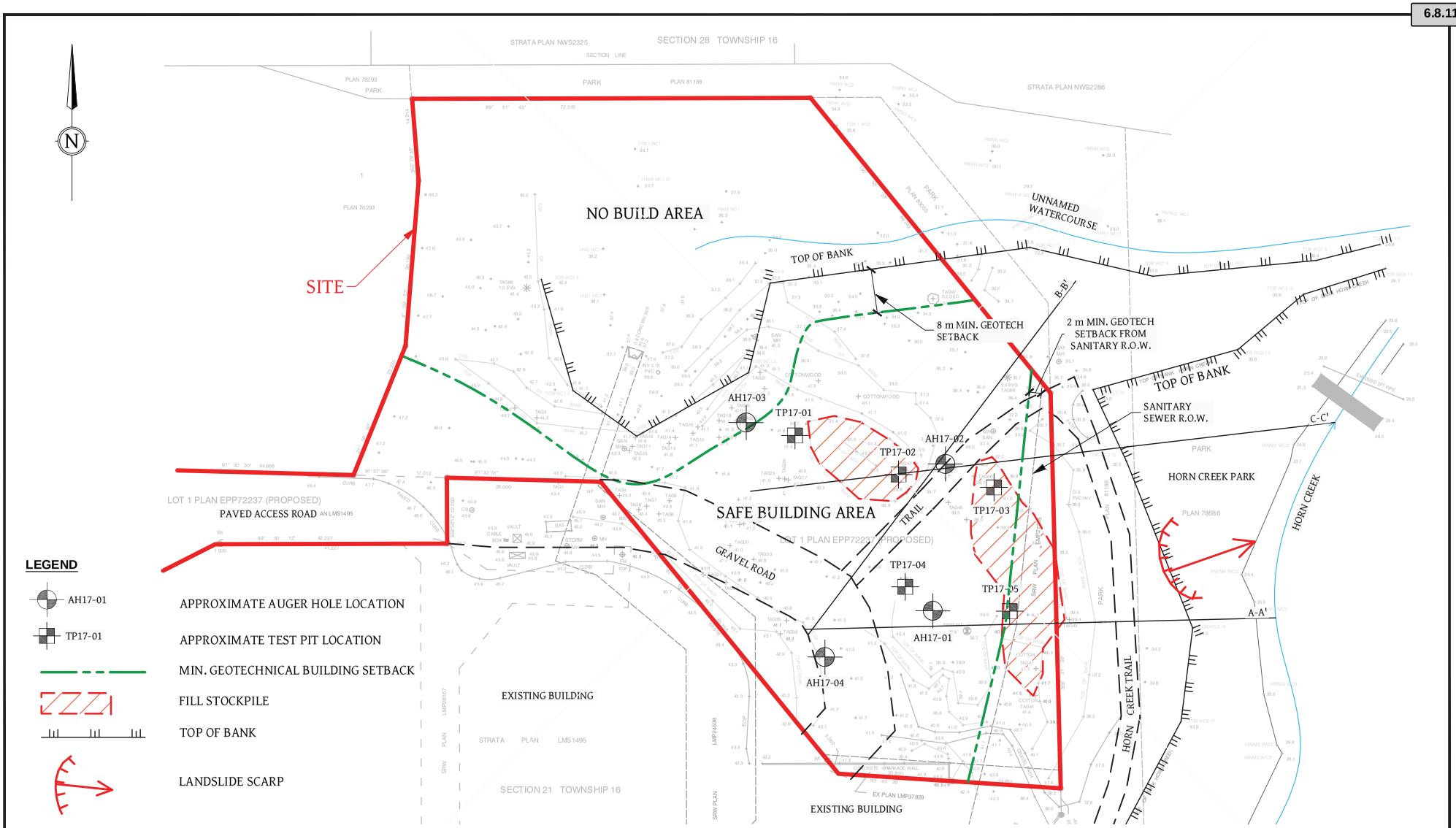
FIG. NO: 2	



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REV	Date	Issue/Revision Description	Drawn	Check

ADAPTED FROM: TUNBRIDGE & TUNBRIDGE
PROJECT/DWG. NO: G459TOPSK2
DATE: FEB 2019

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TITLE: **TEST HOLE LOCATION & GEOTECHNICAL HAZARD SITE PLAN**

PROJECT: GEOTECHNICAL HAZARD AND SITE ASSESSMENT

ADDRESS: 3182 GLADWIN ROAD, ABBOTSFORD, BC

CLIENT: NATURBANA PROPERTIES LTD.

SEAL:

DESIGN: NA	DATE: FEB 2019
CHECK: RB	SCALE: NTS
DRAWN: KTD	FILE NO: 171-00950-01
FIG. NO: 3	

LEGEND

- Storm Sewer
- Denotes High Priority
- Denotes Moderate Priority
- Denotes Low Priority

DRAWING REFERENCE:

GOLDER ASSOCIATES, PHASE II AND PHASE III REPORT, BANK STABILIZATION MARSHALL CREEK AND HORN CREEK EROSION SITES, ABBOTSFORD, BC, REPORT# 07-1450-0007, DATED MAY 14, 2009

REVISIONS				
1	FEB 06, 2019	RE-ISSUED FOR DEVELOPMENT PERMIT	KTD	RB
0	JUNE 2017	ISSUED FOR REVIEW	BO	JM
REV	Date	Issue/Revision Description	Drawn	Check

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PROJECT/DWG. NO: G459TOPSK2
DATE: FEB 2019

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TITLE: **HORN CREEK BANK EROSION LOCATIONS**

PROJECT: GEOTECHNICAL HAZARD AND SITE ASSESSMENT

ADDRESS: 3182 GLADWIN ROAD, ABBOTSFORD, BC

CLIENT: NATURBANA PROPERTIES LTD.

SEAL:

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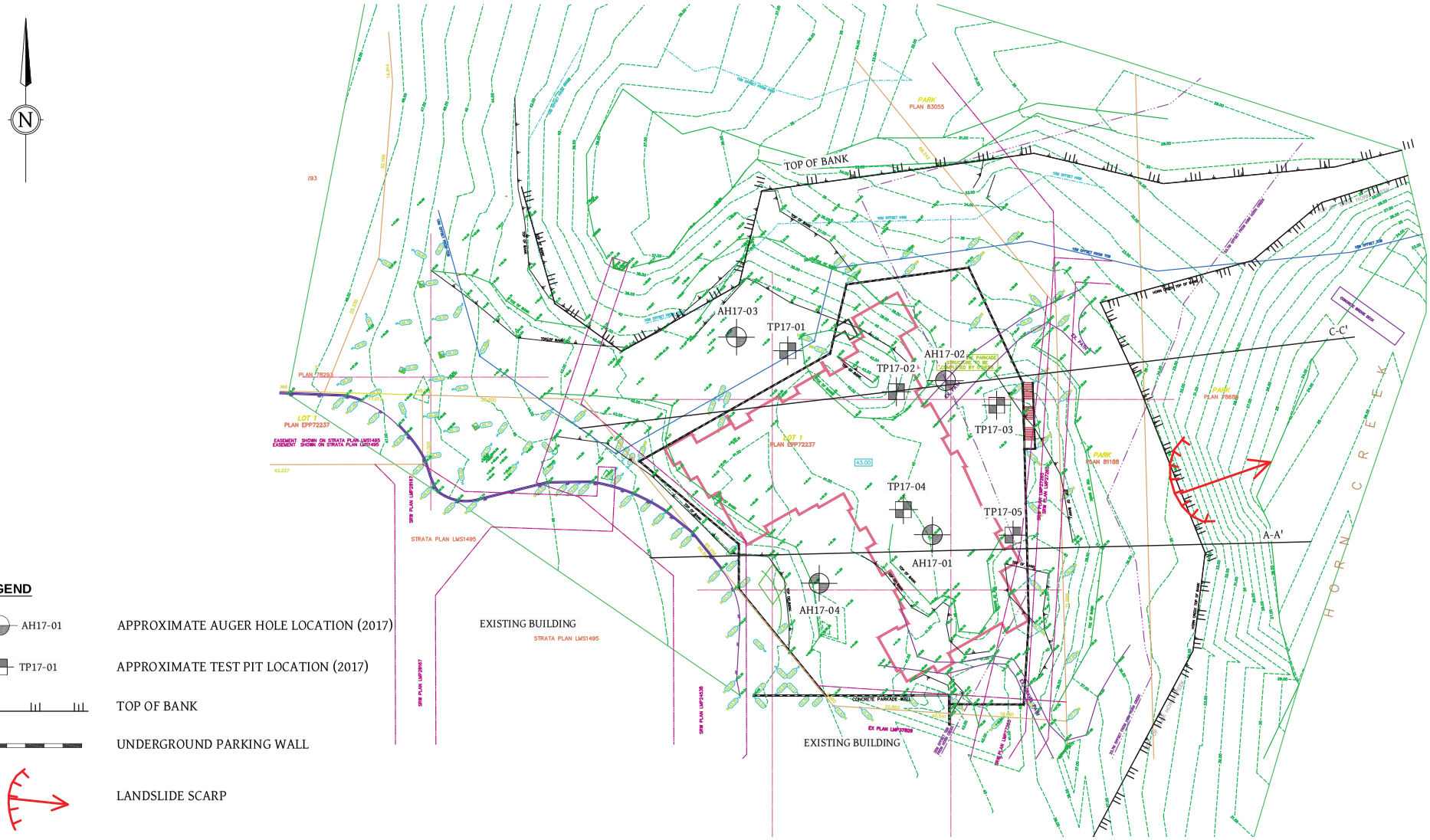
DRAWN: KTD	FILE NO: 171-00950-01
FIG. NO: 4	

Attachment: Attachment B: Geotechnical Report, prepared by WSP (dated February 8, 2019) (PDS 045-2019 : DP with V application for 3182



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REV	Date	Issue/Revision Description	Drawn	Check

ADAPTED FROM: TUNBRIDGE & TUNBRIDGE
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DATE: FEB 2019

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TITLE: **SITE GRADING PLAN**

PROJECT: GEOTECHNICAL HAZARD AND SITE ASSESSMENT

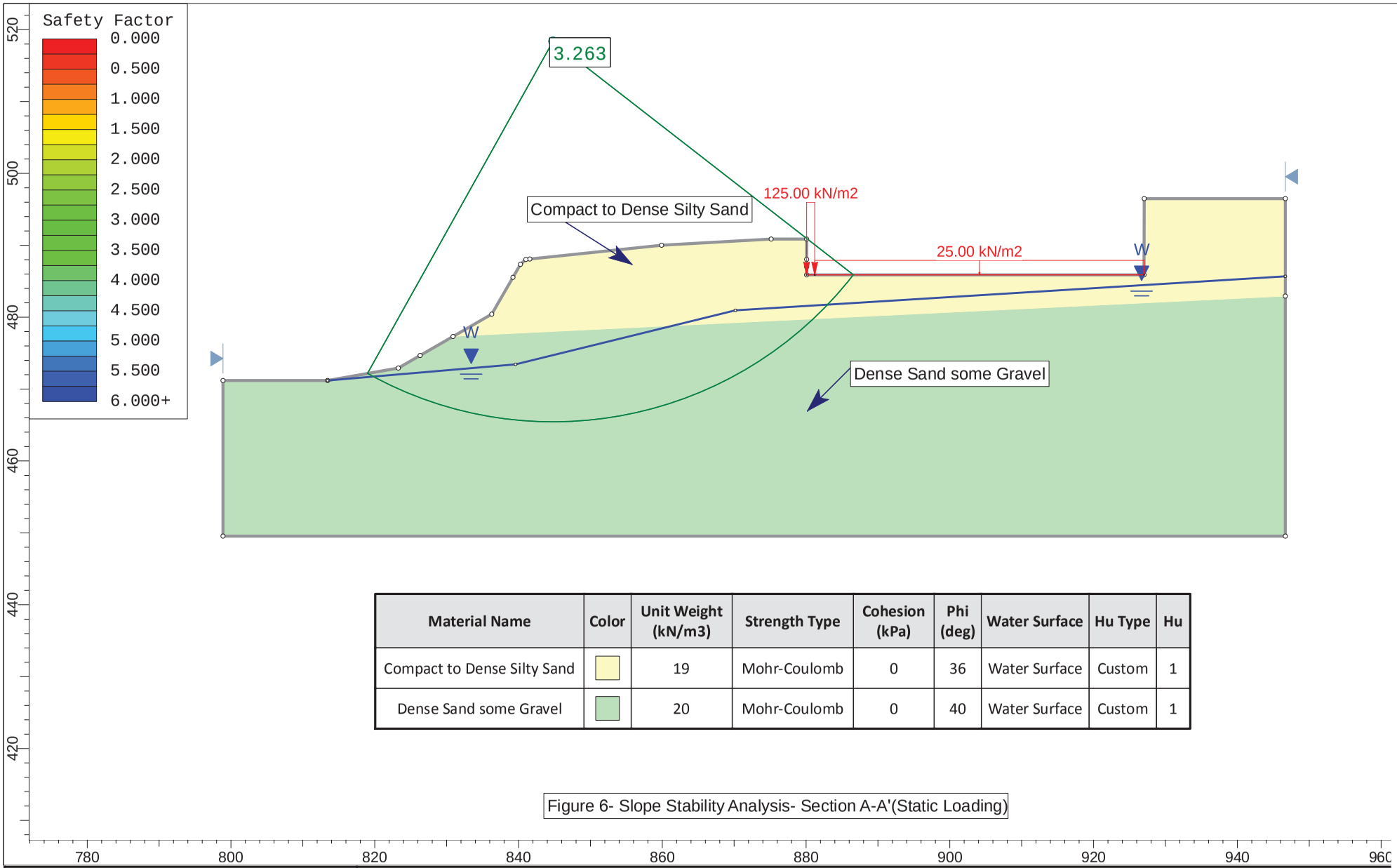
ADDRESS: 3182 GLADWIN ROAD, ABBOTSFORD, BC

CLIENT: NATURBANA PROPERTIES LTD.

SEAL:

DESIGN: NA	DATE: FEB 2019
CHECK: RB	SCALE: NTS
DRAWN: KTD	FILE NO: 171-00950-01
FIG. NO: 5	

Attachment: Attachment B: Geotechnical Report, prepared by WSP (dated February 8, 2019) (PDS 045-2019 : DP with V application for 3182



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type	Hu
Compact to Dense Silty Sand		19	Mohr-Coulomb	0	36	Water Surface	Custom	1
Dense Sand some Gravel		20	Mohr-Coulomb	0	40	Water Surface	Custom	1

Figure 6- Slope Stability Analysis- Section A-A'(Static Loading)

rocscience

SLIDE INTERPRET 8.018

Natura Project, 3182 Gladwin Rd, Abbotsford, BC

Slope Stability Analysis

Drawn By	Scale 1:738	WSP Canada
Date February 2019		A-A 'Static.slim

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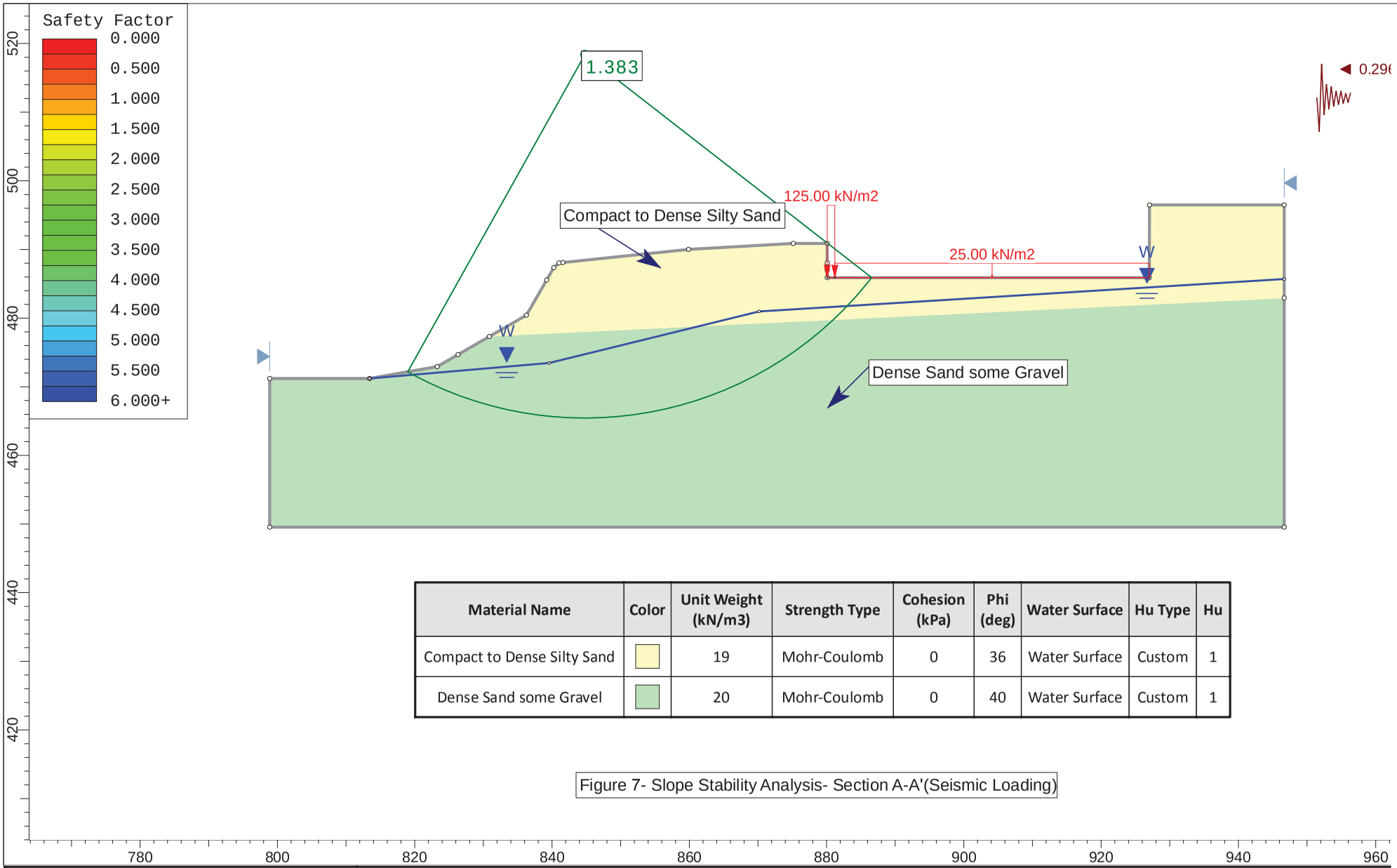

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type	Hu
Compact to Dense Silty Sand		19	Mohr-Coulomb	0	36	Water Surface	Custom	1
Dense Sand some Gravel		20	Mohr-Coulomb	0	40	Water Surface	Custom	1

Figure 7- Slope Stability Analysis- Section A-A'(Seismic Loading)

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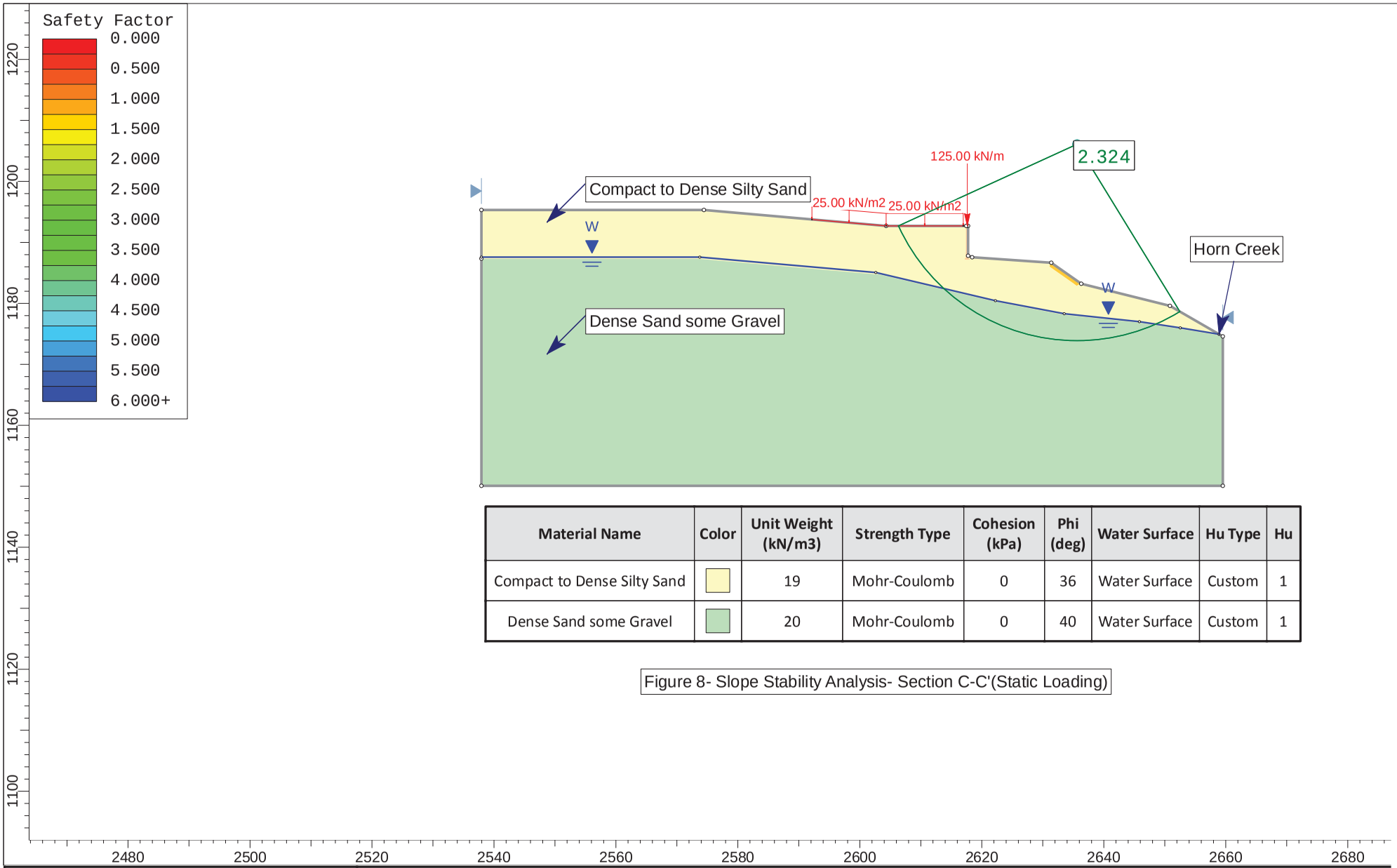
Natura Project, 3182 Gladwin Rd, Abbotsford, BC

Slope Stability Analysis

Drawn By	Scale 1:773	WSP Canada
Date February 2019		File Name 171-00950-01 Slope Stability Analysis - Section A (Sesimic loading).sli

Attachment: Attachment B: Geotechnical Report, prepared by WSP (dated February 8, 2019) (PDS 045-



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type	Hu
Compact to Dense Silty Sand		19	Mohr-Coulomb	0	36	Water Surface	Custom	1
Dense Sand some Gravel		20	Mohr-Coulomb	0	40	Water Surface	Custom	1

Figure 8- Slope Stability Analysis- Section C-C'(Static Loading)

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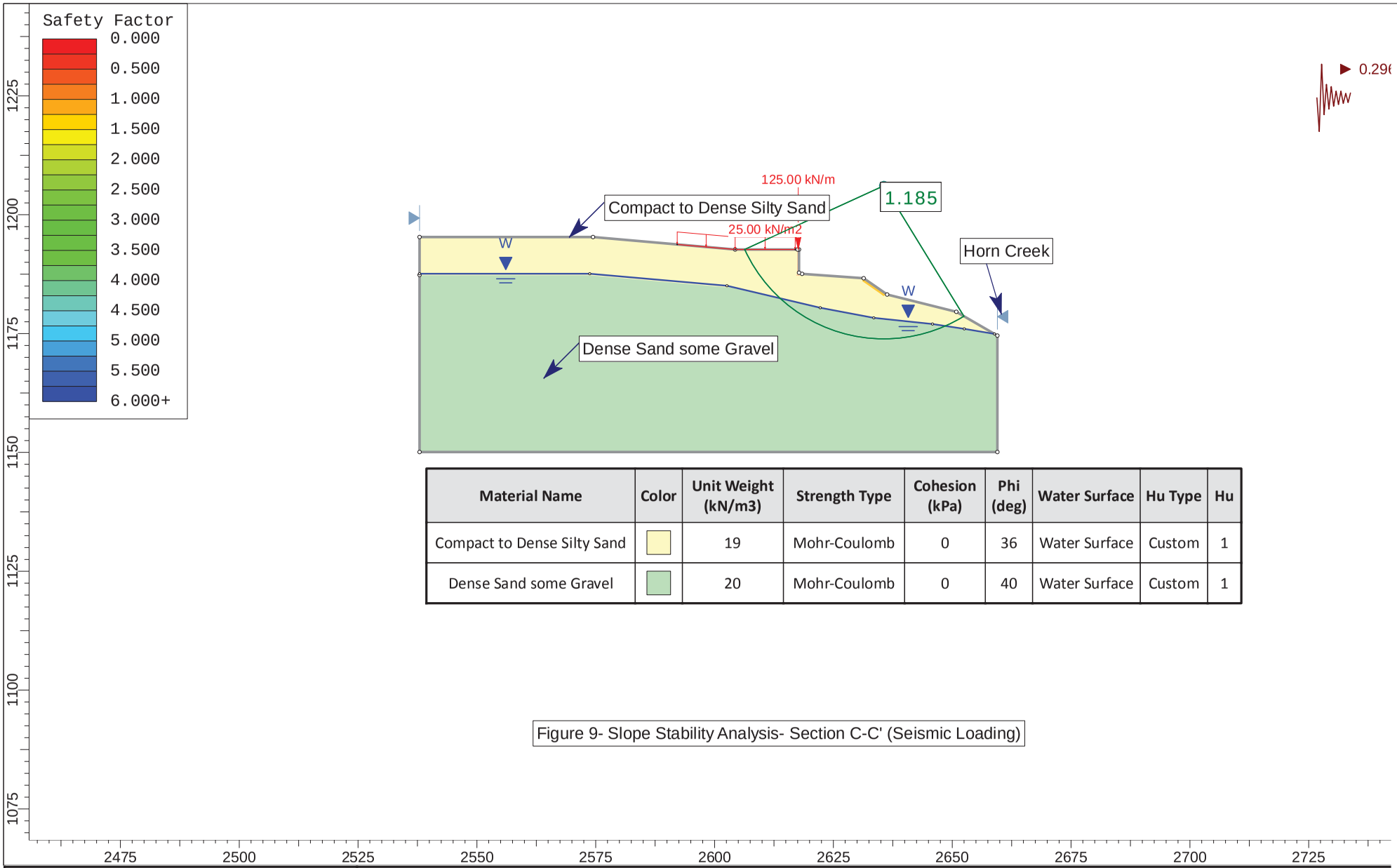
Natura Project, 3182 Gladwin Rd, Abbotsford, BC

Slope Stability Analysis

Drawn By	Scale 1:870	WSP Canada
Date February 2019		C-C'- Static.slim



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type	Hu
Compact to Dense Silty Sand		19	Mohr-Coulomb	0	36	Water Surface	Custom	1
Dense Sand some Gravel		20	Mohr-Coulomb	0	40	Water Surface	Custom	1

Figure 9- Slope Stability Analysis- Section C-C' (Seismic Loading)

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Natura Project, 3182 Gladwin Rd, Abbotsford, BC

Slope Stability Analysis

Drawn By	Scale 1:1116	WSP Canada
Date February 2019		C-C'- Seismic.slim

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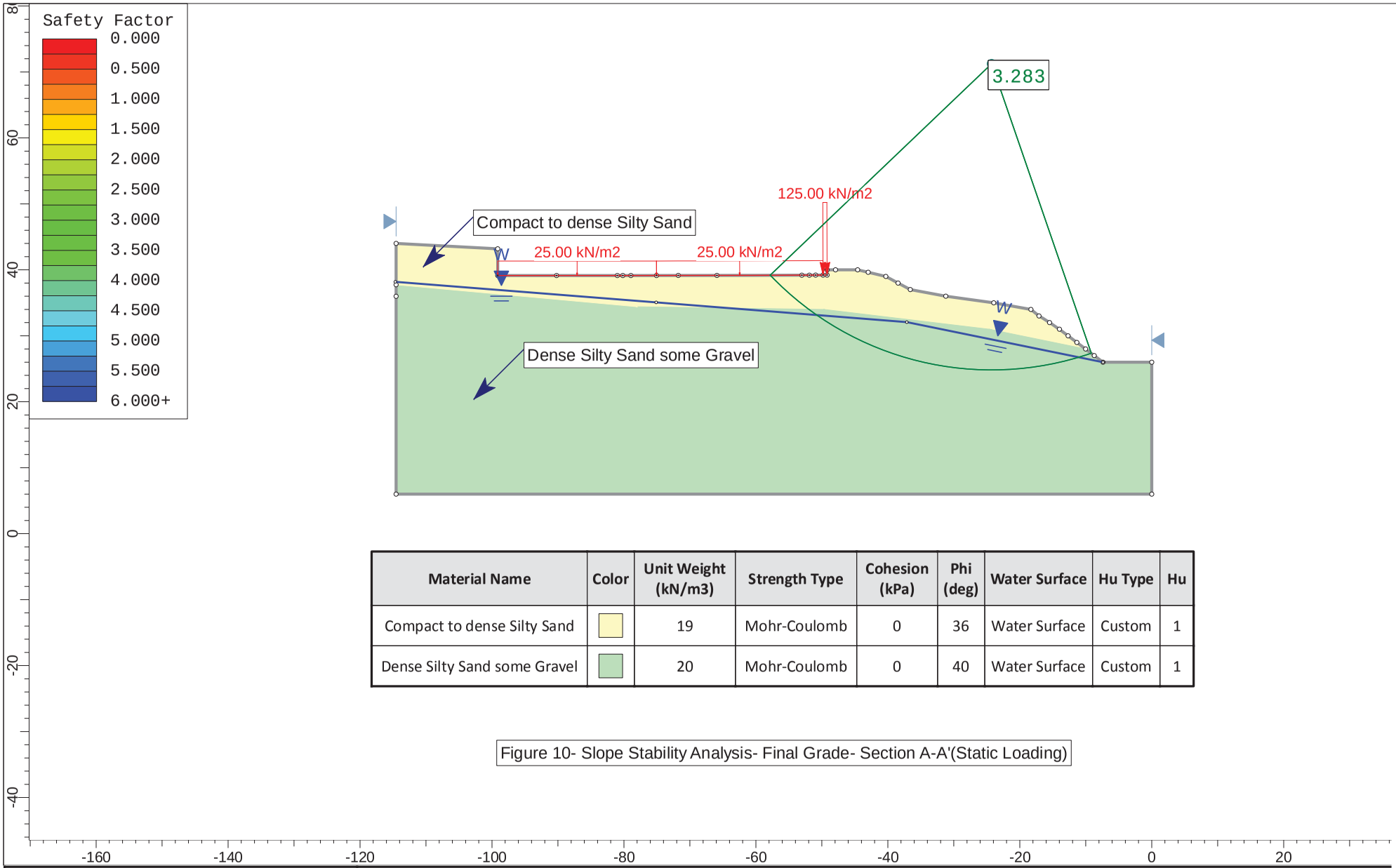

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type	Hu
Compact to dense Silty Sand		19	Mohr-Coulomb	0	36	Water Surface	Custom	1
Dense Silty Sand some Gravel		20	Mohr-Coulomb	0	40	Water Surface	Custom	1

Figure 10- Slope Stability Analysis- Final Grade- Section A-A'(Static Loading)

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Natura Project, 3182 Gladwin Rd, Abbotsford, BC

Slope Stability Analysis

Drawn By	Scale 1:804	WSP Canada
Date February 2019		A-A Static.slim

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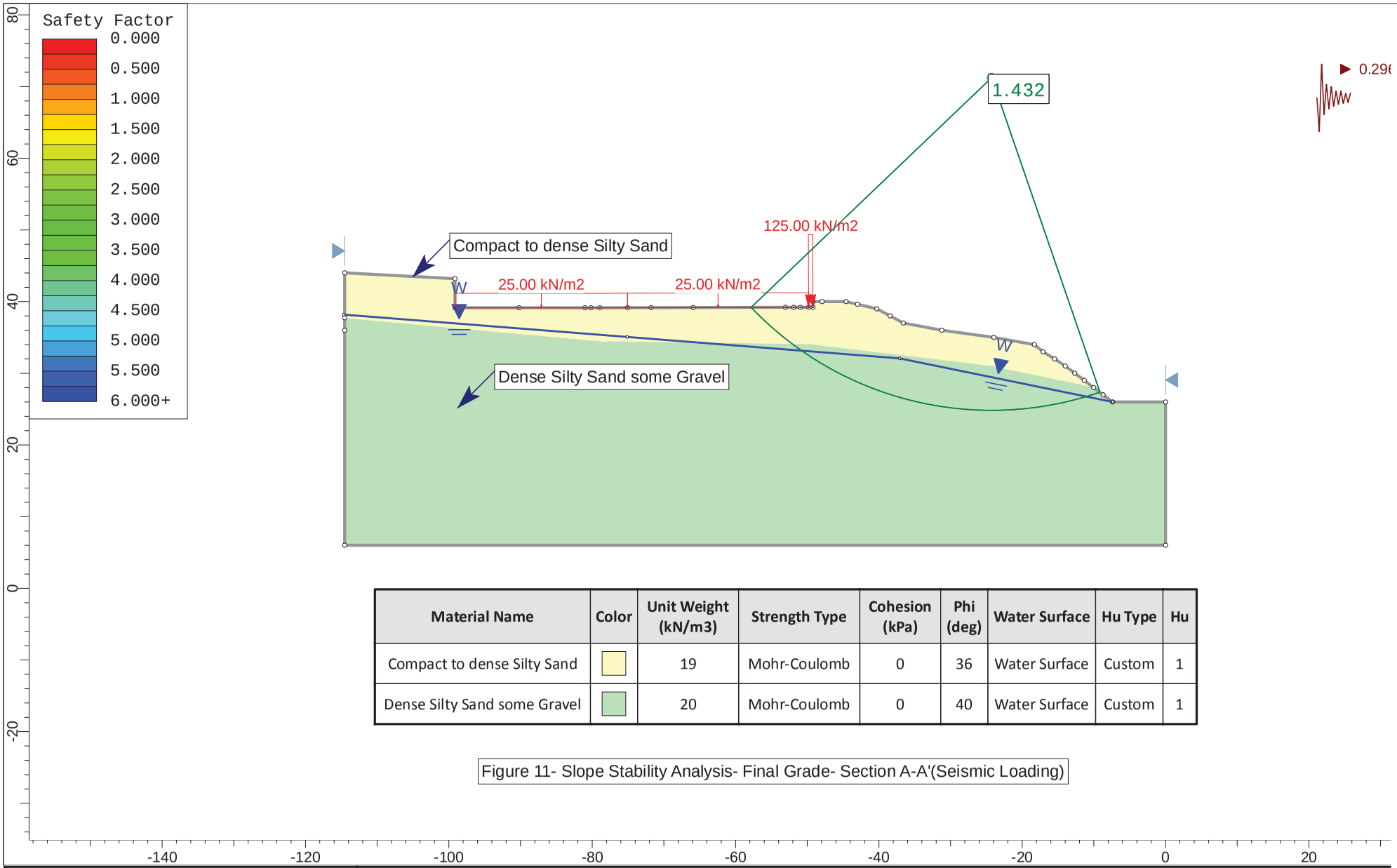

Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type	Hu
Compact to dense Silty Sand		19	Mohr-Coulomb	0	36	Water Surface	Custom	1
Dense Silty Sand some Gravel		20	Mohr-Coulomb	0	40	Water Surface	Custom	1

Figure 11- Slope Stability Analysis- Final Grade- Section A-A'(Seismic Loading)

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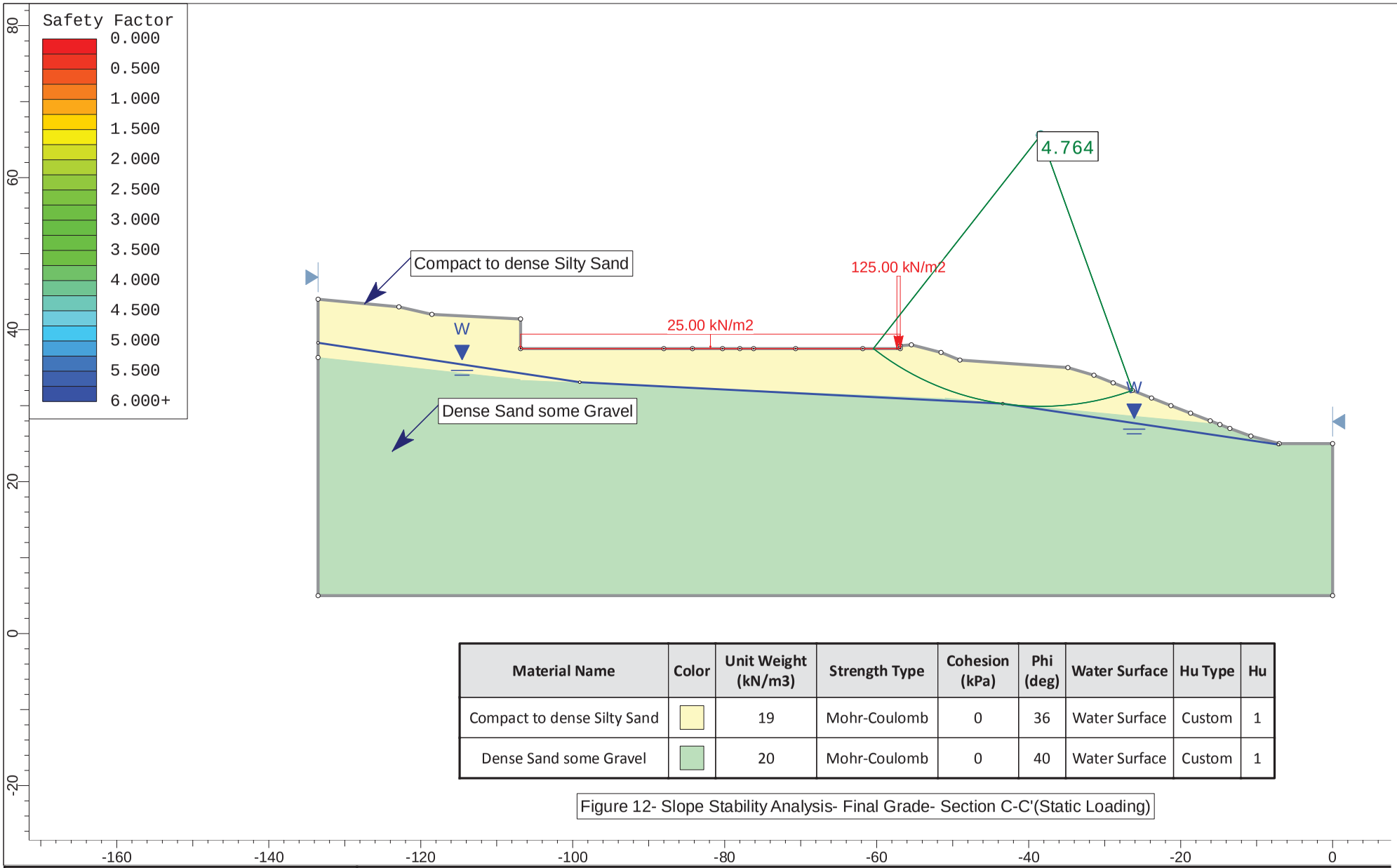
Natura Project, 3182 Gladwin Rd, Abbotsford, BC

Slope Stability Analysis

Drawn By	Scale 1:740	WSP Canada
Date February 2019		A-A 'Seismic.slim

Attachment: Attachment B: Geotechnical Report, prepared by WSP (dated February 8, 2019) (PDS 045-



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type	Hu
Compact to dense Silty Sand		19	Mohr-Coulomb	0	36	Water Surface	Custom	1
Dense Sand some Gravel		20	Mohr-Coulomb	0	40	Water Surface	Custom	1

Figure 12- Slope Stability Analysis- Final Grade- Section C-C'(Static Loading)

rocscience

SLIDEINTERPRET 8.018

Natura Project, 3182 Gladwin Rd, Abbotsford, BC

Slope Stability Analysis

Drawn By	Scale 1:698	WSP Canada
Date February 2019		C-C-' Static.slim

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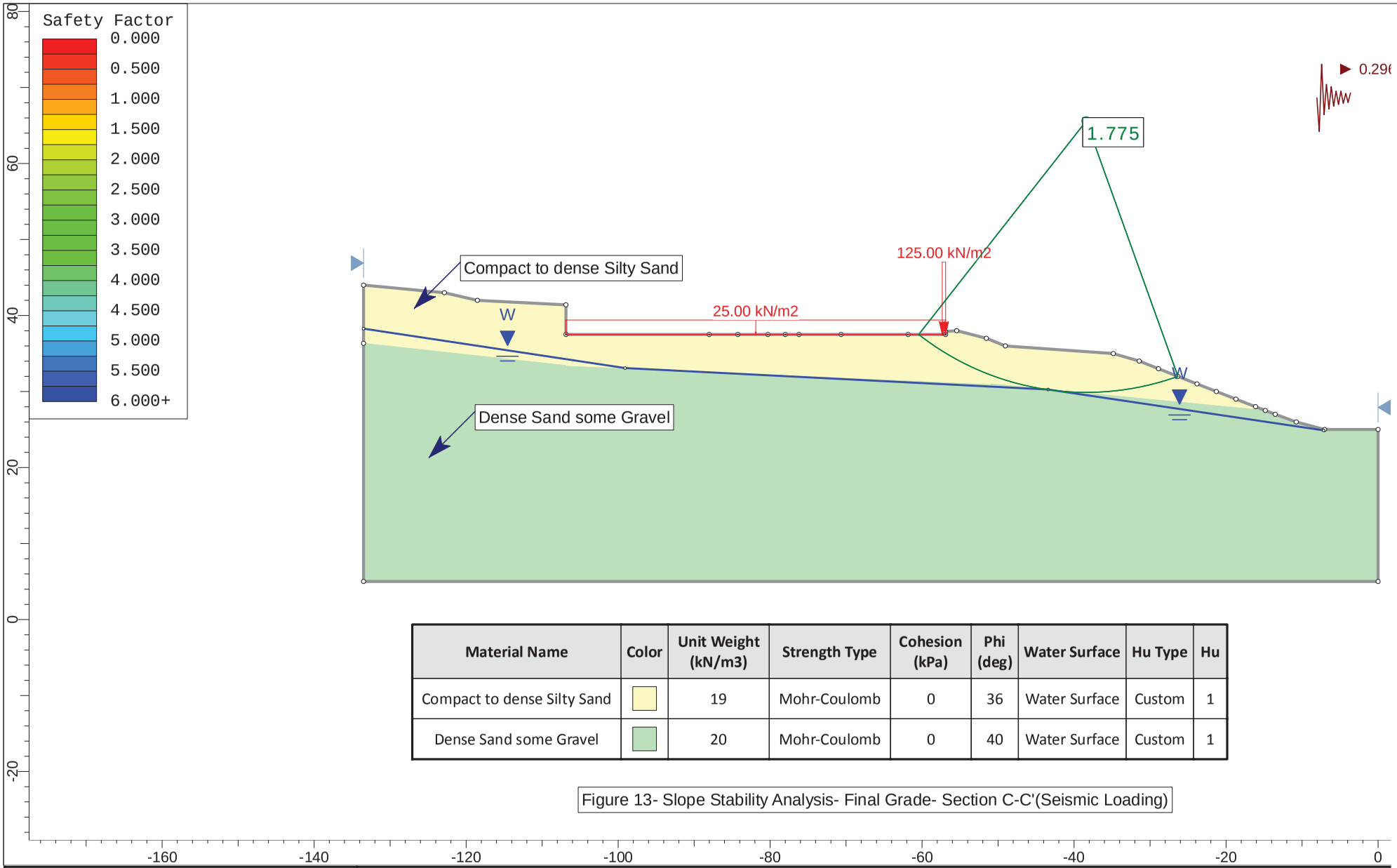

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Compact to dense Silty Sand		19	Mohr-Coulomb	0	36	Water Surface	Custom	1
Dense Sand some Gravel		20	Mohr-Coulomb	0	40	Water Surface	Custom	1

Figure 13- Slope Stability Analysis- Final Grade- Section C-C'(Seismic Loading)

rocscience

SLIDEINTERPRET 8.018

Natura Project, 3182 Gladwin Rd, Abbotsford, BC

Slope Stability Analysis

Drawn By	Scale 1:698	WSP Canada
Date February 2019		C-C-' Seismic.slim

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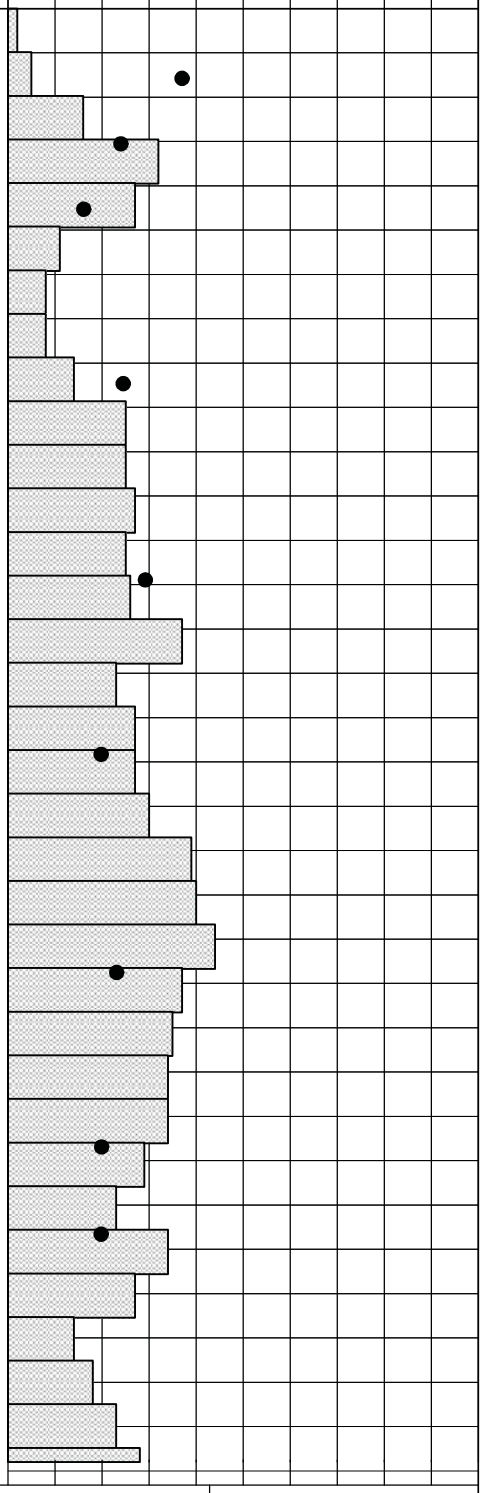
Proposed Multi-Storey Residential Building
Naturbana Properties Ltd.
3182 Gladwin Road
Abbotsford, BC

AH17-01

Project No: 171-00950-01

Depth (m)	Depth (ft)	Description	C	N	Type/ Sample #	Water Level
		soft, dark brown, sandy SILT, some organics, moist, topsoil				
	2	loose to compact/firm to stiff, brown, silty SAND/sandy SILT, moist, fill			AU1	
		dense to compact, grey/brown, SAND, trace to some silt, moist			AU2	
	4	loose to compact, brown, SAND, gravelly to some gravel to silty SAND, trace organics, moist			AU3	
2	6					
	8	loose to compact, grey/brown, SAND, silty to some silt, trace gravel, moist			AU4	
	10	compact/very stiff, grey/brown, silty SAND/sandy SILT, wet to saturated				P1 Apr 20 2017
	12					
4					AU5	
	14	compact to dense, grey, SAND, some silt, wet to saturated				
	16					
					AU6	
	18					
6	20	dense, blue/grey, SAND, silty to some silt, saturated				
	22				AU7	
	24					
8	26				AU8	
	28	compact to dense/very stiff to hard, grey, silty SAND to SAND and SILT, wet			AU9	
	30					
	32					

Continued on Pg 2 of 2



C: Condition of Sample
Good
Disturbed
No Recovery

Type: Type of Sampler
SPT : 2 in. standard
ST : Shelby
G : Grab
CORE

N: Number of Blows
WH : Weight of Hammer
WR : Weight of Rod
Standard Penetration Test : ASTM D1586
Hammer Type:

DYNAMIC CONE PENETRATION TEST

Plastic Limit (%) — Liquid Limit (%)
Moisture Content (%)

- Ground Water Level
- Shear strength in kPa (Torvane)
- PP Pocket Penetrometer (compressive strength in kPa)
- Shear strength in kPa (Unconfined)
- Shear strength in kPa (Field vane)
- Remolded strength in kPa
- Percent Passing # 200 sieve

Drill Method: Hollow Stem Auger / DCPT
Date Drilled: 4/20/2017
Logged by: AM
Checked by: JM

SOIL CLASSIFICATION IN ACCORDANCE WITH THE CANADIAN FOUNDATION ENGINEERING MANUAL 4TH EDITION 2006.

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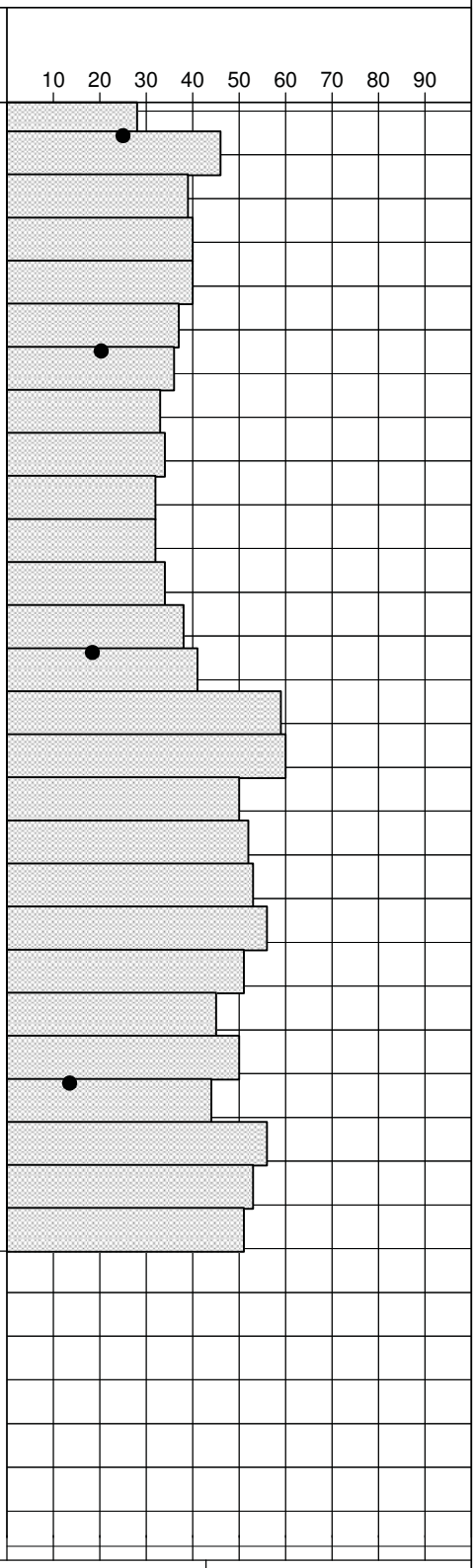
3182 Gladwin Road
Abbotsford, BC

AH17-01

Project No: 171-00950-01

Depth (m)	Depth (ft)	Description	C	N	Type/ Sample #	Water Level
	34, 36	compact to dense/very stiff to hard, grey, silty SAND to SAND and SILT, wet *(continued)*			AU10	
	38, 40, 42, 44, 46, 48	dense, grey, SAND, trace to some silt, saturated			AU11, AU12	
	50, 52, 54, 56, 58	dense, grey, SAND, some gravel, trace silt, saturated			AU13	
	60, 62, 64	Bottom of Auger Hole at 18.0 meters Grounwater seepage encountered at 3.0 meters				



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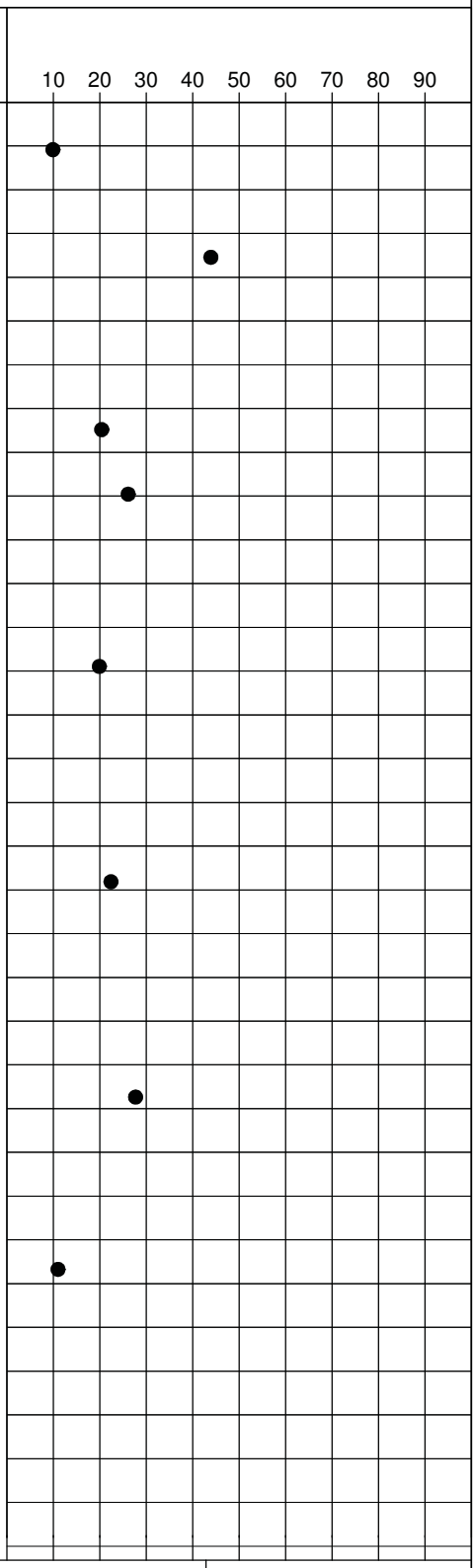
AH17-02

Project No: 171-00950-01

Depth (m)	Depth (ft)	Description	C	N	Type/ Sample #	Water Level
		compact, grey, SAND and GRAVEL, trace to some silt, moist, fill			AU1	
	2	soft to firm, brown, sandy SILT, some organics, moist, remnant topsoil layer, fill				
	4				AU2	
	6					
2		compact, brown, silty SAND, moist				
	8				AU3	
		soft to firm, brown, SILT, some sand to sandy SILT, moist			AU4	
	10	compact/stiff, grey, silty SAND to sandy SILT, moist				
	12					
4					AU5	
	14					
	16					
	18				AU6	
6						P1 Apr 20 2017
	20	compact to dense, grey, silty SAND, saturated				
	22					
					AU7	
	24					
8	26	compact to dense, grey, SAND and GRAVEL, trace silt, saturated			AU8	
	28					
	30					
	32					



Continued on Pg 2 of 2

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Hammer Type:
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Plastic Limit (%) — Moisture Content (%) — Liquid Limit (%)
Ground Water Level
Shear strength in kPa (Torvane)
PP Pocket Penetrometer (compressive strength in kPa)
Shear strength in kPa (Unconfined)
Shear strength in kPa (Field vane)
Remolded strength in kPa
Percent Passing # 200 sieve

Drill Method: Hollow Stem Auger
Date Drilled: 4/20/2017
Logged by: AM
Checked by: JM

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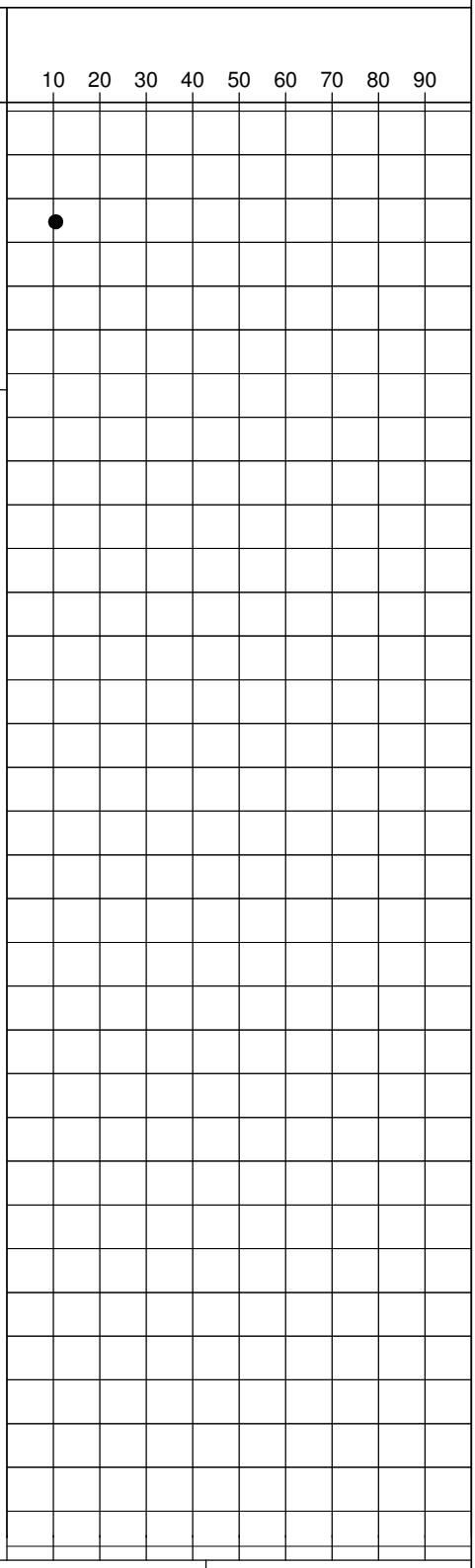
AH17-02

Project No: 171-00950-01

Depth (m)	Depth (ft)	Description	C	N	Type/ Sample #	Water Level
	34, 36, 38	compact to dense, grey, SAND and GRAVEL, trace silt, saturated *(continued)*			AU9	
12	40	Bottom of Auger Hole at 12 meters Groundwater seepage encountered at 6.0 meters				
	42, 44					
14	46					
	48, 50					
16	52, 54					
	56, 58					
18	60, 62, 64					



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Hammer Type:
DYNAMIC CONE PENETRATION TEST

Plastic Limit (%) — Moisture Content (%) — Liquid Limit (%)
Ground Water Level
Shear strength in kPa (Torvane)
PP Pocket Penetrometer (compressive strength in kPa)
Shear strength in kPa (Unconfined)
Shear strength in kPa (Field vane)
Remolded strength in kPa
Percent Passing # 200 sieve

Drill Method: Hollow Stem Auger
Date Drilled: 4/20/2017
Logged by: AM
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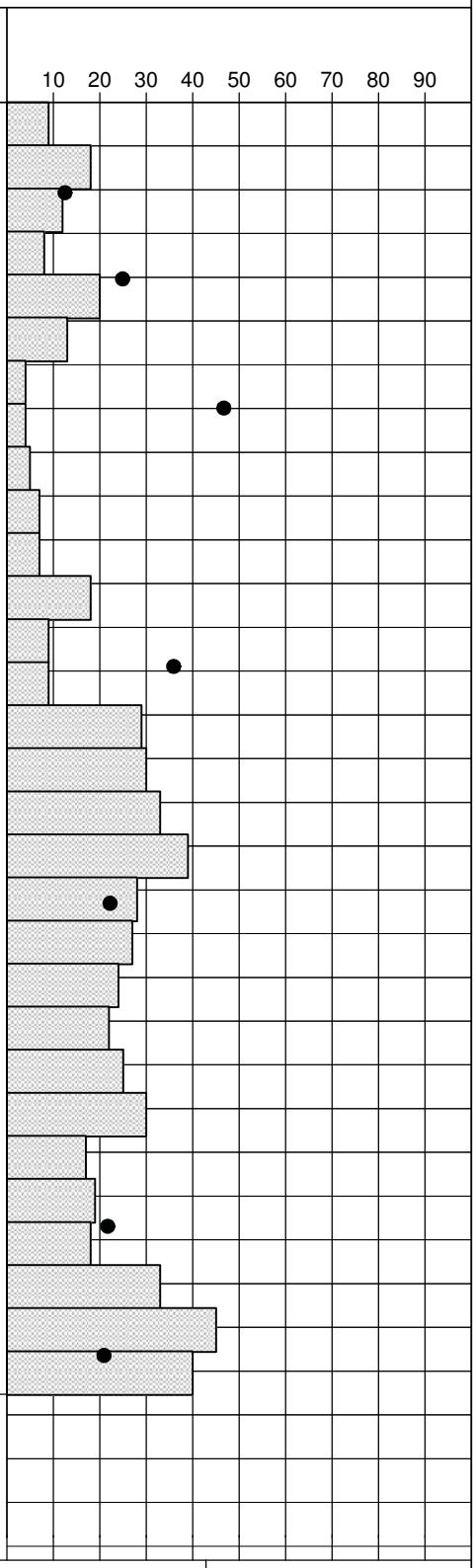
AH17-03

Project No: 171-00950-01

Depth (m)	Depth (ft)	Description	C	N	Type/ Sample #	Water Level
		firm, brown, sandy SILT, some organics, moist, topsoil				
		loose to compact, brown, SAND and GRAVEL, trace silt, moist, fill			AU1	
		loose to compact, brown, silty SAND, moist			AU2	
		loose to compact/firm to stiff, brown, SAND and SILT, moist, remnant topsoil			AU3	
		firm to stiff, light brown, SILT, trace to some sand, moist			AU4	
		compact to dense/very stiff to hard, light brown, silty SAND, sandy SILT, some gravel, moist			AU5	
					AU6	
		compact to dense, brown/grey, SAND, trace silt, trace gravel, saturated			AU7	P1 Apr 20 2017
		Bottom of Auger Hole at 9.0 meters Groundwater seepage encountered at 8.5 meters				



C: Condition of Sample
Good
Disturbed
No Recovery

Type: Type of Sampler
SPT : 2 in. standard
ST : Shelby
G : Grab
CORE

N: Number of Blows
WH : Weight of Hammer
WR : Weight of Rod
Standard Penetration Test : ASTM D1586
Hammer Type:

DYNAMIC CONE PENETRATION TEST

Plastic Limit (%) — Liquid Limit (%)
Moisture Content (%)
Ground Water Level
Shear strength in kPa (Torvane)
PP Pocket Penetrometer (compressive strength in kPa)
Shear strength in kPa (Unconfined)
Shear strength in kPa (Field vane)
Remolded strength in kPa
Percent Passing # 200 sieve

Drill Method: Hollow Stem Auger / DCPT
Date Drilled: 4/20/2017
Logged by: AM
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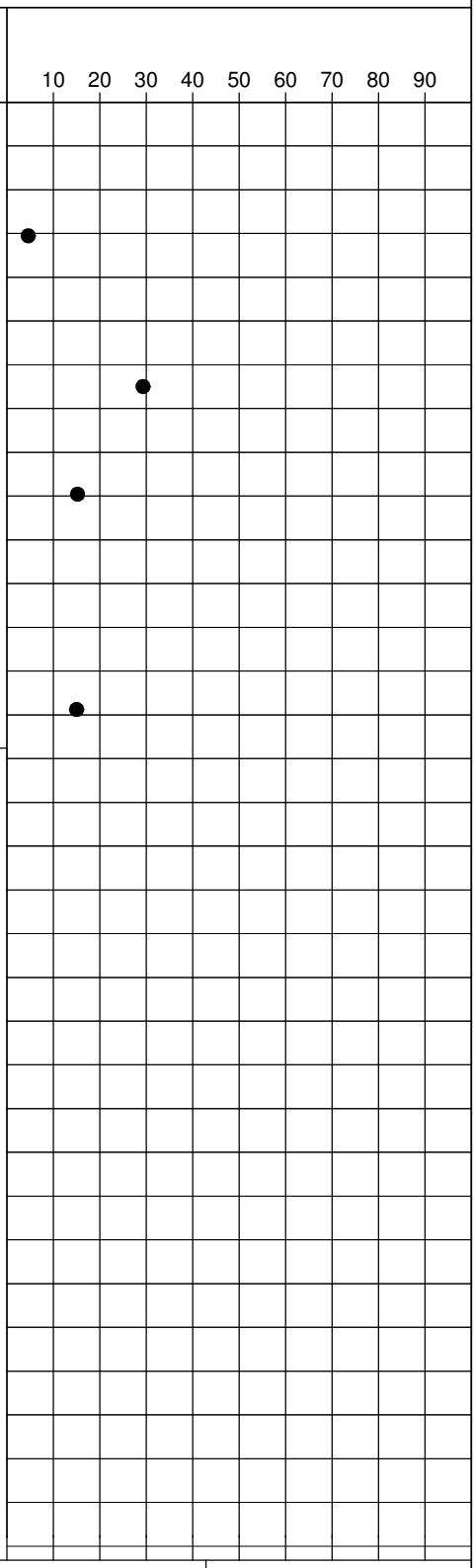
AH17-04
Pg 1 of 1
Project No: 171-00950-01

Depth (m)	Depth (ft)	Description	C	N	Type/ Sample #	Water Level
		compact to dense, brown, SAND and GRAVEL, trace silt, moist, fill			AU1	
		firm, brown, SILT, sandy to trace sand, trace gravel, moist			AU2	
		dense, brown, silty SAND, some gravel, moist, sub-rounded gravel			AU3	
		compact to dense, brown, SAND, trace silt, trace gravel, saturated			AU4	
		Bottom of Auger Hole at 4.5 meters No groundwater seepage encountered				



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PP Pocket Penetrometer (compressive strength in kPa)
Shear strength in kPa (Unconfined)
Shear strength in kPa (Field vane)
Remolded strength in kPa
Percent Passing # 200 sieve

Drill Method: Hollow Stem Auger
Date Drilled: 4/20/2017
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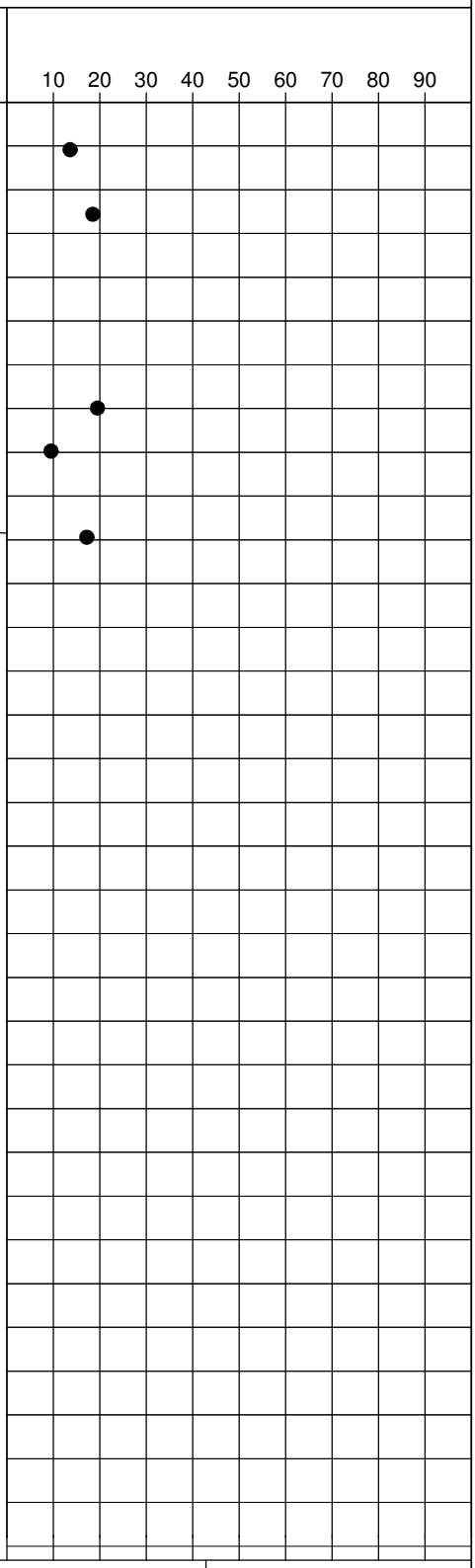
TP17-01

Project No: 171-00950-01

Depth (m)	Depth (ft)	Description	C	N	Type/ Sample #	Water Level
		soft, dark brown, sandy SILT, some organics, moist, topsoil			G1	
	2	loose, light brown, SAND and GRAVEL, silty to some silt, moist, fill			G2	
	4	firm/compact, brown, sandy SILT to silty SAND, some gravel, moist				
	6				G3	
2	8	compact, grey/brown, SAND, silty to trace silt, moist			G4	
		compact, grey/brown, SAND, trace silt, trace gravel, moist				
	10	Bottom of Test Pit at 3.0 meters Groundwater seepage encountered at 3.0 meters			G5	P1 Apr 18 2017
	12					
4	14					
	16					
	18					
6	20					
	22					
	24					
8	26					
	28					
	30					
	32					



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PP Pocket Penetrometer (compressive strength in kPa)
Shear strength in kPa (Unconfined)
Shear strength in kPa (Field vane)
Remolded strength in kPa
Percent Passing # 200 sieve

Drill Method: Test Pit
Date Drilled: 4/18/2017
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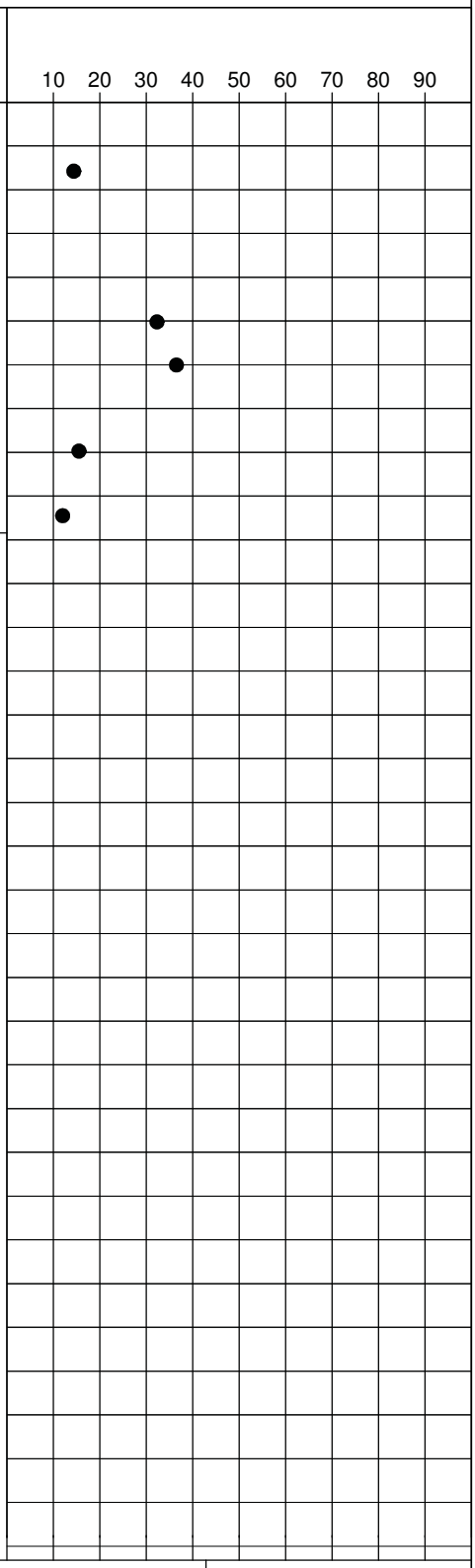
TP17-02

Project No: 171-00950-01

Depth (m)	Depth (ft)	Description	C	N	Type/ Sample #	Water Level
		loose, brown, SAND and GRAVEL, some silt, moist, fill			G1	
		firm, dark brown, sandy SILT, some organics, trace roots, moist, topsoil			G2	
		firm/compact, brown, sandy SILT to silty SAND, trace organics, moist			G3	
		compact, grey/brown, SAND trace silt to silty , trace gravel, moist			G4	
					G5	
		Bottom of Test Pit at 3.0 meters No groundwater seepage encountered				



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Remolded strength in kPa
Percent Passing # 200 sieve

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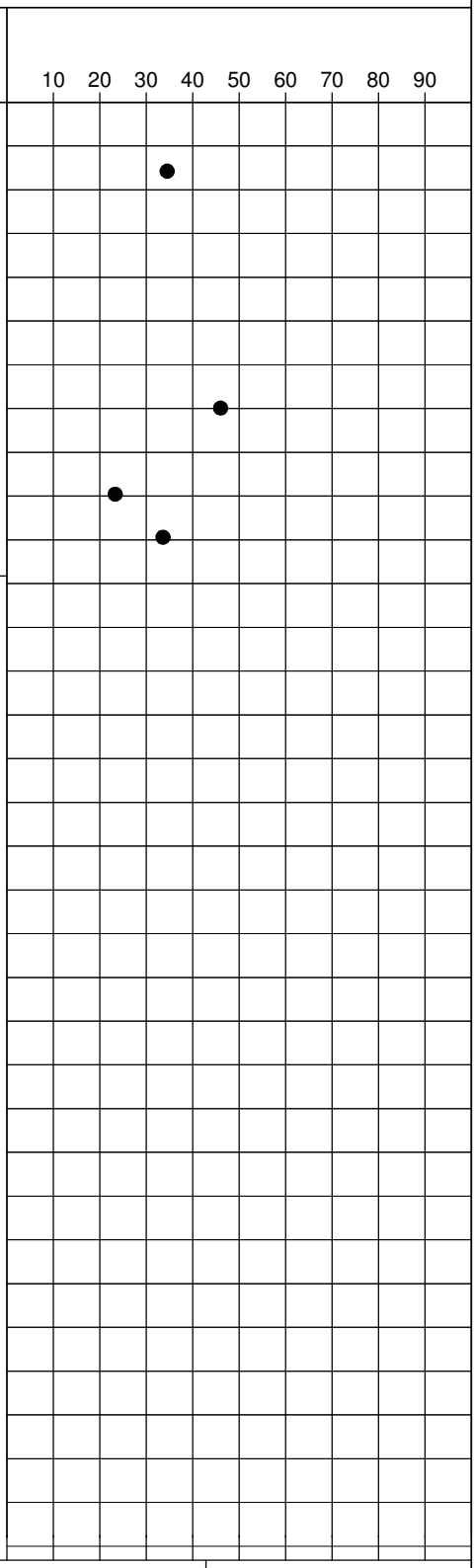
TP17-03

Project No: 171-00950-01

Depth (m)	Depth (ft)	Description	C	N	Type/ Sample #	Water Level
		loose, brown, SAND and GRAVEL, silty to some silt, some organics, moist, boulder at 1.05m, fill			G1	
		stiff, brown, SILT, some sand, some organics, moist, layer of topsoil at 2 m			G2	
		compact, grey/brown, SAND, silty to some silt, moist				
		compact/firm, brown, silty SAND to sandy SILT, moist			G3	
					G4	
		Bottom of Test Pit at 3.3 meters No groundwater seepage encountered				



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Ground Water Level
Shear strength in kPa (Torvane)
PP Pocket Penetrometer (compressive strength in kPa)
Shear strength in kPa (Unconfined)
Shear strength in kPa (Field vane)
Remolded strength in kPa
Percent Passing # 200 sieve

Drill Method: Test Pit
Date Drilled: 4/18/2017
Logged by: AM
Checked by: JM

SOIL CLASSIFICATION IN ACCORDANCE WITH THE CANADIAN FOUNDATION ENGINEERING MANUAL 4TH EDITION 2006.

THIS LOG IS FOR GEOTECHNICAL PURPOSES ONLY
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1 LOG PER PAGE 6/2/17

Attachment: Attachment B: Geotechnical Report, prepared by WSP (dated February 8, 2019) (PDS 045-2019 : DP with V application for 3182

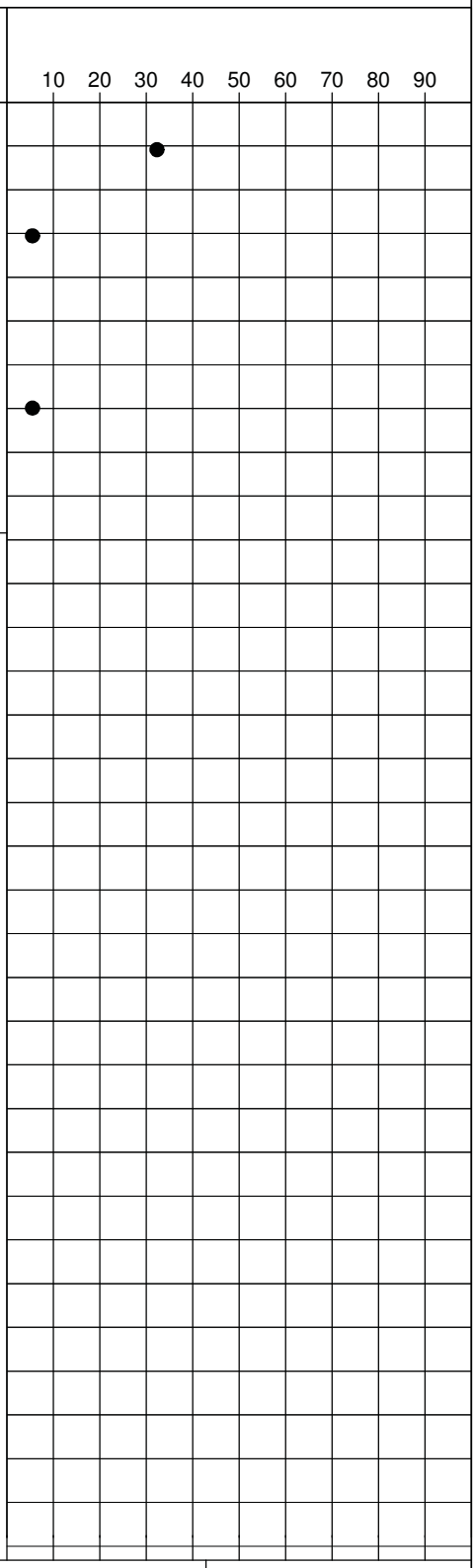
WSP Canada Inc.
100 - 20339 96 Avenue
Langley, B.C. V1M 0E4
Tel: +1 604-533-2992
Fax: +1 604-533-0768
www.wspgroup.com

Proposed Multi-Storey Residential Building
Naturbana Properties Ltd.
3182 Gladwin Road
Abbotsford, BC

TP17-04

Project No: 171-00950-01

Depth (m)	Depth (ft)	Description	C	N	Type/ Sample #	Water Level
		soft, dark brown, sandy SILT, some organics, moist, topsoil			G1	
	2	compact/firm, grey/brown, silty SAND/sandy SILT, moist				
		compact, brown, SAND, trace silt, moist			G2	
	4					
	6					
2					G3	
	8					
	10	Bottom of Test Pit at 3.0 meters No groundwater seepage encountered				
	12					
4						
	14					
	16					
	18					
6	20					
	22					
	24					
8	26					
	28					
	30					
	32					



C: Condition of Sample
Good
Disturbed
No Recovery

Type: Type of Sampler
SPT : 2 in. standard
ST : Shelby
G : Grab
CORE

N: Number of Blows
WH : Weight of Hammer
WR : Weight of Rod
Standard Penetration Test : ASTM D1586
Hammer Type:
DYNAMIC CONE PENETRATION TEST

Plastic Limit (%) — Liquid Limit (%)
Moisture Content (%)
Ground Water Level
Shear strength in kPa (Torvane)
PP Pocket Penetrometer (compressive strength in kPa)
Shear strength in kPa (Unconfined)
Shear strength in kPa (Field vane)
Remolded strength in kPa
Percent Passing # 200 sieve

Drill Method: Test Pit
Date Drilled: 4/18/2017
Logged by: AM
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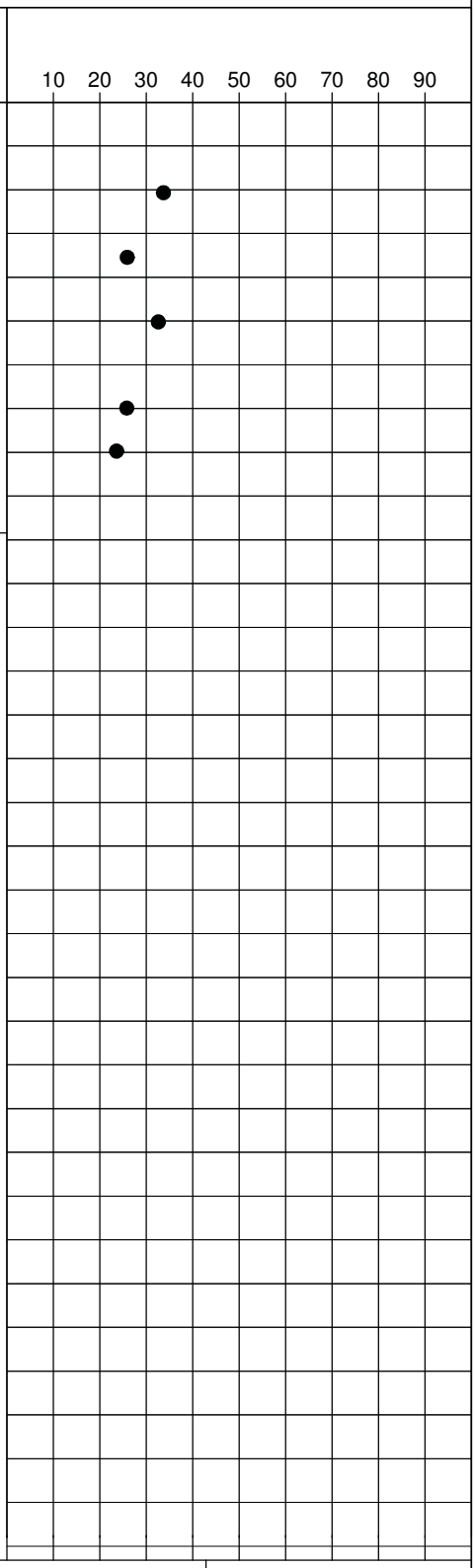
Proposed Multi-Storey Residential Building
Naturbana Properties Ltd.
3182 Gladwin Road
Abbotsford, BC

TP17-05

Project No: 171-00950-01

Depth (m)	Depth (ft)	Description	C	N	Type/ Sample #	Water Level
		soft, dark brown, sandy SILT, some organics, moist, fill			G1	
		loose to compact/soft to firm, light brown, sandy SILT/silty SAND, moist, fill			G2	
					G3	
		compact/firm, brown/grey, silty SAND/sandy SILT, some gravel, moist			G4	
					G5	
		Bottom of Test Pit at 3.0 meters No groundwater seepage encountered				



C: Condition of Sample
Good
Disturbed
No Recovery

Type: Type of Sampler
SPT : 2 in. standard
ST : Shelby
G : Grab
CORE

N: Number of Blows
WH : Weight of Hammer
WR : Weight of Rod
Standard Penetration Test : ASTM D1586
Hammer Type:
DYNAMIC CONE PENETRATION TEST

Plastic Limit (%) — Liquid Limit (%)
Moisture Content (%)
Ground Water Level
Shear strength in kPa (Torvane)
PP Pocket Penetrometer (compressive strength in kPa)
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Photograph 1. – Northwestern portion of proposed building site near AH17-03.

Photograph 2. – Fill stockpile within northern portion of proposed building site.

Attachment: Attachment B: Geotechnical Report, prepared by WSP (dated February 8, 2019) (PDS 045-2019 : DP with V application for 3182

Photograph 3. – Fill stockpile within middle portion of proposed building site near TP17-03.

Photograph 4. – Landslide scarp below TOB downslope of site and above Horn Creek.

Attachment: Attachment B: Geotechnical Report, prepared by WSP (dated February 8, 2019) (PDS 045-2019 : DP with V application for 3182

Photograph 5. – Landslide Failure along the Horn Creek Trail – right side (2018).

Photograph 6. – Old landslide scarp along TOB about 50 m upstream from site.

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Photograph 7. – Horn Creek below southeast portion of site. Note the angular rip rap along the east bank (left side).

Photograph 8. – Horn Creek channel viewed toward the north below the site.

Attachment: Attachment B: Geotechnical Report, prepared by WSP (dated February 8, 2019) (PDS 045-2019 : DP with V application for 3182

Photograph 9. – Unnamed watercourse below site.

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Photograph 10. – TOB along the unnamed watercourse about 10 m north of AH17-03.

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APPENDIX D: *LANDSLIDE ASSESSMENT ASSURANCE STATEMENT*

Note: This Statement is to be read and completed in conjunction with the "*APEGBC Guidelines for Legislated Landslide Assessments for Proposed Residential Development in British Columbia*", March 2006/Revised September 2008 ("*APEGBC* Guidelines") and the "2006 BC Building Code (BCBC 2006)" and is to be provided for *landslide assessments* (not floods or flood controls) for the purposes of the Land Title Act, Community Charter or the Local Government Act. Italicized words are defined in the *APEGBC* Guidelines.

To: The *Approving Authority* City of Abbotsford Date: Feb 6, 2019

32315 South Fraser Way
Abbotsford, BC V2T 1W7
Jurisdiction and address

With reference to (check one):

- ☐ Land Title Act (Section 86) – Subdivision Approval
- R3 ☑ Local Government Act (Sections 919.1 and 920) – Development Permit
- ☑ Community Charter (Section 56) – Building Permit
- ☐ Local Government Act (Section 910) – Flood Plain Bylaw Variance
- ☐ Local Government Act (Section 910) – Flood Plain Bylaw Exemption
- ☐ British Columbia Building Code 2006 sentences 4.1.8.16 (8) and 9.4 4.4.(2) (Refer to BC Building and Safety Policy Branch Information Bulletin B10-01 issued January 18, 2010)

For the Property:

3182 Gladwin Road, Abbotsford, BC
Legal description and civic address of the Property

The undersigned hereby gives assurance that he/she is a *Qualified Professional* and is a *Professional Engineer* or *Professional Geoscientist.*

I have signed, sealed and dated, and thereby certified, the attached *landslide assessment* report on the Property in accordance with the *APEGBC Guidelines*. That report must be read in conjunction with this Statement. In preparing that report I have:

Check to the left of applicable items

✓ 1. Collected and reviewed appropriate background information
✓ 2. Reviewed the proposed *residential development* on the Property
✓ 3. Conducted field work on and, if required, beyond the Property
✓ 4. Reported on the results of the field work on and, if required, beyond the Property
___ 5. Considered any changed conditions on and, if required, beyond the Property
6. For a *landslide hazard analysis* or *landslide risk analysis* I have:
✓ 6.1 reviewed and characterized, if appropriate, any *landslide* that may affect the Property
✓ 6.2 estimated the *landslide hazard*
✓ 6.3 identified existing and anticipated future *elements at risk* on and, if required, beyond the Property
✓ 6.4 estimated the potential *consequences* to those *elements at risk*
7. Where the *Approving Authority* has adopted a *level of landslide safety* I have:
___ 7.1 compared the *level of landslide safety* adopted by the *Approving Authority* with the findings of my investigation
___ 7.2 made a finding on the *level of landslide safety* on the Property based on the comparison
___ 7.3 made recommendations to reduce *landslide hazards* and/or *landslide risks*

8. Where the *Approving Authority* has **not** adopted a *level of landslide safety* I have:

Attachment: Attachment B: Geotechnical Report, prepared by WSP (dated February 8, 2019) (PDS 045-2019 : DP with V application for 3182

✓ 8.1 described the method of *landslide hazard analysis* or *landslide risk analysis* used

✓ 8.2 referred to an appropriate and identified provincial, national or international guideline for *level of landslide safety*

✓ 8.3 compared this guideline with the findings of my investigation

✓ 8.4 made a finding on the *level of landslide safety* on the Property based on the comparison

✓ 8.5 made recommendations to reduce *landslide hazards* and/or *landslide risks*

✓ 9. Reported on the requirements for future inspections of the Property and recommended who should conduct those inspections.

Based on my comparison between

Check one

☐ the findings from the investigation and the adopted *level of landslide safety* (item 7.2 above)

☑ the appropriate and identified provincial, national or international guideline for *level of landslide safety* (item 8.4 above)

I hereby give my assurance that, based on the conditions[1] contained in the attached *landslide assessment* report,

Check one

☐ for subdivision approval, as required by the Land Title Act (Section 86), "that the land may be used safely for the use intended"

Check one

☐ with one or more recommended registered covenants.

☐ without any registered covenant.

RB ☑ for a development permit, as required by the Local Government Act (Sections 919.1 and 920), my report will "assist the local government in determining what conditions or requirements under [Section 920] subsection (7.1) it will impose in the permit".

☑ for a building permit, as required by the Community Charter (Section 56), "the land may be used safely for the use intended"

Check one

RB ☑ with one or more recommended registered covenants.

☐ without any registered covenant.

☐ for flood plain bylaw variance, as required by the "Flood Hazard Area Land Use Management Guidelines" associated with the Local Government Act (Section 910), "the development may occur safely".

☐ for flood plain bylaw exemption, as required by the Local Government Act (Section 910), "the land may be used safely for the use intended".

Reza Berry
Name (print)

Feb 6, 2019
Date

R. Berry
Signature

[1] When seismic slope stability assessments are involved, *level of landslide safety* is considered to be a "life safety" criteria as described in the National Building Code of Canada (NBCC 2005), Commentary on Design for Seismic Effects in the User's Guide, Structural Commentaries, Part 4 of Division B. This states:

"The primary objective of seismic design is to provide an acceptable level of safety for building occupants and the general public as the building responds to strong ground motion; in other words, to minimize loss of life. This implies that, although there will likely be extensive structural and non-structural damage, during the DGM (design ground motion), there is a reasonable degree of confidence that the building will not collapse nor will its attachments break off and fall on people near the building. This performance level is termed 'extensive damage' because, although the structure may be heavily damaged and may have lost a substantial amount of its initial strength and stiffness, it retains some margin of resistance against collapse".

Attachment: Attachment B: Geotechnical Report, prepared by WSP (dated February 8, 2019) (PDS 045-2019 : DP with V application for 3182

Feb. 6, 2019

R. BERNARDINI
43105

R. Bernardini

(Affix Professional seal here)

100 - 20339 96 Avenue
Address

Langley, BC, V1M 2L2

604-455-5340
Telephone

If the *Qualified Professional* is a member of a firm, complete the following.

I am a member of the firm WSP CANADA INC
and I sign this letter on behalf of the firm. (Print name of firm)

Attachment: Attachment B: Geotechnical Report, prepared by WSP (dated February 8, 2019) (PDS 045-2019 : DP with V application for 3182

TECHNICAL MEMORANDUM

TO: Bruno Jury, P.Eng., MBA, LEED, President

FROM: Reza Berry, M.Sc., M.Eng., P.Eng.

FILE NO. 171-00950-02

SUBJECT: **Geotechnical Memorandum on setback recommendation for development of Proposed Multi-Storey Residential Building, 3182 Gladwin Road, Abbotsford, BC (Revision 1)**

DATE: February 8, 2019

As requested, WSP Canada Inc. (WSP) has prepared this memorandum for the above-referenced site pertaining to the feasibility of reducing the setback of the proposed development from the sewer right-of-way (RoW) for easement purposes. WSP previously prepared a report to Horn Park Place Developments Ltd. (the "Client") dated June 2, 2017 (WSP File No: 171-0095-01) providing a Geotechnical Hazard and Site Assessment Report for the proposed residential development.

Authorization to proceed with the scope of work in this memorandum was received from Horn Park Place Developments Ltd. on July 17, 2018. This memorandum has been updated and revised (Revision 1) to address the seismic considerations in the BC Building Code 2018 which came into effect in December of 2018.

This memorandum provides discussion on slope stability and provides preliminary recommendations for setback distances from the Sanitary Right-of-Way (SRoW) from the southeast side of the proposed building.

The underground parking layout, site plan and cross-sections showing the existing slope on the east side of the site were provided by the Client (attached as Figures 1, 2 and 3).

It is understood that at sections A-A and B-B the corner of the proposed parkade will be within 2.5 m of the proposed Sanitary RoW.

Pseudo-static limit equilibrium slope stability analyses were conducted to assess the stability of the slope under both static and seismic loading conditions, with respect to developing a set-back criteria for development from the top of slope and existing sanitary sewer pipe. The analyses were conducted using RocScience Slide 7.0 software employing the Bishop Simplified method with circular slip surfaces. The slope geometry was modeled based on Sections A-A and B-B.

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WSP has not received the proposed foundation elevation from the Client, however, we understand that most of the parkade, as stated by the Client, will be above ground along the east wall and the parkade would only be partially below grade of the order of 4 to 6 feet (1.2 to 1.8 m). Soil and groundwater conditions used for the modeling were based on the findings of the subsurface investigation previously conducted by WSP (File No: 171-00950-01).

WSP conducted a limit equilibrium stability analysis for the slope profiles A-A and B-B. The sections provided indicates that 250 mm PVC Sanitary Line is offset horizontally from the proposed parkade about 2.5 m. The existing sanitary sewer is indicated at a depth of 6.167 m (Section A-A) and 5.768 m (Section B-B) from the existing ground surface. The analysis was completed using RocScience Slide 7.0 software, which employs various methods of slices with circular arcs to assess stability. The limit equilibrium stability analysis computes a minimum Factor of Safety (FoS) for a given position on the slope being modeled based on the boundary conditions input into the program. The FoS represents the ratio of moments and forces resisting sliding failure to the moments and forces acting to induce failure. A FoS less than 1.0 represents unstable conditions. Conversely, a FoS of 1.0 or greater indicates stable conditions. To meet design standards considered typical for this nature of project, a minimum FoS of 1.5 is required for the slope under static loading conditions, and a minimum FoS of 1.1 is required for the slope under design basis seismic loading conditions.

A distributed load of 25 kN/m^2 was considered for a typical multi-storey building on top of the slope with a setback of approximately 2.5 m from the sanitary pipe center line.

The stability of the slope under seismic loading was conducted using a seismic coefficient of 0.296 associated with the 1:2,475-year return period design ground motion obtained from Natural Resources Canada Earthquakes Canada website for the site longitude and latitude. The slope stability analyses were completed using soil parameters shown in Table 1 estimated from the conditions encountered at the auger holes and engineering judgement. The existing slope configuration within the mobilized landslide material under static and seismic loading conditions is shown on Figures 3 to 6 (attached). The results of the slope stability analysis show that the slope has a FoS of 1.69 and 0.82 for Section A-A and 2.06 and 1.08 for Section B-B under static and seismic loading conditions, respectively, which is considered not acceptable when considering the seismic loading case and slope geometry in Section A-A.

Table 1: Soil Parameters for Slope Stability Analyses

Soil Layers	Elevations from Existing Ground Surface (m)	Unit Weight (kN/m^3)	Cohesion (kPa)	Friction Angle (°)
Compact to dense Silty Sand	0 to 8	19	0	36
Dense Sand some Gravel	8 to 18	20	0	40

From a geotechnical perspective, based on our analysis, it is feasible to setback the proposed parkade at the southeast corner of the site a distance of 2.5 m from the sanitary sewer from a slope stability perspective, provided the foundation of the proposed building at this location is set below a 2H:1V influence line taken up from the base of the sanitary sewer or deeper for stability purposes. In addition, as the east slope is presently over steepened settlement sensitive features such as patios, utilities, etc. should not be constructed adjacent to the crest of slope adjacent to the Right-of-Way. It is noted that any proposed development or maintenance near the existing sanitary pipe in the future such as the excavation in the area should be reviewed under supervision of a geotechnical engineer to make sure the excavation is safe for worker access and does not adversely impact the adjacent building.

Our geotechnical report recommends that building foundations be located below a 2H:1V line projected up from the base of adjacent deeper excavations for underground services, other footings, toe of steep slopes. In the areas of Sections A-A and B-B, excavation to a depth suitable to provide the required depth of foundation would likely not be practical due to the site soil and groundwater conditions, as well as the need for temporary excavation shoring and the limited setback from the sewer RoW. Therefore, Consideration should be given to constructing the southeast portion of the building on a pile supported foundations. This would eliminate the need for excavating adjacent to the RoW and lower the foundation load below the 2H:1V line of influence from the sewer.

The attached Terms of Reference form an integral part of this memorandum. We trust this information meets your immediate requirements. If you need additional information or wish to discuss please contact the undersigned.

Sincerely,

WSP CANADA INC.

Original Signed by

Per: Reza Berry, M.Sc., M.Eng, P.Eng
Senior Geotechnical Engineer

Reviewed By: Paul R. Ell, P.Eng.
Senior Geotechnical Engineer

Attached: Terms of Reference
Figure 1- Underground Parking Layout
Figure 2- Site Plan
Figure 3- Cross Sections
Figure 4- Slope Stability Analysis- Section A-A (Static Loading)
Figure 5- Slope Stability Analysis- Section A-A (Seismic Loading)
Figure 6- Slope Stability Analysis- Section B-B (Static Loading)
Figure 7- Slope Stability Analysis- Section B-B (Seismic Loading)

L:_GEO\^Projects\2017\171-00950-02 3176 Gladwin Rd, Abby - GeoHazard\Addendum Memo

Attachment: Attachment B: Geotechnical Report, prepared by WSP (dated February 8, 2019) (PDS 045-2019 : DP with V application for 3182

TERMS OF REFERENCE FOR GEOTECHNICAL REPORTS ISSUED BY WSP CANADA INC.

1 STANDARD OF CARE

WSP Canada Inc. ("WSP") prepared and issued this geotechnical report (the "Report") for its client (the "Client") in accordance with generally-accepted engineering consulting practices for the geotechnical discipline. No other warranty, expressed or implied, is made. Unless specifically stated in the Report, the Report does not address environmental issues.

The terms of reference for geotechnical reports issued by WSP (the "Terms of Reference") contained in the present document provide additional information and caution related to standard of care and the use of the Report. The Client should read and familiarize itself with these Terms of Reference.

2 COMPLETENESS OF THE REPORT

All documents, records, drawings, correspondence, data, files and deliverables, whether hard copy, electronic or otherwise, generated as part of the services for the Client are inherent components of the Report and, collectively, form the instruments of professional services (the "Instruments of Professional Services"). The Report is of a summary nature and is not intended to stand alone without reference to the instructions given to WSP by the Client, the communications between WSP and the Client, and to any other reports, writings, proposals or documents prepared by WSP for the Client relative to the specific site described in the Report, all of which constitute the Report.

TO PROPERLY UNDERSTAND THE INFORMATION, OBSERVATIONS, FINDINGS, SUGGESTIONS, RECOMMENDATIONS AND OPINIONS CONTAINED IN THE REPORT, REFERENCE MUST BE MADE TO THE WHOLE OF THE REPORT. WSP CANNOT BE RESPONSIBLE FOR USE BY ANY PARTY OF PORTIONS OF THE REPORT WITHOUT REFERENCE TO THE WHOLE REPORT AND ITS VARIOUS COMPONENTS.

3 BASIS OF THE REPORT

WSP prepared the Report for the Client for the specific site, development, building, design or building assessment objectives and purpose that the Client described to WSP. The applicability and reliability of any of the information, observations, findings, suggestions, recommendations and opinions contained in the Report are only valid to the extent that there was no material alteration to or variation from any of the said descriptions provided by the Client to WSP unless the Client specifically requested WSP to review and revise the Report in light of such alteration or variation.

4 USE OF THE REPORT

The information, observations, findings, suggestions, recommendations and opinions contained in the Report, or any component forming the Report, are for the sole use and benefit of the Client and the team of consultants selected by the Client for the specific project that the Report was provided. NO OTHER PARTY MAY USE OR RELY UPON THE REPORT OR ANY PORTION OR COMPONENT WITHOUT THE WRITTEN CONSENT OF WSP. WSP will consent to any reasonable request by the Client to approve the use of this Report by other parties designated by the Client as the "Approved Users". As a condition for the consent of WSP to approve the use of the Report by an Approved User, the Client must provide a copy of these Terms of Reference to that Approved User and the Client must obtain written confirmation from that Approved User that the Approved User will comply with these Terms of Reference, such written confirmation to be provided separately by each Approved User prior to beginning use of the Report. The Client will provide WSP with a copy of the written confirmation from an Approved User when it becomes available to the Client, and in any case, within two weeks of the Client receiving such written confirmation.

The Report and all its components remain the copyright property of WSP and WSP authorises only the Client and the Approved Users to make copies of the Report, but only in such quantities as are reasonably necessary for the use of the Report by the Client and the Approved Users. The Client and the Approved Users may not give, lend, sell or otherwise disseminate or make the Report, or any portion thereof, available to any party without the written permission of WSP. Any use which a third party makes of the Report, or any portion of the Report, is the sole responsibility of such third parties. WSP accepts no responsibility for damages suffered by any third party resulting from the use of the Report. The Client and the Approved Users acknowledge and agree to indemnify and hold harmless WSP, its officers, directors, employees, agents, representatives or sub-consultants, or any or all of them, against any claim of any nature whatsoever brought against WSP by any third parties, whether in contract or in tort, arising or related to the use of contents of the Report.

5 INTERPRETATION OF THE REPORT

a. **Nature and Exactness of Descriptions:** The classification and identification of soils, rocks and geological units, as well as engineering assessments and estimates have been based on investigations performed in accordance with the standards set out in Paragraph 1 above. The classification and identification of these items are judgmental in nature and even comprehensive sampling and testing programs, implemented with the appropriate equipment by experienced personnel,

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may fail to locate some conditions. All investigations or assessments utilizing the standards of Paragraph 1 involve an inherent risk that some conditions will not be detected and all documents or records summarizing such investigations will be based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated and all persons making use of such documents or records should be aware of, and accept, this risk. Some conditions are subject to changes over time and the parties making use of the Report should be aware of this possibility and understand that the Report only presents the conditions at the sampled points at the time of sampling. Where special concerns exist, or when the Client has special considerations or requirements, the Client must disclose them to WSP so that additional or special investigations may be undertaken, which would not otherwise be within the scope of investigations made by WSP or the purposes of the Report.

b. **Reliance on information**: The evaluation and conclusions contained in the Report have been prepared on the basis of conditions in evidence at the time of site investigation and field review and on the basis of information provided to WSP. WSP has relied in good faith upon representations, information and instructions provided by the Client and others concerning the site. Accordingly, WSP cannot accept responsibility for any deficiency, misstatement or inaccuracy contained in the report as a result of misstatements, omissions, misrepresentations or fraudulent acts of persons providing information.

c. **Additional Involvement by WSP**: To avoid misunderstandings, WSP should be retained to assist other professionals to explain relevant engineering findings and to review the geotechnical aspects of the plans, drawings and specifications of other professionals relative to the engineering issues pertaining to the geotechnical consulting services provided by WSP. To ensure compliance and consistency with the applicable building codes, legislation, regulations, guidelines and generally-accepted practices, WSP should also be retained to provide field review services during the performance of any related work. Where applicable, it is understood that such field review services must meet or exceed the minimum necessary requirements to ascertain that the work being carried out is in general conformity with the recommendations made by WSP. Any reduction from the level of services recommended by WSP will result in WSP providing qualified opinions regarding adequacy of the work.

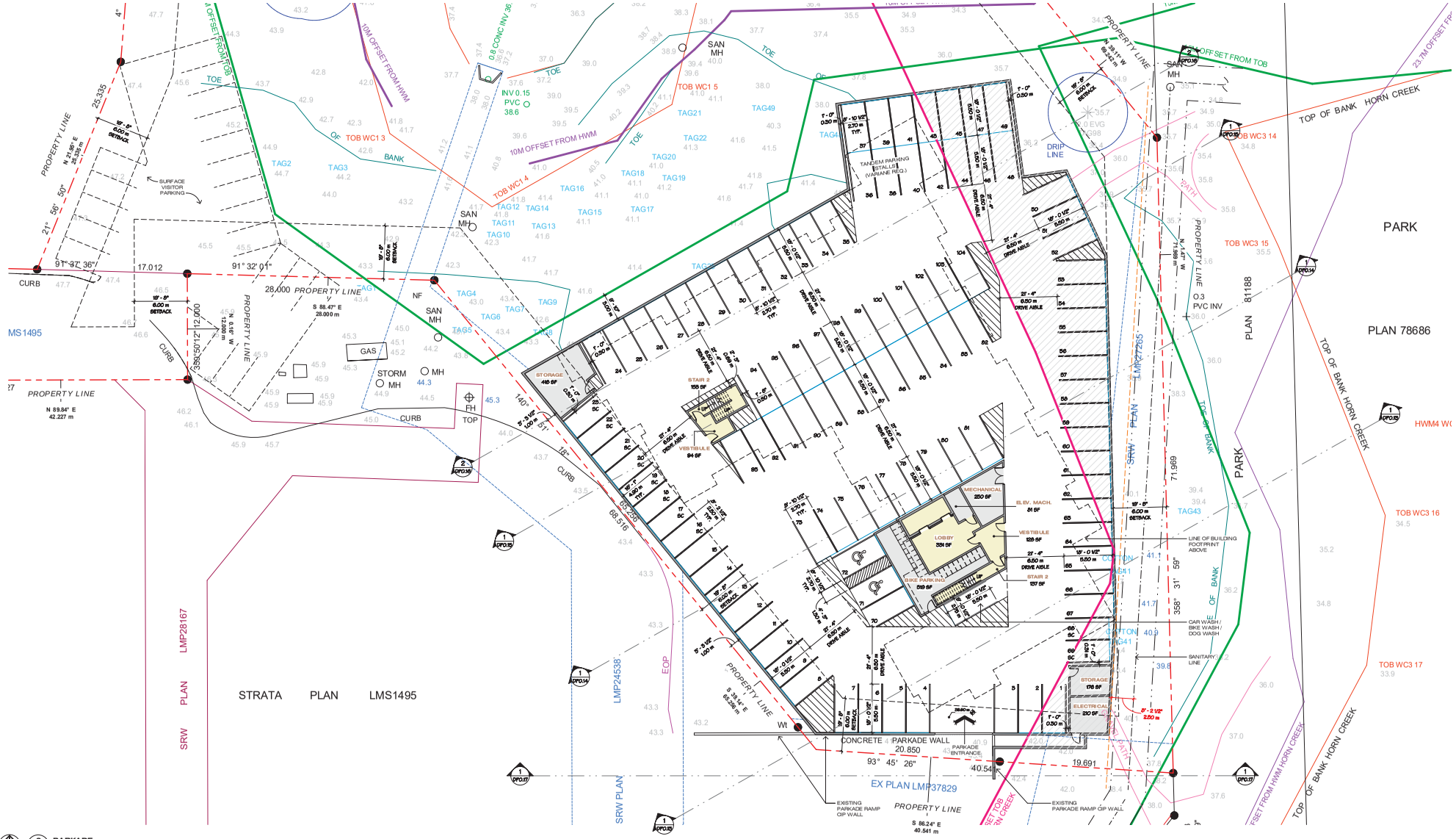
6 ALTERNATE REPORT FORMAT

When WSP submits both electronic and hard copy versions of the Instruments of Professional Services, the Client agrees that only the signed and sealed hard copy versions shall be considered final and legally binding upon WSP. The hard copy versions submitted by WSP shall be the original documents for record and working purposes, and, in the event of a dispute or discrepancy, the hard copy versions shall govern over the electronic versions; furthermore, the Client agrees and waives all future right of dispute that the original hard copy signed and sealed versions of the Instruments of Professional Services maintained or retained, or both, by WSP shall be deemed to be the overall originals for the Project.

The Client agrees that the electronic file and hard copy versions of Instruments of Professional Services shall not, under any circumstances, no matter who owns or uses them, be altered by any party except WSP. The Client warrants that the Instruments of Professional Services will be used only and exactly as submitted by WSP.

The Client recognizes and agrees that WSP prepared and submitted electronic files using specific software or hardware systems, or both. WSP makes no representation about the compatibility of these files with the current or future software and hardware systems of the Client, the Approved Users or any other party. The Client further agrees that WSP is under no obligation, unless otherwise expressly specified, to provide the Client, the Approved Users and any other party, or any or all of them, with specific software and hardware systems that are compatible with any electronic submitted by WSP. The Client further agrees that should the Client, an Approved User or a third party require WSP to provide specific software or hardware systems, or both, compatible with the electronic files prepared and submitted by WSP, for any reason whatsoever included but not restricted to an order from a court, then the Client will pay WSP for all reasonable costs related to the provision of the specific software or hardware systems, or both. The Client further agrees to indemnify and hold harmless WSP, its officers, directors, employees, agents, representative or sub-consultant, or any or all of them, against any claim or any nature whatsoever brought against WSP, whether in contract or in tort, arising or related to the provision or use or any specific software or hardware provided by WSP.

Attachment: Attachment B: Geotechnical Report, prepared by WSP (dated February 8, 2019) (PDS 045-2019 : DP with V application for 3182



2 PARKADE
DP0.5 1/16" = 1'-0"

U/G PARKING

NATURA
3182 GLADWIN ROAD, ABBOTSFORD, BC

SCALE 1/16" = 1'-0"
JOB NO. 17104

Figure 1- Underground Parking Layout

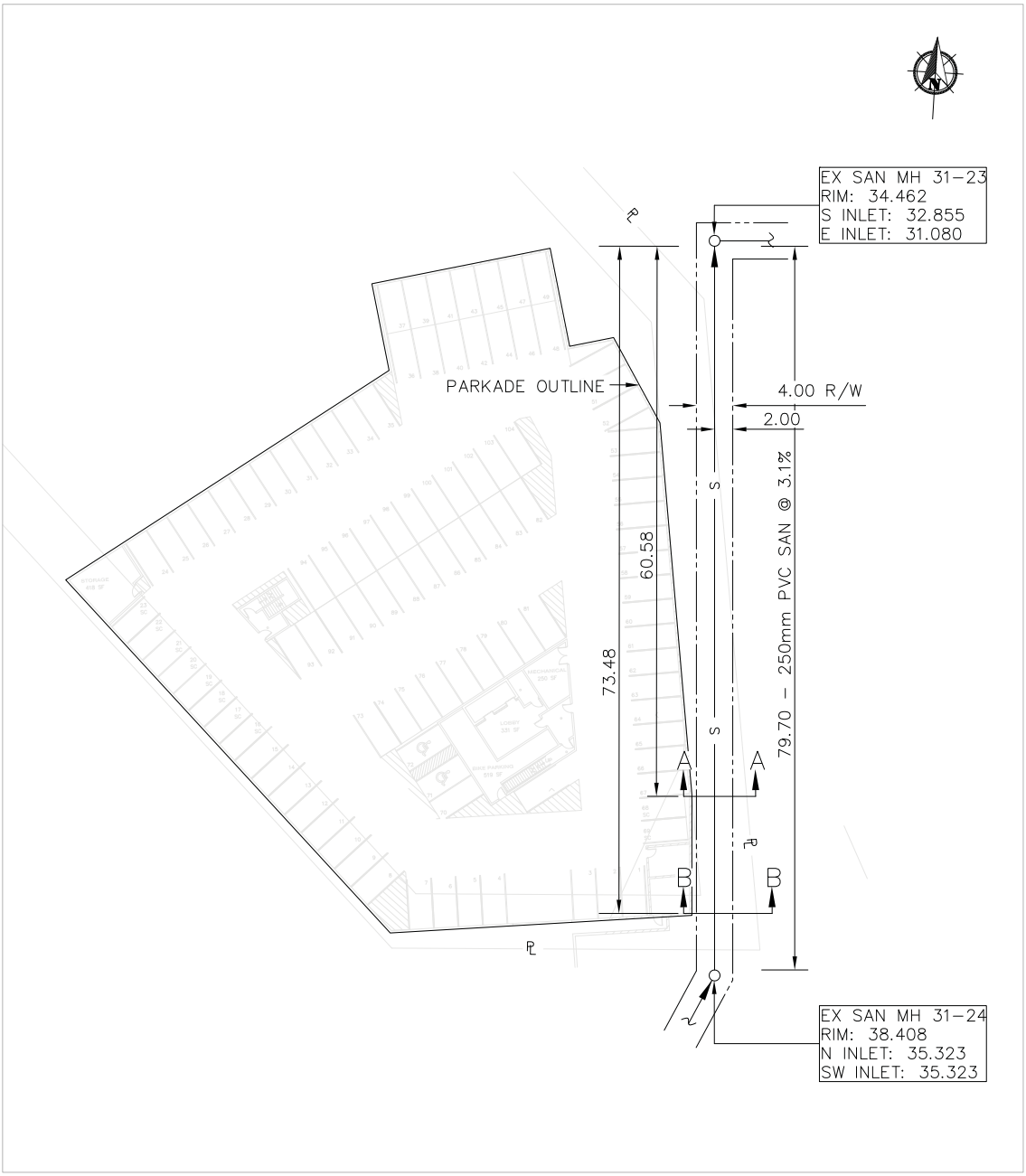
DP0.5

JULY 31ST, 2018

ARCHITECTURE & LANDSCAPE ARCHITECTURE

9355 YOUNG ROAD
CHILLIWACK, B.C. CANADA
V2P 4S3
TEL: 604 | 793 | 9445
FAX: 604 | 793 | 9446
EMAIL: chp@chparchitects.com
Craven | Huston | Powers | Architects
CHPA

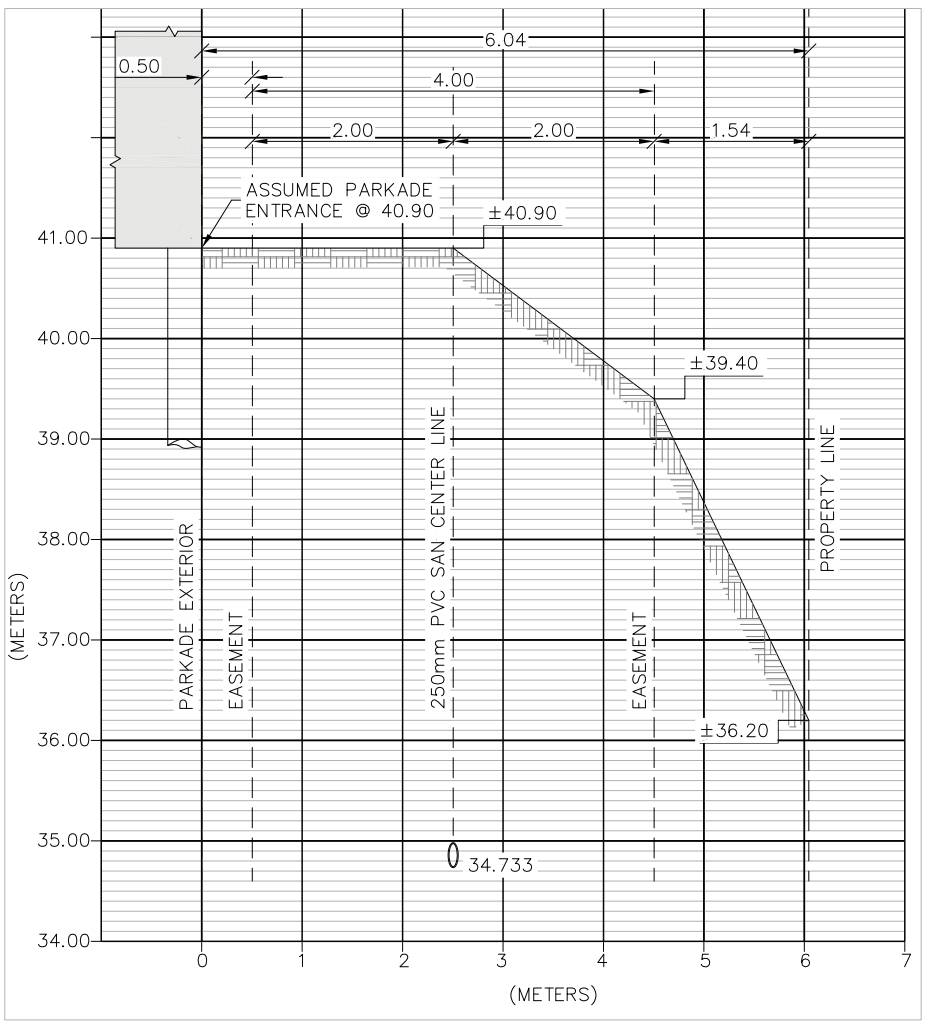
Attachment: Attachment B: Geotechnical Report, prepared by WSP (dated February 8, 2019) (PDS 045-2019 - DP with V application for 3182 Gladwin Road and a portion of 3172 Gladwin Road)



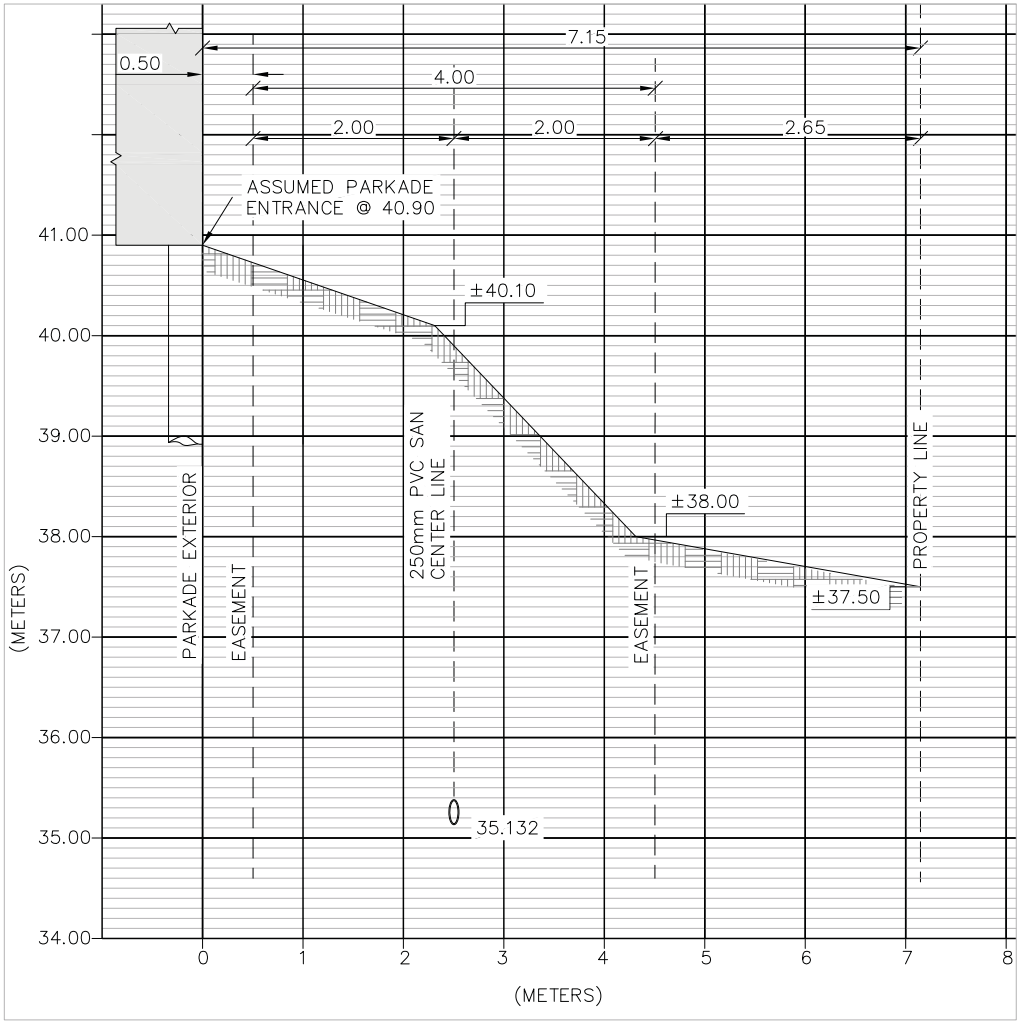
SITE PLAN

Figure 2- Site Plan

Attachment: Attachment B: Geotechnical Report, prepared by WSP (dated February 8, 2019) (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion of 3172 Gladwin Road)



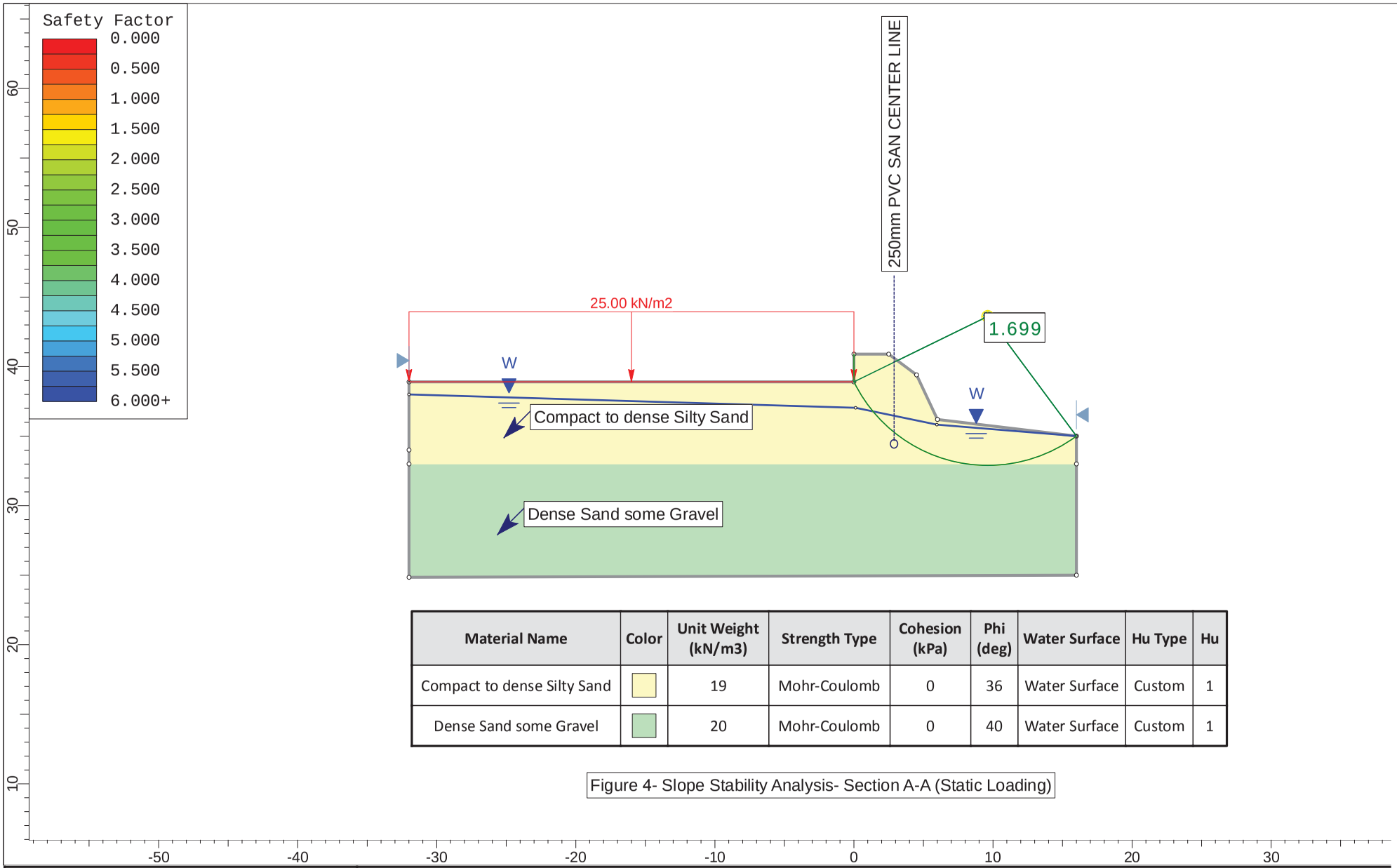
SECTION A–A



SECTION B–B

Figure 3- Cross Sections

Attachment: Attachment B: Geotechnical Report, prepared by WSP (dated February 8, 2019) (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion of 3172 Gladwin Road)



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type	Hu
Compact to dense Silty Sand		19	Mohr-Coulomb	0	36	Water Surface	Custom	1
Dense Sand some Gravel		20	Mohr-Coulomb	0	40	Water Surface	Custom	1

Figure 4- Slope Stability Analysis- Section A-A (Static Loading)

rocscience

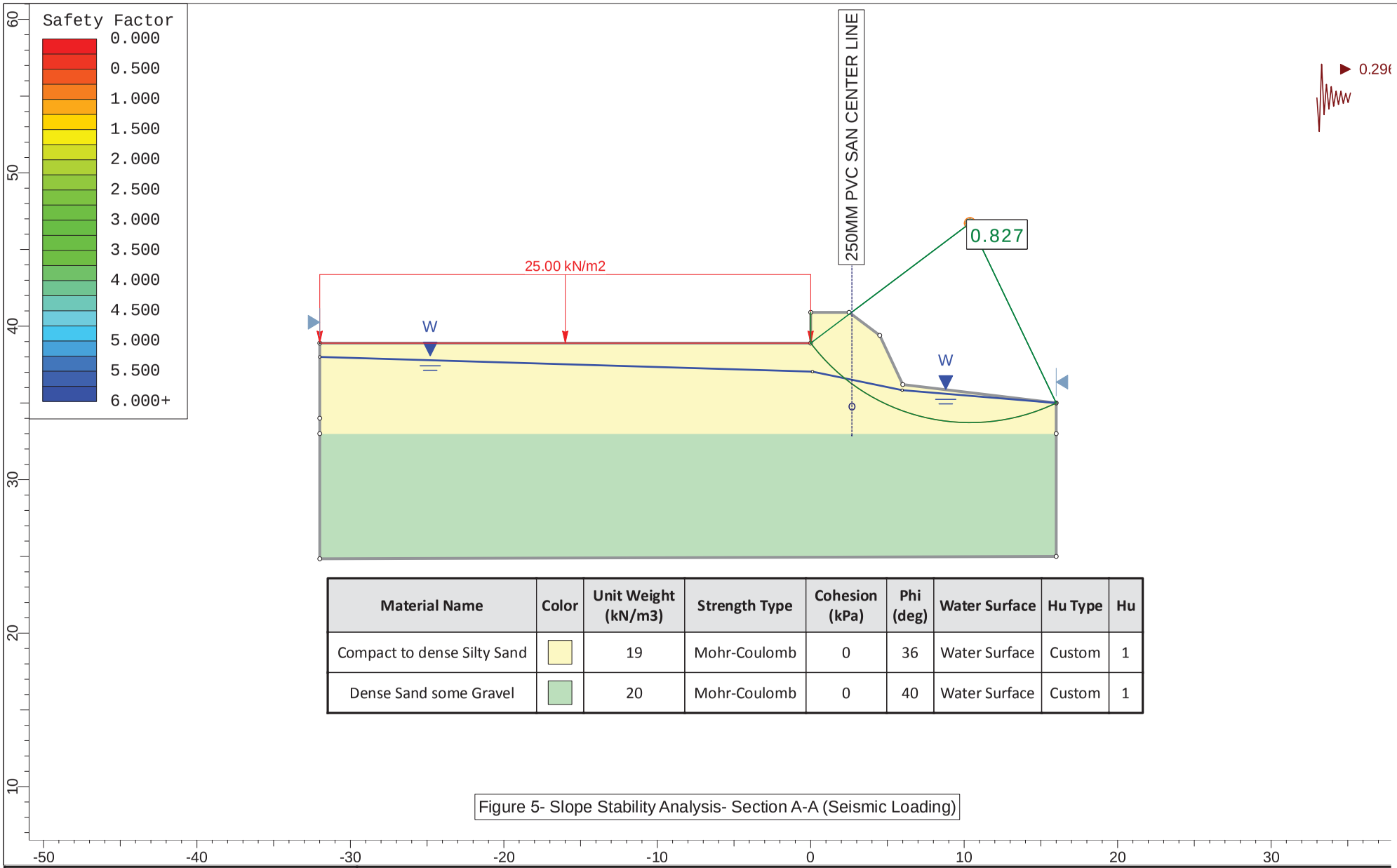
SLIDE INTERPRET 8.018

Natura Project, 3182 Gladwin Rd, Abbotsford, BC

Slope Stability Analysis

Drawn By	Scale 1:381	WSP Canada
Date February 2019		File Name Slope Stability Analysis- Section A-A (Static Loading).slim

Attachment: Attachment B: Geotechnical Report, prepared by WSP (dated February 8, 2019) (PDS 045-



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type	Hu
Compact to dense Silty Sand		19	Mohr-Coulomb	0	36	Water Surface	Custom	1
Dense Sand some Gravel		20	Mohr-Coulomb	0	40	Water Surface	Custom	1

Figure 5- Slope Stability Analysis- Section A-A (Seismic Loading)

rocscience

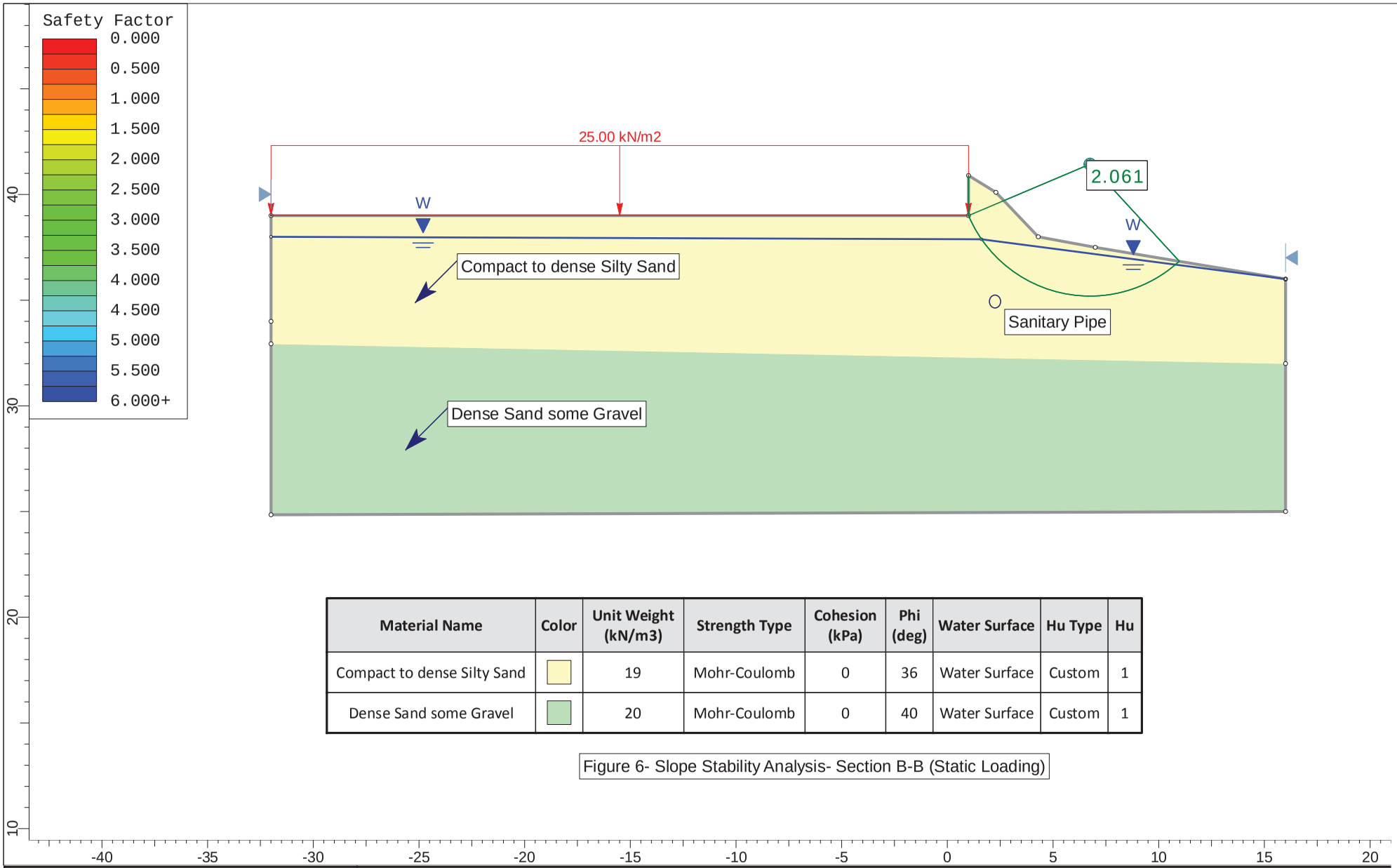
SLIDEINTERPRET 8.018

Natura Project, 3182 Gladwin Rd, Abbotsford, BC

Slope Stability Analysis

Drawn By	Scale 1:346	WSP Canada
Date February 2019		File Name Slope Stability Analysis- Section A-A(Seismic Loading).slim

Attachment: Attachment B: Geotechnical Report, prepared by WSP (dated February 8, 2019) (PDS 045-



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Compact to dense Silty Sand		19	Mohr-Coulomb	0	36	Water Surface	Custom	1
Dense Sand some Gravel		20	Mohr-Coulomb	0	40	Water Surface	Custom	1

Figure 6- Slope Stability Analysis- Section B-B (Static Loading)

rocscience

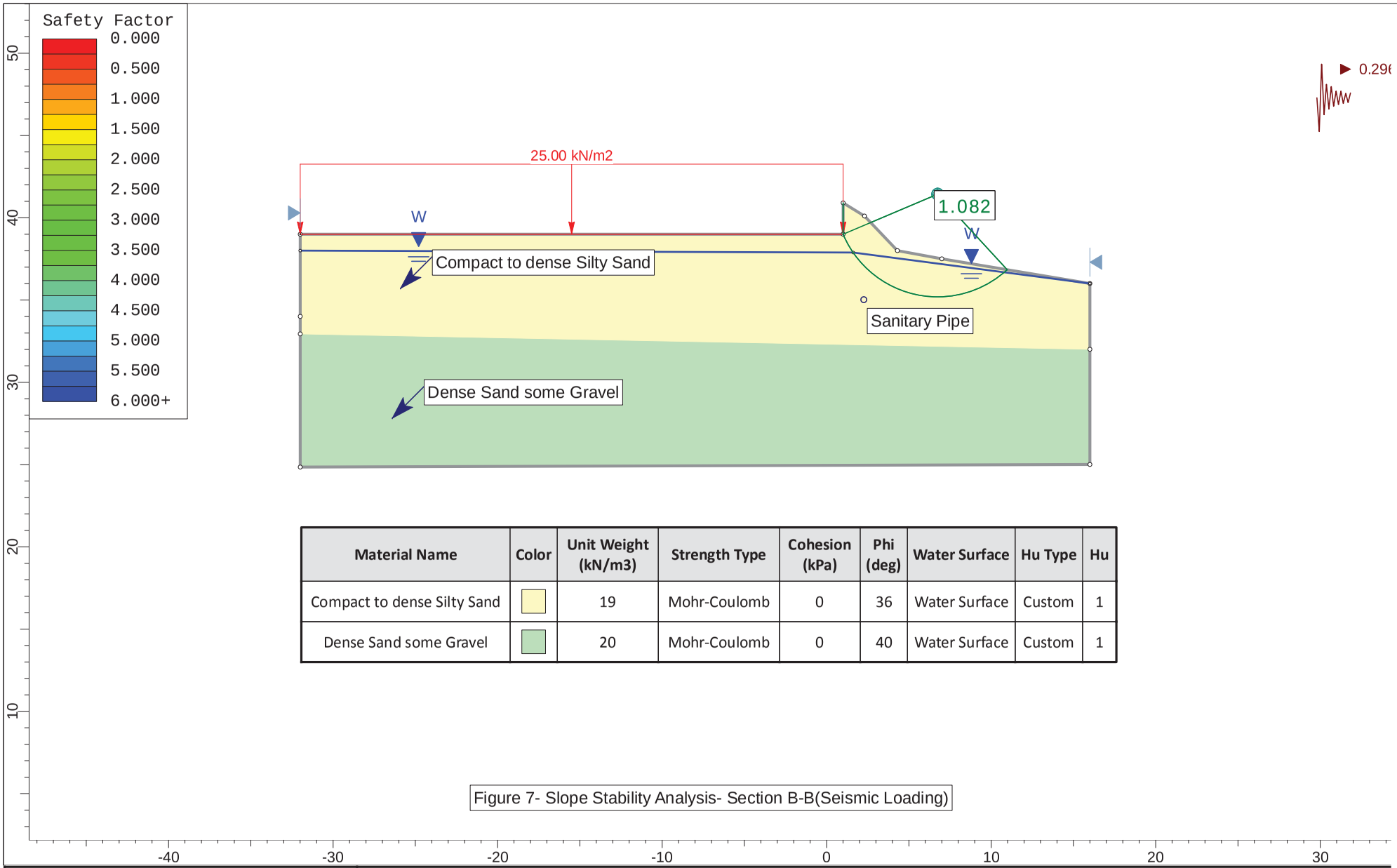
SLIDEINTERPRET 8.018

Natura Project, 3182 Gladwin Rd, Abbotsford, BC

Slope Stability Analysis

Drawn By	Scale 1:251	WSP Canada
Date February 2019		File Name Slope Stability Analysis- Section B-B (Static Loading).slim

Attachment: Attachment B: Geotechnical Report, prepared by WSP (dated February 8, 2019) (PDS 045-



Material Name	Color	Unit Weight (kN/m3)	Strength Type	Cohesion (kPa)	Phi (deg)	Water Surface	Hu Type	Hu
Compact to dense Silty Sand		19	Mohr-Coulomb	0	36	Water Surface	Custom	1
Dense Sand some Gravel		20	Mohr-Coulomb	0	40	Water Surface	Custom	1

Figure 7- Slope Stability Analysis- Section B-B(Seismic Loading)

rocscience

SLIDEINTERPRET 8.018

Natura Project, 3182 Gladwin Rd, Abbotsford, BC

Slope Stability Analysis

Drawn By	Scale 1:322	WSP Canada
Date February 2019		File Name Slope Stability Analysis- Section B-B (Seismic Loading).slim

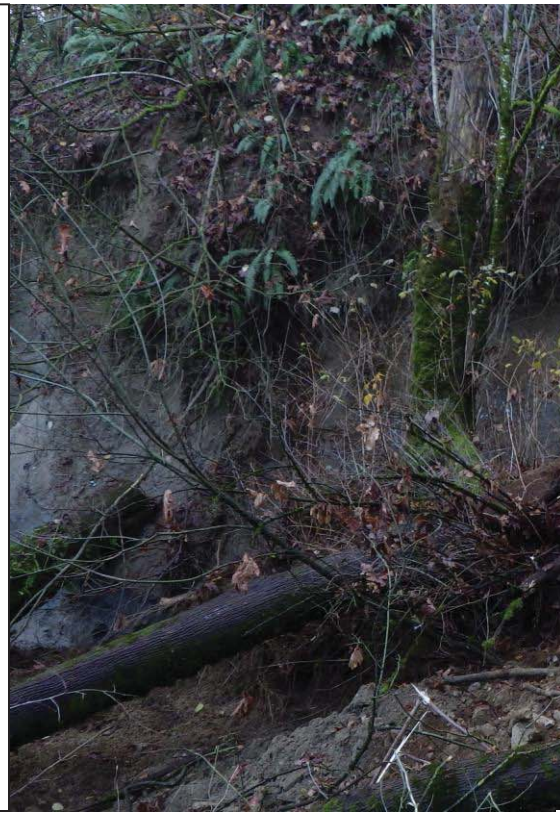
Attachment: Attachment B: Geotechnical Report, prepared by WSP (dated February 8, 2019) (PDS 045-

Horn Creek Slope Failure – Update: December 01,2018 12:30pm

An additional portion of slope has failed adjacent to the park trail, bringing the scarp edge into the existing trail by roughly 0.5m. We have now closed the trail and re-directed trail users around the closure, through private property at 3182 Gladwin St. as shown in yellow below. The red portion indicates the approximate location of the closed portion of trail. A temporary trail easement should be in place by this later this week.

This most recent slope failure occurred in dry weather conditions and was reported to the City on December 01, 2018.

New erosion.
An additional 18m^2 of ground area at the top of bank collapsed. One remaining bigleaf maple, which was slated for removal this Wednesday, and a wildlife tree slid also and now lay at the toe. . New soil made it to the creek and may have altered flows again. Orange paint on the ground highlights new cracks in the existing trail. **No further manual tree felling at top of bank should occur due to danger of potential bank failure.**

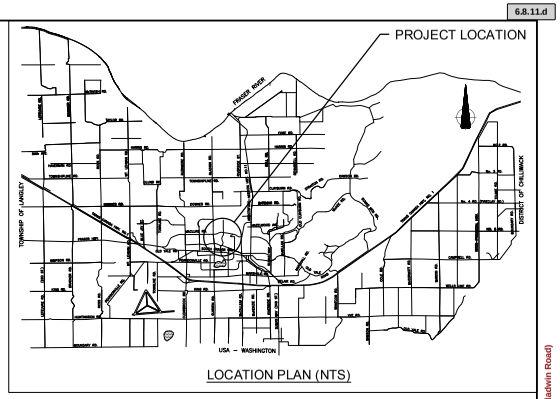


Attachment: Attachment C: Horn Creek Slope Failure (prepared by PRC and Engineering) (PDS 045-2019 : DP with V application for 3182

Trail closure and detour Dec 01,2018.
northend

Trail closure and detour – Dec. 01, 2018
south end

Attachment: Attachment C: Horn Creek Slope Failure (prepared by PRC and Engineering) (PDS 045-2019 : DP with V application for 3182



LOCATION PLAN (NTS)

NOT FOR CONSTRUCTION

GRID NO. D8 SHEET NO. 1 OF 3 DRWG. NO. D–1187

LOCATION FOR GAS, ELECTRICAL, TEL, & CABLE UTILITIES ARE APPROXIMATE. CONTACT "BC ONE CALL" TO CONFIRM LOCATIONS PRIOR TO DESIGN OR CONSTRUCTION.

BC ONE CALL: TICKET # _____ DATE: _____

NO.	DATE	BY	REVISIONS	TECH	ENG.
2	2019 03 21	MR	UPDATED SITE PLAN WITH NEW POINTS (19–33991)		T.S.
1	2019 03 12	WD	UPDATED SITE PLAN WITH NEW POINTS		T.S.

DATE:	2018 11 20
DRAWN:	WD
DESIGN:	SK
SAP WORK ORDER #	104005

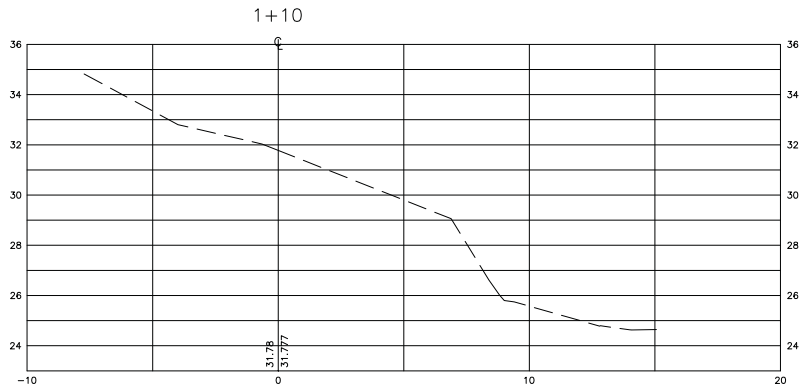
SURVEY JOB NO.:	18–32224
SURVEY CREW:	WD/RG
DATUM (HOR./VER.):	UTM NAD 83 (CSRS) ZONE 10
GEOID MODEL:	HTv2.0
SCALE: HOR. 1 : 250	VER.

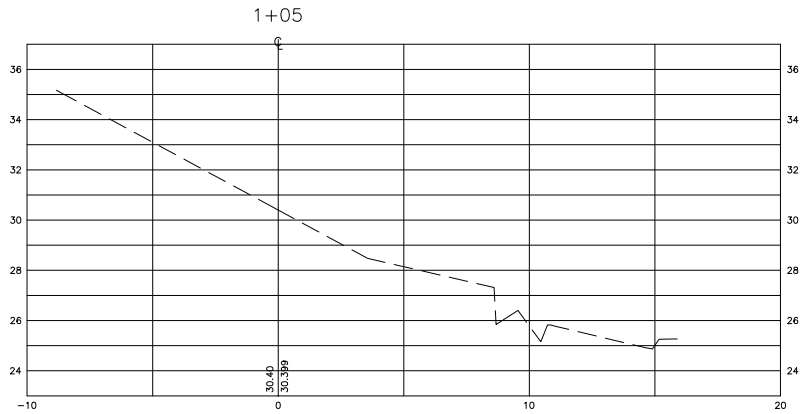
ABBOTSFORD

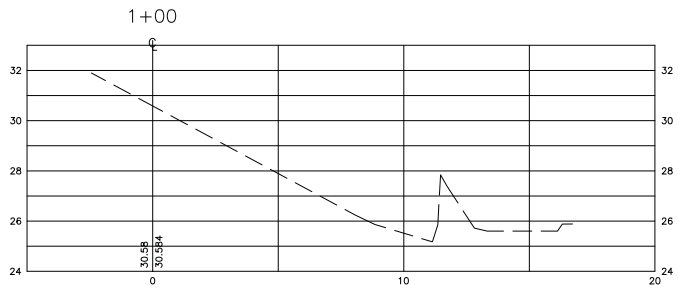
HORN CREEK PARK
CREEK BANK FAILURE
SITE PLAN AND REMEDIATION WORK

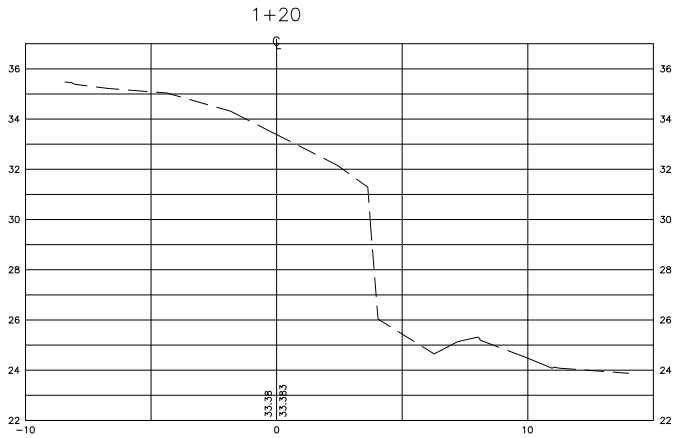
T:\LDDPROJ\D1187\DWG\D1187.dwg

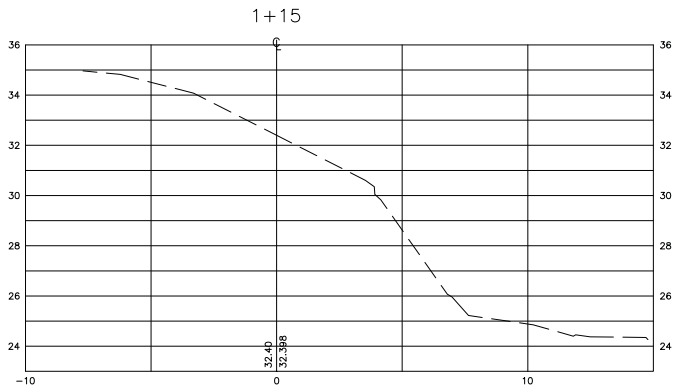
Attachment: Attachment C: Horn Creek Slope Failure (prepared by PRC and Engineering) (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion of 3172 Gladwin Road)











NOT FOR CONSTRUCTION

GRID NO. D8 SHEET NO. 2 OF 3 DRWG. NO. D−1187

SCALE:
HOR: 1:100
VER. 1:100

LOCATION FOR GAS, ELECTRICAL, TEL, & CABLE UTILITIES ARE APPROXIMATE. CONTACT 'BC ONE CALL' TO CONFIRM LOCATIONS PRIOR TO DESIGN OR CONSTRUCTION.

BC ONE CALL: TICKET # _____ DATE: _____

NO.	DATE	BY	REVISIONS	TECH	ENG.
2	2019 03 21	MR	UPDATED SITE PLAN WITH NEW POINTS (19−33991)		T.S.
1	2019 03 12	WD	UPDATED SITE PLAN WITH NEW POINTS		T.S.

DATE: 2018 11 20
DRAWN: WD
DESIGN: SK
SAP WORK ORDER # 104005

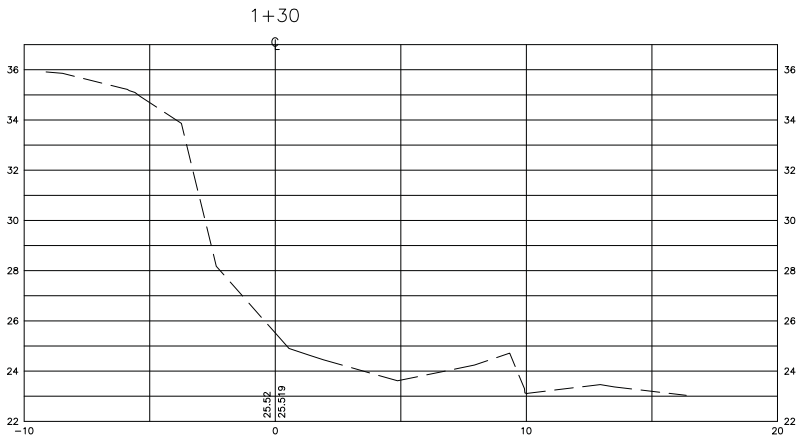
SURVEY JOB NO.: 18−32224
SURVEY CREW: WD/RG
DATUM (HOR./VER.): UTM NAD 83 (CSRS) ZONE 10
GEOID MODEL: HTv2.0
SCALE: HOR. 1 : 100 VER. 1 : 100

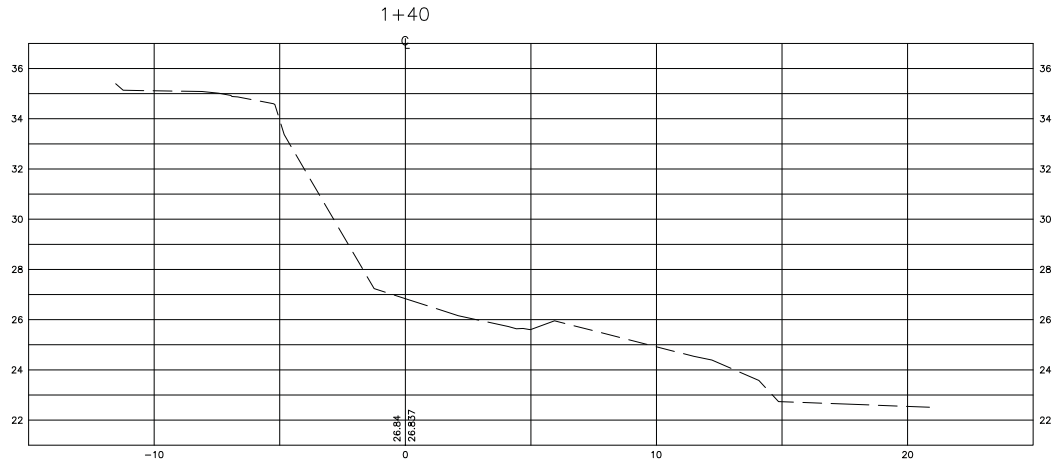
ABBOTSFORD

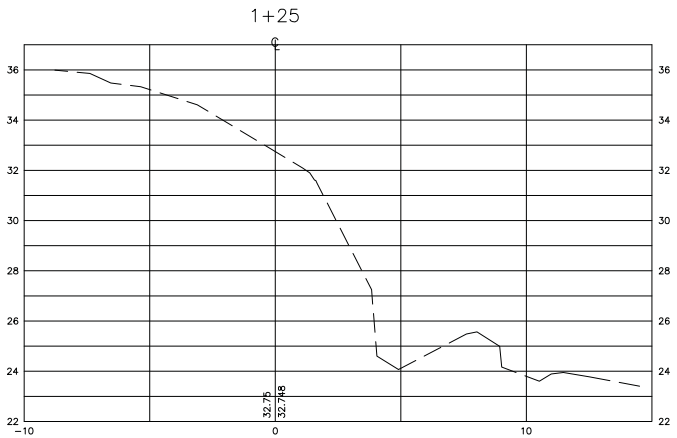
HORN CREEK PARK
CREEK BANK FAILURE
CROSS SECTIONS

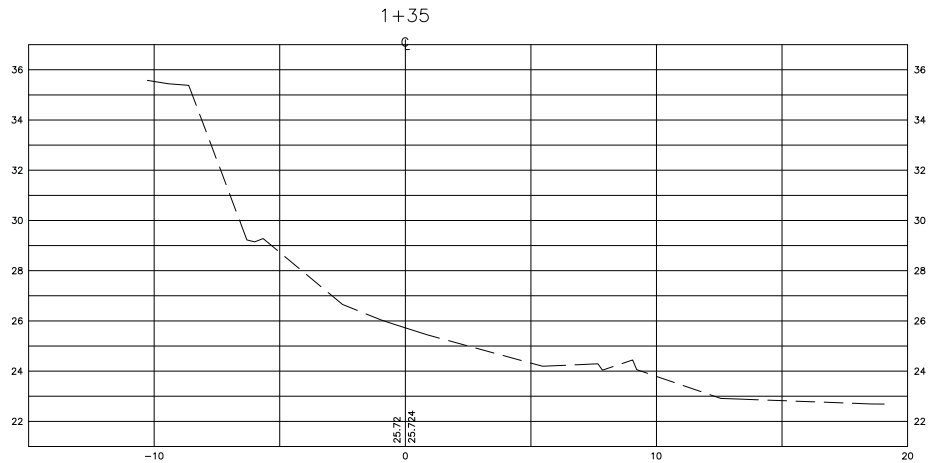
T:\LDDPROJ\D1187\DWG\D1187.dwg

Attachment: Attachment C: Horn Creek Slope Failure (prepared by PRC and Engineering) (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion of 3172 Gladwin Road)









NOT FOR CONSTRUCTION

SCALE:
HOR: 1:100
VER. 1:100

GRID NO. D8 SHEET NO. 3 OF 3 DRWG. NO. D−1187

LOCATION FOR GAS, ELECTRICAL, TEL, & CABLE UTILITIES ARE APPROXIMATE. CONTACT 'BC ONE CALL' TO CONFIRM LOCATIONS PRIOR TO DESIGN OR CONSTRUCTION.

BC ONE CALL: TICKET # _____ DATE: _____

NO.	DATE	BY	REVISIONS	TECH	ENG.
2	2019 03 21	MR	UPDATED SITE PLAN WITH NEW POINTS (19−33991)		T.S.
1	2019 03 12	WD	UPDATED SITE PLAN WITH NEW POINTS		T.S.

DATE: 2018 11 20	SURVEY JOB NO.: 18−32224
DRAWN: WD	SURVEY CREW: WD/RG
DESIGN: SK	DATUM (HOR./VER.): UTM NAD 83 (CSRS) ZONE 10 GEOID MODEL: HTv2.0
SAP WORK ORDER # 104005	SCALE: HOR. 1 : 100 VER. 1 : 100

ABBOTSFORD

HORN CREEK PARK
CREEK BANK FAILURE
CROSS SECTIONS

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Attachment: Attachment C: Horn Creek Slope Failure (prepared by PRC and Engineering) (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion of 3172 Gladwin Road)

REVISED

Environmental Assessment Application

3182 Gladwin Road, Abbotsford, British Columbia

Prepared for:

Horn Park Place Developments Ltd.
8 Boulderwood Place
Port Moody, British Columbia

Attention: Bruno Jury
President

April 17, 2019

Pinchin File: 231866.000

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MEMBER OF PG

Attachment: Attachment D: Environmental Assessment Application, prepared by Pinchin (dated April 17, 2019) (PDS 045-2019 : DP with V

Issued to:	**Horn Park Place Developments Ltd.**
Contact:	**Bruno Jury** **President**
Issued on:	**April 17, 2019**
Pinchin File:	**231866.000**
Issuing Office:	**Abbotsford, BC**
Primary Pinchin Contact:	**Jeremy Nilson** **Project Biologist** **604.425.1927** **jnilson@pinchin.com**

Author: Bonnie Williams, R.P.Bio.
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Reviewer: Jeremy Nilson, R.P.Bio.
Project Biologist
604.425.1927
jnilson@pinchin.com

Attachment: Attachment D: Environmental Assessment Application, prepared by Pinchin (dated April 17, 2019) (PDS 045-2019 : DP with V

Attachment: Attachment D: Environmental Assessment Application, prepared by Pinchin (dated April 17, 2019) (PDS 045-2019 : DP with V

EXECUTIVE SUMMARY

Pinchin Ltd. (Pinchin) was retained as a Qualified Environmental Professional (QEP) by Horn Park Place Developments Ltd. (Client) to provide environmental consulting services in support of the proposed development at 3182 Gladwin Road, Abbotsford, BC (subject property).

The proposed development is a 5-storey multi-family residential building. The proposed development will result in an encroachment into the typical City of Abbotsford (CoA) prescribed Streamside Protection and Enhancement Area (SPEA) for watercourses (UT1, UT2 and Horn Creek) on the subject property. As such, a Development Variance Permit (DVP) application must be submitted. The DVP application includes proposed mitigation and compensation measures.

The preliminary proposed work schedule includes project construction commencing in June 2019 starting with excavation, site servicing and landscaping. Building construction is proposed to begin in September 2019 and be completed January 2021. Post-construction monitoring and maintenance of environmental works will be conducted over a three (3) year period following the completion of the compensation planting.

Pinchin conducted an environmental assessment per the COA Streamside Protection Bylaw No. 1465-2005 (SPB). The original field assessment was undertaken on February 17, 2017; with follow-up assessments on May 12, 2017; June 7, 2017; March 2, 2018; and January 14, 2019. In addition, Pinchin completed a Riparian Areas Regulation (RAR) Detailed Assessment Report dated March 19, 2018 (Report Number 5079A) to evaluate watercourses at the subject property with regard to the RAR Assessment Methods. The RAR Detailed Assessment was reviewed by the Ministry of Forests, Lands, Natural Resource Operations and Rural Development and found to have met the applicable assessment and reporting criteria.

Table 1 below summarizes the results of the fish habitat assessment including the SPEA setback widths based on the CoA SPB and the RAR Assessment Methods. CHPA's Existing Site Survey in Appendix I depicts the RAR and SPB SPEA.

Table 1. Fish Habitat Assessment Summary

Watercourse Identifier	Classification	SPB SPEA Width (m)	RAR SPEA Width (m)
Horn Creek	Permanent, fish bearing	30	23.7
UT1	Permanent, non-fish bearing	30	10.0
UT2	Non-permanent, non-fish bearing	15	10.0

Adverse effects to terrestrial Environmental Valuable Resources (i.e., vegetation resources, wildlife and wildlife habitat) and species of management concern are anticipated to be avoided or reduced primarily through delineation and protection of the variance SPEA (i.e., which will encompass the high value habitat features including mature riparian forest and watercourses), where habitat values were considered highest.

Based on the nature of the proposed development (i.e., the nature and density of development required to achieve a viable project) and the location of watercourses on and in proximity to the subject property, wholly avoiding encroachment of the SPB SPEA was not considered feasible. However, the proposed development was located within the subject property and configured such that there would be the lowest extent of encroachment into the SPB SPEA. In addition, site servicing and landscaping were designed to minimize the encroachment into the SPEA. As encroachment into the SPEA was not avoided, mitigation measures and compensation measures were applied.

Negative temporary and/or permanent impacts to instream or aquatic habitat associated Horn Creek, UT1 or UT2 will not occur as a result of this development. Enhancement plantings within aquatic habitat associated with UT1 are proposed (i.e., to be completed by the CoA).

Permanent impacts to the SPEA (i.e., riparian habitat) will occur due to the encroachment into the typical CoA SPEA. Typically, compensation for permanent encroachment into SPEA is required to meet a 2:1 ratio of compensation to encroachment. The proposed compensation scenario was developed through extensive consultation with CoA staff. While the proposed compensation scenario does not meet the typical target 2:1 ratio, it is Pinchin's understanding that the proposed scenario is acceptable to CoA staff in concept as the proposed compensation scenario incorporates the dedication of the SPEA lands within the subject property to the CoA, which is not typically required under these development conditions. As such, the dedication of the SPEA lands together with the proposed enhancement works is considered to address the 2:1 ratio requirement.

The SPEA will be protected through multiple measures including a 3-5 m buffer from the building to the SPEA boundary, installation of tree protection fencing for trees along the SPEA boundary, and clear

Attachment: Attachment D: Environmental Assessment Application, prepared by Pinchin (dated April 17, 2019) (PDS 045-2019 : DP with V

delineation of the SPEA boundary with 1.8 m high fencing and signage prior to construction works. Further details are included in this report and Pinchin's CEMP.

To prevent temporary and permanent impacts to the watercourses and riparian area, mitigation measures, as detailed in this report and Pinchin's Construction Environmental Management Plan (CEMP), Appendix IV, have been prescribed for the proposed works. An Erosion and Sediment Control Plan has also been prepared for this project.

Site servicing will be conducted within or in close proximity to the building footprint such that there will be no impact to the SPEA.

Overall, there will be a total of approximately 847 m^2 of temporary impacts to the SPEA resulting from building construction and re-grading of the adjacent east CoA park property. The areal extent of temporary impact is subject to change based on actual works completed in field; however the full area of the temporary impact will be restored under the direction of a QEP.

Temporary impacts within the SPEA due to the construction of the building will include approximately 163 m^2 of temporary impacts along the northern parkade wall. This temporary disturbance is required for access to facilitate construction of the parkade. Disturbed areas from the temporary impacts of building construction will be re-vegetated per the proposed compensation works.

At the request of the CoA, an existing soil berm located on the east property boundary and the CoA property within Horn Creek Park will be regraded to create a less steep and more consistent slope. Plans are not finalized at this time, but the regrading will result in approximately 684 m^2 of temporary impacts within Horn Creek Park. This area is currently characterized by young red alder trees and an understory dominated by Himalayan blackberry and stinging nettle with sparse occurrences of salmonberry and red elderberry. The regraded area on the CoA property will be restored per recommendations included in Section 5.4.4.

Additional, temporary impacts from the proposed development works include potential audible and vibration impacts to wildlife life including birds and small mammals, and the production of dust causing potential disturbance to wildlife within the SPEA and Horne Creek Park. Please note that per discussion with the Client and the CoA, the site servicing plan will be updated at a later date (i.e., through building permit application) in order to reduce temporary impacts to the SPEA attributable to installation of site servicing.

Table 2 below presents the area of encroachment (permanent impact) and temporary impacts from site servicing into the SPB SPEA and the associated area of compensation.

Attachment: Attachment D: Environmental Assessment Application, prepared by Pinchin (dated April 17, 2019) (PDS 045-2019 : DP with V

Table 2. Habitat Budget Summary

Temporary impacts to the SPEA (areal extent)	847 m^2
Permanent Impacts to the SPEA (areal extent)	-2,922 m^2
Area within SPEA to be enhanced and/or restored (areal extent)	+4,832 m^2
Wetland plantings within UT1 (areal extent)	+549 m^2
Ratio of enhancement/restoration to encroachment	1.84 : 1

Compensation in the form of invasive plant species removal, native riparian plantings, habitat complexing (i.e. large woody debris and bird boxes) and wetland planting will be completed within the SPEA and UT1 (i.e., wetland planting only within UT1). Per agreement with the CoA, the Client will conduct the invasive plant species removal, riparian planting and habitat complexing, and the 3-year monitoring and maintenance period of these works. After the successful 3 year monitoring and maintenance period, the Client will dedicate the SPEA to the CoA, and the CoA will conduct the wetland planting with monies provided by the Client. Please note that per agreement, the City will be responsible for the monitoring and maintenance of the wetland plantings including costs.

Please note that wetland planting works if conducted by CoA will require a Notification of an Authorized Change per the Provincial *Water Sustainability Regulation*.

The cost estimate for completing the riparian compensation works and 3 years of monitoring and maintenance is $69,248.30. The estimated cost for completed the wetland compensation works is $13,648.80. The estimated cost for the regrading restoration works is $15,908.20.

This Executive Summary is subject to the same standard limitations as contained in the report and must be read in conjunction with the entire report.

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1.0 INTRODUCTION

Pinchin Ltd. (Pinchin) was retained by Horn Park Place Developments Ltd. (Client) to provide environmental consulting services in support of the proposed development at 3182 Gladwin Road, Abbotsford, BC (subject property). The subject property is located within the City of Abbotsford (CoA) Natural Environment Permit Development (NEDP) area for both streams and sensitive ecosystems, as well as steep slopes. Figure 1 details the subject property location.

The proposed development is a 5-storey multi-family dwelling residential building including underground parking, a parking lot, site servicing and landscaping (i.e., both residential and environmental). Encroachment into the typical CoA prescribed Streamside Protection and Enhancement Area (SPEA) for watercourses on the subject property is necessary to accommodate reasonable development consistent with designated zoning and land use. As such, a Development Variance Permit (DVP) application is required including proposed mitigation and compensation measures.

Overall, there will be a total permanent encroachment of 2,922 m^2 into the typical CoA SPEA from the proposed development and a total temporary encroachment of approximately 847 m^2. Further details regarding permanent and temporary impacts are detailed in Section 3.0. Figures 3 - 6 depict the existing site survey, the proposed development, habitat balance, and site sections of the proposed development in the context of potential environmental concerns. Please note the site sections will be updated at a later date to address CoA comments from their April 12, 2019 Environmental Review.

1.1 Project Schedule

The preliminary proposed work schedule includes project construction commencing in June 2019 starting with excavation, site servicing and landscaping. Building construction is proposed to begin in September 2019 and finalizing in January 2021.

Post-construction monitoring and maintenance of environmental works will be conducted over a three (3) year period following the completion of the compensation planting.

2.0 ENVIRONMENTAL ASSESSMENT

Pinchin was retained by the Client to conduct an environmental assessment at the subject property in support of the proposed development. As the proposed development will require a variance, Pinchin also conducted a Riparian Areas Regulation (RAR) Detailed Assessment as per the RAR Assessment Methods. The RAR Detailed Assessment is included in Appendix I.

The environmental assessment addresses the CoA Wildlife *Assessment Report Guidelines* (2014) and provides a discussion of the Environmentally Valuable Resources (EVR) within the subject property;

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including recommendations to avoid, mitigate, and compensate for potential effects to the EVR due to the proposed development activities.

The environmental assessment was conducted in two phases: 1) a desktop assessment of existing stream classifications and known occurrences of sensitive wildlife and vegetation on or near the subject property; and 2) a field assessment to characterize EVR on the subject property.

2.1 Desktop Assessment

2.1.1 Methods

A desktop assessment was conducted prior to the field assessment to identify mapped watercourses on or adjacent to the subject property, existing and potential vegetation adjacent to mapped watercourses, and occurrences of species of management concern with potential to occur within the subject property. Historical occurrence records were searched within a two-kilometer radius of the subject property. Based on anticipated available habitat, species of management concern with potential to occur within the subject property were also identified during the desktop assessment for further consideration during the field assessment. The following resources were consulted:

- BC Conservation Data Centre (BCCDC);
- BC Frogwatch Atlas;
- BC Great Blue Herons Atlas;
- CoA WebMap;
- Data BC—Habitat Wizard;
- Fisheries Information Summary System (FISS);
- Google Earth;
- Metro Vancouver Sensitive Ecosystem Inventory (SEI) Mapping;
- Sensitive Habitat Information Mapping (SHIM); and
- Wildlife Tree Stewardship Atlas.

2.1.2 Results

The subject property is located on 3182 Gladwin Road in Abbotsford, BC (Figure 1). The legal description of the subject property is provided in Table 1.

Table 1. Legal Description and Size of the Subject Property

Civic Address	Lot Size (hectares)	Legal Description	PID	Zoning
3182 Gladwin Rd.	1.216	LOT 1 SECTION 21 TOWNSHIP 16 NEW WESTMINSER DISTRICT PLAN EPP72237	030-182-883	RML (Low Rise Apartment Zone)

The following EVR were identified as having potential to occur within the subject property and are assessed in this report:

- Aquatic and riparian ecosystems;
- Mature and second growth forest;
- Wildlife habitat features, such as bird nesting habitat, travel corridors, wildlife trees, and coarse woody debris (CWD);
- Species of management concern, including:
- Provincially Red and Blue-listed fish and wildlife;
- Federally threatened and endangered fish, plants, wildlife, and invertebrates listed under Schedule 1 of the *Species at Risk Act* (SARA); and
- Salmonids, game fish, and regionally significant fish species.

The CoA WebMap and the SHIM identified three watercourses within and immediately adjacent to (i.e. within 50 metres of) the subject property: Horn Creek, Unnamed Tributary 1, and Unnamed Tributary 2 (Figure 2).

- Horn Creek was identified as Horn Creek (tributary to Willband Creek; Watershed Code: 100-054300-53400). Horn Creek flows northwest adjacent to the subject property and flows into Willband Creek approximately 1.5 km downstream from the subject property (CoA WebMap 2017). Horn Creek has been classified as a fish bearing stream. Coho salmon (*Oncorhynchus kisutch*), cutthroat trout (*O. clarkii clarkii*), rainbow trout (*O. mykiss*) and lamprey (*Lamptera* sp.) are known to occur within Horn Creek, upstream of the confluence with Willband Creek (Hemmera 2010; DataBC 2017);
- Unnamed Tributary 1 (UT1) was identified as a tributary to Horn Creek and flows northeast through the subject property (CoA WebMap 2017). Storm water sourced from a drainage detention pond associated with an existing development southwest of the subject property discharges into UT1 from a stormwater outfall located near the

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approximate centre of the subject property (CoA WebMap 2017). Fish presence within UT1 has been documented as unknown (SHIM 2017); and

- Unnamed Tributary 2 (UT2) was identified as a tributary to UT1 and flows southeast adjacent to the subject property into UT1 near the northeast corner of the property (CoA WebMap 2017). Fish presence within UT2 has been documented as unknown (SHIM 2017).

A review of available wildlife feature data returned results for a bald eagle nest at Mill Lake, approximately 1.4 km south of the subject property.

A review of available historical occurrence records for species of management concern returned results for two species, Roell's brotherella (*Brotherella roellii*) and Oregon forestsnail (*Allogona townsendiana*), at multiple locations near the subject property (BC CDC 2017a). In addition to those species with nearby historical occurrence records, a total of 17 species of management concern are considered to have potential to occur within the subject property based on their geographic range and preferred habitats. A summary of the conservation status and occurrence data for species of management concern are provided in Table 2 (BC CDC 2014; eBird 2017; DataBC 2017).

Table 2. Species of Management Concern with Potential to Occur Within the Subject Property

Common Name	Scientific Name	BC List	SARA	Occurrence Data
Fish				
Coho Salmon	*Oncorhynchus kisutch*	Yellow	—	Detected within Horn Creek, upstream from the Maclure Road crossing.
Cutthroat Trout, *clarkii* ssp.	*Oncorhynchus clarkii, clarkii*	Blue	—	Detected within Horn Creek, upstream from the Maclure Road crossing.
Rainbow Trout	*Oncorhynchus mykiss*	Yellow	—	Detected within Horn Creek, upstream from the Maclure Road crossing and Trafalgar Street crossing.
Lamprey	*Lampetra sp.*	Yellow	—	Detected within Horn Creek, upstream from the Maclure Road crossing.
Plants				
Roell's brotherella	*Brotherella roellii*	Red	Endangered	Last detected in 2007: 1.9 km northwest along Downes Creek; 1.8 km southeast in Ravine Park; and 600 m southeast in Century Park

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Common Name	Scientific Name	BC List	SARA	Occurrence Data
Mammals				
Townsend's Big-eared Bat	*Corynorhinus townsendii*	Blue	—	No results returned
Snowshoe Hare, *washingtonii* ssp.	*Lepus americanus washingtonii*	Red	—	No results returned
Keen's Myotis	*Myotis keenii*	Blue	—	No results returned
Little Brown Myotis	*Myotis lucifugus*	Yellow	Endangered	No results returned
Pacific Water Shrew	*Sorex bendirii*	Red	Endangered	No results returned
Trowbridge's Shrew	*Sorex trowbridgii*	Blue	—	No results returned
Birds				
Great Blue Heron, *fannini* subspecies	*Ardea herodias fannini*	Blue	Special Concern	Last detected 1.4 km south at Mill Lake Park and 1.8 km southeast at Ravine Park in 2017
Olive-sided Flycatcher	*Contopus cooperi*	Blue	Threatened	No results returned
Barn Swallow	*Hirundo rustica*	Blue	—	Last detected 1.4 km south at Mill Lake Park
Western Screech-Owl, *kennicottii* ssp.	*Megascops kennicottii*	Blue	Special Concern	No results returned
Band-tailed Pigeon	*Patagioenas fasciata*	Blue	Special Concern	No results returned
Invertebrates				
Oregon Forestsnail	*Allogona townsendiana*	Red	Endangered	Two locations: 1.7 km northwest along Downes Road in 2005; and 1.7 km northeast along Willband Creek in 2006

2.2 Field Assessment

2.2.1 Methods

The field assessment was conducted to identify EVR within the subject property and to ground-truth the results of the desktop assessment. Transects of the subject property were surveyed on foot to identify unmapped watercourses, vegetation, and wildlife habitat features.

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2.2.1.1 Aquatic and Riparian Ecosystems

Watercourses within and immediately adjacent to the subject property were assessed to determine regulatory and SPEA setback requirements.

Watercourses that are not protected under the CoA SPB (i.e. those that are not considered to be integral to a stream and provide fish habitat), were assessed to determine their status with regard to the provincial RAR and *Water Sustainability* Act (WSA).

Assessment of watercourses included documentation of existing instream and riparian habitat, as well as delineation of the high water mark (HWM) and top of bank (TOB) boundaries.

Assessment of instream and riparian habitat was based on the following standards and methods:

- Fish-stream Identification Guidebook, Version 2.1 (MOE 1998);
- Reconnaissance (1:20 000) Fish and Fish Habitat Inventory Standards and Procedures (RIC 2001);
- RAR Assessment Methods (Schedule to the RAR); and
- Fish Passage Culvert Inspection Procedures (Parker 2000).

2.2.1.2 Terrestrial Ecosystems

Vegetation Resources

The vegetation assessment included documentation of the dominant plant species and habitat types, as well as non-native plants and provincially or regionally noxious weeds. Wetland habitat, when present, was identified to site class, as described in MacKenzie and Moran (2004). Please note that wetlands meeting the definition of a wetland per the *Water Sustainability Act* (i.e., swamp, fen, marsh, or prescribed feature) would be subject to further protection.

Wildlife and Wildlife Habitat

Wildlife EVR identified during the desktop assessment as having potential to occur within the subject property were ground-truthed during the field assessment. The wildlife field assessment included:

- Documentation of wildlife habitat features, such as wildlife trees, mineral licks, travel corridors, and CWD abundance;
- Assessment of amphibian breeding habitat;
- Assessment of habitat considered suitable for species of management concern;
- Assessment of bird nesting habitat, including visual surveys of trees considered suitable for heron or raptor nests protected under the BC *Wildlife Act*; and

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- Documentation of wildlife observations or sign, such as scat and tracks.

Species of Management Concern

The assessment of species of management concern included provincially Red and Blue-listed fish and wildlife; federally threatened and endangered fish, plants, wildlife, and invertebrates listed under Schedule 1 of the *Species at Risk Act* (SARA); and salmonids, game fish, and regionally significant fish species. Although the individual assessment of provincially Red and Blue-listed plants and invertebrates was not conducted, habitat for these species was taken into consideration through the assessment of species with similar life requisites.

Likelihood of occurrence for species of management concern was assessed qualitatively based on the ability of the habitat to meet one or more life requisites for each species. If habitat suitable for species of management concern was identified, additional survey effort was applied. Leaf litter was hand-raked within suitable microhabitats for Oregon forestsnail (i.e., stinging nettle (*Urtica dioica*), bigleaf maple (*Acer macrophyllum*), and abundant leaf litter) if any were found. Habitat suitable for bird, small mammal, and bat species of management concern, such as man-made structures, rock crevices, wildlife trees, or wetlands, were photographed, measured, and appropriately documented.

2.2.2 Results

Detailed results of the field assessments are provided below. A complete list of the species detected during the field assessment is included in Appendix II and selected site photographs are included in Appendix III.

2.2.2.1 Aquatic and Riparian Ecosystems

The original field assessment was undertaken on February 17, 2017; with follow-up assessments on May 12, 2017; June 7, 2017; March 2, 2018; and January 14, 2019.

The field assessment confirmed the presence and location of the three watercourses identified during the desktop assessment: Horn Creek, UT1, and UT2. Culvert crossings located within the subject watercourses were also assessed for fish passage capacity. A hydrological assessment of the culvert flow capacity was not completed however, as there was no evidence of overland flooding or erosion.

Riparian vegetation included mature forest and was generally consistent throughout the subject property; with the exception of a heavily disturbed area dominated by Himalayan blackberry (*Rubus armeniacus*) and young red alder (*Alnus rubra*) located at the upper extent of UT1. The riparian vegetation is described in detail in Section 2.3.2 and a complete bio-inventory of plant species detected during the field assessment is provided in Appendix II.

Fish presence was not directly confirmed during the field assessment; however, documented fish presence was confirmed during the desktop assessment within Horn Creek. The unnamed tributaries (UT1 and UT2) provided limited suitable fish habitat and obstacles to fish passage were identified during the field assessment and are described in detail below.

Horn Creek (Watercourse 1)

Horn Creek flowed northeast adjacent to the eastern property boundary and was confined within the banks of a steep sided ravine. A gravel walking path was located above the west TOB of the ravine within the riparian habitat associated with Horn Creek.

Horn Creek flowed in an irregular meandering channel pattern and the channel was confined. Sidebars were occasionally observed adjacent to Horn Creek throughout the length of the channel adjacent to the subject property. Cobbles were the dominant substrate type and gravels and boulders were the subdominant substrate type. Physical indicators of high flows within and outside of the channel of Horn Creek were observed in areas throughout the assessed length and included rafted debris and fluvial sediment deposition. Areas subject to bank erosion were also observed.

Channel measurements for the assessed portion of Horn Creek are summarized in Table 3.

Table 3. Channel Measurements for Horn Creek.

Average channel width (m)	7.9
Average wetted width (m)	5.8
Average bankfull depth (m)	0.20
Average residual pool depth (m)	0.40
Average channel gradient (%)	4.0
Stage of Stream Discharge	High

Cover associated with Horn Creek included instream and riparian habitat features. The total cover of instream habitat features was > 20% of the assessed watercourse length. Instream vegetation was absent throughout the length of the channel. Instream cover types present within the assessed portion of Horn Creek included:

- Accumulated small woody debris (subdominant);
- Accumulated large woody debris (dominant);
- Boulder cover (dominant);
- Deep pools (subdominant);
- Overhanging vegetation (dominant); and

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- Undercut banks (trace).

Crown closure was 21-40%. Riparian habitat consisted of mature mixed coniferous and deciduous forest. The riparian vegetation stage was classified as mature forest with canopy gaps and a well-developed understory.

Features associated with Horn Creek within the assessed length included a pedestrian footbridge crossing upstream from the confluence with UT1 and a debris jam (fallen trees) near the southern portion of the subject property.

Habitat suitable for resident and anadromous fish species was identified within Horn Creek adjacent to the subject property.

Based on the field assessment, Horn Creek was classified as a permanent, fish bearing stream.

Unnamed Tributary 1 (UT1)

UT1 originated from a stormwater outfall and appeared as mapped on the CoA WebMap. The SHIM identified UT1 as non-fish bearing. The CoA WebMap identified the stream as being fed by storm water drainage from the development located southwest of the stream, and ultimately draining into Horn Creek.

At the time of the field assessments, the channel had an approximate width of 1.5 m, with well-defined banks, and a substrate consisting of gravel and sand. Flow was observed during all assessments; however, flows appeared to be predominantly sourced from the stormwater outfall referenced above. Flows to UT1 during the November assessments were augmented by minor seepages adjacent to the channel; however, these seepages did not contribute appreciable flows during the May and June assessments. The seepages where characterized a saturated soil substrate, and abundant growth of skunk cabbage (*Lysichiton americanus*). A cascade barrier was observed immediately upstream of the confluence with Horn Creek. The barrier consisted of two cascades (height approximately 0.5 m) with minimal plunge pools (i.e. <0.3 m depth). The gradient of the feature was measured to be 32%, with 1.0 m high drop over a linear distance of approximately 8.5 m.

An 800 mm diameter, corrugated steel culvert conveyed flows under a gravel walking path northeast towards Horn Creek. The crossing located along UT1 was approximately 2 m long with a gradient of 3%. There was no observed evidence of a hanging culvert. Water velocity through the culvert was not assessed. Based on the length, gradient, and observed flow conditions at the time of the assessment, the crossing appeared to be fish passable. As the proposed development will not require replacement of the existing crossing, and the crossing appeared to be passable to fish, the culvert crossing is not further discussed in this report.

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Channel measurements for UT1 are summarized in Table 4.

Table 4. Channel Measurements for UT1.

Average channel width (m)	2.0
Average wetted width (m)	1.9
Average bankfull depth (m)	0.70
Average residual pool depth (m)	0.15
Average channel gradient (%)	10.0 %
Stage of Stream Discharge	High *

* The site assessment was completed during the winter months, following heavy precipitation and rain on snow events. As UT1 is primarily sourced by stormwater runoff from the surrounding area, the stage of stream discharge was considered high (> 90 % bankfull width).

Cover associated with UT1 included instream and riparian habitat features. Instream vegetation was absent throughout the length of the channel. Instream cover types present within UT1 within the subject property included:

- Accumulated small woody debris (subdominant);
- Accumulated large woody debris (subdominant);
- Overhanging vegetation (dominant);
- Sparse deep pools (subdominant); and
- Undercut banks (subdominant).

Crown closure was approximately 21-40%. Riparian habitat consisted of mature mixed coniferous and deciduous forest (Figure 2). The riparian vegetation stage was classified as mature forest with a well-developed understory.

Although sampling for fish was not undertaken, UT1 was classified as non-fish bearing based on the presence of the cascade barrier immediately upstream of Horn Creek. For optimal jumping, the pool must be a minimum of 1.25 times the height of the cascade; as a result, these cascades were considered very likely to prevent upstream fish passage. Moreover, UT1 conveyed a minimal volume of flows, there was no suitable rearing habitat (e.g. pools, glides). Based on the above, UT1 was classified as non-fish bearing.

As barriers to fish passage were observed within UT1 immediately upstream from the confluence with Horn Creek, UT1 was classified as a permanent, non-fish bearing stream.

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Unnamed Tributary 2 (UT2)

UT2 conveyed flows from two small diameter plastic pipes located on the north side of an existing gravel walking path, adjacent to the northern property boundary at 32910 Maclure Road. The CoA service record cards indicate a storm outfall exists from 32910 Maclure Road (Pers. Comm. October 2018). The source of flows was not confirmed during the field assessment; however, based on the CoA service record cards, it is anticipated that UT2 is primarily sourced by stormwater runoff.

UT2 flowed in a narrow, shallow, low to moderate gradient channel with riffle-pool channel morphology for approximately 50 m before flowing into UT1. Gravels and fines were the dominant substrate type and cobbles and boulders were the subdominant substrate type.

Channel measurements for UT2 are summarized in Table 5.

Table 5. Channel Measurements for UT2.

Average channel width (m)	1.1
Average wetted width (m)	1.1
Average bankfull depth (m)	0.30
Average residual pool depth (m)	0.16
Average channel gradient (%)	5.0 %
Stage of Stream Discharge	High *

* The site assessment was completed during the winter months, following heavy precipitation and rain on snow events. As UT2 is primarily sourced by stormwater runoff from the surrounding area, the stage of stream discharge was considered high (> 90 % bankfull width).

Cover associated with UT2 included instream and riparian habitat features. Instream vegetation was absent throughout the length of the channel. Instream cover types present within UT2 on the subject property included:

- Accumulated small woody debris (subdominant); and
- Overhanging vegetation (dominant).

Crown closure was approximately 21-40%. Riparian habitat consisted of mature mixed coniferous and deciduous forest (Figure 2). The riparian vegetation stage was classified as mature forest with a well-developed understory.

Features associated with UT1 included a small (300 mm diameter) corrugated steel culvert, which conveyed flows under the gravel walking path eastwards towards UT1. The crossing located along UT2 was approximately 2 m long with a gradient of 3%. There was no observed evidence of a hanging culvert. Water velocity through the culvert was not assessed. Based on the length, gradient, and observed flow conditions at the time of the assessment, the crossing appeared to be fish passable. As UT2 is located on

the neighbouring north property, replacement of this crossing is not anticipated to be required as part of the proposed development; and therefore is not further discussed in this report.

Habitat suitable for resident and anadromous fish species was not identified within UT2 (i.e. deep pools and abundant instream cover).

As UT2 is sourced entirely from stormwater runoff and barriers to fish passage were observed immediately upstream from the confluence with Horn Creek, UT2 was classified as a non-permanent, non-fish bearing stream.

2.2.2.2 Vegetation Resources

Three distinct habitat types were observed during the field assessment: mature riparian forest along the west bank of Horn Creek and north of its tributaries; young deciduous upland forest in the southern half of the subject property; and anthropogenically disturbed habitat along the western property boundary and existing driveway access (Figure 2).

The mature riparian forest was considered disturbed. The tree layer was dominated by red alder (*Alnus rubra*) with sparse black cottonwood (*Populus trichocarpa*), western redcedar (*Thuja plicata*), and western hemlock (*Tsuga heterophylla*). The understory vegetation was comprised primarily of salmonberry (*Rubus spectabilis*), Himalayan blackberry (*Rubus armeniacus*), sword fern (*Polystichum munitum*), skunk cabbage (*Lysichiton americanus*), and common horsetail (*Equisetum arvense*).

The young deciduous upland forest was dominated by young red alder with an understory comprised primarily of salmonberry and Himalayan blackberry.

Noxious weeds were not detected during the field assessment.

A complete summary of plant species identified within the subject property is provided in Appendix II; Table A.

2.2.2.3 Wildlife Habitat Features

Wildlife habitat features detected during the field assessment included wildlife trees, CWD, and bird nesting habitat.

Wildlife trees were detected throughout the mature riparian forest. CWD cover was moderate within the subject property and was comprised primarily of sporadic fallen branches in various stages of decay. These features provided abundant breeding, foraging, and overwintering habitat suitable to a variety of birds, small mammals, and amphibians.

Abundant Eastern cottontail (*Sylvilagus floridanus*) scat was detected throughout the subject property, as well as a single visual detection of an adult.

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A total of sixteen bird species were detected during the field assessment. Habitat within the subject property provided abundant nesting habitat for species associated with mature and young forest, riparian habitat, or shrub-dominated habitat. Nests or nesting activity for raptors and heron protected under the BC *Wildlife Act*, or migratory birds protected under the *Migratory Birds Convention Act* were not observed during the field assessment.

A complete summary of wildlife species identified by sign, sight, or sound within the subject property is provided in Appendix II; Table B.

2.2.2.4 Species of Management Concern

The mature riparian forest and instream habitat associated with watercourses within and adjacent to the subject property was considered to provide the highest value habitat for species of management concern. The field assessment confirmed the availability of potentially suitable habitat to meet one or more of the life requisites for the species of management concern described in Table 4; Section 2.2.2.1.

A summary of the field assessment results for species of management concern including likelihood of occurrence is provided in Table 6. Likelihood was assessed qualitatively based on the ability of the habitat to meet one or more life requisites for each species based on provincial and federal management documents, peer-reviewed literature, and professional opinion.

Table 6. Likelihood of Occurrence for Species of Management Concern with Potential to Occur Within and Adjacent to the Subject Property.

Common Name	Scientific Name	Likelihood	Detected Onsite? (Yes/No)	Notes
Fish				
Coho Salmon	*Oncorhynchus kisutch*	Horn Creek High UT1 and UT2 Low	Not surveyed	Areas of suitable habitat were detected within UT1, i.e., sparse deep pools and abundant instream cover. Obstacles to fish passage that exist near the confluence with Horn Creek lower the likelihood of fish presence. Suitable habitat was observed within Horn Creek. [a]
Cutthroat Trout, *clarkii* subspecies	*Oncorhynchus clarkii, clarkii*			
Rainbow Trout	*Oncorhynchus mykiss*			
Lamprey	*Lampetra* sp.	Horn Creek High UT1 and UT2 Low	Not surveyed	Suitable habitat detected within UT1 and Horn Creek. Obstacles to fish passage within UT1 that exist near the confluence with Horn Creek lower the likelihood of presence in UT1 and UT2. [a]

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Common Name	Scientific Name	Likelihood	Detected Onsite? (Yes/No)	Notes
Plants				
Roell's brotherella	*Brotherella roellii*	Low	Not assessed	Preferred habitat present, i.e., mixed wood and second growth forests along stream banks.[b]
Mammals				
Townsend's Big-eared Bat	*Corynorhinus townsendii*	Low	No	Preferred habitat not detected; maternity roosts and hibernacula strongly associated with artificial structures; sensitive to human disturbance.[c]
Snowshoe Hare, *washingtonii* subspecies	*Lepus americanus washingtonii*	Moderate	No	Preferred habitat detected, existing habitat degradation and fragmentation may lower likelihood.[d]
Keen's Myotis	*Myotis keenii*	Moderate	No	Preferred roosting habitat present, e.g., wildlife trees.[e]
Little Brown Myotis	*Myotis lucifugus*	Moderate	No	
Pacific Water Shrew	*Sorex bendirii*	Moderate to high	No	Preferred watercourses with adjacent mature forest detected; likelihood lowered due to sensitivity to human disturbance, habitat fragmentation, and degradation.[f]
Trowbridge's Shrew	*Sorex trowbridgii*	Moderate to high	No	Preferred habitat detected, i.e., mature riparian forests.[g]
Birds				
Great Blue Heron, *fannini* subspecies	*Ardea herodias fannini*	Moderate	No	Preferred habitat present, mature forest within 10 km of suitable aquatic habitat.[h]
Olive-sided Flycatcher	*Contopus cooperi*	Moderate	No	Preferred nesting habitat present, prefers mature forest near clearings, i.e., edge habitats.[i]
Barn Swallow	*Hirundo rustica*	Moderate	No	Preferred nesting habitat present, i.e., wildlife trees and anthropogenic structures near clearings.[j]
Western Screech-Owl, *kennicottii* subspecies	*Megascops kennicottii*	Moderate	No	Preferred nesting habitat present, i.e., mature forest near watercourses.[k]
Band-tailed Pigeon	*Patagioenas fasciata*	Moderate	No	Preferred nesting habitat present, i.e., mature forests near clearings.[l]

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Common Name	Scientific Name	Likelihood	Detected Onsite? (Yes/No)	Notes
Invertebrates				
Oregon Forestsnail	*Allogona townsendiana*	Moderate	No	Preferred habitat is likely present, i.e., bigleaf maple within mature mixed forest; stinging nettle presence unknown.[m]

References:

a. Roberge et al. 2002
b. COSEWIC 2010
c. BC CDC 2016b
d. Zevit 2012
e. Garcia and Rasheed 2004; EC 2015
f. EC 2014
g. BC MOE 1994
h. COSEWIC 2008
i. EC 2016a
j. COSEWIC 2011
k. COSEWIC 2013
l. COSEWIC 2009
m. EC 2016b

2.3 Regulatory Framework

The environmental assessment of the subject property takes into consideration applicable federal, provincial, and municipal legislation and guidelines for EVR occurring or with potential to occur on the subject property. The following sections provide a summary of the legislation that applies on private land.

2.3.1 Aquatic and Riparian Habitat

Fish and fish habitat are protected on private land under the federal *Fisheries Act;* the provincial *Water Sustainability Act;* and the CoA SPB and Waterways Protection Bylaw No. 269-96. The subject property also falls within the NEDP Area and must follow the NEDP Guidelines for riparian habitat (CoA 2016).

The CoA's NEDP Guidelines require No Net Loss of habitat within a SPEA (CoA 2016). In this case (i.e., where habitat loss is unavoidable), application for a DVP is required which must include habitat compensation. Project activities proposed within a SPEA and/or instream habitat are regulated through local bylaws (i.e. DVPs), the provincial *Water Sustainability Act* (e.g. access roads, installation or removal of storm water outfalls, crossing installations or replacements), and the federal *Fisheries Act*.

Mitigation measures outlined in Section 4.2 will be implemented to avoid or reduce potential effects to aquatic and riparian ecosystems within the subject property and to avoid contravention of the legislation described above.

2.3.2 Vegetation Resources

Vegetation resources, including plant species of management concern, are not protected on private land under federal or provincial legislation. Vegetation legislation applicable on private land includes the BC *Weed Control Act,* the CoA NEDP, and the CoA Tree Protection Bylaw No. 1831-2009.

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Under the BC *Weed Control Act*, it is required that noxious weeds be controlled following the *Weed Control Regulation*.

Trees removed within the subject property will require an arborist assessment, approval from the CoA, and replacement per the CoA *Tree* Protection Bylaw No. 1831-2009 and BC Ministry of Environment's *Tree Replacement Criteria* (BC MOE 1996).

Mitigation measures outlined in Section 4.2 will be implemented to avoid or reduce potential effects to vegetation within the subject property and to avoid contravention of the legislation described above.

2.3.3 Wildlife and Wildlife Habitat

Wildlife legislation applicable on private land includes the federal *Migratory Birds Convention Act, 1994* (MBCA) and the BC *Wildlife Act*. Under the MBCA, all species defined as migratory birds within the act are protected from destruction or disturbance, including their nest and eggs. The BC *Wildlife Act* affords protection to additional species not defined as migratory birds, including their nest (when occupied) and eggs; as well as year-round protection of the nests of eagles, osprey, peregrine falcon, and heron. The BC *Wildlife Act* also affords protection to species defined as wildlife (i.e., the majority of native vertebrate species) within the act, unless otherwise specified within the *Designation and Exemption Regulation.*

Mitigation measures outlined in Section 4.2 will be implemented to avoid or reduce potential effects to wildlife within the subject property and to avoid contravention of the legislation described above.

2.3.4 Species of Management Concern

Legislation applicable to species of management concern on private land includes the SARA and the CoA NEDP. The SARA applies primarily to species at risk (listed as Endangered, Threatened, or Extirpated under Schedule 1) where they occur on federal lands; however, aquatic species (i.e., fish) are protected wherever they occur. Habitat suitable for fish species at risk was not detected within the subject property and occurrence records were not found within two kilometers; therefore, contravention of the SARA is not anticipated.

The subject property falls within the CoA Sensitive Ecosystem NEDP Area and must follow the NEDP Guidelines (CoA 2016) for terrestrial habitat. Under the NEDP Guidelines, habitat with wildlife species at risk occurrence records must be protected, or where loss of habitat is unavoidable, mitigation to offset the loss must be implemented.

Species of management concern with potential to occur within the subject property, based on geographic range and the availability of suitable habitat, are listed in Table 2. The best management practices outlined in Section 4.2 must be implemented to avoid or reduce effects to species of management concern due to the proposed development activities

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2.4 Discussion

The following sections provide a discussion of the EVR in relation to future development of the subject property.

Generally, habitat within the subject property was considered to provide moderate habitat values overall, with the highest value habitats consisting of the mature riparian forest and watercourses within and adjacent to the subject property.

Development of the subject property is anticipated to include vegetation clearing, grading, and construction of an apartment complex within the young deciduous upland forest, as well as within the existing anthropogenically disturbed areas.

EVR are anticipated to be protected primarily through delineation and protection of the mature riparian forest via implementation of the SPEA.

2.4.1 Aquatic and Riparian Ecosystems

The fish habitat assessment identified three watercourses within and adjacent to the subject property. Table 7 below summarizes the results of the fish habitat assessment including the Streamside Protection and Enhancement Area setback widths based on the CoA SPB and the RAR Assessment Methods. The Existing Site Survey (Figure 3) depict the RAR and SPB SPEA's.

Based, on the findings of the assessment, the CoA SPB would prescribe a 30 m wide SPEA for UT1 and Horn Creek and a 15 m wide SPEA for UT2.

In addition, Pinchin completed a RAR Detailed Assessment Report dated March 19, 2018 (Report Number 5079A) to evaluate watercourses at the subject property in the context of the RAR Assessment Methods. The RAR Detailed Assessment was reviewed by the Ministry of Forests, Lands, Natural Resource Operations and Rural Development and found to have met the applicable assessment and reporting criteria. The RAR Detailed Assessment Report is included in Appendix I.

Table 7. Classification and SPEA Widths Required per the CoA Streamside Protection Bylaw No. 1465-2005 and the Riparian Areas Regulation Assessment Methods.

Watercourse Identifier	Classification	SPB SPEA Width (m)	RAR SPEA Width (m)
Horn Creek	Permanent, fish bearing	30	23.7
UT1	Permanent, non-fish bearing	30	10.0

Watercourse Identifier	Classification	SPB SPEA Width (m)	RAR SPEA Width (m)
UT2	Non-permanent, non-fish bearing	15	10.0

2.4.2 Terrestrial Ecosystems

Adverse effects to terrestrial EVR (i.e., vegetation resources, wildlife and wildlife habitat) are anticipated to be avoided or reduced primarily through delineation and protection of the SPEA (i.e., which will encompass the high value habitat features including mature riparian forest and watercourses), where habitat values were considered highest.

It is recommended that wherever possible existing trails and driveways are to be incorporated into the proposed development of the subject property to further reduce effects to EVR (i.e., by reducing the requirement for new trails or driveways); Figure 2 depicts existing trails within the area for reference. Effects to EVR due to clearing within the developable area (i.e., the young deciduous upland forest) are anticipated to be limited to a small loss of bird nesting habitat, as well as marginal forage and cover habitat for local wildlife species.

Temporary adverse effects, i.e., sensory disturbance and risk of injury or mortality to terrestrial wildlife EVR are anticipated to be avoided or reduced through implementation of the mitigation measures described in Section 4.2.

2.4.3 Species of Management Concern

Federal recovery strategies for species of management concern listed as threatened or endangered under Schedule 1 of the SARA provide additional information on threats and critical habitat. This information can be used for management or planning purposes and implementation of best management practices. Of the species of management concern described in Table 2, final recovery strategies have been prepared for Pacific water shrew, olive-sided flycatcher, and Oregon forestsnail. A proposed recovery strategy is available for little brown myotis. Protection of habitat suitable for species of management concern (i.e., mapped critical habitat or habitat that meets the biophysical attributes of critical habitat for a species) is also considered to provide protection for species with similar life requisites.

Critical habitat was not identified within the subject property for any species of management concern; however, critical habitat for Oregon forestsnail is defined at two locations: Downes Road (ID No. 337) and Willband Creek (ID No. 350; DataBC 2013). Habitat within the mature riparian forest also met the biophysical attributes for Oregon forestsnail, i.e., bigleaf maple within a mature mixed forest. Although stinging nettle was not identified, the timing of the field assessment may not have been ideal for detection

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of this species; therefore, the subject property was assumed to provide suitable habitat for Oregon forestsnail.

Although critical habitat has not been defined for Roell's brotherella and this species was not assessed in the field, there are historical occurrence records for this species near the subject property and habitat within the subject property is potentially suitable. As Roell's brotherella is typically found in mixed wood and second growth forests along stream banks (COSEWIC 2010), protection of the mature riparian forest within the SPEA is considered to provide protection for this species.

Long-term adverse effects to species of management concern are anticipated to be avoided or reduced primarily through protection of the mature riparian forest within the SPEA described in Section 4.1. Temporary effects to species of management concern are anticipated to be avoided, reduced, or compensated through implementation of the mitigation measures described in Section 4.2.

3.0 DEVELOPMENT IMPACTS

Negative temporary and/or permanent instream impacts to Horn Creek, UT1 or UT2 will not occur as a result of this development. Enhancement plantings within aquatic habitat associated with UT1 are proposed (i.e., to be completed by the CoA). Permanent impacts to the riparian area of Horn Creek, UT1 and UT2 will occur through the encroachment of the development into the SPB SPEA. Figure 4 depicts the Overall Site Plan including the area of permanent encroachment, temporary impacts and compensation at the subject property.

Per discussions with the Client and civil engineer, the proposed site servicing will be conducted within or in close proximity to the building footprint with the exceptions of the decommissioning of the existing sanitary line. The sanitary service line within the SPEA will be decommissioned in place (i.e., cut and capped) and as such will not involve ground works or temporary impacts within the SPEA .

Overall, there will be a total of approximately 847 m^2 of temporary impacts to SPEA resulting from building construction and re-grading of the adjacent east CoA park property. The areal extent of temporary impact is subject to change based on actual works completed in field; however the entire area of the temporary impact will be restored under the direction of a QEP.

Temporary impacts within the SPEA due to the construction of the building will include approximately 163 m^2 of temporary impacts along the northern parkade wall. This temporary disturbance is required for access to facilitate construction of the parkade. Disturbed areas from the temporary impacts of building construction will be re-vegetated per the proposed compensation works.

At the request of the CoA, an existing soil berm located on the east property boundary and the CoA property within Horn Creek Park will be regraded to create a less steep and more consistent slope. Plans

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are not finalized at this time, but the regrading will result in approximately 684 m^2 of temporary impacts within Horn Creek Park. This area is currently characterized by young red alder trees and an understory dominated by Himalayan blackberry and stinging nettle with sparse occurrences of salmonberry and red elderberry. The regraded area on the CoA property will be restored per recommendations included in Section 5.4.4.

Please note that per discussion with the Client and the CoA, the site servicing plan will be finalized at a later date (i.e., through building permit application).

Additional, temporary impacts from the proposed development works include potential audible and vibration impacts to wildlife life including birds and small mammals, and the production of dust causing potential disturbance to wildlife within the SPEA and Horne Creek Park.

Table 8 presents in Section 5.3 the area of encroachment (permanent impact) and temporary impacts into the SPB SPEA and the associated area of compensation.

Site sections (Figure 6A – 6H) depict the areas of encroachment into the SPEA, the proximity of the proposed development to existing trees, and the compensation areas within the SPEA. The site sections conclude the proposed development should not interfere with existing trees marked to be retained, and the plans depict adequate space between the SPEA and the proposed development to provide emergency access and building maintenance access. The site sections will be updated at a later date to address CoA comments from their April 12, 2019 Environmental Review.

Mitigation measures for the construction works are detailed below, and in Pinchin's CEMP

4.0 MITIGATION

4.1 Mitigation Hierarchy

4.1.1 Avoidance

Based on the nature of the proposed development (i.e., the nature and density of development required to achieve a viable project) and the location of watercourses on and in proximity to the subject property, wholly avoiding encroachment of the SPB SPEA was not considered feasible. However, the proposed development was located within the subject property and configured such that there would be the lowest extent of encroachment into the SPB SPEA. In addition, site servicing and landscaping were designed to minimize the encroachment into the SPEA. As encroachment into the SPEA was not avoided, mitigation measures and compensation measures were applied.

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4.1.2 Mitigate

In effort to prevent temporary and permanent impacts to the watercourses and riparian area, mitigation measures have been prescribed for the proposed works. Please see the following for more detailed descriptions of prescribed mitigation measures:

- Construction Environmental Management Plan (CEMP) prepared by Pinchin Ltd., dated April 4, 2019, Appendix IV; and
- Section 4.2 of this report.

4.1.3 Compensation

Permanent impacts to the SPEA will occur due to the encroachment from the proposed development. As such, a compensation planting plan has been prescribed (see Table 8; Section 5.3). Compensation includes removing invasive plant species, installing native plants, adding habitat complexing features, and implementing a three (3) year monitoring and maintenance program for the compensation works. Details of the compensation works can be found in Section 5.0.

4.2 Mitigation Measures

4.2.1 General

- A Qualified Environmental Professional (QEP) must be retained by the proponent to conduct regular site inspections and monitor the implementation of mitigation measures during construction for protection of terrestrial and aquatic habitat.

4.2.2 SPEA Protection

The following recommendations have been proposed to permanently protect the SPEA:

- Typically, the CoA requires a default 5 m buffer from the boundary of the SPEA to any new construction to accommodate the root systems of vegetation. As such, there will be a minimum of 5 m buffer between the SPEA and the proposed development on the northeast aspect of the proposed building, and a minimum buffer of 3 m between the SPEA and the proposed development on the northwest aspect of the proposed building. The 3 m buffer is adequate as it will be occupied by a maintained walking path therefore providing adequate space for construction activities, tree retention/establishment and access for building maintenance;
- Trees along the boundary of the SPEA must be protected per the guidelines outlined in the CoA Tree Protection Bylaw No. 1831-2009; and

- The boundaries of the SPEA must be clearly delineated with permanent signage and fencing prior to construction activities. The fencing must be 1.8 m tall and either chain-link or post and rail with wire mesh fit to the back of the fence. Signage to inform the owner of sensitive habitat areas must be placed every 15 m along the fence boundary.

4.2.3 Aquatic and Riparian Ecosystems

- Project design should incorporate the use of the existing access (i.e. using existing pathways to access the SPEA for compensation planting) to avoid unnecessary loss of habitat within the NEDP Areas; and
- Erosion and sediment control (ESC) measures per the CoA Erosion and Sediment Control Bylaw, 2010 (Bylaw No. 1989-2010), must be implemented to avoid or reduce the potential for discharge of sediment-laden waters into any existing or new drainage facility or watercourse.

4.2.4 Vegetation Resources

- Project design should incorporate the use of the existing road and watercourse crossings (note: watercourse crossings are not anticipated) to avoid unnecessary loss of habitat within the NEDP Areas;
- Vegetation clearing will be limited to the approved project footprint and associated access areas;
- Machinery must be clean and free of soils and plant materials prior to mobilization to and demobilization from the subject property to avoid the introduction or spread of invasive species;
- Noxious weeds were not identified during the field assessment; however, noxious weeds identified by the Contractor(s) during Project activities must be reported to the QEP before disturbing the plants or area around the plants. Development of an Invasive Species Management Plan may be required if noxious weeds are detected on-Site; and
- Central Valley Arborist will complete windthrow assessments following initial clearing and following building construction. Trees may be identified during such assessments as requiring modification (e.g., topping, limb modification or removal), conversion to wildlife trees or removal. Any such works would be subject to the typical requirements of the local tree protection bylaw.

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4.2.5 Wildlife and Wildlife Habitat Features

Through delineation of the SPEA and protection of the mature riparian forest within the SPEA, it is anticipated that the majority of wildlife and wildlife habitat features will be protected from potential adverse effects due to development activities. The following mitigation measures will be implemented to further avoid or reduce adverse effects to wildlife and wildlife habitat features:

- Limit dust by sweeping access roads and road shoulders. A gravel access pad with a minimum of 3" crushed rock is to be installed at the access driveway. Water spray, the use of additional clean gravel or other dust mitigation techniques may be required if the work Site is generating dust that is migrating beyond the Project boundaries; and
- A pre-construction bird nest survey should be conducted by a QEP prior to development activities;
- If detected, a species-specific, no-disturbance setback would be established while the nest is active;
- Nests protected under the BC *Wildlife Act* would be protected year-round from destruction;
- Nest surveys will take into consideration the habitat requirements and habits of all bird species of management concern with potential to nest within the subject property; and
- Results of the bird nest survey are valid for five days during the Environment and Climate Change Canada breeding bird window (March 1 to August 31), after which, additional surveys may be recommended in consultation with a QEP.

4.2.6 Species of Management Concern

Through delineation and protection of the mature riparian forest within the SPEA, it is anticipated that the majority of species of management concern will be protected from adverse effects due to development of the subject property. The following mitigation measures will be implemented to further avoid or reduce adverse effects to species of management concern:

- Habitat with moderate to high potential for the occurrence of Pacific water shrew and Trowbridge's shrew was identified within the mature riparian forest. Note the mature riparian forest will not be impacted by the development variance and protection of these species will occur through delineation and protection of the mature riparian forest within the SPEA and implementation of the mitigation measures described in above; and
- Bird and bat species of management concern are considered likely to occur within the subject property. These species will be protected through delineation and protection of

the mature riparian forest within the SPEA and implementation of the mitigation measures described in above.

5.0 COMPENSATION PLAN

5.1 Introduction

A compensation plan is required in support of the DVP permit with regard to encroachment within the typical CoA SPEA prescribed for watercourses on the subject property.

Included in this compensation plan is a restoration plan to stabilize the regraded area located on CoA property.

The objective of this restoration plan is to create high quality and functional riparian habitat that provides ecological function in the form of shade, litter fall, and insect drop to fish habitat located on the subject properties and downstream thereof. The restoration plan includes riparian restoration and enhancement in the form of 1) removal of invasive plants including Himalayan blackberry (*Rubus armeniacus*) and yellow archangel (*Lamium galeobdolon*) within the planting area; 2) installation of native riparian and wetland plantings; and 3) installation of additional habitat features (e.g., woody debris) for habitat complexing.

5.2 Background

5.2.1 Streamside Protection and Enhancement Area (SPEA)

Baseline setbacks for watercourses located on the subject property were assigned per the CoA SPB.

Per the SPB, Unnamed Tributary 1 (UT1) and Horn Creek would receive a 30 metre SPEA from the top of bank in which the proposed development will encroach upon.

5.2.2 Arborist Report Summary

Per the Central Valley Arborist Report, dated March 21, 2018, a total of 30 black cottonwood trees will be removed (22 trees between 20 and 30 centimeters (cm) diameter breast height (DBH) and 8 trees with a DBH greater than 30 cm) for the proposed development. As such, per the CoA, Tree Protection Bylaw (Bylaw No. 1831-2009) the trees must be replaced. The CoA requires that each of the 22 trees between 20-30 cm DBH be replaced by 2 trees, and the 8 trees >30 cm DBH be replaced by 3 trees.

Both project engineer and project arborist staff will be present on-site during works as necessary to appropriately field fit designs while maintaining adherence to all applicable standards and best practices. If the removal of any additional trees is required (including any of the 8 referenced above) during

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proposed works, then they are to be replaced per the Provincial Ministry of Environment Tree Replacement Requirements and appropriate liaison and/or permitting through the CoA will be required.

5.3 Proposed Development Variance

The proposed development requires an encroachment into the typical 30 m SPEA prescribed by the CoA SPB.

Per CoA policy (NEDP Guidelines - NE3), compensation is typically required for lost habitat value at a ratio of 2:1. In addition, CoA staff have provided draft guidelines to inform consideration of the relative value of compensation works (CoA Weighting System). However, it is Pinchin's understanding that the proposed compensation scenario, despite not meeting the 2:1 compensation ratio, is conceptually acceptable to CoA staff due to the proposed dedication of the SPEA lands to the CoA following completion of the maintenance and monitoring of riparian enhancement works. Dedication of SPEA land is not normally required in such a development, as such the proposed dedication represents an additional measure on the part

The proposed development includes compensation in the form of riparian enhancement within the riparian areas associated with UT1, UT2 and Horn Creek. The proposed enhancements will result in improved habit values with regard to aquatic life, birds, small mammals and other wildlife in the local environment.

Table 8 below presents a quantitative summary of the proposed changes (i.e., permanent impacts) to the SPEA on the subject properties.

Table 8. Habitat Budget Summary

Temporary impacts to the SPEA (areal disturbance)	847 m^2
Permanent Impacts to the SPEA	-2,922 m^2
Area within SPEA to be enhanced and/or restored	+4,832 m^2
*Wetland plantings within UT1	+549 m^2
**Ratio of enhancement/restoration to encroachment	1.8:1

* Wetland plantings are to be funded by the Client but completed by the CoA.

** Less than 2:1 ratio conceptually acceptable as Client is dedicating enhanced SPEA to the CoA.

Figure 4 depicts the habitat balance for the proposed development at the subject property.

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5.4 Riparian Enhancement and Restoration

Lands within the riparian area of UT1, UT2 and Horn Creek will be enhanced and restored through the management of invasive plants and the installation of native plantings and other habitat features.

Per the CoA Weighting System, the proposed enhancement and restoration works would be generally considered Scenario 1(b) "Restoration of areas that were primarily vegetated with invasive and/or ornamental plants (e.g. invasive plant removal and replanting with native plants)". Such works are valued at one times the area of enhancement for purposes of calculating the relative value for purposes of compensation. As such, an area of 4,832 m^2 within the SPEA associated with UT1, UT2, and Horn Creek (Figure 4) will be enhanced to address, in part, the required compensation.

Riparian vegetation within the planting area consists of a young deciduous upland forests with a shrub understory dominated by Himalayan blackberry and ground cover dominated by yellow archangel. The enhancement and restoration prescription is intended to create a diverse vegetative assemblage within the riparian environment adjacent to UT1, UT2 and Horn Creek. By enhancing riparian vegetation, riparian habitat values (e.g., shading of the watercourses, contribution of leaf litter, generation of woody debris, wildlife foraging) will be improved.

A cost estimate for purposes of bonding with the CoA is included in Appendix VI.

5.4.1 Riparian Planting Specifications

A list of recommended plant species including quantities and sizes for the riparian planting is provided in Table C, Appendix V. In lieu of a dedicated planting plan, a QEP familiar with riparian restoration must be onsite at the time of planting to assist with plant layout. Only shrubs and ferns shall be planted within utility corridors such as the sanitary line and storm outfall.

Recommended native plant species adapted to local conditions are presented. The planting of diverse plant species will promote the colonization of native species and should mitigate growth of invasive species. Composition of trees and shrubs may vary based on plant availability and local planting conditions, subject to QEP written approval.

A total of 30 trees, 1800 shrubs, 271 ferns and 300 willow plugs are to be planted in the identified planting area (Figure 4) to offset permanent and temporary impacts resultant of the works. Shrubs, ferns and willows will be planted at an average density of approximately one plant per two (2) square metres (1 plant / 2 m^2). A lower planted density of trees was recommended due to the larger spacing required (i.e., proposed density of 1 tree / 3 m^2) and larger tree stock (5-gallon pot size) will be planted to improve survivorship. Note this does not include replacement trees required for the tree removal within the developable area as prescribed in the arborist report.

Per the NEDP Guidelines - NE3, enhancement plantings are typically to be completed at a density of one plant per square metre over an area twice the size of the area of disturbance (i.e., 2:1 compensation to encroachment). A lower density of shrubs, ferns and willows was recommended in this instance due to the existing native vegetation currently characterizing the subject property. To still comply with the NEDP Guidelines - NE3 despite the fewer number of plants prescribed and the less than 2:1 compensation ratio, the Client will be dedicating the SPEA to the CoA instead of maintaining it as private property.

5.4.2 Habitat Complexing Specifications

Riparian enhancement will also be achieved by installation of additional habitat features within the riparian area. Habitat features will consist of 10 pieces of large woody debris (minimum diameter 30 cm, minimum length 3 metres) and 5 nest boxes for migratory birds. Large woody debris will be obtained from tree felled at the subject property during the clearing and grubbing stage. The large woody debris will be installed southeast of UT1 per QEP direction. The nest boxes will be approved and placed as directed by a QEP with suitable avian experience.

The QEP will provide written confirmation to the CoA following completion of these works as to the sites of the habitat complexing features.

5.4.3 Wetland Planting Specifications

Wetland plantings are required to help achieve compliance with the NEDP Guidelines – NE3 for the proposed development. Per communication with the CoA, the Client will fund the wetland planting however, the CoA will install and planting, maintain, monitoring and complete this section of the compensation works.. The cost estimate for the wetland restoration planting is included in Appendix VII. Wetland plants are to be installed at 1 plant per 1/m^2, as such a total of 549 wetland plants are required to restore a 549 m^2 wetland area.

A list of recommended plant species for and numbers for the wetland planting is provided in Table D, Appendix V. Pinchin recommends planting facultative hydrophytes typically found in swamps; obligatory hydrophytes are to be planted within wetted areas (e.g. standing water or saturated soil) and facultative hydrophytes will be planted within areas without year round standing water or saturated soil. In lieu of a dedicated planting plan, a QEP familiar with wetland restoration must be onsite at the time of planting to assist with plant layout.

Please note that it is Pinchin's understanding that restoration planting works within a stream, if completed by local government, require Notification of an Authorized Change under the Provincial *Water Sustainability Regulation*. If such works were to be completed by a private landowner, a Change

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Approval for Changes In and About a Stream would be required under the Provincial *Water Sustainability Act*.

5.4.4 Regraded Area Stabilization

The 684 m^2 regraded temporary impact area on CoA property will be stabilized with native plantings based on the existing conditions of the area. A list of recommended plant species, quantities and sizes for the regraded area is provided in Table D, Appendix V. In lieu of a dedicated planting plan, a QEP familiar with riparian restoration must be onsite at the time of planting to assist with plant layout. In addition. straw, at a minimum thickness of 5 cm, is to be laid exposed soil within this area.

Recommended native plant species adapted to local conditions are presented. The planting of diverse plant species will promote the colonization of native species and should mitigate growth of invasive species. Composition of trees and shrubs may vary based on plant availability and local planting conditions, subject to QEP written approval.

A total of 100 red alder, 10 Douglas fir, and 354 shrubs are to be planted to stabilize the regraded area. Shrubs shall be planted at an average density of approximately one plant per one (1) square metres (1 plant / 1 m^2). A lower planted density of trees was recommended due to the larger spacing required (i.e., proposed density of 1 tree / 3 m^2) and larger tree stock (5-gallon pot size) will be planted to improve survivorship. The quantity of plants is subject to change based on the actual area regraded; however, the density of plantings shall remain the same.

Pinchin has provided a cost estimate to complete these restoration works, it is Pinchin's understanding that the Client will fund these works, timing subject to CoA works within the adjacent trail network.

5.4.5 Site Preparation

Invasive Himalayan blackberry and yellow archangel are prevalent within the planting area. Prior to planting, invasive plants are to be removed by hand or mechanically, as appropriate. Effort should be made to remove as much of the invasive plant material as possible (i.e. roots and stems) while minimizing removal of the underlying soil.

5.4.6 Plantstock Criteria

Criteria for specified plants should be followed to promote survivorship.

- All plants must be of guaranteed nursery stock.
- Botanical names are to be used in purchasing;
- Tree stock should be at least 5-gallon pot size;

Attachment: Attachment D: Environmental Assessment Application, prepared by Pinchin (dated April 17, 2019) (PDS 045-2019 : DP with V

- Shrubs must be at least 1-gallon pot size;
- Stock should be planted in the spring (April/May) or fall (late September/October), and watered if necessary; and
- Willow staking should be completed in the winter months (November to February) after the leaves have fallen and before germination.

5.4.7 Plant Health

The plants must comply with the BC Landscape and Nursery Association standards for nursery stock. The plants must be healthy with well-developed root systems and top growth and free of:

- Disease;
- Insect infestation;
- Broken tops, torn roots, and abrasions of bark on the trunk and branches;
- Weak root or branch systems;
- Dried out root systems;
- Prematurely opened or damaged buds;
- Dry, loose, or broken ball of earth;
- Damage from heating, freezing, or moulding; and
- Abnormal leaf colour.

5.5 Monitoring and Maintenance of Restoration Area

Regular monitoring and maintenance (e.g., watering) of riparian restoration planting, wetland plantings and temporary impact on CoA property plantings is recommended to meet the objectives of this restoration plan. The Client will fund the wetland plantings monitoring and maintenance but will not be responsible for conducting the works. Pinchin has provided a cost estimate for restoration works including maintenance and monitoring of the temporary impact area with the CoA lands to the east of subject property. It is Pinchin's understanding that CoA will provide maintenance and monitoring of this area.

Regular maintenance and removal of invasive shrubs (i.e., Himalayan blackberry and yellow archangel) is the most cost-effective way of protecting planted stock. Monitoring and maintenance over a 3-year period will be the responsibility of the Client. The Client will obtain a fire hydrant permit for watering the restoration plants as/if necessary. The planting area will be accessed through the proposed development's driveway and pathways.

Attachment: Attachment D: Environmental Assessment Application, prepared by Pinchin (dated April 17, 2019) (PDS 045-2019 : DP with V

Monitoring should include an initial inspection following completion of the riparian planting and one inspection annually for the following three years to review implementation of the restoration plan. Monitoring is to include assessment survivorship and vigour of plantings as well as the occurrence of invasive plants and should be completed by a QEP. After three years of monitoring, the restoration plan would be deemed to be successfully implemented if survivorship of plantings exceeds 90%. Naturally re-generated native trees, shrubs, and ferns within the planting area would be included in calculation of survivorship. Additional planting or monitoring may be required if total survivorship of plantings, including natural regeneration, is less than 90%.

Monitoring and maintenance should also address installed habitat complexing features. While limited decomposition of woody debris is acceptable (i.e., per QEP assessment) bird boxes must be functional following the monitoring period.

A monitoring letter report should be provided following each inspection to outline any recommended or required measures required to meet the objectives of the planting plan. The final letter report would either confirm that the restoration plan has been successfully implemented or will provide recommendations for further measures to ensure the objectives of this plan have been met.

Pinchin does not assume responsibility for plant survivorship, or replacement of dead or damaged plants.

5.6 Land Dedication

The Client proposes to dedicate the SPEA to the CoA instead of maintaining it as private property post-development. The land dedication will form part of the proposed compensation package ensuring that the proposed development meets the NEDP Guidelines - NE3. The land transfer will be a condition of the final building permit. The Client will still commit to monitoring and maintaining the restoration area for 3 years.

Attachment: Attachment D: Environmental Assessment Application, prepared by Pinchin (dated April 17, 2019) (PDS 045-2019 : DP with V

6.0 TERMS AND LIMITATIONS

The work performed by Pinchin Ltd. was conducted in accordance with generally accepted engineering or scientific practices current in this geographical area at the time the work was performed. No warranty is either expressed or implied by furnishing written reports or findings. The Client acknowledges that subsurface and concealed conditions may vary from those encountered or inspected. Pinchin Ltd. can only comment on the environmental conditions observed on the date(s) the assessment is performed. The work is limited to those areas of concern identified by the Client or outlined in our proposal. Other areas of concern may exist but were not investigated within the scope of this assignment.

Pinchin Ltd. makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and these interpretations may change over time. Pinchin Ltd. accepts no responsibility for consequential financial effects on transactions or property values, or requirements for follow-up actions and costs.

The liability of Pinchin Ltd. or its staff will be limited to the lesser of the fees paid or actual damages incurred by the Client. Pinchin Ltd. will not be responsible for any consequential or indirect damages. Pinchin Ltd. is only liable for damages resulting from negligence of Pinchin Ltd. All claims by the Client shall be deemed relinquished if not made within two years after last date of services provided. Information provided by Pinchin Ltd. is intended for Client use only, but can be relied upon by the current home owner at the Site under the same limitations as the Client. Pinchin Ltd. will not provide results or information to any party unless disclosure by Pinchin Ltd. is required by law. Any use by a third party of reports or documents authored by Pinchin Ltd. or any reliance by a third party on or decisions made by a third party based on the findings described in said documents, is the sole responsibility of such third parties. Pinchin Ltd. accepts no responsibility for damages suffered by any third party.

231866.000 REVISED Environmental Application, 3182 Gladwin Road, Abbotsford, BC, Horn Park Place, April 17 2019

Template: Master Report Template, HO, December 12, 2017

Attachment: Attachment D: Environmental Assessment Application, prepared by Pinchin (dated April 17, 2019) (PDS 045-2019 : DP with V

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Attachment: Attachment D: Environmental Assessment Application, prepared by Pinchin (dated April 17, 2019) (PDS 045-2019 : DP with V

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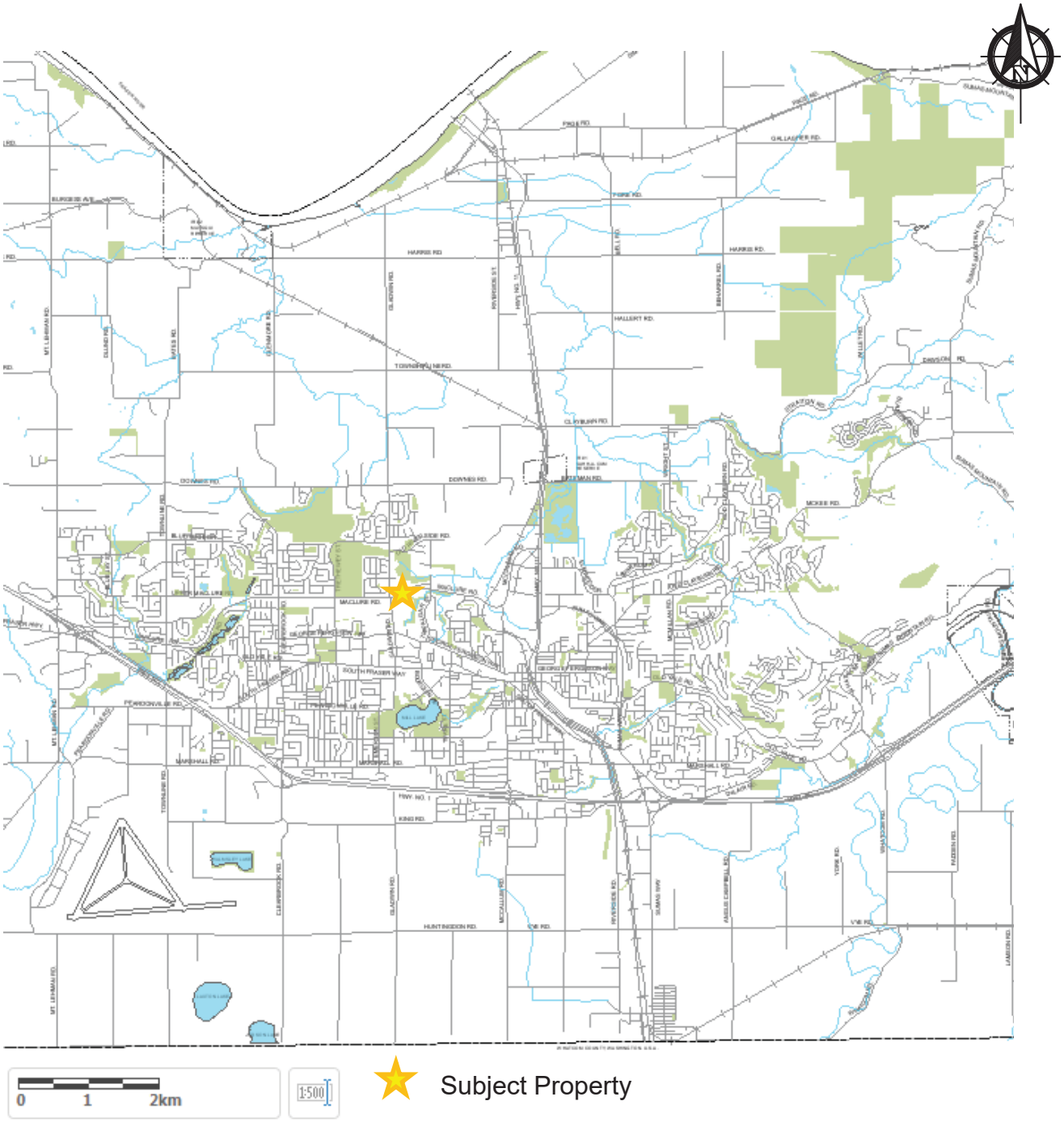
Attachment: Attachment D: Environmental Assessment Application, prepared by Pinchin (dated April 17, 2019) (PDS 045-2019 : DP with V

Attachment: Attachment D: Environmental Assessment Application, prepared by Pinchin (dated April 17, 2019) (PDS 045-2019 : DP with V

FIGURES



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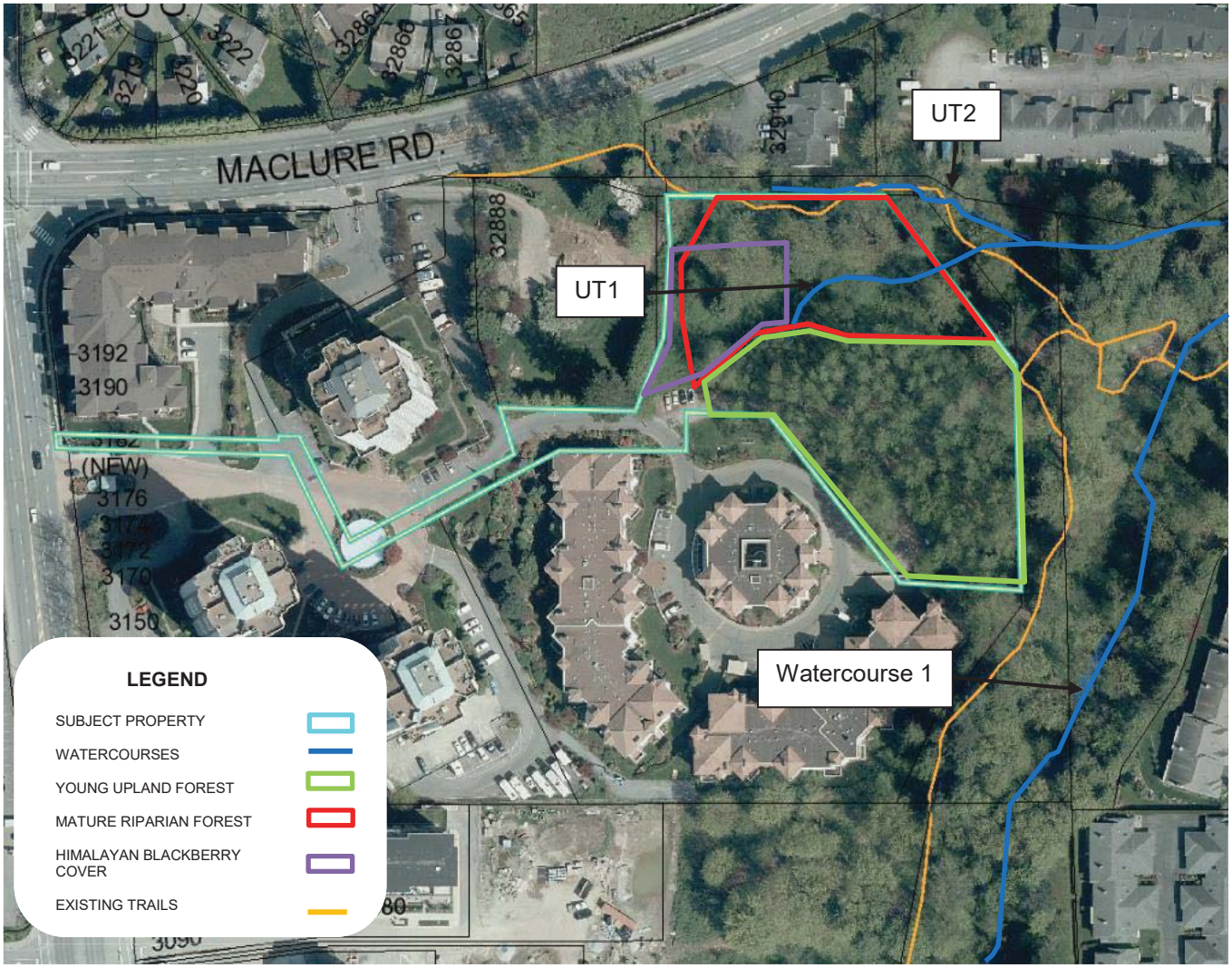
PROJECT NAME:	ENVIRONMENTAL ASSESSMENT APPLICATION				
LOCATION:	3182 GLADWIN ROAD, ABBOTSFORD, BC				
TITLE:	OVERVIEW MAP				
DATE: APRIL 2019	PROJECT #: 231866.000	IMAGE SOURCE: ABBOTSFORD WEBMAP	DRAWN BY: BW	CHECKED BY: JN	FIGURE NO.: 1

Attachment: Attachment D: Environmental Assessment Application, prepared by Pinchin (dated April 17, 2019) (PDS 045-2019 : DP with V



PINCHIN

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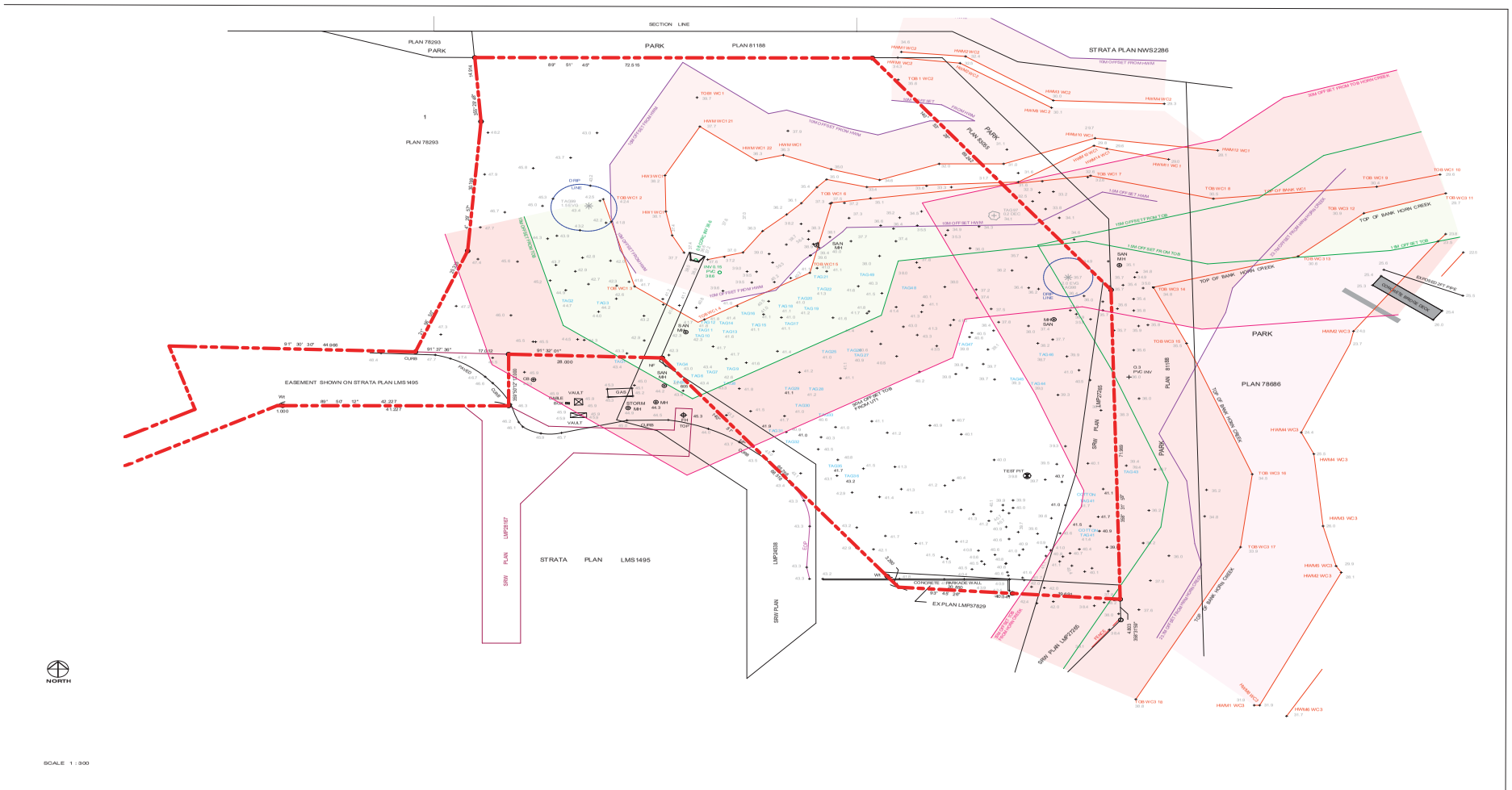
PROJECT NAME:	ENVIRONMENTAL ASSESSMENT APPLICATION
LOCATION:	3182 GLADWIN ROAD, ABBOTSFORD, BC
TITLE:	SUBJECT PROPERTY AERIAL OVERVIEW

DATE:	PROJECT #:	IMAGE SOURCE:	DRAWN BY:	CHECKED BY:	FIGURE NO.:
APRIL 2019	231866.000	ABBOTSFORD WEBMAP	BW	JN	2

Attachment: Attachment D: Environmental Assessment Application, prepared by Pinchin (dated April 17, 2019) (PDS 045-2019 : DP with V



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	PROJECT NAME: ENVIRONMENTAL ASSESSMENT APPLICATION				
	LOCATION: 3182 GLADWIN ROAD, ABBOTSFORD, BRITISH COLUMBIA				
	TITLE: EXISTING SITE SURVEY				FIGURE NO. 3
	DATE: APRIL 2019	PROJECT NO.: 231866.000	IMAGE SOURCE: CHPA (2019)	DRAWN BY: BW	CHECKED BY: JN

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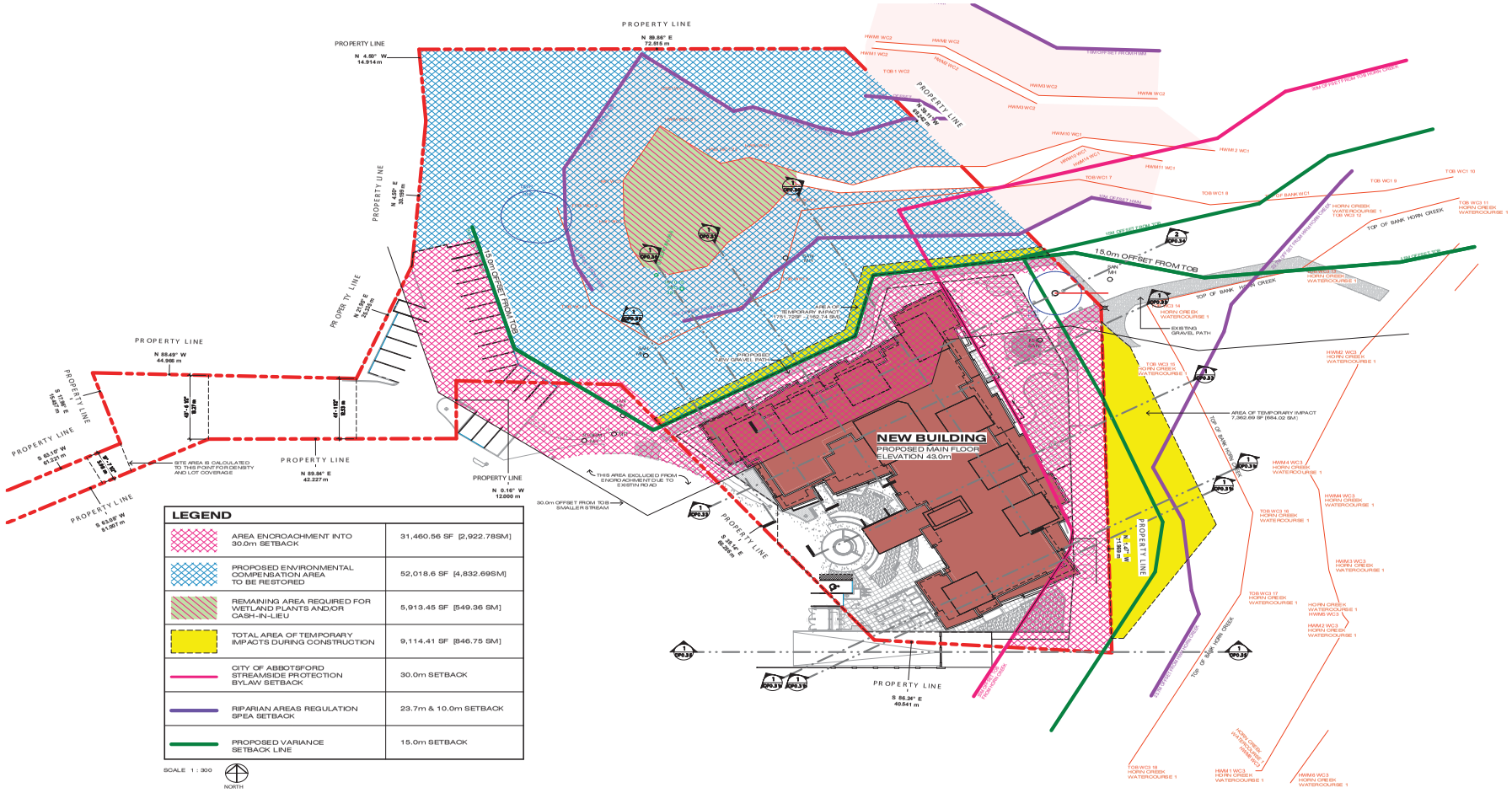

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CLIENT NAME:	HORN PARK PLACE DEVELOPMENTS LTD.
PROJECT NAME:	ENVIRONMENTAL ASSESSMENT APPLICATION
LOCATION:	3182 GLADWIN ROAD, ABBOTSFORD, BRITISH COLUMBIA
TITLE:	PROPOSED DEVELOPMENT AND HABITAT BALANCE PLAN
FIGURE NO.	4

DATE:	PROJECT NO.:	IMAGE SOURCE:	DRAWN BY:	CHECKED BY:
APRIL 2019	231866.000	CHPA (2019)	BW	JN

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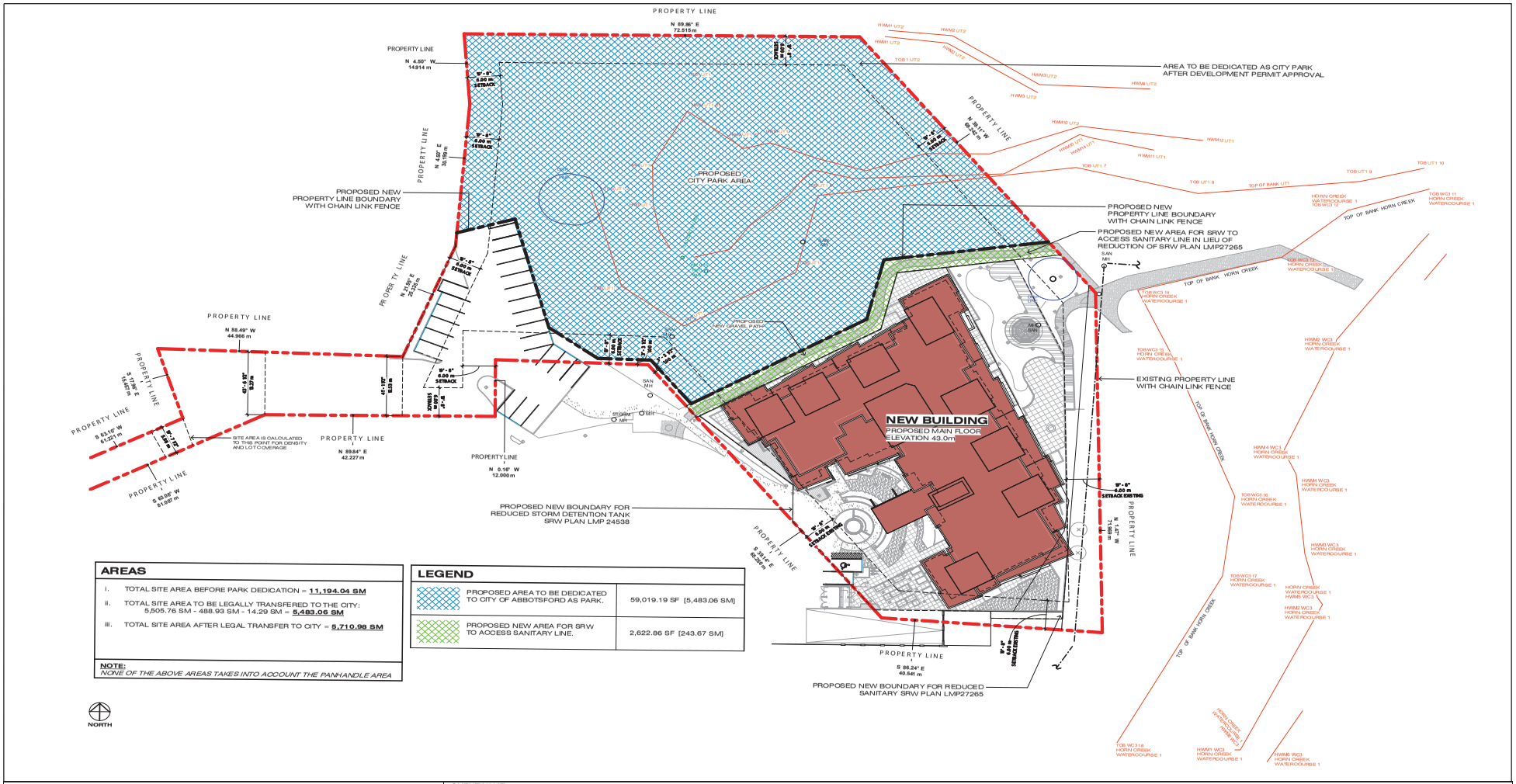

AREAS	
i.	TOTAL SITE AREA BEFORE PARK DEDICATION = **11,194.04 SM**
ii.	TOTAL SITE AREA TO BE LEGALLY TRANSFERED TO THE CITY: 5,505.76 SM - 488.93 SM - 14.29 SM = **5,483.06 SM**
iii.	TOTAL SITE AREA AFTER LEGAL TRANSFER TO CITY = **5,710.98 SM**

NOTE:
NONE OF THE ABOVE AREAS TAKES INTO ACCOUNT THE PANHANDLE AREA

LEGEND	
PROPOSED AREA TO BE DEDICATED TO CITY OF ABBOTSFORD AS PARK.	59,019.19 SF [5,483.06 SM]
PROPOSED NEW AREA FOR SRW TO ACCESS SANITARY LINE.	2,622.86 SF [243.67 SM]

PINCHIN

CLIENT NAME:	HORN PARK PLACE DEVELOPMENTS LTD.
PROJECT NAME:	ENVIRONMENTAL ASSESSMENT APPLICATION
LOCATION:	3182 GLADWIN ROAD, ABBOTSFORD, BRITISH COLUMBIA
TITLE:	LAND DEDICATION PLAN
FIGURE NO.	5

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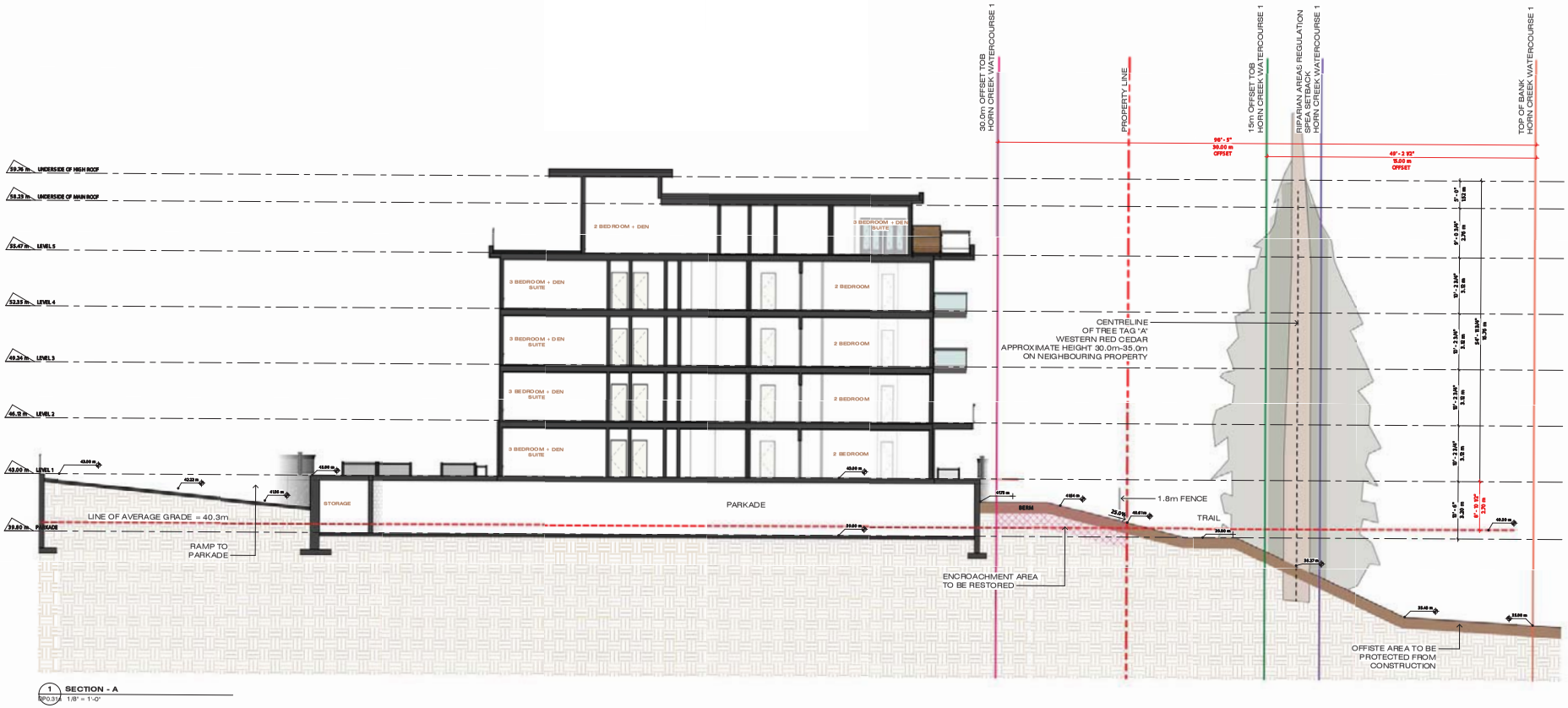

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CLIENT NAME:	HORN PARK PLACE DEVELOPMENTS LTD.
PROJECT NAME:	ENVIRONMENTAL ASSESSMENT APPLICATION
LOCATION:	3182 GLADWIN ROAD, ABBOTSFORD, BRITISH COLUMBIA
TITLE:	SITE SECTIONS
FIGURE NO.	6A

DATE:	PROJECT NO.:	IMAGE SOURCE:	DRAWN BY:	CHECKED BY:
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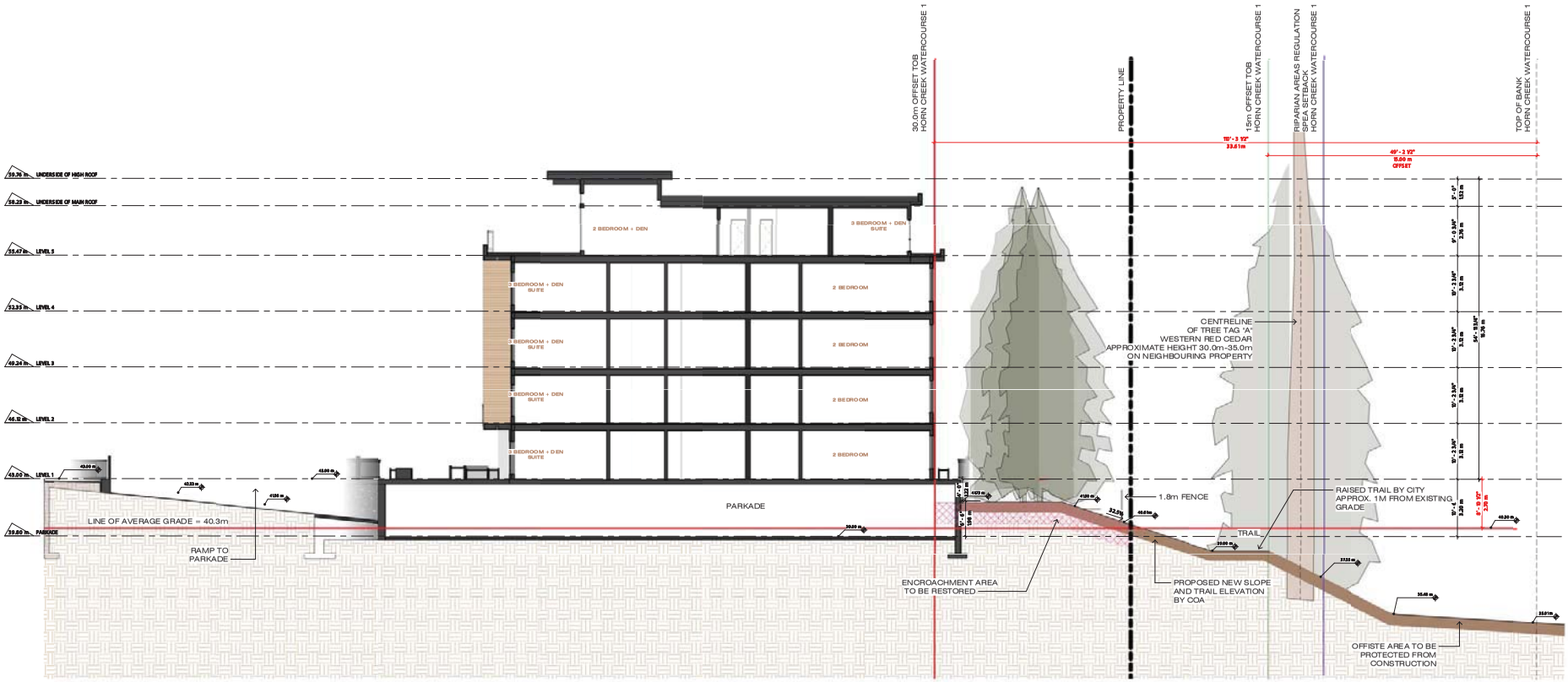

SECTION - A REV 1

PINCHIN	CLIENT NAME: HORN PARK PLACE DEVELOPMENTS LTD.				
	PROJECT NAME: ENVIRONMENTAL ASSESSMENT APPLICATION				
	LOCATION: 3182 GLADWIN ROAD, ABBOTSFORD, BRITISH COLUMBIA				
	TITLE: SITE SECTIONS				FIGURE NO. 6B
	DATE: APRIL 2019	PROJECT NO.: 231866.000	IMAGE SOURCE: CHPA (2019)	DRAWN BY: BW	CHECKED BY: JN

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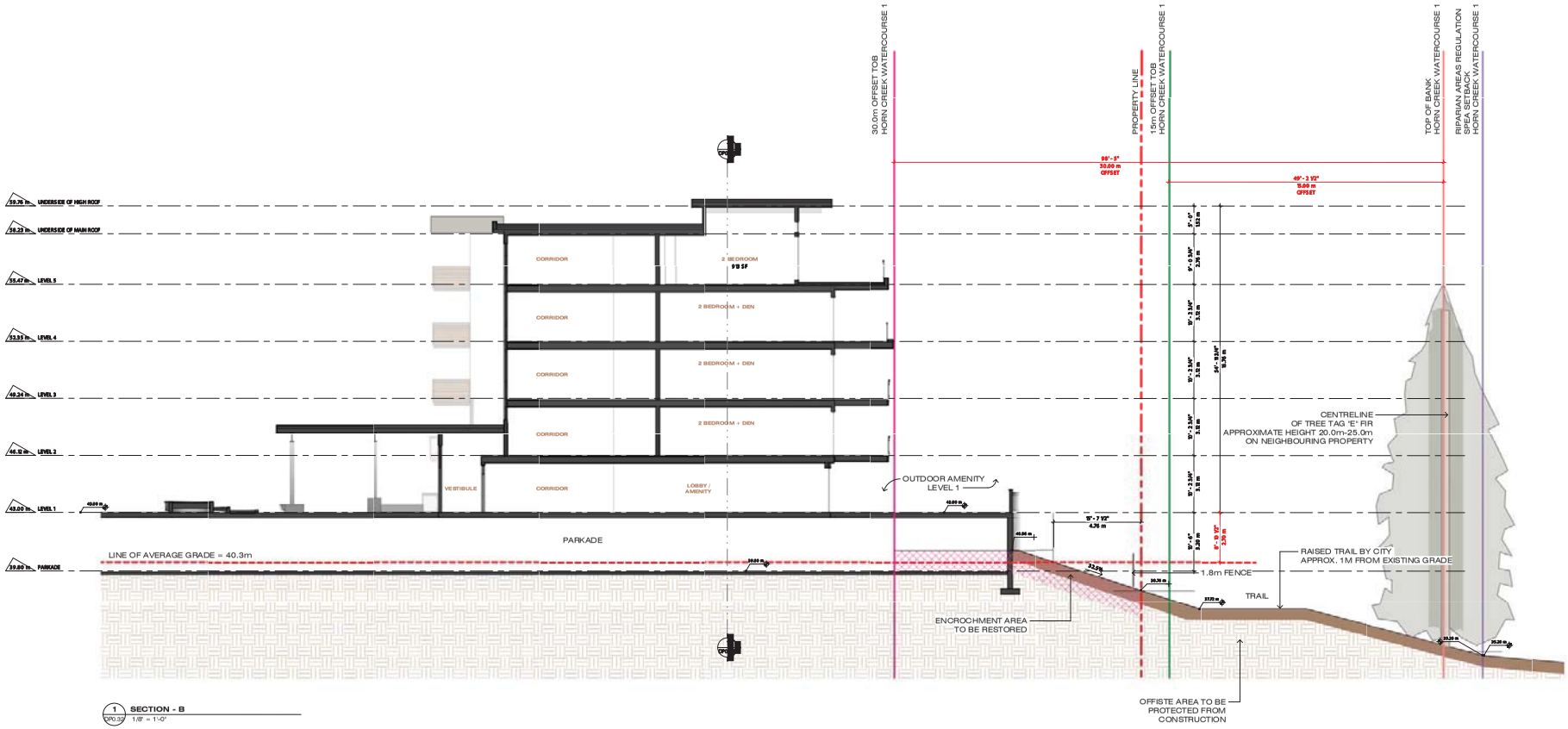

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	PROJECT NAME: ENVIRONMENTAL ASSESSMENT APPLICATION				
	LOCATION: 3182 GLADWIN ROAD, ABBOTSFORD, BRITISH COLUMBIA				
	TITLE: SITE SECTIONS				FIGURE NO. 6C
	DATE: APRIL 2019	PROJECT NO.: 231866.000	IMAGE SOURCE: CHPA (2019)	DRAWN BY: BW	CHECKED BY: JN

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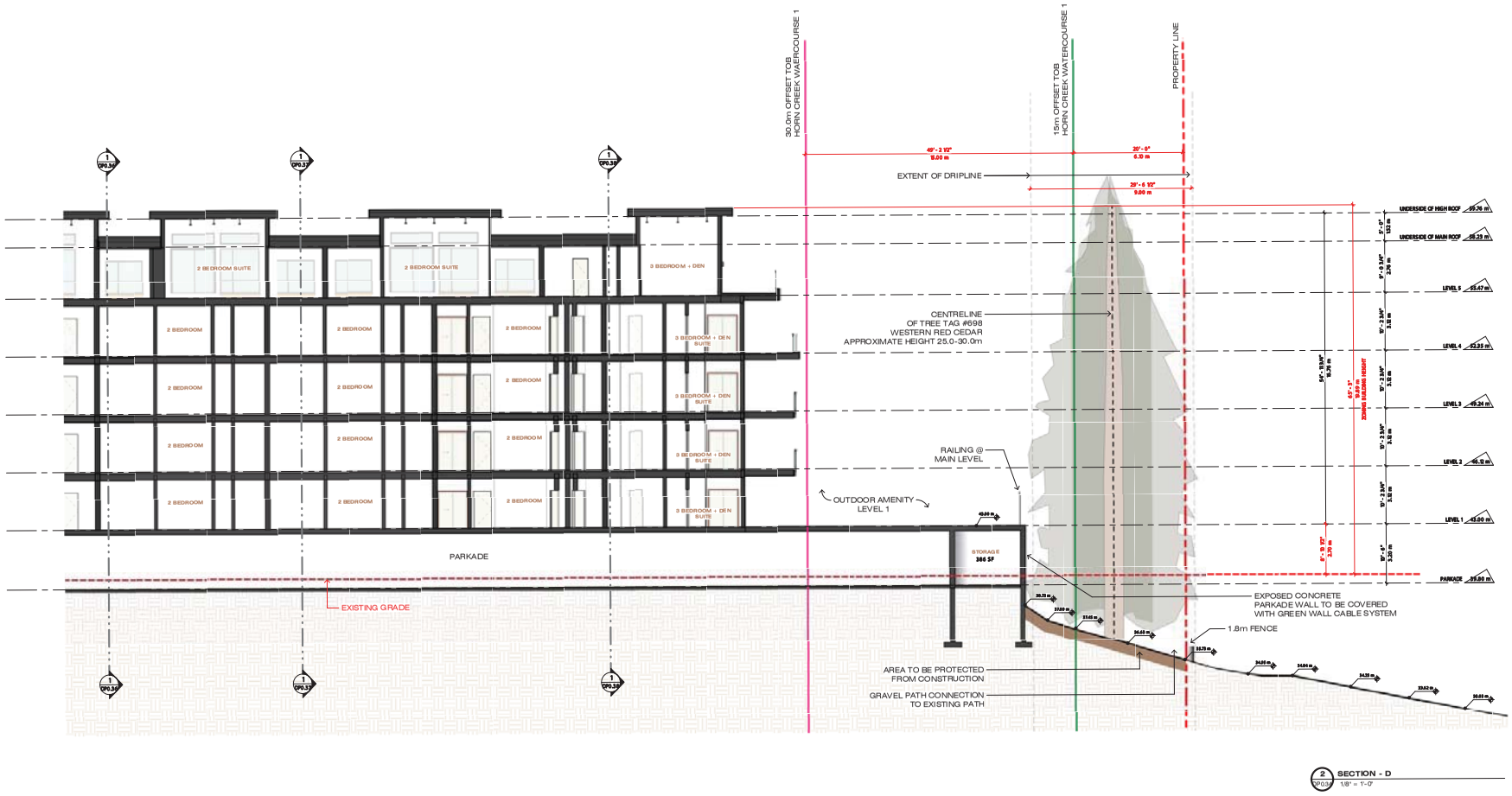

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	PROJECT NAME: ENVIRONMENTAL ASSESSMENT APPLICATION				
	LOCATION: 3182 GLADWIN ROAD, ABBOTSFORD, BRITISH COLUMBIA				
	TITLE: SITE SECTIONS				FIGURE NO. 6D
	DATE: APRIL 2019	PROJECT NO.: 231866.000	IMAGE SOURCE: CHPA (2019)	DRAWN BY: BW	CHECKED BY: JN

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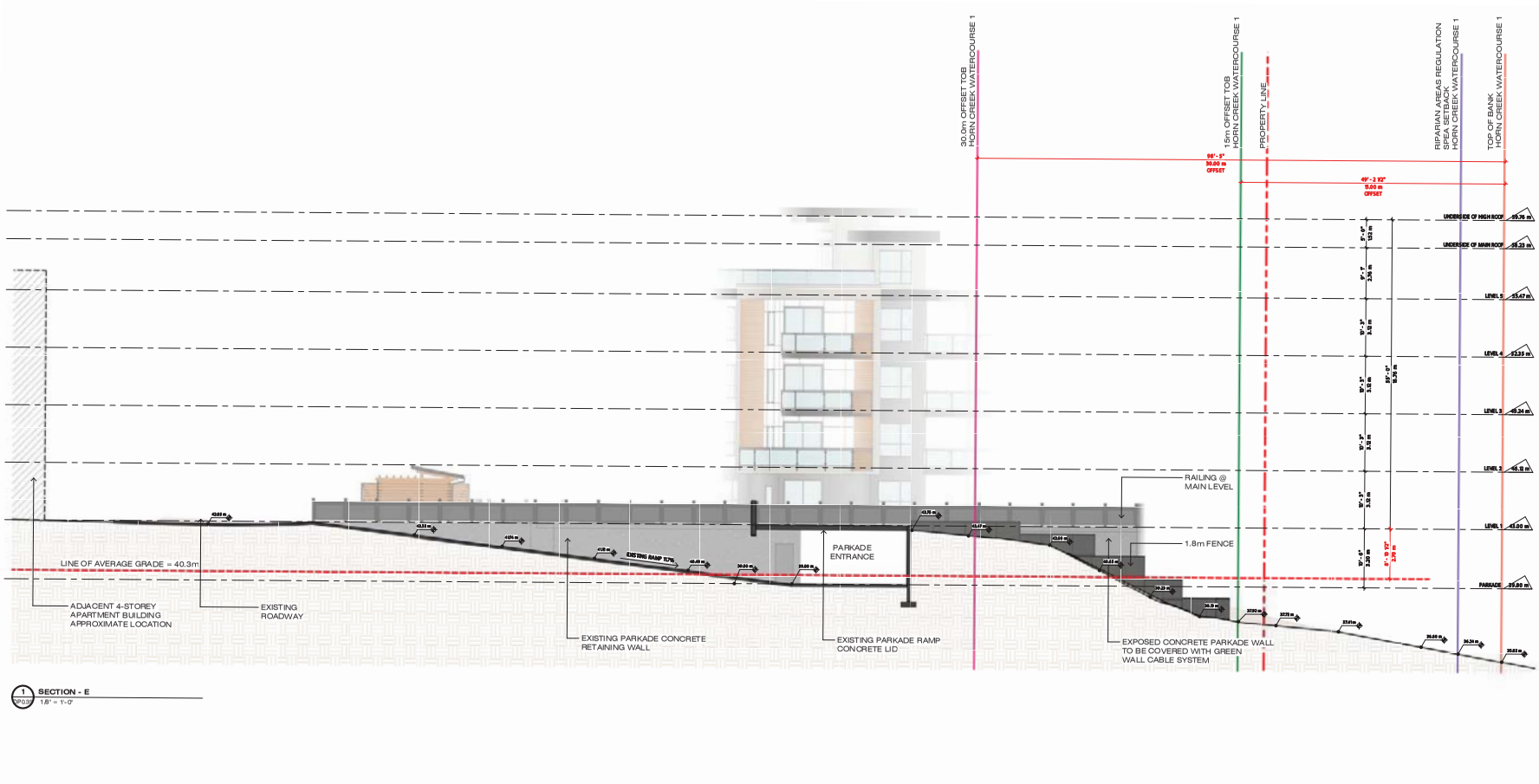

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	PROJECT NAME: ENVIRONMENTAL ASSESSMENT APPLICATION				
	LOCATION: 3182 GLADWIN ROAD, ABBOTSFORD, BRITISH COLUMBIA				
	TITLE: SITE SECTIONS				FIGURE NO. 6E
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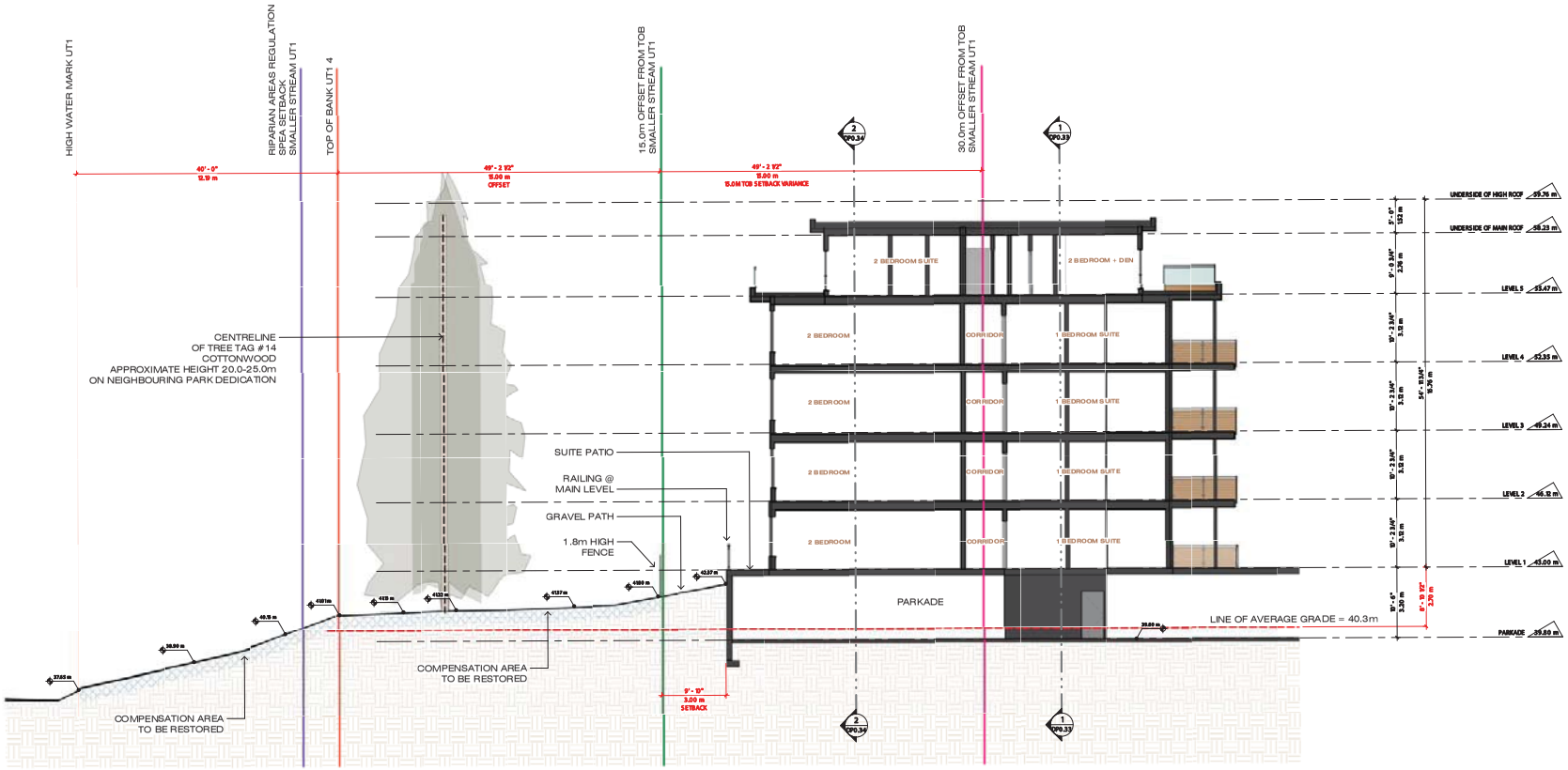

1 SECTION - F
1/8" = 1'-0"

PINCHIN	CLIENT NAME: HORN PARK PLACE DEVELOPMENTS LTD.				
	PROJECT NAME: ENVIRONMENTAL ASSESSMENT APPLICATION				
	LOCATION: 3182 GLADWIN ROAD, ABBOTSFORD, BRITISH COLUMBIA				
	TITLE: SITE SECTIONS				FIGURE NO. 6F
	DATE: APRIL 2019	PROJECT NO.: 231866.000	IMAGE SOURCE: CHPA (2019)	DRAWN BY: BW	CHECKED BY: JN

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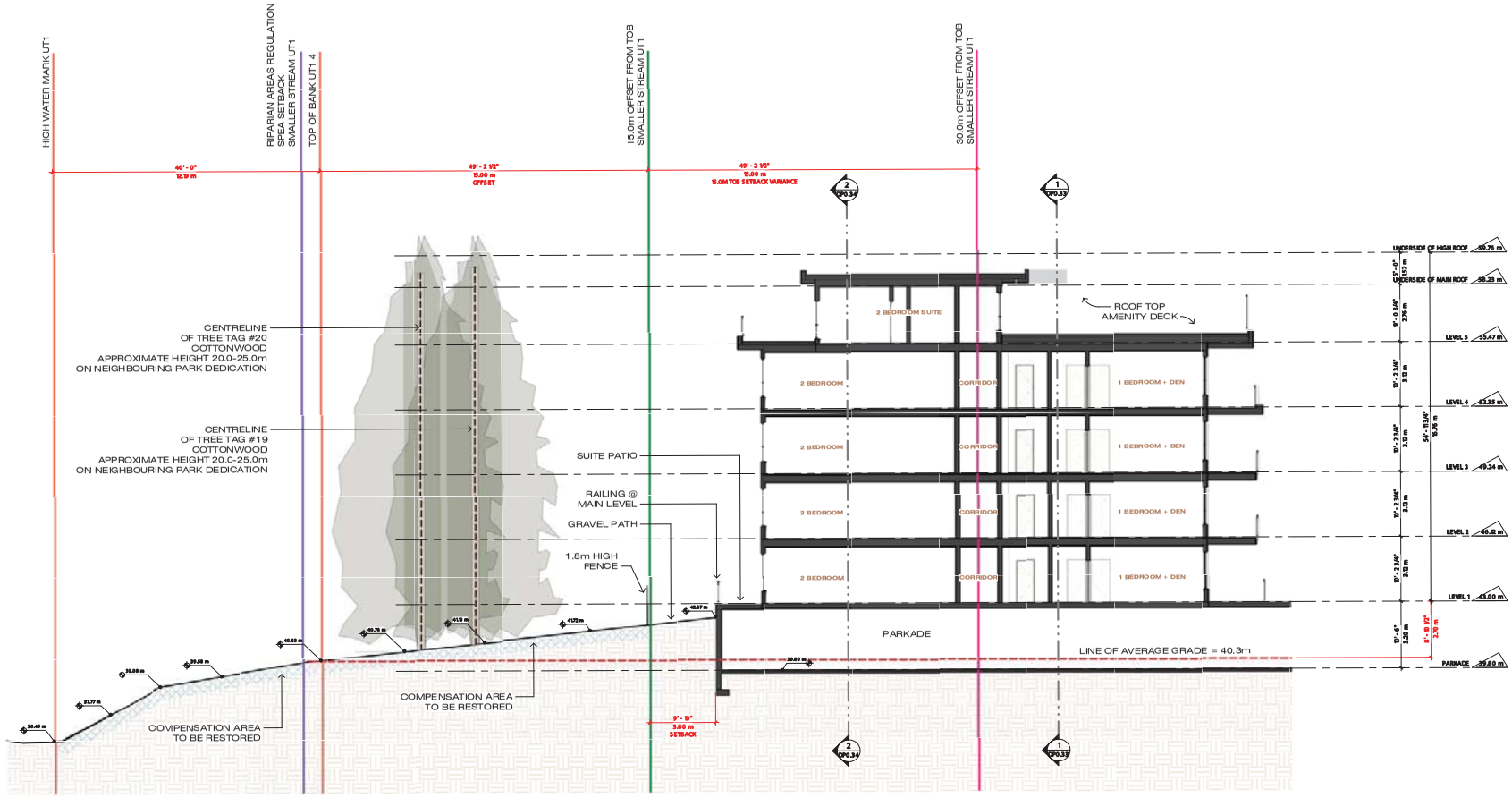

1 SECTION - G
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PINCHIN

CLIENT NAME:	HORN PARK PLACE DEVELOPMENTS LTD.
PROJECT NAME:	ENVIRONMENTAL ASSESSMENT APPLICATION
LOCATION:	3182 GLADWIN ROAD, ABBOTSFORD, BRITISH COLUMBIA
TITLE:	SITE SECTIONS
FIGURE NO.	6G

DATE:	PROJECT NO.:	IMAGE SOURCE:	DRAWN BY:	CHECKED BY:
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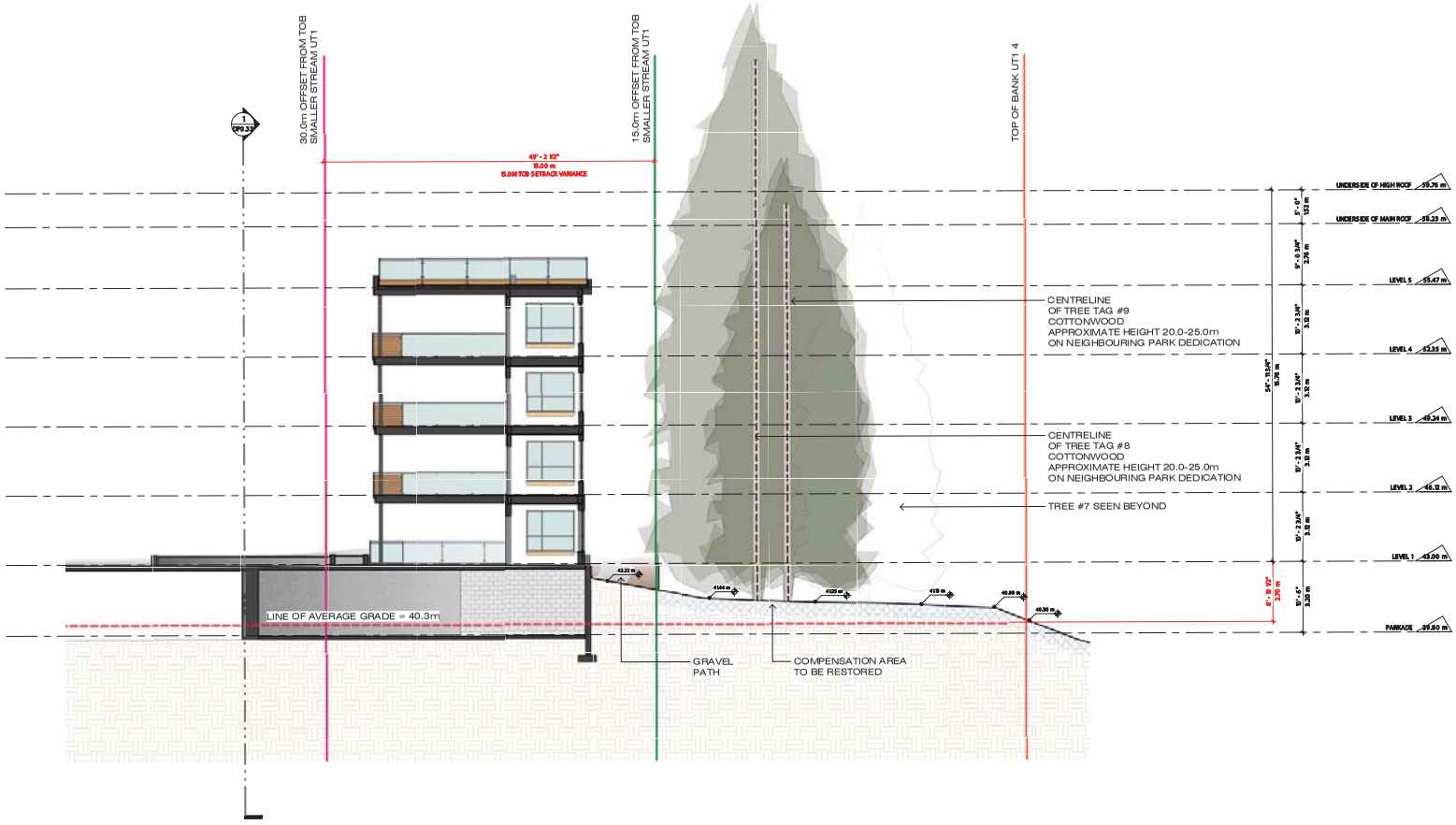

1 SECTION - J
1/8" = 1'-0"

PINCHIN

CLIENT NAME:	HORN PARK PLACE DEVELOPMENTS LTD.
PROJECT NAME:	ENVIRONMENTAL ASSESSMENT APPLICATION
LOCATION:	3182 GLADWIN ROAD, ABBOTSFORD, BRITISH COLUMBIA
TITLE:	SITE SECTIONS
FIGURE NO.	6H

DATE:	PROJECT NO.:	IMAGE SOURCE:	DRAWN BY:	CHECKED BY:
APRIL 2019	231866.000	CHPA (2019)	BW	JN

6.8.11.e

Attachment: Attachment D: Environmental Assessment Application, prepared by Pinchin (dated April 17, 2019) (PDS 045-2019 : DP with V

APPENDIX I

Riparian Areas Regulation Detailed Assessment

Riparian Areas Regulation: Assessment Report

Please refer to submission instructions and assessment report guidelines when completing this report.

Date	March 19, 2018
Project #	122563.000/1067.02

I. Primary QEP Information

First Name	Jeremy		Middle Name		
Last Name	Nilson				
Designation	R.P.Bio.		Company Pinchin Ltd.		
Registration #	2943		Email jnilson@pinchin.com		
Address	Suite 201, 34143 Marshall Road				
City	Abbotsford	Postal/Zip	V2S 1L8	Phone #	604.425.1927
Prov/state	British Columbia	Country	British Columbia		

II. Secondary QEP Information (use **Form 2** for other QEPs)

First Name	Jim		Middle Name		
Last Name	McDonald				
Designation	P.Eng., P.Geo		Company WSP		
Registration #	38345		Email jim.mcdonald@WSP.com		
Address	100 – 20339 96 Avenue				
City	Langley	Postal/Zip	V1M 0E4	Phone #	604.533.2992
Prov/state	BC	Country	Canada		

III. Developer Information

First Name	Bruno		Middle Name		
Last Name	Jury				
Company	Horn Park Place Developments Ltd.				
Phone #	604.652.2009		Email bjury@naturbanaproperties.com		
Address	8 Boulderwood Place				
City	Port Moody	Postal/Zip	V3H 4G5		
Prov/state	BC	Country	Canada		

IV. Development Information

Development Type	Construction: Med-density multi-family residential		
Area of Development (ha)	0.68	Riparian Length (m)	180
Lot Area (ha)	1.23	Nature of Development	New
Proposed Start Date	April 11, 2018	Proposed End Date	December 1, 2020

V. Location of Proposed Development

Street Address (or nearest town)	3182 Gladwin Road						
Local Government	City of Abbotsford			City	Abbotsford		
Stream Name	Horn Creek, Tributary to Willband Creek						
Legal Description (PID)	030-182-883			Region	Lower Mainland		
Stream/River Type	Stream			DFO Area	Lower Fraser		
Watershed Code	100-054300-53400 (Willband Creek), 10, 550257, 5434322						
Latitude	49	3’	34”	Longitude	122	18’	44”

Completion of Database Information includes the Form 2 for the Additional QEPs, if needed. Insert that form immediately after this page.

Attachment: Attachment D: Environmental Assessment Application, prepared by Pinchin (dated April 17, 2019) (PDS 045-2019 : DP with V

Table of Contents for Assessment Report

		Page Number
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2. Results of Riparian Assessment (SPEA width)	**……**	**7**
3. Site Plan	**……**	**13**
4. Measures to Protect and Maintain the SPEA (detailed methodology only).	**……**	**15**
1. Danger Trees	……	15
2. Windthrow	……	16
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5. Environmental Monitoring	**……**	**20**
6. Photos	**……**	**21**
7. Assessment Report Professional Opinion	**……**	**26**
8. Geotechnical Hazard and Site Assessment	**……**	**28**

Attachment: Attachment D: Environmental Assessment Application, prepared by Pinchin (dated April 17, 2019) (PDS 045-2019 : DP with V

Attachment: Attachment D: Environmental Assessment Application, prepared by Pinchin (dated April 17, 2019) (PDS 045-2019 : DP with V

Section 1. Description of Fisheries Resources Values and a Description of the Development proposal

(Provide as a minimum: Species present, type of fish habitat present, description of current riparian vegetation condition, connectivity to downstream habitats, nature of development, specific activities proposed, timelines)

The proponent required a *Riparian Areas Regulation* (RAR) assessment in association with the proposed construction of a multi-family, residential apartment building at 3182 Gladwin Road, Abbotsford, BC (subject property). The proposed development consists of an apartment building and other structures including a parkade, outdoor amenities and a parking lot. The subject property is located in the City of Abbotsford, and is currently characterized by a combination of mature riparian forest, young deciduous upland forest, and anthropogenically disturbed areas.

Aquatic Habitat Assessment Methods

The following items were assessed with regard to the subject watercourses as per Section 1.2.1 of the RAR Assessment Methods:

- Fish species presence;
- Description of instream fish habitat; and,
- Description of riparian condition.

Prior to the field assessment, a literature search was conducted with regard to the watercourses located within or adjacent to the subject properties. Pinchin Ltd. (Pinchin) referred to the Community Mapping Network's Sensitive Habitat Inventory Mapping (SHIM) and the online City of Abbotsford mapping program to identify existing information relating to known streams and fish presence on or near the subject property.

The study area included the subject property, and portions of neighbouring parcels within 30 metres (m) of the subject property to identify any streams that would require a SPEA. The study area was traversed on foot on February 17, 2017 and March 2, 2018. Conditions at the time of assessments were clear and cool at 7°C, and overcast and cool at 5°C, respectively.

Per the RAR, streams include any of the following that provide fish habitat:

a) a watercourse, whether it usually contains water or not;
b) a pond, lake, river, creek, brook;
c) a ditch, spring or wetland that is connected by surface flow to something referred to in paragraph (a) or (b);"

Per the RAR, "fish" were considered to include "salmonids, game fish, and regionally important fish". To be considered fish habitat, watercourses were assessed to determine 1) if they contained fish or 2) had a surface connection to fish bearing habitat.

To be characterized as a stream, watercourses had to demonstrate evidence of regular flows sufficient to mark on the soil of the bed of the stream a character distinct from that of its banks, in vegetation, as well as in the nature of the soil itself; and have a surface connection to fish habitat (i.e. watercourses had to demonstrate physically identifiable features by which to be delineated).

Physically identifiable features of streams (i.e., creeks and brooks) were defined per the Fish-stream Identification Guidebook, Version 2.1 (1998). Per the Fish-stream Identification Guidebook, watercourses were assessed for the presence of a continuous channel bed, whether or not portions were obscured by bridging vegetation, with evidence of scour, rafted debris, and deposits of mineral

alluvium. Scour had to be sufficient to erode at least some portion of the channel bed such that mineral substrates were exposed. In lower energy systems where flows might not be sufficient to consistently erode surface soils, streams were identified by the presence of a continuous channel bed with evidence of regular inundation.

Ditches were distinguished from channelized streams when they were clearly constructed to drain property, did not have natural springs or headwaters, and were not part of the natural historic drainage pattern. Per Section 3.6.5 of the RAR Assessment Methods, ditches require SPEA determination when they are connected to fish habitat, regardless of the fish habitat value of the ditch.

Existing Riparian Habitat on the Subject Property

Riparian habitat within the Riparian Assessment Area (RAA) of watercourses within the study area included a mature mixed deciduous-coniferous forest (characterizing the majority of the riparian area) and a heavily disturbed area dominated by Himalayan blackberry (*Rubus armeniacus*) and young red alder (*Alnus rubra*) located at the upper extent of UT1.

Tree species observed within the mature riparian forest included red alder, black cottonwood (*Populus trichocarpa*), western redcedar (*Thuja plicata*), and western hemlock (*Tsuga heterophylla*).

The understory within the forest was characterized by the occurrence of shrub and ground cover species including: salmonberry (*Rubus spectabilis*), Himalayan blackberry, sword fern (*Polystuchum munitum*), skunk cabbage (*Lysichiton americanus*) and common horsetail (*Equisetum arvense*).

Aquatic Habitat Assessment Results

Three watercourses (Watercourse 1, UT1 and UT2) were identified within the subject property. The watercourse assessment results are described in detail below.

Watercourse 1 (Horn Creek)

Watercourse 1, also known as Horn Creek, occurs adjacent to the eastern property boundary. Flows within Watercourse 1 are confined by steeply sloped banks. Watercourse 1 flows in an irregular meandering channel pattern throughout the length of the channel adjacent to the subject property (approximately 50 m). According to Abbotsford WebMap, Watercourse 1 originates approximately 300 m south of the subject property (i.e. approximately 55 m north of Nelson Place). The confluence of Watercourse 1 with Willband Creek occurs approximately 1.5 km downstream of the subject property.

Watercourse 1 had an average width of 7.9 m with an average residual pool depth of 0.20 m. At the time of the assessment, the watercourse was conveying high flows. Cobbles were the dominant substrate type and gravels and boulder were the subdominant substrate type. Instream habitat included large woody debris, boulders, deep pools, overhanging vegetation and trace undercut banks.

SHIM classifies Watercourse 1 as a fish bearing creek. Based on SHIM and suitable habitat observed for resident and anadromous fish, Watercourse 1 is classified as a permanent fish bearing stream. As a result, Watercourse 1 will require a SPEA per the RAR.

Unnamed Tributary 1 (UT1)

UT1, an unnamed tributary to Horne Creek, originates from a stormwater outfall fed from the development located southwest of the watercourse. At the time of the field assessment, the channel had an approximate width of 2.0 m and an average bankfull depth of 0.70 m, with well-defined banks, and a substrate consisting of gravel and sand. UT1 flows over a distance of approximately

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60 m on the north central section of the subject property. Overall, UT1 flows to the northeast for approximately 190 m before its confluence with Horn Creek.

Flows to UT1 were augmented by minor seepages adjacent to the channel. The seepages were characterized by a saturated soil substrate, and abundant growth of skunk cabbage (*Lysichiton americanus*). A cascade barrier was observed immediately upstream of the confluence with Horn Creek. The barrier consisted of two cascades (approximately 0.5 m height) with minimal plunge pools (i.e. <0.3 m depth). The gradient of the cascade was measured to be 32%, with 1.0 m high drop over a linear distance of approximately 8.5 m.

An 800 mm diameter, corrugated steel culvert conveys flows under a gravel walking path northeast towards Watercourse 1. The culvert crossing along UT1 was approximately 32 m long with a gradient of 3%. There was no observed evidence of a perched culvert. Instream habitat included large woody debris, overhanging vegetation and undercut banks. Suitable rearing habitat (i.e. deep pools) was not observed.

Evidence of a defined spring or other significant perennial source of water was not identified during any of the site assessments. Based on the presence of the groundwater seepages, absence of significant natural sources of water, and presence of facultative hydrophytes (e.g. skunk cabbage), UT1 likely functioned as a swamp/headwater stream prior to the installation of the stormwater detention tank and associated outfall. Although saturated conditions persist during most of the year, these systems would not typically be considered permanent based on the absence of surface flows between the late spring and early fall. Flows are currently present for more than six months of the year, this condition likely does not reflect historic discharge.

Based on the flow regime observed, barriers to fish passage and absence of rearing habitat, UT 1 is classified as a non-permanent and non-fish bearing stream.

Based on the results of the field assessment, UT1 was classified as a non-permanent, non-fish bearing stream connected by surface flow to fish habitat. As a result UT1 will require a SPEA per the RAR.

Unnamed Tributary 2 (UT2)

UT2, an unnamed tributary to UT1, originates from two small diameter plastic pipes located on the north side of an existing gravel walking path, adjacent to the northern property boundary. The source of flows was not confirmed during the field assessment; however it is anticipated that UT2 is primarily sourced by stormwater runoff from the surrounding area.

UT2 flowed in a narrow, shallow, low to moderate gradient channel with riffle-pool channel morphology for approximately 50 m before flowing into UT1. Gravels and fines were the dominant substrate type and cobbles and boulders were the subdominant substrate type. The average channel width of UT1 was 1.1 m and the average bankfull depth was 0.30 m. Instream habitat observed was minimal and was limited to overhanging vegetation. Habitat suitable for resident and anadromous fish species was not identified within UT2 (e.g. deep pools and abundant instream cover).

Features associated with UT2 included a small (300 mm diameter) corrugated steel culvert, which conveyed flows under the gravel walking path eastwards towards UT1. The crossing located along UT2 was approximately 2 m long with a gradient of 3%. There was no observed evidence of a perched culvert.

As UT2 is anticipated to be sourced from stormwater runoff and UT1 is considered non-fish bearing, UT2 was classified as a non-permanent, non-fish bearing stream.

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Based on the results of the field assessment, UT2 was classified as a non-permanent, non-fish bearing stream connected by surface flow to fish habitat. As a result UT2 will require a SPEA per the RAR.

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Section 2. Results of Riparian Assessment (SPEA width)

Attach or insert the Form 3 or Form 4 assessment form(s). Use enough duplicates of the form to produce a complete riparian area assessment for the proposed development

2. Results of Detailed Riparian Assessment

Refer to Chapter 3 of Assessment Methodology

Date: February 17, 2017

Description of Water bodies involved (number, type)	Watercourse 1
Stream	X
Wetland	
Lake	
Ditch	
Number of reaches	
Reach #	

Channel width and slope and Channel Type (use only if water body is a stream or a ditch, and only provide widths if a ditch)

	Channel Width(m)		Gradient (%)
starting point	10.1		6
upstream	7.0		
	5.1		
	6.9		
	~~11.9~~		
downstream	~~4.4~~		
	4.8		2
	7.8		
	10.0		
	9.8		
	9.4		
Total: minus high /low	70.9		
mean	7.9		4
	R/P	C/P	S/P
Channel Type	X		

I, Jeremy Nilson hereby certify that:

a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;

b) I am qualified to carry out this part of the assessment of the development proposal made by the developer Horn Park Place Developments Ltd.;

c) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and

d) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

Site Potential Vegetation Type (SPVT)

	Yes	No	
SPVT Polygons		X	Tick yes only if multiple polygons, if No then fill in one set of SPVT data boxes

I, Jeremy Nilson hereby certify that:

a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;

b) I am qualified to carry out this part of the assessment of the development proposal made by the developer Horn Park Place Developments Ltd. ;

c) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and

d) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

Polygon No:

	LC	SH	TR
SPVT Type			X

Method employed if other than TR

N/A

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Zone of Sensitivity (ZOS) and resultant SPEA

Segment No:	1	If two sides of a stream involved, each side is a separate segment. For all water bodies multiple segments occur where there are multiple SPVT polygons					
LWD, Bank and Channel Stability ZOS (m)	23.7						
Litter fall and insect drop ZOS (m)	15.0						
Shade ZOS (m) max	23.7	South bank	Yes		No	X	
SPEA Maximum	**23.7**	(For ditch use table 3-7)					

I, Jeremy Nilson hereby certify that:

a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;

b) I am qualified to carry out this part of the assessment of the development proposal made by the developer Horn Park Place Developments Ltd. ;

c) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and

d) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

Comments

Watercourse 1 was assessed as providing fish habitat and being fish-bearing based on SHIM records, the presence of instream habitat features and the surface connection to Willband Creek (known to be fish-bearing).

Watercourse 1 does not occur within the subject property. The west bank of Watercourse 1 falls within the study area (i.e. within 30 metres of the subject property) but the east bank does not. As such, the east bank of Watercourse 1 is not included in the attached Site Plan.

As per RAR Methodology a 23.7 m SPEA measured horizontally from the high water mark is applicable to Watercourse 1. The SPEA boundary must be delineated by a surveyor prior to commencement of land disturbing activities.

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2. Results of Detailed Riparian Assessment

Refer to Chapter 3 of Assessment Methodology

Date: February 17, 2017

Description of Water bodies involved (number, type): UT1

Stream	X
Wetland	
Lake	
Ditch	
Number of reaches	
Reach #	

Channel width and slope and Channel Type (use only if water body is a stream or a ditch, and only provide widths if a ditch)

	Channel Width(m)		Gradient (%)
starting point	1.4		10
upstream	1.6		
	~~0.9~~		
	1.2		
	~~8.9~~		
downstream	1.0		
	1.1		12
	1.4		
	1.4		
	1.5		
	1.6		
Total: minus high /low	13.4		
mean	1.34		11
	R/P	C/P	S/P
Channel Type			X

I, Jeremy Nilson hereby certify that:

e) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;

f) I am qualified to carry out this part of the assessment of the development proposal made by the developer Horn Park Place Developments Ltd.;

g) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and

h) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

Site Potential Vegetation Type (SPVT)

	Yes	No	
SPVT Polygons		X	Tick yes only if multiple polygons, if No then fill in one set of SPVT data boxes

I, Jeremy Nilson hereby certify that:

e) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;

f) I am qualified to carry out this part of the assessment of the development proposal made by the developer Horn Park Place Developments Ltd. ;

g) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and

h) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

Polygon No:

	LC	SH	TR
SPVT Type			X

Method employed if other than TR

N/A

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Zone of Sensitivity (ZOS) and resultant SPEA

Segment No:	1	If two sides of a stream involved, each side is a separate segment. For all water bodies multiple segments occur where there are multiple SPVT polygons					
LWD, Bank and Channel Stability ZOS (m)	10						
Litter fall and insect drop ZOS (m)	10						
Shade ZOS (m) max	4.02	South bank	Yes	X	No		
SPEA Maximum	**10**	(For ditch use table3-7)					

Segment No:	2	If two sides of a stream involved, each side is a separate segment. For all water bodies multiple segments occur where there are multiple SPVT polygons					
LWD, Bank and Channel Stability ZOS (m)	10						
Litter fall and insect drop ZOS (m)	10						
Shade ZOS (m) max	4.02	South bank	Yes		No	X	
SPEA Maximum	**10**	(For ditch use table3-7)					

I, Jeremy Nilson hereby certify that:

e) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;

f) I am qualified to carry out this part of the assessment of the development proposal made by the developer Horn Park Place Developments Ltd. ;

g) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and

h) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

Comments

Segment 1 includes the south bank of UT1. Segment 2 includes the north bank of UT1.

Based on its surface connection to Horn Creek, UT1 is considered a stream under the RAR Methodology.

As per RAR Methodology a 10 m SPEA measured horizontally from high water mark is applicable to UT1. The SPEA boundary must be delineated by a surveyor prior to commencement of land disturbing activities.

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2. Results of Detailed Riparian Assessment

Refer to Chapter 3 of Assessment Methodology

Date: February 17, 2017

Description of Water bodies involved (number, type)	UT2
Stream	X
Wetland	
Lake	
Ditch	
Number of reaches	
Reach #	

Channel width and slope and Channel Type (use only if water body is a stream or a ditch, and only provide widths if a ditch)

	Channel Width(m)		Gradient (%)
starting point	1.7		3
upstream	~~1.8~~		
	1.0		
	0.9		
	~~0.8~~		
downstream	0.9		
	1.0		7
	0.8		
	1.2		
	1.0		
	0.9		
Total: minus high /low	9.4		
mean	0.96		5
	R/P	C/P	S/P
Channel Type		X	

I, Jeremy Nilson hereby certify that:

i) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;

j) I am qualified to carry out this part of the assessment of the development proposal made by the developer Horn Park Place Developments Ltd.;

k) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and

l) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

Site Potential Vegetation Type (SPVT)

	Yes	No	
SPVT Polygons		X	Tick yes only if multiple polygons, if No then fill in one set of SPVT data boxes

I, Jeremy Nilson hereby certify that:

i) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;

j) I am qualified to carry out this part of the assessment of the development proposal made by the developer Horn Park Place Developments Ltd. ;

k) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and

l) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

Polygon No:

	LC	SH	TR
SPVT Type			X

Method employed if other than TR

N/A

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Zone of Sensitivity (ZOS) and resultant SPEA

Segment No:	1	If two sides of a stream involved, each side is a separate segment. For all water bodies multiple segments occur where there are multiple SPVT polygons					
LWD, Bank and Channel Stability ZOS (m)	10						
Litter fall and insect drop ZOS (m)	10						
Shade ZOS (m) max	2.9	South bank	Yes	X	No		
SPEA Maximum	**10**	(For ditch use table3-7)					

Segment No:	2	If two sides of a stream involved, each side is a separate segment. For all water bodies multiple segments occur where there are multiple SPVT polygons					
LWD, Bank and Channel Stability ZOS (m)	10						
Litter fall and insect drop ZOS (m)	10						
Shade ZOS (m) max	N/A	South bank	Yes		No	X	
SPEA Maximum	**10**	(For ditch use table3-7)					

I, Jeremy Nilson hereby certify that:

i) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;

j) I am qualified to carry out this part of the assessment of the development proposal made by the developer Horn Park Place Developments Ltd. ;

k) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and

l) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

Comments

Segment 1 includes the south bank of UT2. Segment 2 includes the north bank of UT2.

The watercourse was determined to be a non-fish bearing stream based on observed barriers to fish and minimal seasonal flow. Based on its surface connection to UT1, UT2 is considered a stream under the RAR Methodology.

As per RAR Methodology a 10 m SPEA measured horizontally from the high water mark is applicable to UT2. The SPEA boundary must be delineated by a surveyor prior to commencement of land disturbing activities.

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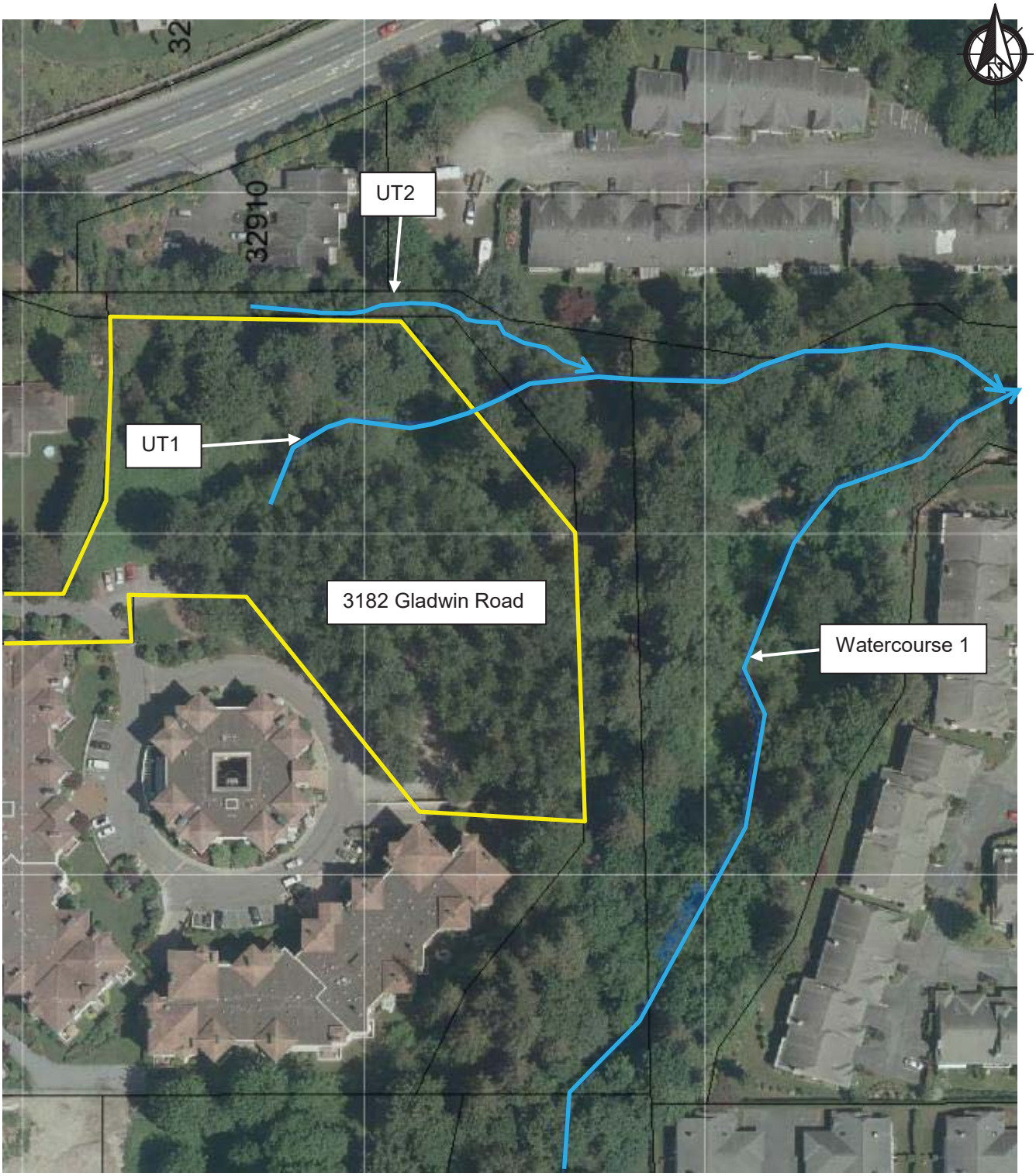
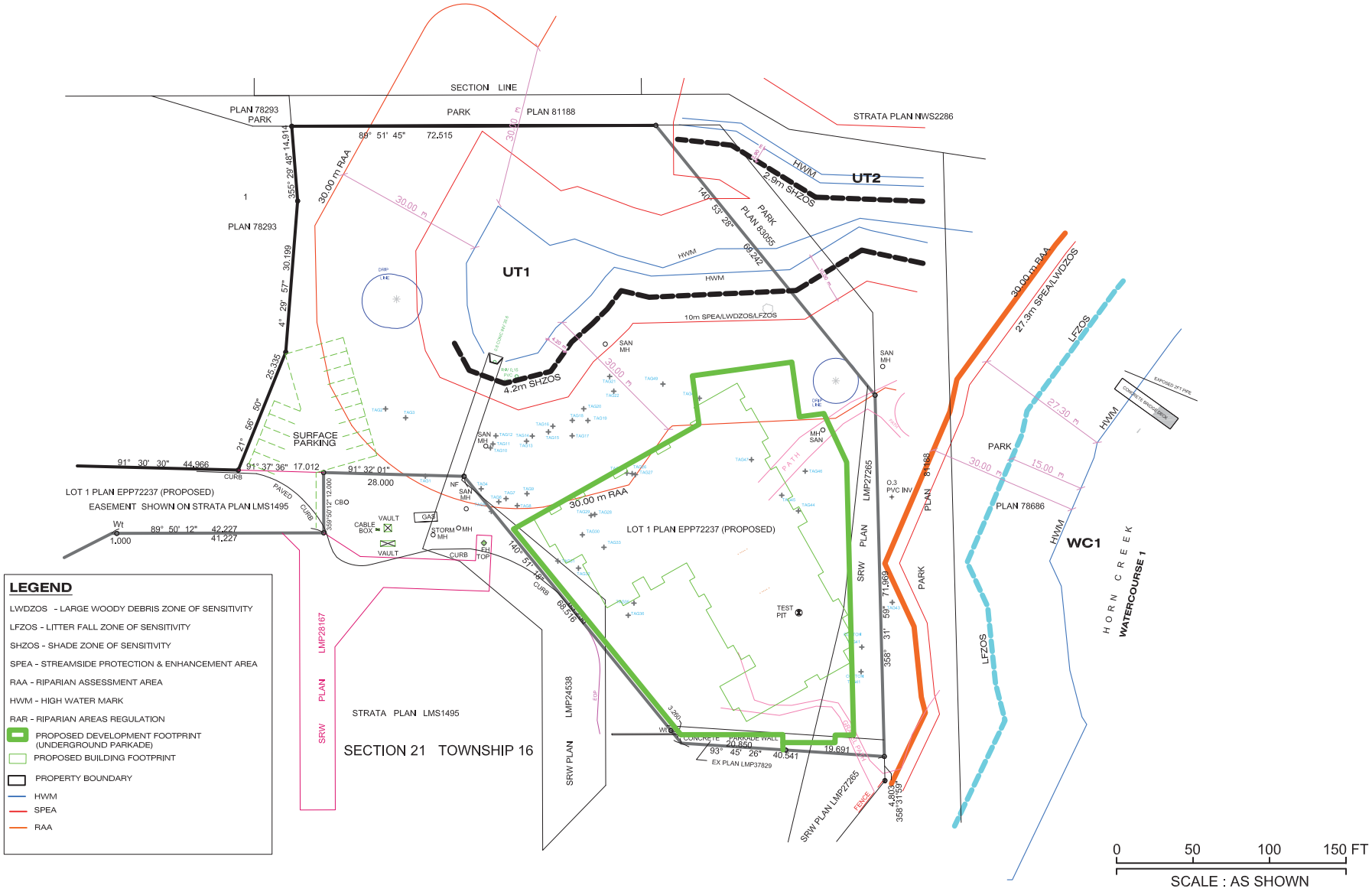


PINCHIN

CLIENT NAME:	HORN PARK PLACE DEVELOPMENTS LTD.
PROJECT NAME:	DETAILED RIPARIAN AREA ASSESSMENT
LOCATION:	3182 GLADWIN ROAD, ABBOTSFORD, BC
TITLE:	LOCATION MAP

DATE:	PROJECT #:	IMAGE SOURCE:	DRAWN BY:	CHECKED BY:	FIGURE NO.:
MARCH 2018	122563.000	ABBOTSFORD WEBMAP	BW	JN	1

Attachment: Attachment D: Environmental Assessment Application, prepared by Pinchin (dated April 17, 2019) (PDS 045-2019 : DP with V



PINCHIN

HORN PARK PLACE DEVELOPMENTS LTD.	DATE: MARCH 2018
RAR DETAILED ASSESSMENT	FIGURE: 2
3182 GLADWIN ROAD, ABBOTSFORD, BC	PROJECT NO: 122563.000/1067.02
SITE PLAN	DRAWN BY: BW / CHECKED BY: JN
	SOURCE : CHPA SITE PLAN

Section 4. Measures to Protect and Maintain the SPEA

This section is required for detailed assessments. Attach text or document files, as need, for each element discussed in chapter 1.1.3 of Assessment Methodology. It is suggested that documents be converted to PDF *before* inserting into the assessment report. Use your "return" button on your keyboard after each line. You must address and sign off each measure. If a specific measure is not being recommended a justification must be provided.

1. Danger Trees	Proposed development activities, including construction of an apartment building, will take place within striking distance of trees within the SPEA. Potential danger trees (e.g. trees with a significant lean) were observed within the prescribed SPEA. An arborist report for the proposed development is currently in progress. The arborist report will include prescriptions for tree management outside the SPEA. The prescription for tree management activities outside of the SPEA may impact measures to address Danger Trees inside the SPEA. An enhancement prescription for areas adjacent to the SPEA is also in progress at the time of submitting this report. The prescription for enhancement activities may impact measures to address Danger Trees inside the SPEA. A follow-up assessment of Danger Trees within the SPEA must be completed by a QEP (Certified Danger Tree Assessor) prior to the start of development. The follow-up assessment must be submitted as an amendment to this Assessment Report prior to the start of development. Note, dead trees in the SPEA function as a source of large woody debris (LWD) and must be retained during and following the development phase unless a QEP (Certified Danger Tree Assessor) determines that the trees pose a risk to persons or property (as described in Appendix 2 of the RAR Assessment Methods). Trees felled in the SPEA must be left in the SPEA to function as LWD, and must be replaced per the provincial criteria as described in Section 3.7.1 of the RAR Assessment Methods).

I, Jeremy Nilson , hereby certify that:

m) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;

n) I am qualified to carry out this part of the assessment of the development proposal made by the developer Horn Park Place Developments Ltd.;

o) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation

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2. Windthrow	The proposed development includes clearing of vegetation (including trees) within subject property including portions of the RAA but not within the prescribed SPEA. Generally, clearing of trees adjacent to the SPEA may result in increased likelihood of windthrow. Existing development (i.e. other large apartment buildings) in the local area as well as the proposed development of the subject property will function as windbreaks to newly exposed cleared edges, limiting the likelihood of windthrow. An arborist report for the proposed development is currently in progress. The arborist report will include prescriptions for tree management outside the SPEA. The prescription for tree management activities outside of the SPEA may impact measures to address Windthrow inside the SPEA. An enhancement prescription for areas adjacent to the SPEA is also in progress at the time of submitting this report. The prescription for enhancement activities may impact measures to address Windthrow inside the SPEA. A follow-up assessment of Windthrow within the SPEA must be completed by a QEP prior to the start of development. The follow-up assessment must be submitted as an amendment to this Assessment Report.
I, Jeremy Nilson, hereby certify that: a. I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*; b. I am qualified to carry out this part of the assessment of the development proposal made by the developer Horn Park Place Developments Ltd. ; c. I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation	
3. Slope Stability	The area within the proposed development was relatively flat and indicators of slope instability were not observed. As the associated works are anticipated to comply with all applicable building codes and regulations, the risk of slope instability compromising the integrity of the SPEA is considered low. A detailed geotechnical assessment has been completed for the subject property. Please see attached geotechnical assessment prepared by WSP.
I, Jim McDonald, hereby certify that: a. I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*; b. I am qualified to carry out this part of the assessment of the development proposal made by the developer Horn Park Place Developments Ltd. ; c. I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation	

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4. Protection of Trees	Trees within the SPEA (aside from danger trees as identified by a QEP) are to be left in place. Orange snow fencing should be placed at the SPEA boundary to prevent accidental encroachment during the construction phase of this project. The fencing must extend to a minimum of the periphery of the drip line of trees located in the SPEA. Trees at the SPEA boundary are to be protected from the development. Impacts to trees within the SPEA can occur through 1) compaction or disturbance to soils; 2) disposal of concrete leachate or other pollutants; or 3) parking of vehicles beneath the drip line. The project environmental monitor should be contacted if there will be any excavation, soil deposition, or other ground disturbing activities will occur within 5 m of the drip line of trees in the SPEA.
I, Jeremy Nilson, hereby certify that: a. I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*; b. I am qualified to carry out this part of the assessment of the development proposal made by the developer Horn Park Place Developments Ltd. ; c. I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation	
5. Encroachment	The SPEA boundary must be delineated by a qualified professional (e.g. BC land surveyor) prior to commencement of works. During the construction phase, the SPEA must be delineated with snow fencing and/or silt fencing as required to prevent accidental/inadvertent encroachment of machinery. Generally, the SPEA is a no disturbance zone, and no new land uses are permitted in the SPEA. Encroachment to remove invasive vegetation species is permitted if it does not adversely affect native vegetation, and is conducted under the recommendations of a QEP. Re-planting of disturbed areas within the SPEA is permitted provided it is done under the recommendation of a QEP. There is to be no temporary or permanent storage of construction materials or substrate within the SPEA during or after construction. The SPEA is off-limits to equipment, vehicle, and pedestrian traffic. Permanent signage and fencing is recommended to be installed along the boundary of the SPEA on the subject property. Fencing materials are to be determined in collaboration with the City of Abbotsford (i.e. local government).
I, Jeremy Nilson , hereby certify that: a. I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*; b. I am qualified to carry out this part of the assessment of the development proposal made by the developer Horn Park Place Developments Ltd.; c. I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation	

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6. Sediment and Erosion Control	There must not be any discharge of sediment, sediment laden water, or other deleterious substances from the work area to the SPEA. If required to prevent discharge of sediment to the SPEA, the following measures should be employed: 1) silt fencing or (equivalent) should be placed as required to prevent entrainment of sediment towards the watercourse on the subject property; 2) exposed soils resultant of construction should be covered with 2.5 cm (1") of straw, and seeded with an appropriate grass seed mixture if weather permits; and 3) soil stockpiles should be covered with poly or straw, and positioned such they are as far from the SPEA as possible. Additional erosion and sediment control measures may be required once construction has started based on a QEP assessment.
I, Jeremy Nilson, hereby certify that: a. I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*; b. I am qualified to carry out this part of the assessment of the development proposal made by the developer Horn Park Place Developments Ltd. ; c. I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation	
7. Stormwater Management	Wherever possible, stormwater generated from proposed development activities within the RAA is to be returned to natural hydrological pathways (e.g. infiltrated to ground). Stormwater is not to be discharged to the SPEA. If stormwater generated from development activities within the RAA cannot be returned to natural hydrological pathways it must be diverted from the SPEA. Changes In and About a Stream (as defined by the Provincial Water Sustainability Act) related to water management (e.g. installation of a stormwater outfall) may engage the SPEA provided that all applicable regulatory agencies (e.g. Fisheries and Oceans Canada, Ministry of Forests, Lands, Natural Resource Operations and Rural Development) are consulted as required by applicable legislation. Industry standard best management practices (e.g. Standards and Best Practices for Instream Works, Measures to Avoid Harm to Fish) are to be adhered to at all times during any works in and about the SPEA. Required best management practices include the restoration of any disturbed areas within the SPEA.
I, Jeremy Nilson, hereby certify that: a. I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*; b. I am qualified to carry out this part of the assessment of the development proposal made by the developer Horn Park Place Developments Ltd; c. I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation	

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8. Floodplain Concerns (highly mobile channel)	Floodplain concerns as described by the RAR Assessment Methods (i.e. very dynamic channels with large floodplains, development on large floodplains and/or alluvial fans) do not occur on the subject property. Indicators of recent and/or historical flooding were not observed during the site assessment. The watercourses existed within relatively confined banks with steep slopes. As such, flooding is not anticipated.

I, Jeremy Nilson, hereby certify that:

a. I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;

b. I am qualified to carry out this part of the assessment of the development proposal made by the developer Horn Park Place Developments Ltd. ;

c. I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation

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Section 5. Environmental Monitoring

Attach text or document files explaining the monitoring regimen Use your "return" button on your keyboard after each line. It is suggested that all document be converted to PDF *before* inserting into the PDF version of the assessment report.
Include actions required, monitoring schedule, communications plan, and requirement for a post development report.

The proponent has been informed that a qualified environmental professional (QEP) who is familiar with this project, the local ecology, erosion and sediment control, and construction best management practices should be retained to provide environmental monitoring for this project. The measures described above should be communicated to site workers as required to prevent impacts to the SPEA.

A QEP should monitor the works as required to ensure that the SPEA is protected from the development, that the measures above are respected, and that there are no impacts to instream habitat.

As the proposed works include ground disturbances, a QEP should be retained to conduct regular site inspections to ensure the measures described above have been appropriately implemented and that works are not posing a risk to the SPEA or to fish habitat. At a minimum, inspections should occur:

- at the project start to ensure mitigation measures have been installed as required;
- at the mid-point of construction to determine if the installed measures are functioning as intended, and to determine if additional measures may be required; and
- at the project end to determine if the measures employed were sufficient to protect the integrity of the SPEA.

Monitoring frequency can be decreased at the QEP's discretion if the developer demonstrates an appropriate level of compliance, and/or during extended periods of dry weather. Monitoring frequency can be increased at the QEPs discretion if work activities are deemed to pose a high risk to the SPEA or the watercourse on the subject property, or during extended periods of heavy rain.

The developer has also been informed of the requirement to have a QEP complete and file a post-development report. This report should indicate whether or not the above measures were implemented, and how effective they were at protecting the integrity of the SPEA.

In addition, all works are to adhere to the City of Abbotsford Erosion and Sediment Control Bylaw No. 1998-2010.

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Section 6. Photos

Provide a description of what the photo is depicting, and where it is in relation to the site plan.

Photos

Frame 1.	North aspect (facing downstream) showing existing conditions within Horn Creek near the pedestrian bridge adjacent to the eastern property boundary (February 17, 2017).
Frame 2.	Southwest aspect (facing upstream) showing existing conditions within Horn Creek upstream from the confluence of UT1 and Horn Creek, adjacent to the eastern property boundary (February 17, 2017).

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Frame 3. East aspect of existing riparian habitat and trail along south side of Horn Creek tributaries, i.e. UT1 and UT2 (February 17, 2017).

Frame 4. Southwest aspect of the stormwater outfall that feeds into UT1 near the approximate centre of the subject property. (February 17, 2017).

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Frame 5. North aspect of the headwaters of UT1 including Natural seepages and hydrophytes (March 2, 2018).

Frame 6. West aspect of the culvert crossing along UT1. The culvert conveys flows under a gravel walking path. The culvert appeared to be fish passable. (February 17, 2017).

Attachment: Attachment D: Environmental Assessment Application, prepared by Pinchin (dated April 17, 2019) (PDS 045-2019 : DP with V

Frame 7. Existing conditions and substrate within the lower extent of UT1 (February 17, 2017).

Frame 8. Northwest aspect of the obstacle to fish passage located immediately upstream from the confluence of UT1 and Horn Creek (February 17, 2017).

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Frame 9.	Southeast aspect of the confluence of UT1 and Horn Creek, adjacent to the eastern property boundary (February 17, 2017).
Frame 10.	South aspect showing existing conditions with young upland forest (February 17, 2017).

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Section 7. Professional Opinion

Assessment Report Professional Opinion on the Development Proposal's riparian area.

Date March 19, 2018

1. I/We Jeremy Nilson, R.P.Bio and Jim McDonald, P. Eng.

hereby certify that:

a) I am/We are qualified environmental professional(s), as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;

b) I am/We are qualified to carry out the assessment of the proposal made by the developer Horn Park Place Developments Ltd., which proposal is described in section 3 of this Assessment Report (the "development proposal"),

c) I have/We have carried out an assessment of the development proposal and my/our assessment is set out in this Assessment Report; and

d) In carrying out my/our assessment of the development proposal, I have/We have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation; AND

2. As qualified environmental professional(s), I/we hereby provide my/our professional opinion that:

a) ☐ if the development is implemented as proposed by the development proposal there will be no harmful alteration, disruption or destruction of natural features, functions and conditions that support fish life processes in the riparian assessment area in which the development is proposed, **OR**

(Note: include local government flex letter, DFO Letter of Advice, or description of how DFO local variance protocol is being addressed)

b) ☒ if the streamside protection and enhancement areas identified in this Assessment Report are protected from the development proposed by the development proposal and the measures identified in this Assessment Report as necessary to protect the integrity of those areas from the effects of the development are implemented by the developer, there will be no harmful alteration, disruption or destruction of natural features, functions and conditions that support fish life processes in the riparian assessment area in which the development is proposed.

[NOTE: **"qualified environmental professional"** means an applied scientist or technologist, acting alone or together with another qualified environmental professional, if

(a) the individual is registered and in good standing in British Columbia with an appropriate professional organization constituted under an Act, acting under that association's code of ethics and subject to disciplinary action by that association,

(b) the individual's area of expertise is recognized in the assessment methods as one that is acceptable for the purpose of providing all or part of an assessment report in respect of that development proposal, and

(c) the individual is acting within that individual's area of expertise.]

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Limitations: This report was prepared for the exclusive use of the Ministry of Forests, Lands and Natural Resource Operations (MFLNRO), Fisheries and Oceans Canada (DFO), and the City of Abbotsford subject to the conditions and limitations contained within the duly authorized work plan. This report is based on the best information available to Pinchin Ltd. at the time of preparing this report after conducting work using best industry practices to obtain information. Pinchin Ltd. can only comment on the environmental conditions observed on the date(s) the assessment was performed. To the extent that Pinchin Ltd. was required to rely on information from other persons, Pinchin Ltd. has verified such information to the extent reasonably possible in the circumstances. The material provided in this report reflects best industry judgment in light of the information available at the time of preparation of this report.

Information provided by Pinchin Ltd. is intended for MFLNRO, DFO, and the City of Abbotsford use only. Pinchin Ltd. will not provide results or information to any party unless disclosure by Pinchin Ltd. is required by law. Any use by a third party of reports or documents authored by Pinchin Ltd. or any reliance by a third party on or decisions made by a third party based on the findings described in said documents, is the sole responsibility of such third parties. Pinchin Ltd. accepts no responsibility for damages suffered by any third party as a result of decisions made or actions conducted. If additional parties require reliance on this report, written authorization from Pinchin Ltd. will be required. Such reliance will only be provided by Pinchin Ltd. following written authorization from MFLNRO, DFO, and/or the City of Abbotsford. Pinchin Ltd. disclaims responsibility of consequential financial effects on transactions or property values, or requirements for follow-up actions and costs. No other warranties are implied or expressed.

Pinchin Ltd. makes no other representations whatsoever, including those concerning the legal significance of its findings or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issue, regulatory statutes are subject to interpretation and these interpretations may change over time.

The liability of Pinchin Ltd. or its staff will be limited to the lesser of the fees paid or actual damages incurred by the MFLNRO, DFO, and/or the City of Abbotsford. Pinchin Ltd. will not be responsible for any consequential or indirect damages. Pinchin Ltd. is only liable for damages resulting from the negligence of Pinchin Ltd. All claims by MFLNRO, DFO, and/or the City of Abbotsford shall be deemed relinquished if not made within two years after last date of services provided.

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APPENDIX II

Vegetation and Wildlife Bio-Inventory Results

Table A. Plant Species Detected During the Field Assessment

Common Name	Scientific Name	Origin
Mature Riparian Forest		
Fir species	—	Native
Red Alder	*Alnus rubra*	Native
Lady Fern	*Athyrium filix-femina* var. *cyclosorum*	Native
Deer Fern	*Blechnum spicant*	Native
Common Horsetail	*Equisetum arvense*	Native
Yellow Archangel	*Lamium galeobdolon*	Non-native
Skunk Cabbage	*Lysichiton americanus*	Native
Sword Fern	*Polystichum munitum*	Native
Himalayan Blackberry	*Rubus armeniacus*	Non-native
Salmonberry	*Rubus spectabilis*	Native
Western Redcedar	*Thuja plicata*	Native
Black Cottonwood	*Populus trichocarpa*	Native
Western Hemlock	*Tsuga heterophylla*	Native
Young Deciduous Upland Forest		
Red Alder	*Alnus rubra*	Native
Lady Fern	*Athyrium filix-femina* var. *cyclosorum*	Native
Yellow Archangel	*Lamium galeobdolon*	Non-native
Himalayan Blackberry	*Rubus armeniacus*	Non-native
Salmonberry	*Rubus spectabilis*	Native

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Table B. Wildlife Species Detected During the Field Assessment

Common Name	Scientific Name
Mammals	
Eastern Grey Squirrel	*Sciurus carolinensis*
Eastern Cottontail	*Sylvilagus floridanus*
Birds	
Mallard	*Anas platyrhynchos*
Anna's Hummingbird	*Calypte anna*
Northern Flicker	*Colaptes auratus*
Steller's Jay	*Cyanocitta stelleri*
Northwestern Crow	*Corvus caurinus*
Black-capped Chickadee	*Poecile atricapillus*
Brown Creeper	*Certhia americana*
Pacific Wren	*Troglodytes pacificus*
Golden-crowned Kinglet	*Regulus satrapa*
American Robin	*Turdus migratorius*
Varied Thrush	*Ixoreus naevius*
Dark-eyed Junco	*Junco hyemalis*
Song Sparrow	*Melospiza melodia*
Spotted Towhee	*Pipilo maculatus*
House Finch	*Haemorhous mexicanus*

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APPENDIX III

Selected Site Photographs

Photograph 1. North aspect (facing downstream) showing existing conditions within Horn Creek near the pedestrian bridge adjacent to the eastern property boundary (February 17, 2017).

Photograph 2. Southwest aspect (facing upstream) showing existing conditions within Horn Creek upstream from the confluence of UT1 and Horn Creek, adjacent to the eastern property boundary (February 17, 2017).

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Photograph 3. East aspect of existing riparian habitat and trail along south side of Horn Creek tributaries, i.e. UT1 and UT2 (February 17, 2017).

Photograph 4. Southwest aspect of the stormwater outfall that feeds into UT1 near the approximate centre of the subject property. (February 17, 2017).

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Photograph 5. Northeast aspect of existing riparian habitat associated with the south bank of UT1 at the upper extent near the stormwater outfall (February 17, 2017).

Photograph 6. West aspect of the culvert crossing along UT1. The culvert conveys flows under a gravel walking path. The culvert appeared to be fish passable. (February 17, 2017).

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Photograph 7. Existing conditions and substrate within the lower extent of UT1 (February 17, 2017).

Photograph 8. Northwest aspect of the obstacle to fish passage located immediately upstream from the confluence of UT1 and Horn Creek (February 17, 2017).

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Photograph 9. Southeast aspect of the confluence of UT1 and Horn Creek, adjacent to the eastern property boundary (February 17, 2017).

Photograph 10. South aspect showing existing conditions with young upland forest (February 17, 2017).

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Photograph 11. North aspect showing existing conditions within mature riparian forest (February 17, 2017).

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APPENDIX IV

Construction Environmental Management Plan

REVISED

Construction Environmental Management Plan

3182 Gladwin Road
Abbotsford, British Columbia

Prepared for:

Horn Park Place Developments Ltd.
8 Boulderwood Place
Port Moody, BC V3H 4G4

Attn: Bruno Jury
President

April 9, 2019

Pinchin File: 231866.000

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Issued To:	**Horn Park Place Developments Ltd.**
Contact:	**Bruno Jury**
Issued On:	**April 9, 2019**
Pinchin File:	**231866.000**
Issuing Office:	**Abbotsford, BC**
Primary Contact:	**Jeremy Nilson** **Project Biologist** **604.425.1927** **jnilson@pinchin.com**

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1.0 INTRODUCTION

1.1 Background

Pinchin Ltd. (Pinchin) was retained by Horn Park Place Developments Ltd. (Client) to prepare the following Construction Environmental Management Plan (CEMP) for implementation during the development of 3182 Gladwin Way, Abbotsford, BC (the Site).

The CEMP is designed to identify elements of the Project that could present a hazard to the environment and recommend appropriate mitigation measures to avoid or reduce effects to the environment due to Project activities.

Specifically, the purpose of the CEMP is to:

- Document and describe measures that will be taken to prevent or mitigate potential adverse environmental effects resulting from planned work activities;
- Provide clear, concise guidance to Project personnel regarding the procedures for protection of the environment;
- Communicate environmental protection and mitigation requirements;
- Provide the basis for environmental protection and compliance with municipal by-laws, including provincial and federal acts, regulations and guidelines;
- Be used as an educational tool for training of Project personnel during the environmental orientation;
- Define Project personnel responsibilities for managing environmental risk; and
- Communicate environmental commitments to Project personnel, the Client, and regulatory agencies.

This CEMP is a living document and should be expanded and updated throughout the term of the contract to reflect changes in scheduling, Site conditions, and weather-dependent contingency measures. Changes to the CEMP should be made in consultation with Pinchin. Any necessary changes to the CEMP must be implemented before re-starting works affected by these changes.

1.2 Environmental Governance and Guidance Documents

This CEMP has been compiled with reference to the following environmental legislation, guidelines, and best management practices (BMPs):

<u>Municipal</u>

- City of Abbotsford *Streamside Protection Bylaw, 2005 (Bylaw No. 1465-2005)*; and

- City of Abbotsford *Erosion and Sediment Control (ESC) Bylaw, 2010 (Bylaw No. 1989-2010).*

Provincial

- BC Fire Code (2012);
- *BC Environmental Management Act* (s.6 – s.10, s.12, s.55, s.79 – s.80) (BC Ministry of Environment, 2018);
  - Contaminated Sites Regulation (CSR) (BC Reg. 375/96);
  - Hazardous Waste Regulation (BC Reg. 63/88); and
  - Waste Discharge Regulation (BC Reg. 320/2004);
- BC Ministry of Environment and Climate Change Strategy (MOECCS) Water Quality Guidelines (Criteria) Reports;
  - Approved Water Quality Guidelines (BC Ministry of Environment, 2017); and
  - Working Water Quality Guidelines (BC Ministry of Environment, 2017);
- *BC Wildlife Act* (s.29, s.33, s.34, s.75) (RSBC 1996, Chapter 488, 2018);
- *BC Water Sustainability Act* (SBC 2014, Chapter 15, 2018);
- *BC Weed Control Act* (RSBC 1996, Chapter 247, 2018);
- *BC Workers Compensation Act* (RSBC 1996, Chapter 492, 2018);
  - Occupational Health and Safety (OHS) Regulation (BC Reg.296/97); and
  - WorkSafe BC OHS Guidelines (WorkSafe BC, 2018).Federal

Federal

- Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines (1999);
- CCME Environmental Code of Practice for Above Ground Storage Tanks Containing Petroleum Products and Allied Petroleum Products (PN 1326, 2003);
- *Canadian Environmental Protection Act* (CEPA, 1999) (s. 64 – s.65, s.95 – s.96, s.175, s.179, s.181 – s.182, s.185 – s.189, s.193 – s.194, s.201 – s.202, s.205) (S.C. 1991, c. 33);
  - Schedule 1 – List of Toxic Substances (CEPA, 2018);
  - Environmental Emergency Regulations (SOR/2003-307);
  - Ozone-Depleting Substances Regulations, 1998 (SOR/99-7);
  - Polychlorinated biphenyls (PCB) Regulations (SOR/2008-273); and

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- Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations (SOR/2008-197);
- Fisheries and Oceans Canada (DFO) Development Guidelines for the Protection of Aquatic Habitat (DFO, 1993);
- DFO Validity of Including Turbidity Criteria for Aquatic Resource Protection in Land Development Guideline (DFO, 2008);
- *Fisheries Act* (s.23; s.34 – s.37) (R.C.S., 1985. C. F-14);
- *Migratory Birds Convention Act,* 1994 (RSBC, 1996, Chapter 488);
- Workplace Hazardous Materials Information System (WHMIS, 2015); and
- *Transport of Dangerous Goods Act* (s.5 – s.8, s.15, s.18) (1192, c.34);
  - Schedule (Sections 2 and 27); and
  - Transportation of Dangerous Goods Regulations (BC Reg. 203/85).

2.0 ROLES AND RESPONSIBILITIES

2.1 Pinchin Ltd.

Pinchin will communicate environmental requirements and provide technical advice to the Client, the Owner, and Contractors as necessary for the Project.

Pinchin will provide a copy of the CEMP to the Client for distribution to the Project owner and Contractors for planning purposes, prior to initiation of works.

2.2 Horn Park Place Ltd.

Horn Park Place Ltd. (Client) through their selected general contractor is responsible for construction and environmental performance of the Project. Contractor supervisors will be issued a copy of the CEMP and asked to read and understand the content, their roles, and their responsibilities. Upon completion of the CEMP review, the Client, Site Supervisor and/or Construction Manager will be asked to review, sign, and date the Environmental Orientation Record (Attachment II). All pertinent information within the CEMP is to be reviewed with the appropriate construction crews before Project activities begin.

Applicable mitigation measures identified within the CEMP must be followed by the Client and their subcontractors while undertaking works. Environmental issues will be reviewed in pre-job meetings at the start of each workday. It is the responsibility of all construction crew members to:

- Read or be familiar with the relevant material within his CEMP;
- Abide by the terms and conditions of this CEMP;

- Abide by the terms and conditions of environmental regulatory approvals;
- Procure, implement, and/or install the appropriate measures at the appropriate times: and
- Keep a copy of this CEMP and the regulatory authorizations and approvals on-Site at all times during construction.

Environmental incidents, including hydrocarbon spills of any volume/size, must be reported to the Site Superintendent, Construction Manager, and Environmental Monitor immediately; the Spill Response Plan (Attachment III) must be implemented. The Client will use appropriately trained staff members to deal with potential environmental incidents related to work activities.

A copy of this CEMP, agency documents, and any other required regulatory documents on-Site at all times in a designated area, where they are readily available for review. It is Client's responsibility to consistently review the CEMP prior to engaging in works that have potential to affect environmentally sensitive areas.

2.3 Qualified Environmental Professional

The Environmental Monitor (EM) for the Project must be a Qualified Environmental Professional (QEP). A QEP is an applied scientist or technologist who is registered and in good standing with an appropriate British Columbia (BC) professional organization (e.g. professional Biologist, Agrologist, Forester, or Geoscientist).

The EM will conduct or oversee weekly inspections to ensure compliance with this CEMP, *Bylaw No. 1989-2010* and *Bylaw No. 1465-2005*. In the event that dewatering of the excavation is required the EM will oversee setup of the de-watering system and conduct water quality (turbidity) testing. Water quality standards for turbidity per the ESC Bylaw will be referenced by the EM to determine Site compliance. The maximum allowable turbidity at point of discharge into the municipal drainage system or watercourse, is 25 nephelometric turbidity units (NTU) during dry weather conditions (i.e. less than 25 mm of rain in a 24 hour period); or 100 NTU during significant rainfall)[1]. The EM will provide recommendations to the client and/or the Site foreman for implementation/correction of ESC mitigation measures as required and document weekly inspections.

[1] Economic Development & Planning Services. Guidelines for Erosion and Sediment Control (ESC) Bylaw. Available at: https://www.abbotsford.ca/Assets/2014+Abbotsford/Planning+and+Development/Planning/Erosion+$!26+Sediment+Control+(ESC)/Guidelines+For+Erosion+And+Sediment+Control+Bylaw+Exempted.pdf. Accessed January 2018.

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3.0 PROJECT CONTACT INFORMATION

Organization	Position	Name	Telephone Number
Horn Park Place Ltd.	Project Manager	Bruno Jury	250.334.3263
Pinchin Ltd.	Qualified Environmental Professional (QEP) and Environmental Project Manager	Jeremy Nilson	778.347.3271

4.0 SITE DESCRIPTION

The Project is located at the property identified by the civic address of 3182 Gladwin Road, Abbotsford, British Columbia being approximately 2.33 hectares in size (Site; Attachment I). The Site is currently characterized as being largely vegetated with two watercourses (UT1 and UT2) transecting the Site and one watercourse (Watercourse 1) flowing parallel to the east Site boundary. Figure 1, Attachment I, depicts the current Site conditions.

The following Environmentally Valuable Resources (EVR) were identified as having potential to occur within or near the Site and are assessed in this report:

- Aquatic and riparian ecosystems;
- Wildlife habitat features, such as bird nesting habitat and course woody debris (CWD); and
- Species of management concern, including provincially Red and Blue-listed or federally threatened and endangered species under Schedule I of the *Species at Risk Act* (SARA), salmonids, game fish, and regionally significant fish species.

Although Pinchin identified UT1 and UT2 as non-fish bearing, they are tributaries to Watercourse 1 which is a fish bearing watercourse (Pinchin Environmental Assessment Report, 3182 Gladwin Road, Abbotsford, BC, dated February 1, 2019).

Invasive plants of concern identified within the Site included Himalayan blackberry (*Rubus armeniacus)* and yellow archangel (*Lamium galeobdolon*)[2]. Large thickets of Himalayan blackberry and yellow archangel are within the riparian areas of UT1 and UT 2.

Based on documented geographic range, preferred habitats, and results from the review of existing occurrence data, a total of 17 species of management concern were identified as having reasonable potential to occur within the Site. Of the species of management concern, only the Roell's brothera

[2] Invasive Species Council of BC. 2014. Regulation: Provincially Noxious. Available at: http://bcinvasives.ca/invasive-species/about/regulated-invasive-species-in-bc/list-of-regulated-invasive-plants-in-bc/. Accessed January 2018.

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(*Brotherella roelli*) had historical occurrence records near the Site. Species of management concern were not detected during the field assessment, however their preferred habitat exists with the riparian areas of UT1, UT2 and Watercourse 1. Pinchin's Environmental Assessment of the Site dated February 1, 2019. Depicts further details of species of management concern.

Wildlife and wildlife habitat features detected on the Site included bird nesting habitat and bat roosting habitat within existing trees and CWD within the riparian areas of UT1, UT2 and Watercourse 1.

5.0 SCOPE OF WORK

The scope of work outlined in this section was provided to Pinchin by the Client. It was provided as an overview of the work and should not be relied upon for construction purposes.

The proposed development activities include the subdivision and development of a multi-unit residential apartment building, parking lot and a trail connecting to existing trails adjacent to the Site.

The scope of the proposed construction activities includes, but is not limited to the following: clearing, grubbing, excavation, grading, servicing, and building construction.

Figure 2, Attachment I, depicts the proposed Site plan.

6.0 POTENTIAL ENVIRONMENTAL EFFECTS

Potential environmental concerns for this Project include the following:

- Introduction of harmful or polluting substances (e.g. sediment, fuel, concrete debris, etc.) into any aquatic system;
- Disturbance to existing vegetation outside of the approved Project footprint;
- Encroachment into the modified (i.e., subject to variance) Streamside Protection and Enhancement Area (SPEA);
- Invasive plant species management including proper disposal; and
- Waste disposal (e.g. disposal of construction debris during Site preparation).

Vegetation clearing and ground disturbance activities scheduled to occur during the General Nesting Period for migratory birds (late March to mid-August[3]) have the potential to result in sensory disturbance and incidental take (i.e. inadvertent harm, mortality, or harassment to birds, nests, and eggs) of birds protected under the Provincial *Wildlife Act* and the Federal *Migratory Birds Convention Act.*

Precipitation, and wind must be accounted for in the implementation of mitigation measures.

[3] Environment and Climate Change Canada. 2017. General nesting periods of migratory birds in Canada. Available at: https://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=4F39A#_04. Accessed January 2018.

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7.0 ENVIRONMENTAL PROTECTION AND MITIGATION

7.1 General

The following environmental mitigation measures apply to the project in general:

- A copy of this CEMP will be available on-Site at all times during the Project works;
- Crew tailgate meetings must be held on a regular basis to discuss environmental concerns and responsibilities. Meeting topics must be documented and retained on Site for review;
- Site supervisors are to have a clear understanding of the approved work areas, scope, environmental issues, and mitigation measures; and be appropriately trained and capable of implementing the requirements of the CEMP;
- All environmental incidents must be reported immediately per the Spill Response Plan (Attachment III); and
- Prior to the commencement of construction, snow or silt fencing must be placed on the boundary of the SPEA to prohibit encroachment into the SPEA during construction works. Once construction works is complete, a chain link fence with signage must be placed at the boundary of the SPEA. Signage must be placed every 15 m along the permanent fence.

7.2 Erosion and Sediment Control

Project activities must be conducted in a manner that avoids the introduction of sediment or sediment-laden waters to any watercourse, ditch, or drainage system. As such, per the CoA ESC Bylaw, an ESC Plan must be prepared by an ESC Supervisor. The ESC Plan is to comply with the CoA ESC Bylaw and include an ESC Submission Form and an ESC Supervisor Letter of Appointment Form. Monitoring must be conducted by the ESC Supervisor as per the CoA ESC Bylaw.

In addition to the ESC Plan, the following erosion and sediment control (ESC) measures and work practices are to be implemented and maintained for the duration of development.

- Sufficient quantities of ESC materials (i.e. silt fence, straw, sandbags, filter cloth, polyethylene sheeting) should be kept on-Site at all times. Requirements to install ESC measures will depend on Site conditions encountered as construction progresses. The EM will work with the construction contractor to determine requirements for deployment of specific measures;
- Excavation can lead to unstable soils that are susceptible to erosion and can result in sediment moving off-Site, either through water or wind action. Soil disturbance and

movements should be scheduled to occur during dry conditions and halted during significant rainfall, i.e., >25 mm over a 24 hour rain event;

- Excavated soil marked for off-Site disposal must be removed from the Site as soon as practical (not stored on Site for extended periods);
- Temporary stockpiles of soils are to be covered by tarps or polyethylene sheeting which is to be anchored with sandbags or stakes or adequately encircled with appropriately installed silt fencing;
- If significant rainfall is expected, loose (not compacted), rough or sloped soils (including trenches), must be covered with poly or equivalent, if inactive, and at the end of each workday for active piles, in advance of storm events;
- Temporary stockpile locations should be at least 15 m away, if practical, and a minimum of 3 m or more from any catch basin, ditches and/or Site boundaries;
- Storm inlet drains may be present on the paved roadways. Storm inlet drains located on or near the Site that collect runoff should be protected with catch basin filter sac inserts to avoid the introduction of eroded soils into the municipal drainage system and/or surrounding natural waterways;
- If sediment-laden water is discharged from the Site, turbidity levels must meet the City of Abbotsford guidelines for turbidity (i.e., turbid water must not exceed 25 nephelometric turbidity units (NTU) during dry weather conditions (i.e. less than 25 mm of rain in a 24 hour period); or 100 NTU during significant rainfall)[4];
- Exposed soils on-Site or within the access route must be stabilized (e.g. seeded with grass seed mixture or spread with straw or other surface protection); and
- Sediment control structures (including polyethylene sheeting) must remain in place until the works are complete and disturbed areas are permanently stabilized. Sediment control structures must be removed prior to demobilization.

7.3 Air Quality and Dust Control

The majority of air emissions generated during the Project are anticipated to result from the operation of heavy equipment and vehicles. All equipment and vehicles used on-Site will be in good working order and will be checked for maintenance concerns by the contractors at the beginning of each shift.

[4] Economic Development & Planning Services. Guidelines for Erosion and Sediment Control (ESC) Bylaw. Available at: https://www.abbotsford.ca/Assets/2014+Abbotsford/Planning+and+Development/Planning/Erosion+$!26+Sediment+Control+(ESC)/Guidelines+For+Erosion+And+Sediment+Control+Bylaw+Exempted.pdf. Accessed January 2018.

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7.3.1 Dust Control

Dust generation has a low potential to be an environmental concern given the location of works and anticipated climate conditions. Access roads or shoulders should be kept clean of dirt to mitigate potential for both dust and sediment laden runoff. A gravel access pad with a minimum of 3" crushed rock is to be installed at the access driveway. Water spray, the use of additional clean gravel or other dust mitigation techniques may be required if the work Site is generating dust that is migrating beyond the Project boundaries.

7.4 Wildlife and Wildlife Habitat

The contractor and subcontractors should implement the following wildlife and wildlife habitat protection measures:

- A pre-construction bird nest survey should be conducted by a QEP prior to vegetation clearing, ground disturbance, or demolition of buildings during the bird nesting window (see below):
  - If detected, a species-specific, no-disturbance setback would be established while the nest is active;
  - Nests protected under the BC *Wildlife Act* (i.e. "(ii) the nest of an eagle, peregrine falcon, gyrfalcon, osprey, heron, or burrowing owl, or (iii) the nest of a bird not mentioned in (ii), when the nest is occupied by a bird or its egg unless authorized under permit" [5]) and species listed as Threatened or Endangered under Schedule 1 of the SARA would be protected year-round from destruction;
  - Nest surveys will take into consideration the habitat requirements and habits of all bird species listed as Threatened or Endangered under Schedule 1 of the SARA with potential to nest on-Site; and
  - Results of the bird nest survey are valid for five days during the regional nesting period for migratory birds (March 10 to August 20), after which, additional surveys may be recommended in consultation with a QEP;
- Crews will dispose of any garbage in secure bins and keep the Site clean and free of food items to deter animals. Food wastes should be removed from Site daily; and
- A general wildlife sweep will be conducted prior to works by visually searching the Site.

[5] B.C. Ministry of Transportation and Infrastructure. Wildlife – Possess, Take, or Destroy Bird Nest and/or Egg. Available at: http://www.th.gov.bc.ca/key_enviro_topics/wildlife_possess_brief.html. Accessed January 2018.

7.5 Works within the Streamside Protection and Enhancement Area (SPEA)

- No work shall be undertaken within the SPEA with the exception of habitat enhancement and/or restoration works authorized by the EM;
- Prior to ground disturbance, the boundaries of the SPEA must be flagged by a QEP and surveyed by a BC Land Surveyor. The SPEA boundary must then be clearly delineated with silt fencing and orange snow fencing. No grade change, storage of materials or equipment is permitted within the SPEA or within the critical root zone of trees growing in the SPEA;
- Machines, equipment or foot traffic are not permitted inside of the SPEA;
- Soil compaction is a concern and hence heavy or repeated traffic on these soils is to be avoided including during enhancement or restoration activities;
- Any trees that are removed should be felled away from or out of watercourses;
- Appropriate fencing, such as spill cedar fencing with wire mesh or chain-link fencing must be installed on the boundary of the SPEA;
- Permanent fencing must be installed along the north property boundary and the subject property. Appropriate fencing could include the existing barbed wire fencing which would need to be extended and repaired or an alternate option for fencing such as a chain-link fence; and
- Permanent buildings are to be situated at least 3 - 5 m from the SPEA (minimum of 3 m on the northwest aspect of the building and a minimum of 5 m on the northeast aspect of the building). Works that would cause temporary compaction of soil are not to occur within the 3 – 5 m buffer from the boundary of the SPEA. The 3 - 5 m buffer between the SPEA and future buildings provides adequate space for construction activities, tree retention/establishment (i.e., based on the existing vegetation) and access for building maintenance.

7.6 Fish and Fish Habitat

Watercourse 1, a permanent fish-bearing watercourse is located adjacent west of the Site. Two tributaries (UT1 and UTB) transect the Site and flow into Watercourse 1. Protection of fish habitat can be facilitated through diligent erosion and sediment control (Section 7.2), on-Site SPEA delineation and fencing and water management (Section 9.0) practices.

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7.7 Vegetation Management

The contractor and subcontractors must conduct works to avoid or reduce removal or damage to vegetation outside of the approved Project footprint during access and construction activities. The following mitigation measures should be implemented to avoid or reduce damage to vegetation outside of the Project footprint:

- Vegetation clearing and stripping of top soil should be limited to the approved Project footprint and associated access areas;
- According to the Invasive Alien Plant Program Application, noxious or invasive plants have been identified within the subject property within 100 m of the subject property. Based on Pinchin's environmental Assessment, Himalayan black berry and yellow archangel inhabit the Site. However, a pre-construction survey should be conducted to identify the presence of additional noxious and invasive plant. If such species are found they should be removed and maintained as prescribed by a QEP;
- Native vegetation should be retained where possible for as long as possible to limit the amount of exposed soils on-Site and minimize disruptions to the environment;
- Temporary barrier fencing should be installed at the approved construction boundary limits to avoid encroachment and/or unnecessary disturbance to native vegetation or compaction of adjacent soils;
- The contractor and subcontractors must conduct works in a manner that minimizes the destruction, scarring or defacing of trees and woody vegetation;
- Where the critical root zone of any tree to be retained, either on the parcel or on an adjacent parcel is within 5 m of any excavation, demolition, construction or engineering works, Tree Protection Barriers must be installed around the tree;
- Carefully clean clothes, boots, hand tools, and other equipment used for treating invasive plants before leaving the Site;
- Any soils that are to be imported to the Site for backfill should be sourced from a reputable supplier to prevent introduction of invasive/noxious weeds; and
- Machinery should be clean and free of soils and plant materials prior to mobilization to and demobilization from the Project area to avoid the introduction or spread of invasive species.

Please see the Arborist Report prepared by Central Valley Arborist Consulting Ltd. for additional details.

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8.0 SOIL HANDLING

Contaminated soil is not expected to be encountered in association with these works. If suspected (i.e. by sight or smell), a QEP shall be immediately notified and laboratory testing for soil contaminants will be conducted as required. Suspected contaminated soil shall not be removed from Site until the soil has been tested and test results have been reviewed.

Contaminated soil shall only be received by an authorized landfill. The Contractor shall dispose of all soil in accordance with regulations under the *Environmental Management Act*.

9.0 WATER MANAGEMENT

In addition to the mitigation measures outlined in Section 7.2, the following measures specific to water management during construction should be implemented:

- Stormwater runoff from work areas with potential to contain hydrocarbons, waste, uncured or powdered concrete, paint, soil particles, or other environmentally harmful substances must not be allowed to discharge off the Site;
- The use of chloraminated water (e.g. city supplied drinking water) should be limited as it can affect environmentally sensitive areas (i.e. UT1. UT2 and Watercourse 1) and is more harmful to fish than chlorinated water. If services are to be flushed prior to commissioning, the water should be discharged into the sanitary system which will require a City of Abbotsford Wastewater Discharge Permit from Source Control; and
- Any construction waste must be stored and/or disposed of in a manner that avoids the potential for off-Site leaching or entry into any watercourse, ditch, or drainage system.

Water that has come into contact with concrete and concrete products has the potential to be basic (i.e. pH > 7) and can be highly toxic to aquatic organisms. If concrete pours are required, the following will be implemented:

- Catch basins and ditches on-Site ultimately drain to the surrounding aquatic environment. Concrete or cement debris and abrasive grits must not enter any watercourse, ditch, drainage system, or catch basin to avoid adverse effects to fish and fish habitat;
- Large horizontal concrete pours should be avoided during heavy rains to prevent the potential for concrete impacted surface water generation;
- Waste materials must be retained for disposal at an appropriate facility; and
- Spills must be reported immediately to the Client representative.

Please refer to project Stormwater Management Plan(s) for the development for additional details of the proposed stormwater management works.

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Note that it the proposed development will be connected to existing stormwater infrastructure located within Verdon Way.

10.0 FUELS AND EQUIPMENT MANAGEMENT

A laydown area must be designated at the Site before Project activities begin. Appropriate signage and employee training awareness should be established regarding the laydown location and protocols. If re-fuelling is required on-Site, the following actions will be taken to avoid fuel and oil leaks and to avoid or reduce potential environmental effects:

- Fuel handing, storage and fuelling will comply with both Canadian Council of Ministers of the Environment (CCME) Codes of Practice and the Ministry of Environments "A Field Guide to Fuel Handling, Transportation & Storage[6];
- All mobile re-fuelling of equipment and fuel and chemical storage must be conducted a minimum of 15 m from the top of bank of watercourses or drainage systems (i.e., catch basins or swales), if present;
- Fuelling operations will be supervised at all times and employees will be adequately trained in the proper dispensing of fuel;
- All fuel and chemicals will be clearly marked as per Workplace Hazardous Materials Information System (WHMIS) and Transportation of Dangerous Goods (TDG) requirements;
- In the event of a spill, the Emergency Response Plan (Attachment II) will be implemented;
- All heavy equipment will be kept in good repair and leak free. The operator will check the condition of the equipment, including hoses and fittings, at the beginning of each shift;
- Fire extinguishers and other emergency response equipment and supplies must be kept in known and visible locations and access to them will not be blocked by other materials or equipment. A list of emergency contacts will be posted at predetermined, accessible and visible locations, as well as kept with the emergency response equipment;
- The Spill Response Plan (Attachment III) will be posted at the work Site, and all personnel made aware of its content and location of response materials, as well as emergency contact names and numbers. The Spill Response Plan will be implemented immediately if a spill occurs;

[6] Ministry of Water, Land and Air Protection. A Field Guide to Fuel Handling, Transportation and Storage, 3rd edition. 2002. http://www.env.gov.bc.ca/epd/industrial/oil_gas/pdf/fuel_handle_guide.pdf

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- Machinery (e.g., truck, lift, excavator, bulldozer, non-operating generator) must be equipped with a drip tray below the oil pan when not in use (i.e. when parked for more than six hours). Operating stationary machinery and parked machinery will be located as far away from the top of bank of any watercourse, ditch, or drainage system as practical;
- Emergency response hydrocarbon spill kits, and personnel trained in their deployment and use, must be on the work Site at all times;
- Oil spill response materials and equipment, such as sorbent pads, booms and leak proof containers, will be kept on-Site in sufficient quantities and in an easily accessible location to contain and clean up the amount of fuel, oil or other petroleum hydrocarbons stored on-Site;
- All solid waste will be collected and disposed of appropriately, off-Site;
- All grease and oil required for maintenance will be properly applied. Any excess will be cleaned and disposed of in an environmentally appropriate manner, as will all containers, lids, and contaminated cloths and applicators. Used oil will be collected and recycled;
- A complete set of MSDS sheets will be kept for all chemicals on-Site; and
- A list of emergency contacts will be kept on-Site with the emergency response equipment.

11.0 WASTE MANAGEMENT

Project waste management practices must comply with the BC *Environmental Management Act*, the BC *Hazardous Waste Regulation*, and the *Transportation of Dangerous Goods Act* and Regulations. All activities will be conducted in an environmentally responsible manner. The following procedures will be implemented for waste management:

- Waste will be reduced to the extent feasible and an adequate number of appropriate waste containers will be made available. Waste should be categorized and labeled appropriately;
- Domestic waste will be collected daily and stored in closed containers until disposed of at the local landfill. Recyclable waste that can be collected will be segregated and taken to an appropriate facility;
- If hazardous materials are identified, proper handling and disposal will be conducted as per WorkSafe BC and the *Hazardous Waste Regulations* and *Transportation of Dangerous Goods Act* and Regulations. These include, but may not be limited to: appropriate personal protective equipment (PPE), storage and handling requirements, identification and personnel training;

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- Chemical and liquid waste (i.e., waste oil, etc.) will be stored within secondary containment in the predefined chemical storage area. Chemical waste will be properly disposed of at an appropriate waste facility. Disposal of chemical wastes will be in accordance with the Transportation of Hazardous Goods Directorate, with proof of disposal records maintained for auditing purposes;
- All construction will minimize waste where practical;
- Designate a safe area for temporary waste storage with adequate containment, secure and protected from weather until removal and disposal can be arranged;
- Categorize and label all waste and recycling materials appropriately. Sampling and analysis of waste materials may be required to determine the appropriate disposal option;
- Check to ensure that Hazardous Waste registration, storage, permit and transportation requirements are met, if applicable; and
- Remove all waste materials from the Site as soon as possible in accordance with all applicable standards and regulations.

12.0 SPILL PREVENTION AND EMERGENCY RESPONSE PLAN

In the event of a chemical spill or other environmental incident, the Client representative and QEP must be notified immediately. Spills to water are required to be reported. The Project will comply with the Spill Response Plan (Attachment III).

13.0 HOUSEKEEPING AND SITE CLEANUP

The Site should be maintained in a clean and tidy manner throughout the construction period. Access roads should be free of sediment and debris in order to avoid off-Site migration of sediment. The following measures should be implemented upon completion of works:

- Roads and work areas must be kept free of mud and dust that have the potential to erode or wash into waterways;
- Removal of surplus materials and wastes from the work Site, and subsequent disposal in appropriately authorized facilities; and
- Re-establishment of ground cover on disturbed areas must be established as soon as possible.

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14.0 ENVIRONMENTAL MONITORING

The purpose of prescribed environmental monitoring is to inspect, evaluate, and report on the environmental protection measures utilized during completion of the Project and to provide recommendations for adjusting measures as may be necessary throughout all Project phases.

The EM should monitor implementation of measures to avoid potential effects to the environment. Weekly inspections are recommended for the duration of Project activities until soils on Site are permanently stabilized. A reduced monitoring frequency may be acceptable at the discretion of the EM during the dry season or if project activities are low risk and the Site is generally stable. Inspections should be documented by Site photographs and a report summarizing construction activities, Site observations, water turbidity measurements, implemented mitigation measures and recommendations.

The EM has the authority to halt or modify the works in order to protect the environment, if adverse effects are anticipated to occur as a result of Project activities. The EM will be obligated to advise the appropriate regulatory authorities if construction activities do not comply with regulatory requirements and when corrective actions are not implemented.

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15.0 TERMS AND LIMITATIONS

This CEMP was developed in general accordance with currently acceptable practices for the development of CEMPs and specific Client requests, as applicable to this Site. This CEMP was prepared for the sole use of the Client and contractors working under their direction. Any use which a third party makes of this CEMP, or any reliance on or decisions to be made based on it, are the sole responsibility of the third parties.

Pinchin Ltd. will not be responsible for any consequential or indirect damages. Pinchin Ltd. will only be liable for damages resulting from negligence of Pinchin Ltd. Pinchin Ltd. will not be liable for any losses or damage if client has failed, within a period of two (2) years following the date upon which the claim is discovered within the meaning of the BC Limitations Act 1996, to commence legal proceedings against Pinchin Ltd. to recover such losses or damage.

The information provided in this CEMP is based upon analysis of available information. In evaluating the Site, Pinchin Ltd. has relied in good faith on information provided by other individuals noted in this CEMP. Pinchin Ltd. has assumed that the information provided is factual and accurate. Pinchin Ltd. accepts no responsibility for any deficiency, misstatement or inaccuracy contained in this EMP as a result of omissions, misinterpretations, or fraudulent acts of persons interviewed, contacted, or reports that were reviewed.

Pinchin Ltd. makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and these interpretations may change over time.

231866.000 REVISED CEMP, 3182 Gladwin Road, Abbotsford, BC, Horn Park Place, April 9 2019

Template: Master Report for Phase I ESA Stage 1 PSI – National Master, EDR, September 15, 2017

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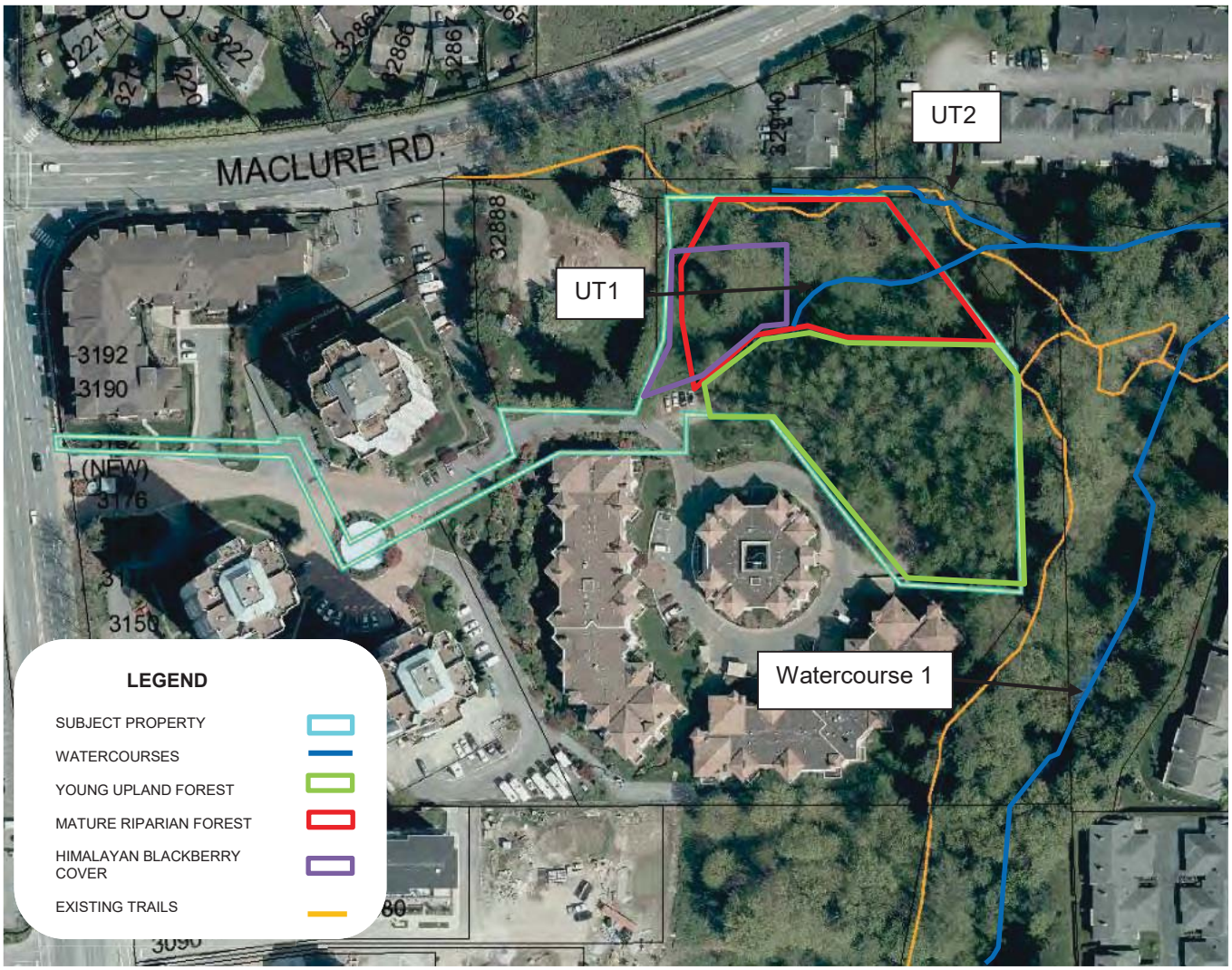
ATTACHMENT I

Figures



PINCHIN

CLIENT NAME:	HORN PARK PLACE DEVELOPMENTS LTD.
PROJECT NAME:	CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN
LOCATION:	3182 GLADWIN ROAD, ABBOTSFORD, BC
TITLE:	EXISTING SITE CONDITIONS

DATE:	PROJECT #:	IMAGE SOURCE:	DRAWN BY:	CHECKED BY:	FIGURE NO.:
APRIL 2019	231866.000	ABBOTSFORD WEBMAP	BW	JN	1

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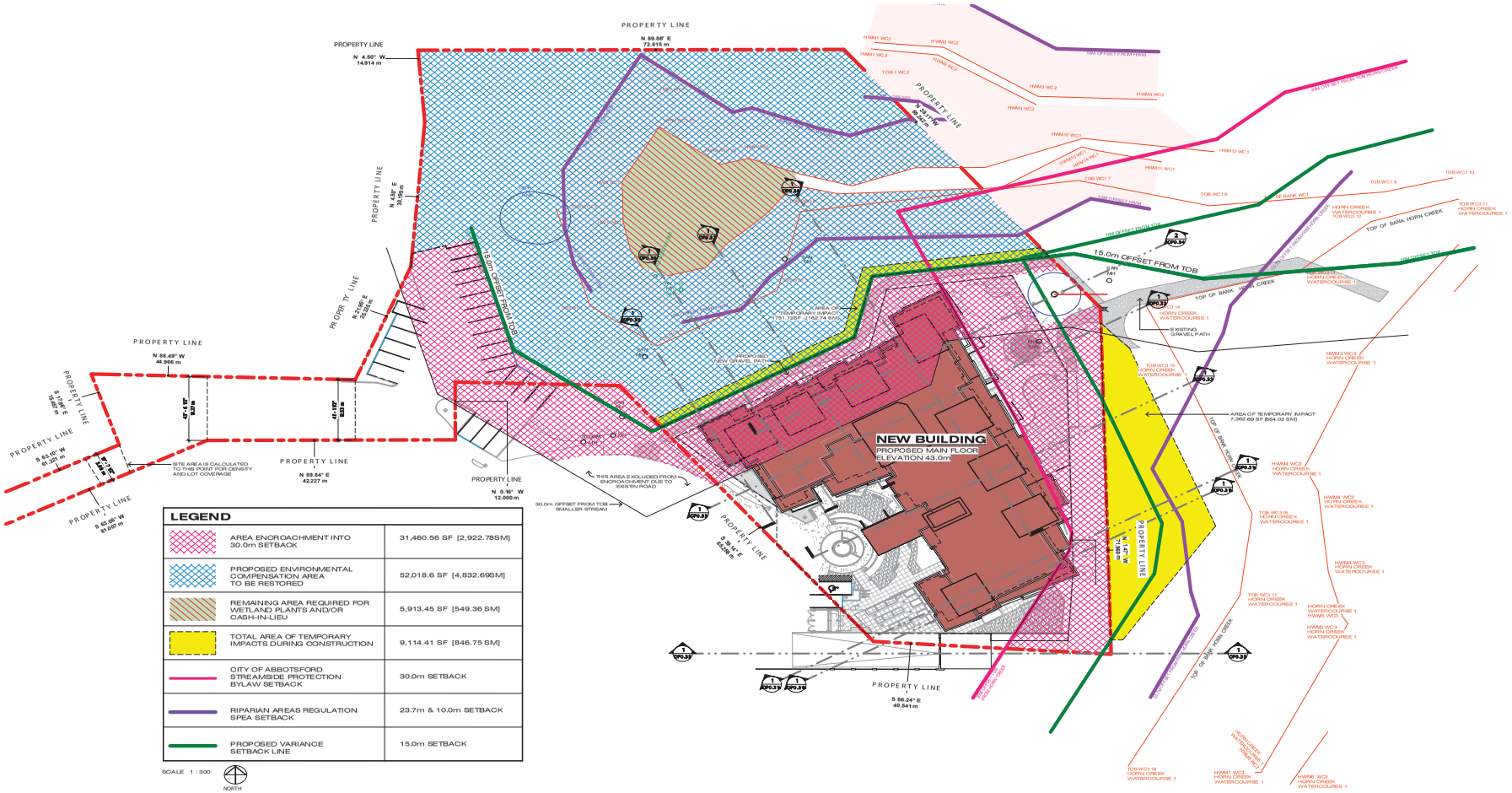

PINCHIN

CLIENT NAME:	HORN PARK PLACE DEVELOPMENTS LTD.
PROJECT NAME:	CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN
LOCATION:	3182 GLADWIN ROAD, ABBOTSFORD, BRITISH COLUMBIA
TITLE:	PROPOSED SITE PLAN
FIGURE NO.	2

DATE:	PROJECT NO.:	IMAGE SOURCE:	DRAWN BY:	CHECKED BY:
APRIL 2019	231866.000	CHPA (2019)	BW	JN

6.8.11.e

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ATTACHMENT II

Environmental Orientation Record

ENVIRONMENTAL ORIENTATION RECORD

The Environmental Orientation Record (EOR) shall be completed for all work involving an environmental component. The Project Supervisor is responsible for ensuring that the environmental requirements of the work are reviewed with the workers before work is started, and that a record of the discussion is documented on the EOR. For work undertaken by Contractors, this form must be signed by the Project Supervisor (or work coordinator) and the Contractor. By signing the EOR, the Project Supervisor and/or the Contractor indicate they have been advised of the environmental requirements of the contract. The EOR shall be filed with the contract documents.

Date:		File No.
1 **Project Information:**		
Project Title		
Project Description		
Project Location		
2 **Contractor Information:**		
Company Name		
Company Address		
Site Contact/Representative Name		
Phone #	Cell #	E-mail
3 **Key Environmental Issues and Requirements Review and record the environmental issues and requirements of the work as specified in the Environmental Management Plan (EMP), Environmental Field Guides or other environmental requirements (e.g. Contract clauses). (Use the checklist below to guide discussion).**		

Is there an EMP, Field Guide, or other environmental requirement for the work?		☐ Yes	☐ NA
Environmental Issues	Environmental Protection Requirements	Discussed	NA
Soil erosion / compaction		☐ Yes	☐ NA
Vegetation disturbance or removal		☐ Yes	☐ NA

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Generation and disposal of hazardous substances		☐ Yes	☐ NA
Generation and disposal of waste		☐ Yes	☐ NA
Contaminated soil management		☐ Yes	☐ NA
Spill of hazardous substances		☐ Yes	☐ NA
Fuel and flammable storage		☐ Yes	☐ NA
Dust generation / other air emissions		☐ Yes	☐ NA
Water quality – erosion and siltation		☐ Yes	☐ NA
Fish and Aquatic - Habitat alteration, disturbance or loss		☐ Yes	☐ NA
Wildlife and Bird – Habitat Alteration, Disturbance or Loss		☐ Yes	☐ NA
Disturbance to Heritage Resources / Archaeological Sites		☐ Yes	☐ NA
Visual Impacts / Noise Concerns		☐ Yes	☐ NA
Property Considerations		☐ Yes	☐ NA
Disruption of Recreation Use		☐ Yes	☐ NA
Public Safety Concerns		☐ Yes	☐ NA
Do the tools and equipment meet the requirements?		☐ Yes	☐ NA

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4 **Permits and Approvals Information:** Ensure the necessary environmental permits and approvals relating to the work have been obtained prior to starting work.		
Are environmental notifications, permits, licenses or approvals required? If so, list applicable regulatory requirements.	☐Yes	☐NA
Have the permits, licenses and approvals obtained and / or checked? If so, identify permit reference numbers.	☐Yes	☐NA
5 **Emergency Response Plan**		
Has the Emergency Response Plan been discussed?	☐Yes	☐NA
Has the Oil and Chemical Spill Response Plan been discussed?	☐Yes	☐NA
Are there spill kits available on location? If so where are they located?	☐Yes	☐NA
6 **Environmental Incident Reporting:** Ensure Contractor is aware of EIR system.		
Environmental Incident Reporting Procedures discussed?	☐Yes	☐NA
7 E**nvironmental Competency**		
Demonstrated applicable environment training for appropriate crew members/supervisors?	☐Yes	☐NA
Site environmental monitor to be on-site in lieu of training?	☐Yes	☐NA

The undersigned has been briefed on the environmental requirements of the work as detailed above.

For work undertaken by the Contractor:

Signed: _____ Date: _____

Environmental Monitor:

Signed: _____ Date: _____

Additional Comments:

_____

_____

_____

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ATTACHMENT III

Spill Response Plan

SPILL RESPONSE PLAN

INCIDENT

If a spill of fuel, oils, lubricants or other harmful substances occurs at the site, the following procedures will be implemented.

Spill Response Steps

1. ENSURE SAFETY
2. **STOP THE FLOW** (when possible)
3. SECURE THE AREA
4. CONTAIN THE SPILL
5. **NOTIFY/REPORT** (PEP 1-800-663-3456)
6. CLEAN-UP

(Circumstances may dictate another sequence of events)

ENSURE SAFETY

- Ensure Personal, Public and Environmental Safety
- Wear appropriate Personal Protective Equipment (PPE)
- Never rush in, always determine the product spilled before taking action
- Warn people in immediate vicinity
- Ensure **no ignition sources** if spill is of a flammable material

STOP THE FLOW (when possible)

- Act quickly to reduce the risk of environmental impacts
- Close valves, shut off pumps or plug holes/leaks, set containers upright
- Stop the flow of the spill at its source

SECURE THE AREA

- Limit access to spill area
- Prevent unauthorized entry onto site

CONTAIN THE SPILL

- Block off and protect drains and culverts
- Prevent spilled material from entering drainage structures (ditches, culverts, drains)

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- Use spill sorbent material to contain spill
- If necessary, use a dike, berm or any other method to prevent any discharge off site
- Make every effort to minimize contamination
- Contain as close to the source as possible

NOTIFY/REPORT

- Notify appropriate Site Supervisor or alternate (EM) and COA representative of incident (provide spill details)
- When necessary the first external call should be made to (see spill reporting requirements): **Provincial Emergency Program (PEP) 1-800-663-3456 (24 hours)**
- Provide necessary spill details to other external agencies (see spill reporting requirements)
- Complete an Environmental Incident Report (EIR)

CLEAN UP

- All equipment and material used in clean-up (*e.g*. used sorbents, oil containment materials etc.) must be disposed of in accordance with provincial requirements.
- Accidental spills may produce special wastes (*e.g*. material with > 3% oil) and contaminated soil. All waste disposals must comply with the B.C. Hazardous Waste Regulations and the *Waste Management Act.* The EM will assist in compliance with provincial regulations.
- Waste sorbent material may not be disposed of in a landfill without prior approval from the province.
- If contaminated soil is encountered it must be treated and dealt with as required on a site-specific basis, and must comply with the requirements of the *B.C. Contaminated Sites Regulations.*

SPILL REPORT

The report should include the following information:

- Name and phone number of person reporting the spill
- Name and phone number of person involved with the spill
- Location and time of the spill
- Type and quantity of material spilled
- Cause and effect of spill
- Details of action taken or proposed to contain the spill and minimize its effect
- Names of agencies on the scene
- Names of other persons or agencies advised

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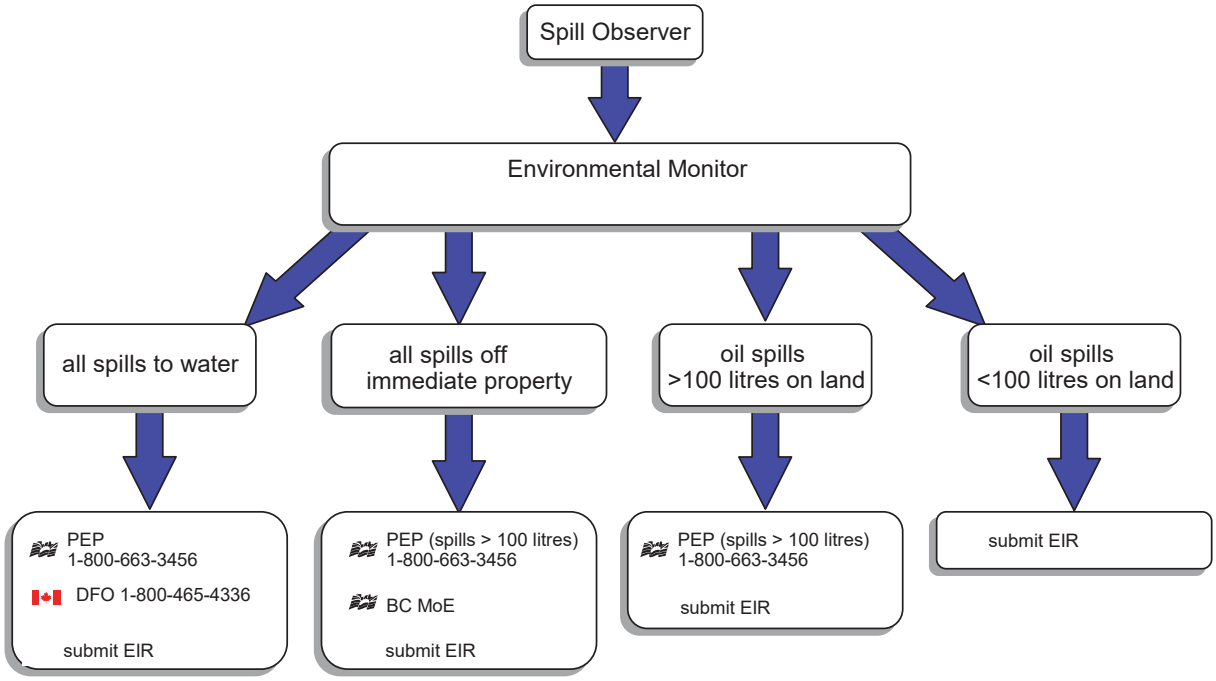
Spill Reporting
Notification Chart



Reportable Spill Quantity List

List of externally reportable quantities for commonly used substances

Product	Quantity
Class 2.1 – flammable gas (e.g., propane)	10 kg or 10 min.
Class 2.2 – non flammable gas (e.g., SF6, CO2)	10 kg or 10 min.
Class 3 – flammable liquids	100 litres
Class 8 – corrosive liquid acids and caustics (e.g., battery acid)	5 kg or litres
Class 9 – environmentally hazardous (e.g., PCB's, used ethylene glycol)	1 kg or litre
Oil & Waste Oil	100 litres
Other Substances (e.g., new antifreeze, power-wash water)	200 kg or litres
Pesticides & Herbicides	1 kg or litre

ALL SPILLS TO WATER ARE REPORTABLE

If in doubt as to whether or not to report a spill, err on the side of caution and report the spill.

The City of Abbotsford must also be notified of any reportable spill.

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APPENDIX V

Recommended Plant Species

Table C. Recommended Plants for Compensation Planting within the SPEA at 3182 Gladwin Road, Abbotsford, BC

Recommended Plants for SPEA Compensation		Number of Plants
Trees		
Western Hemlock	*Tsuga heterophylla*	10 (min. #5 pot)
Western Redcedar	*Thuja plicata*	10 (min. #5 pot)
Douglas Fir	*Pseudotsuga menziesii*	10 (min. #5 pot)
Total		**30**
Shrubs		
Salmonberry	*Rubus spectabilis*	360 (min. #1 pot)
Red Osier Dogwood	*Cornus sericea*	360 (min. #1 pot)
Dull Oregon Grape	*Mahonia nervosa*	360 (min. #1 pot)
Indian Plum	*Oemleria cerasiformis*	360 (min. #1 pot)
Snowberry	*Symphoricarpos*	360 (min. #1 pot)
Total		**1800**
Willows		
Pacific Willow	*Salix lucida*	100 (plugstock)
Hooker's Willow	*Salix hookeriana*	100 (plugstock)
Scouler's Willow	*Salix scouleriana*	100 (plugstock)
Total		**300**
Ferns		
Sword Fern	*Polystichum munitum*	271 (min. #1 pot)
Total		**271**

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Table D. Recommended Wetland Plants for 3182 Gladwin Road, Abbotsford.

Recommended Wetland Plants			Number of Plants
Wetland Plants			
Hardhack	Facultative hydrophyte	*Spiraea douglasii*	138 (min. #1 pot)
Cattail	Obligatory hydrophyte	*Typha latifolia*	138 (min. #1 pot)
Skunk cabbage	Obligatory hydrophyte	*Betula papyrifera*	135 (min. #1 pot)
Pacific Willow	Facultative hydrophyte	*Salix lucida*	138 (plugstock)
	Total		**549**

Table E. Recommended Temporary Impact Restoration on City of Abbotsford Property.

Recommended Replacement Trees		Number of Plants
Trees		
Red Alder	*Alnus rubra*	100 (min. #5 pot)
Douglas Fir	*Pseudotsuga menziesii*	10 (min. #5 pot)
Total		**110**
Shrubs		
Salmonberry	*Rubus spectabilis*	118 (min. #1 pot)
Red elderberry	*Sambucus racemosa*	118 (min. #1 pot)
Indian Plum	*Oemleria cerasiformis*	118 (min. #1 pot)
Total		**354**

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APPENDIX VI

Cost Estimate for Restoration Planting

Cost Estimate for Restoration Planting

Area to be restored (m^2)				4,832	
Task	**Details / Calculated Variable**	**Cost per Unit**	**Number of Units**	**Estimated Cost**	**With 10% Contingency**
PHYSICAL WORK					
Site Preparation					
site preparation	NA - no preparation necessary OR area per excavator per day				
• *excavator and operator for site prep*	x hrs @ $x /hour			$ -	$ -
invasive plant removal	80 hrs @ $60 /hour	60	80	$ 4,800.00	$ 5,280.00
topsoil	NA - good top soil on site, no excavation required OR x m^3 (based on	N/A	N/A	$ -	$ -
excavator and operator for topsoil placement	x hrs @ $x /hour			$ -	$ -
	Subtotal Site Preparation			***$ 4,800.00***	***$ 5,280.00***
Material					
native plants	2401 plants (see Appendix II - Restoration Plan)				
• *trees (#5 pot and 30 plants)*	average $18 / tree by 30 trees	18	30	$ 540.00	$ 594.00
• *Willow stakes (plugstock and 300 plants)*	average $5 / plug by 300 Willows	5	300	$ 1,500.00	$ 1,650.00
• *shrubs and ferns (#1 pot and 2071 plants)*	average $8 / shrub by 2071 shrubs and ferns	8	2071	$ 16,568.00	$ 18,224.80
• *seed (indicate if hydroseed or hand-seed)*	# bags/ x m^2 @ x seed/x m^2 coverage	N/A	N/A	$ -	$ -
pest barriers	$x / vole protector OR $x / beaver guard	N/A	N/A	$ -	$ -
fencing	based on 200 m of fencing	60	200	$ 12,000.00	$ 13,200.00
signage	based on 10 signs	35	10	$ 350.00	$ 385.00
mulch	x m^3 (based on x m^2 area by x average depth)	N/A	N/A	$ -	$ -
habitat complexing (LWD)	N/A, LWD to be obtained from felled trees at the site	N/A	N/A	$ -	$ -
Bird nest boxes	5 boxes at $75	75	5	$ 375.00	$ 412.50
wildlife passage (indicate type and length)	$x / m by x m	N/A	N/A	$ -	$ -
wildlife passage inlet/outlet and interior structures	average $x / piece by x pieces OR $x / x m^2 area	N/A	N/A	$ -	$ -
rock material (indicate what it is for)	xxx m^3 of rock delivered	N/A	N/A	$ -	$ -
spawning gravel	xxx m^3 of spawning gravel delivered	N/A	N/A	$ -	$ -
	Subtotal Materials			***$ 31,333.00***	***$ 34,466.30***
Installation					
plant installation	250 hours @ $60/hour	60	250	$ 15,000.00	$ 16,500.00
vole / beaver guard installation	installed during planting OR x hours @ $x/hour	N/A	N/A	$ -	$ -
fencing and signage installation	x hrs @ $x /hour	N/A	N/A	$ -	$ -
mulch installation	x hrs @ $x /hour	N/A	N/A	$ -	$ -
installation of habitat complexing (CWD, LWD)	8 hrs @ $60 /hour	60	8	$ 480.00	$ 528.00
installation of wildlife passage, including associated structures	x hrs @ $x /hour	N/A	N/A	$ -	$ -
installing instream habitat enhancements	x hrs @ $x /hour	N/A	N/A	$ -	$ -
	Subtotal Installation			***$ 15,480.00***	***$ 17,028.00***
	TOTAL PHYSICAL WORK			***$ 51,613.00***	***$ 56,774.30***
MONITORING AND REPORTING					
monitoring / reporting sessions per year =	1 visits & reports / year				
years of monitoring =	3 years				
environmental monitoring during construction (indicate frequency)	8 hrs @ $90 /hour	90	8	$ 720.00	$ 792.00
post-construction report	12 hrs @ $90 /hour	90	12	$ 1,080.00	$ 1,188.00
annual inspection	9 hrs @ $90 /hour	90	9	$ 810.00	$ 891.00
inspection with the City upon request of any security reduction/release	3 hrs @ $110 /hour	110	3	$ 330.00	$ 363.00
preparing annual monitoring reports	20 hrs @ $90 /hour	90	20	$ 1,800.00	$ 1,980.00
	TOTAL MONITORING & REPORTING			***$ 2,940.00***	***$ 3,234.00***
MAINTENANCE					
years of maintenance =	3 years				
watering plants	watering through summer plus other dry periods, 2 hours per week, for 15 weeks a year for three years @ $60/hour	60	90	$ 5,400.00	$ 5,940.00
invasive plant removal	16 hrs per year @ $60 /hour for 3 years of maintenance	60	48	$ 2,880.00	$ 3,168.00
replacing plants that do not survive (based on target 90% success)	Assuming no more than 20 plant deaths: 20 plants x 10 plants per hou	60	2	$ 120.00	$ 132.00
repairing or replacing pest barriers	N/A	N/A	N/A	$ -	$ -
repairing or replacing (*indicate structure*)	N/A	N/A	N/A	$ -	$ -
	TOTAL MAINTENANCE			***$ 8,400.00***	***$ 9,240.00***
	Total Estimated Restoration Cost			$ 62,953.00	$ 69,248.30
	cost/m^2 of Rehabilitation			$ 13.03	

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APPENDIX VII

Cost Estimate for Temporary Impact Restoration on CoA Property

Cost Estimate for Restoration Within the Temporary Impact Area on CoA

Area to be restored (m^2)				684	
Task	**Details / Calculated Variable**	**Cost per Unit**	**Number of Units**	**Estimated Cost**	**10% Contingency**
PHYSICAL WORK					
Site Preparation	Site preparation will be regrading the soil berm and is to be completed as part of building construction, as such, no additional cost.				
site preparation	N/A				
• *excavator and operator for site prep*	N/A			$ -	$ -
invasive plant removal	N/A	N/A	N/A	$ -	$ -
topsoil	N/A	N/A	N/A	$ -	$ -
excavator and operator for topsoil placement	N/A			$ -	$ -
	Subtotal Site Preparation				
Material					
native plants	464 Total: 110 Trees, 354 Shrubs				
• *douglas fir (#5 pot and 10 plants)*	average $18 / tree by 10 coniferous trees	18	10	$ 180.00	$ 198.00
• *red alder (#5 pot and 100 plants)*	average $15 / tree by 100 deciduous trees	15	100	$ 1,500.00	$ 1,650.00
• *shrubs (#1 pot and 2071 plants)*	average $8 / shrub by 354 shrubs and ferns	8	354	$ 2,832.00	$ 3,115.20
fencing	based on x m of fencing	N/A	N/A	$ -	$ -
signage	based on 10 signs	N/A	N/A	$ -	$ -
mulch	x m^3 (based on x m^2 area by x average depth)	N/A	N/A	$ -	$ -
habitat complexing (CWD, LWD)	average $x / piece by x pieces OR $x / x m^2 area	N/A	N/A	$ -	$ -
wildlife passage (indicate type and length)	$x / m by x m	N/A	N/A	$ -	$ -
wildlife passage inlet/outlet and interior structures	average $x / piece by x pieces OR $x / x m^2 area	N/A	N/A	$ -	$ -
rock material (indicate what it is for)	xxx m^3 of rock delivered	N/A	N/A	$ -	$ -
spawning gravel	xxx m^3 of spawning gravel delivered	N/A	N/A	$ -	$ -
	Subtotal Materials			***$ 4,512.00***	***$ 4,963.20***
Installation					
plant installation	65 hours @ $60/hour	60	65	$ 3,900.00	$ 4,290.00
vole / beaver guard installation	installed during planting OR x hours @ $x/hour	N/A	N/A	$ -	$ -
fencing and signage installation	x hrs @ $x /hour	N/A	N/A	$ -	$ -
mulch installation	x hrs @ $x /hour	N/A	N/A	$ -	$ -
installation of habitat complexing (CWD, LWD)	x hrs @ $x /hour	N/A	N/A	$ -	$ -
installation of wildlife passage, including associated structures	x hrs @ $x /hour	N/A	N/A	$ -	$ -
installing instream habitat enhancements	x hrs @ $x /hour	N/A	N/A	$ -	$ -
	Subtotal Installation			***$ 3,900.00***	***$ 4,290.00***
	TOTAL PHYSICAL WORK			***$ 8,412.00***	***$ 9,253.20***
MONITORING AND REPORTING					
monitoring / reporting sessions per year =	1 visits & reports / year				
years of monitoring =	3 years				
environmental monitoring during construction (indicate frequency)	8 hrs @ $90 /hour	90	8	$ 720.00	$ 792.00
post-construction report	12 hrs @ $90 /hour	90	12	$ 1,080.00	$ 1,188.00
annual inspection	4 hrs @ $90 /hour	90	4	$ 360.00	$ 396.00
inspection with the City upon request of any security reduction/release	1 hrs @ $110 /hour	110	1	$ 110.00	$ 121.00
preparing annual monitoring reports	20 hrs @ $90 /hour	90	20	$ 1,800.00	$ 1,980.00
	TOTAL MONITORING & REPORTING			***$ 2,270.00***	***$ 2,497.00***
MAINTENANCE					
years of maintenance =	3 years				
watering plants	watering through summer plus other dry periods, 1 hours per week, for 15 weeks a year for three years @ $60/hour	60	45	$ 2,700.00	$ 2,970.00
invasive plant removal	5 hrs @ $60 /hour 12 months of maintenance	60	15	$ 900.00	$ 990.00
replacing plants that do not survive (based on 90% success)	Assuming no more than 6 plant deaths: 6 plants x 2 plants per hour @ $60/hour	60	3	$ 180.00	$ 198.00
repairing or replacing pest barriers	x hrs @ $x /hour x years of maintenance	N/A	N/A	$ -	$ -
repairing or replacing (*indicate structure*)	indicate variable	N/A	N/A	$ -	$ -
	TOTAL MAINTENANCE			***$ 3,780.00***	***$ 4,158.00***
	Total Estimated Restoration Cost			$ 14,462.00	$ 15,908.20
	cost/m^2 of Rehabilitation			$ 21.14	

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APPENDIX VIII

Cost Estimate for Wetland Restoration Planting

Cost Estimate for Wetland Planting

Area to be restored (m^2)				549	
Task	**Details / Calculated Variable**	**Cost per Unit**	**Number of Units**	**Estimated Cost**	**10% Contingency**
PHYSICAL WORK					
Site Preparation					
site preparation	NA - no preparation necessary OR area per excavator per day				
• *excavator and operator for site prep*	x hrs @ $x /hour			$ -	$ -
invasive plant removal	40 hrs @ $60 /hour	60	40	$ 2,400.00	$ 2,640.00
topsoil	NA - good top soil on site, no excavation required OR x m^3 (based on	N/A	N/A	$ -	$ -
excavator and operator for topsoil placement	x hrs @ $x /hour			$ -	$ -
	Subtotal Site Preparation			***$ 2,400.00***	***$ 2,640.00***
Material					
native wetland plants	549 plants (see Appendix II - Restoration Plan)				
• *shrubs and herbs (#1 pot and 411 plants)*	average $8 / plant by 411 plants	8	411	$ 3,288.00	$ 3,616.80
• *Willow stakes (plugstock and 138 plants)*	average $5 / plug by 138 Willows	5	138	$ 690.00	$ 759.00
• *seed (indicate if hydroseed or hand-seed)*	# bags/ x m^2 @ x seed/x m^2 coverage	N/A	N/A	$ -	$ -
pest barriers	$x / vole protector OR $x / beaver guard	N/A	N/A	$ -	$ -
fencing	based on 200 m of fencing	N/A	N/A	$ -	$ -
signage	based on 10 signs	N/A	N/A	$ -	$ -
mulch	x m^3 (based on x m^2 area by x average depth)	N/A	N/A	$ -	$ -
habitat complexing (LWD)	N/A, LWD to be obtained from felled trees at the site	N/A	N/A	$ -	$ -
Bird nest boxes	N/A	N/A	N/A	$ -	$ -
wildlife passage (indicate type and length)	$x / m by x m	N/A	N/A	$ -	$ -
wildlife passage inlet/outlet and interior structures	average $x / piece by x pieces OR $x / x m^2 area	N/A	N/A	$ -	$ -
rock material (indicate what it is for)	xxx m^3 of rock delivered	N/A	N/A	$ -	$ -
spawning gravel	xxx m^3 of spawning gravel delivered	N/A	N/A	$ -	$ -
	Subtotal Materials			***$ 3,978.00***	***$ 4,375.80***
Installation					
plant installation	65 hours @ $60/hour	60	65	$ 3,900.00	$ 4,290.00
vole / beaver guard installation	installed during planting OR x hours @ $x/hour	N/A	N/A	$ -	$ -
fencing and signage installation	x hrs @ $x /hour	N/A	N/A	$ -	$ -
mulch installation	x hrs @ $x /hour	N/A	N/A	$ -	$ -
installation of habitat complexing (CWD, LWD)	x hrs @ $x /hour	N/A	N/A	$ -	$ -
installation of wildlife passage, including associated structures	x hrs @ $x /hour	N/A	N/A	$ -	$ -
installing instream habitat enhancements	x hrs @ $x /hour	N/A	N/A	$ -	$ -
	Subtotal Installation			***$ 3,900.00***	***$ 4,290.00***
	TOTAL PHYSICAL WORK			***$ 10,278.00***	***$ 11,305.80***
MONITORING AND REPORTING					
monitoring / reporting sessions per year =	1 visits & reports / year				
years of monitoring =	3 years				
environmental monitoring during construction (indicate frequency)	8 hrs @ $90 /hour	90	8	$ 720.00	$ 792.00
post-construction report	8 hrs @ $90 /hour	90	8	$ 720.00	$ 792.00
annual inspection	4 hrs @ $90 /hour	90	4	$ 360.00	$ 396.00
inspection with the City upon request of any security reduction/release	Not applicable as monitoring and maintenance will be conducted by the	110	3	$ 330.00	$ 363.00
preparing annual monitoring reports	20 hrs @ $90 /hour	90	20	$ 1,800.00	$ 1,980.00
	TOTAL MONITORING & REPORTING			***$ 2,130.00***	***$ 2,343.00***
MAINTENANCE					
years of maintenance =	3 years				
watering plants	watering through summer plus other dry periods, 1 hour per week, for 15 weeks a year for three years @ $60/hour	60	45	$ -	$ -
invasive plant removal	8 hrs per year @ $60 /hour for 3 years of maintenance	60	24	$ -	$ -
replacing plants that do not survive (based on 90% success)	Assuming no more than 20 plant deaths: 20 plants x 10 plants per hou	N/A	N/A	$ -	$ -
repairing or replacing pest barriers	N/A	N/A	N/A	$ -	$ -
repairing or replacing (*indicate structure*)	N/A	N/A	N/A	$ -	$ -
	TOTAL MAINTENANCE			***$ -***	***$ -***
	Total Estimated Restoration Cost			$ 12,408.00	$ 13,648.80
	cost/m^2 of Rehabilitation			$ 22.60	

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PINCHIN

REVISED

Construction Environmental Management Plan

3182 Gladwin Road
Abbotsford, British Columbia

Prepared for:

Horn Park Place Developments Ltd.
8 Boulderwood Place
Port Moody, BC V3H 4G4

Attn: Bruno Jury
President

March 21, 2019

Pinchin File: 231866.000

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MEMBER OF PG

Issued To:	**Horn Park Place Developments Ltd.**
Contact:	**Bruno Jury**
Issued On:	**March 21, 2019**
Pinchin File:	**231866.000**
Issuing Office:	**Abbotsford, BC**
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Attachment: Attachment E: CEMP (dated March 21 2019) (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion of 3172

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1.0 INTRODUCTION

1.1 Background

Pinchin Ltd. (Pinchin) was retained by Horn Park Place Developments Ltd. (Client) to prepare the following Construction Environmental Management Plan (CEMP) for implementation during the development of 3182 Gladwin Way, Abbotsford, BC (the Site).

The CEMP is designed to identify elements of the Project that could present a hazard to the environment and recommend appropriate mitigation measures to avoid or reduce effects to the environment due to Project activities.

Specifically, the purpose of the CEMP is to:

- Document and describe measures that will be taken to prevent or mitigate potential adverse environmental effects resulting from planned work activities;
- Provide clear, concise guidance to Project personnel regarding the procedures for protection of the environment;
- Communicate environmental protection and mitigation requirements;
- Provide the basis for environmental protection and compliance with municipal by-laws, including provincial and federal acts, regulations and guidelines;
- Be used as an educational tool for training of Project personnel during the environmental orientation;
- Define Project personnel responsibilities for managing environmental risk; and
- Communicate environmental commitments to Project personnel, the Client, and regulatory agencies.

This CEMP is a living document and should be expanded and updated throughout the term of the contract to reflect changes in scheduling, Site conditions, and weather-dependent contingency measures. Changes to the CEMP should be made in consultation with Pinchin. Any necessary changes to the CEMP must be implemented before re-starting works affected by these changes.

1.2 Environmental Governance and Guidance Documents

This CEMP has been compiled with reference to the following environmental legislation, guidelines, and best management practices (BMPs):

<u>Municipal</u>

- City of Abbotsford *Streamside Protection Bylaw, 2005 (Bylaw No. 1465-2005)*; and

- City of Abbotsford *Erosion and Sediment Control (ESC) Bylaw, 2010 (Bylaw No. 1989-2010).*

Provincial

- BC Fire Code (2012);
- *BC Environmental Management Act* (s.6 – s.10, s.12, s.55, s.79 – s.80) (BC Ministry of Environment, 2018);
  - Contaminated Sites Regulation (CSR) (BC Reg. 375/96);
  - Hazardous Waste Regulation (BC Reg. 63/88); and
  - Waste Discharge Regulation (BC Reg. 320/2004);
- BC Ministry of Environment and Climate Change Strategy (MOECCS) Water Quality Guidelines (Criteria) Reports;
  - Approved Water Quality Guidelines (BC Ministry of Environment, 2017); and
  - Working Water Quality Guidelines (BC Ministry of Environment, 2017);
- *BC Wildlife Act* (s.29, s.33, s.34, s.75) (RSBC 1996, Chapter 488, 2018);
- *BC Water Sustainability Act* (SBC 2014, Chapter 15, 2018);
- *BC Weed Control Act* (RSBC 1996, Chapter 247, 2018);
- *BC Workers Compensation Act* (RSBC 1996, Chapter 492, 2018);
  - Occupational Health and Safety (OHS) Regulation (BC Reg.296/97); and
  - WorkSafe BC OHS Guidelines (WorkSafe BC, 2018).Federal

Federal

- Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines (1999);
- CCME Environmental Code of Practice for Above Ground Storage Tanks Containing Petroleum Products and Allied Petroleum Products (PN 1326, 2003);
- *Canadian Environmental Protection Act* (CEPA, 1999) (s. 64 – s.65, s.95 – s.96, s.175, s.179, s.181 – s.182, s.185 – s.189, s.193 – s.194, s.201 – s.202, s.205) (S.C. 1991, c. 33);
  - Schedule 1 – List of Toxic Substances (CEPA, 2018);
  - Environmental Emergency Regulations (SOR/2003-307);
  - Ozone-Depleting Substances Regulations, 1998 (SOR/99-7);
  - Polychlorinated biphenyls (PCB) Regulations (SOR/2008-273); and

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- Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations (SOR/2008-197);
- Fisheries and Oceans Canada (DFO) Development Guidelines for the Protection of Aquatic Habitat (DFO, 1993);
- DFO Validity of Including Turbidity Criteria for Aquatic Resource Protection in Land Development Guideline (DFO, 2008);
- *Fisheries Act* (s.23; s.34 – s.37) (R.C.S., 1985. C. F-14);
- *Migratory Birds Convention Act,* 1994 (RSBC, 1996, Chapter 488);
- Workplace Hazardous Materials Information System (WHMIS, 2015); and
- *Transport of Dangerous Goods Act* (s.5 – s.8, s.15, s.18) (1192, c.34);
  - Schedule (Sections 2 and 27); and
  - Transportation of Dangerous Goods Regulations (BC Reg. 203/85).

2.0 ROLES AND RESPONSIBILITIES

2.1 Pinchin Ltd.

Pinchin will communicate environmental requirements and provide technical advice to the Client, the Owner, and Contractors as necessary for the Project.

Pinchin will provide a copy of the CEMP to the Client for distribution to the Project owner and Contractors for planning purposes, prior to initiation of works.

2.2 Horn Park Place Ltd.

Horn Park Place Ltd. (Client) through their selected general contractor is responsible for construction and environmental performance of the Project. Contractor supervisors will be issued a copy of the CEMP and asked to read and understand the content, their roles, and their responsibilities. Upon completion of the CEMP review, the Client, Site Supervisor and/or Construction Manager will be asked to review, sign, and date the Environmental Orientation Record (Appendix II). All pertinent information within the CEMP is to be reviewed with the appropriate construction crews before Project activities begin.

Applicable mitigation measures identified within the CEMP must be followed by the Client and their subcontractors while undertaking works. Environmental issues will be reviewed in pre-job meetings at the start of each workday. It is the responsibility of all construction crew members to:

- Read or be familiar with the relevant material within his CEMP;
- Abide by the terms and conditions of this CEMP;

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- Abide by the terms and conditions of environmental regulatory approvals;
- Procure, implement, and/or install the appropriate measures at the appropriate times: and
- Keep a copy of this CEMP and the regulatory authorizations and approvals on-Site at all times during construction.

Environmental incidents, including hydrocarbon spills of any volume/size, must be reported to the Site Superintendent, Construction Manager, and Environmental Monitor immediately; the Spill Response Plan (Appendix III) must be implemented. The Client will use appropriately trained staff members to deal with potential environmental incidents related to work activities.

A copy of this CEMP, agency documents, and any other required regulatory documents on-Site at all times in a designated area, where they are readily available for review. It is Client's responsibility to consistently review the CEMP prior to engaging in works that have potential to affect environmentally sensitive areas.

2.3 Qualified Environmental Professional

The Environmental Monitor (EM) for the Project must be a Qualified Environmental Professional (QEP). A QEP is an applied scientist or technologist who is registered and in good standing with an appropriate British Columbia (BC) professional organization (e.g. professional Biologist, Agrologist, Forester, or Geoscientist).

The EM will conduct or oversee weekly inspections to ensure compliance with this CEMP, *Bylaw No. 1989-2010* and *Bylaw No. 1465-2005*. In the event that dewatering of the excavation is required the EM will oversee setup of the de-watering system and conduct water quality (turbidity) testing. Water quality standards for turbidity per the ESC Bylaw will be referenced by the EM to determine Site compliance. The maximum allowable turbidity at point of discharge into the municipal drainage system or watercourse, is 25 nephelometric turbidity units (NTU) during dry weather conditions (i.e. less than 25 mm of rain in a 24 hour period); or 100 NTU during significant rainfall)[1]. The EM will provide recommendations to the client and/or the Site foreman for implementation/correction of ESC mitigation measures as required and document weekly inspections.

[1] Economic Development & Planning Services. Guidelines for Erosion and Sediment Control (ESC) Bylaw. Available at: https://www.abbotsford.ca/Assets/2014+Abbotsford/Planning+and+Development/Planning/Erosion+$!26+Sediment+Control+(ESC)/Guidelines+For+Erosion+And+Sediment+Control+Bylaw+Exempted.pdf. Accessed January 2018.

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3.0 PROJECT CONTACT INFORMATION

Organization	Position	Name	Telephone Number
Horn Park Place Ltd.	Project Manager	Bruno Jury	250.334.3263
Pinchin Ltd.	Qualified Environmental Professional (QEP) and Environmental Project Manager	Jeremy Nilson	778.347.3271

4.0 SITE DESCRIPTION

The Project is located at the property identified by the civic address of 3182 Gladwin Road, Abbotsford, British Columbia being approximately 2.33 hectares in size (Site; Appendix I). The Site is currently characterized as being largely vegetated with two watercourses (UT1 and UT2) transecting the Site and one watercourse (Watercourse 1) flowing parallel to the east Site boundary. Figure 1, Appendix I, depicts the current Site conditions.

The following Environmentally Valuable Resources (EVR) were identified as having potential to occur within or near the Site and are assessed in this report:

- Aquatic and riparian ecosystems;
- Wildlife habitat features, such as bird nesting habitat and course woody debris (CWD); and
- Species of management concern, including provincially Red and Blue-listed or federally threatened and endangered species under Schedule I of the *Species at Risk Act* (SARA), salmonids, game fish, and regionally significant fish species.

Although Pinchin identified UT1 and UT2 as non-fish bearing, they are tributaries to Watercourse 1 which is a fish bearing watercourse (Pinchin Environmental Assessment Report, 3182 Gladwin Road, Abbotsford, BC, dated February 1, 2019).

Invasive plants of concern identified within the Site included Himalayan blackberry (*Rubus armeniacus)* and yellow archangel (*Lamium galeobdolon*)[2]. Large thickets of Himalayan blackberry and yellow archangel are within the riparian areas of UT1 and UT 2.

Based on documented geographic range, preferred habitats, and results from the review of existing occurrence data, a total of 17 species of management concern were identified as having reasonable potential to occur within the Site. Of the species of management concern, only the Roell's brothera

[2] Invasive Species Council of BC. 2014. Regulation: Provincially Noxious. Available at: http://bcinvasives.ca/invasive-species/about/regulated-invasive-species-in-bc/list-of-regulated-invasive-plants-in-bc/. Accessed January 2018.

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(*Brotherella roelli*) had historical occurrence records near the Site. Species of management concern were not detected during the field assessment, however their preferred habitat exists with the riparian areas of UT1, UT2 and Watercourse 1. Pinchin's Environmental Assessment of the Site dated February 1, 2019. Depicts further details of species of management concern.

Wildlife and wildlife habitat features detected on the Site included bird nesting habitat and bat roosting habitat within existing trees and CWD within the riparian areas of UT1, UT2 and Watercourse 1.

5.0 SCOPE OF WORK

The scope of work outlined in this section was provided to Pinchin by the Client. It was provided as an overview of the work and should not be relied upon for construction purposes.

The proposed development activities include the subdivision and development of a multi-unit residential apartment building, parking lot and a trail connecting to existing trails adjacent to the Site.

The scope of the proposed construction activities includes, but is not limited to the following: clearing, grubbing, excavation, grading, servicing, and building construction.

Figure 2, Appendix I, depicts the proposed Site plan.

6.0 POTENTIAL ENVIRONMENTAL EFFECTS

Potential environmental concerns for this Project include the following:

- Introduction of harmful or polluting substances (e.g. sediment, fuel, concrete debris, etc.) into any aquatic system;
- Disturbance to existing vegetation outside of the approved Project footprint;
- Encroachment into the modified (i.e., subject to variance) Streamside Protection and Enhancement Area (SPEA);
- Invasive plant species management including proper disposal; and
- Waste disposal (e.g. disposal of construction debris during Site preparation).

Vegetation clearing and ground disturbance activities scheduled to occur during the General Nesting Period for migratory birds (late March to mid-August[3]) have the potential to result in sensory disturbance and incidental take (i.e. inadvertent harm, mortality, or harassment to birds, nests, and eggs) of birds protected under the Provincial *Wildlife Act* and the Federal *Migratory Birds Convention Act.*

Precipitation, and wind must be accounted for in the implementation of mitigation measures.

[3] Environment and Climate Change Canada. 2017. General nesting periods of migratory birds in Canada. Available at: https://www.ec.gc.ca/paom-itmb/default.asp?lang=En&n=4F39A#_04. Accessed January 2018.

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7.0 ENVIRONMENTAL PROTECTION AND MITIGATION

7.1 General

The following environmental mitigation measures apply to the project in general:

- A copy of this CEMP will be available on-Site at all times during the Project works;
- Crew tailgate meetings must be held on a regular basis to discuss environmental concerns and responsibilities. Meeting topics must be documented and retained on Site for review;
- Site supervisors are to have a clear understanding of the approved work areas, scope, environmental issues, and mitigation measures; and be appropriately trained and capable of implementing the requirements of the CEMP;
- All environmental incidents must be reported immediately per the Spill Response Plan (Appendix III); and
- Prior to the commencement of construction, snow or silt fencing must be placed on the boundary of the SPEA to prohibit encroachment into the SPEA during construction works. Once construction works is complete, a chain link fence with signage must be placed at the boundary of the SPEA. Signage must be placed every 15 m along the permanent fence.

7.2 Erosion and Sediment Control

Project activities must be conducted in a manner that avoids the introduction of sediment or sediment-laden waters to any watercourse, ditch, or drainage system. As such, per the COA ESC Bylaw, an ESC Plan must be prepared by an ESC Supervisor. The ESC Plan is to comply with the COA ESC Bylaw and include an ESC Submission Form and an ESC Supervisor Letter of Appointment Form. Monitoring must be conducted by the ESC Supervisor as per the COA ESC Bylaw.

In addition to the ESC Plan, the following erosion and sediment control (ESC) measures and work practices are to be implemented and maintained for the duration of development.

- Sufficient quantities of ESC materials (i.e. silt fence, straw, sandbags, filter cloth, polyethylene sheeting) should be kept on-Site at all times. Requirements to install ESC measures will depend on Site conditions encountered as construction progresses. The EM will work with the construction contractor to determine requirements for deployment of specific measures;
- Excavation can lead to unstable soils that are susceptible to erosion and can result in sediment moving off-Site, either through water or wind action. Soil disturbance and

movements should be scheduled to occur during dry conditions and halted during significant rainfall, i.e., >25 mm over a 24 hour rain event;

- Excavated soil marked for off-Site disposal must be removed from the Site as soon as practical (not stored on Site for extended periods);
- Temporary stockpiles of soils are to be covered by tarps or polyethylene sheeting which is to be anchored with sandbags or stakes or adequately encircled with appropriately installed silt fencing;
- If significant rainfall is expected, loose (not compacted), rough or sloped soils (including trenches), must be covered with poly or equivalent, if inactive, and at the end of each workday for active piles, in advance of storm events;
- Temporary stockpile locations should be at least 15 m away, if practical, and a minimum of 3 m or more from any catch basin, ditches and/or Site boundaries;
- Storm inlet drains may be present on the paved roadways. Storm inlet drains located on or near the Site that collect runoff should be protected with catch basin filter sac inserts to avoid the introduction of eroded soils into the municipal drainage system and/or surrounding natural waterways;
- If sediment-laden water is discharged from the Site, turbidity levels must meet the City of Abbotsford guidelines for turbidity (i.e., turbid water must not exceed 25 nephelometric turbidity units (NTU) during dry weather conditions (i.e. less than 25 mm of rain in a 24 hour period); or 100 NTU during significant rainfall)[4];
- Exposed soils on-Site or within the access route must be stabilized (e.g. seeded with grass seed mixture or spread with straw or other surface protection); and
- Sediment control structures (including polyethylene sheeting) must remain in place until the works are complete and disturbed areas are permanently stabilized. Sediment control structures must be removed prior to demobilization.

7.3 Air Quality and Dust Control

The majority of air emissions generated during the Project are anticipated to result from the operation of heavy equipment and vehicles. All equipment and vehicles used on-Site will be in good working order and will be checked for maintenance concerns by the contractors at the beginning of each shift.

[4] Economic Development & Planning Services. Guidelines for Erosion and Sediment Control (ESC) Bylaw. Available at: https://www.abbotsford.ca/Assets/2014+Abbotsford/Planning+and+Development/Planning/Erosion+$!26+Sediment+Control+(ESC)/Guidelines+For+Erosion+And+Sediment+Control+Bylaw+Exempted.pdf. Accessed January 2018.

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7.3.1 Dust Control

Dust generation has a low potential to be an environmental concern given the location of works and anticipated climate conditions. Access roads or shoulders should be kept clean of dirt to mitigate potential for both dust and sediment laden runoff. A gravel access pad with a minimum of 3" crushed rock is to be installed at the access driveway. Water spray, the use of additional clean gravel or other dust mitigation techniques may be required if the work Site is generating dust that is migrating beyond the Project boundaries.

7.4 Wildlife and Wildlife Habitat

The contractor and subcontractors should implement the following wildlife and wildlife habitat protection measures:

- A pre-construction bird nest survey should be conducted by a QEP prior to vegetation clearing, ground disturbance, or demolition of buildings during the bird nesting window (see below):
  - If detected, a species-specific, no-disturbance setback would be established while the nest is active;
  - Nests protected under the BC *Wildlife Act* (i.e. "(ii) the nest of an eagle, peregrine falcon, gyrfalcon, osprey, heron, or burrowing owl, or (iii) the nest of a bird not mentioned in (ii), when the nest is occupied by a bird or its egg unless authorized under permit" [5]) and species listed as Threatened or Endangered under Schedule 1 of the SARA would be protected year-round from destruction;
  - Nest surveys will take into consideration the habitat requirements and habits of all bird species listed as Threatened or Endangered under Schedule 1 of the SARA with potential to nest on-Site; and
  - Results of the bird nest survey are valid for five days during the regional nesting period for migratory birds (March 10 to August 20), after which, additional surveys may be recommended in consultation with a QEP;
- Crews will dispose of any garbage in secure bins and keep the Site clean and free of food items to deter animals. Food wastes should be removed from Site daily; and
- A general wildlife sweep will be conducted prior to works by visually searching the Site.

[5] B.C. Ministry of Transportation and Infrastructure. Wildlife – Possess, Take, or Destroy Bird Nest and/or Egg. Available at: http://www.th.gov.bc.ca/key_enviro_topics/wildlife_possess_brief.html. Accessed January 2018.

7.5 Works within the Streamside Protection and Enhancement Area (SPEA)

- No work shall be undertaken within the SPEA with the exception of habitat enhancement and/or restoration works authorized by the EM;
- Prior to ground disturbance, the boundaries of the SPEA must be flagged by a QEP and surveyed by a BC Land Surveyor. The SPEA boundary must then be clearly delineated with silt fencing and orange snow fencing. No grade change, storage of materials or equipment is permitted within the SPEA or within the critical root zone of trees growing in the SPEA;
- Machines, equipment or foot traffic are not permitted inside of the SPEA;
- Soil compaction is a concern and hence heavy or repeated traffic on these soils is to be avoided including during enhancement or restoration activities;
- Any trees that are removed should be felled away from or out of watercourses;
- Appropriate fencing, such as spill cedar fencing with wire mesh or chain-link fencing must be installed on the boundary of the SPEA;
- Permanent fencing must be installed along the north property boundary and the subject property. Appropriate fencing could include the existing barbed wire fencing which would need to be extended and repaired or an alternate option for fencing such as a chain-link fence; and
- Permanent buildings are to be situated at least 3 m from the SPEA. Works that would cause temporary compaction of soil are not to occur within the 3 metre buffer from the boundary of the SPEA. The 3 m buffer between the SPEA and future buildings provides adequate space for construction activities, tree retention/establishment (i.e., based on the existing vegetation) and access for building maintenance.

7.6 Fish and Fish Habitat

Watercourse 1, a permanent fish-bearing watercourse is located adjacent west of the Site. Two tributaries (UT1 and UTB) transect the Site and flow into Watercourse 1. Protection of fish habitat can be facilitated through diligent erosion and sediment control (Section 7.2), on-Site SPEA delineation and fencing and water management (Section 9.0) practices.

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7.7 Vegetation Management

The contractor and subcontractors must conduct works to avoid or reduce removal or damage to vegetation outside of the approved Project footprint during access and construction activities. The following mitigation measures should be implemented to avoid or reduce damage to vegetation outside of the Project footprint:

- Vegetation clearing and stripping of top soil should be limited to the approved Project footprint and associated access areas;
- According to the Invasive Alien Plant Program Application, noxious or invasive plants have been identified within the subject property within 100 m of the subject property. Based on Pinchin's environmental Assessment, Himalayan black berry and yellow archangel inhabit the Site. However, a pre-construction survey should be conducted to identify the presence of additional noxious and invasive plant. If such species are found they should be removed and maintained as prescribed by a QEP;
- Native vegetation should be retained where possible for as long as possible to limit the amount of exposed soils on-Site and minimize disruptions to the environment;
- Temporary barrier fencing should be installed at the approved construction boundary limits to avoid encroachment and/or unnecessary disturbance to native vegetation or compaction of adjacent soils;
- The contractor and subcontractors must conduct works in a manner that minimizes the destruction, scarring or defacing of trees and woody vegetation;
- Where the critical root zone of any tree to be retained, either on the parcel or on an adjacent parcel is within 5 m of any excavation, demolition, construction or engineering works, Tree Protection Barriers must be installed around the tree;
- Carefully clean clothes, boots, hand tools, and other equipment used for treating invasive plants before leaving the Site;
- Any soils that are to be imported to the Site for backfill should be sourced from a reputable supplier to prevent introduction of invasive/noxious weeds; and
- Machinery should be clean and free of soils and plant materials prior to mobilization to and demobilization from the Project area to avoid the introduction or spread of invasive species.

Please see the Arborist Report prepared by Central Valley Arborist Consulting Ltd. for additional details.

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8.0 SOIL HANDLING

Contaminated soil is not expected to be encountered in association with these works. If suspected (i.e. by sight or smell), a QEP shall be immediately notified and laboratory testing for soil contaminants will be conducted as required. Suspected contaminated soil shall not be removed from Site until the soil has been tested and test results have been reviewed.

Contaminated soil shall only be received by an authorized landfill. The Contractor shall dispose of all soil in accordance with regulations under the *Environmental Management Act*.

9.0 WATER MANAGEMENT

In addition to the mitigation measures outlined in Section 7.2, the following measures specific to water management during construction should be implemented:

- Stormwater runoff from work areas with potential to contain hydrocarbons, waste, uncured or powdered concrete, paint, soil particles, or other environmentally harmful substances must not be allowed to discharge off the Site;
- The use of chloraminated water (e.g. city supplied drinking water) should be limited as it can affect environmentally sensitive areas (i.e. UT1. UT2 and Watercourse 1) and is more harmful to fish than chlorinated water. If services are to be flushed prior to commissioning, the water should be discharged into the sanitary system which will require a City of Abbotsford Wastewater Discharge Permit from Source Control; and
- Any construction waste must be stored and/or disposed of in a manner that avoids the potential for off-Site leaching or entry into any watercourse, ditch, or drainage system.

Water that has come into contact with concrete and concrete products has the potential to be basic (i.e. pH > 7) and can be highly toxic to aquatic organisms. If concrete pours are required, the following will be implemented:

- Catch basins and ditches on-Site ultimately drain to the surrounding aquatic environment. Concrete or cement debris and abrasive grits must not enter any watercourse, ditch, drainage system, or catch basin to avoid adverse effects to fish and fish habitat;
- Large horizontal concrete pours should be avoided during heavy rains to prevent the potential for concrete impacted surface water generation;
- Waste materials must be retained for disposal at an appropriate facility; and
- Spills must be reported immediately to the Client representative.

Please refer to project Stormwater Management Plan(s) for the development for additional details of the proposed stormwater management works.

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Note that it the proposed development will be connected to existing stormwater infrastructure located within Verdon Way.

10.0 FUELS AND EQUIPMENT MANAGEMENT

A laydown area must be designated at the Site before Project activities begin. Appropriate signage and employee training awareness should be established regarding the laydown location and protocols. If re-fuelling is required on-Site, the following actions will be taken to avoid fuel and oil leaks and to avoid or reduce potential environmental effects:

- Fuel handing, storage and fuelling will comply with both Canadian Council of Ministers of the Environment (CCME) Codes of Practice and the Ministry of Environments "A Field Guide to Fuel Handling, Transportation & Storage[6];
- All mobile re-fuelling of equipment and fuel and chemical storage must be conducted a minimum of 15 m from the top of bank of watercourses or drainage systems (i.e., catch basins or swales), if present;
- Fuelling operations will be supervised at all times and employees will be adequately trained in the proper dispensing of fuel;
- All fuel and chemicals will be clearly marked as per Workplace Hazardous Materials Information System (WHMIS) and Transportation of Dangerous Goods (TDG) requirements;
- In the event of a spill, the Emergency Response Plan (Appendix II) will be implemented;
- All heavy equipment will be kept in good repair and leak free. The operator will check the condition of the equipment, including hoses and fittings, at the beginning of each shift;
- Fire extinguishers and other emergency response equipment and supplies must be kept in known and visible locations and access to them will not be blocked by other materials or equipment. A list of emergency contacts will be posted at predetermined, accessible and visible locations, as well as kept with the emergency response equipment;
- The Spill Response Plan (Appendix III) will be posted at the work Site, and all personnel made aware of its content and location of response materials, as well as emergency contact names and numbers. The Spill Response Plan will be implemented immediately if a spill occurs;

[6] Ministry of Water, Land and Air Protection. A Field Guide to Fuel Handling, Transportation and Storage, 3rd edition. 2002. http://www.env.gov.bc.ca/epd/industrial/oil_gas/pdf/fuel_handle_guide.pdf

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- Machinery (e.g., truck, lift, excavator, bulldozer, non-operating generator) must be equipped with a drip tray below the oil pan when not in use (i.e. when parked for more than six hours). Operating stationary machinery and parked machinery will be located as far away from the top of bank of any watercourse, ditch, or drainage system as practical;
- Emergency response hydrocarbon spill kits, and personnel trained in their deployment and use, must be on the work Site at all times;
- Oil spill response materials and equipment, such as sorbent pads, booms and leak proof containers, will be kept on-Site in sufficient quantities and in an easily accessible location to contain and clean up the amount of fuel, oil or other petroleum hydrocarbons stored on-Site;
- All solid waste will be collected and disposed of appropriately, off-Site;
- All grease and oil required for maintenance will be properly applied. Any excess will be cleaned and disposed of in an environmentally appropriate manner, as will all containers, lids, and contaminated cloths and applicators. Used oil will be collected and recycled;
- A complete set of MSDS sheets will be kept for all chemicals on-Site; and
- A list of emergency contacts will be kept on-Site with the emergency response equipment.

11.0 WASTE MANAGEMENT

Project waste management practices must comply with the BC *Environmental Management Act*, the BC *Hazardous Waste Regulation*, and the *Transportation of Dangerous Goods Act* and Regulations. All activities will be conducted in an environmentally responsible manner. The following procedures will be implemented for waste management:

- Waste will be reduced to the extent feasible and an adequate number of appropriate waste containers will be made available. Waste should be categorized and labeled appropriately;
- Domestic waste will be collected daily and stored in closed containers until disposed of at the local landfill. Recyclable waste that can be collected will be segregated and taken to an appropriate facility;
- If hazardous materials are identified, proper handling and disposal will be conducted as per WorkSafe BC and the *Hazardous Waste Regulations* and *Transportation of Dangerous Goods Act* and Regulations. These include, but may not be limited to: appropriate personal protective equipment (PPE), storage and handling requirements, identification and personnel training;

Attachment: Attachment E: CEMP (dated March 21 2019) (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion of 3172

- Chemical and liquid waste (i.e., waste oil, etc.) will be stored within secondary containment in the predefined chemical storage area. Chemical waste will be properly disposed of at an appropriate waste facility. Disposal of chemical wastes will be in accordance with the Transportation of Hazardous Goods Directorate, with proof of disposal records maintained for auditing purposes;
- All construction will minimize waste where practical;
- Designate a safe area for temporary waste storage with adequate containment, secure and protected from weather until removal and disposal can be arranged;
- Categorize and label all waste and recycling materials appropriately. Sampling and analysis of waste materials may be required to determine the appropriate disposal option;
- Check to ensure that Hazardous Waste registration, storage, permit and transportation requirements are met, if applicable; and
- Remove all waste materials from the Site as soon as possible in accordance with all applicable standards and regulations.

12.0 SPILL PREVENTION AND EMERGENCY RESPONSE PLAN

In the event of a chemical spill or other environmental incident, the Client representative and QEP must be notified immediately. Spills to water are required to be reported. The Project will comply with the Spill Response Plan (Appendix III).

13.0 HOUSEKEEPING AND SITE CLEANUP

The Site should be maintained in a clean and tidy manner throughout the construction period. Access roads should be free of sediment and debris in order to avoid off-Site migration of sediment. The following measures should be implemented upon completion of works:

- Roads and work areas must be kept free of mud and dust that have the potential to erode or wash into waterways;
- Removal of surplus materials and wastes from the work Site, and subsequent disposal in appropriately authorized facilities; and
- Re-establishment of ground cover on disturbed areas must be established as soon as possible.

Attachment: Attachment E: CEMP (dated March 21 2019) (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion of 3172

14.0 ENVIRONMENTAL MONITORING

The purpose of prescribed environmental monitoring is to inspect, evaluate, and report on the environmental protection measures utilized during completion of the Project and to provide recommendations for adjusting measures as may be necessary throughout all Project phases.

The EM should monitor implementation of measures to avoid potential effects to the environment. Weekly inspections are recommended for the duration of Project activities until soils on Site are permanently stabilized. A reduced monitoring frequency may be acceptable at the discretion of the EM during the dry season or if project activities are low risk and the Site is generally stable. Inspections should be documented by Site photographs and a report summarizing construction activities, Site observations, water turbidity measurements, implemented mitigation measures and recommendations.

The EM has the authority to halt or modify the works in order to protect the environment, if adverse effects are anticipated to occur as a result of Project activities. The EM will be obligated to advise the appropriate regulatory authorities if construction activities do not comply with regulatory requirements and when corrective actions are not implemented.

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15.0 TERMS AND LIMITATIONS

This CEMP was developed in general accordance with currently acceptable practices for the development of CEMPs and specific Client requests, as applicable to this Site. This CEMP was prepared for the sole use of the Client and contractors working under their direction. Any use which a third party makes of this CEMP, or any reliance on or decisions to be made based on it, are the sole responsibility of the third parties.

Pinchin Ltd. will not be responsible for any consequential or indirect damages. Pinchin Ltd. will only be liable for damages resulting from negligence of Pinchin Ltd. Pinchin Ltd. will not be liable for any losses or damage if client has failed, within a period of two (2) years following the date upon which the claim is discovered within the meaning of the BC Limitations Act 1996, to commence legal proceedings against Pinchin Ltd. to recover such losses or damage.

The information provided in this CEMP is based upon analysis of available information. In evaluating the Site, Pinchin Ltd. has relied in good faith on information provided by other individuals noted in this CEMP. Pinchin Ltd. has assumed that the information provided is factual and accurate. Pinchin Ltd. accepts no responsibility for any deficiency, misstatement or inaccuracy contained in this EMP as a result of omissions, misinterpretations, or fraudulent acts of persons interviewed, contacted, or reports that were reviewed.

Pinchin Ltd. makes no other representations whatsoever, including those concerning the legal significance of its findings, or as to other legal matters touched on in this report, including, but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and these interpretations may change over time.

231866.000 REVISED CEMP, 3182 Gladwin Road, Abbotsford, BC, Horn Park Place, March 21 2019

Template: Master Report for Phase I ESA Stage 1 PSI – National Master, EDR, September 15, 2017

Attachment: Attachment E: CEMP (dated March 21 2019) (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion of 3172

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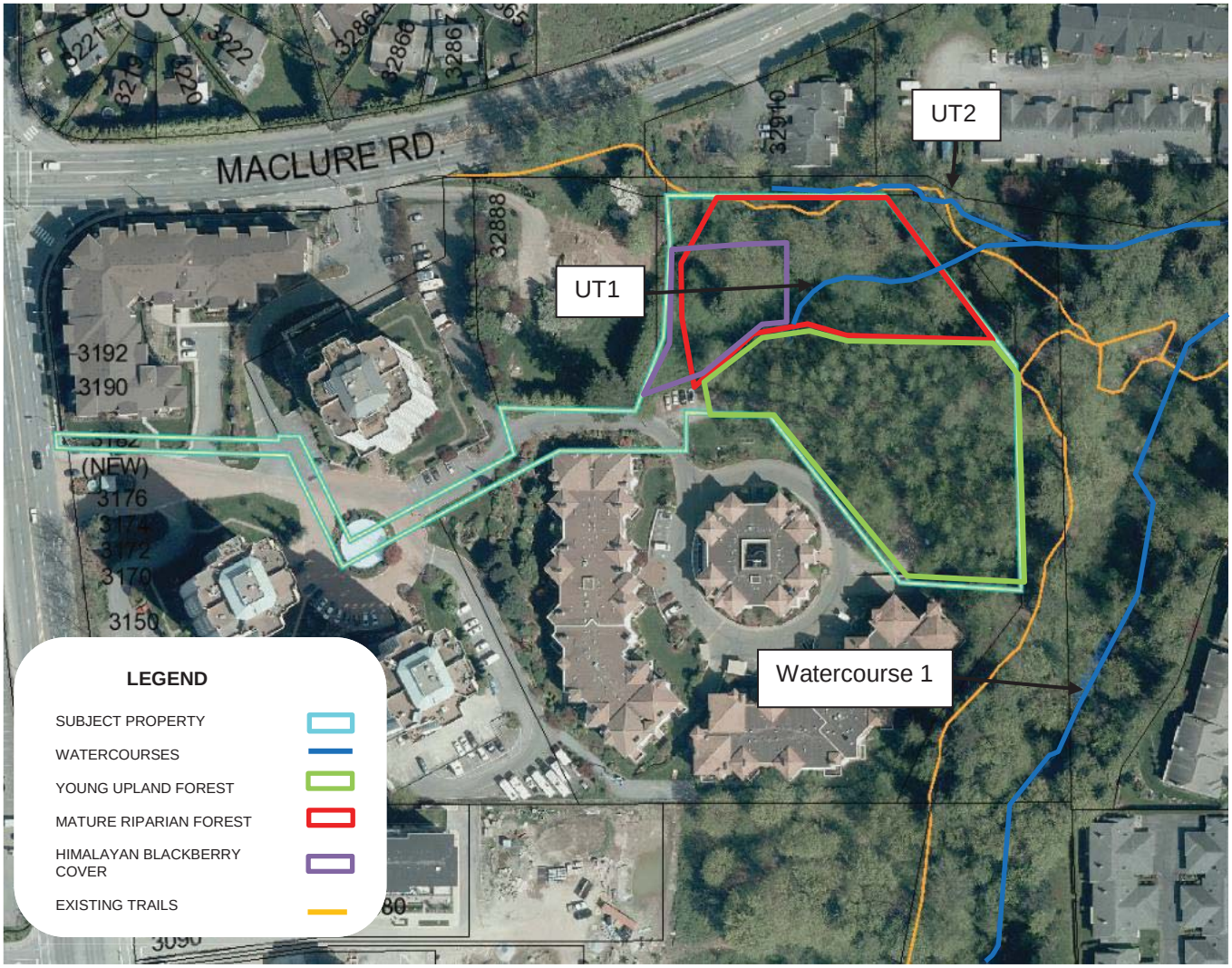
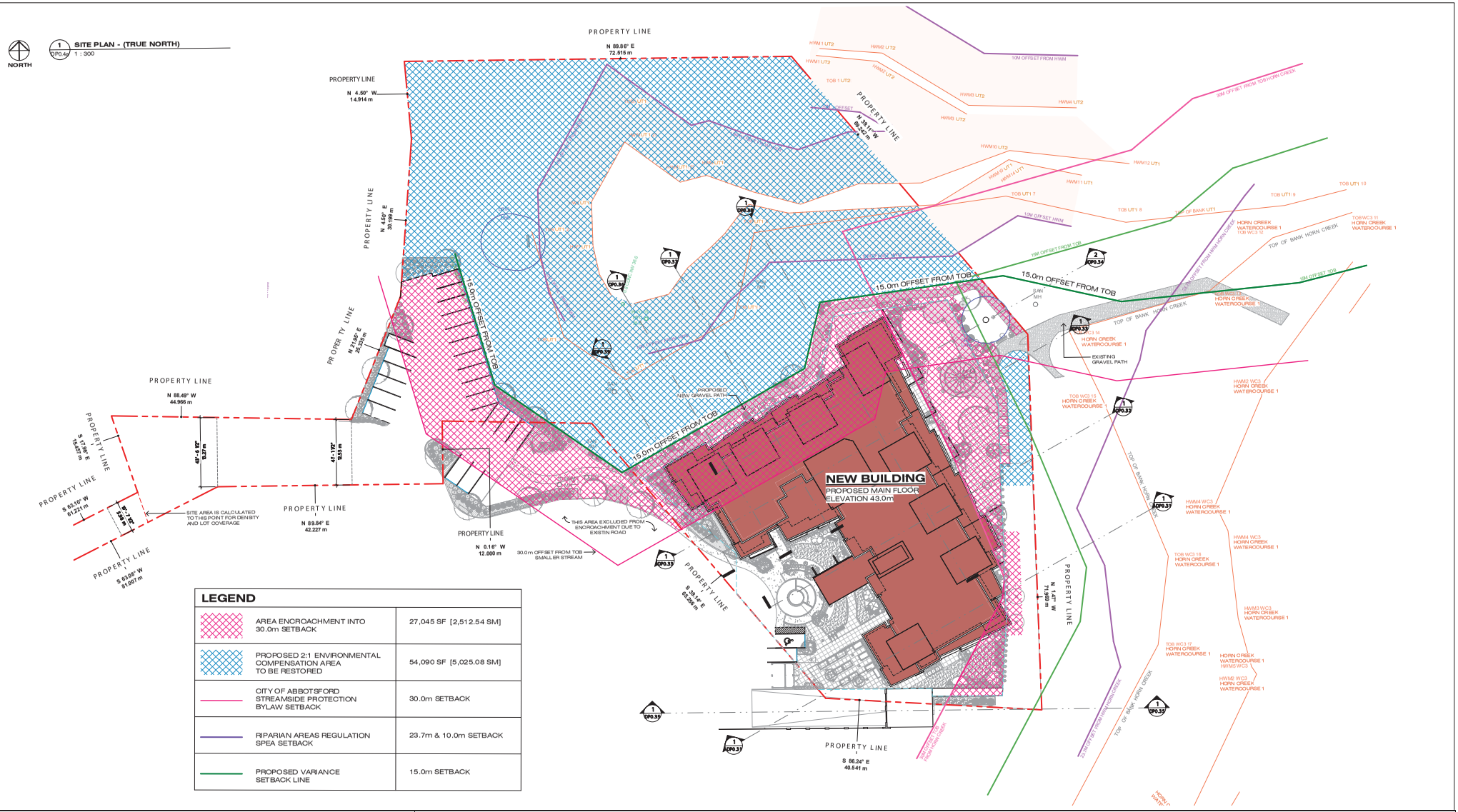
APPENDIX I

Figures



CLIENT NAME:	HORN PARK PLACE DEVELOPMENTS LTD.				
PROJECT NAME:	CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN				
LOCATION:	3182 GLADWIN ROAD, ABBOTSFORD, BC				
TITLE:	EXISTING SITE CONDITIONS				
DATE: NOV 2018	PROJECT #: 122563.000	IMAGE SOURCE: ABBOTSFORD WEBMAP	DRAWN BY: BW	CHECKED BY: JN	FIGURE NO.: 1

Attachment: Attachment E: CEMP (dated March 21 2019) (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion of 3172



PINCHIN

CLIENT NAME:	HORN PARK PLACE DEVELOPMENTS LTD.
PROJECT NAME:	CONSTRUCTION ENVIRONMENTAL MANAGEMENT PLAN
LOCATION:	3182 GLADWIN ROAD, ABBOTSFORD, BRITISH COLUMBIA
TITLE:	PROPOSED SITE PLAN
FIGURE NO.	2

DATE:	PROJECT NO.:	IMAGE SOURCE:	DRAWN BY:	CHECKED BY:
MARCH 2019	231866.000	CHPA	B. WILLIAMS	J. NILSON

6.8.11.f

Attachment: Attachment E: CEMP (dated March 21 2019) (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion of 3172

APPENDIX II

Environmental Orientation Record

ENVIRONMENTAL ORIENTATION RECORD

The Environmental Orientation Record (EOR) shall be completed for all work involving an environmental component. The Project Supervisor is responsible for ensuring that the environmental requirements of the work are reviewed with the workers before work is started, and that a record of the discussion is documented on the EOR. For work undertaken by Contractors, this form must be signed by the Project Supervisor (or work coordinator) and the Contractor. By signing the EOR, the Project Supervisor and/or the Contractor indicate they have been advised of the environmental requirements of the contract. The EOR shall be filed with the contract documents.

Date:		File No.
1 **Project Information:**		
Project Title		
Project Description		
Project Location		
2 **Contractor Information:**		
Company Name		
Company Address		
Site Contact/Representative Name		
Phone #	Cell #	E-mail
3 **Key Environmental Issues and Requirements Review and record the environmental issues and requirements of the work as specified in the Environmental Management Plan (EMP), Environmental Field Guides or other environmental requirements (e.g. Contract clauses). (Use the checklist below to guide discussion).**		

Is there an EMP, Field Guide, or other environmental requirement for the work?		☐ Yes	☐ NA
Environmental Issues	Environmental Protection Requirements	Discussed	NA
Soil erosion / compaction		☐ Yes	☐ NA
Vegetation disturbance or removal		☐ Yes	☐ NA

Attachment: Attachment E: CEMP (dated March 21 2019) (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion of 3172

Generation and disposal of hazardous substances		☐ Yes	☐ NA
Generation and disposal of waste		☐ Yes	☐ NA
Contaminated soil management		☐ Yes	☐ NA
Spill of hazardous substances		☐ Yes	☐ NA
Fuel and flammable storage		☐ Yes	☐ NA
Dust generation / other air emissions		☐ Yes	☐ NA
Water quality – erosion and siltation		☐ Yes	☐ NA
Fish and Aquatic - Habitat alteration, disturbance or loss		☐ Yes	☐ NA
Wildlife and Bird – Habitat Alteration, Disturbance or Loss		☐ Yes	☐ NA
Disturbance to Heritage Resources / Archaeological Sites		☐ Yes	☐ NA
Visual Impacts / Noise Concerns		☐ Yes	☐ NA
Property Considerations		☐ Yes	☐ NA
Disruption of Recreation Use		☐ Yes	☐ NA
Public Safety Concerns		☐ Yes	☐ NA
Do the tools and equipment meet the requirements?		☐ Yes	☐ NA

4 **Permits and Approvals Information:** Ensure the necessary environmental permits and approvals relating to the work have been obtained prior to starting work.		
Are environmental notifications, permits, licenses or approvals required? If so, list applicable regulatory requirements.	☐Yes	☐NA
Have the permits, licenses and approvals obtained and / or checked? If so, identify permit reference numbers.	☐Yes	☐NA
5 **Emergency Response Plan**		
Has the Emergency Response Plan been discussed?	☐Yes	☐NA
Has the Oil and Chemical Spill Response Plan been discussed?	☐Yes	☐NA
Are there spill kits available on location? If so where are they located?	☐Yes	☐NA
6 **Environmental Incident Reporting:** Ensure Contractor is aware of EIR system.		
Environmental Incident Reporting Procedures discussed?	☐Yes	☐NA
7 E**nvironmental Competency**		
Demonstrated applicable environment training for appropriate crew members/supervisors?	☐Yes	☐NA
Site environmental monitor to be on-site in lieu of training?	☐Yes	☐NA

The undersigned has been briefed on the environmental requirements of the work as detailed above.

For work undertaken by the Contractor:

Signed: _____ Date: _____

Environmental Monitor:

Signed: _____ Date: _____

Additional Comments:

_____

_____

_____

Attachment: Attachment E: CEMP (dated March 21 2019) (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion of 3172

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APPENDIX III

Spill Response Plan

SPILL RESPONSE PLAN

INCIDENT

If a spill of fuel, oils, lubricants or other harmful substances occurs at the site, the following procedures will be implemented.

Spill Response Steps

1. ENSURE SAFETY
2. **STOP THE FLOW** (when possible)
3. SECURE THE AREA
4. CONTAIN THE SPILL
5. **NOTIFY/REPORT** (PEP 1-800-663-3456)
6. CLEAN-UP

(Circumstances may dictate another sequence of events)

ENSURE SAFETY

- Ensure Personal, Public and Environmental Safety
- Wear appropriate Personal Protective Equipment (PPE)
- Never rush in, always determine the product spilled before taking action
- Warn people in immediate vicinity
- Ensure **no ignition sources** if spill is of a flammable material

STOP THE FLOW (when possible)

- Act quickly to reduce the risk of environmental impacts
- Close valves, shut off pumps or plug holes/leaks, set containers upright
- Stop the flow of the spill at its source

SECURE THE AREA

- Limit access to spill area
- Prevent unauthorized entry onto site

CONTAIN THE SPILL

- Block off and protect drains and culverts
- Prevent spilled material from entering drainage structures (ditches, culverts, drains)

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- Use spill sorbent material to contain spill
- If necessary, use a dike, berm or any other method to prevent any discharge off site
- Make every effort to minimize contamination
- Contain as close to the source as possible

NOTIFY/REPORT

- Notify appropriate Site Supervisor or alternate (EM) and COA representative of incident (provide spill details)
- When necessary the first external call should be made to (see spill reporting requirements): **Provincial Emergency Program (PEP) 1-800-663-3456 (24 hours)**
- Provide necessary spill details to other external agencies (see spill reporting requirements)
- Complete an Environmental Incident Report (EIR)

CLEAN UP

- All equipment and material used in clean-up (*e.g*. used sorbents, oil containment materials etc.) must be disposed of in accordance with provincial requirements.
- Accidental spills may produce special wastes (*e.g*. material with > 3% oil) and contaminated soil. All waste disposals must comply with the B.C. Hazardous Waste Regulations and the *Waste Management Act.* The EM will assist in compliance with provincial regulations.
- Waste sorbent material may not be disposed of in a landfill without prior approval from the province.
- If contaminated soil is encountered it must be treated and dealt with as required on a site-specific basis, and must comply with the requirements of the *B.C. Contaminated Sites Regulations.*

SPILL REPORT

The report should include the following information:

- Name and phone number of person reporting the spill
- Name and phone number of person involved with the spill
- Location and time of the spill
- Type and quantity of material spilled
- Cause and effect of spill
- Details of action taken or proposed to contain the spill and minimize its effect
- Names of agencies on the scene
- Names of other persons or agencies advised

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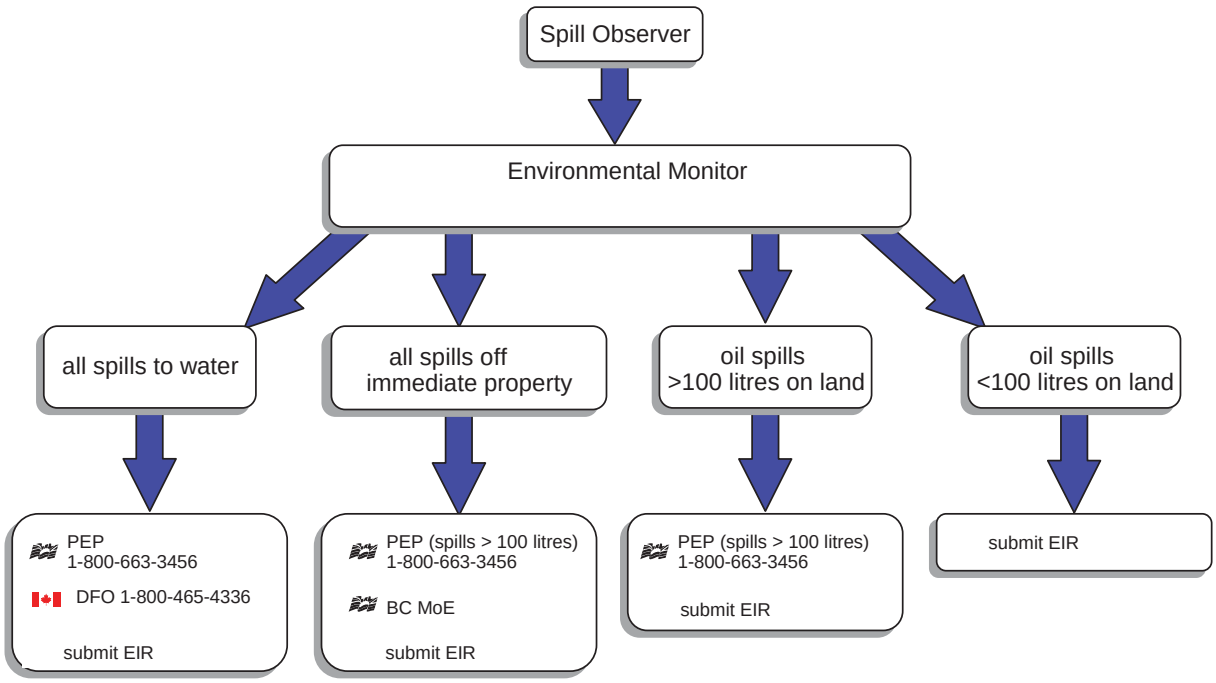
Spill Reporting Notification Chart



Reportable Spill Quantity List

List of externally reportable quantities for commonly used substances

Product	Quantity
Class 2.1 – flammable gas (e.g., propane)	10 kg or 10 min.
Class 2.2 – non flammable gas (e.g., SF6, CO2)	10 kg or 10 min.
Class 3 – flammable liquids	100 litres
Class 8 – corrosive liquid acids and caustics (e.g., battery acid)	5 kg or litres
Class 9 – environmentally hazardous (e.g., PCB's, used ethylene glycol)	1 kg or litre
Oil & Waste Oil	100 litres
Other Substances (e.g., new antifreeze, power-wash water)	200 kg or litres
Pesticides & Herbicides	1 kg or litre

ALL SPILLS TO WATER ARE REPORTABLE

If in doubt as to whether or not to report a spill, err on the side of caution and report the spill.

The City of Abbotsford must also be notified of any reportable spill.

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CENTRAL VALLEY
ARBORIST CONSULTING LTD.

CERTIFIED ARBORIST

604-850-4938
P.O Box 82, Station A
Abbotsford, BC V2T 6Z4

ARBORIST REPORT

For

3182 Gladwin Road

Abbotsford, BC

Prepared for: Horn Park Place Developments Ltd.
8 Boulderwood Place
Port Moody, BC

Prepared by: Jason Emery
Certified Arborist ISA #PN-8228A
Qualified Tree Risk Assessor

Date: March 21st 2018

Web: www.arborist-tree.com • Email: kwak@shaw.ca

Attachment: Attachment F: Arborist Report, prepared by Central Valley Arborist Consulting Ltd. (dated March 21, 2018) (PDS 045-2019 : DP with

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CENTRAL VALLEY
ARBORIST CONSULTING LTD.

604-850-49
P.O Box 882 Abbotsford Statio
Abbotsford, BC V2T 7

March 26, 2018

Horn Park Place Developments Ltd.
8 Boulderwood Place
Port Moody, BC

Introduction

The following arborist report has been prepared by Jason Emery (Certified Arborist) for the proposed development located at 3182 Gladwin Road, Abbotsford BC.

On March 18th 2018, Central Valley Arborist Consulting Ltd was retained by Bruno Jury to undertake an assessment of the existing trees located at the proposed development and to give a tree inventory with the intent of making recommendations for removal and preservation. The suitability for tree retention was evaluated based on the health of the trees and their location in relation to the proposed building envelopes and infrastructure. This report also outlines the existing condition of the trees on and adjacent to the property, summarizes the proposed tree removals and retention trees as well as suggested guidelines for protecting the remaining trees during the construction process. (Note: The objective of this report is to ensure the proposed development is in compliance with the City of Abbotsford Tree Preservation Bylaw #1831-2009.)

Site Overview

The subject site is a flat lot with no existing building located on it. There is an existing Environmental Sensitive Area (ESA) with a setback outside the north and east property line. The proposed development consists of the creation of a new apartment building with driveway access from Gladwin Road. (See Site Plan for details)

On Site Evaluation

On March 21st 2018, I attended the site to inventory and assess the trees. Information was documented with respect to common tree name, diameter at breast height (DBH), overall health and structural condition, retention value and required root zone protection has been suggested. The trees were tagged and are numbered 1 to 55, 97, and 698. In total there are 56 trees with a DBH 20 centimeters or greater located on the proposed development property. (See attached Evaluation Summary and Site Plan for details)

Note: The rating criteria for "Overall Tree Health and Structural Condition" and "Tree Retention Value Rating" is located on page #5 of this report.

Attachment: Attachment F: Arborist Report, prepared by Central Valley Arborist Consulting Ltd. (dated March 21, 2018) (PDS 045-2019 : DP with

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Tree Retention and Removal

On-Site Trees to be RETAINED within the Subject Property

- There are a total of 26 trees to be retained (20 trees between 20 and 30 centimeters DBH and 6 trees with a DBH 30 centimeters or greater.) All 26 trees are within the ESA.

On-Site Trees to be REMOVED within the Subject Property

- There are a total of 30 trees that require removal (22 between 20 and 30 centimeters DBH and 8 trees with a DBH 30 centimeters or greater.) Of which there are:
  - 30 trees in direct conflict with the proposed development.
  - 30 trees considered to have a Low Retention Value (Poor Species Profile)
  - 0 trees assessed to have a poor Overall Health and Structural Rating and/or are within conflict with the proposed development.
  - 0 trees assessed to be hazardous/dead (See attached Preservation Summary)

Off-Site Trees with in City Lands:

- Not applicable to this project.

Off Site Trees on Neighboring Private Property:

- Tree Tag 43 and Trees Labeled A-E located on neighboring property to the East.

Tree Replacement

The replacement trees must meet city requirements for minimum size at planting (i.e. 6 cm DBH for deciduous species and 3.0 meters height for coniferous species) and criteria. Number of replacement trees required for this project will be determined by the City of Abbotsford.

Construction Guidelines

Six times the diameter was used to determine the optimal root protection zone (RPZ). **The optimal root protection zone is to be measured in the field from the outer edge of the stem of the tree**. The RPZ is the area around the tree in which no grading or construction activity may occur without project arborist approval and is required for the tree to retain good health and vigor.

The following are tree preservation guidelines and standards for the RPZ's

- No soil disturbance or stripping;
- The natural grade shall be maintained within the protection zone;
- No storage, dumping of materials, parking, underground utilities or fires;
- Any plan affecting trees should be reviewed by a consultant including demolition, erosion control, improvement, utility, drainage, grading, landscape and irrigation;
- Special foundations, footings and paving designs are required if within the tree protection zone;

- Utilities should be routed around the RPZ;
- Excavation within the tree protection zone should be supervised by a consulting arborist;
- Surface drainage should not be altered so as to direct water into or out of the RPZ; and
- Site drainage improvements should be designed to maintain the natural water table levels within the RPZ.

Respecting these guidelines will prevent changes to the soil and rooting conditions, wounding of the trees and contamination due to spills and waste. Any plans for work or activities within the RPZ that are contrary to these guidelines should be discussed with the project arborist so that mitigation measures can be implemented.

Tree Protection Fences

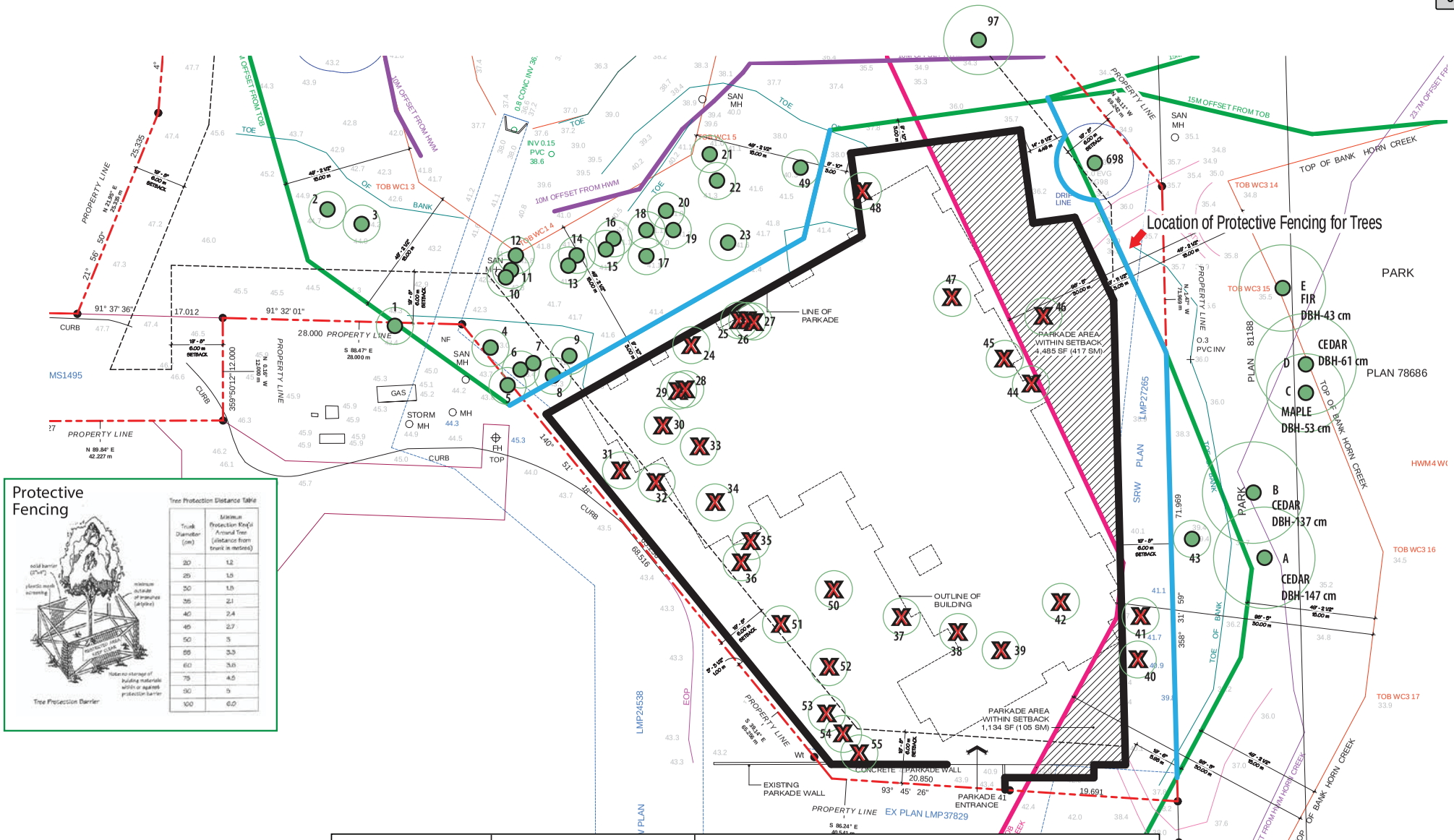
Prior to any construction activity on site, tree protection fences must be constructed at the specified distance from the tree trunks. The protection barrier or temporary fencing must be at least 1.2 meters in height and constructed of 2 by 4 lumber with orange plastic mesh screening. This must be constructed prior to tree removal, excavation or construction and remain intact throughout the entire period of construction. (See attached Fencing Instructions)

If there are any further questions, please do not hesitate to contact our office.

Respectfully submitted,

Jason Emery
Certified Arborist PN- 8228A
Qualified Tree Risk Assessor (TRAQ)

Attachment: Attachment F: Arborist Report, prepared by Central Valley Arborist Consulting Ltd. (dated March 21, 2018) (PDS 045-2019 : DP with



Client:
Bruno Jury

Site Location:
Horn Park Place
3182 Gladwin Road
Abbotsford, BC

CENTRAL VALLEY
ARBORIST CONSULTING LTD.
604-850-4938

56	Total tagged trees located on development property 20cm (DBH) or greater
26	Total retained trees 20cm (DBH) or greater
30	Total trees removed 20cm (DBH) or greater
6	A-E & #43 Trees located on neighbouring property to the East

Attachment: Attachment F: Arborist Report, prepared by Central Valley Arborist Consulting Ltd. (dated March 21, 2018) (PDS 045-2019 : DP with

TREE RATING CRITERIA

Overall Health and Structural Rating

- **Excellent** = Tree of possible specimen quality, unique species or size with no discernible defects, or heritage tree.
- **Normal** = Tree is in good condition with no significant structural weaknesses or health concerns considering its growing environment and species.
- **Moderate** = Tree has noted health and/or minor structural weaknesses; however, treatments may be recommended to improve the health or structural condition of the tree.
- **Poor** = Tree is in serious decline from its typical growth habits and has multiple very definable health and/or structural weaknesses. These trees may have difficulty adapting to land use changes.
- **Dead/Dying** = Tree was found to be dead, and/or has severe defects and is in severe decline.

Tree Retention Value Rating

This rating provides guidance for tree retention planning and takes into account the tree's species profile and its growing conditions.

- **High** = Trees are worthy of consideration for retention. This includes dominant trees in a stand as well as open grown individual trees would be typically included in this category.
- **Medium** = Trees may be considered for retention with limitations and/or treatments. This may include trees growing within groves, moderately difficult topography for root system expansion, recently exposed trees or trees with minor structural defects that can be mitigated through pruning.
- **Low** = Trees with structural/health defects that are not currently high risk or imminent for failure. Trees should not be considered for retention if within striking distance of a high value target. These include poor species profiles* for long term viability. Trees growing in poor locations such as dense stands of trees with high height to diameter ratios, recently exposed edge trees or areas with high water tables leading to shallow constricted rooting.
- **Nil** = Trees should not be considered for retention due to high risk condition or extenuating circumstances that have led to the tree being at high risk of failing and dead or dying trees.

*The species profile is based upon mature age and height/spread of the species, adaptability to land use changes and tree species susceptibility to diseases, pathogen and insect infestation.

Attachment: Attachment F: Arborist Report, prepared by Central Valley Arborist Consulting Ltd. (dated March 21, 2018) (PDS 045-2019 : DP with

CENTRAL VALLEY ARBORIST CONSULTING LTD. *TREE EVALUATION SUMMARY*

Address: 3182 Gladwin Road, Abbotsford BC **Date: March 21st 2018**

Tag #	Common Name	DBH (cm)	Ht (m)	Overall Condition	Retention Value	Comments	Retain/ Remove	Tree Retention Comments	Root Protection Zone (m)
1	cottonwood	>30	20-25	normal	medium	located within set back	retain	will not be affected by construction	N/A
2	cottonwood	20-30	20-25	normal	medium	located within set back	retain	will not be affected by construction	N/A
3	cottonwood	20-30	20-25	normal	medium	located within set back	retain	will not be affected by construction	N/A
4	cottonwood	>30	20-25	normal	medium	located within set back	retain	will not be affected by construction	N/A
5	cottonwood	20-30	20-25	normal	medium	located within set back	retain	protective fencing required	1.5
6	cottonwood	20-30	20-25	normal	medium	located within set back	retain	protective fencing required	1.5
7	cottonwood	20-30	20-25	normal	medium	located within set back	retain	protective fencing required	1.5
8	cottonwood	20-30	20-25	normal	medium	located within set back	retain	protective fencing required	1.5
9	cottonwood	20-30	20-25	normal	medium	located within set back	retain	protective fencing required	1.5
10	cottonwood	20-30	20-25	normal	medium	located within set back	retain	protective fencing required	1.5
11	cottonwood	20-30	20-25	normal	medium	located within set back	retain	will not be affected by construction	N/A
12	cottonwood	20-30	20-25	normal	medium	located within set back	retain	will not be affected by construction	N/A
13	cottonwood	20-30	20-25	normal	medium	located within set back	retain	will not be affected by construction	N/A
14	cottonwood	20-30	20-25	normal	medium	located within setback	retain	will not be affected by construction	N/A
15	cottonwood	20-30	20-25	normal	medium	located within set back	retain	will not be affected by construction	N/A
16	cottonwood	20-30	20-25	normal	medium	located within set back	retain	will not be affected by construction	N/A

Attachment: Attachment F: Arborist Report, prepared by Central Valley Arborist Consulting Ltd. (dated

CENTRAL VALLEY ARBORIST CONSULTING LTD. *TREE EVALUATION SUMMARY*

Address: 3182 Gladwin Road, Abbotsford BC **Date: March 21st 2018**

Tag #	Common Name	DBH (cm)	Ht (m)	Overall Condition	Retention Value	Comments	Retain/ Remove	Tree Retention Comments	Root Protection Zone (m)
17	cottonwood	20-30	20-25	normal	medium	located within set back	retain	will not be affected by construction	N/A
18	cottonwood	20-30	20-25	normal	medium	located within set back	retain	will not be affected by construction	N/A
19	cottonwood	20-30	20-25	normal	medium	located within set back	retain	will not be affected by construction	N/A
20	cottonwood	>30	20-25	normal	medium	located within set back	retain	will not be affected by construction	N/A
21	cottonwood	>30	20-25	normal	medium	located within set back	retain	will not be affected by construction	N/A
22	cottonwood	20-30	20-25	normal	medium	located within set back	retain	will not be affected by construction	N/A
23	cottonwood	20-30	20-25	normal	medium	located within set back	retain	will not be affected by construction	N/A
24	cottonwood	20-30	20-25	normal	low	single stem tree	remove	located inside building proposed building envelope	N/A
25	cottonwood	20-30	20-25	normal	low	single stem tree	remove	located inside building proposed building envelope	N/A
26	cottonwood	20-30	20-25	normal	low	single stem tree	remove	located inside building proposed building envelope	N/A
27	cottonwood	20-30	20-25	normal	low	single stem tree	remove	located inside building proposed building envelope	N/A
28	cottonwood	20-30	20-25	normal	low	single stem tree	remove	located inside building proposed building envelope	N/A

Attachment: Attachment F: Arborist Report, prepared by Central Valley Arborist Consulting Ltd. (dated

CENTRAL VALLEY ARBORIST CONSULTING LTD. *TREE EVALUATION SUMMARY*

Address: 3182 Gladwin Road, Abbotsford BC **Date: March 21st 2018**

Tag #	Common Name	DBH (cm)	Ht (m)	Overall Condition	Retention Value	Comments	Retain/ Remove	Tree Retention Comments	Root Protection Zone (m)
29	cottonwood	20-30	20-25	normal	low	single stem tree	remove	located inside building proposed building envelope	N/A
30	cottonwood	20-30	20-25	normal	low	single stem tree	remove	located inside building proposed building envelope	N/A
31	cottonwood	20-30	20-25	normal	low	single stem tree	remove	located inside building proposed building envelope	N/A
32	cottonwood	20-30	20-25	normal	low	single stem tress	remove	located inside building proposed building envelope	N/A
33	cottonwood	20-30	20-25	normal	low	single stem tree	remove	located inside building proposed building envelope	N/A
34	cottonwood	20-30	20-25	normal	low	single stem tree	remove	located inside building proposed building envelope	N/A
35	cottonwood	>30	20-25	normal	low	single stem tree	remove	located inside building proposed building envelope	N/A
36	cottonwood	>30	20-25	normal	low	single stem tree	remove	located inside building proposed building envelope	N/A
37	cottonwood	20-30	20-25	normal	low	single stem tree	remove	located inside building proposed building envelope	N/A
38	cottonwood	20-30	20-25	normal	low	single stem tree	remove	located inside building proposed building envelope	N/A

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CENTRAL VALLEY ARBORIST CONSULTING LTD. *TREE EVALUATION SUMMARY*

Address: 3182 Gladwin Road, Abbotsford BC **Date: March 21st 2018**

Tag #	Common Name	DBH (cm)	Ht (m)	Overall Condition	Retention Value	Comments	Retain/ Remove	Tree Retention Comments	Root Protection Zone (m)
39	cottonwood	20-30	20-25	normal	low	single stem tree	remove	located inside building proposed building envelope	N/A
40	cottonwood	20-30	20-25	normal	low	single stem tree	remove	located inside building proposed building envelope	N/A
41	cottonwood	20-30	20-25	normal	low	single stem tree	remove	critical root zone too close to excavation site	N/A
42	cottonwood	20-30	20-25	normal	low	single stem tree	remove	CRZ too close to excavation site	N/A
43	cottonwood	20-30	20-25	normal	low	single stem tree	retain	located on neighboring property to the east	1.5
44	cottonwood	>30	20-25	normal	low	single stem tree	remove	located inside building proposed building envelope	N/A
45	cottonwood	>30	20-25	normal	low	single stem tree	remove	located inside building proposed building envelope	N/A
46	cottonwood	>30	20-25	normal	low	single stem tree	remove	located inside building proposed building envelope	N/A
47	cottonwood	>30	20-25	normal	low	single stem tree	remove	located inside building proposed building envelope	N/A
48	cottonwood	>30	20-25	normal	low	single stem tree	remove	located inside building proposed building envelope	N/A
49	cottonwood	20-30	20-25	normal	medium	located on neighboring property to the east	retain	will not be affected by construction	1.5
50	cottonwood	20-30	20-25	normal	low	single stem tree	remove	located within parking area	N/A

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CENTRAL VALLEY ARBORIST CONSULTING LTD. *TREE EVALUATION SUMMARY*

Address: 3182 Gladwin Road, Abbotsford BC **Date: March 21st 2018**

Tag #	Common Name	DBH (cm)	Ht (m)	Overall Condition	Retention Value	Comments	Retain/ Remove	Tree Retention Comments	Root Protection Zone (m)
51	cottonwood	>30	20-25	normal	low	2 stem tree at ground level	remove	within proposed parking area	N/A
52	cottonwood	20-30	20-25	normal	low	single stem tree	remove	within proposed parking area	N/A
53	cottonwood	20-30	20-25	normal	low	single stem tree	remove	within proposed parking area	N/A
54	cottonwood	20-30	20-25	normal	low	single stem tree	remove	within proposed parking area	N/A
55	cottonwood	20-30	20-25	normal	low	single stem tree	remove	with proposed parking area	N/A
97	cottonwood	80	25-30	normal	medium	single stem tree, located within set back	retain	previous limb failures; within striking distance of new development	N/A
698	western red cedar	105	25-30	excellent	high	single stem tree; northeast corner of property	retain	will require protective fencing	6.3
A	western red cedar	147	30-35	excellent	high	Located on neighboring property to the east	retain	quality tree for retention	N/A
B	western red cedar	137	30-35	excellent	high	Located on neighboring property to the east	retain	quality tree for retention	N/A
C	big leaf maple	53	25	poor	low	Located on neighboring property to the east	retain	substantial lean toward proposed building envelope; shear crack and decay on tension side of trunk; recommend 30% crown reduction; **permission required for mitigation**	N/A
D	western red cedar	61	20-25	excellent	high	Located on neighboring property to the east	retain	quality tree for retention	N/A
E	fir	43	20-25	excellent	high	Located on neighboring property to the east	retain	quality tree for retention	N/A

Attachment: Attachment F: Arborist Report, prepared by Central Valley Arborist Consulting Ltd. (dated

TREE PRESERVATION SUMMARY

Project Location:	**3182 Gladwin Road** **Abbotsford, BC**
Applicant/Developer: Name, address, telephone:	Horn Park Place Developments Ltd 8 Boulderwood Place, Port Moody, BC
Consultant: Name, address, telephone:	**Central Valley Arborist Consulting Ltd.** PO Box 882, Station A, Abbotsford, BC, V2T 7A2 Jason Emery 604- 850- 4938

Summary of Proposed Trees Retained, Removed and Replaced

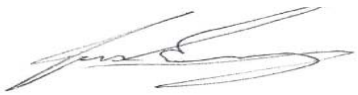
This Tree Protection Summary is a quick reference for the Arborist's Evaluation Report submitted for this development and is to be read in conjunction with that report.

A	Number of trees greater than 20 centimeters DBH	56
B	Number of trees retained (20 between 20-30cm DBH and 6 over 30cm DBH)	26
C	Number of trees to be removed (22 between 20-30cm DBH and 8 over 30cm DBH)	30
D	Number of replacement trees required	*
E	Credit for retained trees	*
F	Number of trees greater than 20 centimeters DBH located in non-disturbance area (Environmental Sensitive Area)	26

* Unknown at this time (To be advised by City of Abbotsford)

Date: March 21st 2018

Summary Proposed and Submitted by:



Jason Emery
Certified Arborist® PN- 8228A
Qualified Tree Risk Assessor
Certified Utility Arborist 0092-TT-03

Attachment: Attachment F: Arborist Report, prepared by Central Valley Arborist Consulting Ltd. (dated March 21, 2018) (PDS 045-2019 : DP with

Photograph #1: view forest structure north side of building envelope

Photograph #2: view of forest structure east side of building envelope

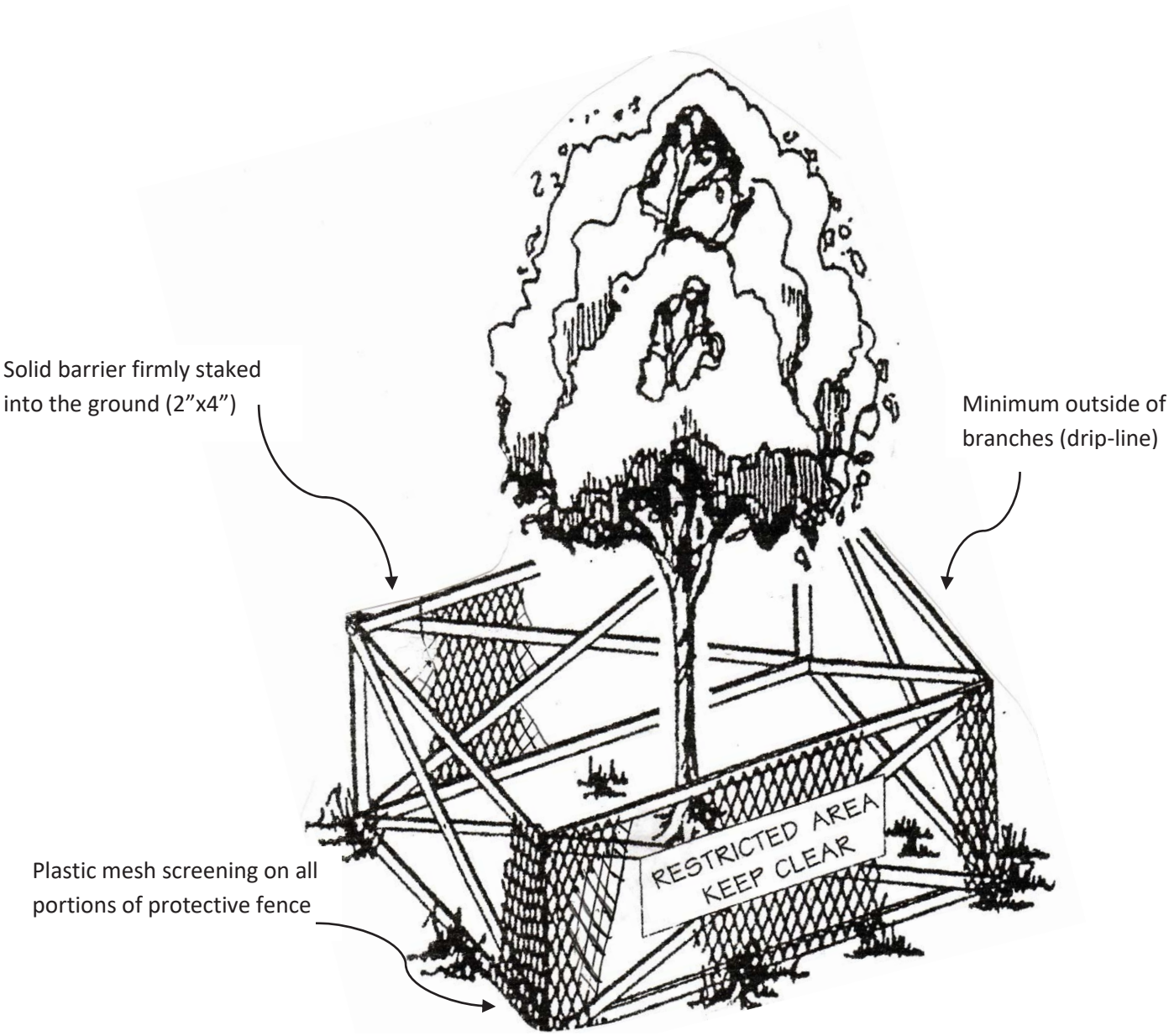
Attachment: Attachment F: Arborist Report, prepared by Central Valley Arborist Consulting Ltd. (dated March 21, 2018) (PDS 045-2019 : DP with

Photograph #3: view of tree tags 50- 55; south property line

Photograph #4: view of tree tag #698; retained cedar tree northeast corner of property

Attachment: Attachment F: Arborist Report, prepared by Central Valley Arborist Consulting Ltd. (dated March 21, 2018) (PDS 045-2019 : DP with

PROTECTIVE FENCING INSTRUCTIONS



Note: No storage of building materials within or against protection barrier and no booms or equipment to enter drip-line at anytime. Barrier is not to be moved once erected.

Attachment: Attachment F: Arborist Report, prepared by Central Valley Arborist Consulting Ltd. (dated March 21, 2018) (PDS 045-2019 : DP with

Qualifications of Author

Jason W. Emery

P.O. Box 882, Station A
Abbotsford, BC
V2T 7A2

Telephone: 604-850-4938
Email: kwak@shaw.ca

- Central Valley Tree and Arborist Services Ltd; 2009 to present
- Certified Utility Arborist #0092-TT-03
- International Society of Arboriculture; Certified Arborist PN-8228A
- PNW-ISA Qualified Tree Risk Assessor (TRAQ)
- Consulting Arborist; October 2015 – Present
- Member: International Society of Arboriculture (ISA)
  Pacific Northwest Chapter
- Over 25 of years' professional work in the tree industry.
- Insurance policy #040149195 ($5,000,000 Liability) – Saxbee Insurance Agencies Ltd.
- Business License: Abbotsford Intra Municipal #119485
- Work Safe BC – 961482-AA

Attachment: Attachment F: Arborist Report, prepared by Central Valley Arborist Consulting Ltd. (dated March 21, 2018) (PDS 045-2019 : DP with

Assumptions and Limiting Conditions

1. Except as expressly set out in this report and in these Assumptions and Limiting Conditions, Central Valley Arborist Consulting Ltd. (Central Valley) makes no guarantee, representation or warranty (express or implied) with regard to: this report; the findings, conclusions and recommendations contained herein; or the work referred to herein.
2. This report has been prepared, and the work undertaken in connection herewith has been conducted, by Central Valley for **Horn Park Place Developments Ltd regarding 3182 Gladwin Road, Abbotsford, BC.** It is intended for the sole and exclusion use by the Client, for the purpose(s) set out in this report. Any use of, reliance on, or decisions made based on this report by any person other than the Client, for any purpose other than the purpose(s) set out in this report, is the sole responsibility of, and at the sole risk of, such other person or the Client, as the case may be. Central Valley accepts no liability or responsibility whatsoever for any losses, expenses, damages, fines, penalties or other harm (including without limitation financial or consequential effects on transactions or property values, and economic loss) that may be suffered or incurred by any person as a result of the use of or reliance on this report or the work referred to herein. The copying, distribution or publication of this report (except for the internal use of the Client) without the express written permission of Central Valley (which consent may be withheld in Central Valley's sole discretion) is prohibited. Central Valley retains ownership of this report and all documents related thereto both generally and as instruments of professional service.
3. The findings, conclusions and recommendations made in this report reflect Central Valley's best professional judgment in light of the information available at the time of preparation. This report has been prepared in a manner consistent with the level of care and skill normally exercised by arborists currently practicing under similar conditions in a similar geographic area and for specific application to the trees subject to this report as at the date of this report. Except as expressly stated in this report, the finds, conclusions and recommendations set out in the report are only valid for the day on which the assessment leading to such finds, conclusions and recommendations was conducted. If generally accepted assessment techniques or prevailing professional standards and best practices change at a future date, modifications to the findings, conclusions, and recommendations in this report may be necessary. Central Valley expressly excludes any duty to provide any such modification if generally accepted assessment techniques and prevailing professional standards and best practices change.
4. Conditions affecting the trees subject to this report (the "Conditions", including without limitation structural defects, scares, decay, fungal fruiting bodies, evidence of insect attack, discolored foliage, condition of root structures, the degree and direction of lean, the general condition of the tree(s) and the surrounding site, and the proximity of property and people) other than those expressly addressed in this report may exist. Unless otherwise expressed: information contained in this report covers only those conditions and trees that are expressly stated to be subject to this report and only reflects such Conditions and trees at the time of inspection; and the inspection is limited to visual examination of such Conditions and trees without dissection, excavation, probing, or coring. While every effort has been made to ensure that the trees recommended for retention are both healthy and safe, no guarantees, representations or warranties are made (express or implied) that those trees will remain standing or will not fail. The Client acknowledges that it is both professionally and practically impossible to predict with absolute certainty the behavior of any single tree, or group of trees, in all given circumstances. Inevitably, a standing tree will always pose some risk. Most trees have the potential for failure and this risk can only be eliminated if the risk is removed. If Conditions change or if additional information becomes available at a future date, modifications to the findings, conclusions, and recommendations in this report may be necessary. Central Valley expressly excludes any duty to provide any such modification if Conditions change or additional information becomes available.
5. Nothing in this report is intended to constitute or provide a legal opinion, and Central Valley expressly disclaims any responsibility for matters legal in nature (including, without limitation, matters relating to title to and ownership or real or personal property and matters relating to cultural and heritage values). Central Valley makes no guarantee, representation or warranty (express or implied) as to the requirements of or compliance with applicable laws, rules, regulations, or policies established by federal, provincial, local government or first Nations bodies (collectively, "Governmental Bodies") or as to the availability of licenses, permits or authorizations of any Governmental Body. Revisions to any regulatory standards (including by-laws, policies, guidelines and any similar directions of a Government bodies in effect from time to time) referred to in this report may be expected over time. As a result, modifications to the findings, conclusions and recommendations in this report may be necessary. Central Valley expressly excludes any duty to provide any such modification if any such regulatory standard is revised.
6. Central Valley shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services as described in the fee schedule and contract of engagement.
7. In preparing this report, Central Valley has relied in good faith on information provided by certain persons, Governmental Bodies, government registries and agents and representatives of each of the foregoing, and Central Valley assumes that such information is true, correct and accurate in all material respects. Central Valley accepts no responsibility for any deficiency, misstatement or inaccuracy contained in this report as a result of omissions, misinterpretations or fraudulent acts of or information provided by such persons, bodies, registries, agents and representatives.
8. Sketches, diagrams, graphs, and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural reports or surveys.
9. Loss or alteration of any part of this report invalidates the entire report.

Attachment: Attachment F: Arborist Report, prepared by Central Valley Arborist Consulting Ltd. (dated March 21, 2018) (PDS 045-2019 : DP with

ABBOTSFORD DEVELOPMENT ENGINEERING DIVISION

FUTURE BUILDING PERMIT
WORKS AND SERVICES REQUIREMENTS

File No:	PRJ18-145
Planner:	Sarah Yusuf, Planner
Prepared By:	Stephen Stemler, Development Technologist II
Approved By:	19/03/22 Sarb Toor, Senior Manager, Development Engineering
Date:	March 21, 2019
Applicant:	HORN PARK PLACE DEVELOPMENTS LTD
Development Property:	3182 GLADWIN RD LOT 1 SECTION 21 TOWNSHIP 16 PLAN EPP72237 NWD

The Local Government Act authorizes local governments to require development to meet current works and services standards as set out in the City's Development Bylaw and Policies.

This report includes the Works & Services **Requirements** to meet the applicable bylaws.

Please have your consulting engineer email Sstemler@abbotsford.ca in regard to this report and any other servicing matters relating to this application.

Attachment: Attachment G: Works and Services Report (dated March 21, 2019) (PDS 045-2019 : DP with V application for 3182 Gladwin Road

REQUIREMENTS

The portion of proposed surface works that front neighbouring properties require detailed design to ensure their integration with the existing infrastructure.

Additional dedications, SRWs, works, features or limits of construction may be needed as identified through the design and construction phases.

At this time, based on the limited information supplied at Development Permit stage, the following comments are to be brought to the attention of the applicant.

On-Site Servicing Requirements

The developer shall enter into the City's standard form of Servicing Agreement and provide the associated payments, securities, fees, dedications and rights-of-way and administration and inspection fee payments to provide for the design, construction and installation of works and services to each proposed lot as required in the Development Bylaw 2011, Bylaw No. 2070-2011, including;

Each Urban existing parcel or proposed lot shall be provided with separate City services including;

- water connection and appropriate meter and chamber
- storm sewer connection and inspection manhole
- sanitary sewer connection and inspection manhole
- driveway

Highways – Dedications and Rights-of-Ways

On Gladwin Road a voluntary dedication of approximately 3.0 m is asked to align with existing neighbouring dedications on Gladwin Road.

Urban Roadways - Construction

For the site to be developed, the developer has to negotiate with adjacent property owners to secure an access easement to utilize the existing access onto Gladwin Road.

Transit

The Developer shall provide a cash-in-lieu contribution of $2,000.00 towards the City's installment of future access improvements on Gladwin Road.

Attachment: Attachment G: Works and Services Report (dated March 21, 2019) (PDS 045-2019 : DP with V application for 3182 Gladwin Road

Drainage Collection and Disposal
Tie into the existing detention facility onsite, sized for storm detention on this site under SUB-621.

Sewage Collection and Disposal
Provide servicing drawings showing all the existing sewers on the property not currently shown in the City's GIS system. These pipes need to be mapped out by the Applicant and provided to the City before full review can be completed by Engineering. Staff will then need to confirm which pipe is intended for sanitary service to this lot or if pipe(s) are in fact live sewers to other developments within this area.

Provide a cash contribution in the amount of $15,000.00 to the City for a pump truck easement machine and provide a 3.0m access right-of-way along the proposed north trail onsite for the machine to access the sanitary system in Horn Creek, east of the site.

Water Distribution Domestic and Fire Fighting
The site shall be serviced off the existing 250 mm City water main onsite with a meter installed outside of any travelled surface. The meter shall be registered within a statutory right-of-way for the City's ownership and maintenance. The meter is to be sized appropriately and the domestic flow calculations are to be provided to ensure the meter is sized correctly.

The site shall have a dedicated fire line which includes a detector check valve with a tattle late meter and remote reader installed in the Mechanical Room.

The applicant is responsible to confirm the required onsite fire flow that is triggered by the proposed building layout, materials and construction methods. In those cases where the City's grid system cannot provide sufficient flows and volumes to conform to the current version of the Fire Underwriters Survey Guide to Recommended Practice (Water Supply for Public Fire Protection, 1999), the applicant shall demonstrate through alternative construction techniques, materials, or secondary on-site fire suppression system (ie. building sprinklers) that the proposed development can be made to conform to these guidelines.
Any changes made to the building(s) for conformance with the fire flow requirements shall be made to satisfy the form and character development permit guidelines taking into account the visual impacts of fire-resistive partitions, non-combustible materials, etc.

All onsite water mains will be private.

Attachment: Attachment G: Works and Services Report (dated March 21, 2019) (PDS 045-2019 : DP with V application for 3182 Gladwin Road

ABBOTSFORD DEVELOPMENT ENGINEERING DIVISION

City of Abbotsford

Engineering Department

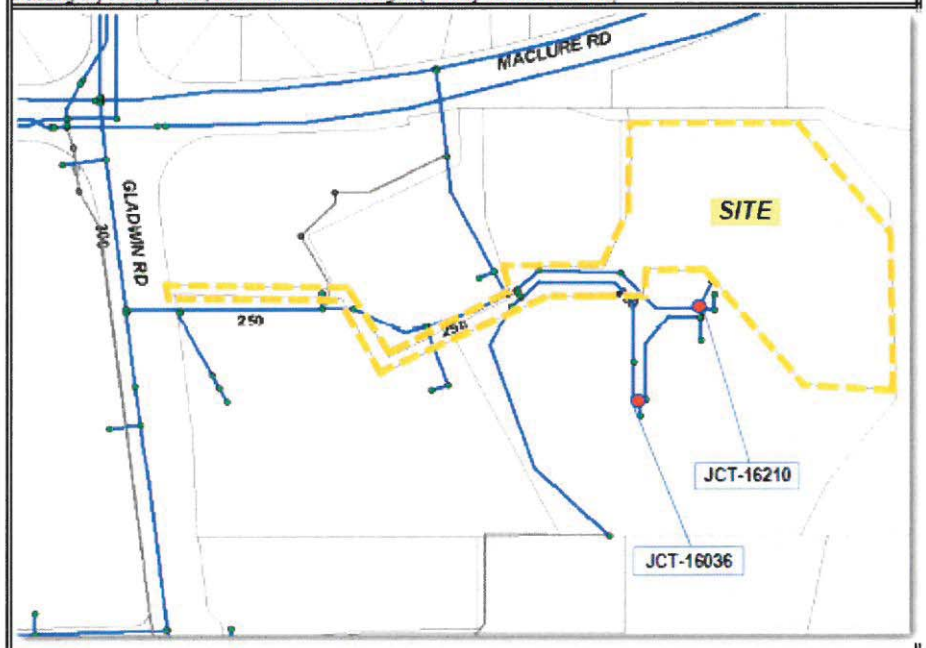
Standard Fire Flow Report (InfoWater)

Applicant:	Krahn Engineering Ltd				
Location:	30513 Great Northern Avenue	Date:	7-Aug-18	Map Grid: D5	PRJ18-124

Existing Infrastructure - Maximum Day + FF Demands

Node ID #	Static Demand Lpm (Igpm)	Static Press. kPa (psi)	Fire Flow Demand Lpm (Igpm)	Res. Press. @ F.F. Demand kPa (psi)	Available Flow Lpm (Igpm)	Residual Pr. @ Available Flow kPa (psi)
JCT-16036	1 (0.1)	729 (106)	10500 (2310)	677 (98)	16020 (3520)	627 (91)
JCT-16210	1 (0.1)	735 (107)	10500 (2310)	684 (99)	15090 (3320)	644 (93)
0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
0	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

The City cannot guarantee pressures will be as high as those shown in this report. Pressures and flows are subject to change and the City shall in no case be liable for damages arising out of the provision or use of this information including any consequential, incidental or direct damages. (Velocity Constraint: 3.0m/s)



Attachment: Attachment G: Works and Services Report (dated March 21, 2019) (PDS 045-2019 : DP with V application for 3182 Gladwin Road

Power/Telecommunications
Service Connection:
Provide underground power and telecommunications services from the distribution system to the proposed building.

Power/Telecommunications
Distribution System:
Pay the Streetscape Contribution Levy, as per the City of Abbotsford Development Bylaw 2011, Bylaw No. 2070-2011 Schedule "D".

Lot Grading
A Lot Grading Plan is required. Final lot grading shall conform to City's Lot Grading Policy and Guidelines.

Any retaining walls that are necessary to effectively grade the Lands to prevent negative impacts on finished neighbouring Lands, either existing or proposed, shall be constructed by the Developer. The standard "Lot Grading Covenant shall be registered against title to all proposed lots.

Lot grading shall also provide for the collection of surface runoff and other drainage that will discharge to the City Drainage system. Lot grading may be designed to allow for surface sheet flows or collected in swales and directed to lawn basins as necessary to the satisfaction of the General Manager, Engineering. Any collection of surface flows to a concentrated point discharge location shall include provision for easements or rights-of-way across impacted Lands as necessary. All lot grading shall be designed to take care of surface flows emanating from onsite grading.

Geotechnical Requirements
Geotechnical reports are required;

- Prior to construction - outlining parameters and details of all cuts and fills in excess of 1.5 m in depth, stabilization practices and in-place testing requirements to be implemented during all stages of earthwork, retaining wall design, suitability of existing soil conditions and remedial measures to be employed by contractors and builders.

- Following construction and prior to release of building permits - certifying that construction practices, methods, procedures noted in the original reports were followed, identifying fills or cuts within proposed building envelope areas, confirming and certifying suitability and stability for building construction and providing guidelines for post-construction slope maintenance.

- Following construction and prior to release of building permits - certifying that construction practices, methods, procedures required for infrastructure servicing were followed.

Attachment: Attachment G: Works and Services Report (dated March 21, 2019) (PDS 045-2019 : DP with V application for 3182 Gladwin Road

Erosion and Sediment Control

All works shall be performed in substantial conformance with the City's Development By-law, the Provincial 'Land Development Guidelines' and the City's Erosion and Sediment Control Bylaw, in the control and prevention of erosion and sediment during all phases of construction. No release of silt, sediment laden waters or deleterious substances is permitted into any existing City storm or drainage system during any phase of development of the Lands.

The ESC Plan requires 4 drawings, each indicating the ESC methods for that stage of construction;

- site preparation
- site servicing
- building construction
- warranty period

Required Covenants, Easements and Rights-of-way

- Shared Driveway Easement with Section 219 Covenant (PL-101b)
- Servicing Easement with Section 219 Covenant (PL-100b)
- On-site water meters rights-of-way (PL-202)

Works & Services Security & Warranty Deposit

Provide as Security Deposit, the estimated construction cost plus 10% for engineering (min $25,000) and 5% for as-constructed drawings (minimum $15,000) in cash or letter of credit.

Administration & Inspection Fee

Pay 5% of the first $300,000 + 3% of the remainder of the estimated construction cost for administration and inspections.

City Services Fees

Tie-in inspection fee ($50 per inspection) for water, sanitary, and storm sewer services.

Water meters supplied, delivered, and installed by the City's Water Operations Department (per Fees and Charges Bylaw, 2006, Amendment Bylaw No. 32)

Regular Service Meter:	
- Up to and including 18mm (3/4") meter	*$470.00*
- 25 mm (1") meter	*$635.00*
- 38 mm (1 ½") meter	*$1,055.00*
- 50 mm (2") meter	*$1,370.00*
Large Diameter Meter:	
- 75 mm (3") meter	*$3,500.00*
- 100 mm (4") meter	*$4,400.00*
- 150 mm (6") meter	*$7,300.00*
- 200 mm (8") meter	*$8,900.00*

Water and sewer main connections and wet taps are supervised and/or performed by City crews at the developer's expense and payable upon invoice.

Street and traffic signs are supplied and installed by the City at the developer's expense and payable upon invoice.

Pay to energize street lights at $50 per street light.

Development Cost Charges

Development Cost Charges (DCCs) shall be paid in accordance with the DCC Bylaws applicable at time of Building Permit.

Attachment: Attachment G: Works and Services Report (dated March 21, 2019) (PDS 045-2019 : DP with V application for 3182 Gladwin Road

ABBOTSFORD

DEVELOPMENT PERMIT NO. 2178 WITH VARIANCES

1. This Development Permit No. 2178 with variances as applied for under File No. PRJ18-145 is issued to the owner (the "Permittee") and shall apply only to that certain parcel or tract of land within the City of Abbotsford (the "City") described below, and any and all buildings, structures, and other development thereon and shall be binding on a purchaser of the Permittee's interest in the Lands, or portion thereof:

   Parcel Identifier: 030-182-883
   Legal Description: Lot 1 Section 21 Township 16 New Westminster District Plan EPP72237;

   and

   Parcel Identifier: Common Property Strata Plan LMS1495
   Legal Description: Section 21 Township 16 New Westminster District Plan LMS01495

   (the "Lands")

2. This Development Permit with variances ("DP") is issued pursuant to the *Local Government Act* and the City of Abbotsford Official Community Plan and in accordance with the applicable bylaws of the City, except as specifically varied or supplemented by this Permit.

Development Permit

3. The following DP works, terms and conditions ("DP Measures") shall apply to the Lands:

   .1 Buildings, structures and off-street parking shall be sited and constructed in conformance with Schedules to A to AH and in accordance with the recommendation of the Geotechnical Report and Technical Memo prepared by WSP dated February 8, 2019 attached as Schedule AX;

   .2 Landscaping shall be established in conformance with the Landscape Plan shown as Schedule AI to AS (the "Landscape Measures");

   .3 Erosion and Sediment Control (ESC) shall be installed, monitored, and inspected in conformance with the Erosion and Sediment Control Bylaw and the ESC Plan attached as Schedule AT (the "ESC Measures");

   .4 Tree removal and protective fencing shall be undertaken in accordance with the Arborist Report prepared by Central Valley Arborist Consulting Ltd. attached as Schedule AU (the "Tree Removal Measures");

   .5 Habitat protection, mitigation, compensation and rehabilitation works shall be completed in accordance with the Habitat Compensation Plan attached as Schedule AV and in accordance with the Environmental Assessment Application report prepared by Pinchin dated April 9, 2019 attached as Schedule AY (the "Environmental Protection Measures");

   .6 Mass site grading shall occur only in accordance with the grading plan attached as Schedule AW and the geotechnical recommendations contained within the Geotechnical Report and Technical

DRAFT

Memo prepared by WSP dated February 8, 2019 attached as Schedule AX (the "Site Grading Measures").

Fees and Securities

4. For the due and proper completion of the DP Measures the following fees and securities are required:

.1 For the due and proper completion of the Landscape Measures as set forth in Section 3.2 of this Permit, the Permittee shall deposit and maintain with the City security in the form of an irrevocable, auto-renewing letter of credit in the sum of $268,342.25, or provide cash in the same amount (the "Security"), until all the Landscaping Measures are certified as complete by a qualified Landscape Architect. The Security may be reduced proportionately as areas of the Lands are landscaped and certified complete by a qualified Landscape Architect.

.2 In the event that the Landscaping Measures are not completed as provided for in this Permit, the City may, at its option, enter upon the Lands to carry out, and complete the Landscaping Measures, and recover the costs of so doing, including the costs of administration and supervision, from the Security deposited by the Permittee.

.3 In accordance with the Development Application and Service Fee Bylaw pay to the City, upon execution of this agreement, the sum of $2,500 in payment of all landscape inspection and administration costs associated with the Landscape Measures.

.4 For the due and proper completion of the ESC Measures and Tree Removal Measures, the Permittee shall deposit and maintain with the City security in the form of an irrevocable, auto-renewing letter of credit in the sum of $14,599.20, or provide cash in the same amount (the "Security"), until all the requirements of this Permit have been met.

.5 For the due and proper completion of the Environmental Protection Measures, the Permittee shall deposit and maintain with the City security in the form of an irrevocable, auto-renewing letter of credit in the sum of $85,156, or provide cash in the same amount (the "Security"), until all the requirements of this Permit have been met.

.6 In the event that the ESC Measures, Tree Removal Measures and Environmental Protection Measures are not completed as provided for in this Permit, the City may, at its option, enter upon the Lands to carry out, and complete the ESC Measures, Tree Removal Measures and Environmental Protection Measures, and recover the costs of so doing, including the costs of administration and supervision, from the Security deposited by the Permittee.

.7 In accordance with the Development Application and Service Fee Bylaw pay to the City, upon execution of this agreement, the sum of $4,987.76 in payment for all environmental inspection and administration costs associated with the ESC Measures and Environmental Protection Measures.

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Attachment: DP No. 2178 with Variances DRAFT (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion of 3172 Gladwin

Attachment: DP No. 2178 with Variances DRAFT (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion of 3172 Gladwin

Development Variances

5. Abbotsford Zoning Bylaw, 2014 shall be varied as follows:

   .1 Section 450.3.4.a - to reduce the minimum setback from the interior lot line for the west property line from 6.0m to approximately 3.5m to allow balcony posts at the northwest corner on floors 1-4;
   .2 Section 450.3.4.a - to reduce the minimum setback from the interior lot line for the south property line from 6.0m to approximately 1.5m to allow parkade wall exposed more than 1.0m ;
   .3 Section 450.3.4.a - to reduce the minimum setback from the interior lot line for the south property line from 6.0m to approximately 5.0m for building face on floors 1-4 ;
   .4 Section 450.3.4.b - to reduce the minimum setback from the interior lot line for the west property line from 10.0m to approximately 3.5m to allow balcony post for 5th storey;
   .5 Section 450.3.4.b - to reduce the minimum setback from the interior lot line for the south property line from 10.0m to approximately 5.0m to allow building face for 5th storey;
   .6 Section 450.3.4.b – to reduce the minimum setback from the interior lot line for the east property line from 10.0m to approximately 8.05m to allow the building face for 5th storey;
   .7 Section 140.4.2.b – to increase the permitted projections into the interior side lot line (south property line) from 0.6m to approximately 2.2m for storeys 1-4 to allow balcony projections;
   .8 Section 140.4.2.b – to increase the permitted projection into the rear lot line (east property line) from 1.2m to approximately 1.7m for the steps along the east side of the building;
   .9 Section 140.4.2.b – to increase the permitted projection into the rear lot line (east property line) from 1.2m to approximately 2.1m for the 5th storey for to allow balcony projection;
   .11 Section 150.7.1 to reduce the minimum drive aisle width for all surface and underground parking areas from 7.5m to 6.5m; and
   .12 Section 150.7.2 – to permit 11 pairs of parking spaces in a tandem configuration in the underground parkade; in accordance with Schedules H to L attached

6. Abbotsford Streamside Protection Bylaw, 2005 is varied as follows:

   .1 Section 4.b.i to allow a 2,954 m^2 encroachment into the Streamside Protection and Enhancement Areas of Horn Creek and an unnamed tributary to Horn Creek; in accordance with schedule F.

Permit Limitations

7. This Permit does not constitute subdivision approval, a Soil Removal/Deposit Permit, a Building Permit or Sign Permit and does not entitle the Permittee to undertake any work without the necessary approvals or permits. Site work must be in compliance with the Soil Deposit/Removal Bylaw, the Erosion and Sediment Control Bylaw and the Blasting Regulation Bylaw; other works must be constructed in accordance with engineering plans and specifications acceptable to the City's General Manager of Engineering; and buildings and structures can only be altered, changed in occupancy or constructed in accordance with the B.C. Building Code following issuance of a Building Permit.

8. This Permit does not constitute an approval under, or relieve the Permittee from complying with, any and all federal, provincial or municipal statute, regulation or bylaw governing the Permittee's use and development of the Lands.

9. If trees on the Lands are proposed to be felled during the critical bird breeding windows:

   - General: March 1st to August 31st;

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Attachment: DP No. 2178 with Variances DRAFT (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion of 3172 Gladwin

- Bald Eagle: January 1st to August 31st;
- Osprey: April 1st to September 14th;
- Heron: January 16th to September 14th;
- Other Raptors: March 1st to September 31st;

then an appropriately qualified environmental professional (QEP) must monitor compliance with all applicable provisions of the:

- *Wildlife Act*;
- *Migratory Birds Convention Act, 1994*;
- any other federal or provincial environmental legislation governing the Permittee's use and development of the Lands;
- the recommendations of the Provincial document, *Develop with Care 2014: Environmental Guidelines for Urban and Rural Land Development in British Columbia (2014)*; and
- The recommendations of the Provincial document, *Guidelines for Raptor Conservation during Urban and Rural Land Development in BC (2013)*.

The nests of an eagle, peregrine falcon, gyrfalcon, osprey, heron, or burrowing owl are protected under the *Wildlife Act*, regardless of nest activity (i.e. active or inactive) and as such, even if trees are proposed to be felled outside the critical bird breeding window, it is recommended that a QEP undertake an assessment of the trees onsite to ensure that there are no nests of the aforementioned species.

Issuance / Expiry

10. This Permit expires if the permit holder does not substantially start any construction within two years from the date of issuance, in accordance with Section 504 of the *Local Government Act*.

AUTHORIZING RESOLUTION PASSED by Abbotsford City Council on the <> day of <>, 2019.

THIS PERMIT IS ISSUED this day of , 20<>.

The Corporate Seal of the CITY OF ABBOTSFORD was hereunto affixed in the presence of:

_____
Mayor, Henry Braun

_____
Corporate Officer, William Flitton

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Attachment: DP No. 2178 with Variances DRAFT (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion of 3172 Gladwin

Attachments:

Schedule A: DP0.0 Natura Condos, prepared by Craven Huston Powers Architects, dated April 15,2019
Schedule B: DP0.1a Existing Site Survey, prepared by Craven Huston Powers Architects, dated April 15,2019
Schedule C: DP0.1b Existing Right-of-Ways Plan, prepared by Craven Huston Powers Architects, dated April 15, 2019
Schedule D: DP0.2 Project Reconciliation, prepared by Craven Huston Powers Architects, dated April 15, 2019
Schedule E: DP0.3 Zoning Bylaw Review, prepared by Craven Huston Powers Architects, dated April 15, 2019
Schedule F: DP0.4a Proposed Environmental Encroachment and Compensation Areas, prepared by Craven Huston Powers Architects, dated April 15, 2019
Schedule G: DP0.4b Proposed New Property Line, prepared by Craven Huston Powers Architects, dated April 15, 2019
Schedule H: DP0.4c Building Setbacks Site Plan, prepared by Craven Huston Powers Architects, dated April 15, 2019
Schedule I: DP0.5a Underground Parking, prepared by Craven Huston Powers Architects, dated April 15, 2019
Schedule J: DP0.5b Underground Parking Density Area, prepared by Craven Huston Powers Architects, dated April 15, 2019
Schedule K: DP0.6 Site Plan – Level 1, prepared by Craven Huston Powers Architects, dated April 15, 2019
Schedule L: DP0.7 Level 1, prepared by Craven Huston Powers Architects, dated April 15, 2019

Schedule M: DP0.8 Level 2, prepared by Craven Huston Powers Architects, dated April 15, 2019

Schedule N: DP0.9 Level 3, prepared by Craven Huston Powers Architects, dated April 15, 2019

Schedule O: DP0.10 Level 4, prepared by Craven Huston Powers Architects, dated April 15, 2019

Schedule P: DP0.11 Level 5, prepared by Craven Huston Powers Architects, dated April 15, 2019

Schedule Q: DP0.12 Roof Plan, prepared by Craven Huston Powers Architects, dated April 15, 2019

Schedule R: DP0.13 Elevations, prepared by Craven Huston Powers Architects, dated April 15, 2019

Schedule S: DP0.14 Elevations, prepared by Craven Huston Powers Architects, dated April 15, 2019

Schedule T: DP0.15 Elevations, prepared by Craven Huston Powers Architects, dated April 15, 2019

Schedule U: DP0.16 Main Entrance, prepared by Craven Huston Powers Architects, dated April 15, 2019
Schedule V: DP0.17 South Perspective - A, prepared by Craven Huston Powers Architects, dated April 15, 2019
Schedule W: DP0.18 South Perspective B, prepared by Craven Huston Powers Architects, dated April 15, 2019
Schedule X: DP0.19 North-West Perspective, prepared by Craven Huston Powers Architects, dated April 15, 2019
Schedule Y: DP0.20 Level 5 Suite, prepared by Craven Huston Powers Architects, dated April 15, 2019

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Schedule Z: DP0.31 Site Section, prepared by Craven Huston Powers Architects, dated April 15, 2019

Schedule AA: DP0.32 Site Section, prepared by Craven Huston Powers Architects, dated April 15, 2019

Schedule AB: DP0.33 Site Section, prepared by Craven Huston Powers Architects, dated April 15, 2019

Schedule AC: DP0.34 Site Section, prepared by Craven Huston Powers Architects, dated April 15, 2019
Schedule AD: DP0.35 Site Section, prepared by Craven Huston Powers Architects, dated April 15, 2019

Schedule AE: DP0.36 Site Section, prepared by Craven Huston Powers Architects, dated April 15, 2019
Schedule AF: DP0.37 Site Section, prepared by Craven Huston Powers Architects, dated April 15, 2019
Schedule AG: DP0.38 Site Section, prepared by Craven Huston Powers Architects, dated April 15, 2019
Schedule AH: DP0.39 Site Section, prepared by Craven Huston Powers Architects, dated April 15, 2019
Schedule AI: L.1.0 Overall Site Plan, prepared by Craven Huston Powers Architects, dated April 15, 2019

Schedule AJ: L.1.1 Tree Management Plan, prepared by Craven Huston Powers Architects, dated April 15, 2019
Schedule AK: L.2.1 Enlarged Landscape Plan A, prepared by Craven Huston Powers Architects, dated April 15, 2019
Schedule AL: L.2.2 Enlarged Landscape Plan B, prepared by Craven Huston Powers Architects, dated April 15, 2019
Schedule AM: L.2.3 Enlarged Landscape Plan C, prepared by Craven Huston Powers Architects, dated April 15, 2019
Schedule AN: L.3.1 Planting Plan A, prepared by Craven Huston Powers Architects, dated April 15, 2019

Schedule AO: L.3.2 Planting Plan B, prepared by Craven Huston Powers Architects, dated April 15, 2019

Schedule AP: L.3.3 Planting Plan C, prepared by Craven Huston Powers Architects, dated April 15, 2019

Schedule AQ: L.4.1 Site Details Fencing, prepared by Craven Huston Powers Architects, dated April 15, 2019
Schedule AR: L.4.2 Site Details Water Feature, prepared by Craven Huston Powers Architects, dated April 15, 2019
Schedule AS: L.4.3 Landscape Details, prepared by Craven Huston Powers Architects, dated April 15, 2019
Schedule AT: Figure 1 Clearing and Grubbing Phase, prepared by Pinchin, dated April 2019

Schedule AU: Arborist Report, prepared by Central Valley Arborist Consulting Ltd., dated March 21, 2018

Schedule AV: Habitat Compensation Plan, prepared by Pinchin, dated April 9. 2019

Schedule AW: Site Grading Plan, prepared by KM Civil, dated April 15. 2019
Schedule AX: Geotechnical Hazard & Site Assessment Report, prepared by WSP, dated February 8, 2019
Schedule AY: Environmental Assessment Application, prepared by Pinchin, dated April 17, 2019

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Attachment: DP No. 2178 with Variances DRAFT (PDS 045-2019 : DP with V application for 3182 Gladwin Road and a portion of 3172 Gladwin

COUNCIL REPORT

Executive Committee

Report No. PDS 043-2019

Date: May 02, 2019
File No: 3100-05 PRJ17-128

To: Mayor and Council
From: Blake Collins, Senior Planner
Subject: Land Use Contract Discharge, Rezoning and Development Permit with Variances applications for the property, located at 34375 Gladys Avenue for 282 apartment units within 2 buildings (Owner: Gladys Development Corp., Directors: G. MacPherson and M. Wubs)

RECOMMENDATION

1. THAT Bylaw No. 2943-2019, “Land Use Contract No. 59 , Discharge Bylaw, 2019", be given first and second readings at the next Regular Meeting of Council and be advanced to an upcoming Public Hearing;

2. THAT Bylaw No. 2942-2019, “Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 250”, be given first and second readings at the next Regular Meeting of Council and be advanced to an upcoming Public Hearing;

3. THAT, prior to adoption of Bylaw No. 2942-2019, “Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 250”, the following conditions be satisfied:
   a) entering into a development agreement to secure the required road dedication and utility upgrades and extensions, in accordance with Development Bylaw, 2011, as detailed in the Works and Services Report including the following offsite transportation improvements:
      i. reconfiguring the South Fraser Way exit lane and development entrance to Transportation Association of Canada guidelines;
      ii. constructing a new east bound entrance lane onto South Fraser Way;
      iii. constructing a new south bound lane on Sumas Way between South Fraser Way and Marshall Road in accordance with the requirements of the Ministry of Transportation and Infrastructure; and
      iv. constructing a pedestrian path from Gladys Avenue to Fraser Street along Sumas Way;
   b) providing a community benefit contribution of $225 per dwelling for park improvements minus the accepted estimated cost of constructing the required offsite pedestrian path from Gladys Avenue to Fraser Street along the west side of Sumas Way;
   c) removing all debris and garbage from the riparian area of Gill Creek and upon completion transferring the environmental area to the City;
   d) registering a Section 219 Covenant to ensure the proposed future construction meets Canada Mortgage and Housing Association Sound Transmission Classification recommendations;

e) obtaining Ministry of Transportation and Infrastructure approval of Bylaw No. 2942, "Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 52"; and
f) resolving all issues of funding for items not budgeted by the City;

4. THAT Development Permit with Variance No. 2187, proceed for public comment at an upcoming Public Hearing, in conjunction with the rezoning application, subject to the following conditions being satisfied prior to the Development Permit with Variances being issued:

a) adoption of Bylaw No. 2942-2019, "Abbotsford Zoning Bylaw 2014, Amendment Bylaw No. 250";
b) completing the following minor revisions to the Development Permit Drawings;
   i. revising the arborist report and landscape drawings to show the retention of the black walnut tree located in the Gladys Avenue boulevard; and
   ii. revising the landscape and architectural site plan to include a sidewalk connection along the south end of the east building connecting to other pedestrian facilities to the satisfaction of the Director, Development Planning; and
c) providing a landscape security equivalent to 110% of an accepted landscape cost estimate prepared by a Landscape Architect, in accordance with the Development Application Procedures Bylaw, 2016;
d) providing a landscaping inspection fee equivalent to 2% of the accepted landscape cost estimate to a maximum of $2,500, in accordance with the Development Application and Service Fee Bylaw, 2010;
e) registering a Section 219 Covenant for private or City garbage and recycling collection for the residential units;
f) owners providing written acknowledgement of the terms and conditions of the permit;
g) providing three sets of signed, sealed development permit plans;
h) providing three sets of signed, sealed landscaping plans;
i) providing three sets of all consultant reports; and
j) providing digital unsecured copies of all plans; and

5. THAT the Mayor and Corporate Officer be authorized to execute all documents relating to this matter.

REPORT CONCURRENCE	
General Manager The General Manager concurs with the recommendation of this report.	**City Manager** The City Manager concurs with the recommendation of this report.

PURPOSE

To discharge an existing Land Use Contract and rezone the subject property from Secondary Commercial Zone (C4) to Mid Rise Apartment Zone (RMM) and Park, Open Space and School Zone (P2) to permit the development of two (2) six (6) storey apartment buildings containing 282 units. The applicant further proposes a Development Permit with Variances for the following:

i. reduce the required visitor parking from 56 parking spaces to 34;
ii. reduce the northern interior side lot line setback 6m to 3m;
iii. increase the height of an accessory building from 4.5m to 11m; and
iv. reduce the required setback between a driveway and an exterior lot line adjacent to Gladys Avenue / South Fraser Way from 3.0m to 1.5m.

SUMMARY OF THE ISSUE

The subject property is designated Urban 1 Midrise in the Official Community Plan. At present the permitted uses on the subject property are regulated by Land Use Contract No. 59 which allows the property to be used for printing and related services, which previously allowed Abbotsford News to operate on the site. The underlying zoning contained within the 2014 Zoning Bylaw is Service Commercial Zone (C4). The applicant is proposing to discharge the Land Use Contract and rezone the property from C4 to the Mid Rise Apartment Zone (RMM) and the Parks, Open Space and School Zone (P2). If the rezoning is approved two apartment buildings with a total of 474 parking spaces are proposed to be constructed. The proposed development's form and density is consistent with the 2016 OCP and the proposed Form and Character is consistent with the Multiple Family Development Permit Guidelines. As the proposed variances are minor and are not anticipated to have a negative impact on surrounding properties staff recommend support for this development application.

BACKGROUND

Applicant:	Elevate Development Corp (Contact: Ms. Tim Clark-Hollis)
Owners:	Gladys Development Corp.
Legal Descriptions:	Lot 2 Except: Part on Plan 73715, Section 15 Township 16 New Westminster District Plan 6983
OCP Designation:	Urban 1 – Midrise
Existing Land Use Contract:	District of Abbotsford No. 59 (Registered as K11197)
Existing Zoning:	Service Commercial Zone (C4)
Proposed Zoning:	Mid Rise Apartment Zone (RMM) and Park, Open Space and School Zone (P2)
Site Area:	2.16 ha (5.34 acre)
Site Description:	The site is currently contains an old commercial/office building that historically housed the Abbotsford News. Gill Creek runs through the northern portion of the site. The property is bounded by Highway11 (Sumas Way) and Gladys Avenue / South Fraser Way.
Surrounding Uses:	N: Gill Creek beyond which are single family homes zoned RS3: S: Gladys Avenue beyond which is South Fraser Way; E: Sumas Way (Highway 11) beyond which is Lonso Park zoned P2; and W: Single Family Residential zoned RS3.

DICUSSION

Context

1. The proposed development is located close at the intersection of Sumas Way (Highway 11) and South Fraser Way/Gladys Avenue. To the north is Gill Creek which runs through a semi forested area. The surrounding area offers numerous commercial services. The proposed development is anticipated to support the existing neighbourhood centre commercial development located across Sumas Way from the subject property.

Official Community Plan

2. The Official Community Plan (OCP) designates the site Urban 1 – Midrise (see Figure 2). This land use designation is intended for enabling multifamily housing in areas that strengthen and support Mixed Use Centres. This land use designation allows for multi-storey buildings including low and mid rises. Heights are limited to 6 storeys. The density range is from a minimum of 1.0 Floor Space Ratio (FSR) to a maximum of 2.0 FSR. The proposal to develop the property into an apartment complies with the land use designation of Urban 1 – Midrise as the proposed apartments have a height of 6 storeys and an FSR of 1.99.

3. The proposed development is in keeping with the broad objectives of the Urban Structure of the OCP by Focusing 75% of Residential Growth in centres and existing neighbourhoods.

Zoning

4. The subject property is currently regulated by Land Use Contract No. 59. The underlying Service Commercial Zone (C4) does not comply with the OCP land use designation of Urban 1 – Midrise. The applicant proposes to discharge the Land Use Contract and rezone the subject property to Mid Rise Apartment Zone (RMM) and Park, Open Space and School Zone (P2) to permit the development of two apartment buildings with a total of 282 units, a total of 452 vehicular parking spaces, bicycle storage lockers sized to accommodate two bikes for each resident parking space (828 bike parking spaces) and 20 visitor bike parking spaces (see Figure 1-18 and Attachments H and I). The RMM Zone currently permits apartment uses with a maximum density of up to a maximum of 2.0 Floor Space Ratio and a maximum height of up to 6 storeys and is consistent with policies of the 2016 Official Community Plan. As such, staff supports the proposed rezoning to RMM and P2.

Community Benefit Contributions

5. Upon adoption of the 2016 Official Community a greater and more purposeful emphasis was placed on making alternative forms of transportation such as walking, biking and public transportation delightful. Additionally, the 2016 OCP emphasized accommodating 75% of new growth in existing neighbourhoods, thereby increasing the demand on the City's existing social infrastructure including park and recreational spaces. In response, the City began negotiating the collection of Community Benefit Contributions (CBC) for residential and commercial developments at time of rezoning. With respect to residential developments staff has been recommending the collection $625 per new unit ($400 per

unit for transit and bicycling infrastructure improvements and $225 for park enhancements). In this instance, the recommended CBC based on this formula is $176,250.

6. Notwithstanding the above, in conjunction with this development several significant offsite transportation and trail related improvements are required (see Site Development Considerations and attached figures). Given the significant cost of these items and the overall benefit that will be derived to the broader community, staff recommends in this specific instance not collecting the transportation related CBCs. Furthermore, given the developer will construct a new pathway linking Fraser Street to the intersection of Sumas Way and South Fraser Way where an informal pathway already exists, staff further recommend that the Park's CBCs ($225 per unit or $63,450) be reduced by the documented value of this work. Staff believes this is a reasonable approach for Community Benefit Contributions for this project based on the site specific works and broader community benefits that are anticipated to occur with completing the required offsite improvements.

Variances

7. To accommodate the proposed development, the developer has requested four variances. These variances are generally minor in scale and scope and as such, staff supports the requested variances and provides the following rationale for the following variances, as described below, as follows:

i. Reduce the required visitor parking spaces from 56 to 34 (from 0.2 to 0.12 visitor parking spaces per unit respectively);

0.2 visitor parking spaces per unit are required for apartments in Abbotsford in accordance with the Zoning Bylaw. In this instance the developer has requested a 22 parking space reduction. In conjunction with this development, the applicant completed a Traffic Impact Assessment (TIA) which included a review of the proposed parking variance (see Attachment G and H). The report concluded that the anticipated required visitor parking for this development to be a maximum of 28 parking spaces or 0.1 spaces per unit. This conclusion was reached based on the following:

a. Similar parking demand studies being completed in communities such as Surrey and Burnaby which concluded that visitor parking ranged from 0.05 and 0.08 spaces per unit;
b. A review of the Metro Vancouver Apartment Parking Study which concluded that the observed visitor parking demand was 0.1 spaces per unit; and
c. Interviews with those using visitor parking spaces which confirmed that approximately 50% of the usage of visitor parking spaces is generated from residents who utilize the spaces for short term convenience parking.

After adjusting for regional variation and given Abbotsford has a reduced availability and frequency of transit compared to the study communities, the report author concludes that the expected visitor parking demand for this facility to be approximately 0.1 spaces per unit or a total of 28 parking spaces. The proposed visitor parking spaces (34) exceeds the anticipated demand as outlined in the applicant's study. Staff notes that no variances have been requested to resident parking, which has been provided in accordance with the Zoning Bylaw. The applicant could have increased the quantity of visitor parking

spaces, however, it would have resulted in increasing the footprint of the underground parkade to the west, thereby, removing the existing row of mature trees along the west property line. Staff recommends the reduction in visitor parking spaces in order to enhance tree retention on the subject site.

ii. To reduce the northern interior side lot line setback from 6m to 3m;

Under the Zoning Bylaw a 6m interior side lot line setback is required. This requirement is put in place to ensure large apartment buildings sensitively integrate into an existing urban environment. In this instance, the development is bordered to the north by Gill Creek which runs through a wide forested ravine. In conjunction with the rezoning of this property, the area containing Gill Creek, including the streamside setbacks, will be rezoned P2 and the property will be transferred to the City. Along this new property boundary the developer has requested a reduction in the required setback from 6m to 3m. Staff has no concerns with this request for the following reasons:

a. The developer has observed the full Streamside Protection and Enhancement Bylaw and Riparian Areas Regulation setbacks adjacent to Gill Creek (10m from top of ravine bank);
b. The developer's Qualified Environmental Professional has confirmed that a 3m setback will not impact the long term health of the environmental features; and
c. The proposed development does not directly interface with other residential development along the north property boundary.

iii. To increase the height of an accessory building from 4.5m to 11m; and

The proposed development includes a two storey 417m^2 amenity building. In accordance with the Zoning Bylaw, accessory buildings are limited to 4.5m in height. In the case of accessory buildings setbacks are reduced as the size and massing of the buildings are generally small and positioned in a rear yard. In this instance, the proposed amenity building is centrally located between the two proposed apartment buildings. Given the building will not impact adjacent properties and if approved, the building will provide future residents with greater access to recreational opportunities, staff have no concerns with this request.

iv. To reduce the required setback and landscape buffer requirements between a driveway and an exterior lot line from 3.0m to 1.5m

To improve the aesthetic quality of new developments the Zoning Bylaw requires a minimum landscape buffer of 3.0m adjacent to a street. In this instance, the subject property has a boulevard of approximately 50m in width across the Gladys Avenue / South Fraser Way frontage of the subject parcel. Given the substantial existing boulevard, the developer has requested to reduce the required buffer from 3.0m to 1.5m. Staff has no concerns given the boulevard will allow for the installation of landscaping between the proposed development and the street. In addition, the amount of surface parking being proposed between the east building and the street is limited to 9 parking spaces and an existing boulevard tree will be retained in situ.

Amenity Contributions

8. In accordance with a 2008 Council resolution E008-2008, staff is negotiating public amenities for variance requests on a case-by-case basis. In conjunction with this

proposal, the developer is requesting variances as described in Section 9 above, to allow for the development of the proposed building and associated parking. In this case the developer will be providing significant offsite traffic and trail improvements. Based on the scale of the works staff does not believe a further amenity contribution is warranted in this instance.

Discharge of Land Use Contract 59

9. In 1973 the District of Abbotsford entered into a Land Use Contract (LUC) establishing the development conditions and uses to occur on the subject property. In accordance with this LUC the uses permitted on the subject property are limited to Printing and related uses. No other uses are permitted within the LUC and the uses permitted by the LUC do not align with the 2016 OCP Land Use designation of Urban 1 – Midrise. To accommodate the proposed multiple family residential development, this LUC must be discharged (see Attachment H). As the discharge request is accompanied by a rezoning application to also change the underlying zoning from C4 to RMM and P2 staff have no concerns with proposed discharge of District of Abbotsford LUC 59.

Multiple Family Development Permit

10. The proposed development is subject to a Multifamily Form and Character Development Permit Guidelines (DPT) in accordance with OCP guidelines. The objectives of the multi-family and DPT guidelines are to encourage the construction of well designed, attractive and livable residential streets. New multifamily residential development should seek to enhance the public realm and contribute to neighbourhoods where residents of all ages feel safe.

11. The proposed apartment building consists of a range of unit types and unit sizes. The proposal includes 282 units with:
    - 18 studio units
    - 75 one bedroom units;
    - 153 two bedroom units (4 of which have “Lock Off Suite” units); and
    - 36 three bedroom units.

12. The proposed development meets the multifamily Development Permit (DP) guidelines as outlined below and as highlighted in Figures 1 – 18 and Attachment J:
    - Hierarchy of spaces - defines the spaces that are public and private by using a combination of landscaping, retaining walls and fencing;
    - Private Amenity Space - provides flexible amenity spaces and includes an array of other features including car wash, dog wash facilities, bike repair and workshop;
    - Parking Location and Design - provides a combination of underground and surface parking for visitors and residents;
    - Underground Parking - provides an underground parkade below grade, which is well incorporated into the development;
    - Building Entrances - the main front entrance is architecturally distinct entrance that has direct internal access from the pick-up / drop-off area; and
    - Architectural Interest - the proposed exterior finishes incorporates a variety of articulation, colours and materials;

- Ground Oriented Units - the ground floor units have pathways that have direct access to pedestrian pathways that provide connections to the adjacent neighbourhood centre and other neighbourhood amenities;
- Building Length – Although the east building exceeds the 90 metres outlined within the guidelines (approximately 115m), they were intended to address interface with City streets and adjacent residential development, in this instance, the subject site directly abuts a Provincial Highway along the east property line, therefore staff have no concerns with the length of the building in this particular instance as it allows the applicant to achieve the vision of the Urban 1 midrise in terms of residential density for a property located across the street from the Neighbourhood Centre;
- Bike Parking - the proposed building includes 8 surface bike parking spaces, 12 underground visitor bike parking spaces and 414 secured bike lockers that can accommodate 2 vertically hung bikes.

Landscaping/Tree Removal and Replacement

13. Street trees or cash-in-lieu will be provided along the full frontage of Gladys Avenue / South Fraser Way in accordance with the Development Bylaw, 2011.

14. An Arborist report was submitted in conjunction with this application, which was prepared by van der Zalm and Associates dated July 27, 2017 (see Attachment E). A total of 37 mature trees exist on the development portion of the subject site. According to the Arborist's recommendations 26 trees are proposed to be removed as they are located within the proposed building envelope and underground parkade location. The developer has made extra effort in the building siting to preserve 11 trees located along the western property boundary. All trees located within the SPEA area will also be retained.

15. As calculated by the Arborist, the removal of the 26 trees will require 59 replacement trees. The landscaping plan displays 76 trees to be planted on site. As the developer has exceeded the minimum replacement number by 17 trees a cash-in-lieu payment is not required.

OCP Policy for Development Near Highways and Railways

16. The subject property is located next to a Highway 11 / Sumas Way. When multiple family residential developments are proposed next to major sources of noise, such as highways, and it is anticipated that the source of the noise could impact the livability of a proposed development, the OCP and Development Permit Guidelines indicate the construction must meet the Sound Transmission Classification recommendations as established by the Canada Mortgage and Housing Corporation. During the review and referral process, the developer retained Brown Strachan Associates: Consulting Engineers in Acoustics to review the proposed architectural plans to determine the ability of the project to comply with these criteria. As noted in the summary report dated January 17, 2018, it is anticipated the upgrades required to be compliant with these recommendation will be limited to acoustically rated windows and doors and additional layers of interior drywall (see Attachment D). To ensure a future building incorporates these modifications, staff recommended that a Section 219 Restrictive Covenant be registered to require an Acoustic Engineer confirm compliance with the CMHC Sound Transmission recommendations prior to issuance of a Building Permit. A clause to this affect has been included for Council consideration in the staff recommendations section of this report.

Steep Slope Development Permit Area

17. The northern portion of the subject property is located within a Steep Slope Development Permit Area. In accordance with the requirements of the 2016 Official Community Plan, the developer hired Took Engineering Inc. to complete a geotechnical investigation. In accordance with the engineer's report dated January 15, 2018, the site may be safely used for the intended use as a 6 storey residential apartment (see Attachment B). That said, due to ground water levels and subsurface soil conditions certain requirements must be implemented during construction and ongoing geotechnical inspection will be required during construction. To ensure the Geotechnical Engineer's recommendations are implemented, the Geotechnical Report and the conditions therein have been included within the proposed Development Permit and will be implemented through the Building Permit process.

Natural Environment Development Permit Area / Streamside Protection and Enhancement Bylaw

18. In accordance with the Official Community Plan, the proposed development is subject to the Natural Environment Development Permit Guidelines due to the presence of Gill Creek. The developer retained Envirowest Consultants Inc. to determine the setbacks and the presence of fish and wildlife habitat (see Attachment C). Consistent with the DP Guidelines and the Streamside Protection Bylaw, a 10m setback from the top of the ravine is required for any development and this setback was surveyed. In conjunction with this application and consistent with City practice, the developer has agreed to zone these lands P2 and transfer the full area to the City. No variances have been requested to the Streamside Protection Bylaw. Staff supports the transfer of this land to the City provided the proponent clean the area of any debris and garbage prior to the transfer.

Site Development Considerations

19. A staff review of the Works and Services Requirements necessary to support this application has been completed. Through the review and referral process, staff requested, received and reviewed a Traffic Impact Assessment (see Attachment F and G). After significant dialogue with the consulting engineer and the City's Transportation Department the final TIA was used by staff to develop and inform the offsite and frontage related works being recommended in conjunction with this application, the results of which are outlined within the Works and Service Requirements (see Attachment A, F and G). The details of the Works and Services Requirements will be incorporated into the Development Agreement, a prerequisite for adoption of the rezoning bylaw. Some notable requirements of the attached Works and Services Requirements are:

- Constructing a new west bound South Fraser Way to Gladys Avenue off-ramp to TAC standards;
- Constructing a new site access from Gladys Avenue to the subject property to TAC standards;
- Constructing a new South Fraser Way east bound on-ramp lane to TAC standards and relocating the existing driveway to 34346 South Fraser Way westward;
- Constructing a new pedestrian pathway from the intersection of South Fraser Way / Gladys Avenue along the west side of Sumas Way to Fraser Street (credit for value of this work will be given to PRC Community Benefit Contributions);

- Constructing a sidewalk from the intersection of South Fraser Way and Sumas Way to the existing sidewalk on Gladys Avenue; and
- Constructing a sidewalk along the west side of Gladys Avenue from South Fraser Way to Marshall Road.

20. In addition to the above comments, the developer is responsible to adhere to all other legislation, which may apply to the land, including:

    (a) complying with all applicable City bylaws, such as Official Community Plan, 2016, Development Bylaw, 2011, Tree Protection Bylaw, 2010, Building Bylaw, 2016, Sign Bylaw, 2001, Erosion and Sediment Control Bylaw, 2010, and Development Cost Charges Imposition Bylaw, 2010 administered by the City; and

    (b) obtaining all other necessary approvals and permits on such terms as they may be issued, including but not limited to a development permit, tree removal permit, subdivision approval, building permit, soil removal/deposit permit, Ministry of Health permit, Ministry of Transportation and Infrastructure approval and Ministry of Environment approval.

Ministry of Transportation and Infrastructure Approval

21. The subject property is adjacent to Sumas Way (Highway 11). As such, the proposed rezoning bylaw requires approval from the Ministry of Transportation and Infrastructure (MOTI). The Ministry has reviewed the Traffic Impact Study prepared in support of this application and has indicated that in order to approve the proposed bylaw change that the developer must construct a new south bound lane on Sumas Way from South Fraser Way to Marshall Road. The applicant has no concerns with completing this work.

22. Staff will be participating in the design review of the proposed lane widening and as a part of that process will be requesting that a sidewalk be included within this scope of work along the west side of Sumas Way / Hwy 11 to Marshall Road.

Communication Plan

If the Land Use Contract discharge bylaw and zoning amendment bylaw are supported by Council, Bylaw Nos. 2943, “Land Use Contract No. 59 Discharge Bylaw, 2019 and 2942, “Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 250" will proceed to a Regular Meeting of Council, where it will be considered for first and second readings. If the development is supported by Council the Bylaws and Development Permit with Variances will then proceed to an upcoming joint Public Hearing. The City will notify, in writing, the owners and occupiers of land within a 100 meter radius of the property and copies of all correspondence received will be provided to Council. Two advertisements for the Public Hearing will be published in the City Page of the local newspaper.

The City received confirmation on January 5th, 2018, that the applicant installed the required Development Notification Signs in accordance with the Development Application Procedures Bylaw, which requires the sign to be installed a minimum of 3 weeks in advance of Council’s consideration of the application.

Council should note that during the review of this application and following the original installation that the rezoning signs were vandalized and blew down during inclement winter weather. When notified, the developer was cooperative in having the signs re-installed.

FINANCIAL PLAN IMPLICATION

No financial plan implications are anticipated. Any capital works implications arising from this application have been addressed through the rezoning process.

Rajat Sharma

Rajat Sharma
General Manager, Finance and Corporate Services
Signed 4/22/2019 8:42 AM

IMPACTS ON COUNCIL POLICIES, STRATEGIC PLAN AND/OR COUNCIL DIRECTION

The proposal meets the goals and objectives identified in the 2016 Official Community Plan, the Affordable Housing Strategy and Council's 2019-2022 Strategic Plan which identifies four cornerstones: vibrant economy, complete community, fiscal discipline and organizational alignment. The proposal is consistent with the four cornerstones of Council's Strategic Plan

SUBSTANTIATION OF RECOMMENDATION

The proposed discharge of the Land Use Contract 59 and rezoning the subject property to RMM and P2 is consistent with the OCP land use designation of Urban 1 - Midrise. A multifamily form and character development permit with variances is required for the development and the proposed development successfully implement the guidelines. The density, scale and built form are well suited to the site, and the increase in residential density is very well placed in close proximity to an urban centre. The proposal includes significant residential amenities that will improvement the livability of the development and neighbourhood and is of a high quality design. Staff recommends support for the proposed applications.

Blake Collins

Blake Collins
Senior Planner
Signed 4/17/2019 4:03 PM

Darren Braun

Darren Braun
Director, Development Planning
Signed 4/19/2019 8:08 AM

Darren Braun

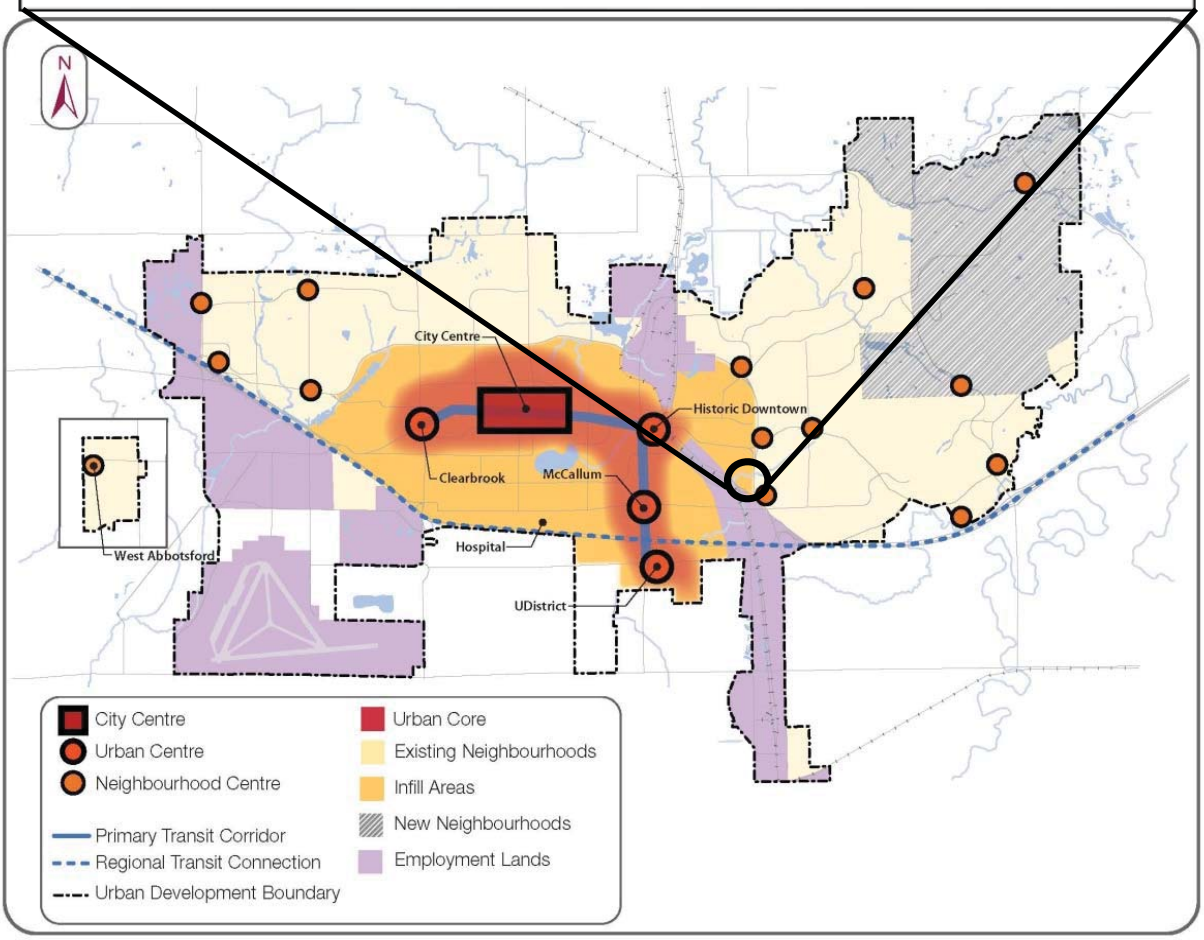
Darren Braun
Director, Development Planning
for
Siri Bertelsen, General Manager,
Planning and Develpment Services
Signed 4/22/2019 9:25 AM

ATTACHMENTS:

Figures 0 to 20
Attachment A: Works and Service Requirements
Attachment B: Geotechnical Report
Attachment C: Fish and Wildlife Report
Attachment D: Acoustic Report
Attachment E: Arborist Report

Attachment F: Traffic Impact Assessment
Attachment G: Traffic Impact Assessment Response Letter
Attachment H: 2943-2019 Land Use Contract No. 59, Discharge Bylaw, 2019 (Final Draft)
Attachment I: 2942-2019 Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 250 (Final ...
Attachment J: Draft DP No. 2187 with Variances

City Context Plan
File: PRJ17-128 Location: 34375 Gladys Avenue



ABBOTSFORD
Planning and Development Services

34375 Gladys Avenue

Figure 1 - Location Plan
File No.: PRJ17-128

50 0 50
Meters

N

Date

Attachment: Figures 0 to 20 (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

ABBOTSFORD
Planning and Development Services

34375 Gladys Avenue

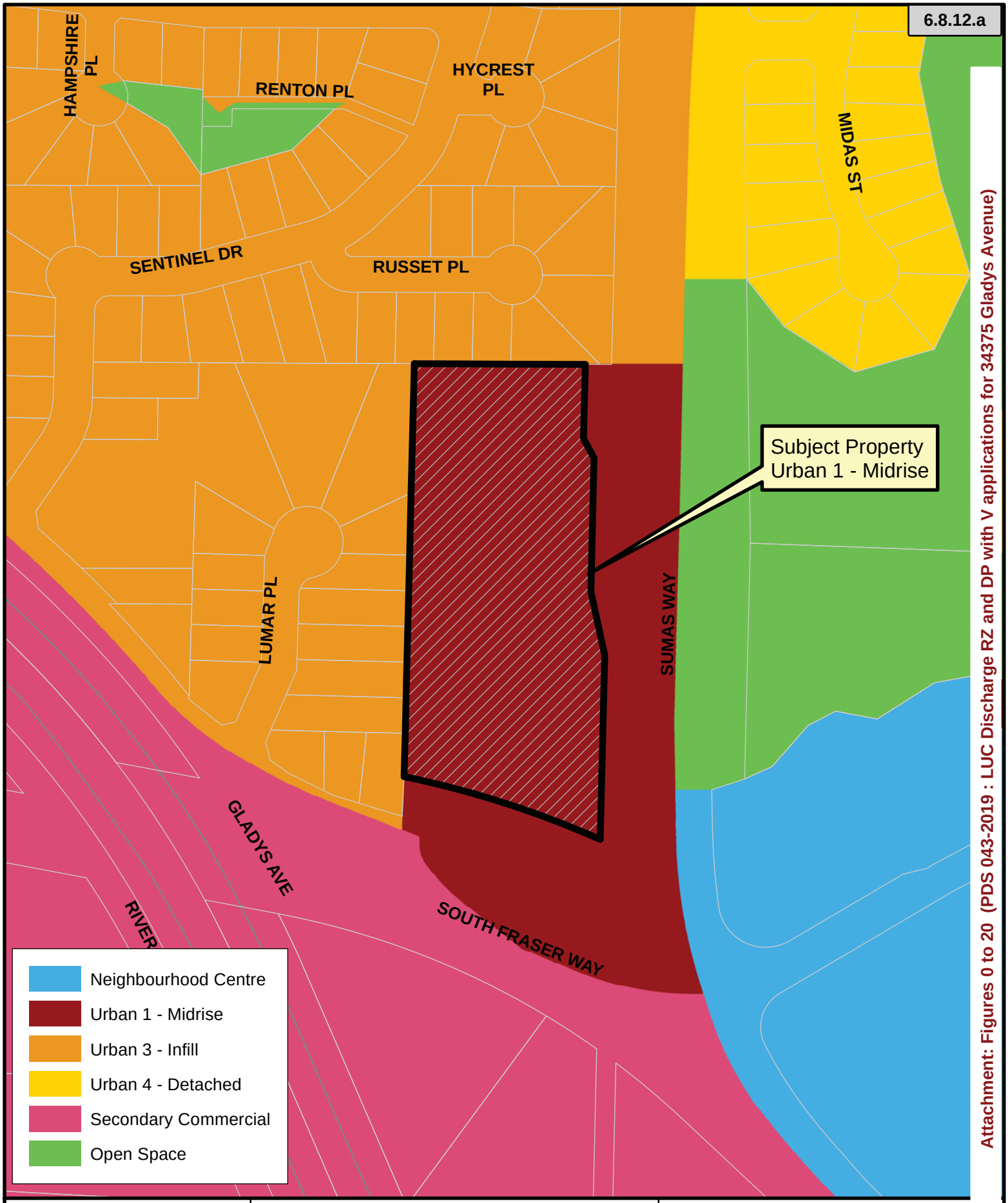
Figure 2 - Context Plan
File No.: PRJ17-128

50 0 150
Meters

N

Date

Attachment: Figures 0 to 20 (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)



Attachment: Figures 0 to 20 (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

ABBOTSFORD
Planning and Development Services

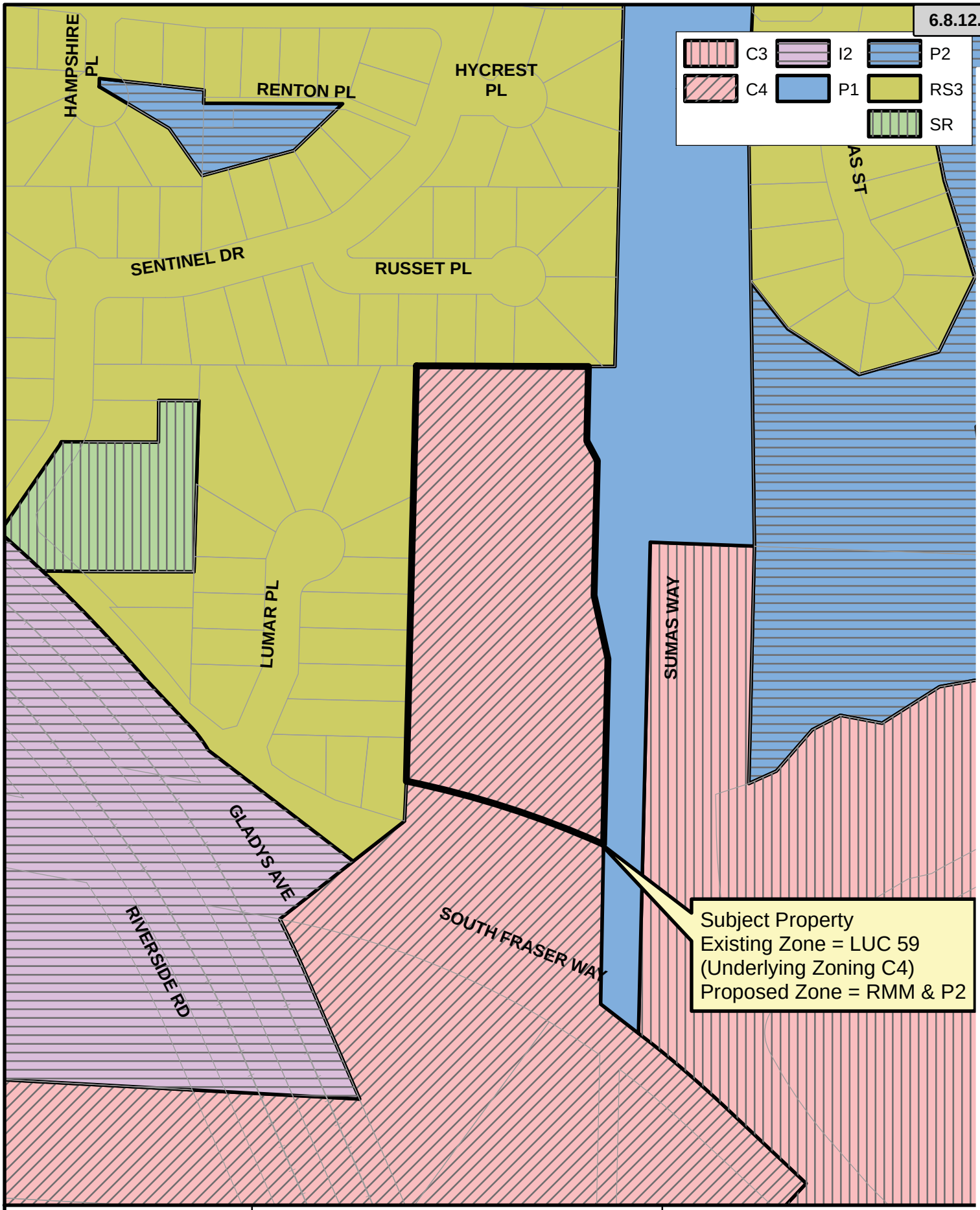
34375 Gladys Avenue

Figure 3 - Official Community Plan
File No.: PRJ17-128

50 0 50
Meters

N

Date



ABBOTSFORD
Planning and Development Services

34375 Gladys Avenue

Figure 4 - Existing & Proposed Zoni
File No.: PRJ17-128

50 0 50
Meters

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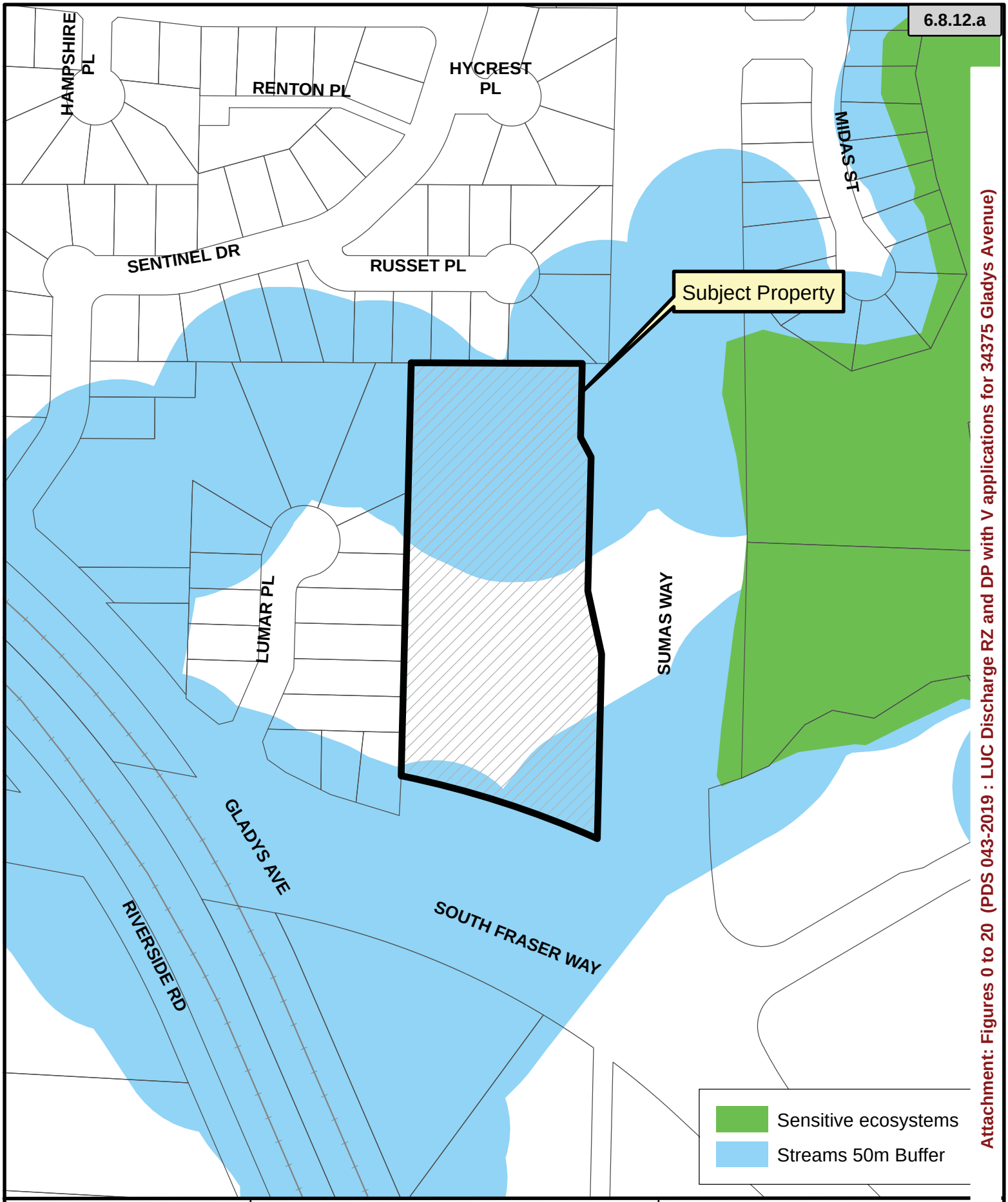
Date



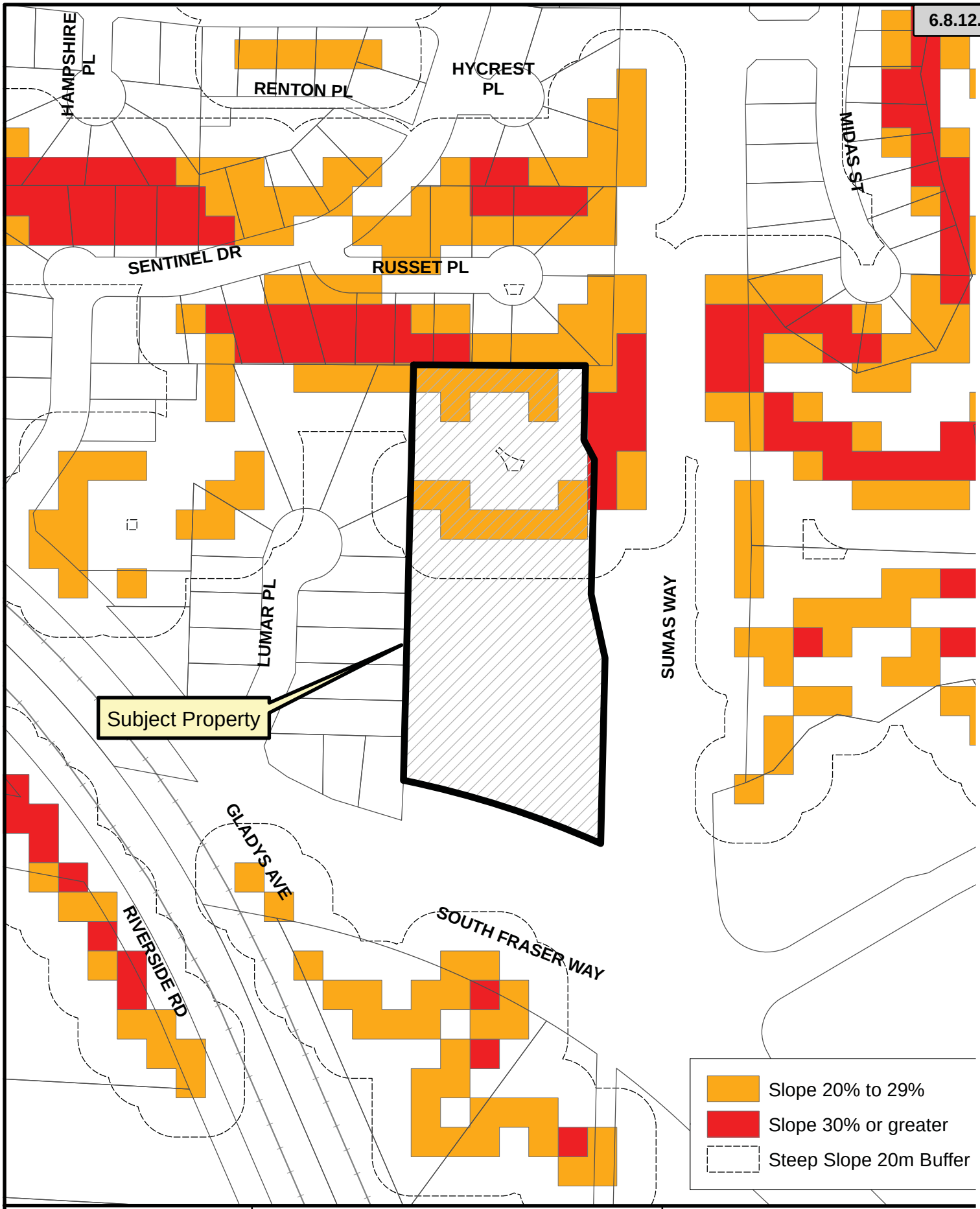
ABBOTSFORD
Planning and Development Services

34375 Gladys Avenue

Figure 5 - Natural Environment Development Permit
File No.: PRJ17-128

50 0 Meters

Attachment: Figures 0 to 20 (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)



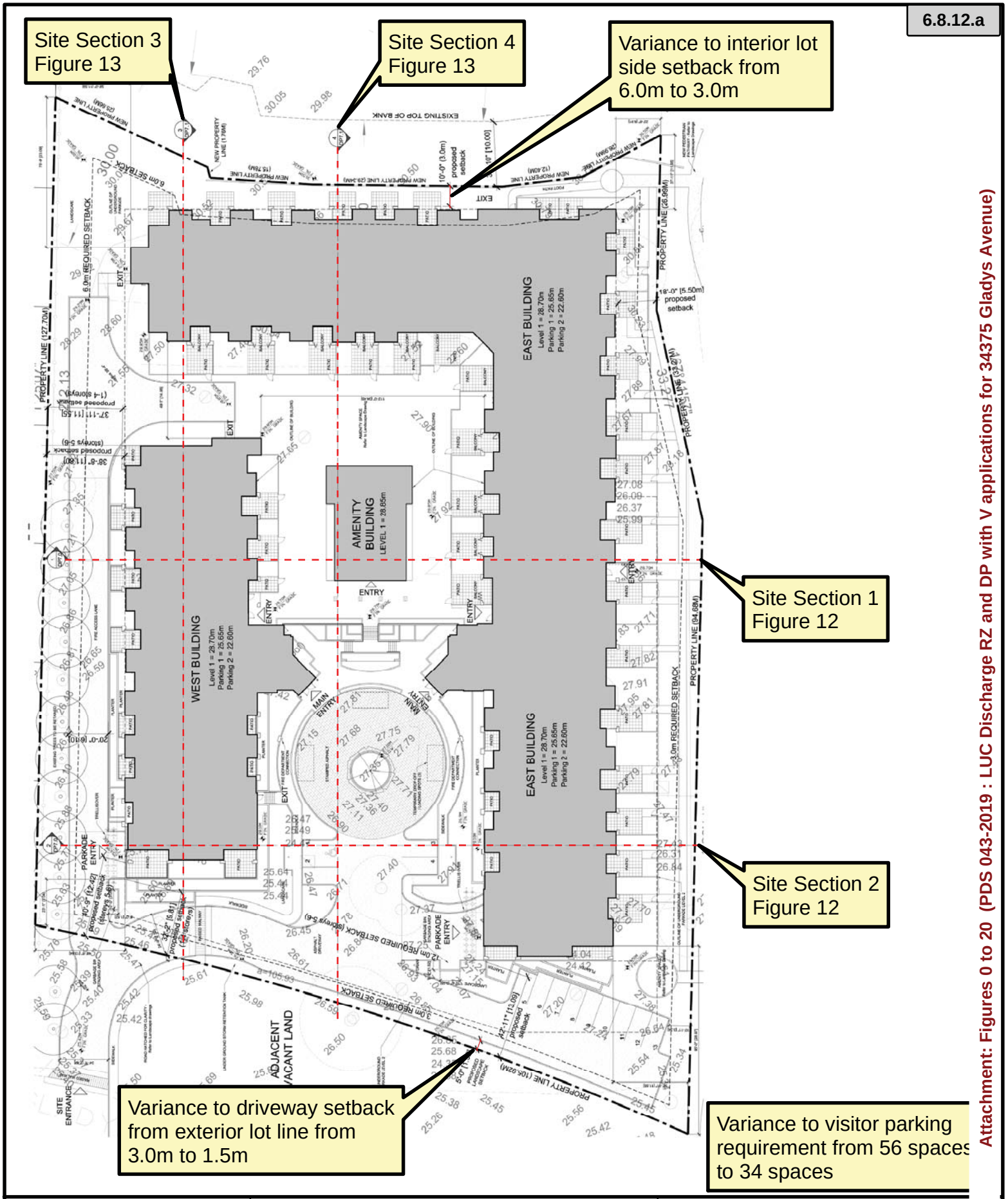
Attachment: Figures 0 to 20 (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

ABBOTSFORD
Planning and Development Services

34375 Gladys Avenue

Figure 6 - Steep Slope
Development Permit
File No.: PRJ17-128

50 0 Meters



Attachment: Figures 0 to 20 (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

ABBOTSFORD
Planning and Development Services

34375 Gladys Avenue

Figure 7 - Site Plan with Variances
File No.: PRJ17-128

N

Date

EAST BUILDING - EAST ELEVATION (SUMAS WAY)

EAST BUILDING - NORTH ELEVATION

EAST BUILDING - WEST ELEVATION

ABBOTSFORD
Planning and Development Services

34375 Gladys Avenue

Figure 8 - East Building Elevations
File No.: PRJ17-128

N	Date

Attachment: Figures 0 to 20 (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375

EAST BUILDING - WEST ELEVATION (PODIUM / COURTYARD)

EAST BUILDING - SOUTH INTERIOR ELEVATION (PODIUM)

EAST BUILDING - SOUTH ELEVATION

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Planning and Development Services

34375 Gladys Avenue

Figure 9 - East Building Elevations
File No.: PRJ17-128

N	Date

Attachment: Figures 0 to 20 (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375

WEST BUILDING - INTERIOR EAST ELEVATION (PODIUM /C OURTYARD)

WEST BUILDING - SOUTH ELEVATION

WEST BUILDING - NORTH ELEVATION

WEST BUILDING - WEST ELEVATION

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34375 Gladys Avenue

Figure 10 - West Building Elevations
File No.: PRJ17-128

N	Date

Attachment: Figures 0 to 20 (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375

North Elevation

South Elevation

West Elevation

East Elevation

Variance to Accessory Building height from 4.5m to 11.0m

ABBOTSFORD
Planning and Development Services

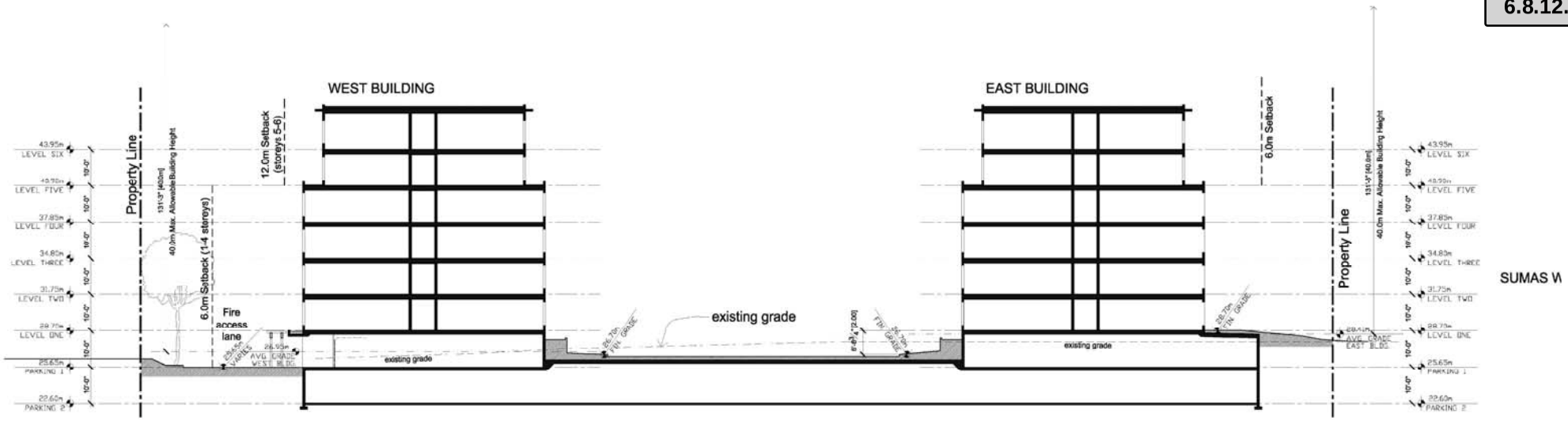
34375 Gladys Avenue

Figure 11 - Amenity Building Elevatic with Variance

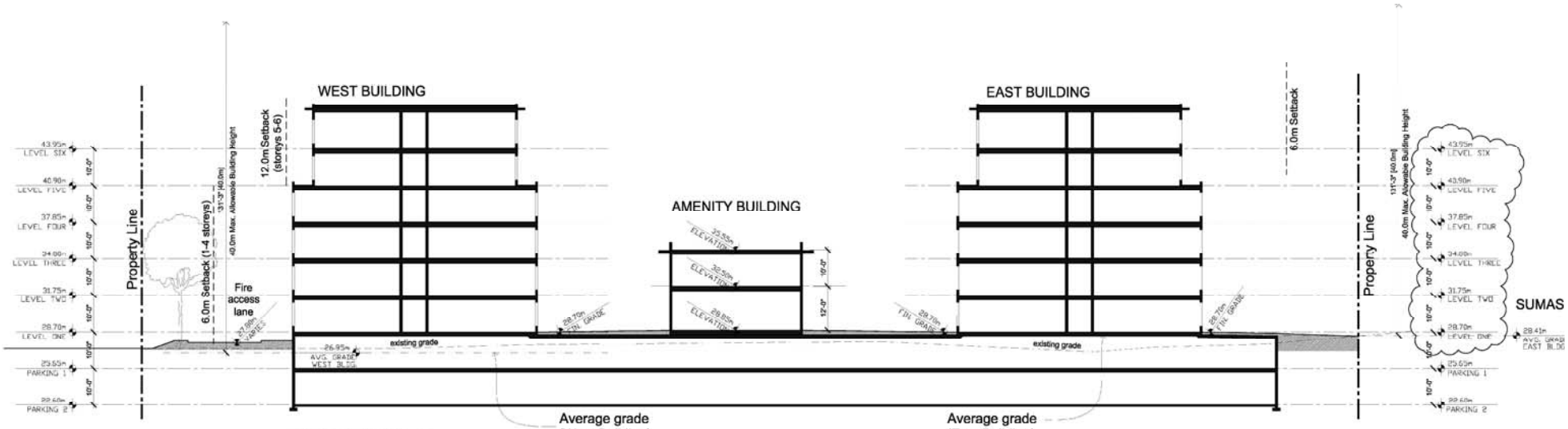
File No.: PRJ17-128

N	Date

Attachment: Figures 0 to 20 (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375



SECTION 1



SECTION 2

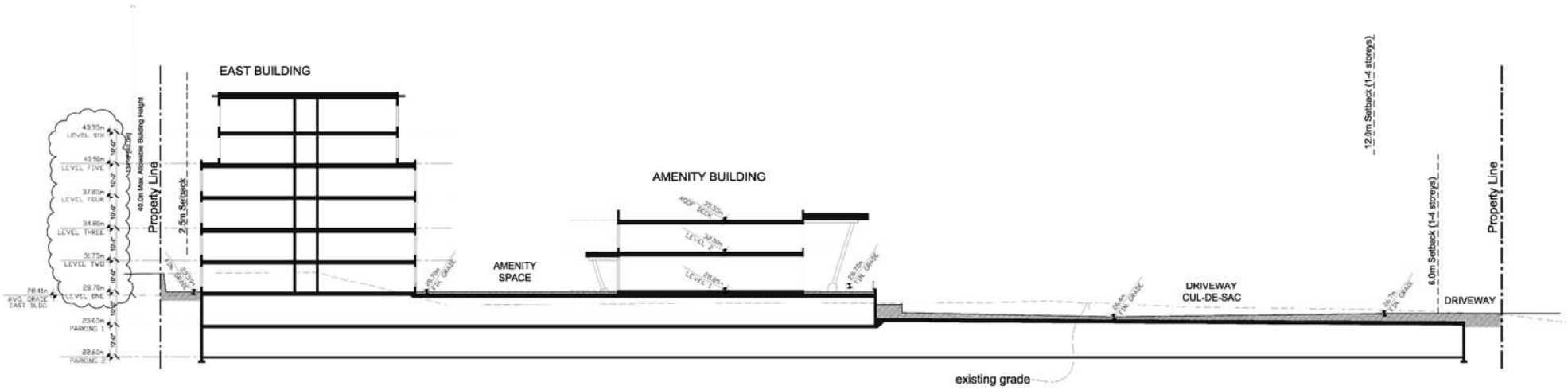
ABBOTSFORD
Planning and Development Services

34375 Gladys Avenue

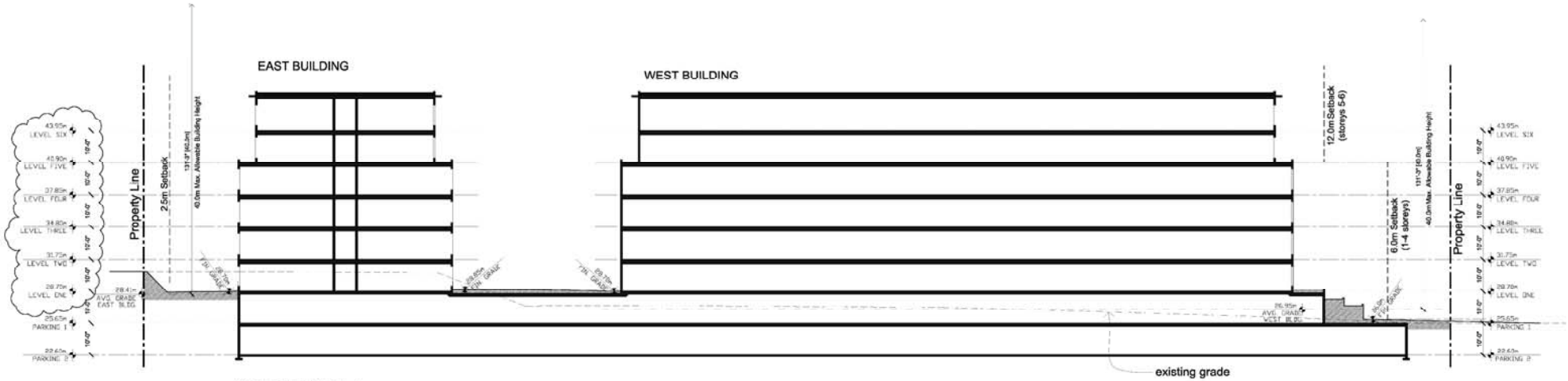
Figure 12 - Site Cross-Sections
File No.: PRJ17-128

N	Date

Attachment: Figures 0 to 20 (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375



SECTION 3



SECTION 4

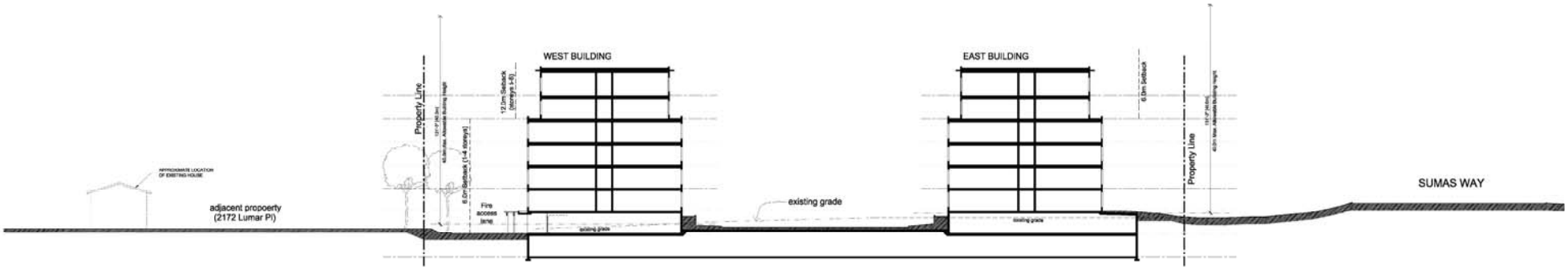
ABBOTSFORD
Planning and Development Services

34375 Gladys Avenue

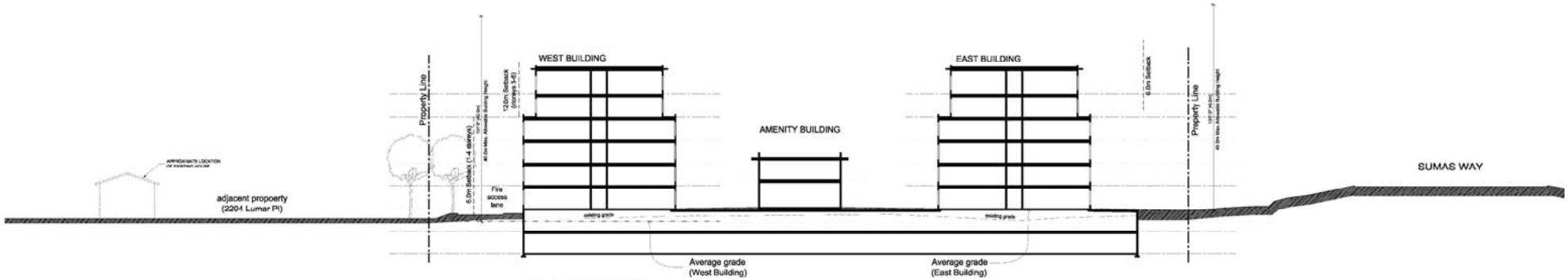
Figure 13 - Site Cross-Sections
File No.: PRJ17-128

N	Date

Attachment: Figures 0 to 20 (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375



SITE SECTION 1



SITE SECTION 2

ABBOTSFORD
Planning and Development Services

34375 Gladys Avenue

Figure 14 - Site Cross-Sections
File No.: PRJ17-128

N	Date

Attachment: Figures 0 to 20 (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375

EW FROM SUMAS TO SOUTHEAST CORNER OF EAST BUILDING

VIEW FROM SUMAS LOOKING SOUTHWEST

VIEW FROM WEST PROPERTY LINE LOOKING SOUTHEAST

EW OF SITE ENTRY LOOKING EAST

VIEW FROM AMENITY BUILDING ROOF DECK LOOKING SOUTHEAST

VIEW FROM AMENITY BUILDING ROOF DECK LOOKING SOUTH

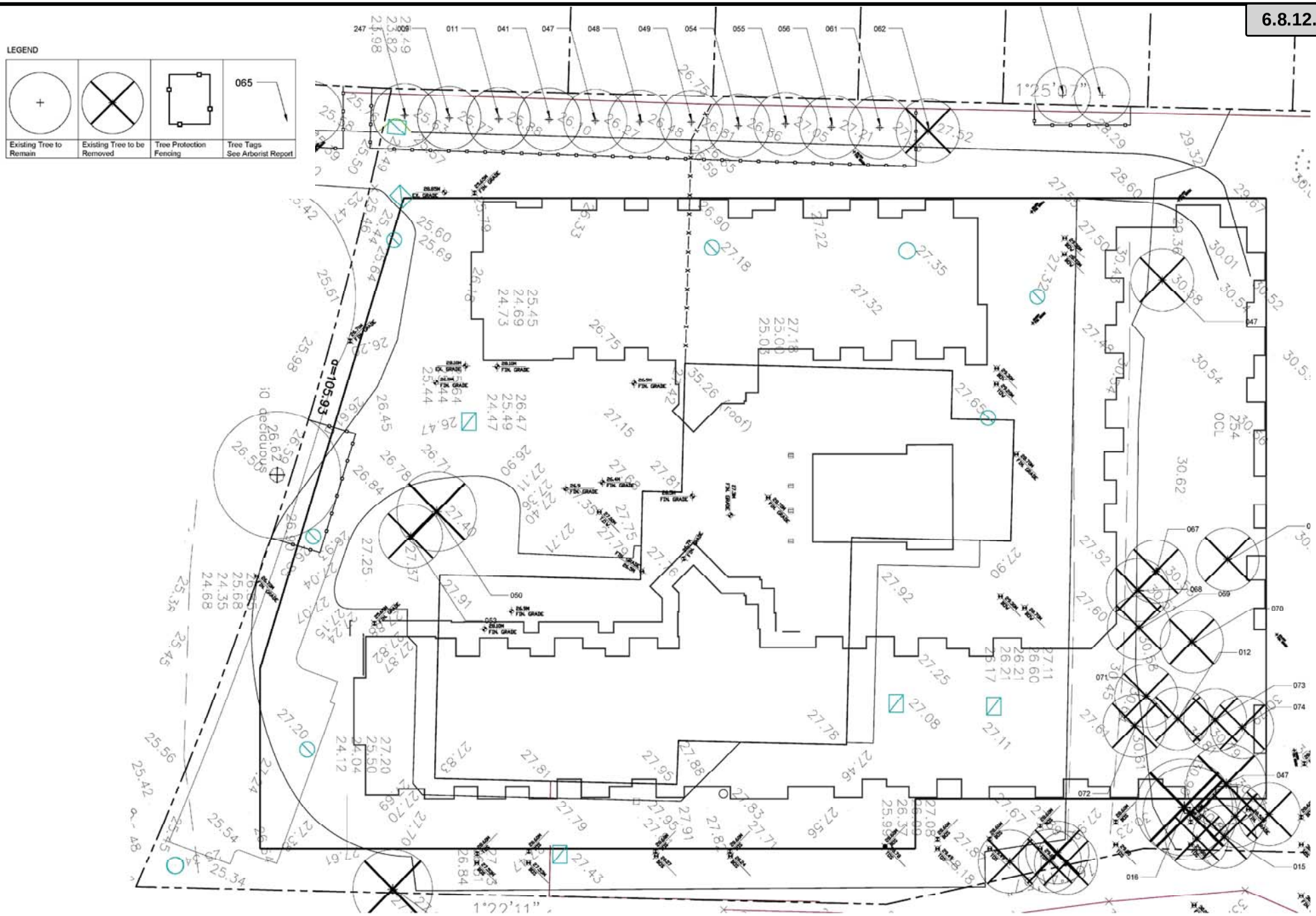
ABBOTSFORD
Planning and Development Services

34375 Gladys Avenue

Figure 15 - Renderings
File No.: PRJ17-128

N | Date

Attachment: Figures 0 to 20 (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375



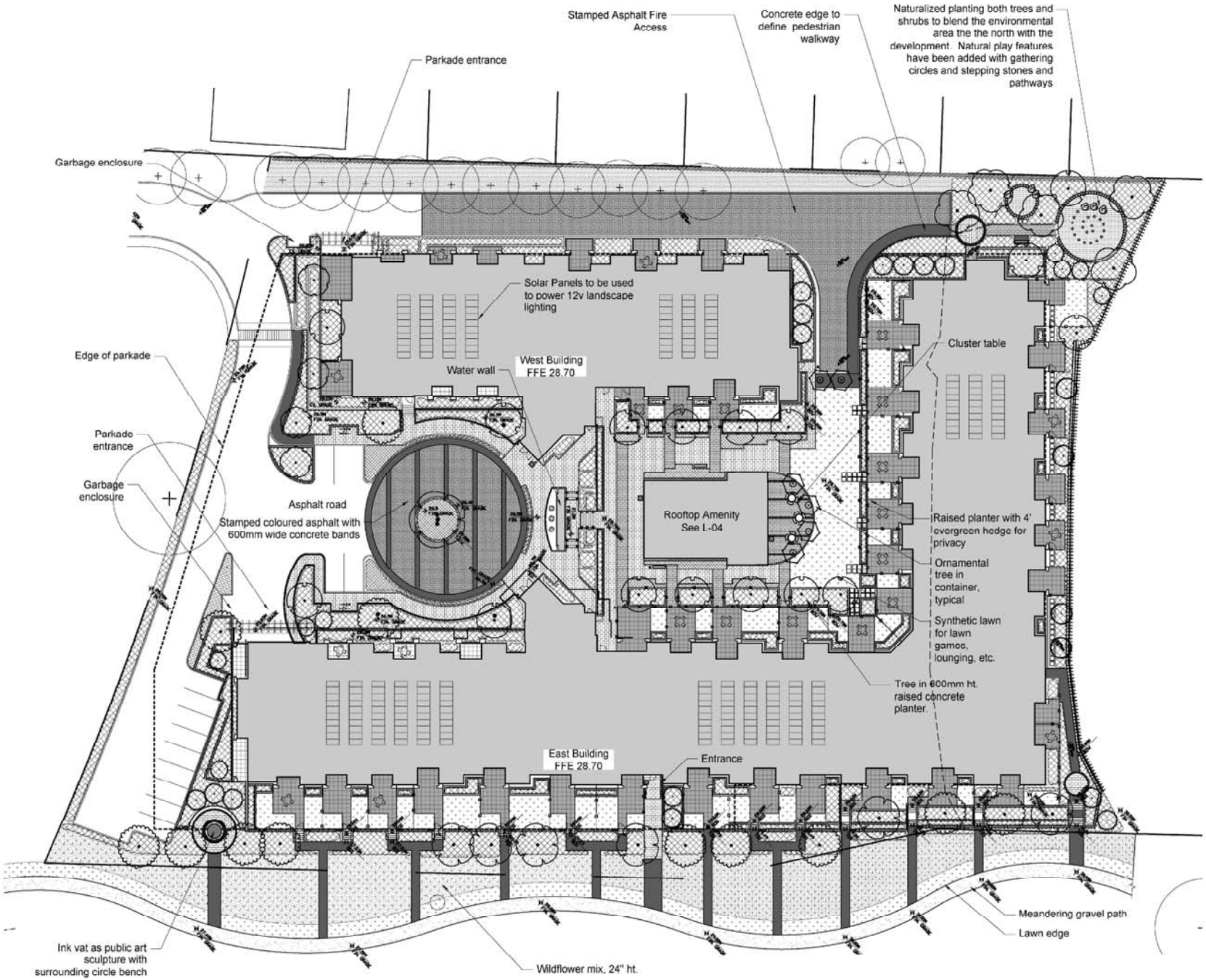
ABBOTSFORD
Planning and Development Services

34375 Gladys Avenue

Figure 17 - Tree Management Plan
File No.: PRJ17-128

N	Date

Attachment: Figures 0 to 20 (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375



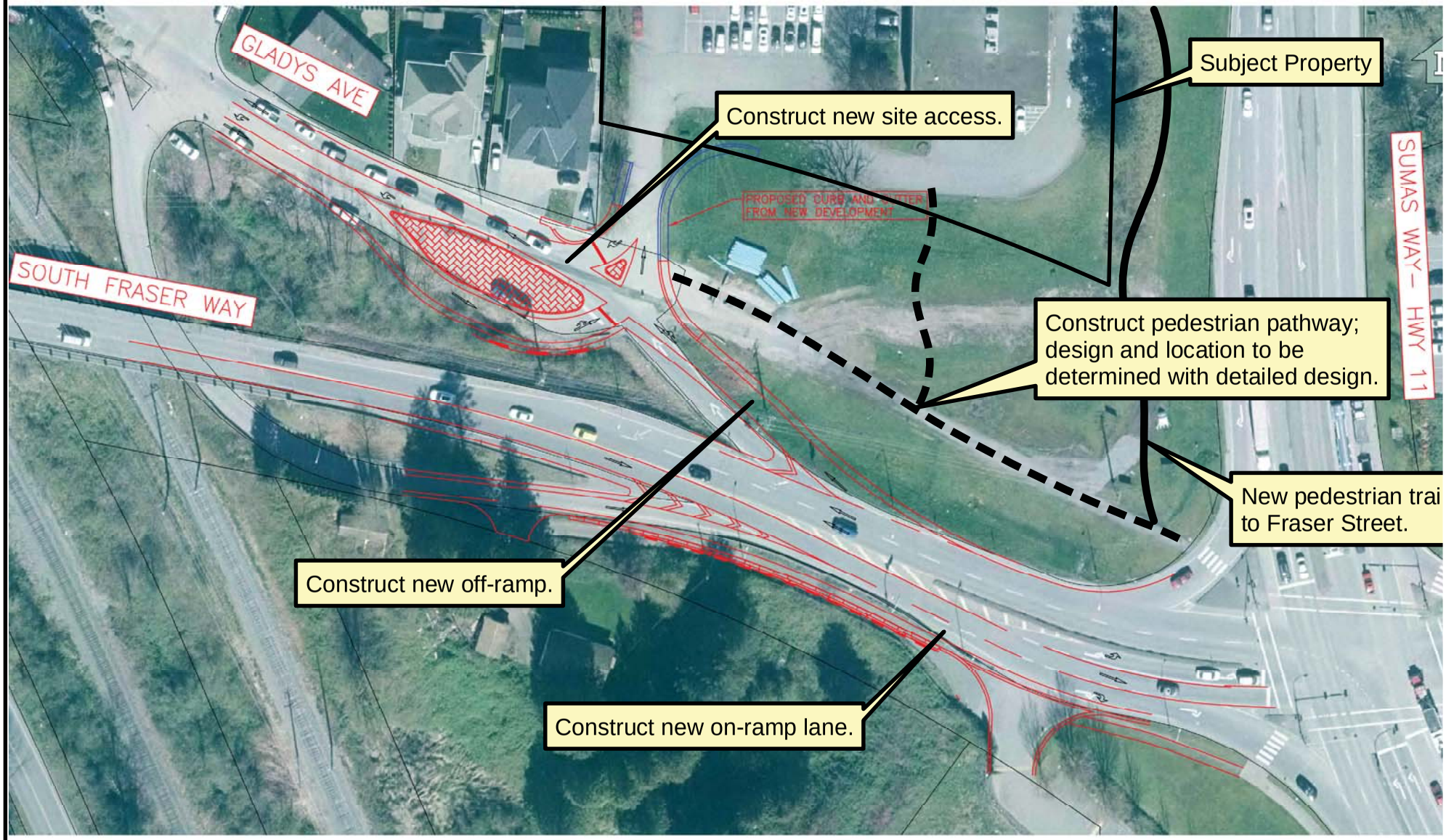
ABBOTSFORD
Planning and Development Services

34375 Gladys Avenue

Figure 18 - Landscape Plan
File No.: PRJ17-128

N	Date

Attachment: Figures 0 to 20 (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375



ABBOTSFORD
Planning and Development Services

34375 Gladys Avenue

Figure 19 - Proposed Roadworks
File No.: PRJ17-128

N	Date

Attachment: Figures 0 to 20 (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375

ABBOTSFORD
Planning and Development Services

34375 Gladys Avenue

Figure 20 - Sumas Way Road Improvem
File No.: PRJ17-128

30 0 30
Meters

N

Date

ABBOTSFORD DEVELOPMENT ENGINEERING DIVISION

REZONING WORKS AND SERVICES REQUIREMENTS

File No:	PRJ17-128
Planner:	Blake Collins, Senior Planner
Prepared By:	Kelsey Baldwin, Development Technologist I
Approved By:	19/04/26 Sarb Toor, Manager, Development Engineering
REVISED Date:	April 25, 2019
Applicant:	Tim Clark-Hollis, Elevate Development Corp.
Development Property:	34375 Gladys Avenue Lot 2 Section 15 Township 16 Plan NWP06983 NWD Except Plan 73715

The Local Government Act authorizes local governments to require development to meet current works and services standards as set out in the City's Development Bylaw and Policies.

This report includes the Works & Services **Requirements** to meet the applicable bylaws and policies and **Future Considerations** that may apply to the next phase of development.

Please have your consulting engineer email Kelsey Baldwin, Development Technologist 1 at kbaldwin@abbotsford.ca in regard to this report and any other servicing matters relating to this application.

Attachment: Attachment A: Works and Service Requirements (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys

REQUIREMENTS

Highways – Dedications and Rights-of-Ways

Sumas Way (Highway 11) is a Provincial Highway under the jurisdiction of the British Columbia Ministry of Transportation and Infrastructure, (BCMOTI). No road dedication is required from the City of Abbotsford, however, BCMOTI may have dedication requirements.

Urban Roadways - Construction

All works as shown in the attached Schedule A are to be designed and constructed by the Developer. Detailed Engineering drawings defining the scope of the work shall be submitted and will be reviewed by City staff.

The Developer is to design and construct pedestrian connections from:

1. the proposed building to the existing northwest corner of the intersection at South Fraser Way and Sumas Way;
2. Gladys Avenue to the northwest corner of the intersection at South Fraser Way and Sumas Way; and
3. the south west corner of the South Fraser Way and Sumas Way intersection to the north west corner of the Marshall Road and Sumas Way intersection.

Latecomer Charges - receivable *Policy 900-9-01*

The Developer is required to submit an acceptable Latecomer Report prior to Latecomer Charges being enacted

Drainage Collection and Disposal

Provide a storm water management plan showing how onsite drainage will be accommodated offsite. All offsite storm water works and services including new installations and upgrades to existing offsite systems required by the storm water management plan shall be designed and constructed in accordance with said storm water management plan.

Water Distribution Domestic and Fire Fighting

The existing 300mm diameter water main fronting the property to the south and the 250mm diameter water main fronting the property to the east are capable of providing adequate Fire and Domestic flows.

Power/Telecommunications

Service Connection:

Provide underground power and telecommunications services from the distribution system to the property line.

Distribution System:

Pay the Streetscape Contribution Levy, as per the City of Abbotsford Development Bylaw 2011, Bylaw No. 2070-2011 Schedule "D".

Relocation of telecommunications poles and lines due to road improvements is required to be converted to underground.

Attachment: Attachment A: Works and Service Requirements (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys

Erosion and Sediment Control

All works shall be performed in substantial conformance with the City's Development By-law, the Provincial 'Land Development Guidelines' and the City's Erosion and Sediment Control Bylaw, in the control and prevention of erosion and sediment during all phases of construction. No release of silt, sediment laden waters or deleterious substances is permitted into any existing City storm or drainage system during any phase of development of the Lands.

The ESC Plan requires 4 drawings, each indicating the ESC methods for that stage of construction;

- site preparation
- site servicing
- building construction
- warranty period

Rezoning Development Agreement Preparation Fee

Pay $500 Development Agreement preparation fee.

Works & Services Security & Warranty Deposit

Provide as Security Deposit, the estimated construction cost plus 10% for engineering (min $25,000) and 5% for as-constructed drawings (minimum $15,000) in cash or letter of credit.

Administration & Inspection Fee

Pay 5% of the first $300,000 + 3% of the remainder of the estimated construction cost for administration and inspections.

FUTURE CONSIDERATIONS FOR BUILDING PERMIT

Bylaws

The applicant is to be familiar with the Development Bylaw to ensure an understanding of possible future Works and services that may impact the development.

The applicant is to review the Works and Services identified in the Development Agreement and how they may impact the building.

Transportation

Road dedications, statutory rights-of-way and easements to accommodate the works and lot grading may require adjustments to the placement or size of the building.

Driveway may not exceed 9m in width.

Street and traffic signs are supplied and installed by the City at the developer's expense and payable upon invoice.

Pay to energize street lights at $50 per street light.

Drainage Collection and Disposal

Onsite infiltration of roof runoff is required. Explore options to infiltrate runoff from the entire site for 1 in 100 year events without a service connection. If a Geotechnical Engineer recommends otherwise, onsite detention of 1 in 100 year events will be the requirement.

Developer to design & construct detention for any newly created City roads and areas.

Attachment: Attachment A: Works and Service Requirements (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys

Provide Statutory Rights of Way for all detention and infiltration facilities.

Storm connections may have specific tie in locations. Review and confirm locations prior to design.

Sewage Collection and Disposal

The proposed residential development shall connect to the City's 375mm sanitary main running along the east side of the property, west of Sumas Way.

Sewer connections may have specific tie in locations. Review and confirm locations prior to design.

Water Distribution Domestic and Fire Fighting

Servicing for this Multi Family property, as submitted for review will require the installation of a separate bulk domestic meter and fire service with tattle-tale meter. The domestic meter shall be located in an outdoor meter chamber, accessible and in a landscaped location (non-travel area) approved by the City.

Any fire hydrants that go through the parkade structure must come from the mechanical room after the tattle-tale meter and dual check valve assembly, and will be privately owned.

Calculations related to the required domestic and fire water demand will be reviewed. There may be a service, meter or flow restrictions.

Water connections may have specific tie in locations. Review and confirm locations prior to design.

Fire Department review may result in geometric changes to onsite roadways, additional fire hydrants, emergency access and building placement.

Water meters supplied, delivered, and installed by the City's Water Operations Department (per Fees and Charges Bylaw, 2006, Amendment Bylaw No. 32)

Regular Service Meter:	
- Up to and including 18mm (3/4") meter	*$470.00*
- 25 mm (1") meter	*$635.00*
- 38 mm (1 ½") meter	*$1,055.00*
- 50 mm (2") meter	*$1,370.00*
Large Diameter Meter:	
- 75 mm (3") meter	*$3,500.00*
- 100 mm (4") meter	*$4,400.00*
- 150 mm (6") meter	*$7,300.00*
- 200 mm (8") meter	*$8,900.00*

Water and sewer main connections and wet taps are supervised and/or performed by City crews at the developer's expense and payable upon invoice.

Development Cost Charges

Development Cost Charges are applicable at Building Permit.

Attachment: Attachment A: Works and Service Requirements (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys

Lot Grading

- A Lot Grading Plan is required. Final lot grading shall conform to City's Lot Grading Policy and Guidelines. Any retaining walls that the Developer or Consulting Engineer consider are necessary to effectively grade the Lands to prevent negative impacts on finished neighbouring Lands, either existing or proposed, shall be constructed by the Developer. The standard "Lot Grading Covenant shall be registered against title to all proposed lots.
- Lot grading shall also provide for the collection of surface runoff and other drainage that will discharge to the City Drainage system. Lot grading may be designed to allow for surface sheet flows or collected in swales and directed to lawn basins as necessary to the satisfaction of the General Manager, Engineering. Any collection of surface flows to a concentrated point discharge location shall include provision for easements or rights-of-way across impacted Lands as necessary. All lot grading shall be designed to take care of surface flows emanating from onsite grading.

Building Permit Submissions

- In order to avoid delays in receipt of building permits, the builder shall be responsible for ensuring that building permit applications on the Lands conform to the intent of the accepted Lot Grading plan(s) prior to submission to the City.
- The developer or his designate shall review and approve building permit applications prior to submission to the City. When submitted, the building permit plans shall provide lot grading information that shall, at time of final inspection for building occupancy or approval, comply with the accepted lot grading plan or the intent of the lot grading design accepted by the General Manager, Engineering prior to construction.

Attachment: Attachment A: Works and Service Requirements (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys

Took Engineering Inc.

5485 - 180th Street, Surrey, BC, Canada V3S 5R9
Tel: (604) 576-8561 Fax: (604) 576-2991 www.tookeng.com
Em: projects@tookeng.com

April 16, 2019 File: 10139

Elevate Development Corporation.
#202, 15127 – 100th Avenue
Surrey BC V3R 0N9

Attention: Tim Hollis

Re: Geotechnical Assessment Report for 34375 Gladys Avenue, Abbotsford, BC

INTRODUCTION

As per your request, Took Engineering attended the subject property April 17 & 18, 2017 and to conduct a Soils Investigation to provide recommendations for founding the proposed six story multi-family residential building with two levels underground parking.

The legal description of the subject property with respect to the multi-family building is Lot 2 Except: part on plan 73715, Sec 15, TWP 16, NWD, Plan 6983.

The soils investigation drilling program was advanced under a preliminary building design considering six story multi-family building with two stories of underground parking. The second story of underground parking had a reduced footprint compared to the first story of underground parking. Subsequent to the site investigation the building size was increased.

The scope of our services did not include environmental assessments or evaluations regarding the existence or absence of hazardous or toxic substances on or below this site.

PROPOSED DEVELOPMENT

The proposed residential development consists of a six story multi-family building with two stories of underground parking.

The second parking level has a slab elevation of 22.60 M.

Cont'd…/2

Attachment: Attachment B: Geotechnical Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

SITE DESCRIPTION

The subject property is bordered by Sumas Way to the East, Gladys Avenue and South Fraser Way to the South and private residential property to the West and North.

The North half of the subject property is protected by an environmental protection zone for Gill Creek which flows from a culvert under Sumas Way to the West.

To the North of the developed area the grade rises approximately 2.9 meters to a cleared area approximately 30 meters wide before dropping down into the Gill Creek ravine.

The western residential properties are at approximately the same grade as the developed portion of the subject property.

To the East, the grade of Sumas Way increases from South to North such that to the South the road grade is approximately 2 meters below the existing parking asphalt grade and to the North the road asphalt grade is approximately 3.5 meters above the existing parking grade.

AREA GEOLOGY

According to the Surficial Geology Map 1486A issued by the Geological Survey of Canada, the geological formation in this area is comprised of recessional and advance glaciofluvial deposits, recessional channel and floodplain deposits laid down in proglacial streams: gravel and sand up to 40 meters thick with deltaic sediments, normal range of thickness 5 to 15m with some sandy till and sub-stratified drift 2 to 10 meters thick.

Cont'd…/3

Attachment: Attachment B: Geotechnical Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

FIELD INVESTIGATION

Test hole drilling was conducted with a truck-mounted hydraulically operated drill rig supplied by On-track Drilling Ltd. A total of six augured test holes were carried out at the location shown on the attached Sheet No.2 "Test Location Plan" down to a maximum depth of 15 meters below the existing asphalt elevation.

The augured test holes were drilled with 150 mm diameter solid stem auger flights to obtain subsoil samples.

Standard Penetration Testing consists of continuous driving on a 60mm diameter cone with a 63.6Kg hammer free-falling a set drop of 0.762M. The blow count per foot (N value) was recorded and evaluated for determination of soil strength and compressibility. The augured test holes were drilled with a 150mm diameter solid stem flight to obtain sub-soil samples.

The test holes were casually backfilled after testing with asphalt patch at the surface.

Representative samples were obtained, sealed in airtight polyethylene bags and subsequently submitted to our laboratory for determination of in-situ moisture contents.

TEST RESULTS

Visual soil description, in-situ moisture contents, water table at the time of testing and Standard Penetration Test (SPT) Profile Plot in blow counts per measured increment versus depth are presented on the attached Test Hole Log Sheet No's 3 to 8.

Cont'd…/4

Attachment: Attachment B: Geotechnical Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

EARTHQUAKE CONSIDERATIONS

In the event of a strong earthquake, there is a **moderate risk** of loss of strength due to liquefaction from the soils between 16 and 24 feet below grade which would affect the portion of the building founded on sandy material. For the remainder of the building the risk of liquefaction is low.

Based upon the soil profiles a **Soil Site Classification of C** is to be used considering the two stories of underground parking.

Based upon the online seismic hazard calculator by Natural Resources Canada in reference with the 2015 National Building Code and with the ground motions having a probability of exceedance of 2% in 50 years (annual probability of 1/2475) the spectral acceleration values for different natural periods are presented below.

Sa(0.05)	= 0.371
Sa(0.1)	= 0.560
Sa(0.2)	**= 0.699**
Sa(0.3)	= 0.681
Sa(0.5)	**= 0.592**
Sa(1.0)	**= 0.347**
Sa(2.0)	**= 0.213**
Sa(5.0)	**= 0.071**
Sa(10.0)	**= 0.025**
PGA(G)	**= 0.307**
PGV(m/s)	= 0.443

The earthquake resistant design requirements are meant to provide minimum standards to assure public safety by safeguarding against major failure and loss of life.

Structures designed in conformance with these provisions should be able to resist moderate earthquakes without significant damage and resist major catastrophic earthquakes without collapse and allow occupants to vacate the premises. These provisions are not intended to ensure that no damage to the structures will occur.

Cont'd…/5

SLOPE STABILITY OF GILL CREEK RAVINE

The City of Abbotsford has adopted Steep Slope Development Permit Guidelines for project sites with slopes of 20 % or greater and for project sites within 20M of slopes that are 20% or greater. Except for some limited exemptions, all projects that satisfy either of the two conditions must have a geotechnical slope hazard assessment performed.

Review of the City of Abbotsford Online Mapping System has disclosed that the Gill Creek ravine has a slope greater than 20% and that the proposed construction is within 20M of the slope.

Review of the survey plans disclosed the Gill Creek top of channel bank ranges in elevation from 22.73 to 23.48 meters.

Review of the RAR report issued by Envirowest Consultants indicates that the environmental setback from Gill Creek is at the South brow of the ravine.

Review of the proposed construction plan indicates that the development is set back from the top of ravine 10.0 meters and underground parking slab elevation is 22.60 meters.

A Groundwater Hydrology study was undertaken by Kalwij Water Dynamics Inc. in the Summer and Fall of 2017 as part of the proposed development. The results of the study indicates that the ground water flow in the upper aquifer is in a North direction, towards Gill Creek and that the site soils have low transmitting capacity such that there is a low likelihood that the proposed construction and associated temporary and permanent dewatering would significantly impact creek flow.

As the proposed building footing elevation is at approximately the same elevation as the creek bed, it is highly unlikely that the stability of the Gill Creek ravine slope will influence the proposed construction.

As the proposed construction is 10.0 meters away from the Gill Creek South top of ravine and is founded at or below the creek channel elevation, it is highly unlikely that the proposed construction will influence the Gill Creek ravine slope stability.

The risk to the Gill Creek ravine of a land slide hazard with respect to the proposed construction is very low.

A Restrictive Covenant with respect to slope stability is not required.

A review of the ravine slope by the geotechnical engineer prior to final occupancy is required.

Cont'd…/6

Attachment: Attachment B: Geotechnical Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

DISCUSSION & RECOMMENDATION

The site has several restrictions that require consideration prior to construction: trees, offsite services, water table, fill material and, the commercial building development.

The trees along the West property line and in the Gill Creek Ravine will have an impact upon the extent of the excavation. An arborist will set the root protection zone to be used in the excavation plan. The tree on the South property line will have to be removed.

It is highly likely that the East excavation face will be supported by soil nailing and shotcrete. The locations and elevations of the offsite service along the West side of the Sumas Way Road alignment are to be confirmed prior to issuance of the excavation plan. The setback requirements between the services and the soil nails are to be established with consultation with the City of Abbotsford. Additionally, there is a possibility that the offsite services will have water accumulation within the service backfill material that could have deleterious effects on the excavation.

The water table was established between 1.1 to 2 meters below asphalt grade at the time of testing. The water table will need to be lowered prior to excavation. The preliminary information from Wedler Engineering places the storm sewer service in the South East corner of the property with an invert elevation of 20.51 M. A dewatering plan should be developed in conjunction with the excavation plan.

Random fill and peat were encountered in test hole #1 to a depth of 4.88 meters (elevation of 22.3 M). It is assumed that the existing building is founded upon native soils and that the asphalted area to the South and East of the existing building has been raised with random fill. The depth of the random fill would taper to meet the native soils. It is highly likely that the proposed construction extends below the random fill and peat strata, however, compacted import structural fill may be required should that not be the case.

Excavation
The excavation for the proposed foundation parking must be done in conjunction with a dewatering plan, the environmental protection zones and in compliance with Occupational Health and Safety Guidelines.

Cont'd…/7

The proposed development second story underground parking slab elevation is set at 22.60 M.

Considering the perimeter drain tile and excavation construction working surface, the bottom of excavation elevation is assumed to be 21.2 M.

The excavation subgrade soils are to be protected from water softening from construction traffic by placement of a working surface layer of 19mm clear crushed rock placed to a thickness of 100 mm for foot traffic and to a thickness of 300mm of 75mm clear crushed rock for any vehicle traffic areas.

The site soils are very sensitive to erosion and sloughing at the excavation face by groundwater exfiltration into the excavation. As such, the ground water must be lowered and maintained below the excavation depth for the duration of construction.

It is highly likely that the West, North and East excavation cut faces are to be stabilized with soil nails and shotcrete. The South excavation face will likely be graded to accommodate the storm water detention system.

An excavation plan will be required considering the following: existing trees along the West property line, the environmental protection zone of Gill Creek to the North, the existing services within the Sumas Way alignment and site access requirements.

It is unlikely that the lowering of the ground water table and the vibrations from the excavation works will affect the neighboring properties; however, it would be prudent to do a preconstruction survey prior to demolition of the existing structures as a way of mitigating any future claims.

Foundations

The foundation bearing soils for the proposed building vary consisting of: stiff brown mottled silty clay and clayey silt with sand lenses, compact grey silty fine to medium sand with medium sand lenses, dense grey silty fine to medium sand trace of gravel.

The **Allowable Soil Bearing Capacity is to be taken as 120.0 kPa (2500 PSF) with a Factor of Safety of 2.0.**

The foundation bearing soils are to be inspected by the Geotechnical Engineer prior to placement of the working surface for confirmation of bearing capacity.

Cont'd…8

Attachment: Attachment B: Geotechnical Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

The foundations are to be backfilled with free draining material with fines passing the 75um sieve size less than 7%. The backfill coarse fraction size may be limited by the building envelope consultant for protection of the foundation water proofing system but is not to exceed 75mm in diameter.

The backfill supporting: the northern retaining wall, pipe services from the building, interior courtyard areas, sidewalks and patios locations are to be compacted to 95% Standard Proctor Maximum Dry Density to prevent settlement.

The lateral earth pressure on the foundation walls is assumed to not be affected by the shotcrete and soil nailing slope stabilization system as the soil nails will have the tension released at the time of backfilling.

It is highly likely that a crane will be used during construction. A crane foundation between 1 and 2 meters of concrete thickness is expected. Dewatering for the crane foundation installation may be required. The foundation bearing soils are to be inspected by the Geotechnical Engineer prior to placement of the working surface for confirmation of bearing capacity.

The elevator pits will have to be designed with a tanking detail, as the water table outside the pit could be higher than the elevator pit inside slab elevation.

The foundation backfill material sieve analysis is to be approved by the Geotechnical Engineer prior to delivery to site.

Compaction testing of the foundation backfill material is to be reviewed and approved by the Geotechnical Engineer during backfilling works.

Retaining walls

The preliminary architectural design notes a 2.0 M +/- retaining wall between the building and the northern environmental protection area to create a yard for the unit occupants.

A retaining wall design is required and it will likely be cast in place or gravity lock block.

The water table in this area was found to be at 3 meters below grade at the time of testing. It is reasonable to assume that the water table will not increase post construction, however, rear wall drainage is still required.

The proposed retaining wall footings are to bear upon the compacted foundation backfill, the **Allowable Soil Bearing Capacity is to be taken as 86 kPa (1500 PSF).**

Cont'd…/9

Attachment: Attachment B: Geotechnical Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Site Water Management

A Groundwater Hydrology study was undertaken by Kalwij Water Dynamics Inc in the summer and fall of 2017 as part of the proposed development. The results of the study indicates that the ground water flow in the upper aquifer is in a north direction, towards Gill Creek and that the site soils have low transmitting capacity such that there is a low likelihood that the proposed construction and associated dewatering would impact creek flow.

The proposed development second story underground parking slab elevation is set at 22.60 M.

Considering the perimeter drain tile and excavation construction working surface, the bottom of excavation elevation is assumed to be 21.2 M.

At the time of drilling, the water table elevation in the Eastern asphalt area was observed at 26.5 in April and dropping to 25.5 in September 2017.

The preliminary information from Wedler Engineering places the storm sewer service in the south east corner of the property with an invert elevation of 20.51 M.

The excavation for the proposed foundation will require lowering the water table approximately 5 meters. This may possibly be achieved by constructing a cut off trench to intercept the ground water and directing it, ultimately, to the city storm sewer service. The cut off trench would have to be installed slowly to avoid erosion of the excavation wall.

The excavations for the crane and elevators will likely require pump dewatering during construction. The pump discharge lines are to be incorporated into the site dewatering design.

The dewatering system design should be incorporated into the excavation plan and consider contractor siting requirements.

Cont'd…/10

Attachment: Attachment B: Geotechnical Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Structural fill

All import structural fill is to be free draining with fines passing the 75 micron sieve less than 7% and coarse fraction less than 75mm diameter.

The structural fill over the underground parking and against the foundation will have a coarse fraction size limitation set by the building envelope professional to prevent physical damage to the water proofing and damp proofing membrane.

Structural fill supporting the building footings is to extend past the edge of footings equal to the depth of fill below the footings.

All structural fill within the building footprint is to be compacted to 95% Standard Proctor Maximum Dry Density.

All structural fill within interior roads and parking areas is to be compacted to 95% Modified Proctor Maximum Dry Density.

All structural fill is to be founded upon bearing soil certified by the Geotechnical Engineer with adequate temporary dewatering for the duration of the fill placement. The structural fill is to be compacted in place in 250 to 300mm inch lifts with a 1000lb plate vibrator or a ride-on-roller.

Pavement Section Recommendations

The Pavement section over the underground parking slab is to be considered in conjunction with the Building Envelope Professional to prevent damage of the waterproofing membrane and lateral movement of the driving surface while providing drainage and support.

To provide a suitable pavement section for the road and parking lot areas the subgrade must be stripped of vegetation, organic soils, and water softened materials. Application of a soil sterilizer to the sub-base prior to placement of base will help control weed growth through the asphaltic concrete.

Cont'd…/11

Attachment: Attachment B: Geotechnical Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Attachment: Attachment B: Geotechnical Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

After the subgrade has been prepared as recommended, the following pavement structure may be placed:

Road and loading areas:

Asphaltic Concrete	75 mm
Base Course	100 mm
Subgrade Course	600 mm

Parking areas:

Asphaltic Concrete	64 mm
Base Course	100 mm
Subgrade Course	450 mm

The base course structural fill mechanical sieve analysis must conform to the MMCD Granular Base specifications.

The sub-grade course structural fill mechanical sieve analysis must conform to the MMCD Select Granular Sub-base or Crushed Granular Sub-base specifications.

Care must be exercised during wet weather construction as the native subgrade is sensitive to surface moisture. **Construction traffic should not be allowed on the exposed subgrade**.

A smooth mouthed bucket mounted on an excavator, should be used to prevent disturbance of the underlying subgrade soils. The subgrade surface should be sloped to provide adequate drainage without ponding.

Inspections

The Geotechnical Engineer is to have a minimum of 48 hours notice in advance for site inspections.

The following site inspections are required by a representative of Took Engineering:

1. Confirmation of Allowable Soil Bearing Capacity of soils supporting foundations and retaining walls.
2. Confirmation of quality of import structural fills prior to delivery to site.
3. Confirmation of compaction testing of structural fills
4. Review of excavation plan
5. Review of shotcrete slope stability design.
6. Review of site dewatering design.
7. Pavement section requirements.

Cont'd…/12

Attachment: Attachment B: Geotechnical Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

CLOSURE

The subject parcel of land may be used safely for the intended purpose of constructing a six story multi-family residential building with two levels of underground parking.

This report should be made available to prospective contractors and/or the contractor for information on factual data only and not as a warranty of subsurface conditions, such as those interpreted from test pits, test borehole logs, trench construction and discussions of nearby project subsurface conditions.

This report is based on the conditions as they presently exist and assume that the explorations are representative of the subsurface conditions throughout the site, i.e., the subsurface conditions everywhere are not significantly different from those known and disclosed by other explorations.

If, during construction, subsurface conditions differ from those encountered and described herein or appear to be present, Took Engineering Inc. should be advised at once so that we can review these conditions and reconsider our recommendations where necessary.

If a substantial lapse of time between the submission of this report and the start of construction at or near the site, it is recommended that this report be reviewed to determine the applicability of the conclusions and recommendations considering the changed conditions and time lapse.

Prior to the start of construction, Took Engineering Inc. must complete a general review of those portions of the plans and specifications that pertain to foundations, earthwork and drainage to determine that they are consistent with our recommendations.

Unanticipated conditions are commonly encountered and cannot be fully determined by merely taking soil samples or making explorations.

During construction, Took Engineering Inc., is to have the opportunity to provide necessary inspection services outlined previously to confirm that soil conditions encountered conform to our interpretation of the test borehole results. The recommendations provided in this report depend on the inspection services being carried out.

The scope of our services did not include environmental assessments or evaluations regarding the existence or absence of hazardous or toxic substances in the soil, subsurface water and ground water, on or below this site.

Cont'd…/13

This report contemplates further verification and investigation prior to site preparation and placing formwork for foundations.

The recommendations contained in this report do not alleviate the contractor from complying with local Building By-laws and the 2012 BC Building Code.

Should you have any questions or concerns regarding the foregoing please do not hesitate to contact the undersigned.

Yours truly,
TOOK ENGINEERING INC.

PROFESSIONAL ENGINEER
PROVINCE OF BRITISH COLUMBIA
D. P. JENSEN

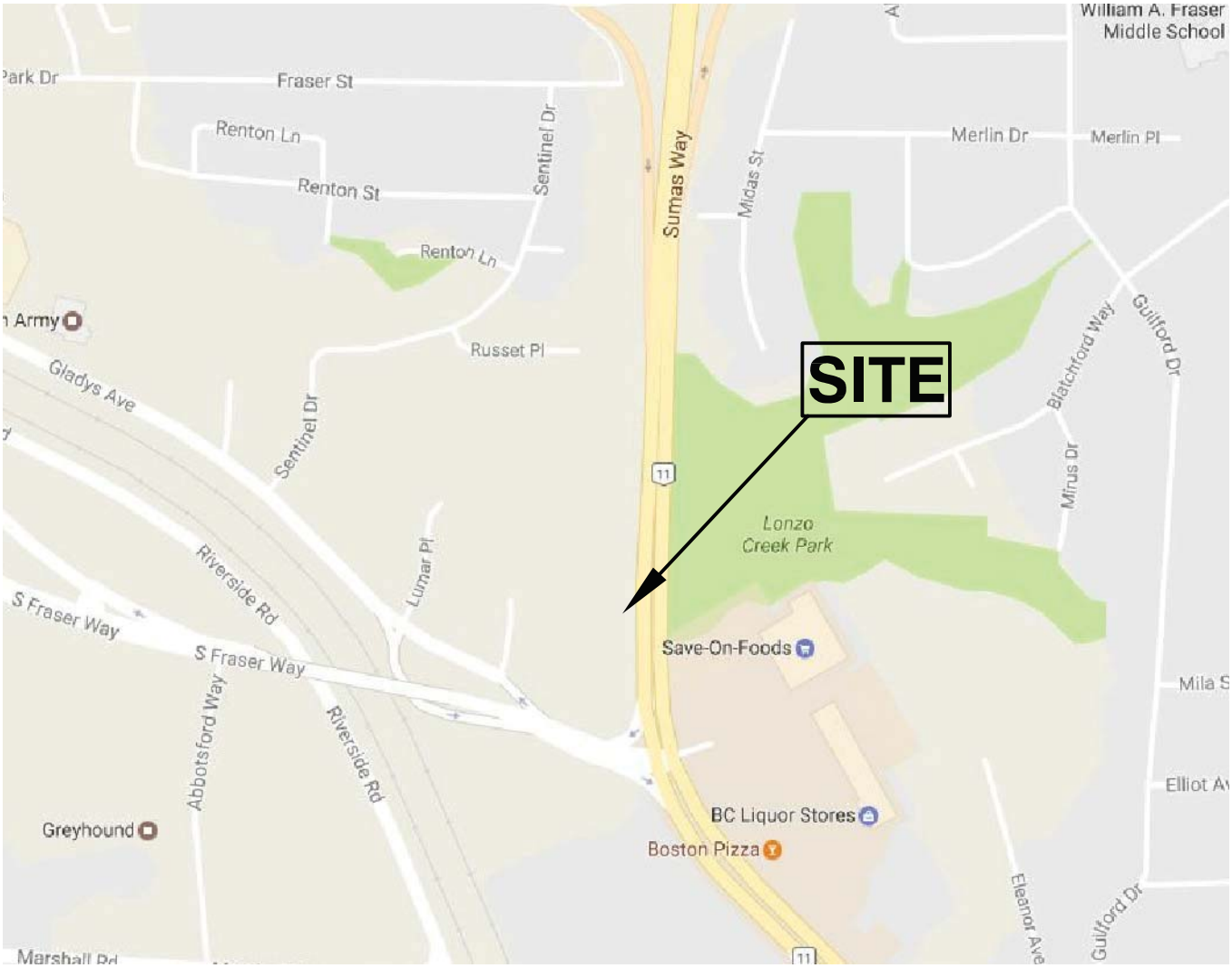
April 18 2019

P. Jensen P. Eng.

Attachments (10)
Copy: Client (2)
10139 SI Report dated Apr16-2019
(amendment to Jan 2018)

Attachment: Attachment B: Geotechnical Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

NORTH



rev#	date	by	revisions
A	APRIL 20, 2017	SAM	SI REPORT

Tooke Engineering Inc.
5485 - 180 th Street, Surrey, BC Canada V3S 5R9
Tel. 604 - 576 - 8561 • Fax. 604 - 576 - 2991

client
ELEVATE DEVELOPMENT CORP.
34375 GLADYS AVENUE, ABBOTSFORD, BC

title
SITE LOCATION PLAN

scale	AS SHOWN	drawn	SAM	sheet no.	file no.	rev#
design	SAM	checked	PJ	1	10139	A
date	APRIL 20, 2017					

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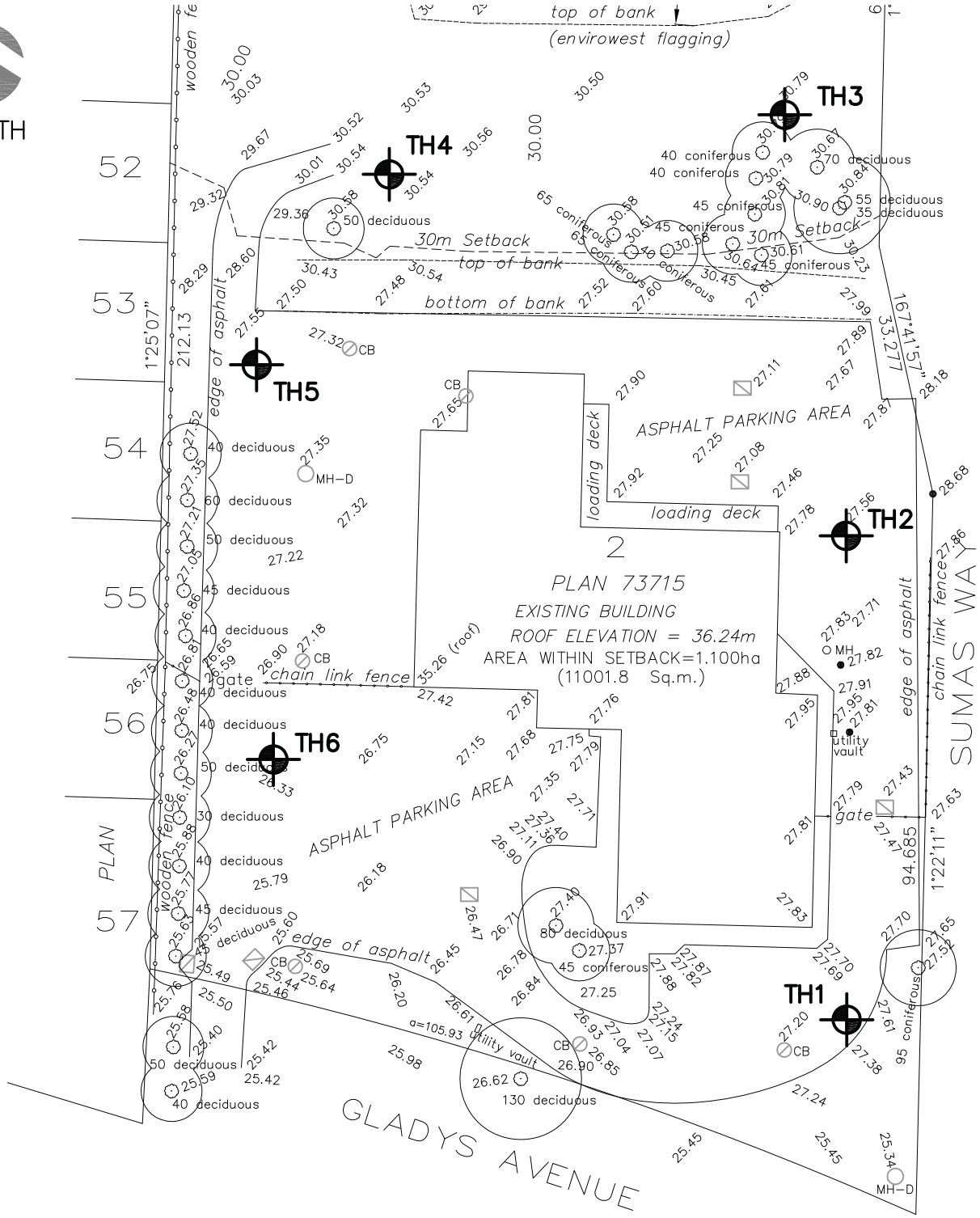
Attachment: Attachment B: Geotechnical Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)



LEGEND

	PROPERTY LINE		200mm Ø PVC CLEANOUT, CAPPED (LOCKABLE)
—G—G—	GAS LINE (APPROX.)	W	WELL LOCATION (APPROX.)
—W—W—	WATER LINE (APPROX.)	PP	POWER POLE
	CONTOUR LINE (ELEV SHOWN)	EB	DENOTES ELECTRICAL BOX
	DRAINAGE SWALE		MANHOLE
× 3.02	SPOT ELEVATION (EXISTING)		CATCH BASIN
3.02	GROUND ELEVATION (EXISTING)		LAWN BASIN
3.02	GROUND ELEVATION (PROPOSED)		HOSE BIBB
	INFILTRATION TEST LOCATION	R.O.W.	RIGHT-OF-WAY
P	PERCOLATION TEST LOCATION		
TH	OBSERVATION HOLE LOCATION		

DIMENSIONS ARE IN MILLIMETERS AND ELEVATIONS ARE IN METERS, UNLESS NOTED OTHERWISE.

rev#	date	by	revisions
A	APRIL 20, 2017	SAM	SI REPORT

Took Engineering Inc
5485 - 180 th Street, Surrey, BC Canada V3S 5P
Tel. 604 - 576 - 8561 • Fax. 604 - 576 - 299

client: ELEVATE DEVELOPMENT CORP.
34375 GLADYS AVENUE, ABBOTSFORD, BC

title: TEST LOCATION PLAN

scale	AS SHOWN	drawn	BC	sheet no.	file no.	rev#
design	ASM	checked	ASM	2	10139	A
date	APRIL 20, 2017					

visit us at: www.took

REPORT

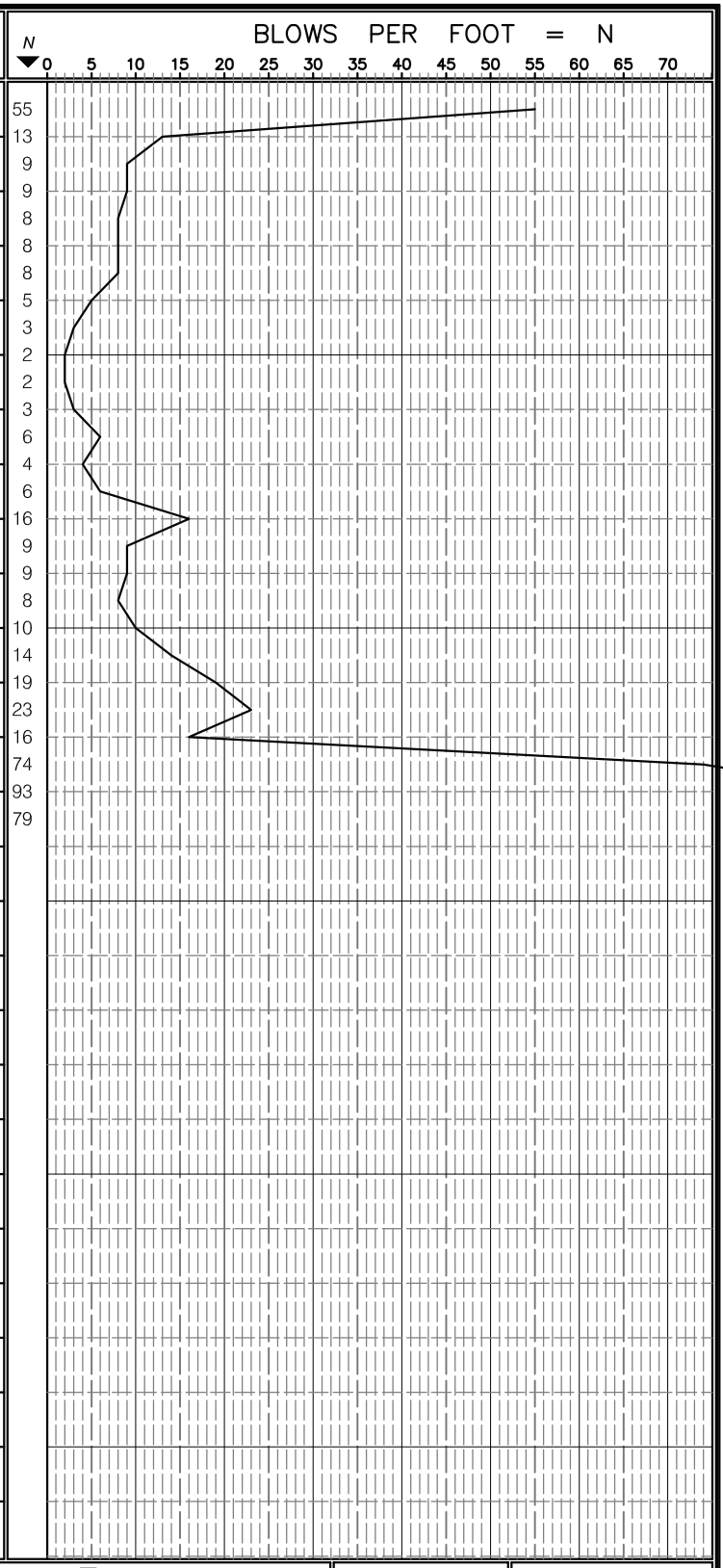
Attachment: Attachment B: Geotechnical Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Took Engineering Inc.
5485 - 180 th Street, Surrey, BC Canada V3S 5R9
Tel. 604 - 576 - 8561 • Fax. 604 - 576 - 2991

TEST HOLE LOG

Client: ELEVATE DEVELOPMENT CORP. File No. 10139 Hole No. TH 1
Project: 34375 GLADYS AVENUE, ABBOTSFORD, BC Date: APRIL 20, 2017

SOIL DESCRIPTION	SYMBOL	DEPTH FEET 0	ELEV. 27.38 M	MOIST. %	N
ASPHALT		2	3"		55
SAND AND GRAVEL STRUCTURAL FILL		4		20	13
SILT/SAND/GRAVEL/TR ORGANICS - FILL		6		15	9
		8		14	9
		10			8
	▽	12		26	8
PEAT		14		108	8
		16			5
BROWN MOTTLED SILTY CLAY AND CLAYEY SILT WITH SAND LENSES		18		34	3
		20		47	2
		22		33	2
		24			3
GREY SAND WITH SOME GRAVEL		26		15	6
VERY DENSE GREY SAND TRACE SILT		28			4
		30		16	6
		32		20	16
		34			9
		36		20	9
		38			8
		40		22	10
VERY DENSE GREY SAND WITH SILT SEAMS		42		25	14
		44			19
		46			23
		48			16
		50		30	74
NOTE: WATER TABLE ENCOUNTERED AT 12'	BOH	52			93
		54			79



N - Spin Dynamic Penetration Test (SDPT)
X - Unconfined Compressive Strength, Qu
▷ Plastic Limit ◁ Liquid Limit ▽ Ground Water Level
(X) - Torvane in Equivalent, Qu
⊗ - Penetrometer in Equivalent, Qu

Test Hole Locations Shown On Page # 2

Sheet 3 of 8

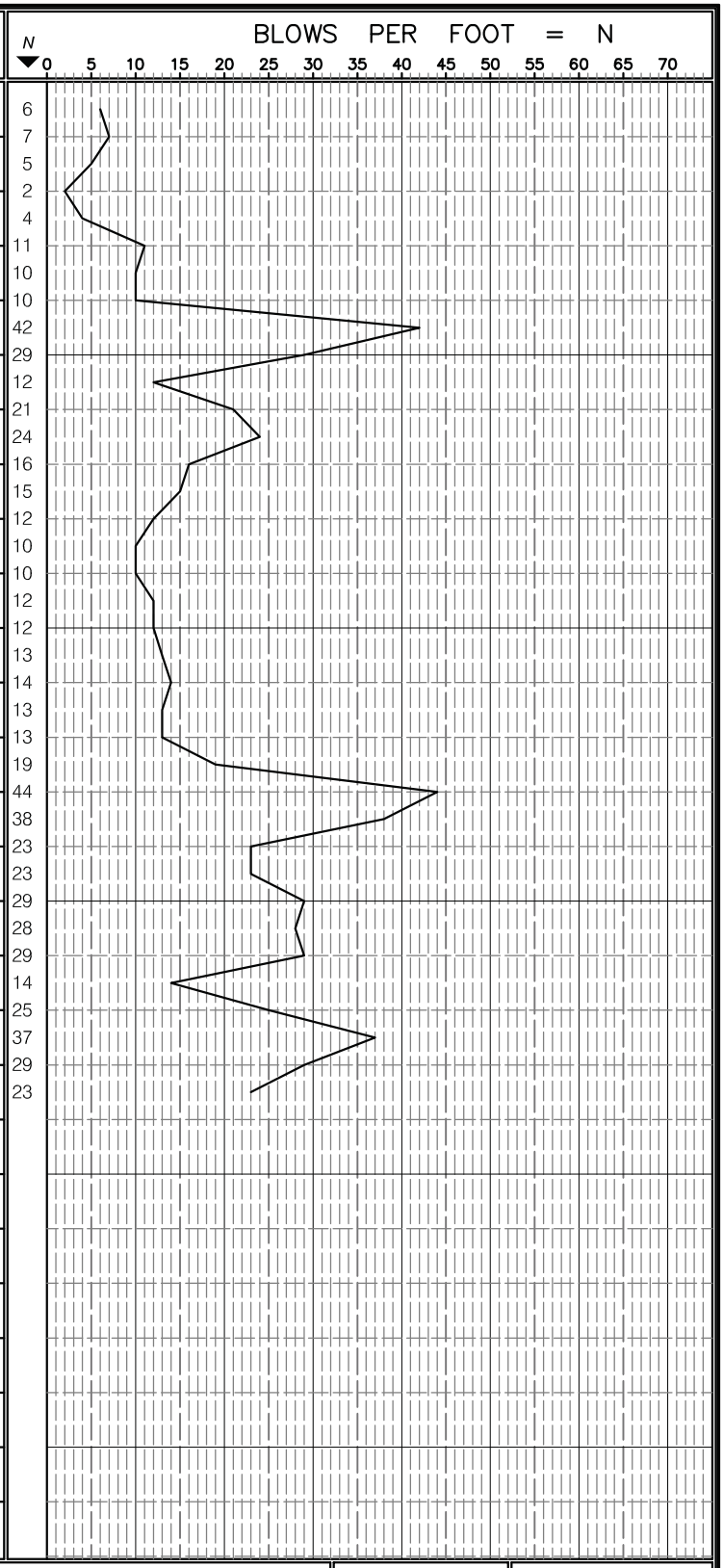
Attachment: Attachment B: Geotechnical Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Took Engineering Inc.
5485 - 180 th Street, Surrey, BC Canada V3S 5R9
Tel. 604 - 576 - 8561 • Fax. 604 - 576 - 2991

TEST HOLE LOG

Client: ELEVATE DEVELOPMENT CORP. File No. 10139 Hole No. TH 2
Project: 34375 GLADYS AVENUE, ABBOTSFORD, BC Date: APRIL 20, 2017

SOIL DESCRIPTION	SYMBOL	DEPTH FEET 0	ELEV. 27.56 M	MOIST. %	N
ASPHALT		3" 8"			6
		2		29	7
SAND AND GRAVEL STRUCTURAL FILL		4			5
					2
MOTTLED BROWN SILTY CLAY WITH SAND LENSES		6		53	4
					11
		8		26	10
					10
BROWN CLAY WITH SAND LENSES		10		57	42
					29
		12			12
					21
		14		23	24
					16
GREY SILTY FINE TO MEDIUM SAND WITH MEDIUM SAND LENSES		16		27	15
					12
		18		29	10
					10
		20			12
					12
		22			13
					14
		24		31	13
					13
		26			19
					44
		28		34	38
					23
		30			23
					29
		32		38	28
					29
		34			14
					25
		36			37
					29
		38		26	23
		40			
		42		28	
		44		28	
BROWN MEDIUM SAND		46		30	
		48			
		50		30	
NOTE: WATER TABLE ENCOUNTERED AT 3' - 9"	BOH	52			
		54			



N - Spin Dynamic Penetration Test (SDPT)
X - Unconfined Compressive Strength, Qu
▷ Plastic Limit ◁ Liquid Limit ▽ Ground Water Level
(X) –Torvane in Equivalent, Qu
⊗ - Penetrometer in Equivalent, Qu

Test Hole Locations Shown On Page # 2

Sheet 4 of 8

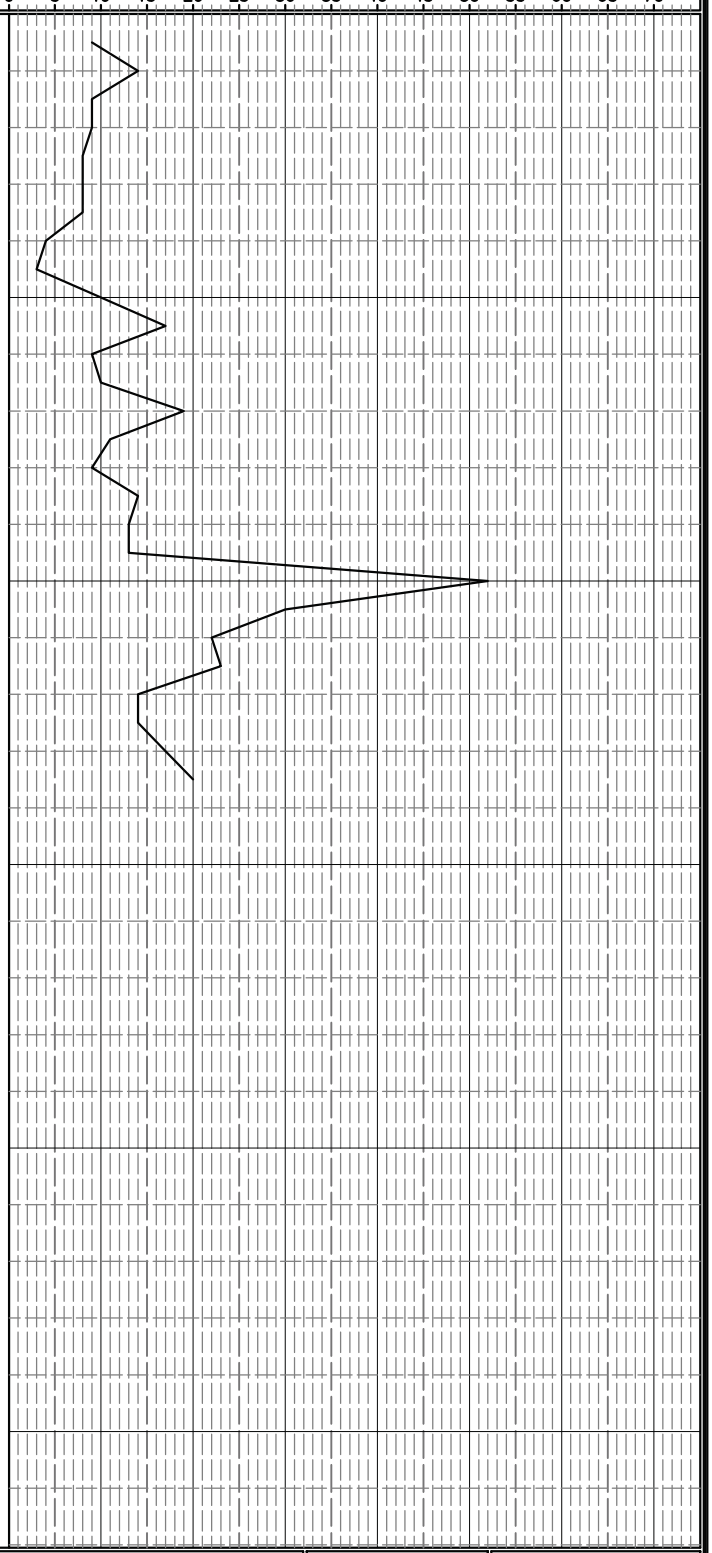
Attachment: Attachment B: Geotechnical Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Took Engineering Inc.
5485 - 180 th Street, Surrey, BC Canada V3S 5R9
Tel. 604 - 576 - 8561 • Fax. 604 - 576 - 2991

TEST HOLE LOG

Client: ELEVATE DEVELOPMENT CORP. File No. 10139 Hole No. TH 3
Project: 34375 GLADYS AVENUE, ABBOTSFORD, BC Date: APRIL 20, 2017

SOIL DESCRIPTION	SYMBOL	DEPTH FEET 0	ELEV. 30.79 M	MOIST. %	N
BROWN SANDY SILT / SILTY SAND FILL		2			9
		4		39	14
		6			9
TOPSOIL		8		34	9
				31	8
GREY MOTTLED SILTY FINE TO MEDIUM SAND		10		45	8
					4
VERY STIFF GREY MOTTLED CLAY		12		29	3
					10
GREY MOTTLED SILTY SAND WITH SILT LENSES		14			17
					9
		16		27	10
		18		23	19
					11
4" CLAY LENSE @ 19'		20		41	9
					14
		22			13
DENSE GREY SILTY SAND		24		27	13
					52
NOTE: WATER TABLE ENCOUNTERED AT 10'	BOH	26			30
					22
		28			23
					14
		30			14
					17
		32			20
		34			
		36			
		38			
		40			
		42			
		44			
		46			
		48			
		50			
		52			
		54			



N - Spin Dynamic Penetration Test (SDPT)
X - Unconfined Compressive Strength, Qu
▷ Plastic Limit ◁ Liquid Limit ▽ Ground Water Level
(X) - Torvane in Equivalent, Qu
⊗ - Penetrometer in Equivalent, Qu

Test Hole Locations Shown On Page # 2

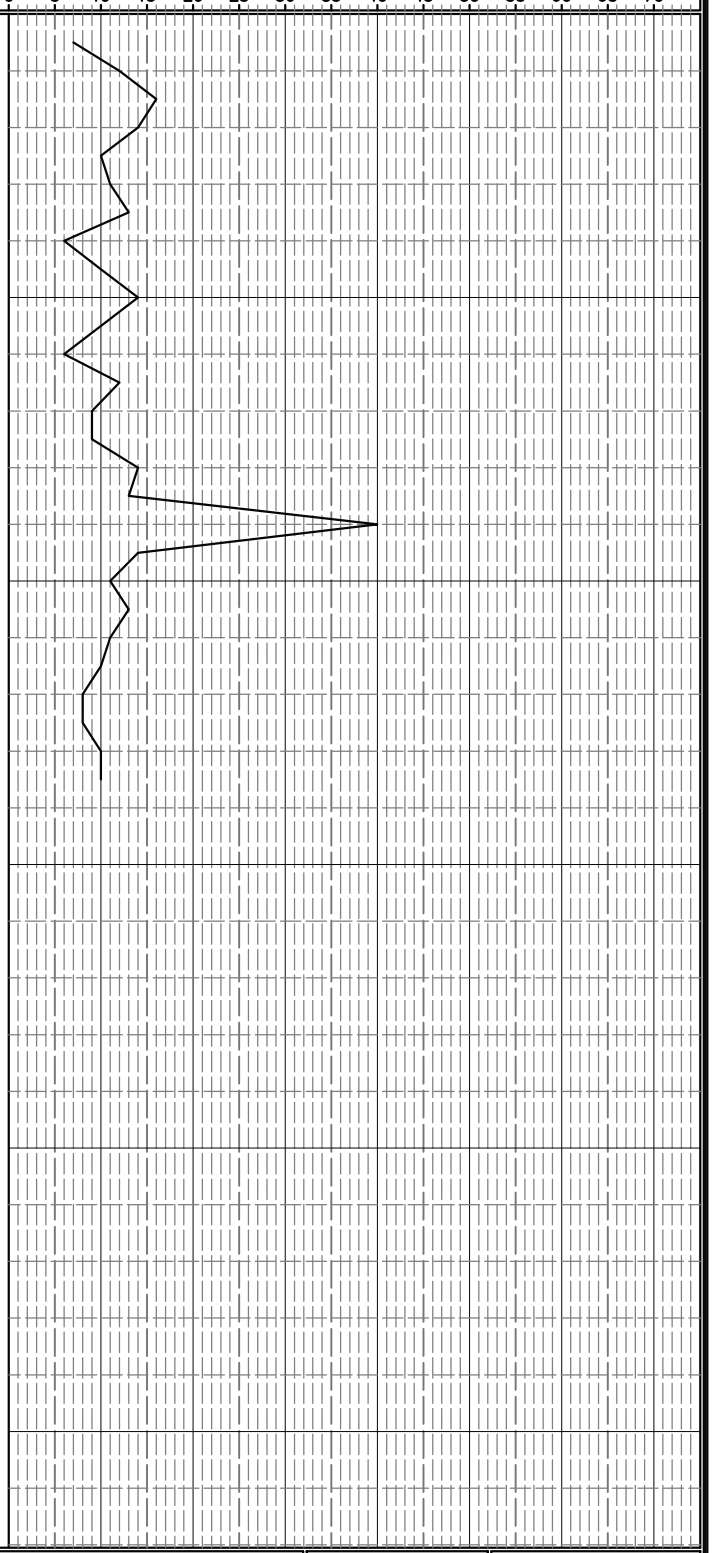
Sheet 5 of 8

Took Engineering Inc.
5485 - 180 th Street, Surrey, BC Canada V3S 5R9
Tel. 604 - 576 - 8561 • Fax. 604 - 576 - 2991

TEST HOLE LOG

Client: ELEVATE DEVELOPMENT CORP. File No. 10139 Hole No. TH 4
Project: 34375 GLADYS AVENUE, ABBOTSFORD, BC Date: APRIL 20, 2017

SOIL DESCRIPTION	SYMBOL	DEPTH FEET 0	ELEV. 30.54 M	MOIST. %	N (BLOWS PER FOOT = N)
BROWN SANDY SILT / SILTY SAND WITH SOME GRAVEL - FILL		2			7
		4		24	12
		6			16
TOPSOIL		8			14
MEDIUM STIFF SILTY CLAY		10		37	10
				35	11
VERY STIFF BROWN MOTTLED CLAY		12			13
BROWN MOTTLED SILTY SAND WITH SAND LENSES		14		29	6
		16			10
6" CLAY LENSE @ 17'		18		33	14
		20			10
		22		30	6
DENSE GREY SILTY SAND		24		32	12
		26		36	9
NOTE: WATER TABLE ENCOUNTERED AT 10'	BOH	28			9
		30			14
		32			13
		34			40
		36			14
		38			11
		40			13
		42			11
		44			10
		46			8
		48			8
		50			10
		52			10
		54			



N - Spin Dynamic Penetration Test (SDPT)
X - Unconfined Compressive Strength, Qu
Plastic Limit
Liquid Limit
Ground Water Level
(X) -Torvane in Equivalent, Qu
⊗ - Penetrometer in Equivalent, Qu

Test Hole Locations Shown On Page # 2

Sheet 6 of 8

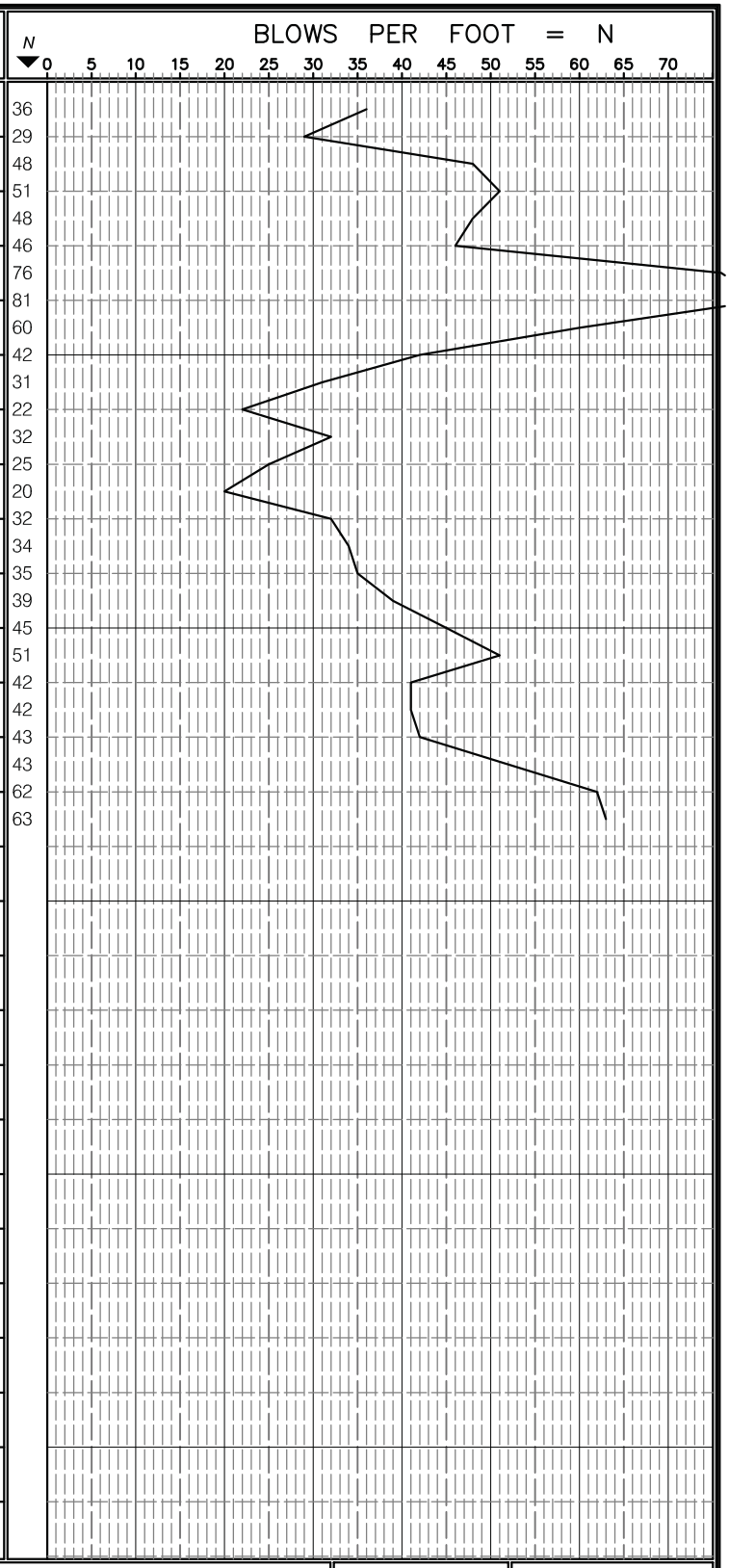
Attachment: Attachment B: Geotechnical Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Took Engineering Inc.
5485 - 180 th Street, Surrey, BC Canada V3S 5R9
Tel. 604 - 576 - 8561 • Fax. 604 - 576 - 2991

TEST HOLE LOG

Client: ELEVATE DEVELOPMENT CORP. File No. 10139 Hole No. TH 5
Project: 34375 GLADYS AVENUE, ABBOTSFORD, BC Date: APRIL 20, 2017

SOIL DESCRIPTION	SYMBOL	DEPTH FEET 0	ELEV. 27.50 M	MOIST. %	N
ASPHALT		2	3"		36
SAND AND GRAVEL STRUCTURAL FILL		4			29
VERY DENSE MOTTLED BROWN SAND WITH SOME GRAVEL TRACE SILT	▽	6		22	48
		8			51
		10		20	48
VERY DENSE GREY SILTY FINE TO MEDIUM SAND TRACE GRAVEL		12		11	46
		14			76
		16		24	81
		18			60
		20		18	42
VERY DENSE GREY SILTY FINE TO MEDIUM SAND TRACE GRAVEL AND SILT LENSES		22			31
		24		23	22
		26		20	32
		28			25
		30		20	20
NOTE: WATER TABLE ENCOUNTERED AT 5'	BOH	32			32
		34			34
		36			35
		38			39
		40			45
		42			51
		44			42
		46			42
		48			43
		50			43
		52			62
		54			63



N - Spin Dynamic Penetration Test (SDPT)
X - Unconfined Compressive Strength, Qu
▷ Plastic Limit ◁ Liquid Limit ▽ Ground Water Level
(X) – Torvane in Equivalent, Qu
⊗ - Penetrometer in Equivalent, Qu

Test Hole Locations Shown On Page # 2

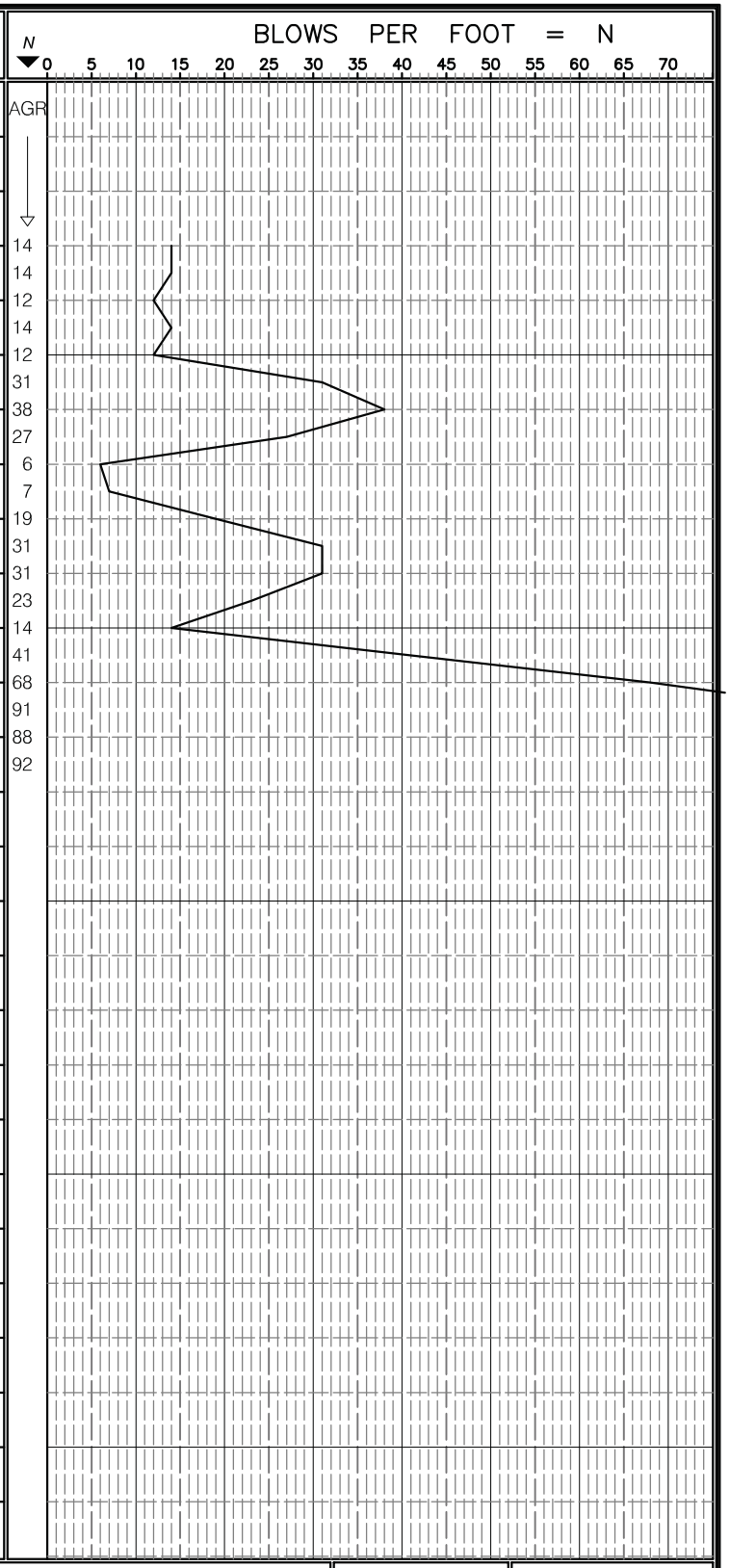
Attachment: Attachment B: Geotechnical Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Took Engineering Inc.
5485 - 180 th Street, Surrey, BC Canada V3S 5R9
Tel. 604 - 576 - 8561 • Fax. 604 - 576 - 2991

TEST HOLE LOG

Client: ELEVATE DEVELOPMENT CORP. File No. 10139 Hole No. TH 6
Project: 34375 GLADYS AVENUE, ABBOTSFORD, BC Date: APRIL 20, 2017

SOIL DESCRIPTION	SYMBOL	DEPTH FEET 0	ELEV. 27.50 M	MOIST. %	N (BLOWS PER FOOT = N)
ASPHALT		3"			AGR
SAND AND GRAVEL STRUCTURAL FILL		2			
BROWN SILT LOAM		4			
BROWN MEDIUM SAND		6		36	14
VERY STIFF BROWN MOTTLED CLAY		8		26	14
BROWN MEDIUM SAND WITH CLAY LENSES		10			12
BROWN MEDIUM SAND WITH TRACE GRAVEL		12		25	14
SOFT TO FIRM BROWN MOTTLED CLAY		14			12
BROWN MOTTLED MEDIUM SAND WITH SILT/CLAY LENSES		16		45 31	31
VERY DENSE BROWN MOTTLED MEDIUM SAND		18			38
		20			27
		22		21	6
		24			7
		26		24	19
		28			31
		30			31
		32			23
		34			14
		36		22	41
		38			68
		40			91
		42			88
		44			92
		46			
		48			
		50			
		52			
		54			
NOTE: WATER TABLE ENCOUNTERED AT 6' - 10"	BOH				



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Test Hole Locations Shown On Page # 2

Sheet 8 of 8

Attachment: Attachment B: Geotechnical Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

envirowest consultants inc.
Suite 101 - 1515 Broadway Street
Port Coquitlam, British Columbia
Canada V3C 6M2
604-944-0502

June 7, 2018

Ms. Tim Hollis, VP of Development
Elevate Development Corp
202, 15127 – 100 Avenue
Surrey, BC V3R 0N9

Dear Ms. Hollis,

RE: PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT
34375 GLADYS AVENUE, ABBOTSFORD
Basic Fish Habitat Assessment Report - Revised

Envirowest Consultants Inc. (Envirowest) has been retained on behalf of Elevate Development Corp (EDCorp) to provide environmental consulting services associated with the proposed six-story multi-family residential development with two levels underground parking located at 34375 Gladys Avenue in Abbotsford (Property).

The Property occurs within an Environmental Development Permit Area (EDPA) as per the City of Abbotsford (City) Official Community Plan. The EDPA is associated with Gill Creek, and therefore contains a streamside setback area protected under the City's Streamside Protection Bylaw No. 2005 (SPB). This report comprises a basic fish habitat assessment report to determine the correct setbacks in accordance with the City's SPB.

A location map is included as Attachment A.

BASIC FISH HABITAT ASSESSMENT

Description of Proposed Development

EDCorp (Proponent) has proposed the construction of a 282 unit, multi-family residential development. The Property is 5.395 acres in size and is currently used for storage and warehousing. The Property is bordered by Sumas Way to the east, Gladys Avenue and South Fraser Way to the south and private residential property to the west and north. An existing 1,700 square metre (m^2) storage building is located within the southern portion of the property.

All construction work will be monitored to ensure compliance with erosion and sediment control (ESC) requirements, and seasonal restrictions such as bird nesting windows. Instream works are not proposed. Maintenance of ESC works and all other construction works will be ongoing throughout the period of construction, with regular reporting of findings, and recommendations

to the City. More details of the monitoring and maintenance program are provided within this report.

Construction Works

Works are to be carried out in accordance with the City's Erosion and Sediment Control (ESC) Bylaw No. 1989-2010. General guidelines include, but are not limited to:

- emphasis to be placed on source control and re-direction of clean off-site waters away from the site;
- all onsite discharge to the drainage system to be directed through a sediment pond or other water treatment system; and
- ESC measures must be in place before any site disturbance (other than what is required to install ESC facilities, as reviewed with and approved by the Environmental Monitor and/or the City's inspector).

The Contractor shall comply with any request by the Environmental Monitor or City's inspector to 'stop work' in the event that the work has the potential to result in adverse effect(s) to the environment and is not being completed in accordance with relevant environmental permits.

Design Impacts and Mitigation

The riparian environment of Gill Creek is located within the City's SPB prescribed setbacks and will not be impacted by the proposed development.

Habitat provisions provided by the watercourse include the contribution of food, nutrients and cool water to downstream reaches of Marshall Creek. Instream works are not proposed and the proposed development does not encroach within the SPB prescribed setbacks; habitat provisions will remain unchanged from existing functions.

Storm Water Management Plan

An Integrated Storm Water Management Plan will be designed by a qualified engineer, in accordance with the requirements of the City.

Site Photographs

Envirowest assessed the site on December 21, 2016, February 16, 2018, and May 2, 2018. Site photographs are included as Attachment B.

Attachment: Attachment C: Fish and Wildlife Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Attachment: Attachment C: Fish and Wildlife Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Survey Drawing

A survey of the Property was performed by Target Land Surveyors and is included as Attachment C. The survey includes the top of bank of the ravine and delineates the relevant SPEA in accordance with the SPB.

Existing Fish Habitat

Gill Creek is a small watercourse that collects water from local storm drains along McMillan Road. Flows are directed southwest into City parkland, then under Sumas Way for approximately 70 m by culvert. Flows are conveyed west for approximately 108 m within the Property, then south within the BC Railway right-of-way, and eventually discharge to Marshall Creek via a 2 kilometre (km) network of storm sewer and channelized watercourses. The extensive network of storm sewer precludes fish presence within Gill Creek.

Within the Property, Gill Creek is located within a wide ravine (greater than 90 metres in width from top of bank to top of bank). The area between the top of the ravine bank and the existing building has been previously disturbed; an approximately 30 m wide cleared area exists at the top of the ravine bank. Vegetation within the disturbed top of bank area is characterized by lawn and sparse ornamental plants.

Riparian vegetation is characterized by red alder (*Alnus rubra*), black cottonwood (*Populus trichocarpa*), western red cedar (*Thuja plicata*), big leaf maple (*Acer macrophyllum*), paper birch (*Betula papyrifera*), noble fir (*Abies procera*), Douglas-fir (*Pseudotsuga menziesii*), Indian plum (*Oemleria cerasiformis*), salmonberry (*Rubus spectabilis*), sword fern (*Polystichum munitum*), and creeping buttercup (*Ranunculus repens*). Invasive non-native plant species present within the ravine include English Ivy (*Hedera helix*), Himalayan blackberry (*Rubus armeniacus*), yellow archangel (*Lamium galeobdolon*), bindweed (*Convolvulus* sp.), and English holly (*Ilex aquifolium*).

Determination of Setbacks

As per Section 3, Subsection 4 of the City's SPB,

'If a Stream is in a Ravine that is more than 60 m in total width from Top of the Ravine Bank to Top of the Ravine Bank, not including the Stream channel within its Active Floodplain boundaries, a Streamside Protection and Enhancement Area shall be at least ten metres wide measured perpendicularly away from the Top of the Ravine Bank.'

The ravine located within the Property is greater than 60 m in width, not including the width of the watercourse within its active floodplain. Additionally, as per the City's Steep Slope Development Permit Guidelines, a minimum setback of 10 m (for slopes less than 30%) from the top or base of any steep slope is recommended except as otherwise recommended by a qualified professional. As such, a Streamside Protection and Enhancement Area (SPEA) setback of 10 m

from the top of the ravine bank has been prescribed. Envirowest Drawing No. 2249-01-01 "SPB Setbacks" is included as Attachment D.

SPEA Protection Measures

Temporary protection of the SPEA will include the installation of snow fencing along the SPEA boundary. Upon completion of construction, a permanent wooden post and rail fence (or equivalent), complete with appropriate "Environmentally Sensitive Area" signage, is to be erected along the proposed SPEA boundary. The SPEA is proposed to be dedicated as park to the City.

Building Buffers

As per the City's SPB, adequate space is to be provided from the edge of the SPEA to the proposed development. Typically the City requires an additional 5 m buffer for the building envelope to the SPEA boundary. SPEA vegetation is located along the top of the ravine bank and into the ravine. The existing riparian area south of the top of the ravine bank to the 10 m setback line is heavily disturbed and has little habitat value; the area south of the top of ravine bank is currently characterized by an approximately 30 m wide cleared area with lawn and sparse ornamental plants As a setback variance has not been proposed, a SPEA enhancement plan is not warranted. Any future growth of trees within the open area from top of ravine bank to the 10 m setback line would not be impacted by the reduced building buffer. The long-term health of the SPEA will not be impacted by the reduction of the buffer to between 3.05 m and 3.2 m.

Further Assessments

Riparian Area Regulations Assessment

The proposed development occurs within the RAR assessment area (30 m from the high water mark or 30 m from the top of bank of a ravine) for Gill Creek. The City's SPB is based on the RAR Simple Assessment methodology, and a variance from the SPB determined SPEA setbacks is not being proposed. As such the proposed SPB SPEA setbacks will be in compliance with the RAR. A RAR Simple Assessment report is included in Attachment E. The report will be submitted to the RAR Notification System following input from the City's Environmental Coordinator.

Geotechnical Assessment

An assessment of the soils and slope stability was conducted by Took Engineering Inc. (Took) (Took Soil Investigation Reporting for 34375 Gladys Avenue, Abbotsford, BC, dated January 15, 2018; submitted separately). Took has determined that the proposed development will not have any impact on the stability of the Gill Creek ravine slopes.

Attachment: Attachment C: Fish and Wildlife Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Hydrological Assessment

A Groundwater Hydrology study was conducted by Kalwij Water Dynamics Inc. (Kalwij) in the summer and fall of 2017 (Kalwij Groundwater Investigation Report, dated October 13, 2017; submitted separately). Kalwii installed one test well and two piezometers (completed by Fyfe Well and Water Services) to conduct a Stage 1 groundwater investigation of the project site. A temporary creek level monitor was also installed in Gill Creek.

Kalwij determined that ground water flow in the upper aquifer is towards Gill Creek, however there is a low probability that the proposed development will impact flows within Gill Creek due to the low transmitting capacity of site soils.

Kalwij recommends the test well and one piezometer remain in place, as well as the creek water level monitor be reinstalled, for monitoring purposes during the construction phase of the Proposed Development. Maintenance and or permanent closure of the test well and piezometers will be executed in accordance with the B.C. Groundwater Protection Regulation.

Arborist Assessment

A tree risk assessment report was completed by van der Zalm and Associates (VDZ) (VDZ Field Report, dated February 27, 2018; submitted separately). VDZ determined that the south canopy edge of the trees, located along the top of the Gill Creek ravine bank, are well established and wind firm. Obvious defects that would result in imminent or probable failure were not detected in trees along the top of ravine bank.

Invasive Plant Assessment

An invasive non-native plant species assessment of the area adjacent to and within the ravine was performed by Envirowest on May 2, 2018 to determine if noxious weeds were present. Noxious weeds are designated under the Weed Control Regulation (WCR) of the BC Weed Control Act (WCA). As per the WCA, a noxious weed means a weed designated by regulation to be a noxious weed, and includes the seeds of the noxious weed. Weeds included in Part I of Schedule A of the WCR are designated as noxious weeds throughout BC; Part II of Schedule A of the WCR lists noxious weeds for specific regions of British Columbia. Additionally, the City relies on the Fraser Valley Regional District Noxious Weed Program to target the following noxious weeds: tansy ragwort (*Senecio jacobaea*), wild chervil (*Anthriscus sylvestris*), giant hogweed (*Heracleum mantegazzianum*), and Japanese knotweed (*Fallopia japonica*). Noxious weeds as designated in Part I of Schedule A or under Part II of Schedule A for the Fraser Valley (specifically wild chervil) were not observed adjacent to or within the ravine on the Property at the time of the assessment.

Other than survey of nesting birds prior to commencement of the project works no further assessment of fish/ecological attributes associated with this proposed development is required.

Attachment: Attachment C: Fish and Wildlife Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Proposed Monitoring

Instream works are not proposed. Erosion and sediment control (ESC) monitoring will be required throughout the construction period, with inspections a minimum of weekly and more frequently during wet weather. ESC monitoring can be performed by a suitable qualified environmental or biological technician.

Active bird nesting may occur during the work period, necessitating a survey of nesting activity and delineation (flagging) of areas where construction will be temporarily prohibited. Bird nest assessments will require the capabilities of a biologist with expertise in bird identification and behaviour, as these monitors will be required to specify appropriate nest buffers.

QEP Declaration Form

The QEP declaration form has been completed and is included as Attachment F.

CONCLUSION

There is no encroachment from the proposed development into the required SPB setback of 10 m from the top of the ravine bank. With the exception of removal of garbage, no work will occur within the City's SPB SPEA.

Please contact me at blanchard@envirowest.ca or 604-944-0502 should you have comments or questions regarding this correspondence.

Sincerely,
ENVIROWEST CONSULTANTS INC.

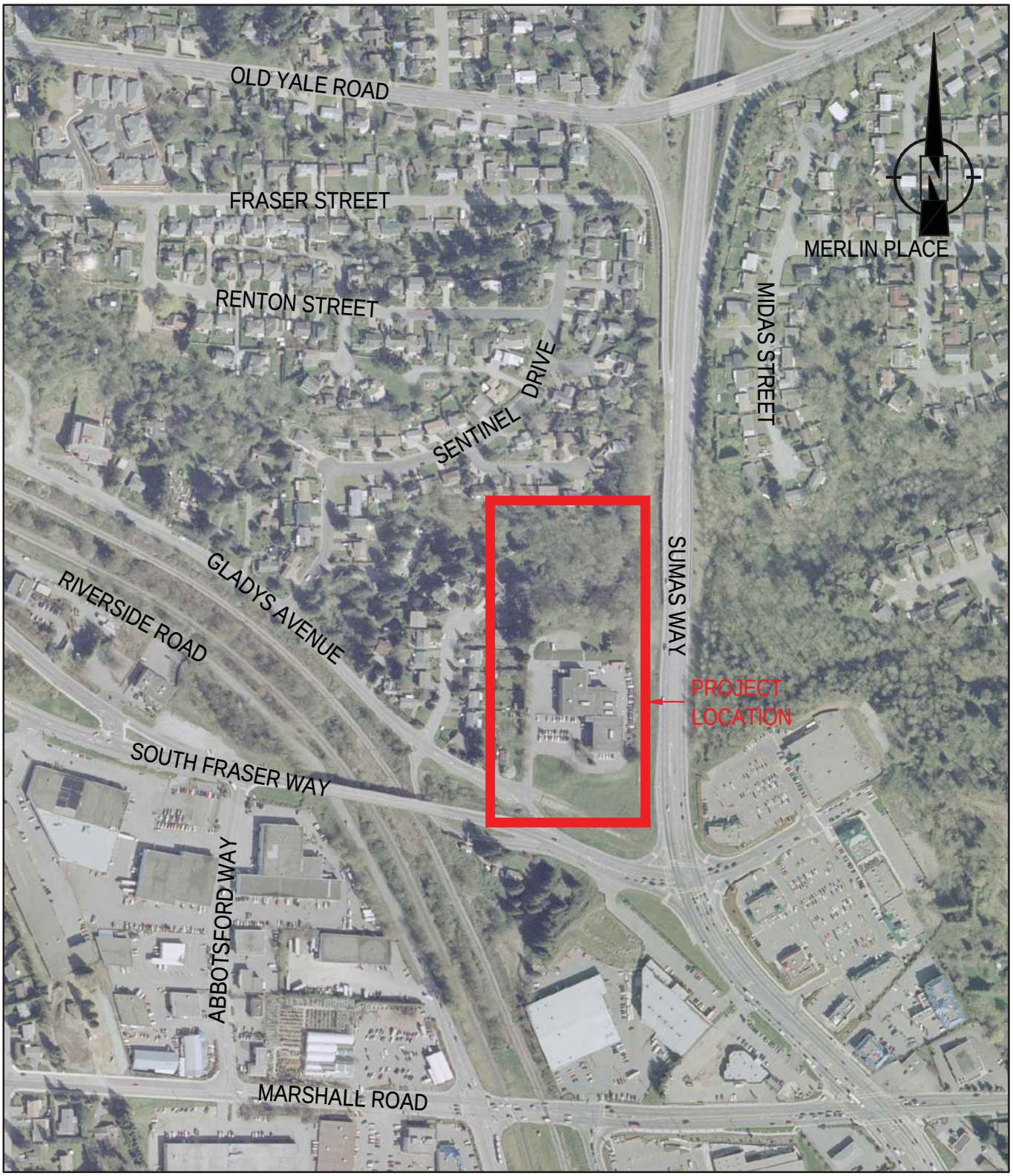
Lisa Blanchard, A.Sc.T., B.I.T.
Project Biologist

Attachment A	Location Map
Attachment B	Site Photographs
Attachment C	Target Land Surveyors Survey/Site Plan
Attachment D	SPB Setbacks
Attachment E	RAR Simple Assessment Report
Attachment F	QEP Declaration Form

Copy:	Ms. Tanya Bettles	City of Abbotsford
	Mr. Ian Whyte	Envirowest Consultants Inc.

Attachment: Attachment C: Fish and Wildlife Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

ATTACHMENT A
Location Map



REFERENCE DRAWINGS
2004 Ortho Photograph from Metro Vancouver.

0 100 200 300

ELEVATE DEVELOPMENT CORPORATION	envirowest consultants inc.	PROJECT LOCATION
34375 GLADYS AVENUE Abbotsford, BC	Suite 101 - 1515 Broadway Street Port Coquitlam, British Columbia Canada V3C 6M2 office: 604-944-0502 facsimile: 604-944-0507 www.envirowest.ca	DESIGN: CEV · DRAWN: LB · CHECKED: · REVISION: 00 · REVISION DATE: SCALE: As Shown · DRAWING NUMBER: FIGURE 1 DATE: April 10, 2018

DATE: 2018-04-10 - 10:56am
PATH: \\ENV-FS-R\Alpha\Envirowest Files\2018\Abbots-Chilliwack-Hope\2249-01\AutoCAD\Final\Figure 1 - Location.dwg
LAYOUT: FIGURE 1 - LOCATION

ATTACHMENT B
Site Photographs

Photograph 1. Northeast view of vegetation in ravine (February 16, 2018).

Photograph 2. Northwest view of Himalayan blackberry located at the top of ravine (February 16, 2018).

Photograph 3. East view of vegetation associated with the top of ravine (February 16, 2018).

Photograph 4. West view of the vegetation located adjacent to the ravine (February 16, 2018).

Photograph 5. West view (downstream) of the watercourse (February 16, 2018).

Photograph 6. East view (upstream) of the watercourse (February 16, 2018).

Photograph 7. North view of vegetation associated with the north bank of ravine (February 16, 2018).

Photograph 8. North view of vegetation from southwest parking lot (February 16, 2018).

ATTACHMENT C
Target Land Surveyors Survey
Site Plan

Attachment: Attachment C: Fish and Wildlife Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

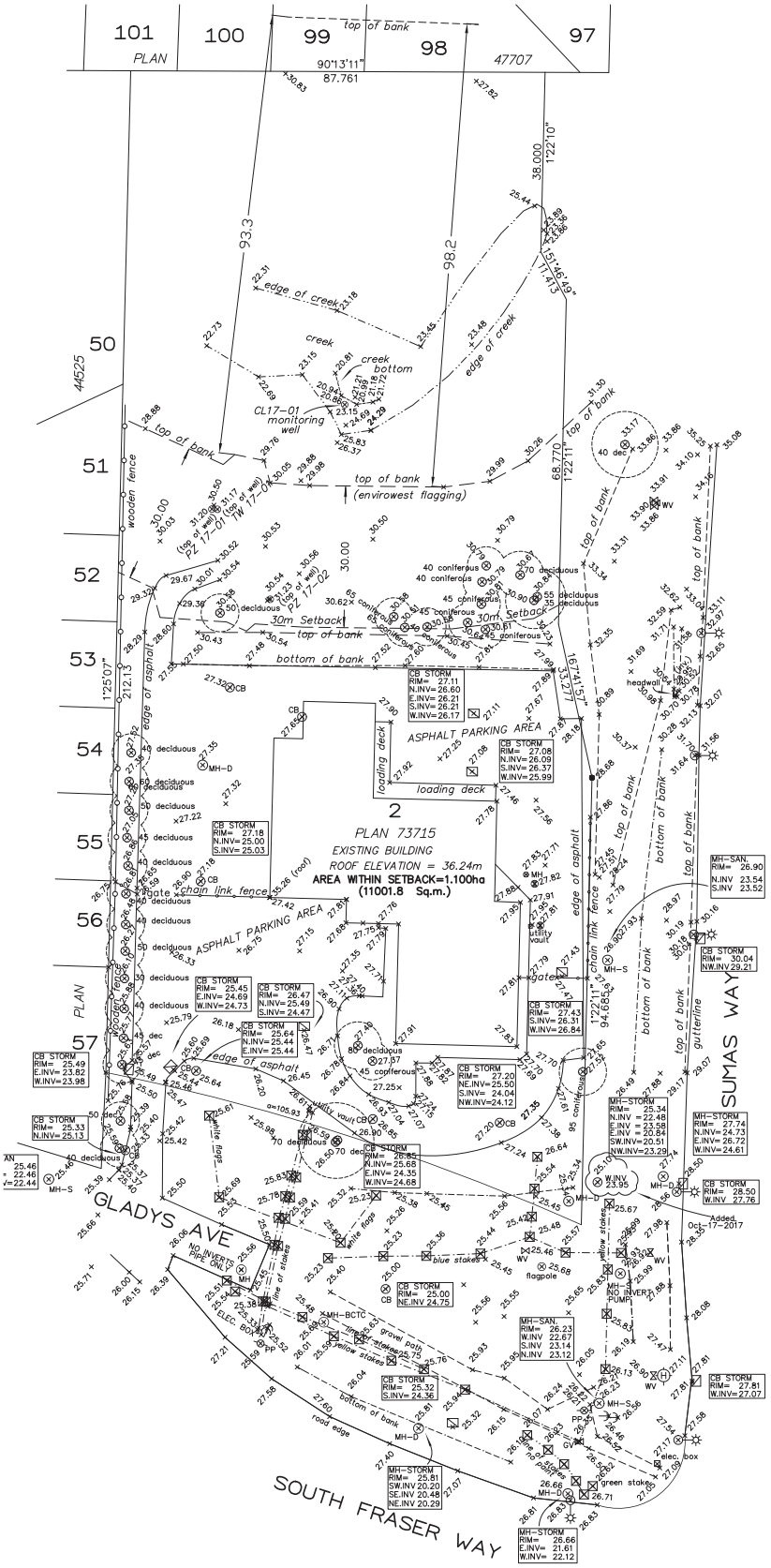
TOPOGRAPHIC PLAN OF LOT 2 EXCEPT: PART ON PLAN 73715 SEC 15 TP 16 NWD PLAN 6983

CIVIC ADDRESS

34375 GLADYS AVENUE, ABBOTSFORD, BC
P.I.D: 007-913-613

LEGEND

- DENOTES STANDARD IRON POST FOUND
- DENOTES MONITORING WELL
- DENOTES CATCH BASIN - TOP ENTRY
- CB DENOTES CATCH BASIN - ROUND
- WV DENOTES WATER VALVE
- MH-D DENOTES STORM MANHOLE
- DENOTES TREE AND CANOPY EXTENT
- DENOTES GROUND ELEVATION
- MH DENOTES MISCELLANEOUS MANHOLE
- MH-S DENOTES SANITARY MANHOLE
- (inv.) DENOTES INVERT ELEVATIONS
- DENOTES STAKES/FLAGS FOR UNDERGROUND UTILITIES



SCALE 1 : 750

5 0 10 20 30

ALL DISTANCES ARE IN METRES

SURVEY DATE: JULY 11, 2016
NOVEMBER 9, 2016
JUNE 23, 2017
September 20, 2017

Lot dimensions are derived from Plan 73715.

Elevations are Geodetic (CVD28 GVRD-2005 - IN METERS) Derived from Control Monument 77H5987 located at the intersection of South Fraser Way and Sumas Way.
Elevation = 25.868m

Spot elevations along curb are taken in gutter

If this plan is used in digital form, Target Land Surveying will only assume responsibility for information content shown on original unaltered drawing.
Tree diameters are taken at 1.4m above grade and are shown in cm.

This Plan was prepared for architectural design and permit purposes, and is for the exclusive use of our client. The signatory accepts no responsibility or liability for any damages that may be suffered by a third party as a result of reproduction, transmission or alteration to this document without consent of the signatory.

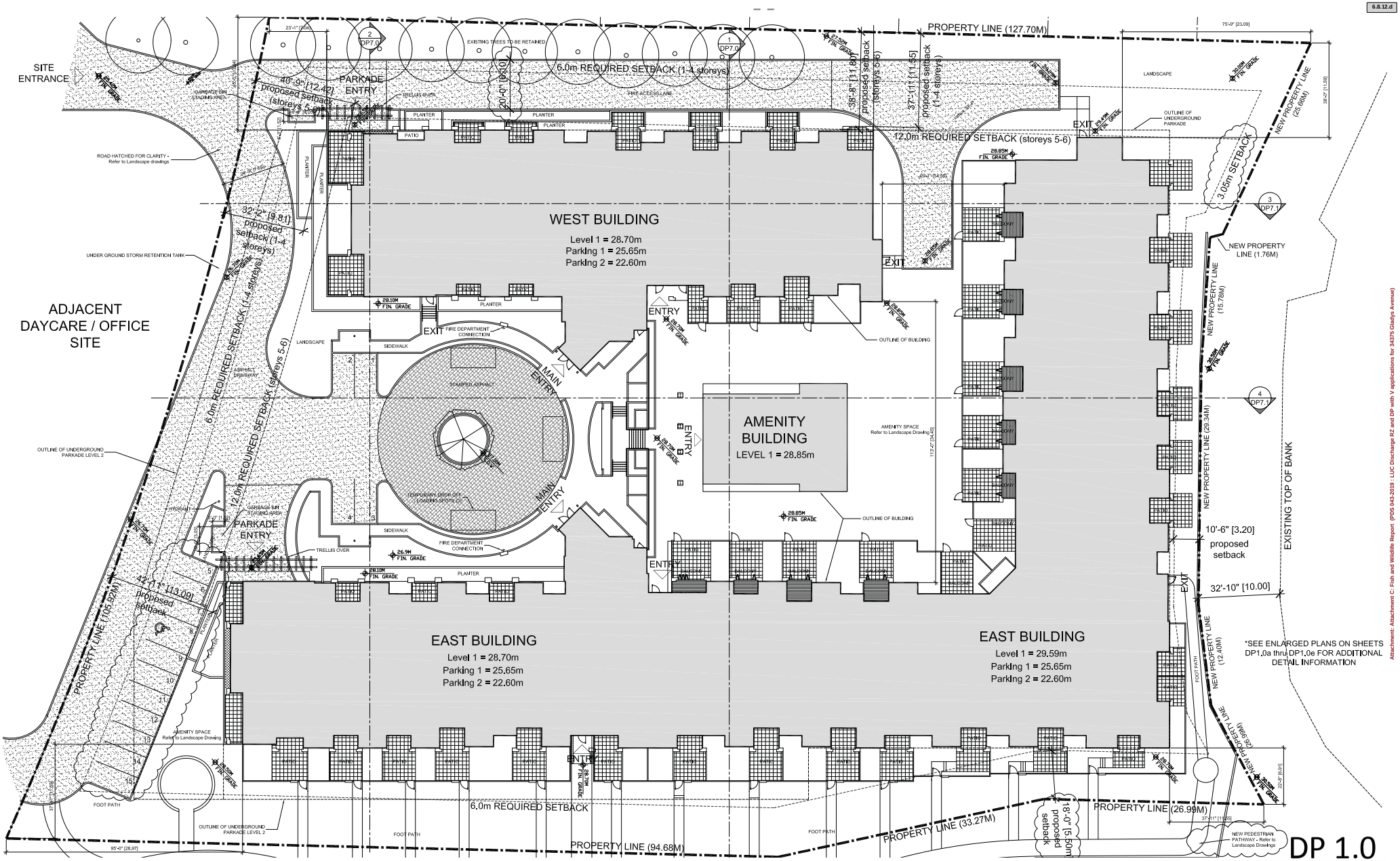
CERTIFIED CORRECT
DATED THIS 26th DAY OF September, 2017.

_____ B.C.L.S.
M. Adam Fulkerson

TARGET LAND SURVEYING
SURREY B.C.
604-583-6161

FILE: 8191-topo-update

Attachment: Attachment C: Fish and Wildlife Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)



DP 1.0

SITE PLAN
scale: 1/16"=1'-0"

NORTH

PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT

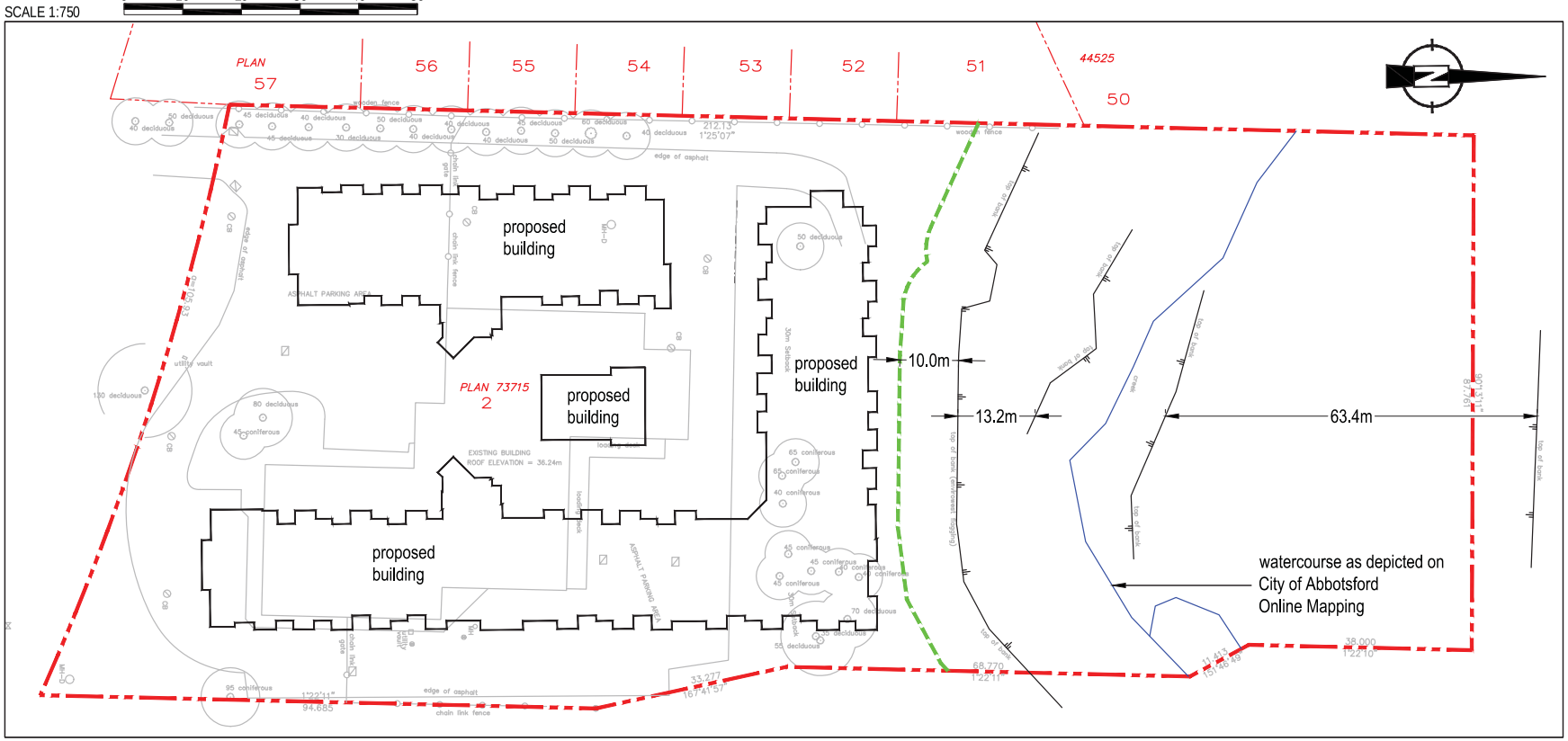
34375 GLADYS AVENUE, ABBOTSFORD, B.C.

ELEVATE DEVELOPMENT CORP.
ATELIER PACIFIC ARCHITECTURE INC.
JANUARY 19, 2018

Attachment: Attachment C: Fish and Wildlife Report (PDS 043-2018 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

ATTACHMENT D
SPB Setbacks

PLAN
SCALE 1:750



LOCATION
SCALE 1:10,000

REFERENCE DRAWINGS

1. File: 8191-topo. "Topographic Plan of Lot 2 Except: Part on Plan 73715 Sec 15 TP 16 NWD Plan 6983". July 19 2016. Target Land Surveying.
2. Drawing No. DP1.0. "Proposed Multi-Family Residential Development". January 19, 2018. Atelier Pacific Architecture Inc.
3. 2016 Watercourses From City of Abbotsford Webmaps (https://maps.abbotsford.ca/Html5Viewer/)
4. 2004 Ortho Photograph From Metro Vancouver.

ELEVATE DEVELOPMENT CORPORATION

34375 GLADYS AVENUE
Abbotsford, BC

envirowest consultants inc.
Suite 101 - 1515 Broadway Street
Port Coquitlam, British Columbia
Canada V3C 6M2
office: 604-944-0502
facsimile: 604-944-0507
www.envirowest.ca

SETBACKS

DESIGN:	DRAWN:	CHECKED:	REVISION:	REVISION DATE:
LB	RK	IWW	00	
SCALE: As Shown			DRAWING NUMBER: 2249-01-01	
DATE: March 27, 2018				

DATE: 2018-03-27 - 12:41pm
PATH: \\ENV-FS-R\Alpha\Envirowest Files\2018\Abbots-Chilliwack-Hope\2249-01\AutoCAD\Final\2249-01-01 Setbacks.dwg
LAYOUT: 2249-01-01 Setbacks

ATTACHMENT E
RAR Simple Assessment Report

FORM 1
Riparian Areas Regulation - Qualified Environmental Professional - Assessment Report

Riparian Areas Regulation: Assessment Report

Please refer to submission instructions and assessment report guidelines when completing this report.

Date June 7, 2018

I. Primary QEP Information

First Name	Ian	Middle Name	
Last Name	Whyte		
Designation	P. Ag	Company Envirowest Consultants Inc.	
Registration #	2820	Email whyte@envirowest.ca	
Address	Suite 101-1515 Broadway Street		
City	Port Coquitlam	Postal/Zip V3C 6M2	Phone # 604-944-0502
Prov/state	BC	Country Canada	

II. Secondary QEP Information (use **Form 2** for other QEPs)

First Name		Middle Name	
Last Name			
Designation		Company	
Registration #		Email	
Address			
City		Postal/Zip	Phone #
Prov/state	BC	Country	

III. Developer Information

First Name	Tim	Middle Name	
Last Name	Clark-Hollis		
Company	Elevate Development Corporation.		
Phone #	604-953-1414	Email tim@elevatecorp.ca	
Address	A114 2099 Lougheed Highway		
City	Port Coquitlam	Postal/Zip V3B 1A8	
Prov/state	BC	Country Canada	

IV. Development Information

Development Type	Construction: high density (>36 units per ha)		
Area of Development (ha)	1.3	Riparian Length (m)	108
Lot Area (ha)	2.18	Nature of Development	redevelopment
Proposed Start Date	January 2019	Proposed End Date	December 2021

V. Location of Proposed Development

Street Address (or nearest town)	34375 Gladys Avenue						
Local Government	City of Abbotsford			City Abbotsford			
Stream Name	Gill Creek						
Legal Description (PID)	007-913-613			Region 2			
Stream/River Type	Stream			DFO Area Lower Fraser			
Watershed Code	100-065700-43900 (Marshall Creek)						
Latitude	49	02	33	Longitude	122	16	21

Completion of Database Information includes the Form 2 for the Additional QEPs, if needed.
Insert that form immediately after this page.

Attachment: Attachment C: Fish and Wildlife Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Table of Contents for Assessment Report

Page Number

1. Description of Fisheries Resources Values ……..

2. Results of Riparian Assessment (SPEA width) ……....

3. Site Plan …….

4. Environmental Monitoring …….

5. Photographs ……..

6. Assessment Report Professional Opinion …….

Section 1. Description of Fisheries Resources Values and a Description of the Development proposal

Proposed Development

Elevate Developments Corp (Proponent) has proposed the construction of a 282 unit, multi-family residential development. The Property is 5.395 acres in size and is currently used for storage and warehousing. The Property is bordered by Sumas Way to the east, Gladys Avenue and South Fraser Way to the south and private residential property to the west and north. An existing 1,700 square metre (m^2) storage building is located within the southern portion of the property.

Existing Biophysical Attributes

Site assessments were performed on December 21, 2016, February 16, 2018, and May 2, 2018. One watercourse, Gill Creek, is located within a wide ravine (greater than 60 metres in width from top-of-bank to top-of-bank).

Gill Creek is a small watercourse that collects water from local storm drains along McMillan Road. Flows are directed southwest into City parkland, then under Sumas Way for approximately 70 m by culvert. Flows are conveyed west for approximately 108 m within the Property, then south within the BC Railway right-of-way, and eventually discharge to Marshall Creek via a 2 kilometre (km) network of storm sewer and channelized watercourses. The extensive network of storm sewer precludes fish presence within Gill Creek.

The area between the top of the ravine bank and the existing building has been previously disturbed; an approximately 30 m wide cleared area exists at the top of the ravine bank. Vegetation within the disturbed top of bank area is characterized by lawn and sparse ornamental plants. Riparian vegetation is characterized by red alder (*Alnus rubra*), black cottonwood (*Populus trichocarpa*), western red cedar (*Thuja plicata*), big leaf maple (*Acer macrophyllum*), paper birch (*Betula papyrifera*), noble fir (*Abies procera*), Douglas-fir (*Pseudotsuga menziesii*), Indian plum (*Oemleria cerasiformis*), salmonberry (*Rubus spectabilis*), sword fern (*Polystichum munitum*), and creeping buttercup (*Ranunculus repens*). Invasive non-native plant species present within the ravine include English Ivy (*Hedera helix*), Himalayan blackberry (*Rubus armeniacus*), yellow archangel (*Lamium galeobdolon*), bindweed (*Convolvulus* sp.), and English holly (*Ilex aquifolium*).

FORM 1
Riparian Areas Regulation - Qualified Environmental Professional - Assessment Report

Attachment: Attachment C: Fish and Wildlife Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Form 4 Simple Assessment Form
Riparian Areas Regulation - Qualified Environmental Professional - Assessment Report

Section 2. Results of Simple Riparian Assessment

Refer to Chapter 2 and Appendix of the Assessment Methods.
Duplicate this form as needed for each assessment report.

Date: June 7, 2018

Stream	X
Wetland	
Lake	
Area	

1. Existing or Potential Vegetation Category 1

I, Mr. Ian Whyte, hereby certify that:
a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;
b) I am qualified to carry out this part of assessment of the development proposal made by the developer Elevate Developments Corp;
c) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and
d) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

2. Fish bearing

Yes	No**
X	

**If non fish-bearing, insert non-fish bearing status report:

Although the presence of fish is likely precluded by the extensive network of storm sewer downstream, the stream is located within a ravine greater than 60 m in width (not including the floodplain) and a 10 m setback from top of ravine bank will be prescribed. Fish presence will not affect the prescribed setback in this case.

I, Mr. Ian Whyte (*name of qualified environmental professional*), hereby certify that:
a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;
b) I am qualified to carry out this part of the assessment of the development proposal made by the developer Elevate Developments Corp ;
c) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and
d) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

3. Stream Flow

Permanent	Non Permanent*
X	

*If non permanent flow, indicate how this was determined:

I, Mr. Ian Whyte (*name of qualified environmental professional*), hereby certify that:
a) I am a qualified environmental professional, as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;
b) I am qualified to carry out this part of the assessment of the development proposal made by the developer Elevate Developments Corp;
c) I have carried out an assessment of the development proposal and my assessment is set out in this Assessment Report; and
d) In carrying out my assessment of the development proposal, I have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation.

Attachment: Attachment C: Fish and Wildlife Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

4. SPEA Width (m) 10

Comments

The SPEA for Gill Creek as it occurs within the subject property has been determined as per Section 2.5.4.1 of the Simple Assessment Method of the RAR. Gill Creek is located within a ravine greater than 60 m in width (excluding the wetted stream width). The resulting SPEA width is 10 m from the top of ravine bank.

Attachment: Attachment C: Fish and Wildlife Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Form 4 Simple Assessment Form

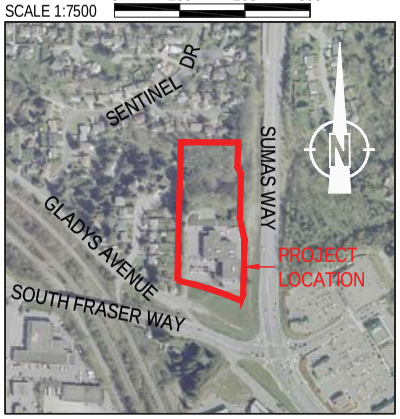
Riparian Areas Regulation - Qualified Environmental Professional - Assessment Report

Orthophoto showing assessment area

Attach JPG file of air/orthophoto (scale less than 3,000) outlining the elements in chapter 2 of Assessment Methods.

Attachment: Attachment C: Fish and Wildlife Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

LOCATION
SCALE 1:7500 0 100 200 300



PLAN
SCALE 1:1500 0 25 50 75 100

REFERENCE DRAWINGS
1. File: 8191-topo. "Topographic Plan of Lot 2 Except: Part on Plan 73715 Sec 15 TP 16 NWD Plan 6983". July 19 2016. Target Land Surveying.
2. Drawing No. DP1.0. "Proposed Multi-Family Residential Development". January 19, 2018. Atelier Pacific Architecture Inc.
3. 2016 Watercourses From City of Abbotsford Webmaps (https://maps.abbotsford.ca/Html5Viewer/)
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ELEVATE DEVELOPMENT CORPORATION

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office: 604-944-0502
facsimile: 604-944-0507
www.envirowest.ca

ORTHOPHOTO

DESIGN:	DRAWN: CEV	CHECKED: LB	REVISION: 00	REVISION DATE:
SCALE: As Shown			DRAWING NUMBER: 2249-01-02	
DATE: June 07, 2018				

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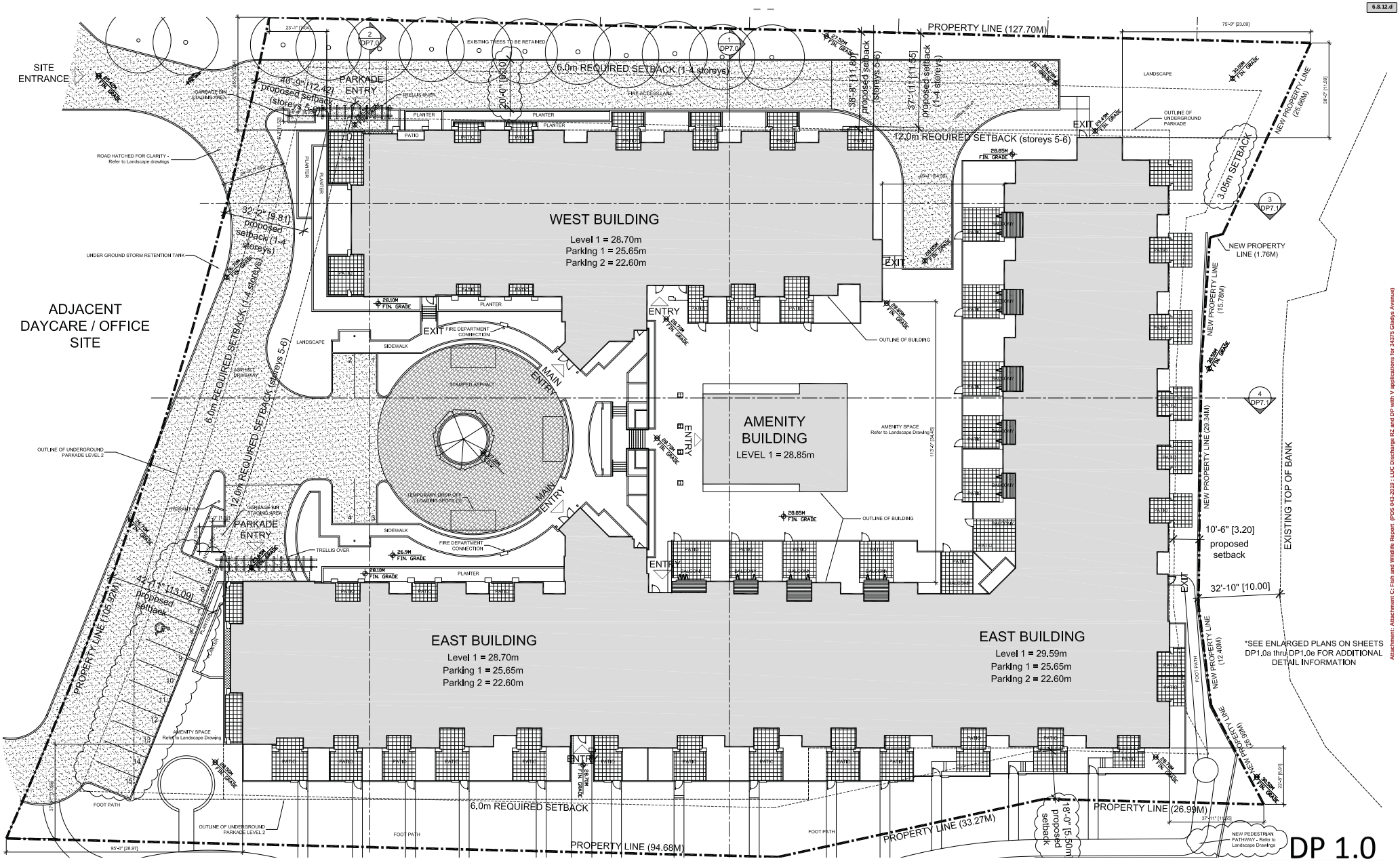
LAYOUT: 2249-01-02

Section 3. Site Plan

Insert jpg file below

Site Plan

Attachment: Attachment C: Fish and Wildlife Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)



DP 1.0

SITE PLAN
scale: 1/16"=1'-0"

NORTH

PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT

34375 GLADYS AVENUE, ABBOTSFORD, B.C.

ELEVATE DEVELOPMENT CORP.
ATELIER PACIFIC ARCHITECTURE INC.
JANUARY 19, 2018

Attachment: Attachment C: Fish and Wildlife Report (PDS 043-2018 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Section 4. Environmental Monitoring

Attach text or document files explaining the monitoring regimen Use your "return" button on your keyboard after each line. It is suggested that all document be converted to PDF *before* inserting into the PDF version of the assessment report.
Include actions required, monitoring schedule, communications plan, and requirement for a post development report.

The developer will retain a QEP to inspect construction activities. Inspections will be conducted a minimum of once per week. The QEP will undertake the following duties:

- Establish the SPEA protection boundary in the field in conjunction with a professional land surveyor prior to the commencement of site activities
- Review sediment and erosion control requirements with the design engineer, the developer, the general contractor, and all sub-contractors prior to and during site activities
- Provide direction during construction to the site foreman and or sub-contractors to ensure noted sediment and control deficiencies are resolved immediately
- Collect samples of waters discharged from the site and within the stream, on an as required basis, for NTU (Nepholometric Turbidity Units) analysis and comparison
- Participate in meetings involving sediment and erosion control and/or construction activities that can potentially affect the drainages and the established protection area
- Prepare weekly summary reports for submission to and review by the developer and the City of Abbotsford
- Prepare a final summary report upon completion of construction to be submitted to the RAR file generated for this project

Emergency contact numbers will be provided by the QEP in addition to the Emergency Management BC 24 hour spill reporting number (1-800-663-3456)

Section 5. Photos

Provide a description of what the photo is depicting, and where it is in relation to the site plan.

See attached site photographs

Attachment: Attachment C: Fish and Wildlife Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Photograph 1. East view of the top of ravine (February 16, 2018).

Photograph 2. West view of the top of ravine (February 16, 2019).

Attachment: Attachment C: Fish and Wildlife Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Photograph 3. West (downstream) view of Gill Creek within the ravine (February 16, 2018).

Photograph 4. East (upstream) view of Gill Creek (February 16, 2018).

Attachment: Attachment C: Fish and Wildlife Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Section 6. Professional Opinion

Assessment Report Professional Opinion on the Development Proposal's riparian area.

Date June 7, 2018

1. I/We___Ian Whyte_____

Please list name(s) of qualified environmental professional(s) and their professional designation that are involved in assessment.)

hereby certify that:

a) I am/We are qualified environmental professional(s), as defined in the Riparian Areas Regulation made under the *Fish Protection Act*;
b) I am/We are qualified to carry out the assessment of the proposal made by the developer, Elevate Developments Corp., which proposal is described in section 3 of this Assessment Report (the "development proposal"),
c) I have/We have carried out an assessment of the development proposal and my/our assessment is set out in this Assessment Report; and
d) In carrying out my/our assessment of the development proposal, I have/We have followed the assessment methods set out in the Schedule to the Riparian Areas Regulation; AND

2. As qualified environmental professional(s), I/we hereby provide my/our professional opinion that:

a) ☐ if the development is implemented as proposed by the development proposal there will be no harmful alteration, disruption or destruction of natural features, functions and conditions that support fish life processes in the riparian assessment area in which the development is proposed, **OR**

(Note: include local government flex letter, DFO Letter of Advice, or description of how DFO local variance protocol is being addressed)

b) ☒ if the streamside protection and enhancement areas identified in this Assessment Report are protected from the development proposed by the development proposal and the measures identified in this Assessment Report as necessary to protect the integrity of those areas from the effects of the development are implemented by the developer, there will be no harmful alteration, disruption or destruction of natural features, functions and conditions that support fish life processes in the riparian assessment area in which the development is proposed.

[NOTE: **"qualified environmental professional"** means an applied scientist or technologist, acting alone or together with another qualified environmental professional, if

(a) the individual is registered and in good standing in British Columbia with an appropriate professional organization constituted under an Act, acting under that association's code of ethics and subject to disciplinary action by that association,
(b) the individual's area of expertise is recognized in the assessment methods as one that is acceptable for the purpose of providing all or part of an assessment report in respect of that development proposal, and
(c) the individual is acting within that individual's area of expertise

ATTACHMENT F
QEP Declaration Form

ABBOTSFORD

Streamside Protection Bylaw
Qualified Professional Declaration Form

Project Name: MULTI-FAMILY RESIDENTIAL DEVELOPMENT
Project Location: 34375 GLADYS AVE, ABBOTSFORD

ASSESSMENT METHOD AND IMPACTS

I, LISA BLANCHARD, declare that I am a "Qualified Professional"[1] as defined under the City of Abbotsford's *Streamside Protection Bylaw* and declare that I have carried out an assessment of the development proposal/activity in a manner that is consistent with the Detailed Assessment Methods described in the provincial *Riparian Area Regulation*. I also declare that the Streamside Protection and Enhancement Areas (SPEAs) identified in the submission to the City, along with measures identified to protect and maintain the integrity of identified SPEAs, will not result in *Fisheries Act* violation.

Signature: Lisa Blanchard

Professional Organization and Member Number: AST TBC #30167

MEASURES TO PROTECT AND MAINTAIN SPEA

The qualified professional must consider additional 'measures' to protect and maintain the integrity of the SPEA. Each of the measures below must be discussed in the Fish Habitat Assessment report and signed off below by the qualified professional(s) that provided expertise to the project for that 'measure'. If the project will require a City of Abbotsford *Environmental Development Permit* (EDP) some 'measures' may be addressed under that permit, if so, write EDP in relevant boxes.

MEASURE	QUALIFIED PROFESSIONAL SIGNATURE	PROFESSIONAL ORGANIZATION AND MEMBER NUMBER
1. Danger Trees	Robin B Clark	Registered Professional Forester #2225
2. Windthrow	Robin B Clark	RPF#2225
3. Slope Stability	P Jensen	9837 EGBC
4. Protection of Trees within the SPEA	Lisa Blanchard	ASTTBC No 30167
5. Prevention of SPEA Encroachment	Lisa Blanchard	ASTTBC No 30167
6. Erosion and Sediment Control	Lisa Blanchard	ASTTBC No 30167
7. Stormwater Management	N/A	
8. Floodplain Concerns	Lisa Blanchard	ASTTBC No 30167

1. Under the City of Abbotsford *Streamside Protection Bylaw* a "Qualified Professional" means an applied scientist or technologist who practices in a relevant applied science or technology field including, without limitation, the field of agrology, forestry, biology, engineering, geomorphology, geology, hydrology, hydrogeology, or landscape architecture, whether acting alone or together with another qualified environmental professional, if

   (a) the individual is registered and in good standing in British Columbia with an appropriate professional organization constituted under an Act, acting under that association's code of ethics and subject to disciplinary action by that association,

   (b) the individual's area of expertise is recognized in the assessment methods as one that is acceptable for the purpose of providing all or part of an assessment report in respect of that development proposal, and

   (c) the individual is acting within that individual's area of expertise.

Brown Strachan Associates
Consulting Engineers in Acoustics

Project: H01.181

April 18, 2019

Atelier Pacific Architecture Inc.
111 – 3823 Henning Drive
Burnaby, BC V5C 6P3

Attention: Mr. Michael Niemi

Dear Mr. Niemi:

Re: 34375 Gladys Avenue, Abbotsford

Further to your email of 18 April 2019 and a review of the project drawings, we confirm that the proposed multi-family residential development at 34375 Gladys Avenue can be designed to satisfy the section MF26 Noise Attenuation requirements in the City of Abbotsford Official Community Plan (OCP, prints appended), without changes to the architectural design.

The OCP specifies that the noise attenuation measures comply with the recommendations outlined by the Canada Mortgage and Housing Corporation (CMHC), which is the indoor noise level design criteria in CMHC's "Road and Rail Noise: Effects on Housing" (NHA 5156 08/86, appended). Where our analysis indicates acoustical upgrades are necessary to satisfy the CMHC indoor design criteria, we anticipate the upgrades will be limited to facade details only, e.g. acoustically rated windows & doors, additional layers of drywall, etc.

As requested, we are in the process of collecting data for our acoustical report. The acoustical report is normally completed on receipt of the City's development permit submission review documents.

Please call if you have any questions.

Yours very truly,

BROWN STRACHAN ASSOCIATES

Association of Professional Engineers and Geoscientists of the Province of British Columbia
A. R. FAWCETT
ENGINEERING LICENSEE
Limited Licence 175313

Andrew R. Fawcett, Eng.L., AScT.

Encl. ARF/sb/19Apr/Elevate.let

Attachment: Attachment D: Acoustic Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

ABBOTSFORD

The information shown is for reference only. All data should be verified by associated legal survey plans and engineering drawings.

N

Scale
1:5,000.00

Plot Date
28-Jun-2018

PROJECT TEAM DIRECTORY

OWNER: ELEVATE DEVELOPMENT CORP.

ARCHITECT: ATELIER PACIFIC ARCHITECTURE INC.

LANDSCAPE CONSULTANT: VAN DER ZALM + ASSOCIATES INC.

CIVIL CONSULTANT: WEDLER ENGINEERING LLP.

GEOTECHNICAL CONSULTANT: TOOK ENGINEERING INC.

TRAFFIC CONSULTANT: BUNT AND ASSOCIATES ENGINEERING LTD.

ARCHITECTURAL DRAWING LIST

DP 0.1 CONTEXT/AERIAL SITE PLAN
DP 0.2 CONTEXT/SITE PHOTOGRAPH

DP 0.3a DESIGN RATIONALE
DP 0.3b DESIGN RATIONALE
DP 0.3c DESIGN RATIONALE
DP 0.4 ARCHITECTURAL AESTHETICS
DP 0.5a PROJECT DATA
DP 0.5b PROJECT DATA CONTINUED

DP 0.6 FIRE ACCESS PLAN

DP 1.0 SITE PLAN
DP 1.0a ENLARGED SITE PLAN
DP 1.0b ENLARGED SITE PLAN
DP 1.0c ENLARGED SITE PLAN
DP 1.0d ENLARGED SITE PLAN
DP 1.0e ENLARGED SITE PLAN
DP 1.1 COMPREHENSIVE SITE PLAN

DP 2.01 PARKADE PLAN LEVEL 1
DP 2.02 PARKADE PLAN LEVEL 2

DP 3.1 LEVEL ONE PLAN
DP 3.2 LEVEL TWO PLAN
DP 3.3 LEVEL THREE PLAN
DP 3.4 LEVEL FOUR PLAN
DP 3.5 LEVEL FIVE PLAN
DP 3.6 LEVEL SIX PLAN
DP 3.7 ROOF PLAN

DP 4.1 WEST BUILDING - LEVEL ONE PLAN
DP 4.2 WEST BUILDING - LEVEL TWO PLAN
DP 4.3 WEST BUILDING - LEVEL THREE PLAN
DP 4.4 WEST BUILDING - LEVEL FOUR PLAN
DP 4.5 WEST BUILDING - LEVEL FIVE PLAN
DP 4.6 WEST BUILDING - LEVEL SIX PLAN

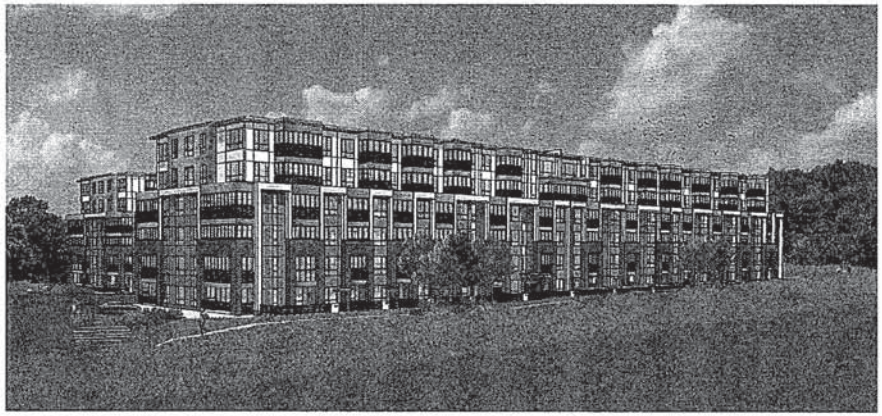
DP 5.1a EAST BUILDING - LEVEL ONE PLAN
DP 5.1b EAST BUILDING - LEVEL ONE PLAN
DP 5.2a EAST BUILDING - LEVEL TWO PLAN
DP 5.2b EAST BUILDING - LEVEL TWO PLAN
DP 5.3a EAST BUILDING - LEVEL THREE PLAN
DP 5.3b EAST BUILDING - LEVEL THREE PLAN
DP 5.4a EAST BUILDING - LEVEL FOUR PLAN
DP 5.4b EAST BUILDING - LEVEL FOUR PLAN
DP 5.5a EAST BUILDING - LEVEL FIVE PLAN
DP 5.5b EAST BUILDING - LEVEL FIVE PLAN
DP 5.6a EAST BUILDING - LEVEL SIX PLAN
DP 5.6b EAST BUILDING - LEVEL SIX PLAN

DP 6.0 EAST BUILDING - ELEVATIONS
DP 6.1 EAST BUILDING - ELEVATIONS
DP 6.2 WEST BUILDING - ELEVATIONS
DP 6.3 MATERIAL BOARD

DP 7.0 AMENITY BUILDING PLAN
DP 7.1 AMENITY BUILDING ELEVATIONS

DP 8.0 BUILDING SECTIONS
DP 8.1 BUILDING SECTIONS
DP 8.2 SITE SECTIONS

DP 9.0a 3D RENDERINGS
DP 9.0b 3D MASSING VIEWS



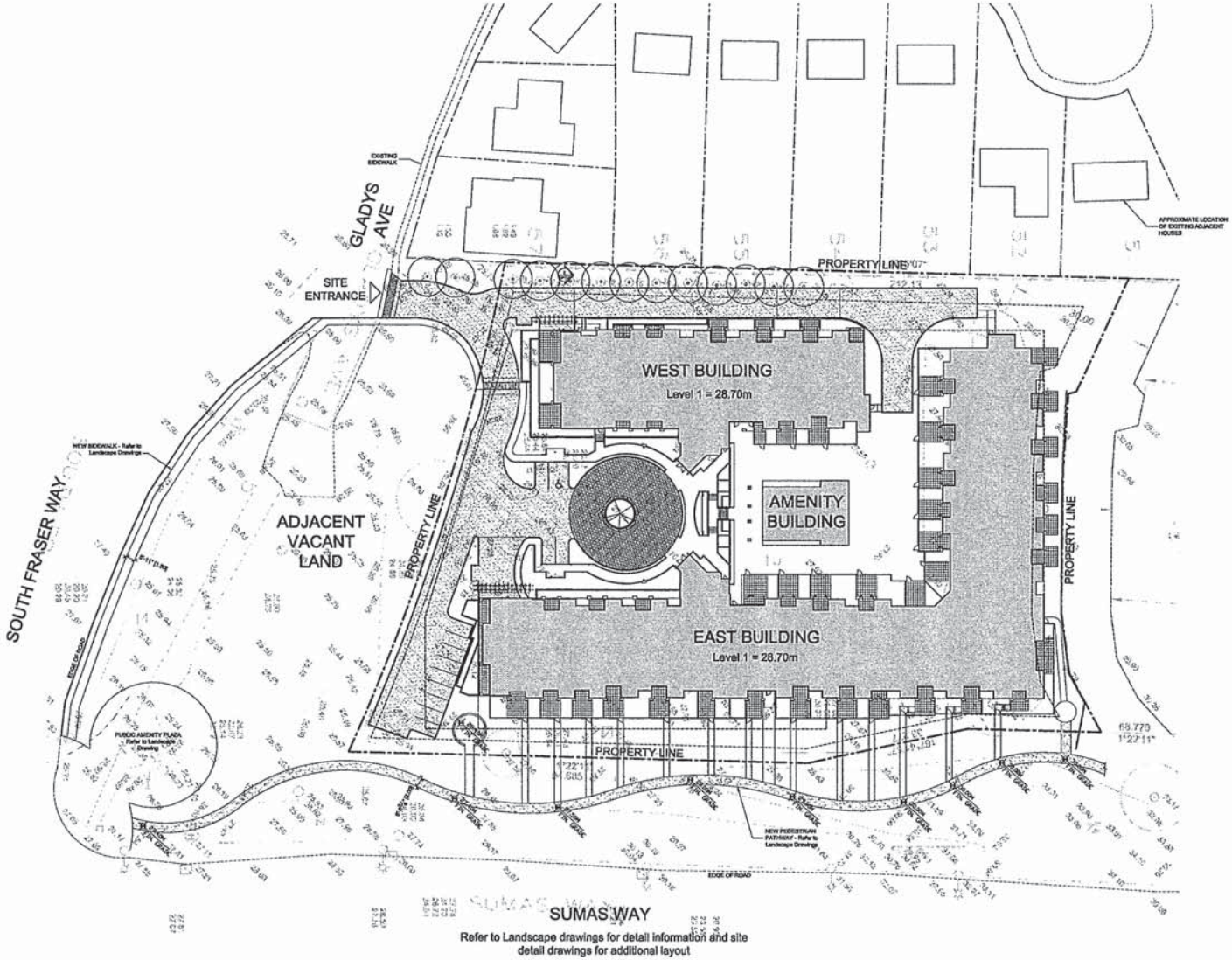
DEVELOPMENT PERMIT SUBMISSION (revised)

Date: APRIL 3, 2019

PREPARED BY: atelier pacific architecture inc.

DP 0.0

COVER PAGE

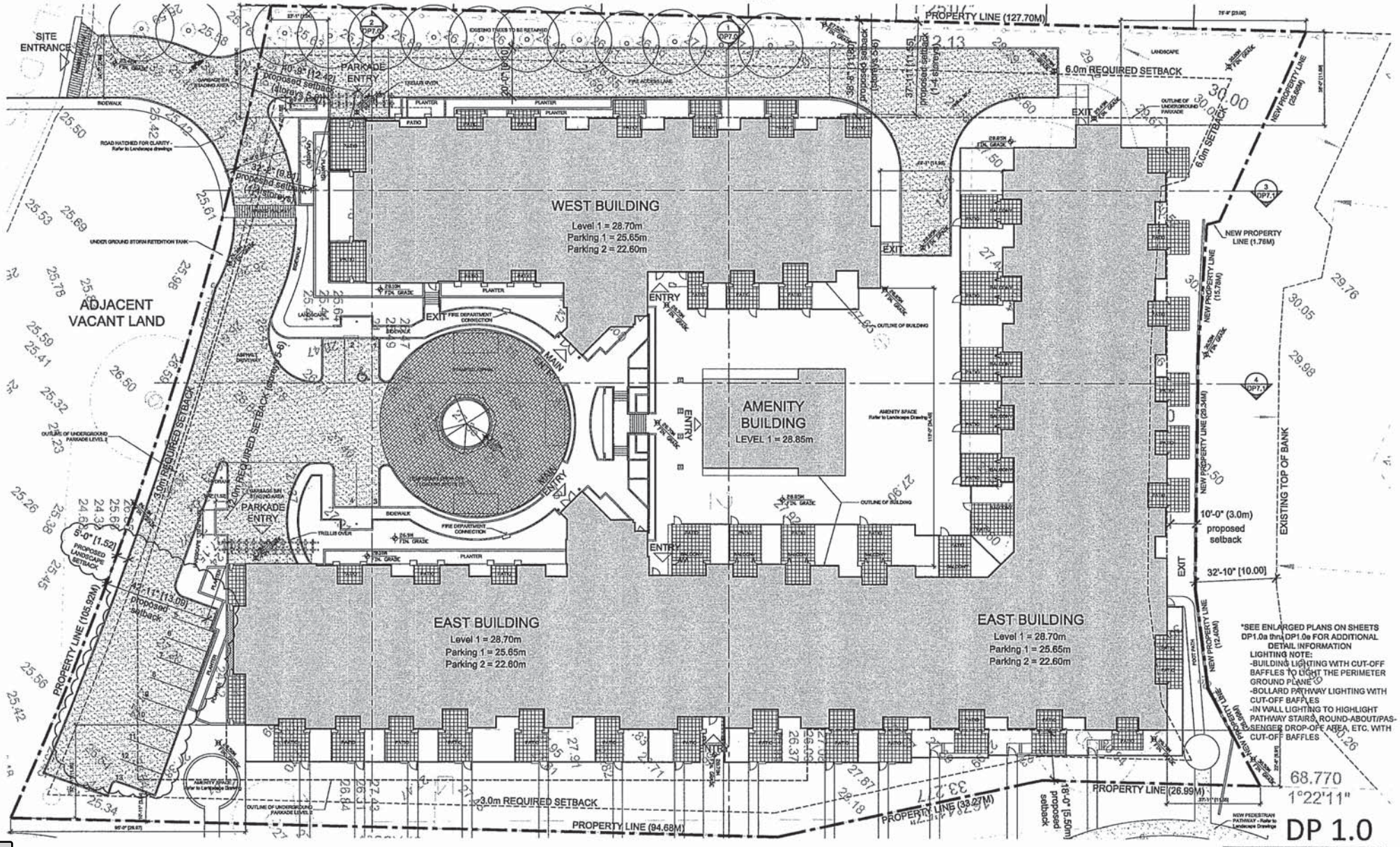


DP 1.1

COMPREHENSIVE SITE PLAN
scale: 1/32"=1'-0"

PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT

34375 GLADYS AVENUE, ABBOTSFORD, B.C.
ELEVATE DEVELOPMENT CORP.
ATELIER PACIFIC ARCHITECTURE INC.
APRIL 3, 2019



DP 1.0

SITE PLAN
scale: 1/16"=1'-0"

PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT

34375 GLADYS AVENUE, ABBOTSFORD, B.C.
ELEVATE DEVELOPMENT CORP.
ATELIER PACIFIC ARCHITECTURE INC.
APRIL 3, 2019

PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT

34375 GLADYS AVENUE, ABBOTSFORD, B.C.

ELEVATE DEVELOPMENT CORP.
ATELIER PACIFIC ARCHITECTURE INC.
APRIL 3, 2019

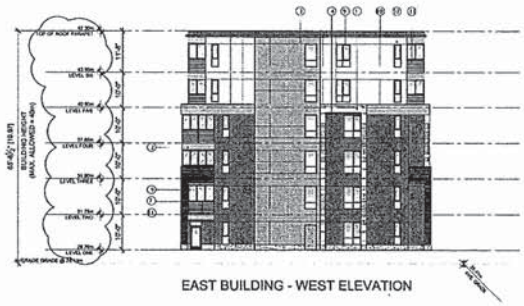
DP 3.6

LEVEL SIX
FLOOR PLAN
scale: 1/16" = 1'-0"

NORTH

EAST BUILDING - EAST ELEVATION (SUMAS WAY)

EAST BUILDING - NORTH ELEVATION



EAST BUILDING - WEST ELEVATION

LIGHTING NOTE:
-BUILDING LIGHTING WITH CUT-OFF BAFFLES TO LIGHT THE PERIMETER GROUND PLANE
-BOLLARD PATHWAY LIGHTING WITH CUT-OFF BAFFLES
-IN WALL LIGHTING TO HIGHLIGHT PATHWAY STAIRS, ROUND-ABOUT/PASSENGER DROP-OFF AREA, ETC. WITH CUT-OFF BAFFLES

PROPOSED MULTI-FAMILY RESIDENTIAL DEVELOPMENT

34375 GLADYS AVENUE, ABBOTSFORD, B.C.
ELEVATE DEVELOPMENT CORP.
ATELIER PACIFIC ARCHITECTURE INC.
APRIL 3, 2019

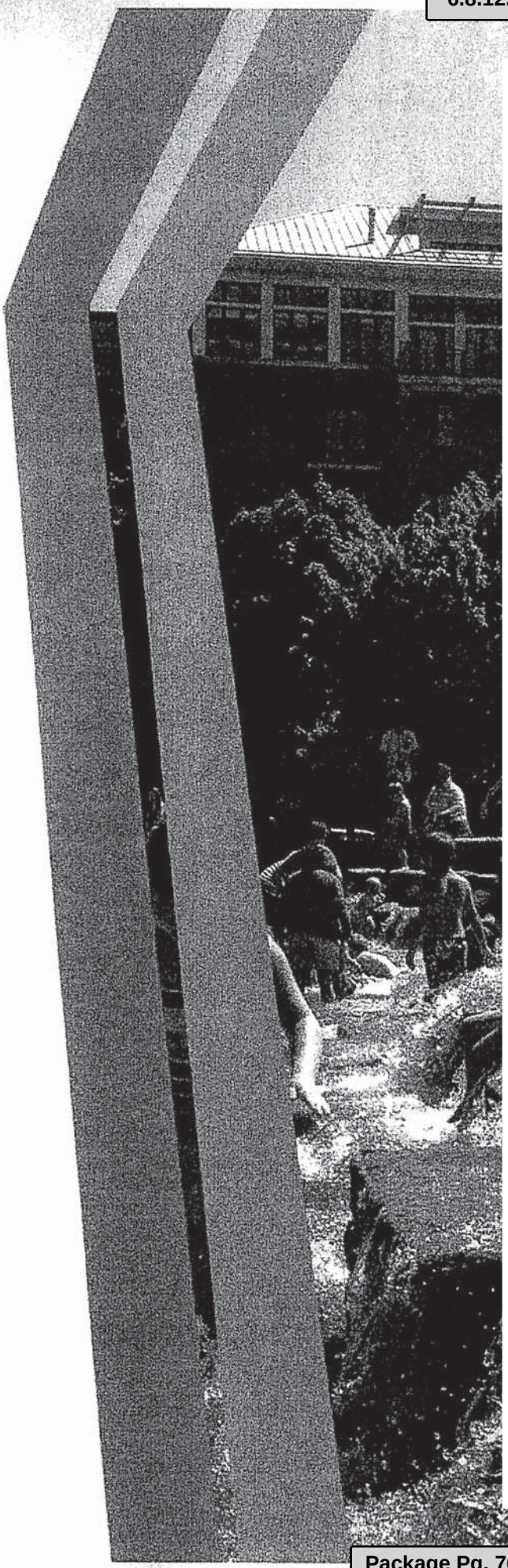
DP 6.0

EAST BUILDING ELEVATIONS
scale: 1/16" = 1'-0"

Bylaw 2600-2016,
being "Official Community Plan Bylaw, 2016" Schedule "A"

2

Multifamily Residential Development Permit Guidelines



Attachment: Attachment D: Acoustic Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

MF19 Architectural Interest

Vary building materials, colours, rooflines and other architectural elements. Establish a rhythm to the streetscape by integrating vertical elements and breaks in the façade of a building. Large expanses of singular materials, such as vinyl siding and stucco, and blank walls are not permitted.

MF20 Ground Oriented Units

Incorporate ground oriented units into residential buildings located along public streets. Design each unit with an individual front door accessible from the street and elevated at least 0.5 metres from the public right-of-way grade for privacy where existing grades permit.

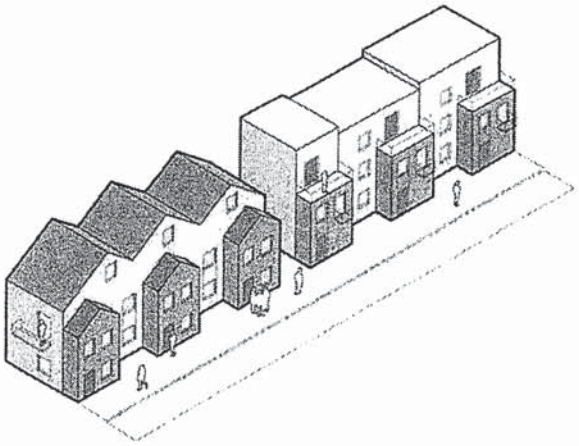


Figure MF19: Architectural Interest

MF21 Scale Transition

Incorporate complementary building forms and transitional heights to harmonize with the height and scale of adjacent buildings, especially when next to lower density residential land use designations.

MF22 Grade Transition

On sloping sites, step ground floor slabs to ensure the building and roofline follow the slope of the site.

MF23 Accessibility

Design buildings to address the functional needs of persons with disabilities including those who are mobility, visually and hearing impaired, and/or have reduced strength or dexterity.

MF24 Weather Protection

Include weather protection at main entrances.

MF25 Visual Privacy

Offset window placement between buildings facing each other to maintain privacy in residential units.

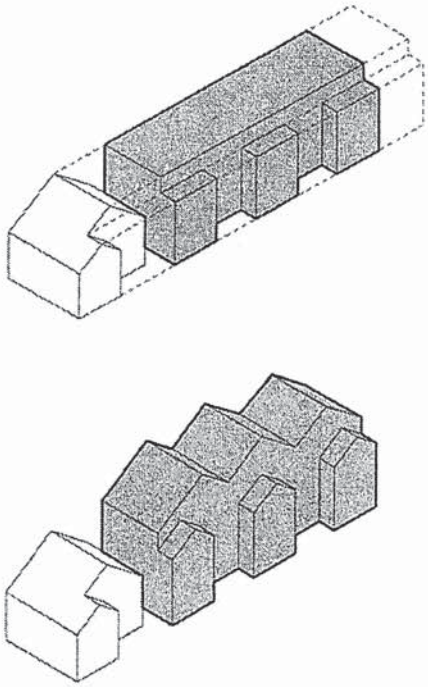


Figure MF21: Scale Transition

MF26 Noise Attenuation

When located adjacent to highways, railways, truck routes or other major noise sources, use noise attenuation measures to comply with the Sound Transmission Classification (STC) recommendations outlined by the Canada Mortgage and Housing Corporation (CMHC).

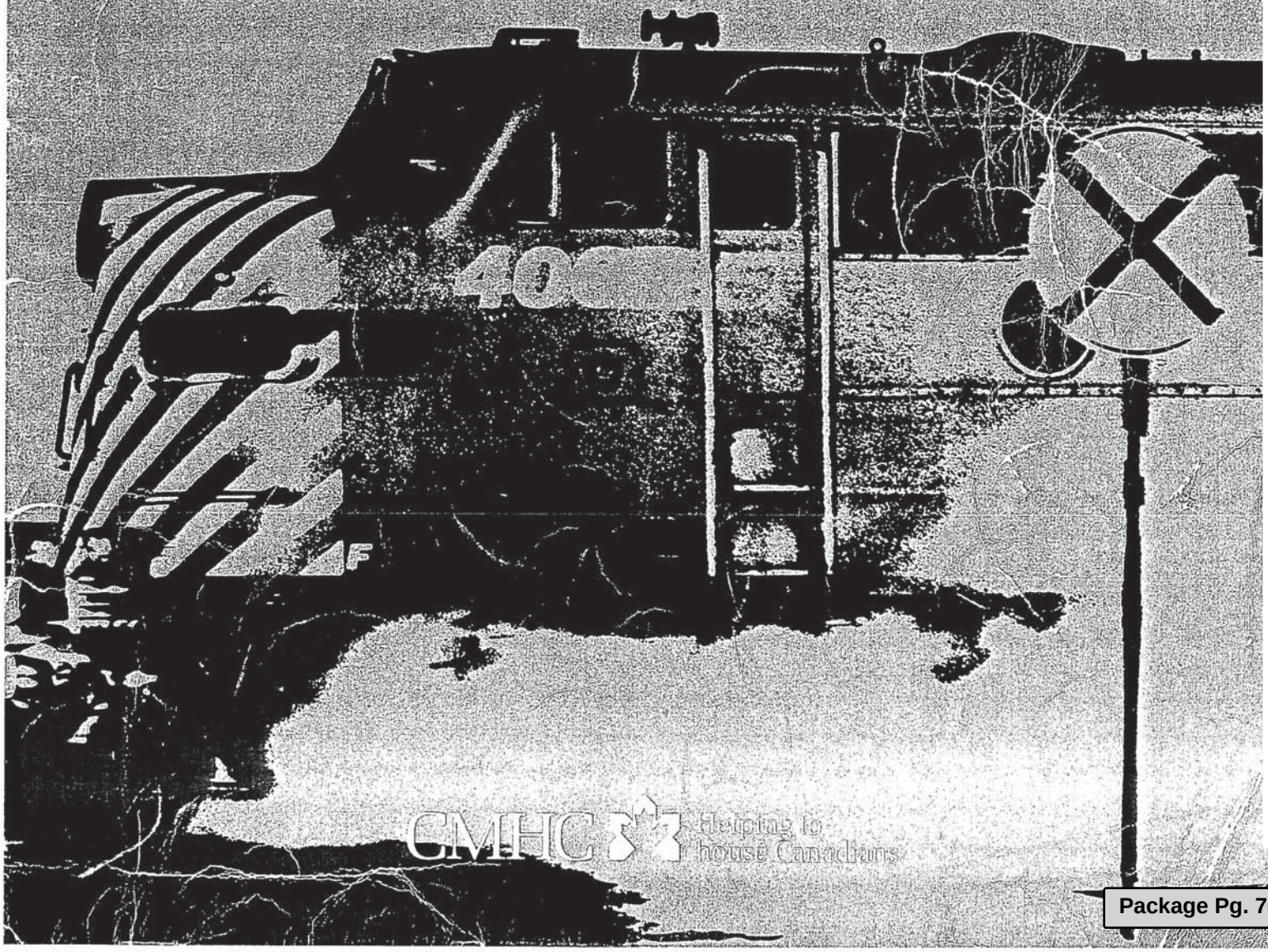
Attachment: Attachment D: Acoustic Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

NHA 5156 08/86

Canada Mortgage and Housing Corporation

Société canadienne d'hypothèques et de logement

Road and Rail Noise: Effects on Housing



CMHC Helping to house Canadians

Attachment: Attachment D: Acoustic Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

CMHC's "Road and Rail Noise: Effects on Housing"
(NHA 5156 08/86, ISBN 0-662-11021-0).

Section C — Recommended Levels of Traffic Noise

The acceptance of noise depends on both the characteristics of that noise and the activities of the listeners. The activities most affected by noise fall into two categories, corresponding to two different criteria. For activities similar to speech communication (including listening to radio and television), the first requirement is that the noise level does not interfere significantly with comfortable speech communication or with listening to soft music. The other important category is sleeping: noise, especially at night, should not interfere with normal sleep patterns.

To deal with the fluctuating noise level from road or rail traffic, it is convenient to describe it in terms of the equivalent level (L_{eq}). This is the level of a steady sound having the same energy, at a given time, as the fluctuating sound. For the purposes of this document, the A-weighted 24-hour equivalent sound level is used as the basic noise descriptor. This noise measure has been extensively tested in numerous social surveys. Of the commonly used noise descriptors, it is among the easiest to measure or to predict accurately, and no other descriptor has been shown to provide a significantly better prediction of the community response to noise.

Hereafter "noise level" expressed in decibels (dB) should be taken to mean the A-weighted 24-hour equivalent sound level.

The maximum equivalent level that will not impair sustained conversational speech is 40 dB. Noise above this level causes people to raise their voices and therefore is not acceptable for a quiet indoor environment. In order to hear quieter passages of music, a level of about 35 dB would be preferred. Communication in a slightly raised voice is acceptable in kitchens and bathrooms and usually in outdoor recreation areas.

Sleep arousal and interference with going to sleep depend on the level of noise and on the fluctuations in level or character that occur. A useful criterion is that the maximum levels should not exceed the indoor background level by more than about 5 dB. Quiet interior levels range from 25 to 35 dB. Normally night-time traffic is less than day-time traffic and the 24-hour average level provides a fair measure of maximum night-time levels. The maximum level acceptable in bedrooms is 35 dB.

Outdoor noise levels should be considered as well as indoor because residential areas ought to include some space for outdoor recreation, such as patios, balconies and play areas. Experience indicates that somewhat higher noise levels are generally more acceptable outside than inside. An appropriate outdoor noise level is 55 dB, which would correspond typically to an indoor level of 40 dB. These levels would permit conversation at close range or in a slightly raised voice most of the time. Such background noise may serve the purpose of masking more specific sounds, such as conversation on a neighbour's patio.

To meet these various criteria of acceptable noise levels, the levels given in Table 1 are recommended:

Table 1

Maximum acceptable levels of road and rail traffic noise in dwellings and in outdoor recreation areas.

Room	Noise Level
Bedrooms.....	35 dB
Living, dining, recreation rooms.....	40 dB
Kitchens, bathrooms, hallways, utility rooms.....	45 dB
Outdoor recreation area.....	55 dB

Attachment: Attachment D: Acoustic Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

van der Zalm + associates inc

Arborist Report

Date: July 27, 2017
1st Revision: August 24, 2017
2nd Revision: April 17, 2019

Project: Residential Multi-Family

Project No.:

Client: Atelier Pacific Architecture Inc./Elevate Development Corporation

Site Address: 34375 Gladys Ave, Abbotsford BC.

Project Arborist: Austin Peterson
ISA Certified Arborist PN 1570A
ISA Tree Risk Assessment Qualified

Background

Austin Peterson (of van der Zalm and associates inc.) was hired by the Client to prepare an ISA Certified Arborist tree report for the subject property at the site address/location identified on the Tree Survey drawings provided by the Client.

Assignment /Scope of Work

The Project Arborist has been retained by the Client to access the health and condition of the trees in accordance with Abbotsford Tree Protection By-law, 2010.

As part of this assessment, the Project Arborist has performed a site review entailing identification and visual assessment of the tree(s) on site based on the tree survey provided by the client or representative(s). The Project Arborist will provide recommendations for the retention or removal of tree(s) on this site 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.

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 van der Zalm + associates.

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.

Site Review & Environmental Description

Google Maps Image

The Project Arborist conducted a site review and evaluation of the trees located at the above referenced property on July 25, 2017.

The site review entailed identification and visual assessment of the trees on site based on the information provided by the project owners or representatives.

The property is bordered by Sumas Way to the east, residential properties to the west north and Gladys Ave to the south.

There is no evidence of raptors nests, osprey nests or heron colonies on the subject site.

City Trees

There is a City of Abbotsford tree associated with this project.

Off Site Trees

There are two private off site tree (2204 Lumar Pl.) associated with this project.

Shared Trees

There are no shared trees 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 on design construction and grading details.

Long term preservation success is dependent on minimizing the impact of 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 trees through the development process and implementation of mitigating works (watering, mulching and other specified activities) is essential for success.

Tree Inventory & Assessment Table – On Site Trees

Tree #	Common Name *Botanical Name*	DBH (m.)	Comments	Replacement Trees
247	Kwanzan Cherry *Prunus serrulata 'Kwanzan'*	.41 .29	Image 1 DRIP LINE = 4.00 meters TRUNK – Multiple stems at 1.0m height. RETAIN – Tree Protection Barrier required. All work within 1-meter of Drip Line must be completed under supervision of Project Arborist and in coordination with City of Abbotsford Urban Forestry Dept.	0
009	Crimson King Maple *Acer platanoides Crimson King*	.42	Image 1 DRIP LINE = 5.00 meters TRUNK – Fork at 2.0m height.	0

			RETAIN – Tree Protection Barrier required. All work within 1-meter of Drip Line must be completed under supervision of Project Arborist and in coordination with City of Abbotsford Urban Forestry Dept.	
011	Kwanzan Cherry *Prunus serrulata* *'Kwanzan'*	.30 .23	Image 1 DRIP LINE = 5.00 meters TRUNK – Fork at 1.0m height. CROWN – Previous side pruning. RETAIN – Tree Protection Barrier required. All work within 1-meter of Drip Line must be completed under supervision of Project Arborist and in coordination with City of Abbotsford Urban Forestry Dept.	0
041	Crimson King Maple *Acer platanoides* *Crimson King*	.35	Image 1 DRIP LINE = 6.50 meters CROWN - Previous side pruning. RETAIN – Tree Protection Barrier required. All work within 1-meter of Drip Line must be completed under supervision of Project Arborist and in coordination with City of Abbotsford Urban Forestry Dept.	0
047	Kwanzan Cherry *Prunus serrulata* *'Kwanzan'*	.31 .34 .17 .22	Image 1 DRIP LINE = 6.00 meters CROWN - Previous side pruning. RETAIN – Tree Protection Barrier required. All work within 1-meter of Drip Line must be completed under supervision of Project Arborist and in coordination with City of Abbotsford Urban Forestry Dept.	0
048	Crimson King Maple *Acer platanoides* *Crimson King*	.45	Image 1 DRIP LINE = 7.00 meters CROWN - Previous side pruning. RETAIN – Tree Protection Barrier required. All work within 1-meter of Drip Line must be completed under supervision of Project Arborist and in coordination with City of Abbotsford Urban Forestry Dept.	0
049	Kwanzan Cherry	.28 .30	Image 1 DRIP LINE = 7.00 meters	0

	Prunus serrulata 'Kwanzan'	.16 .20	CROWN - Previous side pruning. RETAIN – Tree Protection Barrier required. All work within 1-meter of Drip Line must be completed under supervision of Project Arborist and in coordination with City of Abbotsford Urban Forestry Dept.	
054	Crimson King Maple *Acer platanoides Crimson King*	.42	Image 1 DRIP LINE = 7.50 meters TRUNK – Multiple stems from base. RETAIN – Tree Protection Barrier required. All work within 1-meter of Drip Line must be completed under supervision of Project Arborist and in coordination with City of Abbotsford Urban Forestry Dept.	0
055	Kwanzan Cherry *Prunus serrulata 'Kwanzan'*	.25 .26 .18 .13 .11 .09	Image 1 DRIP LINE = 8.00 meters TRUNK - Multiple stems from base. RETAIN – Tree Protection Barrier required. All work within 1-meter of Drip Line must be completed under supervision of Project Arborist and in coordination with City of Abbotsford Urban Forestry Dept.	0
056	Crimson King Maple *Acer platanoides Crimson King*	.51	Image 1 DRIP LINE = 7.50 meters TRUNK – Multiple stems from base. RETAIN – Tree Protection Barrier required. All work within 1-meter of Drip Line must be completed under supervision of Project Arborist and in coordination with City of Abbotsford Urban Forestry Dept.	0
061	Kwanzan Cherry *Prunus serrulata 'Kwanzan'*	.30 .37 .18 .17 .22	Image 1 DRIP LINE = 6.50 meters TRUNK – Multiple stems from base. RETAIN – Tree Protection Barrier required. All work within 1-meter of Drip Line must be completed under supervision of Project Arborist and in coordination with City of Abbotsford Urban Forestry Dept.	0

062	Crimson King Maple *Acer platanoides Crimson King*	.51	Image 1 DRIP LINE = 6.00 meters TRUNK – Scar at base. Multiple stems at 2.0 m height. REMOVE – Within building envelope.	3
050	Red Maple *Acer rubrum*	1.03	Image 2 DRIP LINE = 9.00 meters TRUNK – Multiple stems from base. REMOVE – Within building envelope.	3
053	Yellow Cedar *Chamacyprus nootkatensis*	.36 .23 .22	Image 2 DRIP LINE = 4.00 meters LIVE CROWN RATIO = 90% TRUNK – Multiple stems from base. REMOVE – Within building envelope.	3
066	Zebra Cedar *Thuja plicata 'Zebrina'*	.21 .50	Image 4 DRIP LINE = 5.00 meters LIVE CROWN RATIO = 90% TRUNK – Fork at base. English ivy established on trunk. REMOVE – Within building envelope.	3
067	Zebra Cedar *Thuja plicata 'Zebrina'*	.29 .32	Image 4 DRIP LINE = 4.50 meters LIVE CROWN RATIO = 80% TRUNK – Fork at base. English ivy established on trunk. REMOVE – Within building envelope.	3
068	Black Walnut *Juglans nigra*	.26	DRIP LINE = 7.00 meters LIVE CROWN RATIO = 90% TRUNK – English ivy established on trunk. REMOVE – Within building envelope.	2

069	Paper Birch *Betula papyrifera*	.40	DRIP LINE = 5.00 meters LIVE CROWN RATIO = 90% TRUNK – English ivy established on trunk. CROWN - REMOVE – Within building envelope.	3
070	Zebra Cedar *Thuja plicata 'Zebrina'*	.47	Image 4 DRIP LINE = 6.00 meters LIVE CROWN RATIO = 90% TRUNK – English ivy on trunk. REMOVE – Within building envelope.	3
071	Zebra Cedar *Thuja plicata 'Zebrina'*	.47	Image 4 DRIP LINE = 4.00 meters LIVE CROWN RATIO = 90% TRUNK – English ivy established on trunk. REMOVE – Within building envelope	3
072	Zebra Cedar *Thuja plicata 'Zebrina'*	.47	Image 4 DRIP LINE = 5.00 meters LIVE CROWN RATIO = 90% TRUNK – English ivy established on trunk. REMOVE – Within building envelope.	3
073	Zebra Cedar *Thuja plicata 'Zebrina'*	.34 .19	Image 4 DRIP LINE = 4.50 meters LIVE CROWN RATIO = 90% TRUNK – Fork at base and at 3 m height. REMOVE – Within building envelope.	3
012	Zebra Cedar *Thuja plicata 'Zebrina'*	.39	Image 4 DRIP LINE = 3.50 meters LIVE CROWN RATIO = 80% TRUNK – Fork at 3 m height. REMOVE – Within building envelope.	3
013	Zebra Cedar *Thuja plicata 'Zebrina'*	.28	Image 4 DRIP LINE = 3.50 meters LIVE CROWN RATIO = 80%	2

Attachment: Attachment E: Arborist Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

			TRUNK – Fork at 5 m height. REMOVE – Within building envelope.	
014	Zebra Cedar *Thuja plicata 'Zebrina'*	.29 .24	Image 4 DRIP LINE = 3.50 meters LIVE CROWN RATIO = 80% TRUNK – Fork at base and at 3 m height. REMOVE – Within building envelope.	3
015	Black Cottonwood *Populus trichocarpa*	.73	DRIP LINE = 9.00 meters LIVE CROWN RATIO = 60% REMOVE – Within building envelope.	3
016	Big Leaf Maple *Acer macrophylum*	.45	DRIP LINE = 10.00 meters LIVE CROWN RATIO = 90% REMOVE – Within building envelope.	3
017	Bitter Cherry *Prunus emarginata*	.29	DRIP LINE = 8.00 meters LIVE CROWN RATIO =70% REMOVE – Within building envelope.	2
018	Big Leaf Maple *Acer macrophylum*	.34	DRIP LINE = 6.00 meters LIVE CROWN RATIO = 70% TRUNK – Fork at 9 m height. REMOVE – Within building envelope.	3
019	Big Leaf Maple *Acer macrophylum*	.39	DRIP LINE = 8.00 meters LIVE CROWN RATIO = 80% TRUNK – Fork at 3 m height. REMOVE – Within building envelope.	3
030	Big Leaf Maple *Acer macrophylum*	.39	DRIP LINE = 8.00 meters LIVE CROWN RATIO = 80% REMOVE – Within building envelope.	3
033	Red Cedar *Thuja plicata*	.17	DRIP LINE = 3.00 meters LIVE CROWN RATIO = 90%	0

			REMOVE – Within building envelope.	
034	Paper Birch Betula papyrifera	.20 .22 .11	DRIP LINE = 5.00 meters LIVE CROWN RATIO = 90% TRUNK – Fork at base, English Ivy established on trunk. REMOVE – Within building envelope.	3
046	Red Cedar *Thuja plicata*	.25	DRIP LINE = 4.00 meters LIVE CROWN RATIO = 90% TRUNK – English Ivy established on trunk. REMOVE – Within building envelope.	2
100	Red Cedar *Thuja plicata*	.21	DRIP LINE = 4.00 meters LIVE CROWN RATIO = 90% TRUNK – English Ivy established on trunk. REMOVE – Within building envelope.	2
047	Sycamore Maple *Acer pseudoplatanus*	.25 .24 .10 .27	DRIP LINE = 5.00 meters LIVE CROWN RATIO = 90% TRUNK – Multiple stems at base. English Ivy established on trunk. REMOVE – Within building envelope.	3
048	Red Cedar *Thuja plicata*	1.14	Image 5 DRIP LINE = 7.00 meters LIVE CROWN RATIO = 90% TRUNK – English Ivy established on trunk. REMOVE – Within building envelope.	3

Tree Inventory & Assessment Table – Off Site Trees

064	Douglas Fir *Pseudotsuga menziesii*	.60	Image 3 DRIP LINE = 7.00 meters LIVE CROWN RATIO = 70% CROWN – Broken branches mid canopy.	0

			RETAIN – Tree Protection Barrier required. All work within 1-meter of Drip Line must be completed under supervision of Project Arborist and in coordination with City of Abbotsford Urban Forestry Dept.	
065	Douglas Fir *Pseudotsuga menziesii*	.65	Image 3 DRIP LINE = 7.00 meters LIVE CROWN RATIO = 70% RETAIN – Tree Protection Barrier required. All work within 1-meter of Drip Line must be completed under supervision of Project Arborist and in coordination with City of Abbotsford Urban Forestry Dept.	0

Tree Inventory & Assessment Table – City Trees

248	Black walnut *Juglans nigra*	.80 .69 .58	Image 6 DRIP LINE = 9.50 meters TRUNK – Multiple stems from base. REMOVE – Within likely excavation zone. This tree will require written permission for removal from owner prior to removal.	3

Photographs

Image 1

Image 2

Image 3

Image 4

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Attachment: Attachment E: Arborist Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

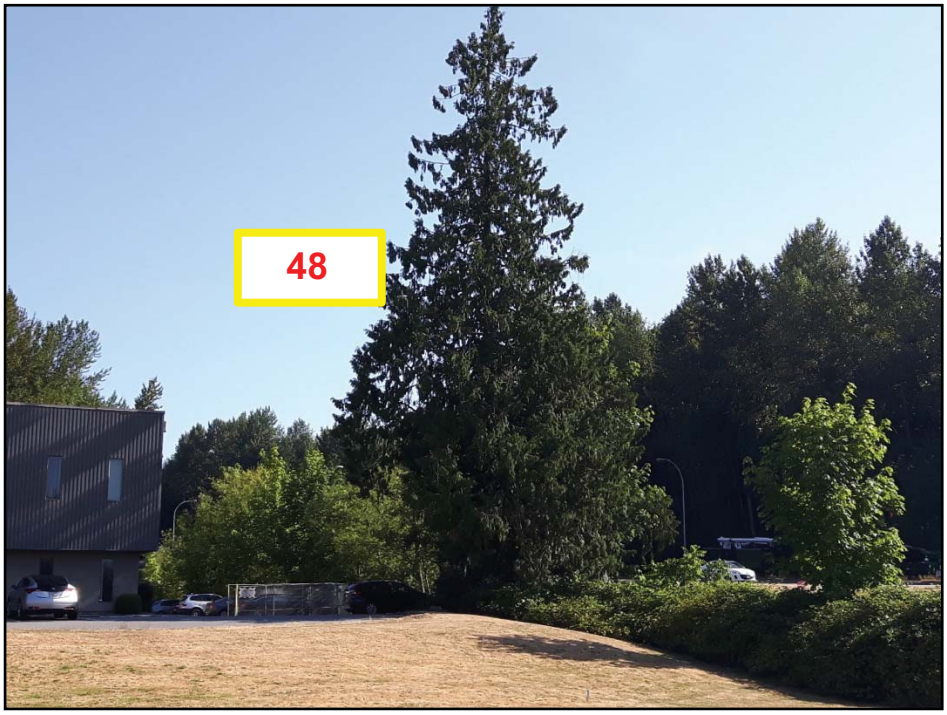


Image 5

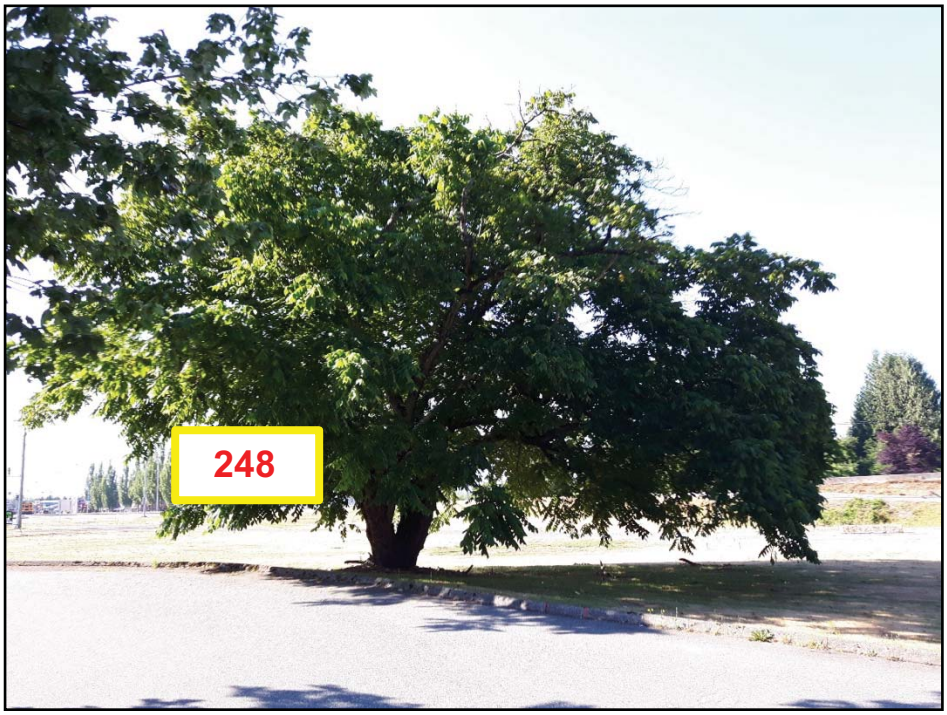


Image 6

Glossary of Key Terms

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

DRIP LINE: Means a circle drawn on the ground around a tree directly under the tips of the outermost branches of the canopy of the tree.

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

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

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

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

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

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

CRZ: Critical Root Zone

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

TPZ: Tree Protection Zone

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

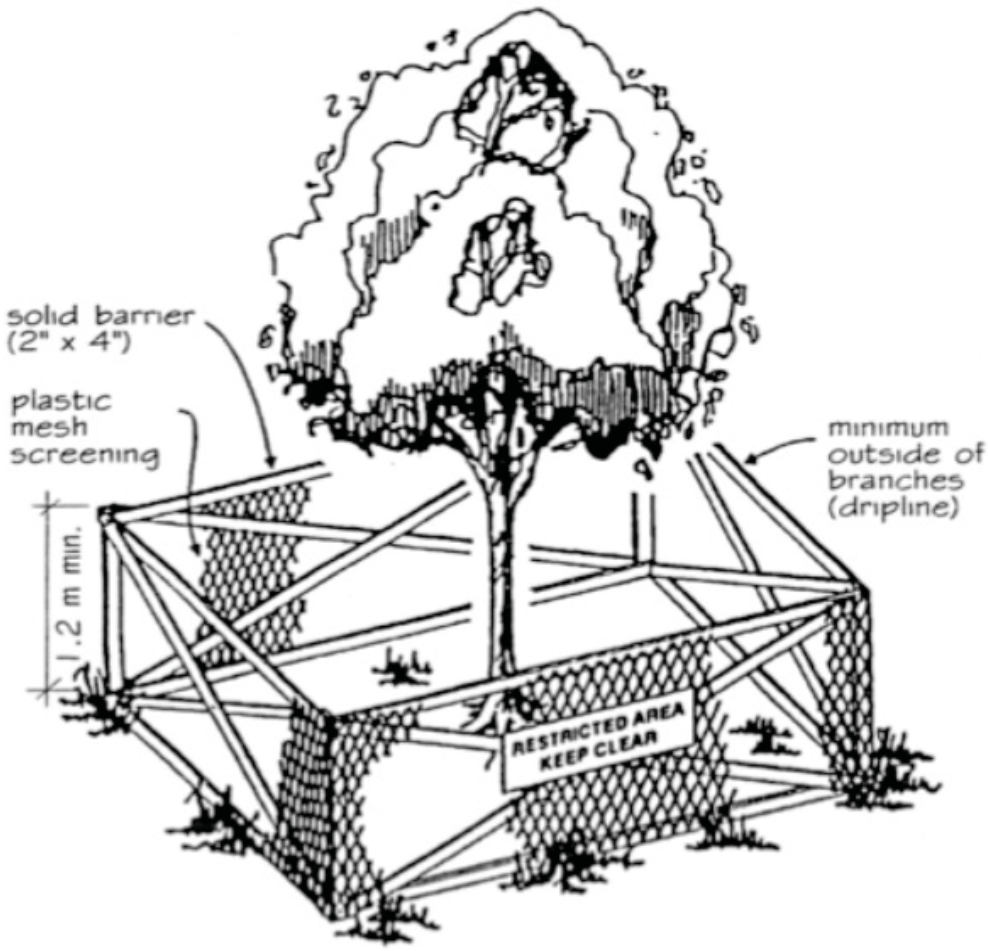
SPEA: Streamside Protection and Enhancement Area

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.

Attachment: Attachment E: Arborist Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

TREE PROTECTION:

Tree Protection Fencing For On-site Trees



Protection Barrier Distance From Tree

Tree Protection Barriers are to be installed at or beyond the tree's Drip Line. The Drip Line means a circle drawn on the ground around a tree directly under the tips of the outermost branches of the canopy of the tree. The fencing itself is constructed per the example above.

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.

- In the event that 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 by the use of 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 or 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 removed 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 arboricultural 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.

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Attachment: Attachment E: Arborist Report (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

bunt & associates

34375 Gladys Avenue

Transportation Impact Assessment

Final Report (V01)

Prepared for

Elevate Development Corp.

Date

October 11, 2018

Project No.

04-17-0021

CORPORATE AUTHORIZATION

Prepared By: James Lee, P.Eng, MBA, PMP
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Date: 2018-10-11
Project No. 04-17-0021
Status: Final (V01)

Engineer's Stamp

This document represents an electronic version of the original hard copy document, sealed, signed and dated by James Lee and retained on file. The content of the electronically distributed document can be confirmed by referring to the original hard copy

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Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

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EXECUTIVE SUMMARY

Development Plan

Elevate Development Corp. (Elevate) is proposing to redevelop the current Abbotsford News site at 34375 Gladys Avenue in Abbotsford, BC. The redeveloped site is planned to include two, six-storey buildings with a total of 282 residential dwelling units.

Parking

Parking for the development is planned to include two levels of underground parking plus a small component of surface parking. Elevate proposes to provide 418 resident stalls which meets the City's Zoning Bylaw requirement. However, to better match the expected visitor demand, Elevate proposes to provide visitor parking at a rate of 0.12 stalls per unit (i.e., 34 stalls) compared to the City's required rate of 0.20 stalls per unit (56 stalls). The proposed provision rate would require an off-street parking supply variance of 22 stalls.

Based on data from both the Metro Vancouver Apartment Parking Study (MVAPS) and previous Bunt parking studies, the proposed reduced visitor parking supply is expected to be adequate to accommodate the peak visitor parking demand. As such, it is recommended that the City approve the proposed visitor parking supply variance.

Traffic Impact of Development

Compared to the existing Abbotsford News site, the development is expected to generate a net increase of approximately 70 vehicle trips during both the weekday AM and PM peak hours, translating to an average of just over 1 new vehicle trip per minute. This magnitude of traffic falls within the general traffic volume fluctuation experienced on any given roadway on a daily basis.

The development's net site traffic is expected to account for less than 1% of total vehicle volumes at both the Sumas Way & South Fraser Way and Sumas Way & Marshall Road intersections in the future horizon years. At the merge point of the Gladys Avenue Underpass onto eastbound South Fraser Way, the development is projected to add 50 vehicles during the AM peak hour, which will account for 23% of the traffic on Opening Day. However, during the critical PM peak hour when traffic delays and long vehicle queues exist at the merge, the development is only expected to add 4 new vehicles to this movement (i.e., one new trip every 15 minutes on average), which translates to 1% of the total traffic.

Given the relatively modest net traffic generation of the site, the proposed development is not expected to have a material impact on the surrounding major road network.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Traffic Operations

Existing Operations

Under existing conditions, the major roadways in the study area (i.e., Sumas Way, Marshall Road, and South Fraser Way) carry significant vehicle volumes and as a result, experience considerable traffic congestion and vehicle queues. Sumas Way & South Fraser Way and the Gladys Avenue Underpass & South Fraser Way intersections operate with overall failing conditions during the weekday PM peak hour and Sumas Way & Marshall Road performs with overall failing operations during both the AM and PM peak traffic periods. Moreover, these intersections also experience several failing individual movements, particularly in the PM peak hour.

To mitigate the existing traffic issues at Sumas Way & South Fraser Way, the intersection was found to require dual eastbound left-turn lanes, protected/permissive phasing for the westbound left-turn in the PM peak hour, one new westbound right-turn lane, and the eastbound right-turn to be upgraded to a "free flow" movement with an add lane on Sumas Way. To mitigate the existing traffic issues at Sumas Way & Marshall Road, the intersection was found to require dual eastbound and westbound left-turn lanes plus a new right-turn lane on all four approaches.

Future Operations

Bunt analyzed future traffic operations in the 2020 (Opening Day), 2031, and 2040 horizon years under both Background (without development) and Total (with development) traffic scenarios.

As advised by the City of Abbotsford and BC Ministry of Transportation & Infrastructure (MoTI), Bunt assumed a 2% annual background traffic growth rate when projecting future traffic volumes. However, it should be emphasized that because the existing conditions analysis already indicated that both the Sumas Way & South Fraser Way and Sumas Way & Marshall Road intersections operate at or over their practical capacity today, it is likely that this level of growth could not practically be realized. When roadways such as Sumas Way, South Fraser Way, and Marshall Road reach capacity, it is likely that drivers will seek alternate routes, adjust their schedules to travel during off-peak times, or elect to take alternative modes of transportation in order to reach their destinations. For these reasons, it is Bunt's opinion that this growth rate is likely overstated.

Regardless, when applying the requested growth rate, traffic operations were shown to continue to worsen in the future, with the two major signalized intersections shown to require significant mitigation measures in order to operate largely within the City's acceptable performance thresholds. However, given the marginal increase in traffic added by the development, the site-generated traffic was not shown to trigger the need for any additional mitigation measures compared to what was required to accommodate Background traffic alone.

The mitigation measures shown to be required at the major signalized intersections included the addition of several lanes in almost every direction, which would likely be beyond what is practical or possible given the local area context, available right-of-way, and extent of property acquisition required. Should

background traffic grow at the rate assumed in the study, to truly achieve acceptable traffic performance at the two critical intersections along Sumas Way in the 2040 horizon year, either grade separation would be required or some combination of improvements to both the subject intersections and other intersections in the nearby road network to relieve traffic volumes at Sumas Way & South Fraser Way and Sumas Way & Marshall Road.

Recommended Improvements

While the full set of measures identified to be required would not be feasible, Bunt recommends that the City/BC MoTI consider implementing the following mitigation measures to help improve both existing and future traffic operations:

Sumas Way & South Fraser Way:

- Introduce dual eastbound left-turn lanes;
- Introduce protected/permitted phasing for the westbound left-turn in the PM peak hour; and,
- Upgrade the eastbound right-turn lane from a channelized yield to a free-flow movement.

  Note: This improvement will coincidentally already be achieved given the road widening on the west side of Sumas Way being conducted by Elevate south of South Fraser Way, as required by the BC MoTI as a condition of approval for this development.

Sumas Way & Marshall Road:

- Introduce dual eastbound and westbound left-turn lanes; and,
- Introduce dedicated right-turn lanes for the east and westbound right-turns.

Note that while these measures would not bring the existing and future traffic operations within the City's acceptable performance thresholds, they would considerably improve the operations for some of the worst performing movements. Moreover, these mitigation measures are considered more reasonable compared to the full set of mitigation measures found to be required. Furthermore, the recommended improvements at Sumas Way & Marshall Road follow the recommended improvements found in the City's 2007 Transportation Master Plan (TMP).

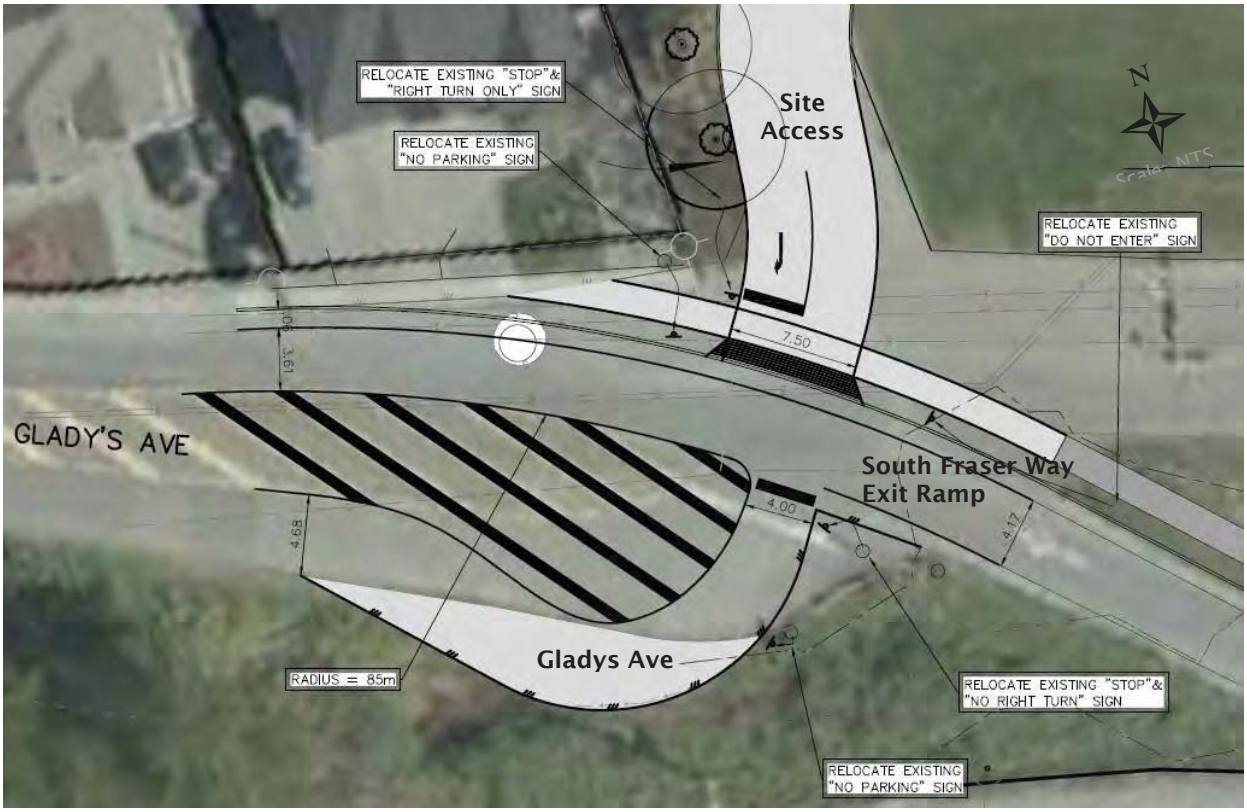
Aside from these mitigation measures, before deciding what additional infrastructure upgrades should be implemented at these two major signalized intersections to accommodate future traffic volumes, Bunt recommends that the City conduct a macroscopic traffic assessment of the City's entire future road network to more accurately forecast Background traffic growth in this area. As emphasized in this report, the results of Bunt's future traffic operations analysis are based on a 2% per year growth rate assumption that Bunt does not feel is realistic. A macroscopic model analysis would be able to account for several factors not possible in a site-specific TIA study, such as redistribution of traffic as major roadways reach capacity, area wide effects of development and infrastructure changes around the City, and potential future shifts in travel mode from reliance on private automobile trips.

Site Plan Design Review

Site Access

While not required from a traffic operations perspective, as part of the proposed development Elevate proposes to reconfigure and improve the existing site access intersection by squaring up the south side of Gladys Avenue so that it meets with the South Fraser Way Exit Ramp at more of a right angle. A conceptual layout of this modification is shown in **Figure E.1**.

Figure E.1: Proposed Gladys Avenue & Site Access Intersection Reconfiguration



Service Vehicles

Bunt's analysis indicated that the required vehicle turning maneuvers for garbage/recycling collection could be achieved without any manoeuvring challenges.

In terms of residential loading, while the development would not require a formal loading stall based on the City's Zoning Bylaw, when loading does occur loading vehicles will use the circular pick-up/drop-off area located immediately in front of the residential buildings.

Bunt's analysis indicated that the required vehicle turning maneuvers for fire truck access could be achieved without any manoeuvring challenges. A fire truck would be able to position itself within 15m from the face of the buildings as required by the BC Building Code, with the exception of the Amenity Building at the north side of the development. As an alternative, Elevate proposes to provide a standpipe/hydrant connection in this area that is located within 15m of the Amenity Building.

Off-Site Works

Gladys Avenue Underpass & South Fraser Way Merge

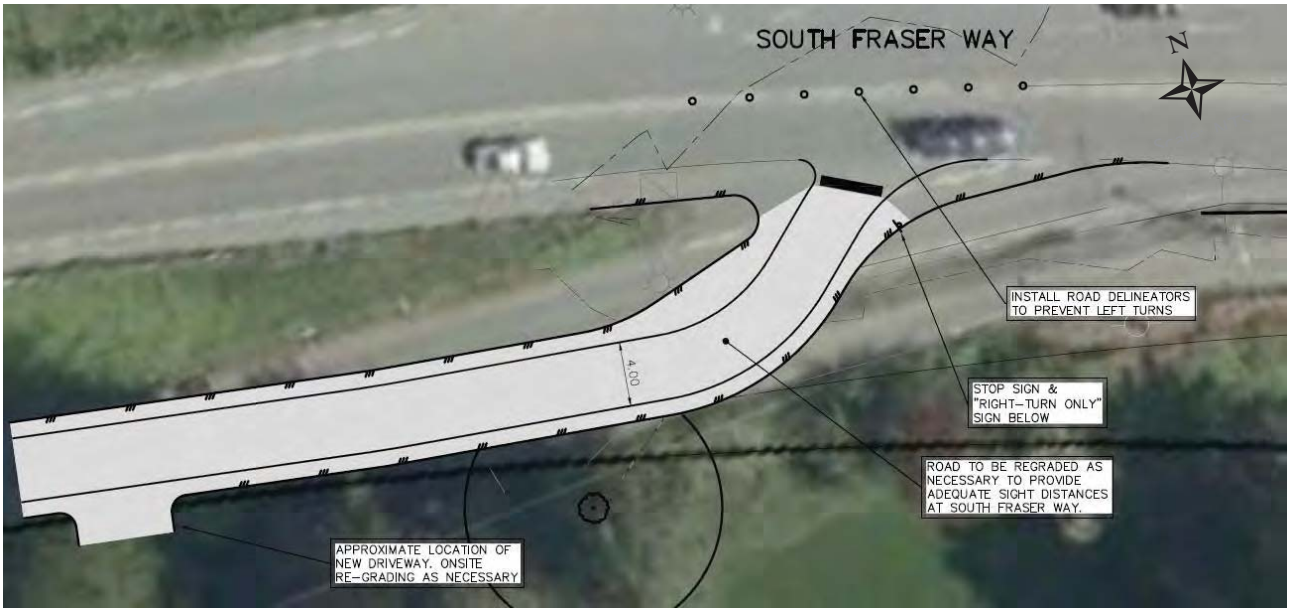
The existing merge point from the Gladys Avenue Underpass to eastbound South Fraser Way currently presents safety challenges due to the sharp angle of the merge and grade difference between the underpass and South Fraser Way. In addition, while the merge operates without issues during the AM peak hour, long vehicle delays and queues are experienced during the PM peak hour. As mentioned previously, the development is expected to add just 4 new vehicles to this movement during the PM peak hour period, translating to one new vehicle every 15 minutes on average.

As a requirement of this study, the City required that Bunt assess various options to improve this intersection with the primary objective of improving safety. Bunt's assessment of various options to address the existing issues concluded the following:

- Widening South Fraser Way to add a new eastbound through lane would effectively remove the "merge" situation that currently exists and also reduce vehicle delays. However, this modification would also introduce a "weaving" segment with only a short distance to make weaving decisions from. For this reason, this option was not considered to be a feasible solution when improving safety is the primary objective.

- The most feasible option to improve safety was determined to be squaring up the existing merge point where the Gladys Avenue Underpass meets South Fraser Way and modifying the underpass so that it reaches the same road elevation as South Fraser Way earlier than it does today. In addition, the existing "yield" control would be changed to a "stop" control. A conceptual layout of this modification is shown in **Figure E.2**. While this option would not solve the vehicle delay or queuing issues at the merge, it would help to improve the safety of this intersection, which is the City's primary objective. For this reason, Bunt recommends that the City consider implementing this option as a short-term improvement. In the long-term, if traffic were to grow at the rate assumed by the City (i.e., 2% per year), more extensive geometric improvements (e.g., the Gladys Avenue Connector discussed in the 2007 TMP) would be required to accommodate vehicle traffic and improve traffic operations.

Figure E.2: Reconfigured Gladys Avenue Underpass & South Fraser Way Intersection Concept



Gladys Avenue & Lumar Place

Bunt's review of the Gladys Avenue & Lumar Place intersection indicated that no sight distance issues exist and that no traffic operations issues are present today or are expected in any of the future horizon years when site traffic is added. As such, Bunt concludes that no intersection modifications are required at this location.

Transportation Demand Management

In terms of Transportation Demand Management (TDM) measures for the site, Elevate plans to provide new pedestrian and cyclist connections in and around the site, which include both a pedestrian footpath running along the east side of the site and a path that runs both through and around the site that connects the development to Gladys Avenue to the south and the pedestrian footpath to the east. In addition, to better accommodate cyclists and encourage the use of alternative modes of transportation, Elevate plans to provide bicycle parking at a level over and above the City's bylaw requirement.

In addition to these measures, Bunt recommends that Elevate consider providing additional TDM measures such as marketing materials and transportation information to new residents that provide clear and simple messages such as cost savings and health benefits (within the context of life style choice and urban living), along with practical information about nearby transit services, carpooling and car-sharing services, and walking and cycling connections (including the proposed on-site multi-use path and footpath).

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

1. INTRODUCTION

1.1 Study Purpose & Objectives

Elevate Development Corp. (Elevate) is proposing to redevelop the current Abbotsford News site at 34375 Gladys Avenue in Abbotsford, BC. The redeveloped site is planned to include two, six-storey buildings with a total of 282 residential dwelling units.

Elevate retained Bunt & Associates (Bunt) to conduct a Transportation Impact Assessment (TIA) to review the transportation implications of the proposed development. The purpose of the study was to obtain an understanding of the potential traffic impact of the development on the adjacent street network, confirm that the site design would be adequate to accommodate the parking, loading, and waste collection needs of the development, assess how the development will accommodate active travel modes, and to investigate potential improvement options to off-site road infrastructure nearby the site with perceived operational challenges. The scope of Bunt's study was developed in consultation with both the City of Abbotsford and British Columbia Ministry of Transportation and Infrastructure (BC MoTI). For reference, the original Terms of Reference (ToR) and follow-up emails from City Staff are included in **Appendix A**.

Report Version

This document serves as the final version of the 34375 Gladys Avenue TIA and includes minor revisions from the previous draft report (dated September 12, 2018) in response to comments provided by City of Abbotsford staff on September 28, 2018. A summary of the report versions is included in **Table 1.1**.

Table 1.1: Report Versions

DATE	DESCRIPTION	NOTES
October 11, 2018	Final (V01)	Finalization of draft report. This version includes minor edits to address comments provided by City of Abbotsford staff on September 28th, 2018.
September 12, 2018	Draft (V03)	Updated draft report to address comments provided by City of Abbotsford staff on August 31st, 2018. This version removed the commercial component from the development plan.
July 6, 2018	Draft (V02)	Updated draft report to address comments provided by City of Abbotsford staff on June 26th, 2018.
January 17, 2018	Draft (V01)	Original Draft Report. This version included a commercial component as part of the development plan.

As noted in the table above, compared to the original version of this study, the commercial component has since been removed from the current development plan and the subsequent report versions were

updated to reflect this change. The key findings and recommendations of Bunt's study are documented in the following report.

1.2 Study Area

The site location and corresponding study area are illustrated in **Exhibit 1.1.** The development site is bounded by Sumas Way to the east, South Fraser Way to the south, existing residential properties to the west, and undeveloped forested land to the north. The study intersections, which were confirmed with City of Abbotsford and BC MoTI staff, are summarized in **Table 1.2**.

Table 1.2: Study Intersections

LOCATION	CONTROL
Sumas Way & South Fraser Way	4-leg intersection with fully-actuated traffic signal. Pedestrian push-buttons are located on each approach.
Sumas Way & Marshall Road	4-leg intersection with fully-actuated traffic signal. Pedestrian push-buttons are located on each approach.
Gladys Avenue & Lumar Place	4-leg intersection with stop control to Lumar Place. South leg is one-way southbound.
Gladys Avenue & Site Access	4-leg intersection with stop control to the access (north approach) and west approach (Gladys Ave). South approach is one-way northbound and East approach is a dead end road.

1.3 Organization of Report

The report sections of the study have been organized as follows:

- **Section 1** presents the study purpose, study area, and details of the proposed development.
- **Section 2** describes the existing conditions at the site location, including current site characteristics, the existing road network, proximity to public transit, bicycle and pedestrian connections, and existing traffic conditions on the adjacent street network.
- **Section 3** forecasts the future traffic volumes in the study area with and without the proposed development and assesses the net impact of site-generated vehicle trips.
- **Section 4** provides a parking analysis, comparing the developer's proposed parking supply to the City's bylaw requirement.
- **Section 5** discusses the proposed design for the site access intersection and assesses the development's garbage/recycling collection, loading arrangement, and fire truck access.

- **Section 6** discusses off-site analysis required by the City of Abbotsford as part of this study. The off-site areas reviewed include the Gladys Avenue Underpass & South Fraser Way and Gladys Avenue & Lumar Place intersections.
- **Section 7** summarizes the planned Transportation Demand Management (TDM) measures for the development and provides additional TDM recommendations.
- **Section 8** provides the conclusions and recommendations of the study based on Bunt's analysis.

1.4 Proposed Development

1.4.1 Development Plan

Elevate's proposed development is to include two, six-storey buildings with a total of 282 residential strata condominium units.

Vehicle access to the development will be via a driveway access connection to Gladys Avenue at the location of the existing driveway to the Abbotsford News site, approximately 85m east of the Gladys Avenue & Lumar Place intersection.

In terms of parking, the development is planned to include two levels of underground parking plus a small component of surface parking.

A detailed breakdown of the proposed development is summarized in **Table 1.3** below. The proposed site plan is shown in **Exhibits 1.2**.

Table 1.3: Proposed Development

USE	SIZE
Residential	282 Units (East Building: 206 units; West Building: 76 units)

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

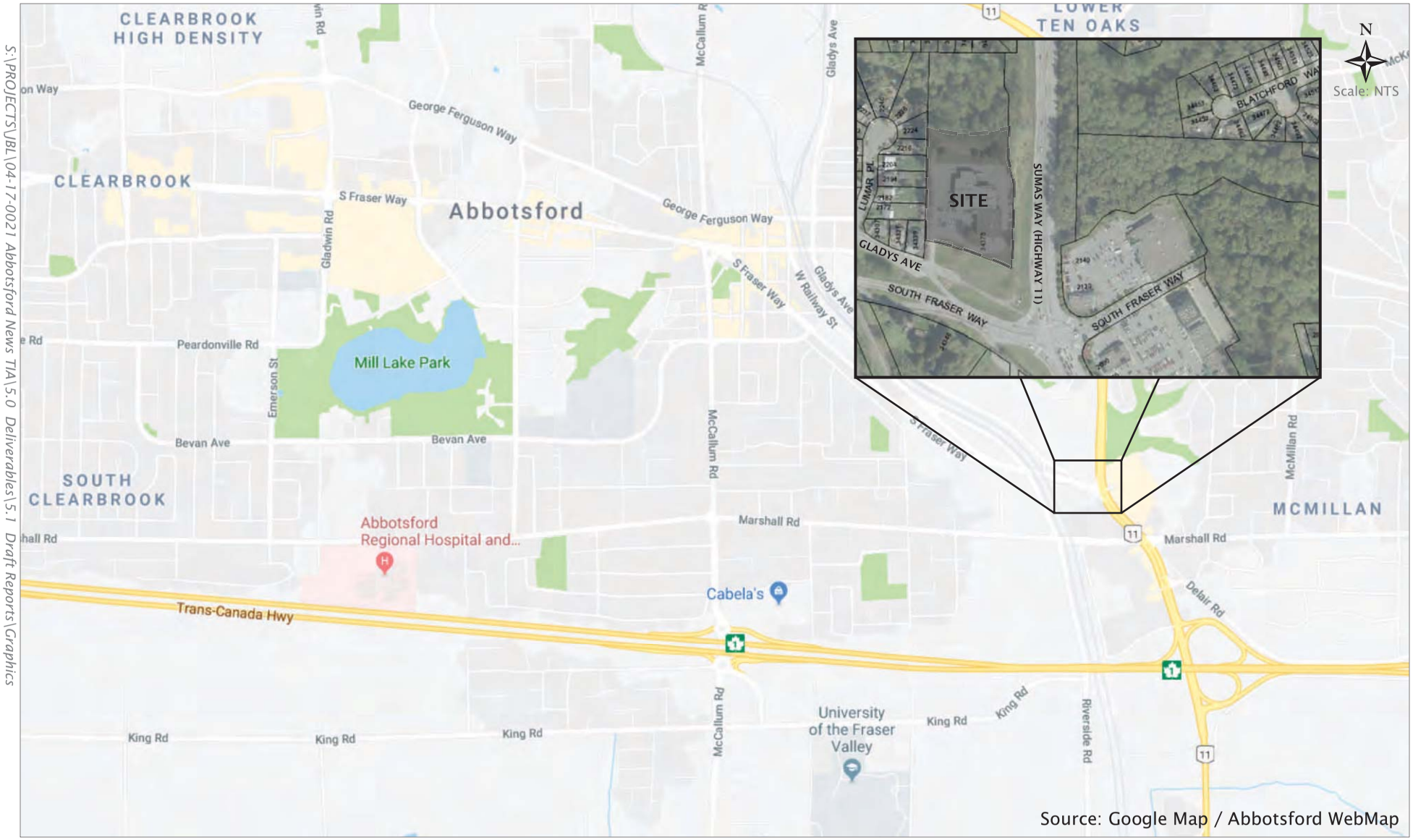


Exhibit 1.1

Site Location and Study Area

34375 Gladys Avenue TIA
04-17-0021 September 2018

bunt & associates

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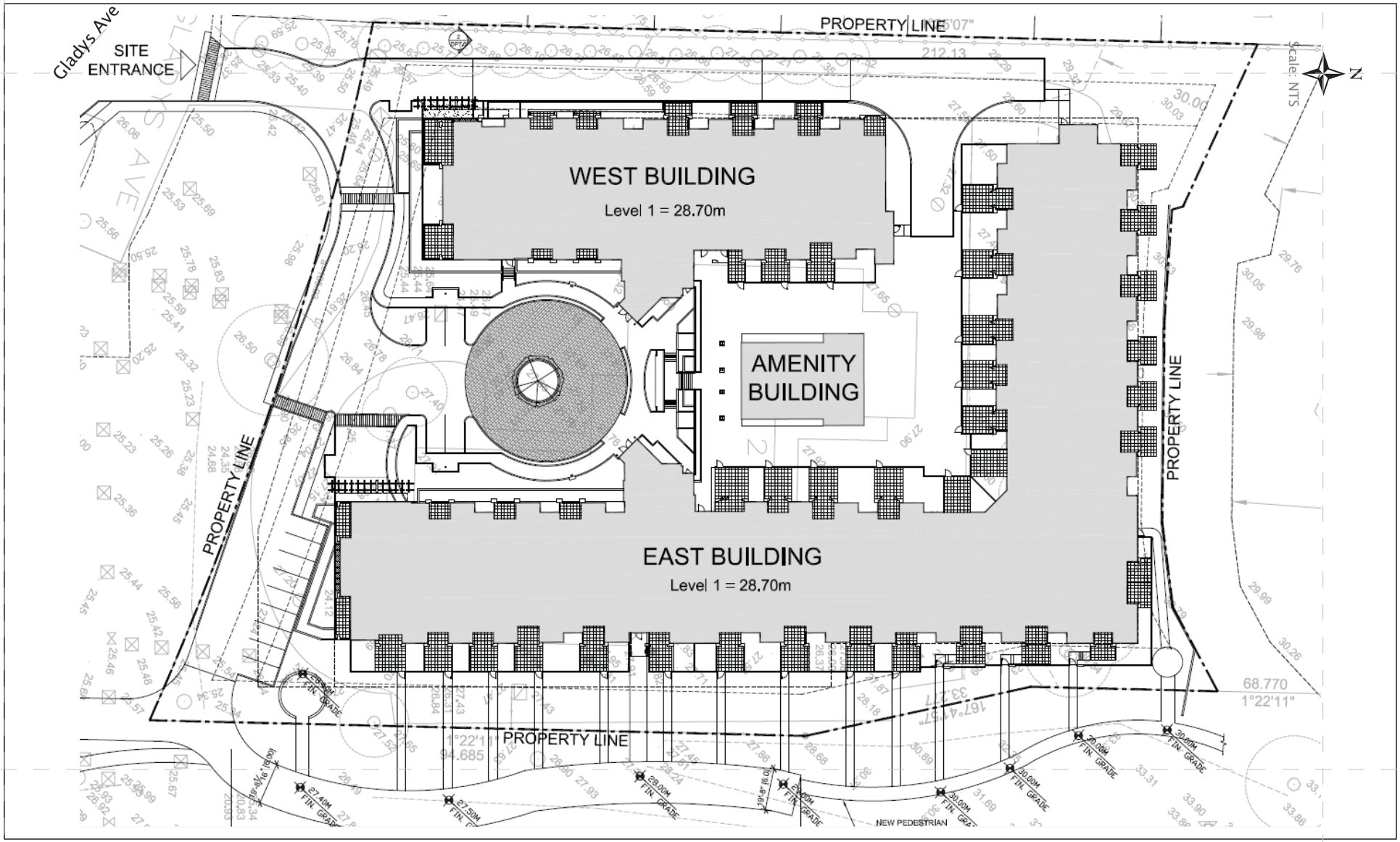


Exhibit 1.2

Proposed Site Plan

34375 Gladys Avenue TIA
04-17-0021 September 2018

bunt & associates

1.4.2 Planned Pedestrian & Bicycle Connections

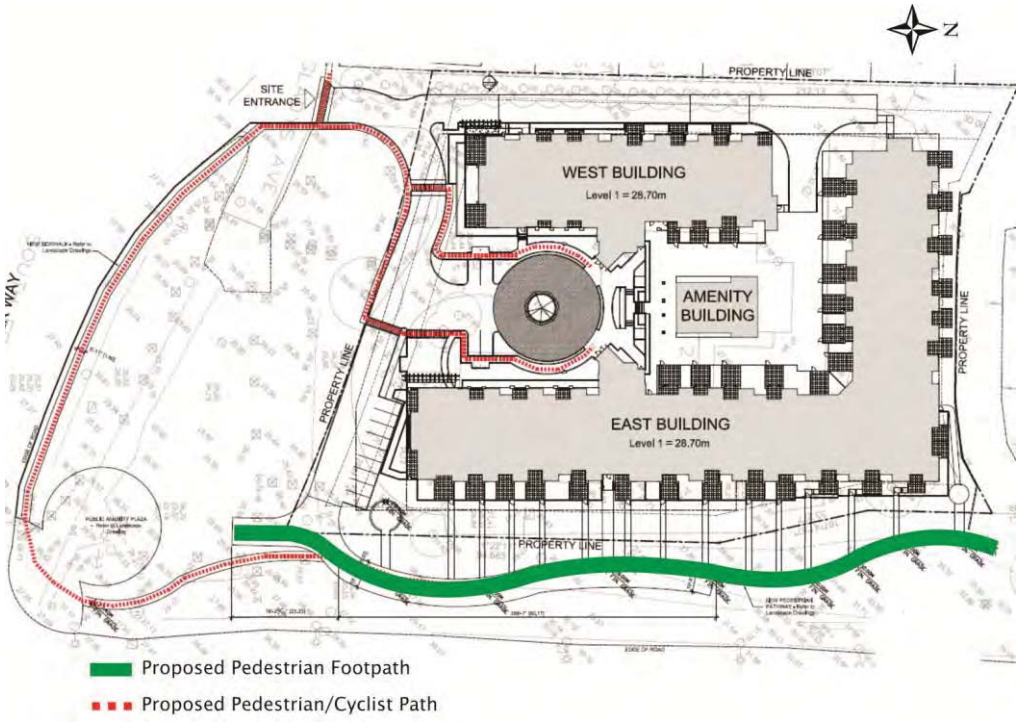
To help integrate the development with the nearby pedestrian and cycling connections, Elevate proposes to provide

1. A pedestrian footpath extending along the east side of the development; and,
2. A path that runs both through and around the site that connects the development to Gladys Avenue to the south and the pedestrian footpath to the east. While this path will be primarily for pedestrians, portions of the path will also be suitable to accommodate cyclists as well.

Figure 1.1 illustrates a conceptual layout of both the pedestrian footpath along the east side of the site and the path that runs both through and around the site.

In addition to these two features, the development will also help accommodate active transportation modes by providing bicycle parking for the development over and above the number of stalls required by the City Zoning Bylaw. The proposed bicycle parking supply is discussed in detail in Section 4.

Figure 1.1: Proposed Pedestrian Connections



Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

2. EXISTING CONDITIONS

2.1 Existing Land Use

The development site, situated within the City's "Abbotsford Centre" community, is located at 34375 Gladys Avenue in the northwest corner of the Sumas Way & South Fraser Way intersection. Today, the site is occupied by the Abbotsford News building, which will be demolished to make way for the new development.

Today, the site is relatively isolated, with single family residential homes located immediately to the west and further to the north beyond a heavy tree line, and commercial developments located to the east (e.g., Abbotsford Village) on the other side of Sumas Way and to the south (e.g., Huntingdon Station) on the other side of South Fraser Way.

2.2 Existing Transportation Network

2.2.1 Road Network

Key roads included in the study area include Gladys Avenue and Lumar Place just west of the site, South Fraser Way south of the site, and Sumas Way east of the site. Key characteristics of each of these roads are provided in **Table 2.1** below. The existing laning and intersection traffic control in the study area are illustrated in **Exhibit 2.1**.

Table 2.1: Existing Street Characteristics

STREET	CLASSIFICATION	NUMBER OF TRAVEL LANES[1]	POSTED SPEED	JURISDICTION	TWO-WAY PEAK HOUR VEHICLE VOLUMES (APPROXIMATE)
Gladys Avenue	Urban Collector	2	50 km/h	City of Abbotsford	AM: 350 PM: 450
Lumar Place	Local Road	2	50 km/h	City of Abbotsford	AM: 10 PM: 10
South Fraser Way	Urban Arterial	2 to 3	50 km/h	City of Abbotsford	AM: 1,200 PM: 1,800
Marshall Road	Urban Arterial	4	50 km/h	City of Abbotsford	AM: 1,200 PM: 1,900
Sumas Way	Provincial Highway	4	50 km/h	BC MoTI	AM: 2,450 PM: 3,300

1. Number of through travel lanes on the roadway in vicinity of the site.

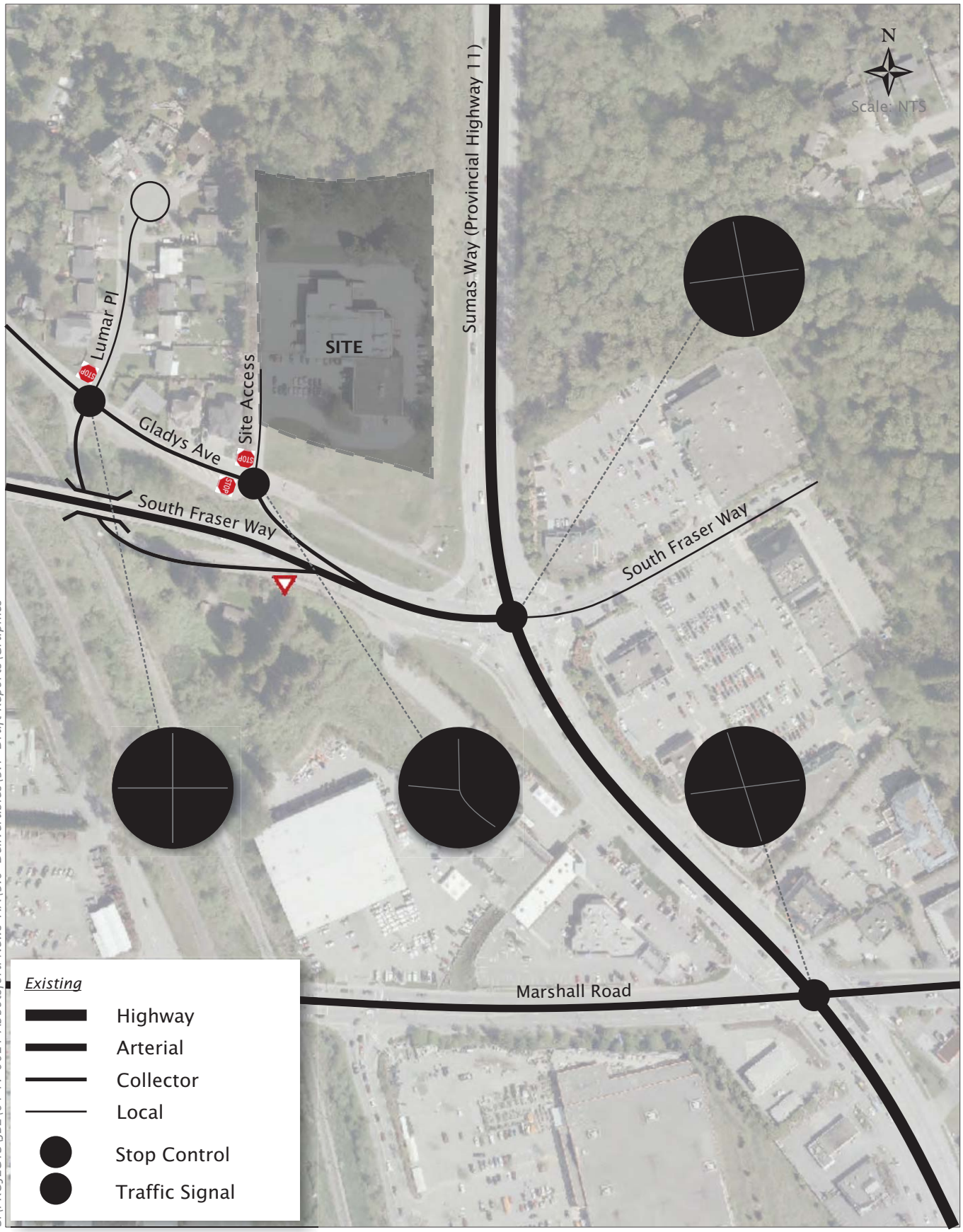


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Exhibit 2.1

Existing Laning and Traffic Control

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Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

2.2.2 Transit Network

Exhibit 2.2 shows the existing bus stops, transit facilities, and bus routes located within an 800m walking distance (10 minutes) from the site. The site itself is accessible by public transit with a stop located on Gladys Avenue just west of the site access. This stop is served by Route 16 - McMillan Commuter (westbound direction only), which provides an east-west connection between Downtown Abbotsford and Whatcom Road and Castle Fun Park to the east. The site is also located in close proximity to the Abbotsford Bus Depot on Abbotsford Way between South Fraser Way and Marshall Road, which is serviced by private Greyhound buses. There are also bus routes providing connections between the Clearbrook neighbourhood and the United States border which travel along Marshall Road approximately 250m south of the site.

Transit frequencies are another important factor when considering convenience of nearby public transit facilities and uses. **Table 2.2** below summarizes the frequency of service for the routes near the site.

Table 2.2: Existing Transit Service Frequency

ROUTE		TWO-WAY SERVICE HEADWAYS (MIN.)				
#	NAME	WEEKDAY AM PEAK	WEEKDAY MID-DAY PEAK	WEEKDAY PM PEAK	EVENING	WEEKENDS
1	McKee – Blueridge GoLine	15	30	15	30	30
2	Blue Jay – Huntingdon GoLine	15	30	15	60	30
7	Sumas Mountain	30	30	30	60	30
16	McMillan Commuter	30	N/A	30	N/A	N/A
26	Sandy Hill*	*	N/A	*	N/A	N/A

*Route 26: Sandy Hill only operates when school is in full session with one full loop during the AM and PM peak periods only.

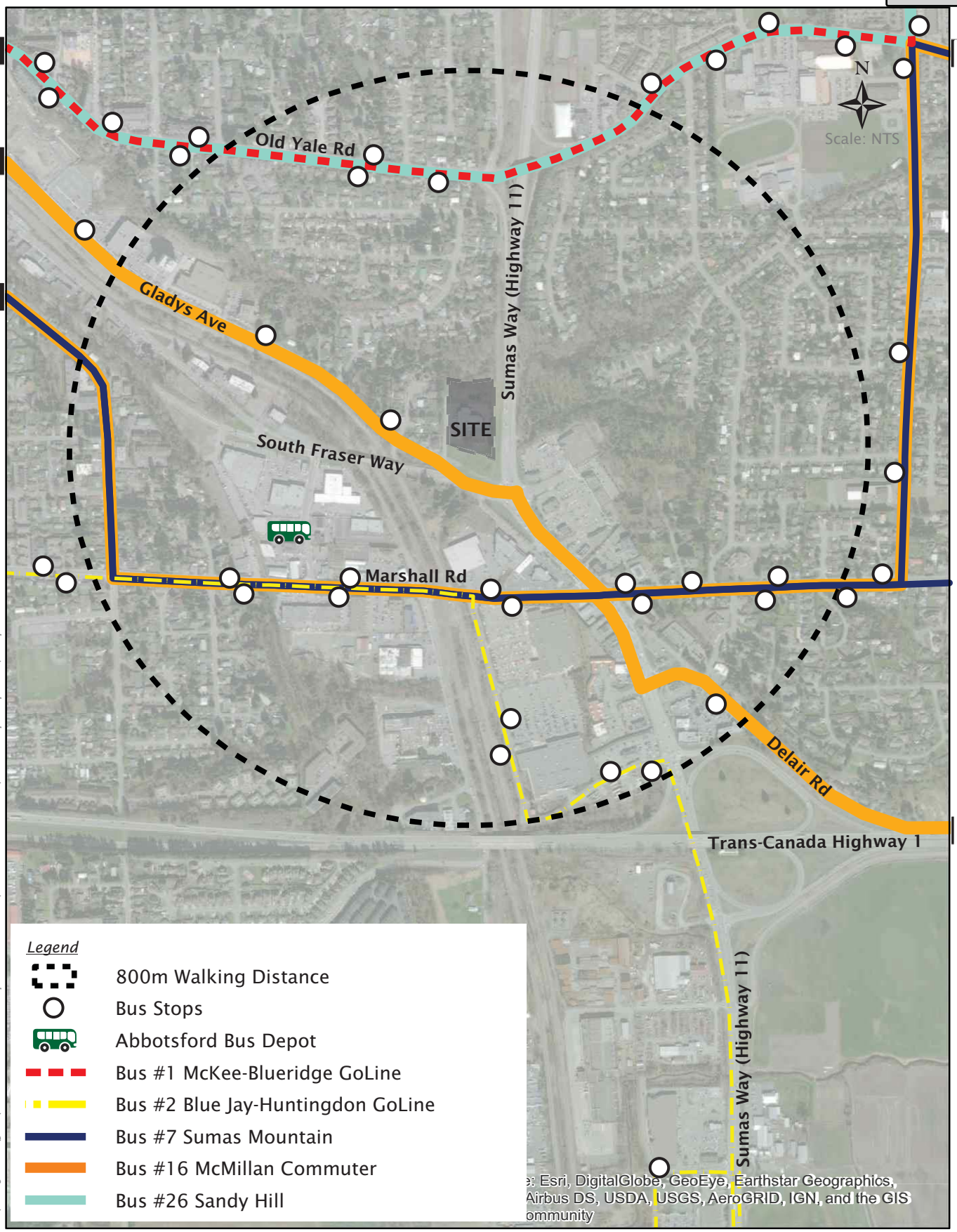
As the table indicates, bus service headways are generally around 15 to 30 minutes during the weekday morning and afternoon peak periods and increase to 30-60 minutes during off-peak times.

2.2.3 Cycling & Pedestrian Networks

Exhibit 2.3 illustrates available cycling facilities in proximity to the site and on the study area road network.

Sumas Way north of the site and south of Lonzo Road near Highway 1 is designated as a provincial bicycle lane facility and has paved shoulders along both sides providing a convenient north-south bicycle connection. While there are currently no bicycle lanes on Sumas Way between Lonzo Road and South Fraser Way to the south, this section of road is slated for future wide curb lanes according to the City of Abbotsford's GIS open data, to better accommodate shared vehicle and cyclist traffic.

Marshall Road (west of Sumas Way) currently has 4.15m wide curb lanes, which although was built to an older city standard, is still intended for bicycle use according to the City's GIS data website. Future wider curb lanes (4.6m) are planned on Marshall Road to the east of Sumas Way and along Guilford Drive, providing a connection to Old Yale Road and the Abbotsford Recreation Centre to the north.



Source: BC Transit / ArcGIS (December 2017)

Exhibit 2.2

Existing Transit Routes and Stops

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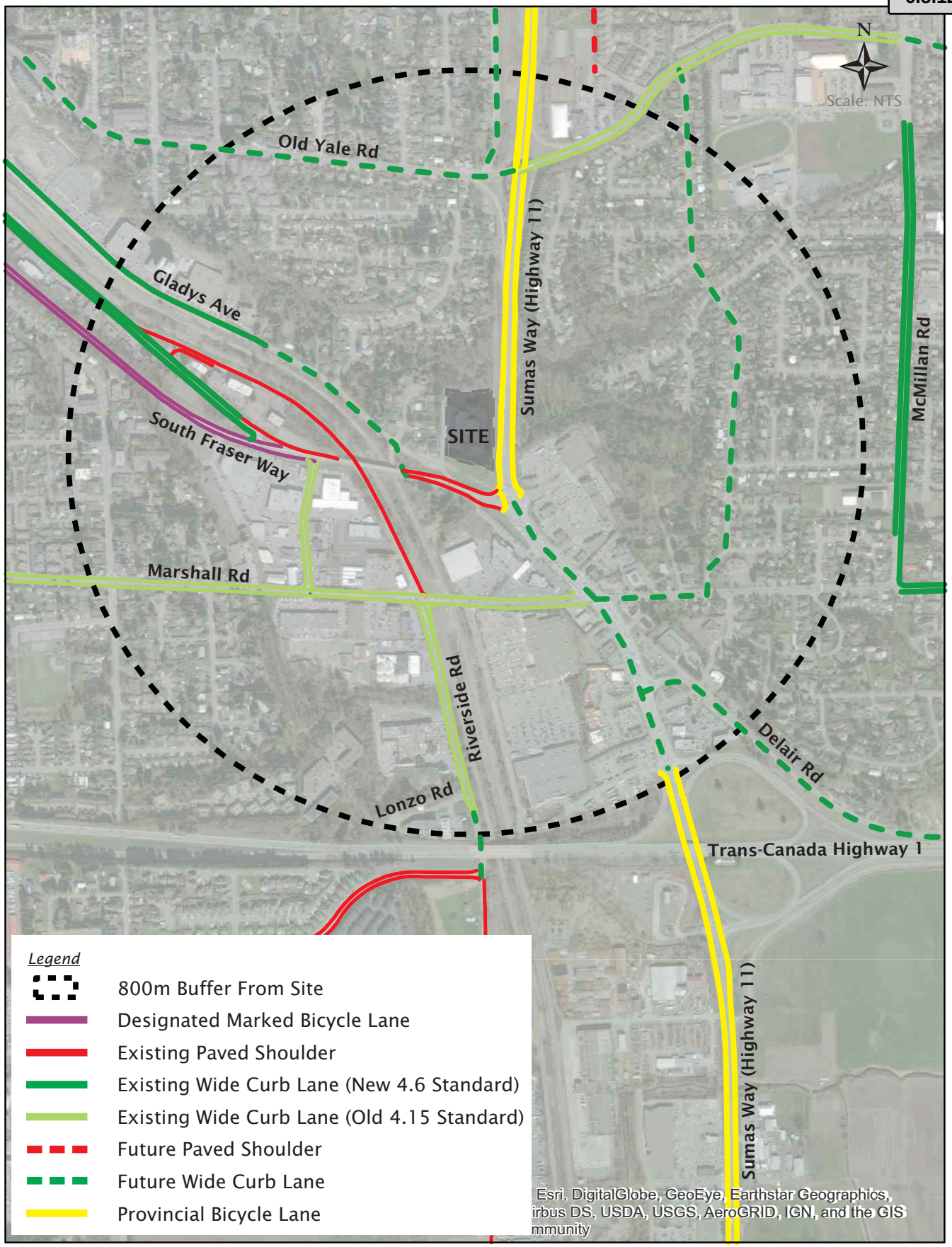

Source: Abbotsford Map Viewer (December 2017)

Exhibit 2.3
Cycling Facilities

34375 Gladys Avenue TIA
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Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Gladys Avenue, to the northwest of the site, currently has wider curb lanes designed to the City's current 4.6m standard. An extension of these wider curb lanes is also planned along Gladys Avenue up to the intersection with Lumar Place and there are existing paved shoulders on the South Fraser Way frontage of the proposed development. There are marked and designated bicycle lanes on South Fraser Way (west of the bridge overpass over the railway lines) providing connections to Downtown Abbotsford.

Sidewalks and paths exist on at least one side of the road on most of the roadways within 800m walking distance from the site, as can be seen in **Exhibit 2.4**. Of note, there are only paved shoulders and no sidewalks on Sumas Highway north of South Fraser Way and on South Fraser Way to the west of the aforementioned bridge overpass. There is a gravel path along the site's South Fraser Way frontage linking the sidewalk on Gladys Avenue to the intersection of Sumas Way & Marshall Road. Moreover, the two signalized study intersections at Sumas Way & Marshall Road and Sumas Way & South Fraser Way have marked crossings, wheelchair letdowns, pedestrian pushbuttons, pedestrian signal heads, and countdown timers on all intersection legs.

In terms of nearby pedestrian destinations, the site is located within 800m walking distance from several commercial and retail outlets along Sumas Way, including Walmart, Save-On-Foods, and Home Depot. In addition, the Fraser Valley Regional Library and Abbotsford Visitor centre are also located off Sumas Way just south of Marshall Road. Surrounding parks include Lorenzo Creek Park, Berry Park, and McMillan Park.

2.3 Current Relevant Polices & Plans

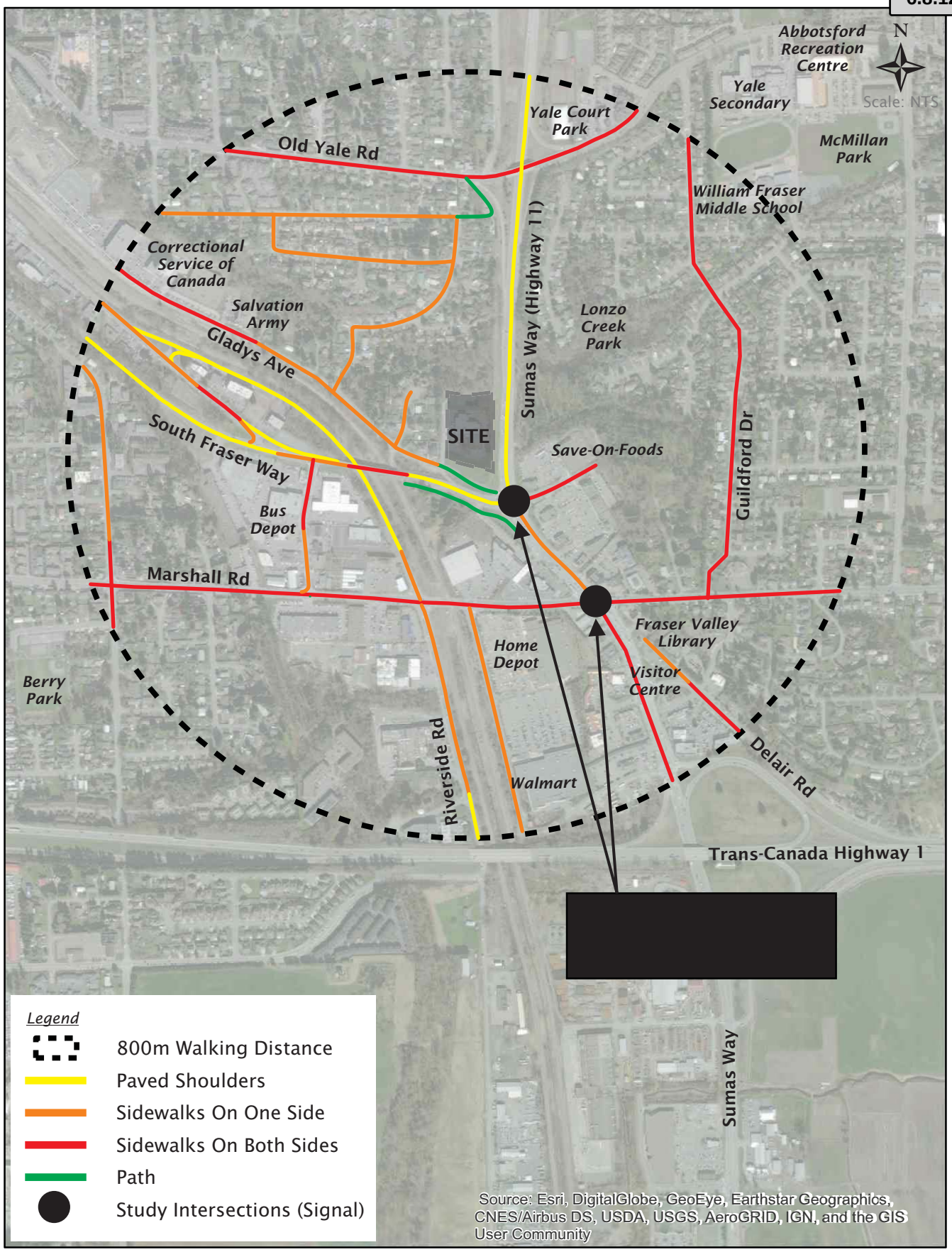
When conducting this study, Bunt referenced a number of existing municipal plans, including the City of Abbotsford's Official Community Plan (2016), Transportation Master Plan (2007), the Gladys Avenue Special Study (2007), and the Transportation & Transit Master Plan (2018).

Official Community Plan (2016)

The City of Abbotsford's Official Community Plan (OCP), titled "Abbotsforward", is based on two years of creative visioning with thousands of Abbotsford residents to produce a document that presents the City's values, priorities, and aspirations of the community, and charts the course for development and implementation of policies.

Sustainability is a major focus in the document, which states that today, the largest source of municipal greenhouse gas (GHG) emissions in Abbotsford is transportation. As such, the City targets a 40% reduction in GHG emissions by 2040. The City plans to achieve this goal through its OCP policies, including the City's urban structure, growth plan, and land use plan, all guided by efficient land use management strategies that are anticipated to reduce vehicle use and help shift toward walking, biking, and transit, while accomplishing many other community goals.

The OCP also discusses policies to support the land use plan, encouraging the provision of diverse, affordable housing close to jobs and services; an accessible transportation system, that seeks to make walking, biking, and transit not only attractive, but preferred options; and mixed use centres that provide



Source: Abbotsford Map Viewer (December 2017)

Exhibit 2.4
Pedestrian Facilities

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the density, mix of uses, and connectivity necessary to further reduce vehicle travel and encourage other transportation options.

When conducting the subject study, Bunt used the City's OCP to guide various aspects of its transportation assessment.

Transportation Master Plan (2007)

The City's 2007 Transportation Master Plan (TMP) was written with the goal of developing a TMP that included an effective implementation strategy to make improvements to the City's transportation network and supporting policies which together would provide the City of Abbotsford with a safe, efficient, and sustainable transportation system for all modes of travel for the next 25 years.

As this document was the most current TMP available at the time the original version of this report was written, Bunt had reviewed the 2007 TMP and incorporated any relevant potential future road upgrades and other infrastructure changes in the study area into that report. The notable future infrastructure changes that Bunt identified and accounted for in the analysis, as was discussed with the City, included the construction of the Gladys Avenue Connector and the future addition of dual eastbound and westbound left-turn lanes and eastbound and westbound right-turn lanes at the Sumas Way & Marshall Road intersection.

While the City released a new Transportation & Transit Master Plan (TTMP) in June 2018, the plan did not mention specific upgrades planned for this area as the 2007 TMP version did. As such, while some of the changes in the area, e.g., the Gladys Avenue Connector, may no longer be high priority since they were not included in the 2018 TTMP, the analysis in this updated TIA report still refers to the potential infrastructure changes discussed in the 2007 TMP should these change come back into consideration.

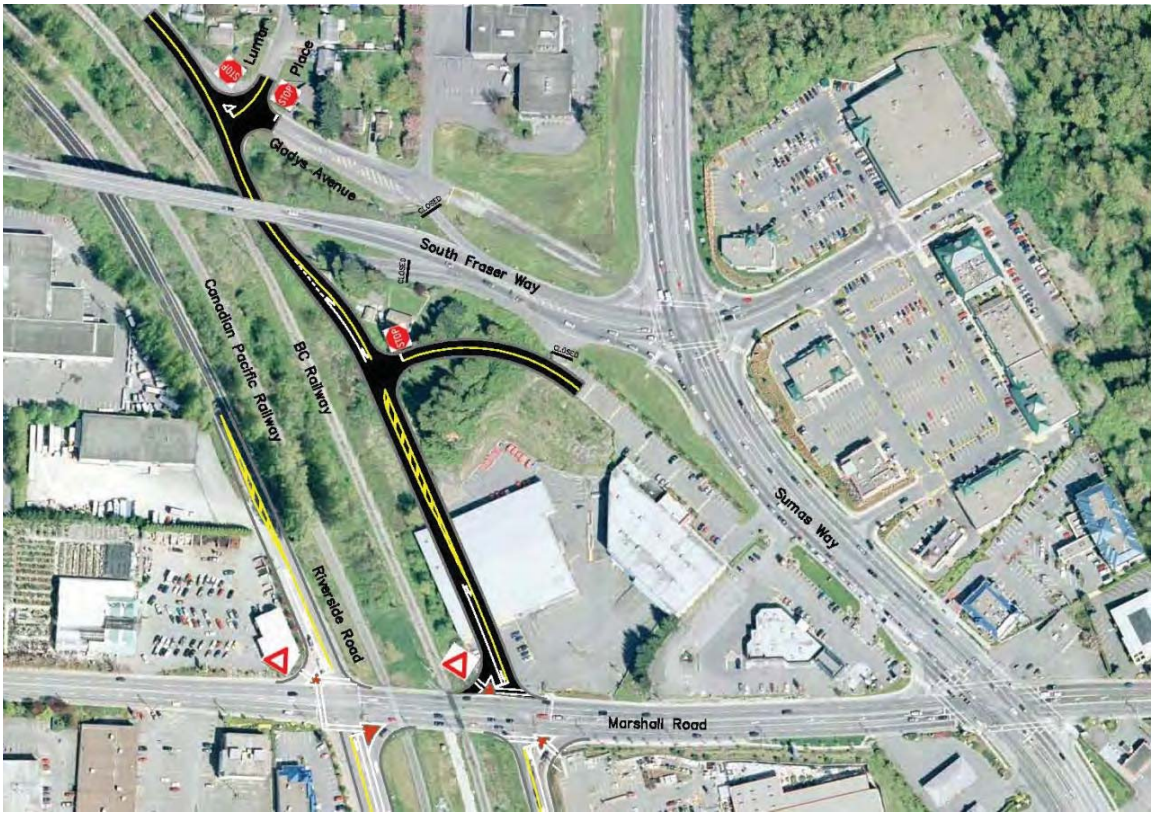
Gladys Avenue Special Study (2007)

The Gladys Avenue Special Study was also completed in 2007 and was a supplementary report to the City's TMP. This report analyzed the Gladys Avenue & South Fraser Way intersection and assessed the possibility of implementing a road connection between Gladys Avenue and Marshall Road as a possible parallel route to Sumas Way. Various improvement options were proposed to achieve this connection, which would improve accessibility along the corridor and remove potential traffic congestion and safety implications of the existing traffic merge condition from eastbound Gladys Avenue onto eastbound South Fraser Way.

As agreed upon with City staff, Bunt's traffic operations analysis included testing scenarios both with and without this connection in place. **Figure 2.1** below provides a conceptual layout of the proposed Gladys Avenue Connector. Should this connection be constructed, the existing connections between South Fraser Way and Gladys Avenue would be closed.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Figure 2.1: Gladys Avenue Connector Conceptual Layout



Source: Gladys Avenue Special Report

Transportation & Transit Master Plan (2018)

Abbotsford's Transportation & Transit Master Plan (TTMP) was introduced in June 2018 with the purpose of presenting a refreshed vision for transportation in Abbotsford that aligns with the directions of the Official Community Plan (2016) as the City grows to 200,000 residents. Specifically, the TTMP's vision is to make Abbotsford's multi-modal transportation system truly enjoyable and functional for everyone, while supporting a shift towards walking, cycling and transit. The plan emphasizes that increasing sustainable transportation is its primary target. The TTMP is intended to help guide Abbotsford's policy, planning and capital investment decisions as well as on-going operations and maintenance activities related to transportation over the next 25 years and beyond.

As this document was released subsequent to the completion of Bunt's original study for the subject site, when producing this updated TIA document, Bunt reviewed the new TTMP and incorporated any new information relevant to the study.

It should be noted that unlike the 2007 TMP, this most recent TTMP did not go into significant detail about the Gladys Avenue area nearby the site, and did not discuss the concept of the Gladys Avenue

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Connector or the recommended specific lane upgrades at the Sumas Way & Marshall Road intersection. However, consistent with the findings of this TIA, the document did identify that the Sumas Way & South Fraser Way and Sumas Way & Marshall Road intersections are currently very congested, particularly during the PM peak hour, and will experience failing conditions in the future.

Relevant to this study, the TTMP discusses the City's desire to transform key east-west corridors such as South Fraser Way (which runs along the south edge of the development) and Essendene Avenue into complete streets that are attractive, accessible, and convenient transportation corridors for all modes while reducing vehicular traffic on these routes. In conjunction, the City plans to conduct major network improvements to enhance other east-west routes (e.g., Maclure Road, George Ferguson Way / McKee Road, and Marshall Road) and add new connections so that these roads can accommodate a greater portion of the vehicular traffic that currently uses South Fraser Way and Essendene Avenue.

It is important to note that while the City's TTMP has stated the goal to reduce traffic along South Fraser Way in the future, based on direction from City staff, Bunt's analysis has still assumed continuous traffic growth (i.e., 2% per year) on South Fraser Way until 2040.

2.4 Data Collection

2.4.1 Traffic Data Collection Program

To establish existing traffic volumes in the study area, Bunt conducted weekday AM (7am-9am) and PM (3pm-6pm) peak period traffic volume counts on Thursday, August 17th, 2017 at the study intersections.

As these counts were collected during the summer period, Bunt also conducted supplementary traffic counts at the key Sumas Way & South Fraser Way and Sumas Way & Marshall Road intersections on Tuesday, November 7, 2017 to assess the seasonal traffic variation due to factors such as schools being back in session, summer vacations being completed, etc.

Note that these data sets were collected at the outset of the original TIA study in 2017. However, as traffic volumes are assumed to have not changed significantly since that time, the same volumes were used in this updated study for the purposes of analysis. For reference, the raw intersection traffic count data is included in **Appendix B**.

2.4.2 Peak Hour Traffic Volumes

The weekday AM and PM peak hours were identified to be 7:45am-8:45am and 4:15pm-5:15pm, respectively. In addition, comparing the November count data to the August count data, Bunt established a seasonal variation adjustment factor that was applied to the remaining study intersections. The seasonal adjustment factor resulted in Bunt's August counts to be factored up by approximately 40% during the weekday AM peak hour and 10% during the weekday PM peak hour to represent peak demand conditions on the adjacent street network. The resulting existing AM and PM peak hour traffic volumes are summarized in **Exhibit 2.5**.

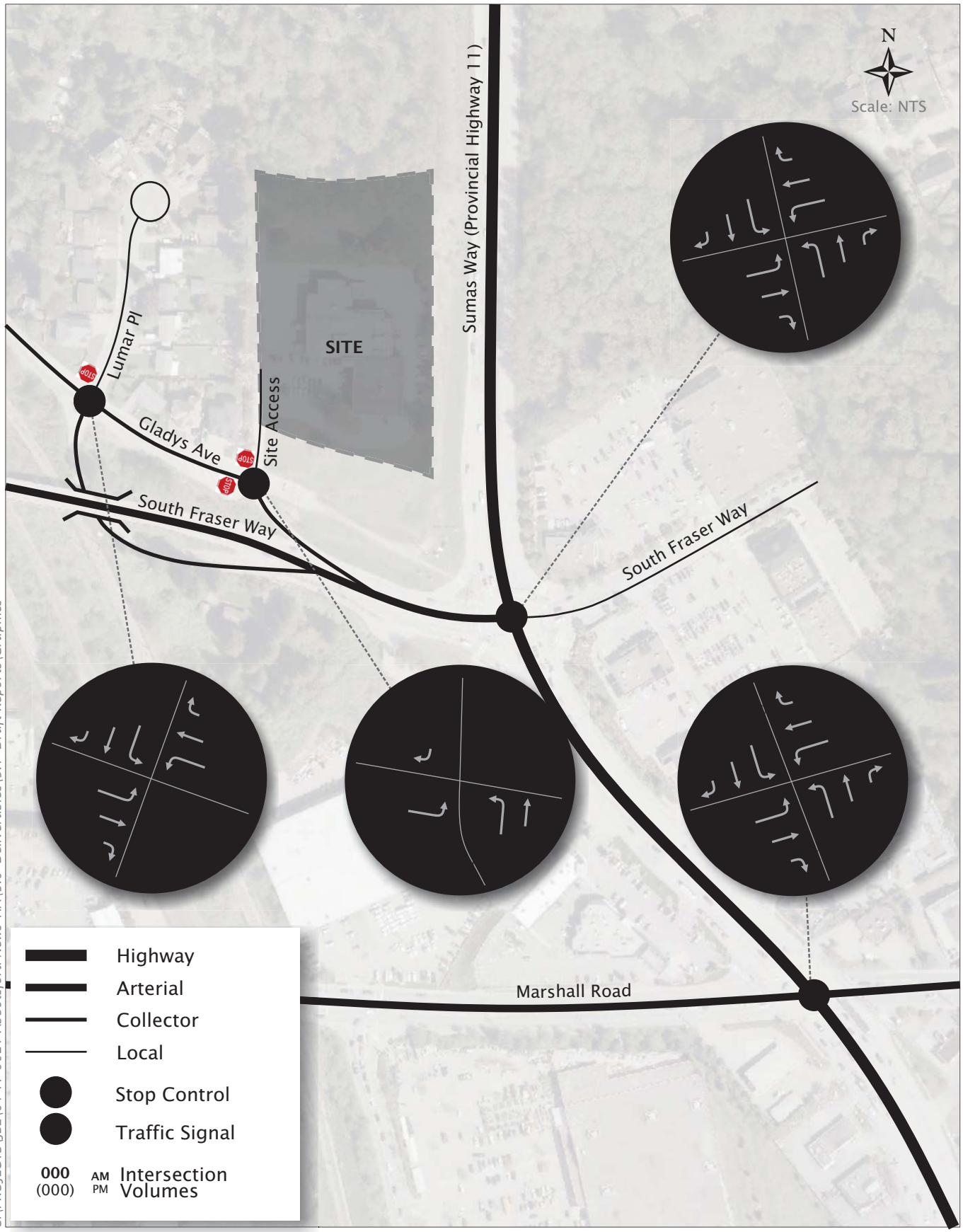


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Exhibit 2.5

Existing 2017 Peak Hour Traffic Volumes

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Existing Site Vehicle Trip Generation

As the exhibit indicates, the Abbotsford News site presently generates 32 vehicle trips (28 in, 4 out) during the weekday AM peak hour and 56 vehicle trips (16 in, 40 out) during the weekday PM peak hour.

2.5 Existing Operations

2.5.1 Performance Thresholds

The existing operations of study area intersections and access points were assessed using the methods outlined in the 2000 Highway Capacity Manual (HCM), using the Synchro 9.1 analysis software (Build 904). The traffic operations were assessed using the performance measures of Level of Service (LOS), volume-to-capacity (V/C) ratio, and 95th percentile queue length.

The LOS rating is based on average vehicle delay and ranges from "A" to "F" based on the quality of operation at the intersection. LOS "A" represents optimal, minimal delay conditions while a LOS "F" represents an over-capacity condition with considerable congestion and/or delay. Delay is calculated in seconds and is based on the average intersection delay per vehicle.

Table 2.3 below summarizes the LOS thresholds for the five Levels of Service, for both signalized and unsignalized intersections.

Table 2.3: Intersection Level of Service Thresholds

LEVEL OF SERVICE	AVERAGE CONTROL DELAY PER VEHICLE (SECONDS)	
	SIGNALIZED	UNSIGNALIZED
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

Source: Highway Capacity Manual

The volume to capacity (V/C) ratio of an intersection represents ratio between the demand volume and the available capacity. A V/C ratio less than 0.85 indicates that there is generally sufficient capacity to accommodate demands and indicative of satisfactory traffic conditions in suburban settings.

A V/C value between 0.85 and 0.95 indicates an intersection is approaching practical capacity; a V/C ratio over 0.95 indicates that traffic demands are close to exceeding the available capacity, resulting in saturated conditions. A V/C ratio over 1.0 indicates a congested intersection where drivers may have to wait through several signal cycles. In downtown and Town Centre contexts, during peak demand periods, V/C ratios over 0.90 and even 1.0 are not uncommon.

The 95th percentile queue is defined to be the queue that has a 5% probability of being exceeded during the analysis time period. It should be emphasized that the 95th percentile queue is typically used for planning purposes when designing storage lengths, and is not the vehicle queue length typically experienced by motorists. Where the reported 95th percentile queue lengths in Synchro were shown to exceed the available storage, Bunt indicated this condition on the traffic operations exhibits.

Metro Vancouver Traffic Operations Performance Thresholds

Throughout Metro Vancouver, the generally accepted performance thresholds that are used to trigger consideration of roadway or traffic control improvements to support roadway or traffic control improvements are listed below.

Signalized Intersections:

- Overall intersection Level of Service = LOS 'D' or better;
- Overall intersection V/C ratio = 0.85 or less;
- Individual movement Level of Service = LOS 'E' or better; and,
- Individual movement V/C ratio = 0.90 or less.

Unsignalized Intersections and Roundabouts:

- Individual movement Level of Service = LOS 'E' or better, unless the volume is very low and vehicle queues of no more than 1-2 vehicles, in which case the longer delay times associated with LOS 'F' traffic operation is considered to be a reasonable performance measure.

City of Abbotsford Traffic Operations Performance Thresholds

As directed by City of Abbotsford Staff, the performance thresholds that were used to trigger consideration of roadway or traffic control improvements employed in this study are listed below. In comparison, these thresholds are considerably more conservative than what is typically used throughout Metro Vancouver as shown previously. However, for consistency with previous City of Abbotsford studies (i.e., Gladys Avenue Special Study), Bunt adopted the City's threshold figures for this traffic assessment.

Signalized Intersections:

- Overall intersection Level of Service = LOS C or better;
- Overall intersection V/C ratio = 0.80 or less;
- Individual movement Level of Service = LOS C or better; and,
- Individual movement V/C ratio = 0.80 or less.

Unsignalized Intersections and Roundabouts:

- Individual movement Level of Service = LOS C or better; and,
- Individual movement V/C ratio = 0.80 or less.

2.5.2 Modelling Assumptions

Signal Timing

The current signal timing plans were provided by the BC MoTI for the Sumas Way & South Fraser Way and Sumas Way & Marshall Road intersections. The signal at Sumas Way & South Fraser Way operates as an actuated uncoordinated signal with a 90 second cycle length in the AM peak and a 114 second cycle length in the PM peak. Due to a geometric design condition, the north and southbound protected left turns do not run concurrently and instead operate with "lead-lag" phasing. The signal at Sumas Way & Marshall Road also operates as an actuated uncoordinated signal with a 127 second cycle length in the AM peak and a 143 second cycle length in the PM peak. These timing plans were used for the existing conditions analysis. For reference, the existing traffic signal timing plans are included in **Appendix C**.

Synchro Parameters

In general, Synchro default parameters were used for the analysis. However, existing peak hour factors (PHF) and heavy vehicle percentages were collected as part of the intersection traffic count and were used to more closely model existing conditions. In addition, the observed pedestrian and cyclist volumes were input into the model.

Following discussions with the City of Abbotsford, Bunt's initial approach was to use single overall peak hour factors for the entire intersections, while the City requested individual movement PHFs. Supporting Bunt's approach, in Chapter 19 of the Highway Capacity Manual (HCM) (6th Edition), the document states that:

"*If peak hour factors are used, a single peak hour factor for the entire intersection is generally preferred because it will decrease the likelihood of creating demand scenarios with conflicting volumes that are disproportionate to the actual volumes during the 15-min analysis period. If PHFs for each individual movement or approach are used, they are likely to generate demand volumes from one 15-min period that are in apparent conflict with demand volumes from another 15-min period, but in reality these peaks do not occur at the same time.*"

Approach-based peak hour factors (PHF) were ultimately agreed upon with the City to be used for the legs at the major intersections of Sumas Way & South Fraser Way and Sumas Way & Marshall Road. For the lower volume intersections of Gladys Avenue & Lumar Place and Gladys Avenue at the site access, the default PHF Synchro parameter of 0.92 was used, as there are not expected to be intense demand peaks.

The approach-based PHFs used for the intersections at Sumas Way & South Fraser Way and Sumas Way & Marshall Road are available in the detailed Synchro output data found in **Appendix D**.

In addition to the PHF and heavy vehicle percentages, Bunt also adjusted the Ideal saturation flow rate from Synchro's default value of 1,900 veh/hr/lane to 1,800 veh/hr/lane, as requested by City staff. Ideal saturation flow rate is the equivalent hourly rate at which vehicles could travel through an intersection approach under ideal conditions (i.e., further improvements would not result in increased capacity), assuming that the green signal was always available and no lost time was experienced.

2.5.3 Existing Operational Analysis Results

Analyzing the existing traffic volumes, **Exhibit 2.6** and **2.7** summarize the existing traffic operations (i.e., LOS and V/C ratios) at the study intersections for the weekday AM and PM peak hours, respectively, while **Table 2.4** presents the 95th percentile vehicle queue lengths. Detailed outputs are provided in Appendix D.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

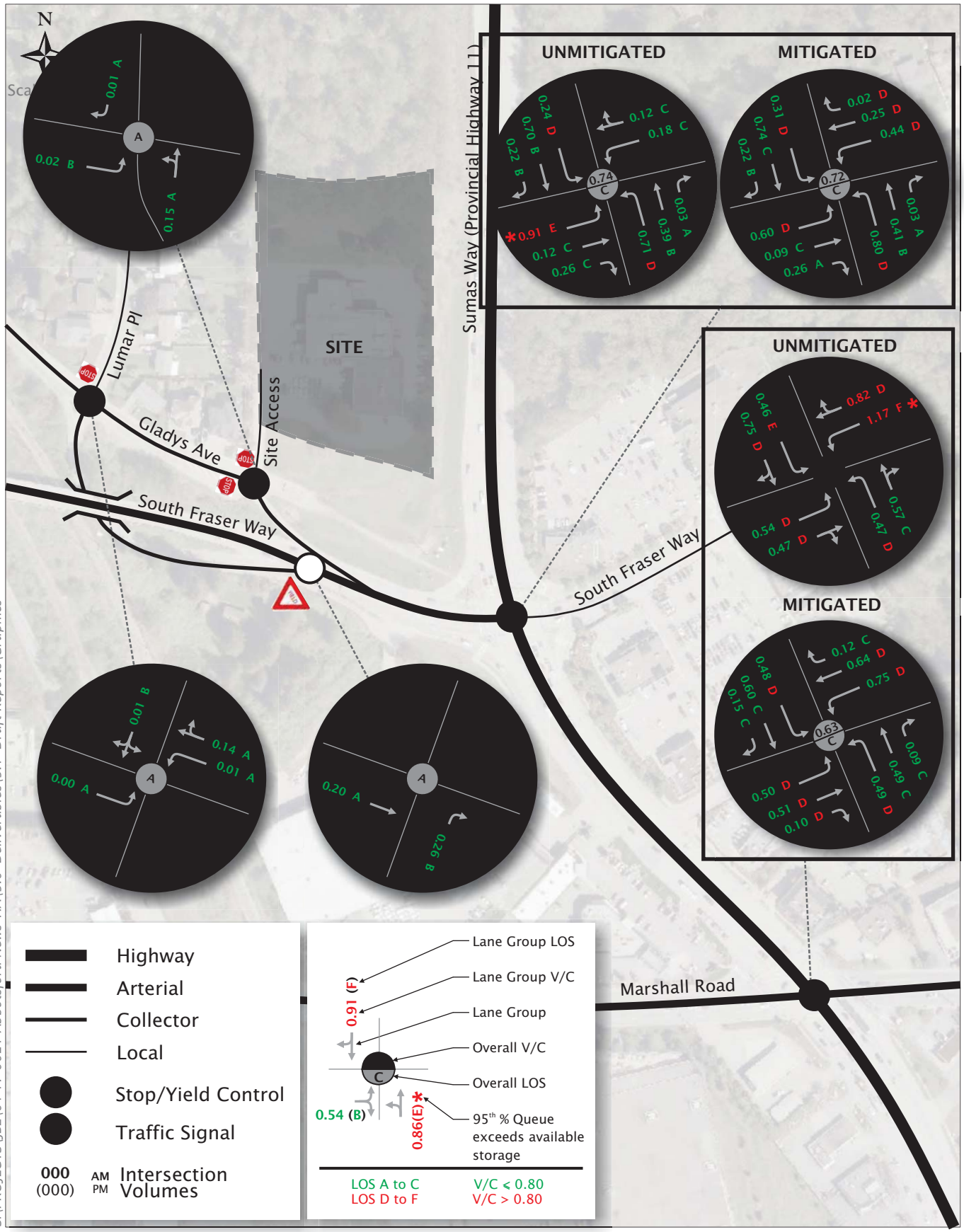

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Exhibit 2.6

Existing AM Peak Hour Traffic Operations

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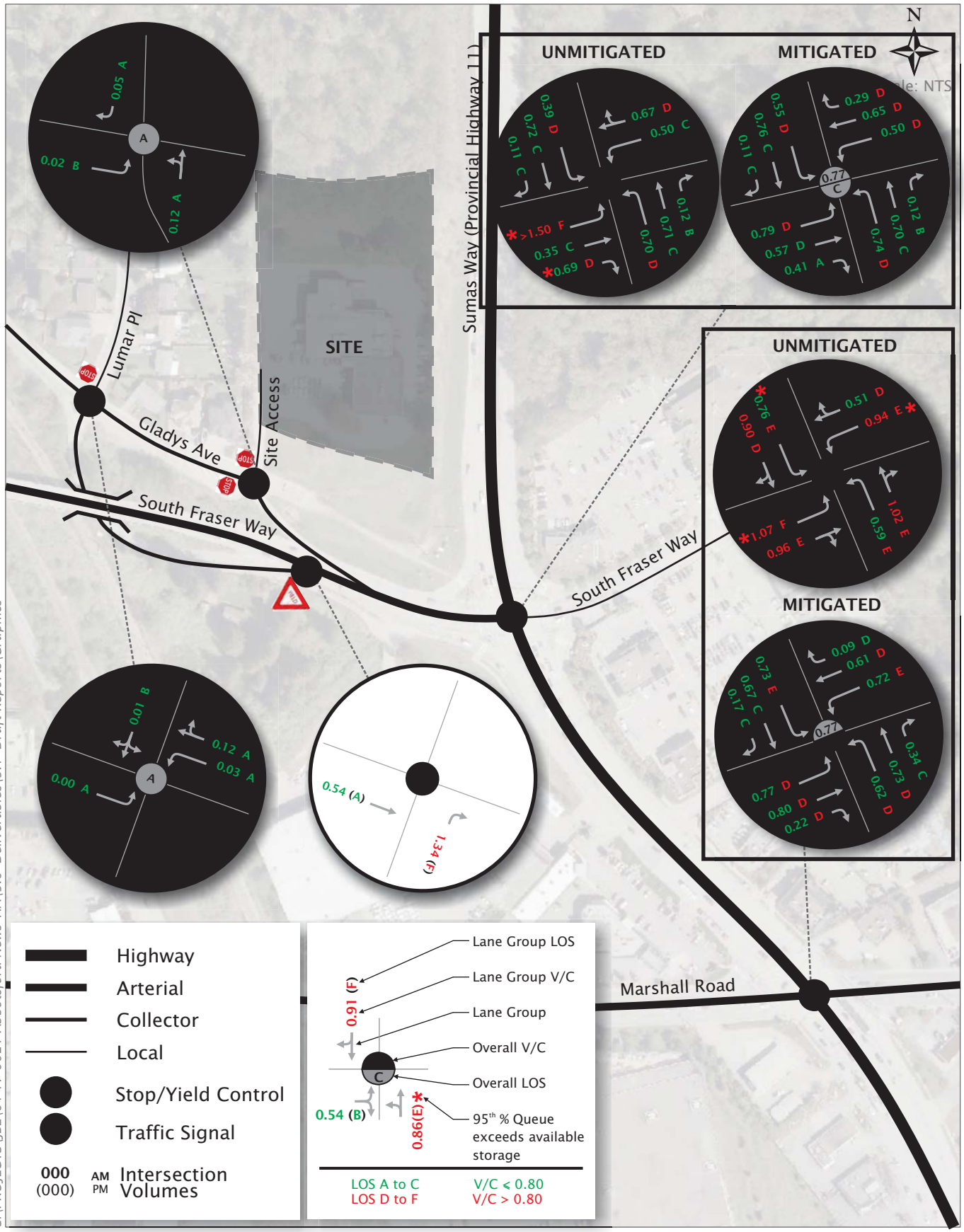

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Exhibit 2.7

Existing PM Peak Hour Traffic Operations

34375 Gladys Avenue TIA
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Table 2.4: Existing 95th Percentile Queues

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM	PM
South Fraser Way & Sumas Way	EBL	**#56**	**#210**
	EBT	11	56
	EBR	14	**#111**
	WBL	14	52
	WBT/R	14	#102
	NBL	50	58
	NBT	59	122
	NBR	1	13
	SBL	14	26
	SBT	97	97
	SBR	14	11
South Fraser Way & Sumas Way **(Mitigated)**	EBL	22	69
	EBT	10	63
	EBR	0	0
	WBL	15	41
	WBT	12	51
	WBR	0	31
	NBL	#56	61
	NBT	60	125
	NBR	0	13
	SBL	15	28
	SBT	104	104
	SBR	15	11
Gladys Avenue & Lumar Place	EBL/T/R	0	0
	WBL	0	1
	WBT/R	0	0
	SBL/T/R	0	0
Marshall Road & Sumas Way	EBL	33	**#156**
	EBT/R	35	#163
	WBL	**#169**	**#99**
	WBT/R	92	65
	NBL	33	47
	NBT/R	92	#200
	SBL	26	**74**
	SBT/R	118	#168

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM	PM
Marshall Road & Sumas Way **(Mitigated)**	EBL	24	66
	EBT	31	86
	EBR	19	26
	WBL	67	#42
	WBT	63	47
	WBR	15	13
	NBL	33	42
	NBT	77	111
	NBR	8	42
	SBL	26	#64
	SBT	89	98
	SBR	17	17
Gladys Avenue & Site Access	WBT/R	0	0
	NBT	0	1
	SBR	0	1
Gladys Avenue Underpass & South Fraser Way	EB	0	0
	NB	8	131

Note:
Bolded results indicate 95th percentile queues that exceed the available turning bay storage length.
"-" indicates a value not applicable to that particular intersection or movement.
"#" indicates that the 95th percentile volume exceeds capacity; therefore vehicle queue may be longer than reported.
"m" indicates that volume for 95th percentile queue is metered by upstream signal

The key findings of the analysis at each of the study intersections are discussed below.

Sumas Way & South Fraser Way

For the weekday AM peak hour, the intersection was shown to operate with an overall V/C ratio of 0.74 and an LOS 'C', which are both within the City's acceptable performance thresholds. However, in terms of individual movements, the northbound and southbound left-turns were shown to operate at LOS 'D', which exceeds the City's acceptable threshold of LOS 'C'. Furthermore, the worst performing individual movement was the eastbound left-turn movement, which was shown to operate with a V/C ratio of 0.91 and LOS 'E', which is beyond acceptable performance thresholds. Moreover, the 95th percentile queue for the eastbound left-turn movement reported in Synchro was shown to extend to 56m, well past the existing 36m long left-turn storage bay. All other queues reported in Synchro were shown to remain within the existing available storage lane lengths.

For the PM peak hour, due to heavier traffic volumes than the morning period, operations were found to be considerably worse, with the intersection performing with an overall V/C ratio of 1.51 and LOS 'F',

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

which both well exceed acceptable thresholds and indicate that the intersection operates over its practical capacity.

In terms of individual movements, the northbound and southbound left-turns and the eastbound and westbound right-turns were all shown to operate at LOS 'D', which does not achieve the City's acceptable performance criteria for delay. Moreover, similar to the morning period, the most pressured individual movement was found to be the eastbound left-turn movement, which was shown to operate at a V/C ratio greater than 1.5 and LOS 'F', indicating that the movement is currently operating over capacity. However, it should be noted that this movement currently operates with just a "permissive" left-turn, meaning that it does not have a leading protected phase under its existing signal timing plan. Similar to the AM period, the 95th percentile queue for the eastbound left-turn movement was found to greatly exceed available storage bay allotments in the PM period. The 95th percentile eastbound right-turn queue also exceeded the existing right-turn storage length of 45m. All other queues for other movements in the intersection were shown to remain within the allotted storage lanes.

Sumas Way & Marshall Road

The busiest intersection in the study area in terms of vehicle volumes, the Sumas Way & Marshall Road intersection was shown to be failing from a V/C ratio and LOS perspective during both the AM and PM peak hours under existing conditions with the existing signal timing.

During the weekday AM peak hour, each individual movement, with the exception of the northbound through + right-turn, was found to operate at LOS 'D' or worse, with the worst delay experienced by the westbound left-turn, which was shown to operate at LOS 'F'. In terms of V/C ratio, both the westbound through + right-turn and westbound left-turn movements exceeded acceptable performance thresholds. The 95th percentile queue for the westbound left-turn movement was found to considerably exceed the 25m long storage bay, as reported in Synchro, while all other movements had queues within the existing available storage lane lengths.

During the weekday PM peak hour, every individual movement was shown to operate with an unacceptable LOS, with the V/C ratios for all movements except the northbound and southbound left-turns and the westbound through + right-turn movements also exceeding acceptable performance thresholds. The worst performing movements were found to be the eastbound left-turn and eastbound through + right-turn given the heavy traffic volumes in this direction during the afternoon period. In terms of 95th percentile queues, the westbound left-turn queue reported by Synchro exceeded the 25m long storage bay by over 70m and similarly, the queue for the eastbound left-turn movement exceeded the 126m left turn storage bay. Moreover, the southbound left-turn 95th percentile queue was shown to extend 74m, which just exceeds the available storage of 70m.

Gladys Avenue & Lumar Place

Under existing conditions, the Gladys Avenue & Lumar Place intersection was shown to operate well within acceptable performance thresholds in terms of V/C ratio, LOS, and 95th percentile queues from both an overall and individual movement perspective. The highest delay was shown to be for the southbound

movement, which operates at LOS 'B' during both AM and PM peak hours, indicating an average delay of 10 to 15 seconds per vehicle.

Gladys Avenue & Site Access (Existing)

Similar to the Gladys Avenue & Lumar Place intersection, due to the relatively low traffic volumes, the existing Gladys Avenue & Site Access intersection was shown to operate well within acceptable performance thresholds during both AM and PM peak hours from both an overall and individual movement perspective.

Gladys Avenue Underpass & South Fraser Way

The yield-controlled merge of Gladys Avenue Merge & South Fraser Way was shown to operate within acceptable performance thresholds in the AM peak hour. However, during the busier PM peak hour, the yield movement from the Gladys Avenue Underpass was shown to exceed acceptable performance thresholds at LOS 'F', V/C ratio exceeding 1.0, and a 95th percentile queue of 131m. The available storage distance of the Gladys Avenue Underpass is about 185m.

A further discussion regarding the geometry and sight lines of the merge is provided in Section 6.1.

2.5.5 Summary of Existing Operations

Today, the major roadways in the study area (i.e., Sumas Way, Marshall Road, and South Fraser Way) carry significant vehicle volumes and as a result, experience considerable traffic congestion and long vehicle queues during the peak hours. Bunt's analysis indicated that under existing conditions both the Sumas Way & South Fraser Way and Sumas Way & Marshall Road intersections were found to operate with V/C ratios and LOS ratings that exceed acceptable performance thresholds for almost every time of day scenario, as well as had several failing individual movements.

As such, it is evident that even for the existing conditions mitigation measures would be required to improve traffic operations at these locations to meet the City's acceptable performance thresholds, regardless of whether the site redevelops. The following section discusses the mitigation measures that would be required under existing conditions.

2.5.6 Existing Conditions Mitigation Analysis

A discussion of the mitigation measures required in order for the Sumas Way & South Fraser Way and Sumas Way & Marshall Road intersections to largely meet the City's acceptable performance thresholds is provided below. For each intersection, a summarized list of the required mitigation measures is first provided followed by a more detailed discussion below on each measure.

Sumas Way & South Fraser Way

- Dual eastbound left turn lanes;
- Protected/permissive phasing for the westbound left-turn in the PM peak hour;
- One new westbound right-turn lane; and,
- Upgrade of the eastbound right turn to "free flow" with an add lane on Sumas Way.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Bunt's analysis indicated that the eastbound left-turn was the worst performing movement under existing conditions and a second eastbound left turn lane would be required to bring this movement's operations to within acceptable performance thresholds. Based on direction provided by City staff at a meeting on August 20th, 2018, Bunt assumed the protected dual eastbound left-turn and westbound left-turn would be able to run concurrently rather than with "lead-lag" phasing. However, it is noted that to physically accommodate these concurrent left turns, it is likely that the intersection's physical footprint would need to be increased.

While the conversion of the current single eastbound through lane into a shared eastbound left + through lane in conjunction with split phasing for the eastbound and westbound directions was explored, the longer cycle length required to accommodate split phasing was shown to worsen operations for the other legs of the intersection leading to the overall intersection LOS and V/C ratio to exceed the City's acceptable performance thresholds.

As the eastbound left-turn only operates with permissive phasing today, when introducing a protected dual eastbound left turn phase, traffic operations were shown to worsen for the westbound through + right movement as some green time would need to be taken from the westbound direction to service this new phase. In addition, the westbound right-turn on red would become more difficult to complete during the east-west phases with the new protected eastbound left-turn phase. Therefore, with the new dual eastbound left-turn in place, a new separated westbound right-turn bay was also found to be required to bring the operations of the westbound through + right movement within acceptable performance thresholds.

Finally, the intersection was also found to require the upgrade of the eastbound right-turn from a yield condition to a free flow condition, which would require the widening of Sumas Way south of South Fraser Way from two lanes to three lanes. Coincidentally, as a condition of project approval from the BC Ministry of Transportation and Infrastructure (MoTI), Elevate is required to widen Sumas Way between South Fraser Way and Marshall Road from two lanes to three lanes, which would achieve the required geometric improvement.

As Exhibit 2.6 and 2.7 showed, with the geometric improvements in place, the overall intersection would meet the City's acceptable performance thresholds. However, while the individual movements were shown to improve significantly, not all movements were shown to operate at LOS 'C' or better, which is the City's acceptable performance threshold. Given the already large intersection footprint and long signal cycle length required to serve all the protected movements, it would not be feasible, or practical, for every individual movement to achieve LOS 'C' or better. Moreover, it is worth noting that the generally accepted performance thresholds used throughout Metro Vancouver is LOS 'D' or better and a V/C ratio of 0.85 or less for an overall intersection and LOS 'E' or better and a V/C ratio of 0.90 or less for an individual movement.

Sumas Way & Marshall Road

- Dual eastbound left turn lanes;
- Dual westbound left turn lanes;
- One new eastbound right turn lane;
- One new westbound right turn lane;
- One new northbound right turn lane; and,
- One new southbound right turn lane.

The mitigation measures required for the eastbound and westbound direction (i.e., dual left turn lanes and new right turn lanes) are consistent with the suggested improvements for the Sumas Way & Marshall Road intersection included in the City's 2007 TMP. The new northbound and southbound right turn lanes were shown to be additional mitigation measures required to bring the northbound and southbound directions within acceptable performance thresholds in existing conditions.

The intersection operations for the mitigated case would largely be within the City's acceptable performance thresholds in terms of V/C ratio and just exceed acceptable LOS ratings. However, these operations would fall within the generally accepted thresholds in Metro Vancouver. Moreover, as mentioned above given the already large intersection footprint and long signal cycle length required to serve all the protected movements, it would not be feasible, or practical, for every individual movement to achieve LOS 'C' or better.

The required geometric improvements would represent six additional right and left turn lanes, which would require a considerable increase to the overall intersection footprint.

It is clear that even under existing traffic conditions both the Sumas Way & South Fraser Way and Sumas Way & Marshall Road intersections would require significant geometric improvements to largely meet the City's acceptable performance thresholds.

3. FUTURE TRAFFIC CONDITIONS

3.1 Traffic Forecasts

3.1.1 Study Horizon Years

In terms of horizon years, City of Abbotsford staff requested that Bunt's study include the Opening Day (assumed to be 2020) and Opening Day + 10 years scenarios. While the Opening Day + 10 years scenario would be 2030, because the City's TMP (2007) looked at the year 2031 study year, Bunt analyzed 2031 rather than 2030 for consistency.

In addition to the Opening Day + 10 years scenario, the BC MoTI also requested that Bunt assess the Opening Day + 20 years scenario. As such, Bunt included the following planning horizons:

- Opening Day (2020);
- Opening Day + 11 years (2031); and,
- Opening Day + 20 years (2040).

3.1.2 Background Traffic Forecasts

Background traffic is traffic that would be present on the road network if the site did not redevelop. In terms of background traffic growth, both the BC MoTI and City of Abbotsford requested that an annual growth rate of 2% per year (applied linearly) be applied to the analysis.

While Bunt applied the requested 2% traffic growth to forecast future Background traffic, it should be noted that as the existing conditions analysis already indicated that both the Sumas Way & South Fraser Way and Sumas Way & Marshall Road intersections operate at or over their practical capacity today, it is reasonable to assume that a continuous 2% annual traffic growth cannot be practically realized, particularly on the heavily congested roadways, unless significant road expansion was conducted to increase traffic capacity.

When roadways such as Sumas Way, South Fraser Way, and Marshall Road reach their practical capacity, it is likely that drivers will seek alternate routes, adjust their schedules to travel during off-peak times, or elect to take alternative modes of transportation in order to reach their destinations.

In addition, as discussed in the City's 2018 Transportation & Transit Master Plan (TTMP), the City has a desire to transform South Fraser Way (which runs east-west south of the site) into a complete street that is an attractive, accessible, and convenient transportation corridor for alternative modes while reducing vehicular traffic on this route. In conjunction, the City plans to conduct major network improvements to enhance other parallel east-west routes so that they can accommodate the vehicular traffic that would otherwise use South Fraser Way. While this potential shift in traffic away from South Fraser Way was not taken into account in Bunt's traffic analysis, it should be kept in mind when assessing the accuracy of the growth rate assumptions used in this study.

For these reasons above, it is recommended that the City conduct a macroscopic traffic assessment of the City's entire road network in the future to more accurately forecast actual future Background traffic in this area. A macroscopic model analysis would be able to account for several factors not possible in a site-specific TIA study, such as redistribution of traffic as major roadways reach capacity, area wide effects of development and infrastructure changes around the City, and potential future shifts in travel mode from reliance on private automobile trips.

Regardless, applying the 2% annual traffic growth requested by the City to the existing vehicle volumes, the forecasted weekday AM and PM peak hour Background traffic volumes for the three study years are shown in **Exhibits 3.1** to **3.3**.

3.1.3 Site Traffic

Trip Generation

As directed by City staff, Bunt estimated the number of vehicle trips to be generated by the proposed development by applying trip rates found in the Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Ed.). **Table 3.1** provides a summary of these trips rates and the corresponding vehicle trips when applying these rates.

Table 3.1: Estimated Peak Hour Trip Generation (GROSS)

LAND USE	SIZE	DESCRIPTION	AM PEAK HOUR			PM PEAK HOUR			SOURCE
			IN	OUT	TOTAL	IN	OUT	TOTAL	
Residential	282 Units	Rate	0.09	0.27	0.36	0.27	0.17	0.44	ITE (210, 10th Ed.): Mid-Rise Residential Apartments[1]
		Vehicle Trips	26	75	101	76	48	124	

1. Residential trip rate is calculated in "vehicle trips per dwelling unit"

When applying the assumed trip rates the estimated trip generation for the development is approximately 100 (75 in, 25 out) and 125 (75 in, 50 out) vehicle trips during the weekday AM and PM peak hours, respectively. To determine the net new number of vehicle trips, the existing Abbotsford News site trips were subtracted from the projected future site trips, which is summarized in **Table 3.2**.

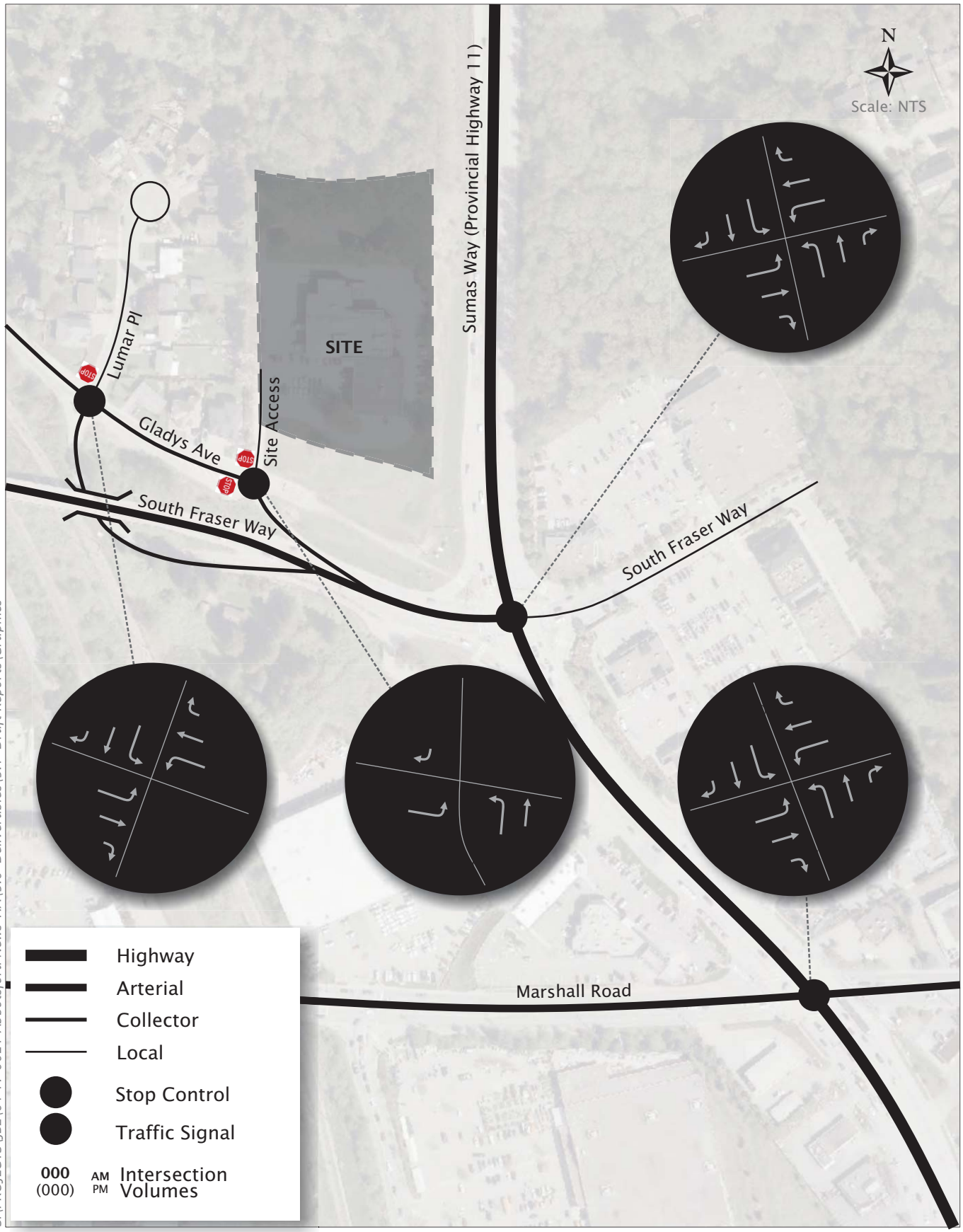

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Exhibit 3.1

Background 2020 Peak Hour Traffic Volumes

34375 Gladys Avenue TIA
04-17-0021 September 2018

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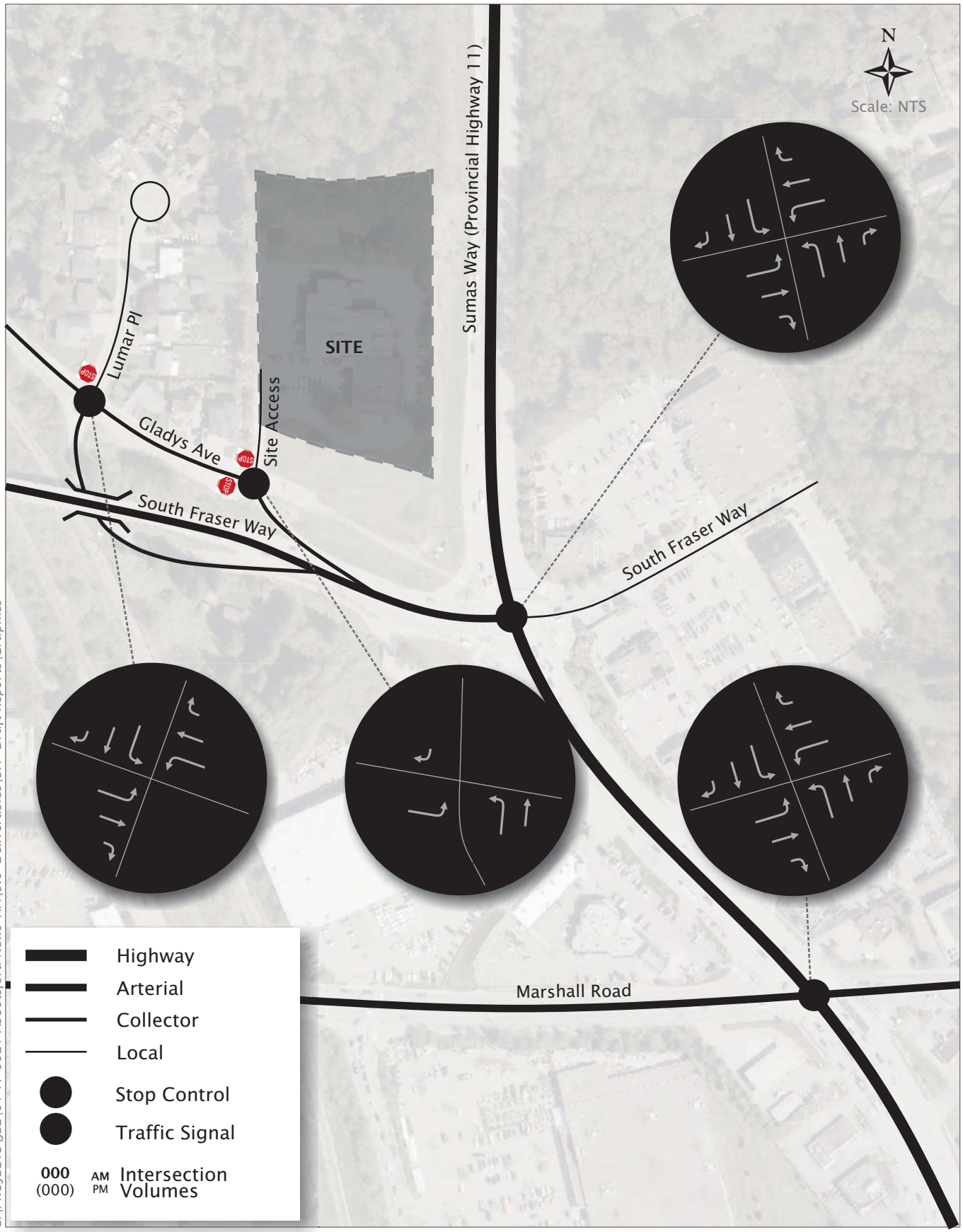

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Exhibit 3.2

Background 2031 Peak Hour Traffic Volumes

34375 Gladys Avenue TIA
04-17-0021 September 2018

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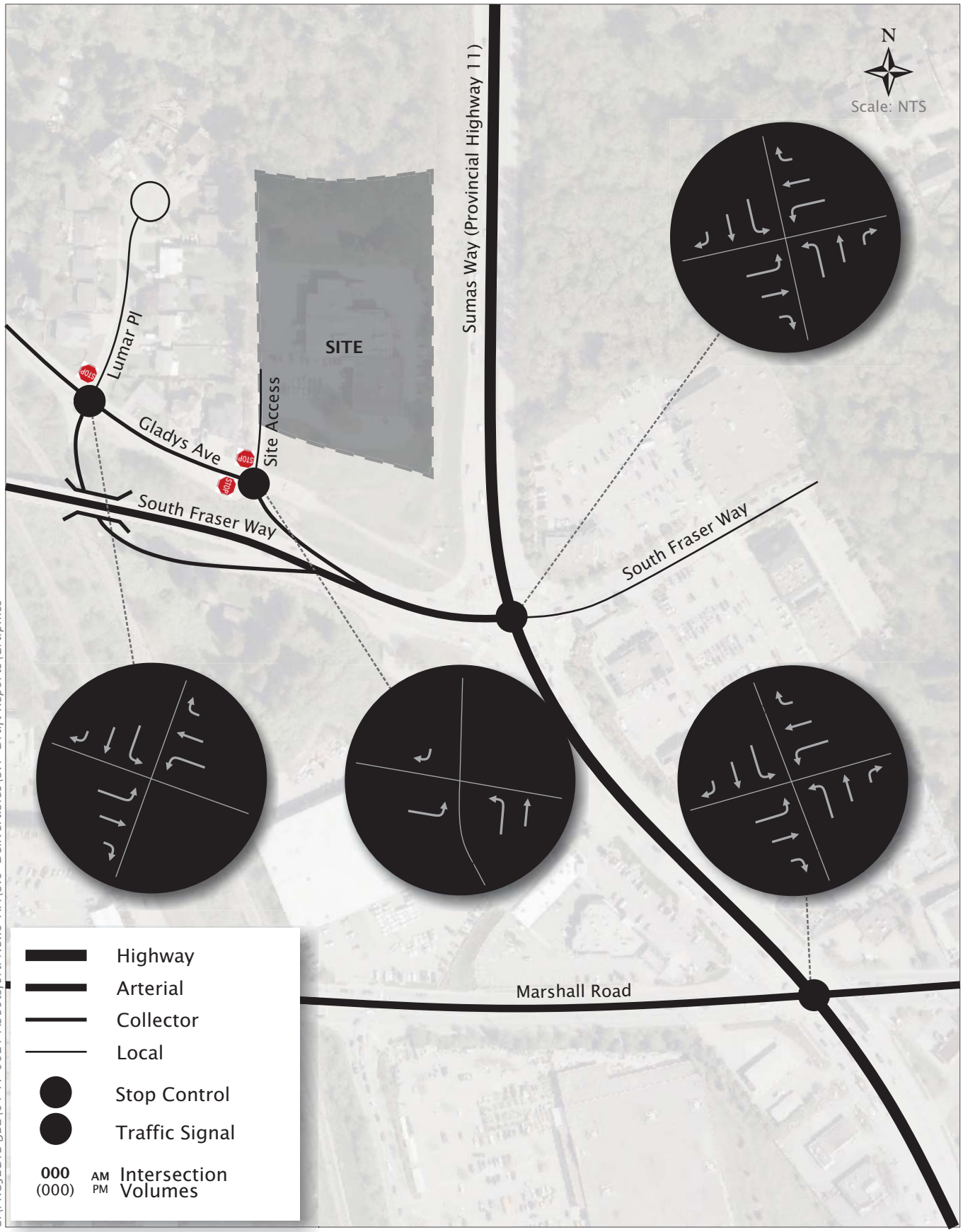

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Exhibit 3.3

Background 2040 Peak Hour Traffic Volumes

34375 Gladys Avenue TIA
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Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Table 3.2: Estimated Peak Hour Trip Generation (NET)

DESCRIPTION	AM PEAK HOUR			PM PEAK HOUR		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Projected Future	26	75	101	76	48	124
Existing	28	4	32	16	40	56
TOTAL (NET)	-2	71	69	60	8	68

Compared to existing conditions, the proposed development is expected to generate a net increase of approximately 70 vehicle trips during both the weekday AM and PM peak hours. This translates to a marginal increase of just over one new vehicle trip per minute on average during both peak periods compared to what is experienced today. This magnitude of traffic falls within the general volume fluctuation experienced on any given roadway on a daily basis.

Trip Distribution

Distributions were estimated for the weekday AM and PM peak periods using the directional distributions from Bunt's existing traffic volume data and information included in the City's TMP and TTMP documents regarding travel patterns observed within the City as guidance. The proposed distributions for the weekday AM and PM peak hours are presented in **Exhibits 3.4** and **3.5**, respectively.

Referring to Section 2.3 of the City's TMP (2007), the document states that *"existing travel patterns in Abbotsford are relatively self-contained, with a high proportion of trips using the internal network to travel between home, work, shopping and other local destinations, as opposed to longer distance trips to and from locations outside the community".* Moreover, Section 2.3.3 of the City's updated TTMP (2018) states that "*the highest concentration of work trips occur within the City Centre*". In reference to Exhibits 3.4 and 3.5, 25-30% of trips were estimated to originate from/be destined to the Sumas Way South zone (and Highway 1), resulting in the remainder (and majority) of site trips remaining within Abbotsford, in line with the City's TMP and TTMP documents.

Applying these distributions to the number of estimated site-generated vehicle trips, the projected site traffic on the study area road network is shown on **Exhibit 3.6**.

3.1.4 Peak Hour Total Traffic

Adding the site traffic forecasts to the Background traffic volumes, the Total (Background + Development) traffic volumes were established. Note that before adding the estimated site traffic, the existing Abbotsford News site trips were first removed from the study road network. The resulting Total traffic volumes for the three future study year scenarios are presented in **Exhibits 3.7** to **3.9**.

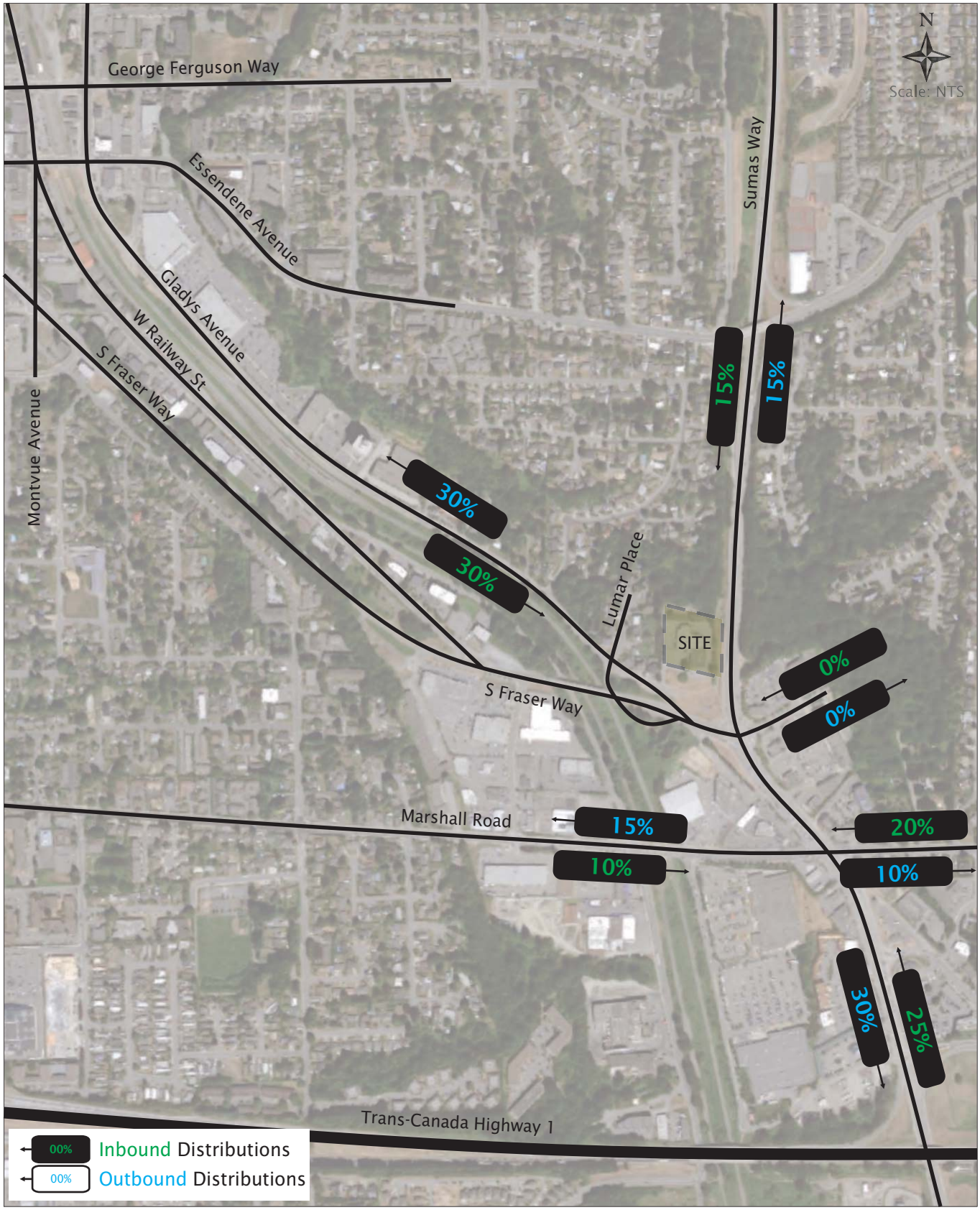

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Exhibit 3.4

Site Traffic Distribution - AM Peak Hour

34375 Gladys Avenue TIA
04-17-0021 September 2018

bunt & associates

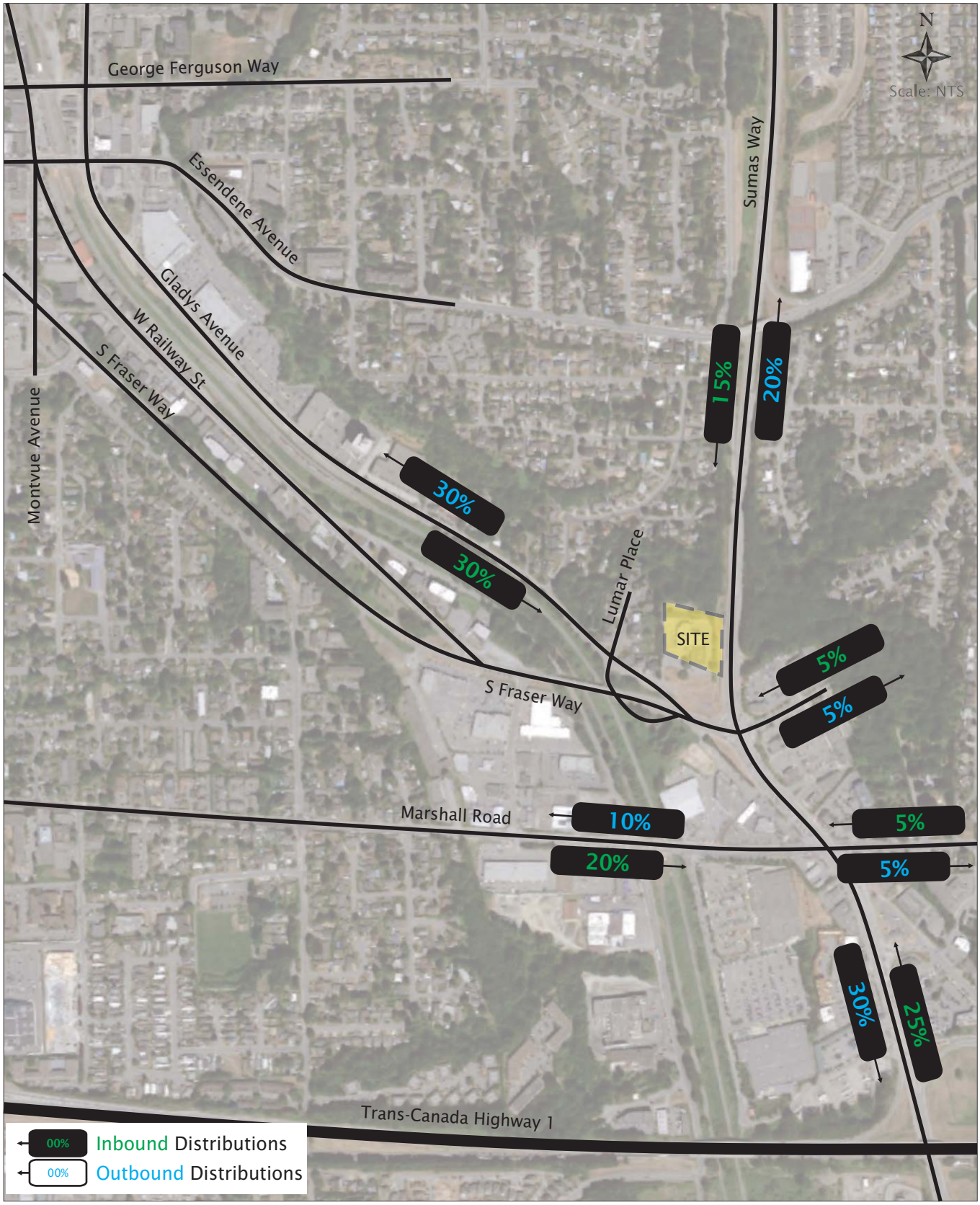

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Exhibit 3.5

Site Traffic Distribution - PM Peak Hour

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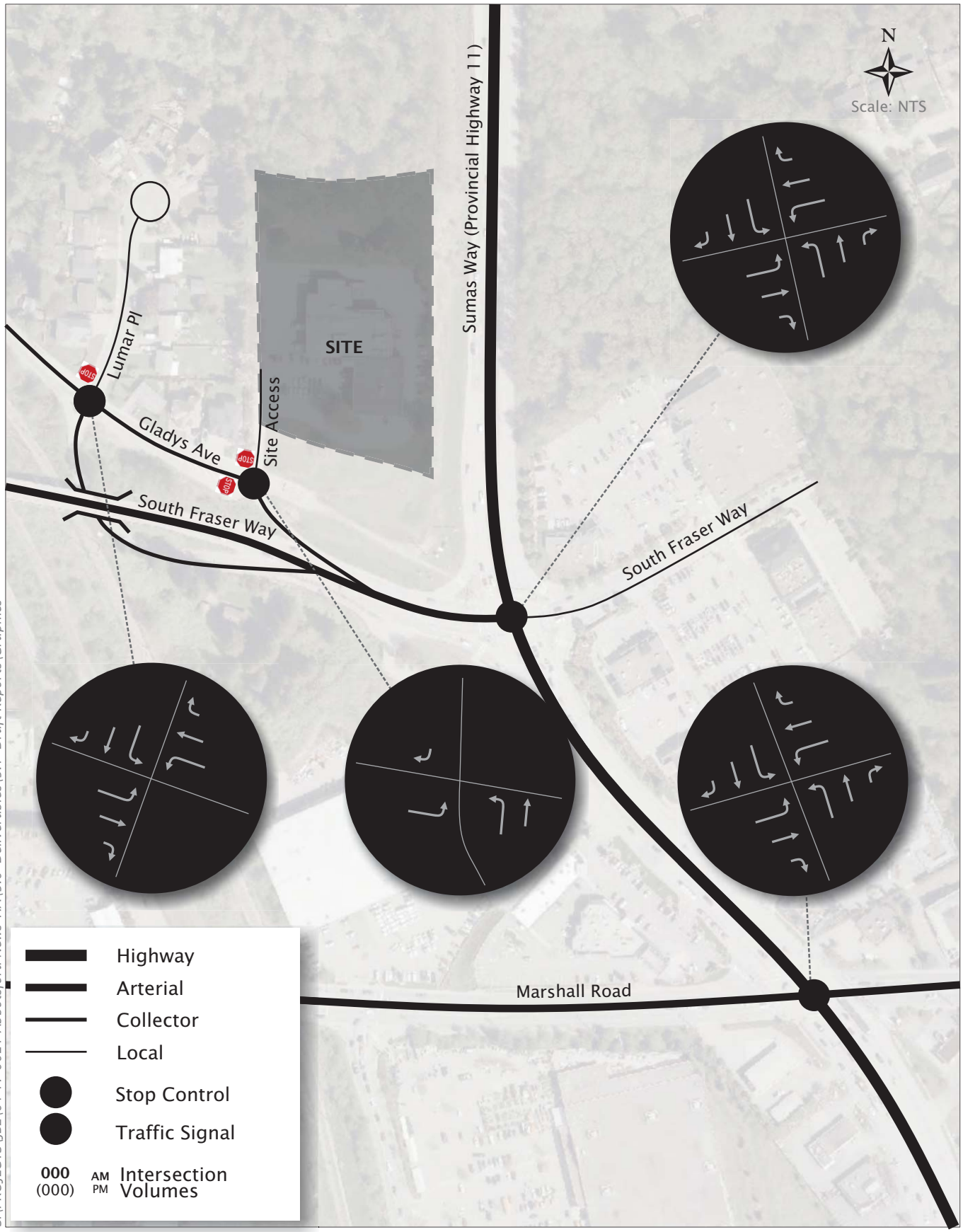

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Exhibit 3.6

Development Site Traffic Volumes

34375 Gladys Avenue TIA
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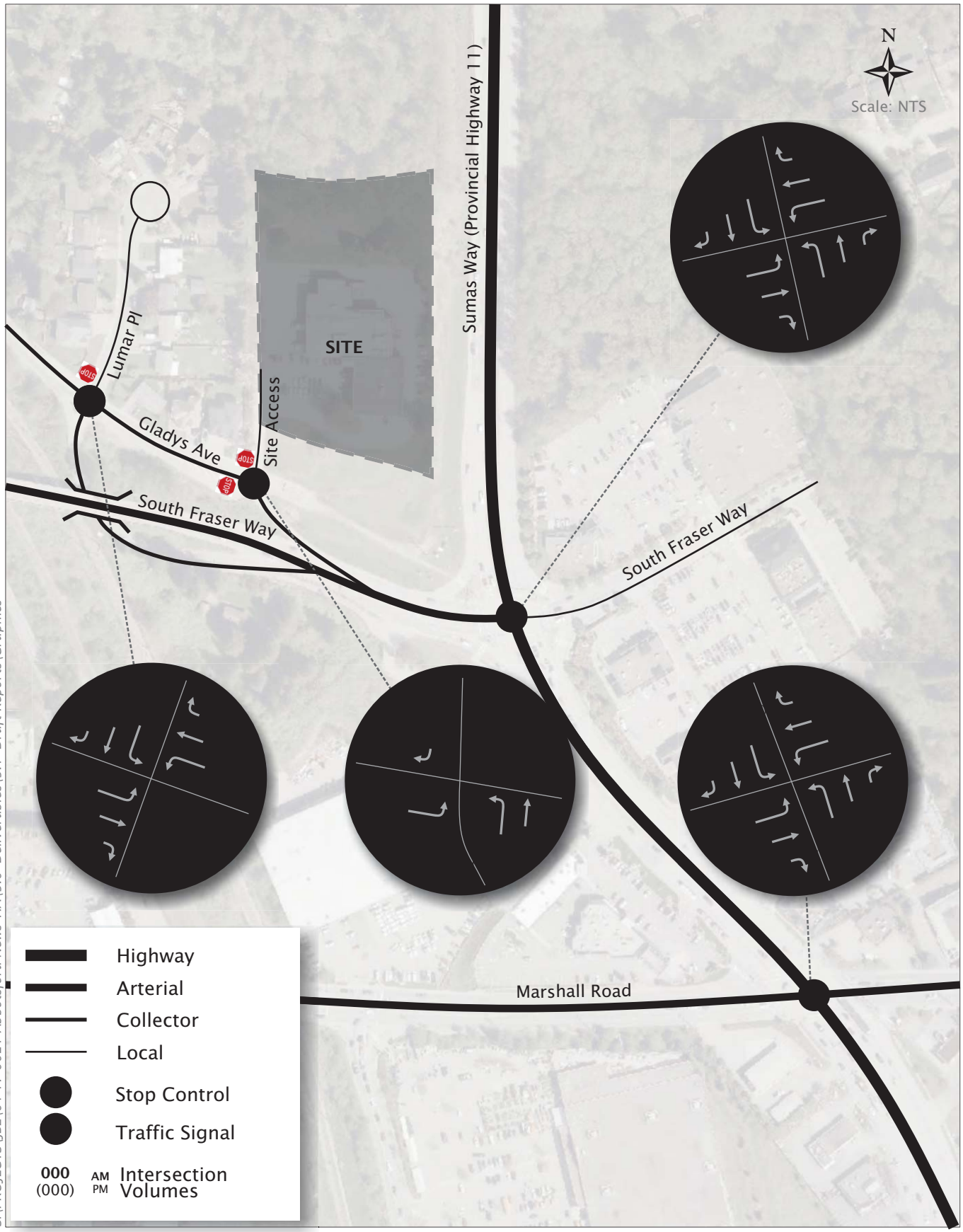

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Exhibit 3.7

Total 2020 Opening Day Peak Hour Traffic Volumes

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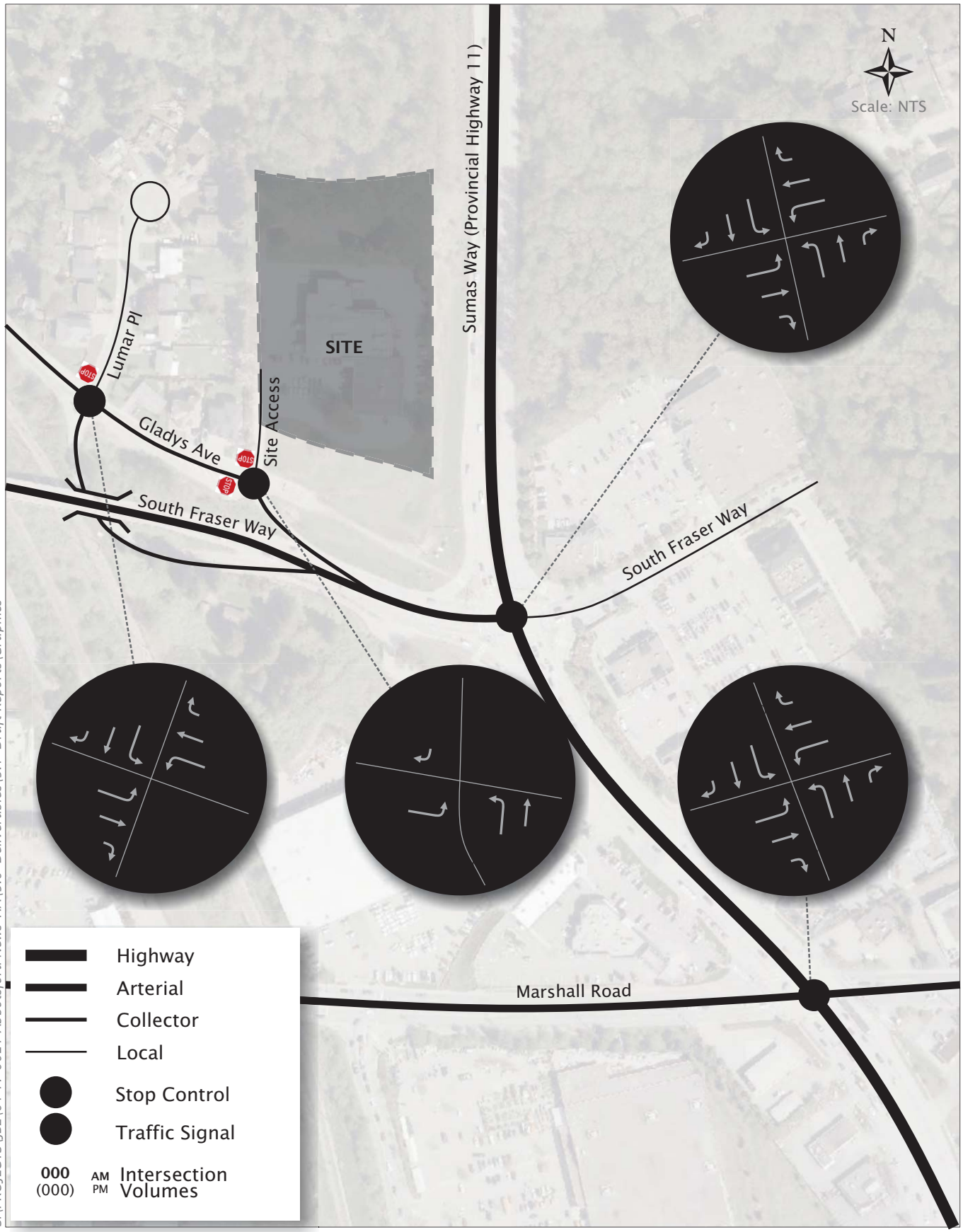

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Exhibit 3.8

Total 2031 Peak Hour Traffic Volumes

34375 Gladys Avenue TIA
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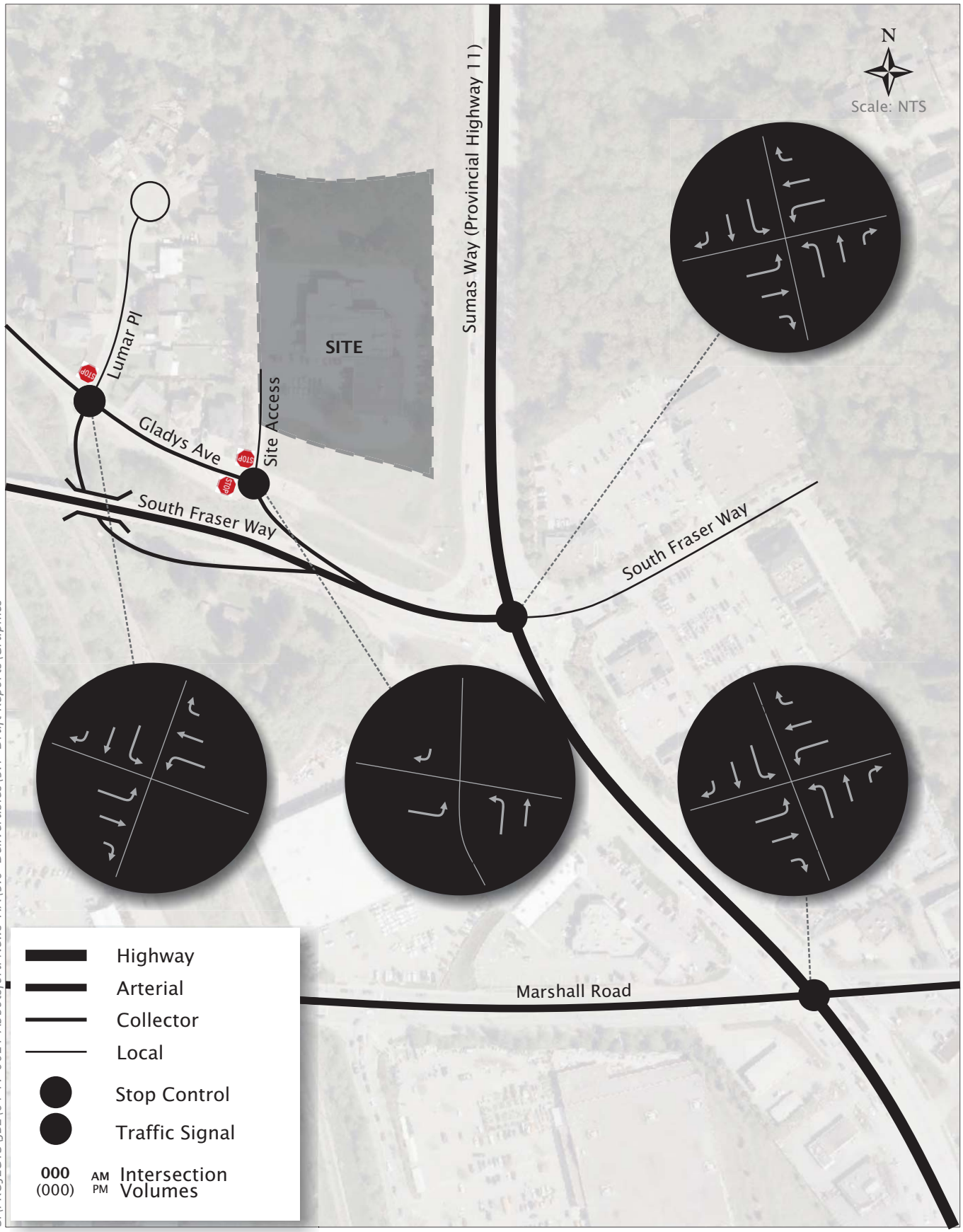

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Exhibit 3.9

Total 2040 Peak Hour Traffic Volumes

34375 Gladys Avenue TIA
04-17-0021 September 2018

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Net Traffic Impact

Tables 3.4, 3.5 and **3.6** summarize the anticipated percentage increase of future traffic attributable to the proposed development at the key intersections within the study area for each of the future horizon year periods. Note that the site traffic volumes shown in the tables represent the net new traffic, i.e., the difference in site traffic between what the proposed development would add compared to what the existing Abbotsford News site contributes today.

Table 3.4: Net Traffic Volume Effect at Critical Intersections (2020)

INTERSECTION	AM PEAK HOUR VOLUMES			PM PEAK HOUR VOLUMES		
	TOTAL TRAFFIC (VEH)	NET SITE TRAFFIC (VEH)	% OF TOTAL TRAFFIC	TOTAL TRAFFIC (VEH)	NET SITE TRAFFIC (VEH)	% OF TOTAL TRAFFIC
Sumas Way & South Fraser Way	3,274	47	1%	4,537	44	1%
Sumas Way & Marshall Road	4,151	38	<1%	5,438	28	<1%
Gladys Avenue Underpass & South Fraser Way	220	50	23%	342	4	1%

Table 3.5: Net Traffic Volume Effect at Critical Intersections (2031)

INTERSECTION	AM PEAK HOUR VOLUMES			PM PEAK HOUR VOLUMES		
	TOTAL TRAFFIC (VEH)	NET SITE TRAFFIC (VEH)	% OF TOTAL TRAFFIC	TOTAL TRAFFIC (VEH)	NET SITE TRAFFIC (VEH)	% OF TOTAL TRAFFIC
Sumas Way & South Fraser Way	3,939	47	1%	5,461	44	<1%
Sumas Way & Marshall Road	5,001	38	<1%	6,555	28	<1%
Gladys Avenue Underpass & South Fraser Way	255	50	19%	406	4	1%

Table 3.6: Net Traffic Volume Effect at Critical Intersections (2040)

INTERSECTION	AM PEAK HOUR VOLUMES			PM PEAK HOUR VOLUMES		
	TOTAL TRAFFIC (VEH)	NET SITE TRAFFIC (VEH)	% OF TOTAL TRAFFIC	TOTAL TRAFFIC (VEH)	NET SITE TRAFFIC (VEH)	% OF TOTAL TRAFFIC
Sumas Way & South Fraser Way	4,483	47	1	6,216	44	<1%
Sumas Way & Marshall Road	5,696	38	<1	7,468	28	<1%
Gladys Avenue Underpass & South Fraser Way	284	50	18%	458	4	<1%

As the tables indicate, the proposed development is expected to account for a minimal percentage of the overall traffic at each of the critical intersections in the study area. As a result, site traffic is not expected to have a material impact on the traffic operations, which is discussed in detail in Section 3.2. The key takeaways from the tables include:

- On Opening Day (2020), the net site traffic is anticipated to account for 1% or less of the Total traffic volumes at the Sumas Way & South Fraser Way and Sumas Way & Marshall Road intersections during both the AM and PM peak hours. This percentage contribution to the total traffic only gets lower in the 2030 and 2041 horizon years as background traffic grows.

- On Opening Day (2020), during the weekday AM peak hour, the net site traffic is expected to account for 23% of the traffic at the Gladys Avenue Underpass & South Fraser Way intersection, specifically to the merge from the Gladys Avenue Underpass onto eastbound South Fraser Way. However, during the critical PM peak hour, the development is only expected to account for 1% of the total traffic. This difference between time periods is important to highlight because during the AM peak hour this intersection does not experience any capacity or delay issues even with site traffic present, but during the PM peak hour, this intersection experiences long delays and vehicle queuing issues under Background traffic volumes alone (i.e., without the proposed development). The proposed development would only contribute 4 new vehicles to this intersection which represents less than 1% of the total traffic. Further discussion on future traffic operations is provided in Section 3.2.

3.1.5 Daily Total Traffic Forecasts

As part of Bunt's study, the City requested that daily traffic link volume forecasts along the roadways in the study area be estimated. To estimate these volumes, Bunt used its existing peak hour traffic volumes and future peak hour traffic volume estimates in conjunction with 24-hour traffic volume data at the Sumas Way & Marshall Road intersection provided by BC MoTI collected on a Tuesday and Wednesday in late January 2017.

An assessment of the MoTI data indicated that on both days, the daily peak hour volume (which occurred during the PM period) equated to almost the exactly the same percentage of the total daily traffic at approximately 8.4%.

This percentage is consistent with what is found in the 2016 Highway Capacity Manual (HCM), which states that on urban roadways, the proportion of the annual average daily traffic (AADT) that occurs during the peak hour is typically in the range of 8% to 10%[1].

Taking the estimated Total peak hour traffic volumes for the future study years, the forecasted future daily traffic volumes were estimated using the following calculation:

[1] Highway Capacity Manual: A Guide for Multimodal Mobility Analysis, 2016, Ch.12, p.12-50.

$$Estimated\ Daily\ Traffic\ (veh) = \ Peak\ Hour\ Volume\ (veh) * (\frac{1}{0.084})$$

The resulting estimated existing and future Total daily traffic road link volumes for the existing condition and three future study years are presented in **Exhibits 3.10, 3.11, 3.12,** and **3.13**. Note that as this is a simplistic analysis approach meant to provide an order of magnitude estimate of daily traffic volumes, it is worth noting that due to the concentrated peaks of the proposed development, i.e., the majority of residential vehicle trips occur during concentrated periods in the morning and afternoon and have much lower vehicle demand outside these times, applying the same calculation to the road links immediate to the site has likely resulted in a conservatively high future daily traffic estimate at these particular locations.

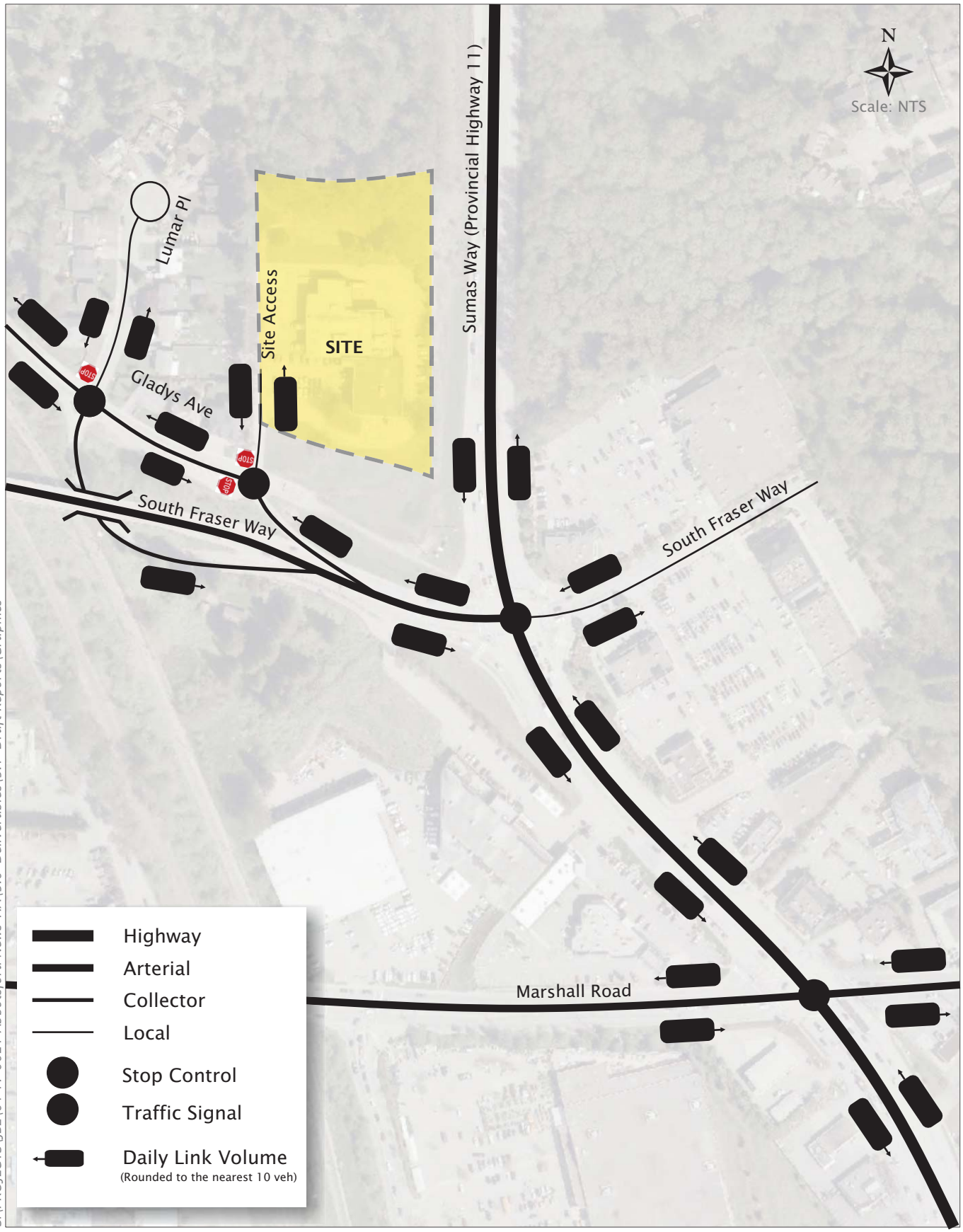

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Exhibit 3.10

Existing 2017 Daily Traffic Volumes

34375 Gladys Avenue TIA
04-17-0021 September 2018

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Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

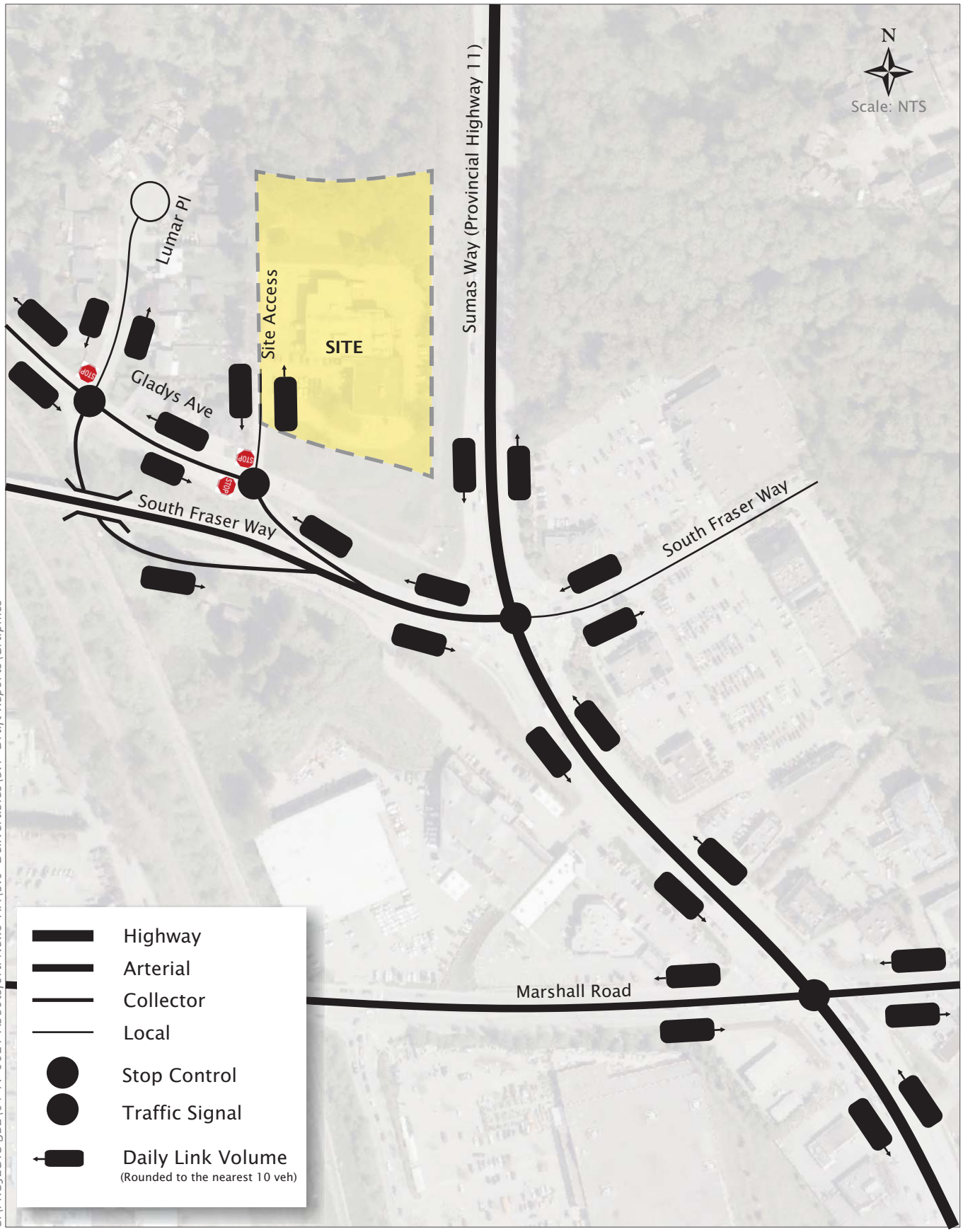

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Exhibit 3.11

Total 2020 Daily Traffic Volumes

34375 Gladys Avenue TIA
04-17-0021 September 2018

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Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

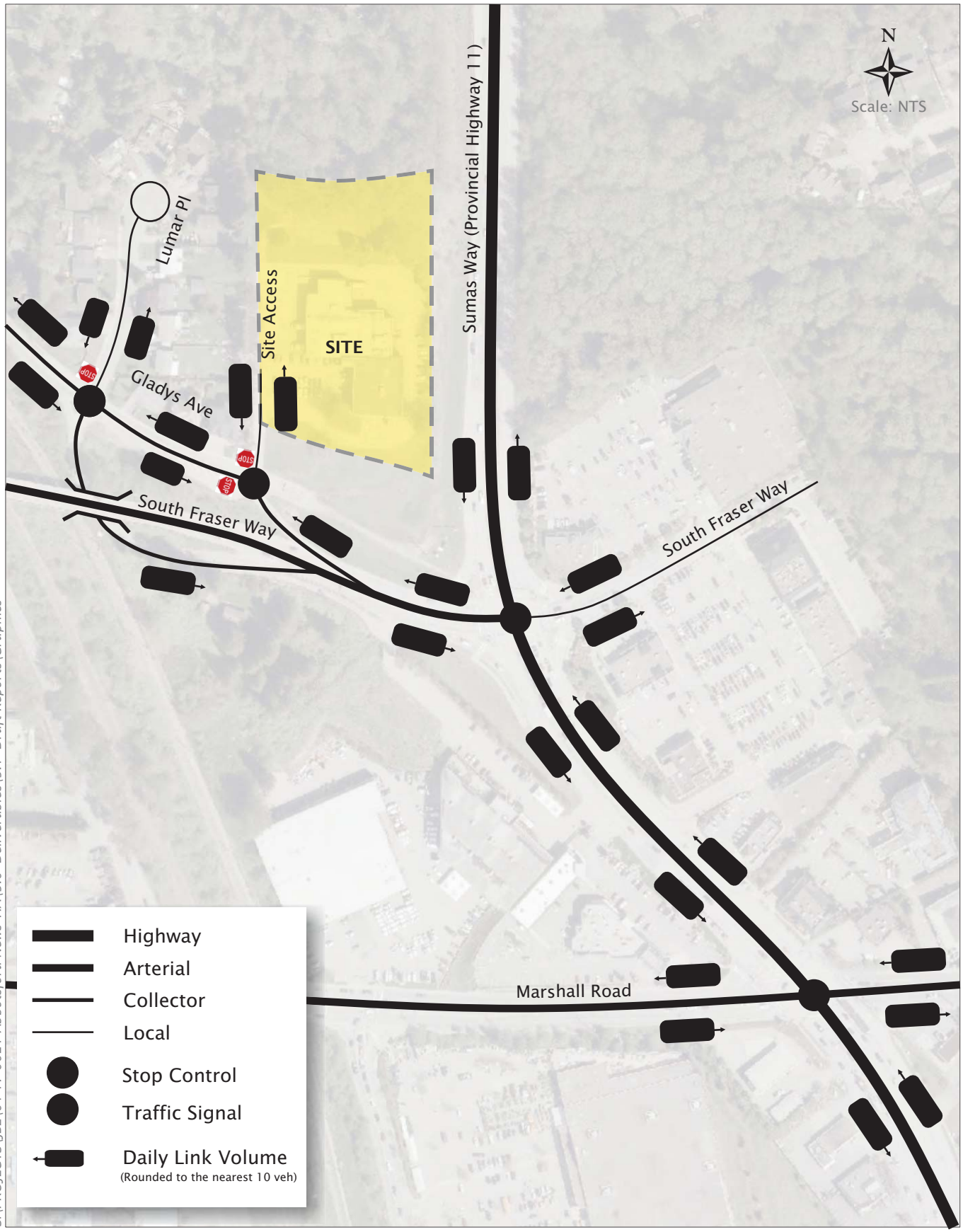

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Exhibit 3.12

Total 2031 Daily Traffic Volumes

34375 Gladys Avenue TIA
04-17-0021 September 2018

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Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

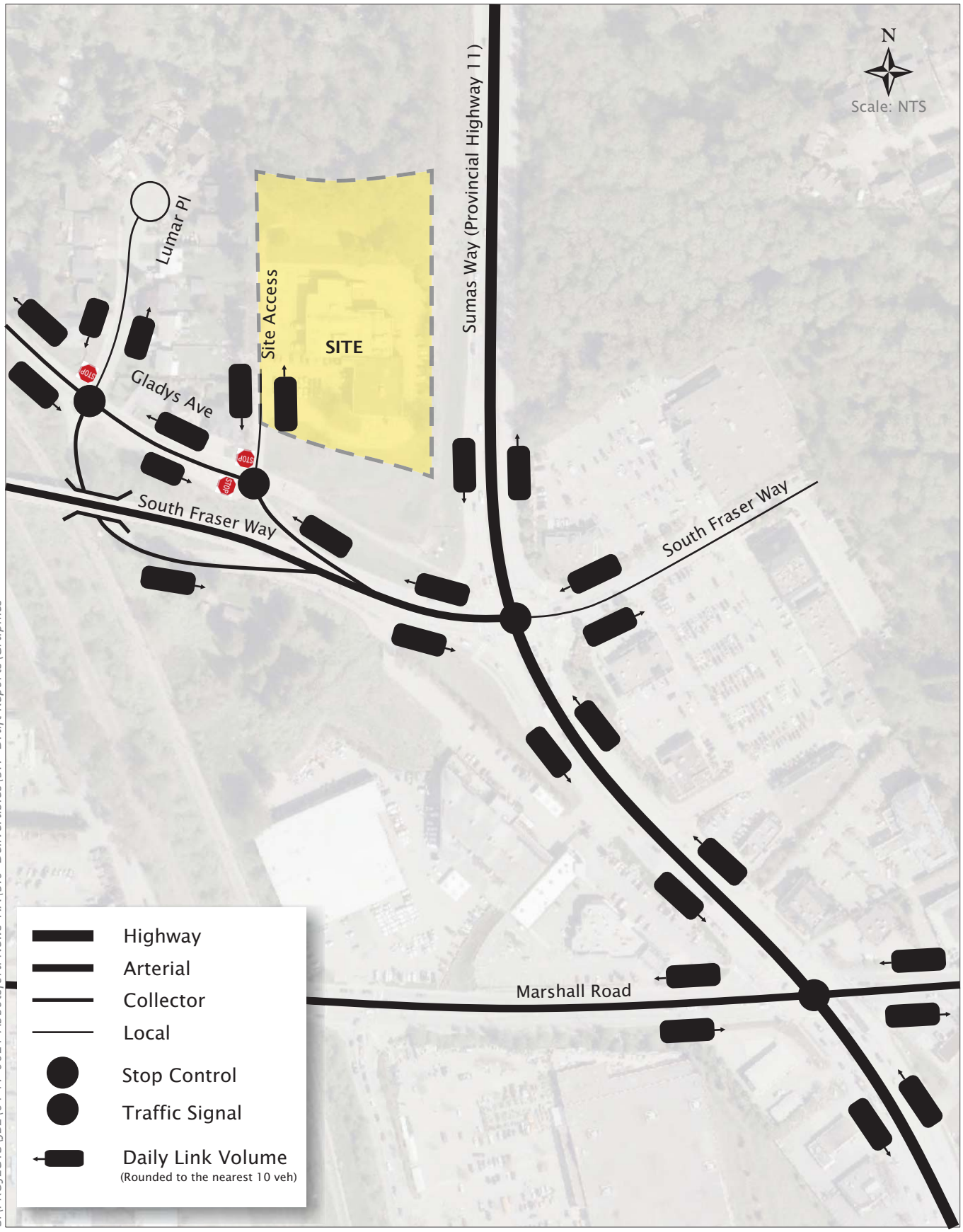

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Exhibit 3.13

Total 2040 Daily Traffic Volumes

34375 Gladys Avenue TIA
04-17-0021 September 2018

bunt & associates

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

3.2 Future Traffic Operations

3.2.1 Future Conditions Analysis Assumptions

Once again using Synchro to assess LOS, V/C ratios, and 95th percentile queue lengths, Bunt conducted a future traffic capacity analysis of the study intersections for each of the study year scenarios.

Signal Timing

For the 2020, 2031, and 2040 study years, the signal timing splits were optimized to respond to anticipated changes in traffic volumes. Cycle lengths for the both the Sumas Way & South Fraser Way and Sumas Way & Marshall Road intersections were optimized in future horizon years; however, at no point were they modelled to exceed 140 seconds. For comparison, the existing PM peak cycle length at the Sumas Way & Marshall Road intersection is 143 seconds.

Mitigation Measures

The mitigation measures that were found to be required at the study intersections in the future horizon years are summarized below. The "Mitigated" scenario traffic operations shown in the exhibits in this section reflect intersection performance with these measures implemented. Further discussion of the traffic operations and the required mitigation measures are discussed in the individual discussions for each scenario.

<u>Sumas Way & South Fraser Way</u>

The following mitigation measures were shown to be required to largely meet acceptable performance thresholds for each horizon year. The mitigation measures listed for each horizon year represents what measures would be required on top of what was required for the previous horizon year. The measures listed for the 2020 "Opening Day" year represents what mitigation measures were found to be required on top of what was identified to be needed under existing conditions discussed earlier in Section 2.5.6.

<u>2020</u>

- No additional mitigation measure required beyond what was assumed in existing conditions.

<u>2031</u>

- One new southbound through lane;
- One new northbound through lane; and,
- Conversion of the westbound right-turn from a channelized yield to a free-flow with add lane.

<u>2040</u>

- One new southbound through lane; and,
- One new northbound through lane.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

These mitigation measures were assumed in both the Background and Total scenarios for each horizon year. Bunt's analysis determined that the addition of the proposed development's site traffic did not trigger the need for any additional mitigation measures compared to what was required to accommodate Background traffic alone in the same horizon year.

Sumas Way & Marshall Road

2020

- One new southbound through lane.

2031

- Southbound dual left-turn lanes;
- One new southbound through lane;
- One new northbound through lane;
- One new eastbound through lane; and,
- One new westbound through lane.

2040

- One new northbound through lane.

Again, the same mitigation measures were shown to be required in the Background and Total scenarios, indicating that the proposed development's site traffic alone does not trigger the need for any additional mitigation measures.

Storage bay lengths for new and existing turn bays were assumed to be adjusted to accommodate the 95th percentile queues predicted by Synchro for each horizon year. However, the northbound, eastbound, and southbound left turn bays were assumed to be fixed with their existing storage lengths as they share road right-of-way with the left-turn bay for the neighbouring intersections and thus have no space available to lengthen any further.

3.2.2 2020 Traffic Performance

Opening Day (2020) Background Traffic Operations

The results of the capacity analysis for the 2020 Opening Day horizon year without the proposed development are summarized in **Exhibits 3.14** and **3.15.** The 95th percentile queue lengths are summarized in **Table 3.7**.

Table 3.7: Background 2020 95th Percentile Queues

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM	PM
South Fraser Way & Sumas Way	EBL	**38**	**m#222**
	EBT	9	m44
	EBR	12	**m100**
	WBL	11	40
	WBT	12	76
	NBL	#52	#100
	NBT	51	#197
	NBR	0	26
	SBL	15	#46
	SBT	#118	#161
	SBR	15	26
South Fraser Way & Sumas Way **(Mitigated)**	EBL	23	**#77**
	EBT	11	67
	EBR	0	0
	WBL	15	44
	WBT	13	#57
	WBR	0	36
	NBL	#62	#71
	NBT	62	129
	NBR	0	13
	SBL	16	#33
	SBT	113	109
	SBR	15	12
Gladys Avenue & Lumar Place	EBL/T/R	0	0
	WBL	0	1
	WBT/R	0	0
	SBL/T/R	0	0
Marshall Road & Sumas Way	EBL	#25	**#165**
	EBT/R	#40	#157
	WBL	**#124**	**#94**
	WBT/R	70	#83
	NBL	#35	#55
	NBT/R	77	#176
	SBL	#25	**#90**
	SBT/R	#106	133
Marshall Road & Sumas Way **(Mitigated)**	EBL	24	#76
	EBT	32	#98

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM	PM
	EBR	19	31
	WBL	72	#46
	WBT	68	49
	WBR	15	15
	NBL	35	44
	NBT	82	118
	NBR	9	47
	SBL	27	**#73**
	SBT	96	106
	SBR	17	18
Gladys Avenue & Site Access	WBT/R	0	0
	NBT	0	1
	SBR	0	1
Gladys Avenue Underpass & South Fraser Way	EB	0	0
	NB	9	164

Note:

Bolded results indicate 95th percentile queues that exceed the available turning bay storage length.

"-" indicates a value not applicable to that particular intersection or movement.

"#" indicates that the 95th percentile volume exceeds capacity; therefore vehicle queue may be longer than reported.

"m" indicates that volume for 95th percentile queue is metered by upstream signal

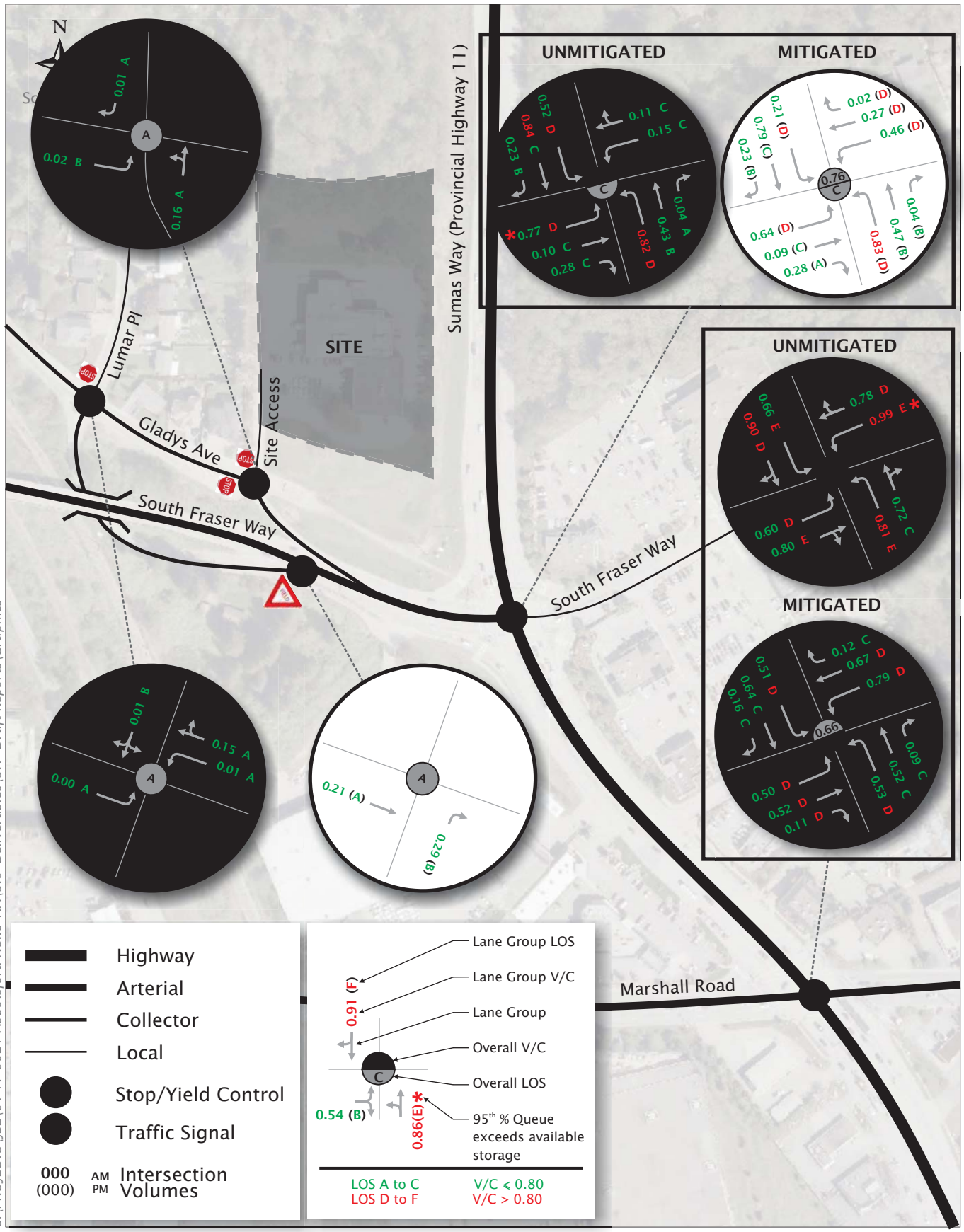

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Exhibit 3.14

2020 Background AM Peak Hour Traffic Operations

34375 Gladys Avenue TIA
04-17-0021 September 2018

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Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

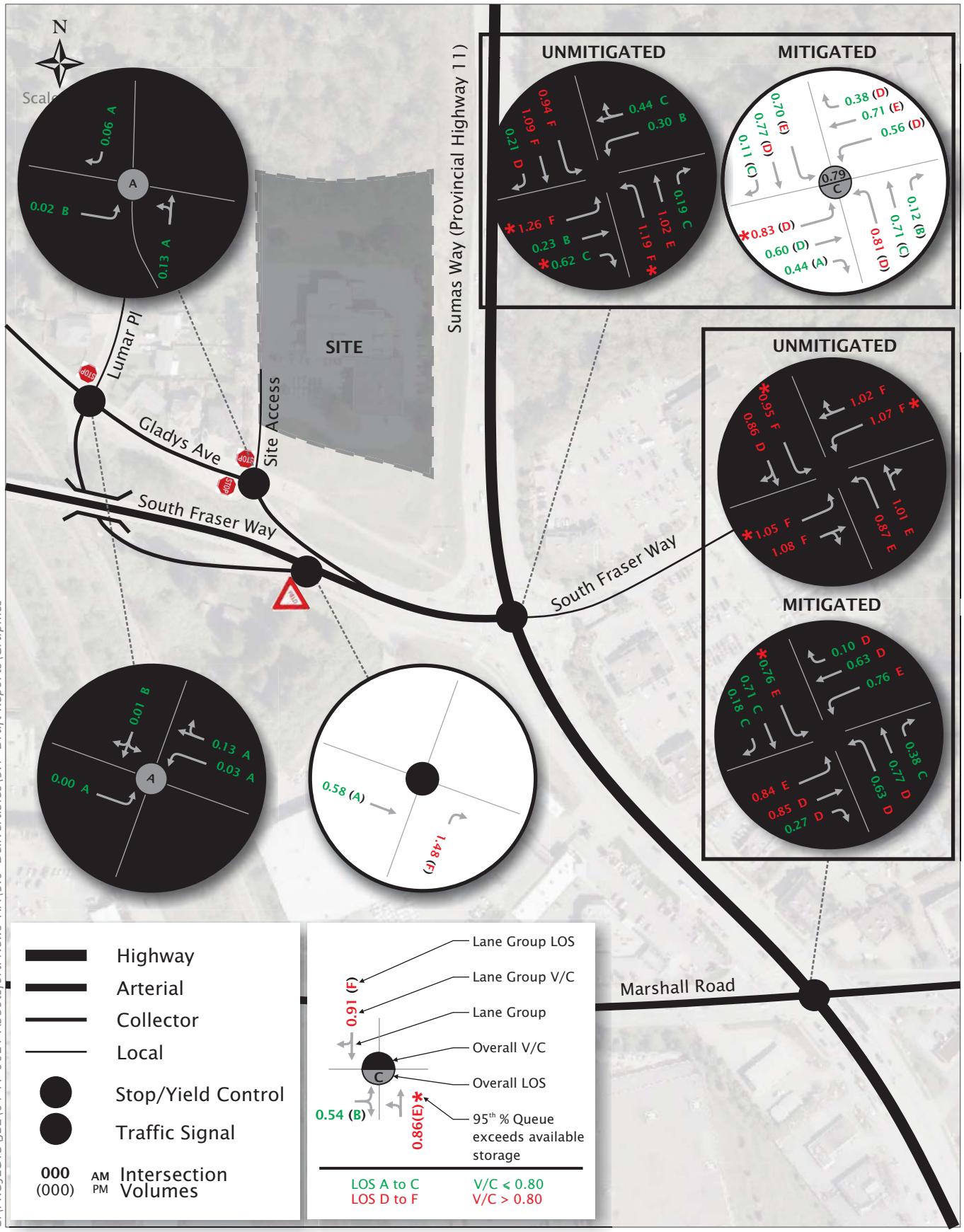

Exhibit 3.15

2020 Background PM Peak Hour Traffic Operations

34375 Gladys Avenue TIA
04-17-0021 September 2018

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As Exhibits 3.14 and 3.15 indicate, the traffic operations for the two major signalized intersections in the study area for the "unmitigated" scenario, which assumes the existing intersection geometry, were shown to significantly exceed the City's acceptable performance thresholds.

During the AM and PM peak hour for the Sumas Way & South Fraser Way intersection, the mitigation measures required in existing conditions were shown to be sufficient to largely maintain the City's acceptable performance thresholds in the Background 2020 horizon year. In the busier PM peak hour, the overall V/C ratios and intersection LOS increased from 0.77 and LOS 'C' in existing "Mitigated" conditions to 0.79 and LOS 'C' in Background 2020 "Mitigated" conditions.

In the PM peak hour, an additional southbound through lane was shown to be required for the Sumas Way & Marshall Road intersection in addition to the turn bay improvements assumed for Existing "Mitigated" conditions. With the mitigation measures in place, the intersection was shown to operate with an overall V/C ratio of 0.81 and LOS 'D', which is just above the City's acceptable performance thresholds.

The intersections of Gladys Avenue & Lumar Place and Gladys Avenue at the site access were shown to continue operating within acceptable performance thresholds in terms of V/C ratios, LOS, and 95th percentile queues. Moreover, at the Gladys Avenue Underpass & South Fraser Way intersection, the 95th percentile queue length for merging traffic was shown to worsen from 131 to 164m during the PM peak hour, which would just fit within the available storage.

Opening Day (2020) Total Traffic Operations

Exhibits 3.16, **3.17** and **Table 3.8** summarize the traffic operations and 95th percentile queues for the 2020 Opening Day Total scenario for the weekday AM and PM peak hours with the development in place.

Table 3.8: Total 2020 95th Percentile Queues

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM	PM
South Fraser Way & Sumas Way	EBL	#44	**m#223**
	EBT	9	44
	EBR	18	**91**
	WBL	11	40
	WBT	12	78
	NBL	#52	**#106**
	NBT	51	#197
	NBR	0	26
	SBL	15	#46
	SBT	#118	#165
	SBR	15	29
South Fraser Way & Sumas Way **(Mitigated)**	EBL	25	**#78**

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM	PM
	EBT	11	68
	EBR	0	0
	WBL	15	44
	WBT	13	#61
	WBR	0	36
	NBL	#61	#76
	NBT	62	129
	NBR	0	13
	SBL	16	#33
	SBT	114	111
	SBR	15	15
Gladys Avenue & Lumar Place	EBL/T/R	0	0
	WBL	1	1
	WBT/R	0	0
	SBL/T/R	0	0
Marshall Road & Sumas Way	EBL	#26	**#173**
	EBT/R	#40	#161
	WBL	**#128**	**#94**
	WBT/R	71	#87
	NBL	#35	#55
	NBT/R	77	#175
	SBL	#27	**#88**
	SBT/R	#106	132
Marshall Road & Sumas Way **(Mitigated)**	EBL	24	#80
	EBT	33	#98
	EBR	20	40
	WBL	72	#46
	WBT	69	49
	WBR	15	16
	NBL	35	#46
	NBT	81	119
	NBR	9	46
	SBL	30	**#74**
	SBT	97	102
	SBR	17	17
Gladys Avenue & Site Access	WBT/R	0	0
	NBT	0	2

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM	PM
	SBR	3	2
Gladys Avenue Underpass & South Fraser Way	EB	0	0
	NB	13	165

Note:
Bolded results indicate 95th percentile queues that exceed the available turning bay storage length.
"-" indicates a value not applicable to that particular intersection or movement.
"#" indicates that the 95th percentile volume exceeds capacity, therefore vehicle queue may be longer than reported.
"m" indicates that volume for 95th percentile queue is metered by upstream signal

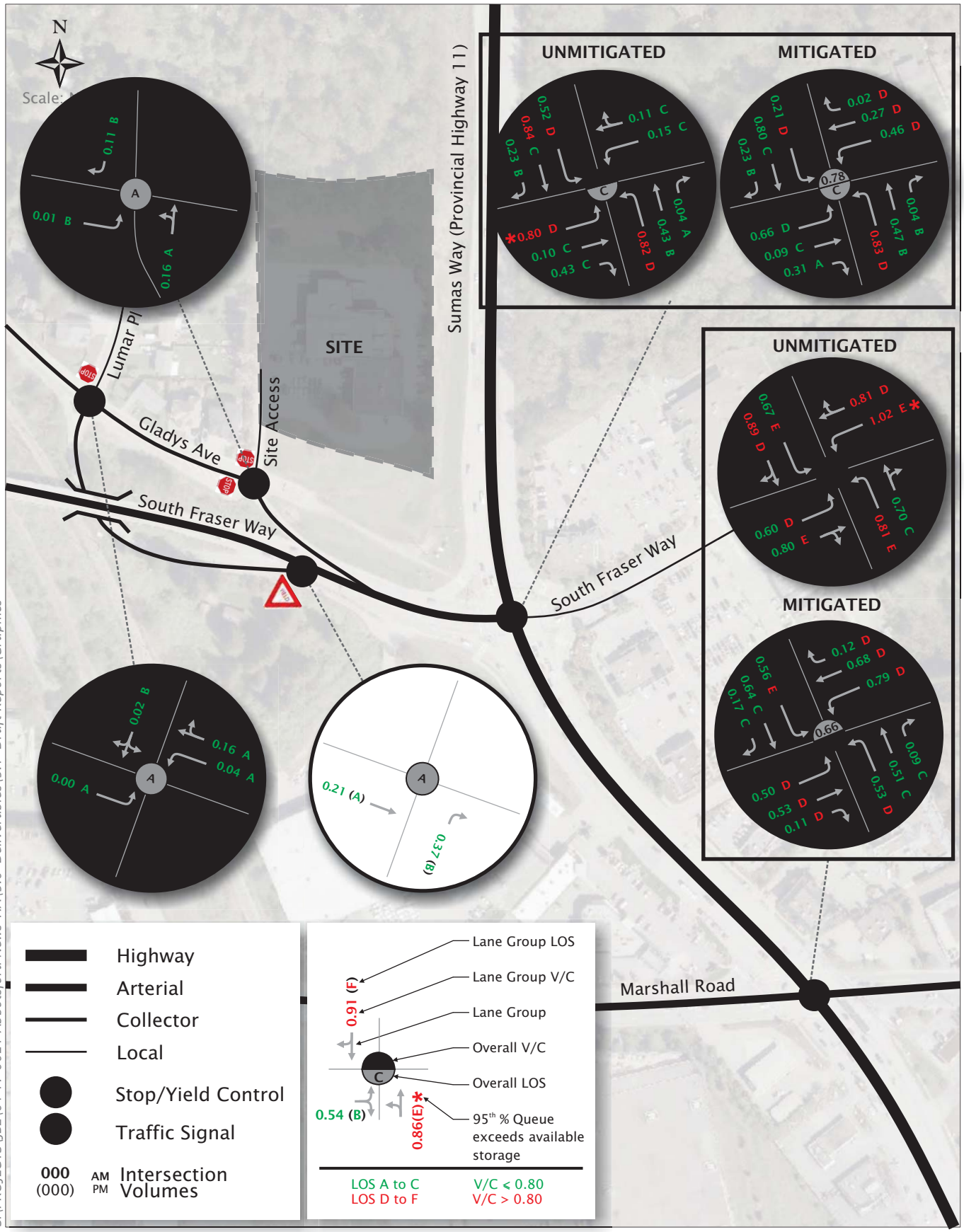

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Exhibit 3.16

2020 Total AM Peak Hour Traffic Operations

34375 Gladys Avenue TIA
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Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

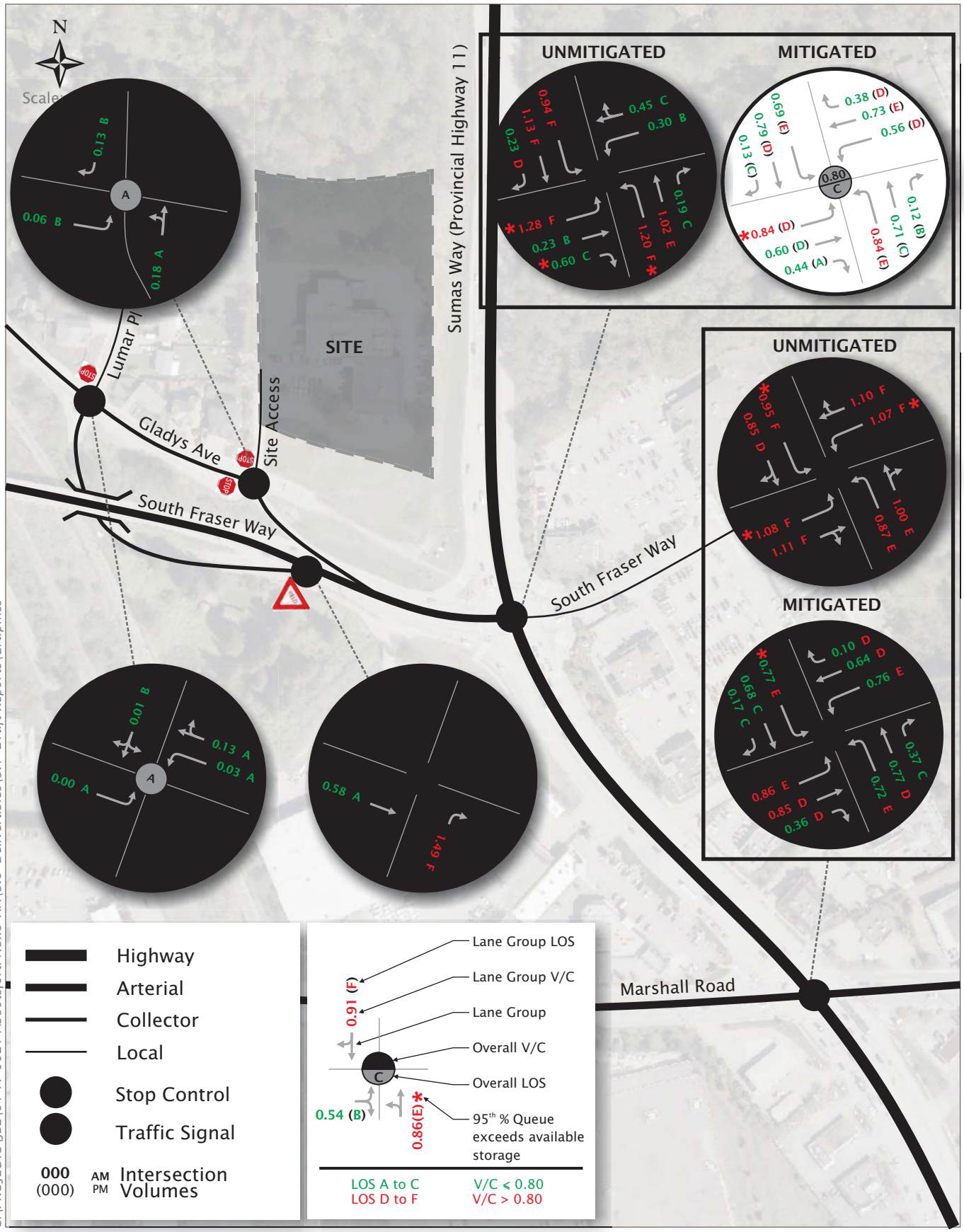

Exhibit 3.17

2020 Total PM Peak Hour Traffic Operations

34375 Gladys Avenue TIA
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As shown, the additional site traffic was found to only marginally increase the V/C ratios and delays at the critical study area intersections along Sumas Way when compared to Background operations. For instance, at the Sumas Way & South Fraser Way intersection, the overall V/C ratio increased by only 0.02 when compared to the Background operations during the AM peak hour. Similarly, the overall V/C ratio increased from 0.79 in the mitigated Background PM scenario to 0.80 in the mitigated Total PM scenario. The eastbound left-turn movement increased from 0.83 in the mitigated 2020 Background PM operations to 0.84 in the mitigated Total PM operations, a marginal increase of only 0.01.

Both the Gladys Avenue & Site Access and Gladys Avenue & Lumar Place intersections were shown to operate well within acceptable performance thresholds with minimal increases to the individual V/C ratios.

During the PM peak hour, at the Gladys Avenue Underpass & South Fraser Way intersection, the 95th percentile queue length for merging traffic was shown to increase by one metre, i.e., 164m to 165m, due to the 4 additional vehicle trips added to this movement by the proposed development.

In general, the marginal impact of the net new site traffic was not shown to trigger any additional mitigation measures when compared to Background conditions.

3.2.3 2031 Traffic Performance

2031 Background Traffic Operations

Exhibits 3.18, 3.19 and **Table 3.9** summarize the Background 2031 traffic conditions and 95th percentile queue lengths.

Table 3.9: Background 2031 95th Percentile Queues

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM	PM
South Fraser Way & Sumas Way	EBL	**#62**	**m#199**
	EBT	12	m51
	EBR	40	**m161**
	WBL	15	47
	WBT	15	96
	NBL	#78	**#129**
	NBT	68	#273
	NBR	2.7	40
	SBL	20	#57
	SBT	#168	#218
	SBR	25	38
South Fraser Way & Sumas Way **(Mitigated)**	EBL	31	**#96**
	EBT	13	87
	EBR	0	0
	WBL	20	54
	WBT	16	#73
	WBR	0	0
	NBL	76	#91
	NBT	64	121
	NBR	0	16
	SBL	20	38
	SBT	113	102
	SBR	27	19
Gladys Avenue & Lumar Place	EBL/T/R	0	0
	WBL	0	1
	WBT/R	0	0
	SBL/T/R	0	0
Marshall Road & Sumas Way	EBL	#50	**#246**
	EBT/R	#74	#238
	WBL	**#207**	**#134**
	WBT/R	112	#118
	NBL	#54	#82
	NBT/R	120	#265
	SBL	#43	**#123**
	SBT/R	#169	#210
Marshall Road & Sumas Way **(Mitigated)**	EBL	28	87
	EBT	26	78

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM	PM
	EBR	18	36
	WBL	84	51
	WBT	51	43
	WBR	16	14
	NBL	41	55
	NBT	75	114
	NBR	14	62
	SBL	16	43
	SBT	94	112
	SBR	28	21
Gladys Avenue & Site Access	WBT/R	0	0
	NBT	1	1
	SBR	0	2
Gladys Avenue Underpass & South Fraser Way	EB	0	0
	NB	14	**285**

Note:
Bolded results indicate 95th percentile queues that exceed the available turning bay storage length.
"-" indicates a value not applicable to that particular intersection or movement.
"#" indicates that the 95th percentile volume exceeds capacity, therefore vehicle queue may be longer than reported.
"m" indicates that volume for 95th percentile queue is metered by upstream signal

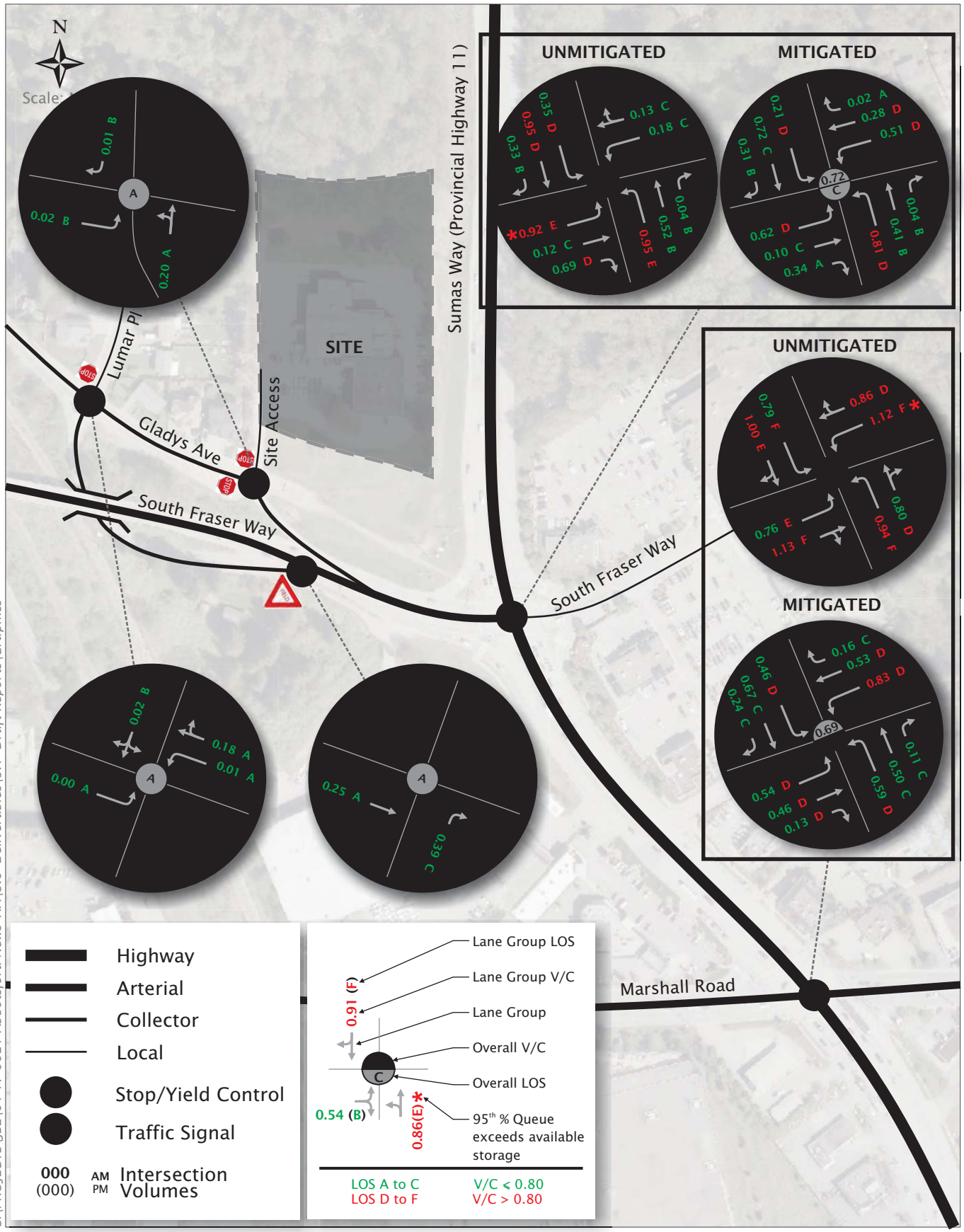

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Exhibit 3.18

2031 Background AM Peak Hour Traffic Operations

34375 Gladys Avenue TIA
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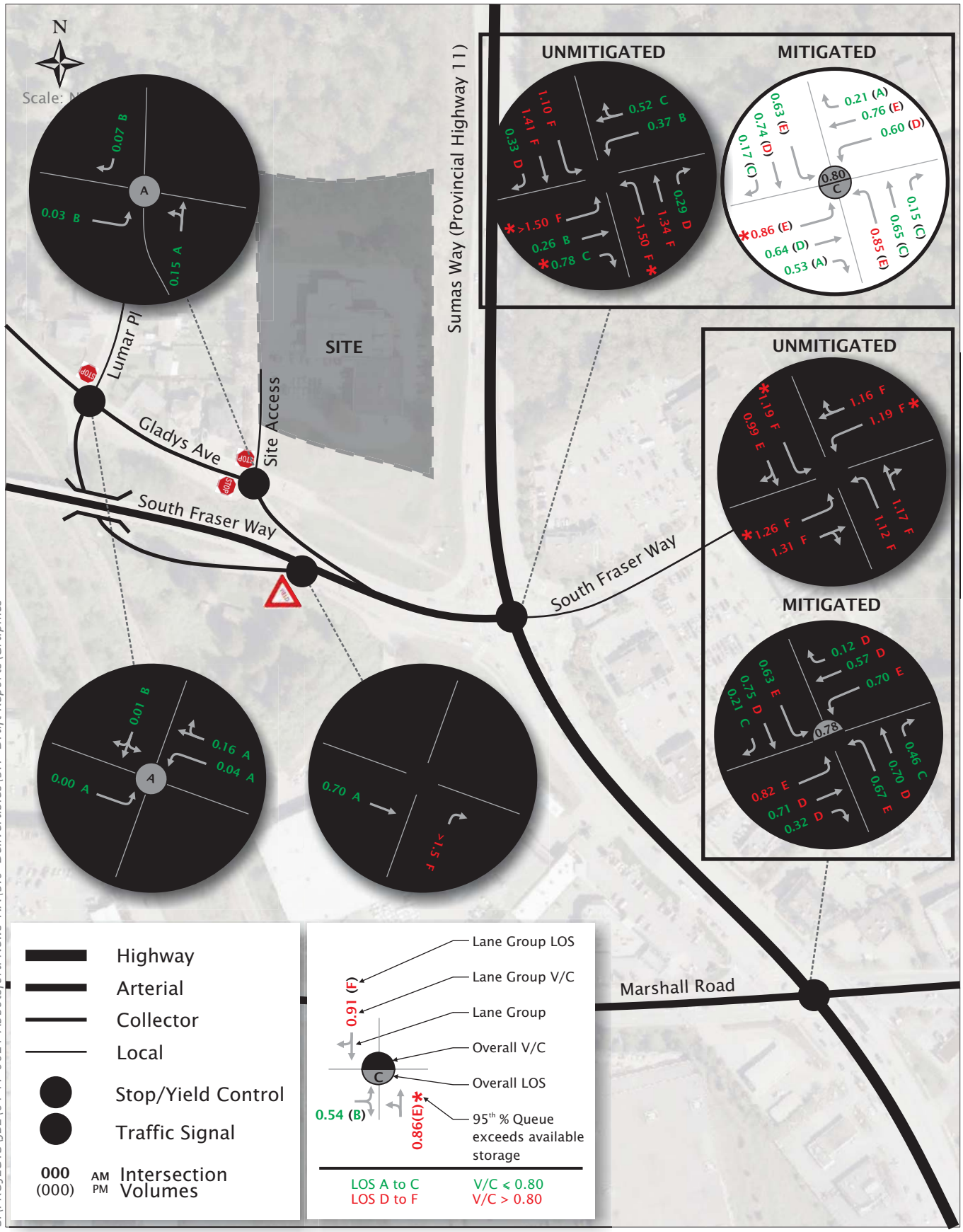

Exhibit 3.19

2031 Background PM Peak Hour Traffic Operations

34375 Gladys Avenue TIA
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At Sumas Way & South Fraser Way, to accommodate the continued background growth since the 2020 horizon year and still largely meet the City's acceptable performance thresholds, one new southbound through lane, one new northbound through lane, and the conversion of the westbound right-turn movement from a channelized yield to a free-flow condition with an add lane on Sumas Way would be required.

By the 2031 horizon year with a background traffic growth of 2% per year, the northbound and eastbound left-turn vehicle demands would be approaching the typical level where an additional left-turn lane would be required. However, as these movements were already assumed to have dual left-turn lanes under the mitigated scenario, and since triple left-turn lanes were not assumed to be a viable mitigation measure, additional through lanes on Sumas Way were instead assumed in order to provide more green time to the heavy left-turn movements.

At Sumas Way & Marshall Road, dual southbound left-turn lanes, one new southbound through lane, one new northbound through lane, one new eastbound through lane, and one new westbound through lane would be required to bring the intersection operations close to the City's acceptable performance thresholds. Even with these extensive measures, many individual movements' LOS and the overall LOS would be greater than the City's threshold of LOS 'C'.

2031 Total Traffic Operations

Exhibits 3.20, 3.21, and **Table 3.10** summarize the Total 2031 traffic conditions and 95th percentile queues.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Table 3.10: Total 2031 95th Percentile Queues

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM	PM
South Fraser Way & Sumas Way	EBL	**#64**	**#205**
	EBT	12	52
	EBR	**#40**	**147**
	WBL	15	47
	WBT	15	98
	NBL	#70	**#136**
	NBT	68	#273
	NBR	3	40
	SBL	20	#57
	SBT	#178	#222
	SBR	31	41
South Fraser Way & Sumas Way **(Mitigated)**	EBL	33	**#96**
	EBT	14	88
	EBR	0	0
	WBL	#23	54
	WBT	17	#78
	WBR	0	0
	NBL	75	**#97**
	NBT	64	121
	NBR	0	16
	SBL	19	38
	SBT	105	103
	SBR	20	21
Gladys Avenue & Lumar Place	EBL/T/R	1	0
	WBL	0	1
	WBT/R	1	0
	SBL/T/R	1	0
Marshall Road & Sumas Way	EBL	#53	**#255**
	EBT/R	#69	#242
	WBL	#207	**#134**
	WBT/R	111	#123
	NBL	#54	#76
	NBT/R	122	#266
	SBL	#42	**#125**
	SBT/R	#175	#212

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM	PM
Marshall Road & Sumas Way **(Mitigated)**	EBL	28	89
	EBT	26	78
	EBR	18	36
	WBL	84	51
	WBT	51	43
	WBR	16	15
	NBL	41	55
	NBT	75	116
	NBR	14	62
	SBL	17	42
	SBT	95	112
	SBR	31	21
Gladys Avenue & Site Access	WBT/R	0	0
	NBT	1	1
	SBR	3	4
Gladys Avenue Underpass & South Fraser Way	EB	0	0
	NB	20	**280**

Note:
Bolded results indicate 95th percentile queues that exceed the available turning bay storage length.
"-" indicates a value not applicable to that particular intersection or movement.
"#" indicates that the 95th percentile volume exceeds capacity, therefore vehicle queue may be longer than reported.
"m" indicates that volume for 95th percentile queue is metered by upstream signal

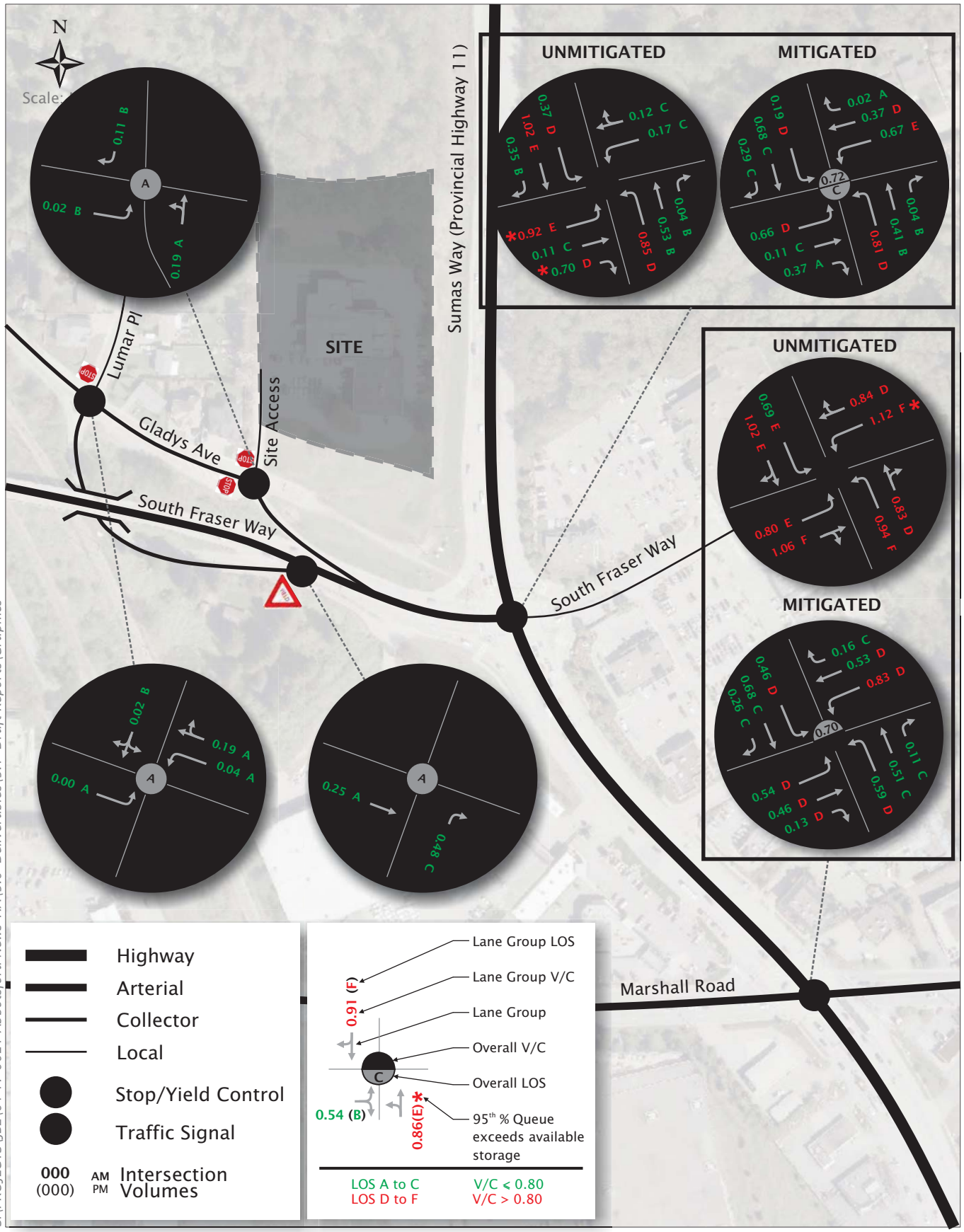

Exhibit 3.20

2031 Total AM Peak Hour Traffic Operations

34375 Gladys Avenue TIA
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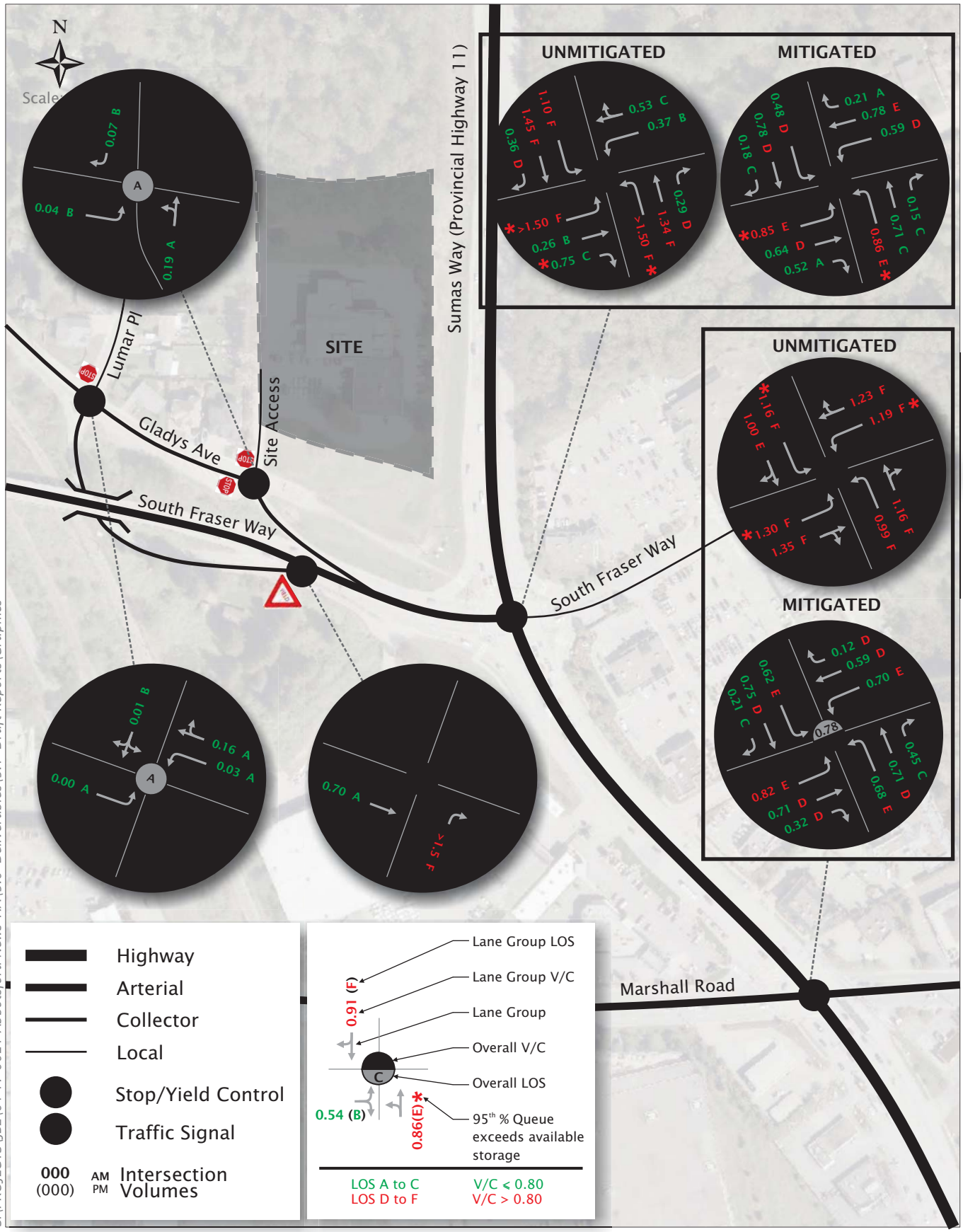

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Exhibit 3.21

2031 Total PM Peak Hour Traffic Operations

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As the results once again indicate, the effects of the site traffic were found to be marginal when compared to the Background operations. For both the major signalized intersections, the site trips were shown to increase the overall V/C ratios by 0.00 to 0.01 compared to Background conditions. As such, no additional mitigation measures beyond what was assumed for the Background scenario were shown to be required to accommodate the site generated trips.

3.2.4 2040 Traffic Performance

2040 Background Traffic Operations

Exhibits 3.22, **3.23,** and **Table 3.11** summarize the Background 2040 traffic conditions and 95th percentile queues.

Table 3.11: Background 2040 95th Percentile Queues

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM	PM
South Fraser Way & Sumas Way	EBL	**#99**	**m#273**
	EBT	18	m58
	EBR	**#105**	**m#252**
	WBL	23	57
	WBT	22	118
	NBL	**#123**	**#150**
	NBT	109	#325
	NBR	7	50
	SBL	27	#65
	SBT	#257	#259
	SBR	**65**	47
South Fraser Way & Sumas Way **(Mitigated)**	EBL	35	**#120**
	EBT	15	103
	EBR	0	0
	WBL	23	62
	WBT	18	#89
	WBR	0	0
	NBL	84	**#108**
	NBT	55	117
	NBR	1	19
	SBL	22	44
	SBT	98	100
	SBR	41	25
Gladys Avenue & Lumar Place	EBL/T/R	0	0
	WBL	0	1

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM	PM
	WBT/R	0	0
	SBL/T/R	0	0
Marshall Road & Sumas Way	EBL	#75	**#295**
	EBT/R	#104	#286
	WBL	**#281**	**#162**
	WBT/R	#152	#143
	NBL	#70	**#96**
	NBT/R	164	#324
	SBL	#54	**#149**
	SBT/R	#236	#262
Marshall Road & Sumas Way **(Mitigated)**	EBL	31	#110
	EBT	29	97
	EBR	27	71
	WBL	98	#66
	WBT	61	52
	WBR	25	24
	NBL	#50	67
	NBT	70	110
	NBR	15	93
	SBL	18	51
	SBT	106	134
	SBR	41	33
Gladys Avenue & Site Access	WBT/R	0	0
	NBT	1	1
	SBR	0	2
Gladys Avenue Underpass & South Fraser Way	EB	0	0
	NB	20	**Err**

Note:
Bolded results indicate 95th percentile queues that exceed the available turning bay storage length.
"-" indicates a value not applicable to that particular intersection or movement.
"#" indicates that the 95th percentile volume exceeds capacity, therefore vehicle queue may be longer than reported.
"m" indicates that volume for 95th percentile queue is metered by upstream signal

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

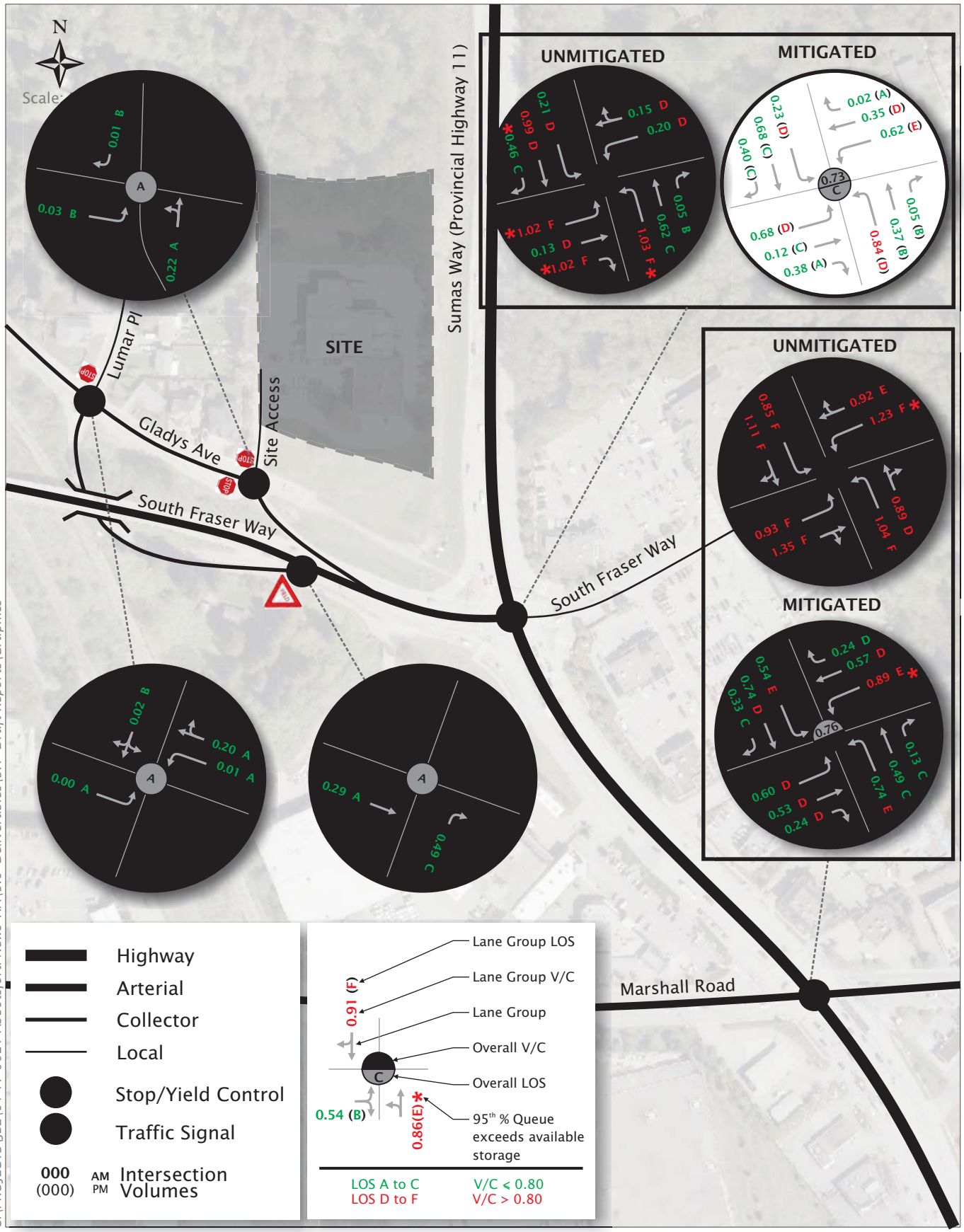

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Exhibit 3.22

2040 Background AM Peak Hour Traffic Operations

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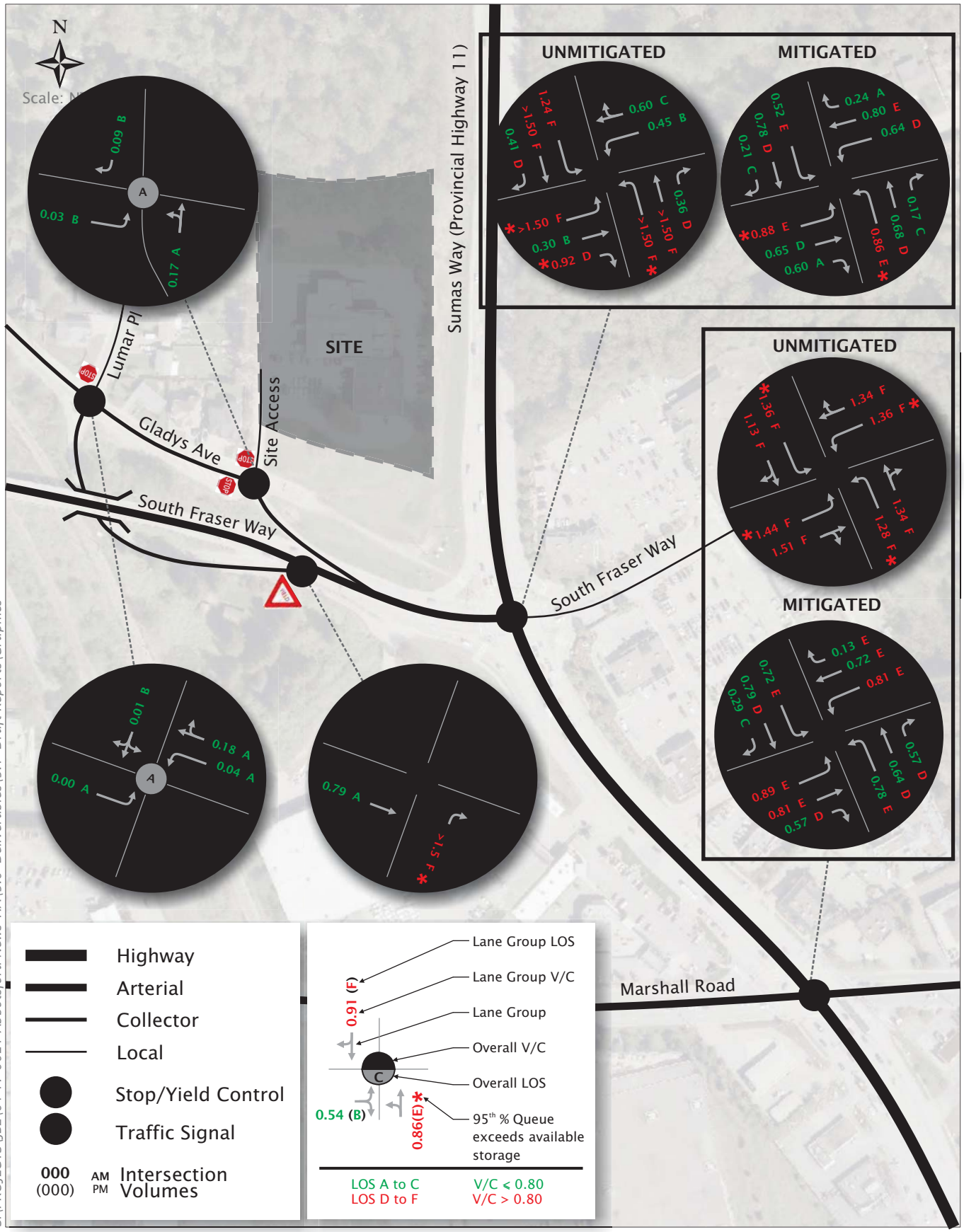

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Exhibit 3.23

2040 Background PM Peak Hour Traffic Operations

34375 Gladys Avenue TIA
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By the 2040 horizon year, the continued growth to the heavy northbound and eastbound left turns as well as northbound and southbound through movements would require one new northbound through lane and one new southbound through lane. This would bring the total through lanes along Sumas Way at South Fraser Way to 4 lanes in each direction. Both the northbound and eastbound left turn traffic volumes would be around 600 vehicles in the PM peak hour, which exceeds the typical capacity of a dual left-turn lane.

For Sumas Way & Marshall Road, compared to the 2031 "Mitigated" scenario, one new northbound through lane was shown to be required to improve the intersection operations.

While the extensive geometric improvements presented would significantly improve traffic operations at Sumas Way & South Fraser Way and Sumas Way & Marshall Road, the overall intersection and many of the individual movements were still shown to operate just over the City's acceptable performance thresholds, but within the thresholds generally accepted throughout Metro Vancouver. However, as these extensive measures would already likely be well beyond what could feasibly be built, no additional mitigation measures were considered. Given the already large intersection footprint and long signal cycle length required to serve all the protected movements, it would not be feasible, or practical, for every individual movement to achieve LOS 'C' or better.

As in previous horizon years, the intersections at Gladys Avenue & Lumar Place and Gladys Avenue at the site access continue to operate within acceptable performance thresholds.

2040 Total Traffic Operations

Exhibits 3.24, **3.25** and **Table 3.12** summarize the Total 2040 traffic conditions and 95th percentile queues with the development in place.

Table 3.12: Total 2040 95th Percentile Queues

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM	PM
South Fraser Way & Sumas Way	EBL	**#98**	**#283**
	EBT	17	59
	EBR	**#107**	**#239**
	WBL	21	58
	WBT	20	124
	NBL	**#107**	**#153**
	NBT	102	#321
	NBR	7	49
	SBL	26	#65
	SBT	#254	#263
	SBR	**63**	50
South Fraser Way & Sumas Way **(Mitigated)**	EBL	36	**#119**
	EBT	15	104
	EBR	0	0
	WBL	23	62
	WBT	18	#94
	WBR	0	0
	NBL	83	#115
	NBT	55	117
	NBR	1	19
	SBL	22	44
	SBT	98	101
	SBR	40	27
Gladys Avenue & Lumar Place	EBL/T/R	0	0
	WBL	1	1
	WBT/R	0	0
	SBL/T/R	1	0
Marshall Road & Sumas Way	EBL	#75	**#302**
	EBT/R	#102	#286
	WBL	#281	**#162**
	WBT/R	#151	#143
	NBL	#74	**#96**
	NBT/R	165	#328
	SBL	#56	**#145**
	SBT/R	#239	#261
Marshall Road & Sumas Way **(Mitigated)**	EBL	31	110

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM	PM
	EBT	30	96
	EBR	28	69
	WBL	98	#66
	WBT	62	52
	WBR	25	28
	NBL	#50	67
	NBT	69	111
	NBR	15	94
	SBL	19	50
	SBT	107	136
	SBR	43	34
Gladys Avenue & Site Access	WBT/R	0	0
	NBT	1	1
	SBR	3	2
Gladys Avenue Underpass & South Fraser Way	EB	0	0
	NB	29	**Err**

Note:
Bolded results indicate 95th percentile queues that exceed the available turning bay storage length.
"-" indicates a value not applicable to that particular intersection or movement.
"#" indicates that the 95th percentile volume exceeds capacity, therefore vehicle queue may be longer than reported.
"m" indicates that volume for 95th percentile queue is metered by upstream signal

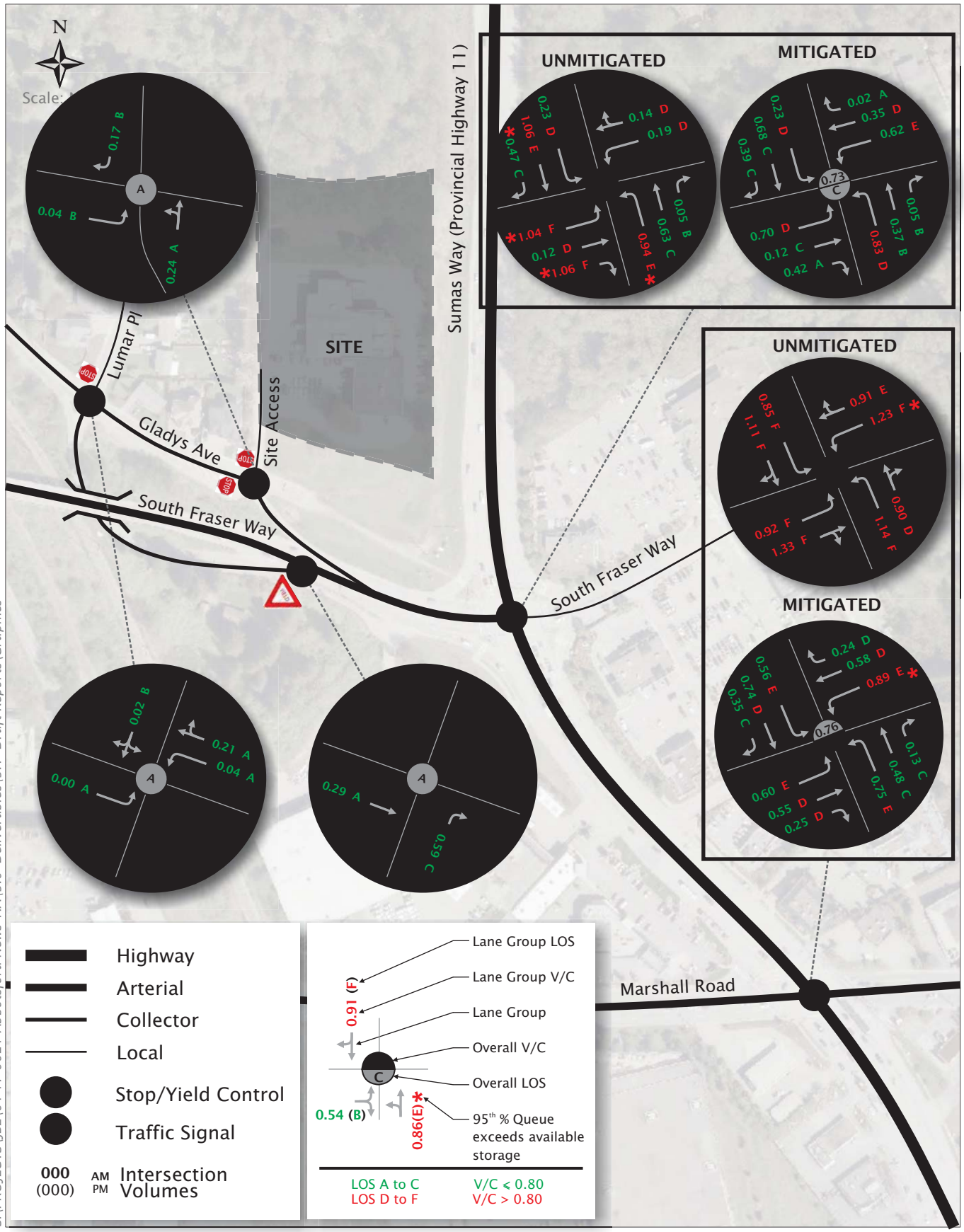

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Exhibit 3.24

2040 Total AM Peak Hour Traffic Operations

34375 Gladys Avenue TIA
04-17-0021 September 2018

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Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

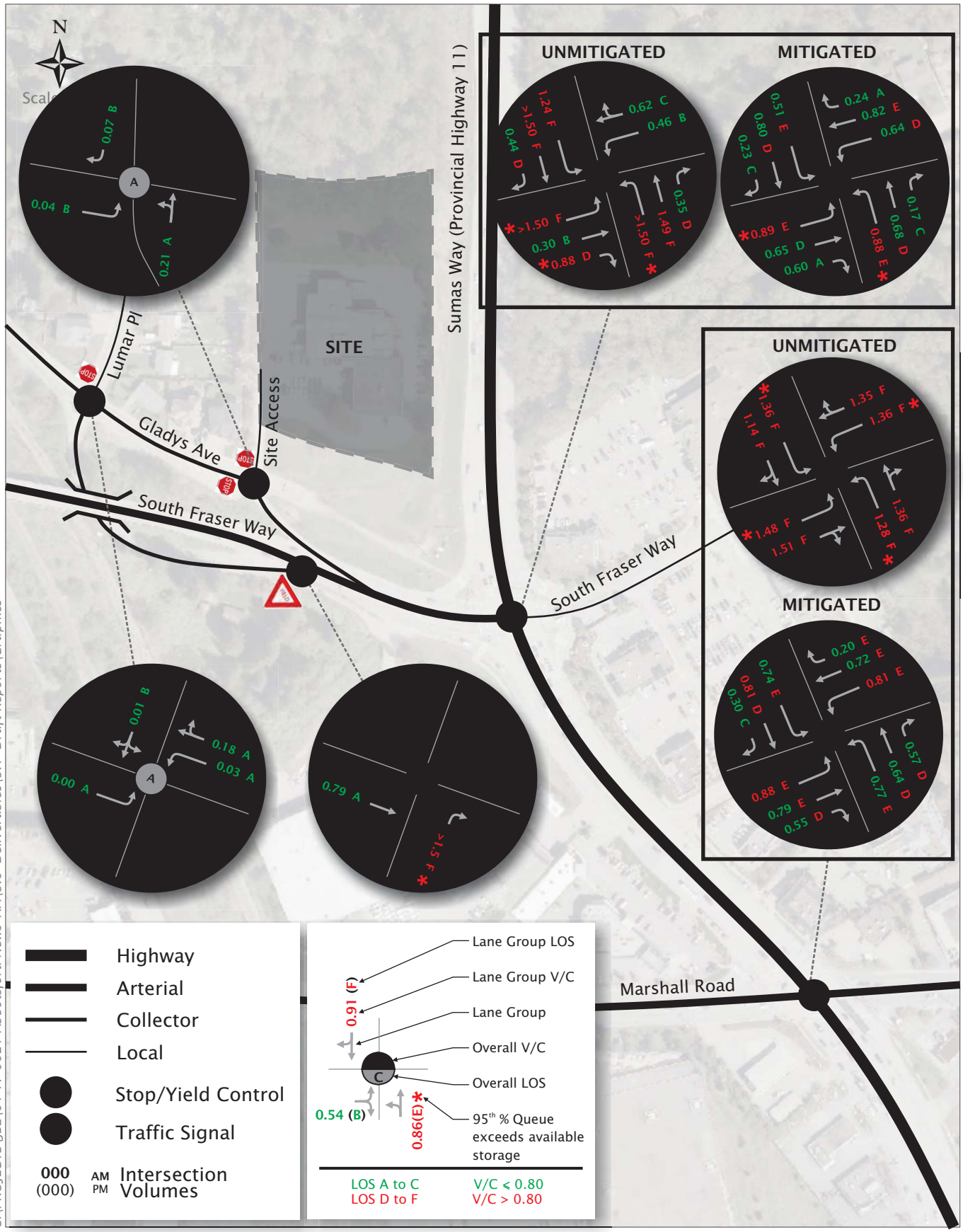

Exhibit 3.25

2040 Total PM Peak Hour Traffic Operations

34375 Gladys Avenue TIA
04-17-0021 September 2018

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As the exhibits indicate, the effects of the site traffic are shown to be marginal when compared to Background operations. The overall intersection of Sumas Way & South Fraser Way is predicted to operate at LOS 'C' and V/C ratio of 0.73 in the AM peak hour and LOS 'D' and V/C ratio of 0.85 in the PM peak hour (with mitigation). Sumas Way & Marshall Road is expected to operate with an LOS 'D' and V/C ratio of 0.76 overall in the AM peak hour and LOS 'D' and V/C ratio of 0.83 in the PM peak hour (with mitigation). Once again, even with site traffic added, the intersections of Gladys Avenue & Lumar Place and Gladys Avenue at the site access were shown to continue operating within acceptable performance thresholds.

3.3 Summary of Traffic Impacts & Recommended Mitigations

The analysis showed that both the intersections of Sumas Way & South Fraser Way and Sumas Way & Marshall Road currently exceed the City's acceptable performance thresholds during both the weekday AM and PM peak hours. Significant geometric improvements would be required under both existing and future conditions to bring both intersections to within the City's acceptable performance thresholds. The mitigation measures required for each analysis year are shown below:

3.3.1 Sumas Way & South Fraser Way

Existing

- Dual eastbound left-turn lanes;
- Protected/permissive phasing for the westbound left-turn;
- One new westbound right-turn lane; and,
- Upgrade of the eastbound right-turn to "free flow" with an add lane on Sumas Way.

2020

- No additional mitigation measure required beyond what was assumed in existing conditions.

2031

- One new southbound through lane;
- One new northbound through lane; and,
- Conversion of the westbound right-turn movement from a channelized yield to a free-flow condition with add lane.

2040

- One new southbound through lane; and,
- One new northbound through lane.

3.3.2 Sumas Way & Marshall Road

Existing

- Dual eastbound left-turn lanes;
- Dual westbound left-turn lanes;

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

- One new eastbound right-turn lane;
- One new westbound right-turn lane;
- One new northbound right-turn lane; and,
- One new southbound right-turn lane.

2020

- One new southbound through lane.

2031

- Southbound dual left-turn lanes;
- One new southbound through lane;
- One new northbound through lane;
- One new eastbound through lane; and,
- One new westbound through lane.

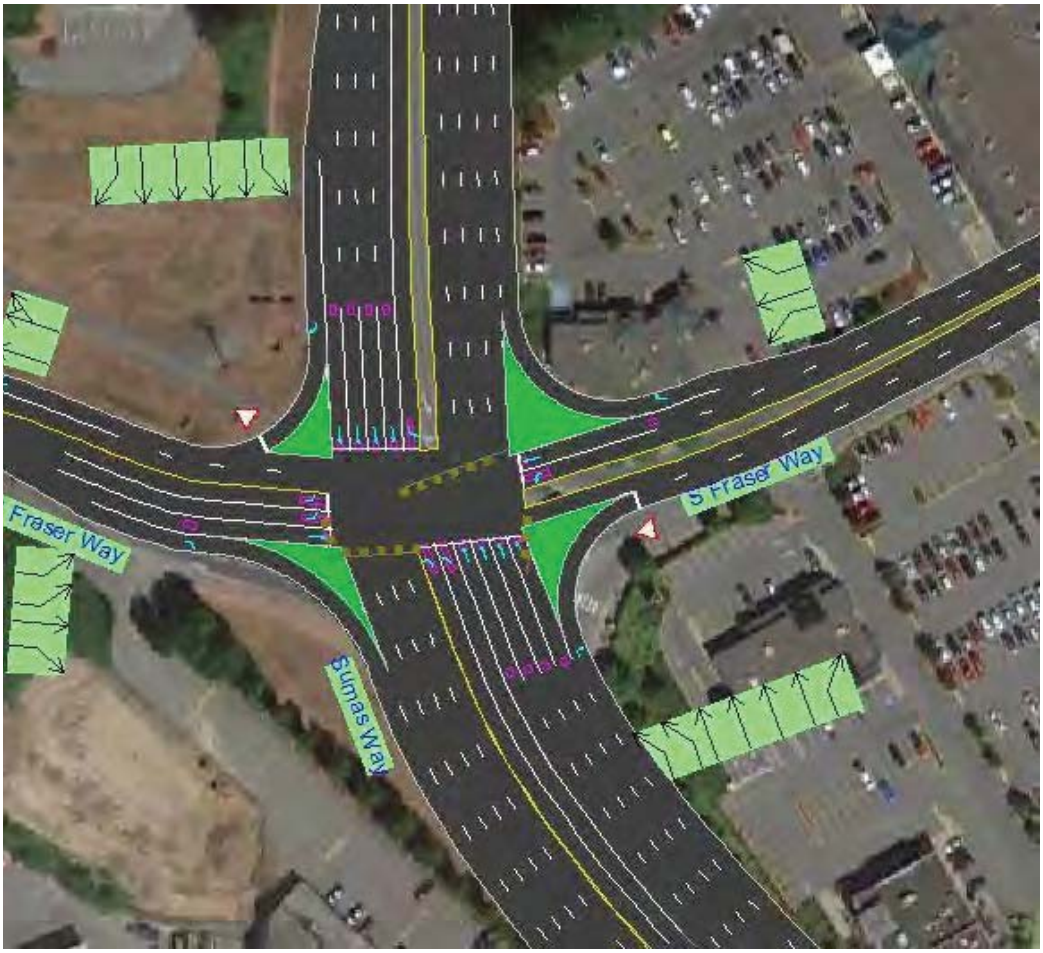
2040

- One new northbound through lane.

To address issues identified for Existing conditions, the geometric improvements required would be limited to improvements to left and right-turn movements at both intersections, which would still likely exceed the short-term improvements the City has envisioned for the area.

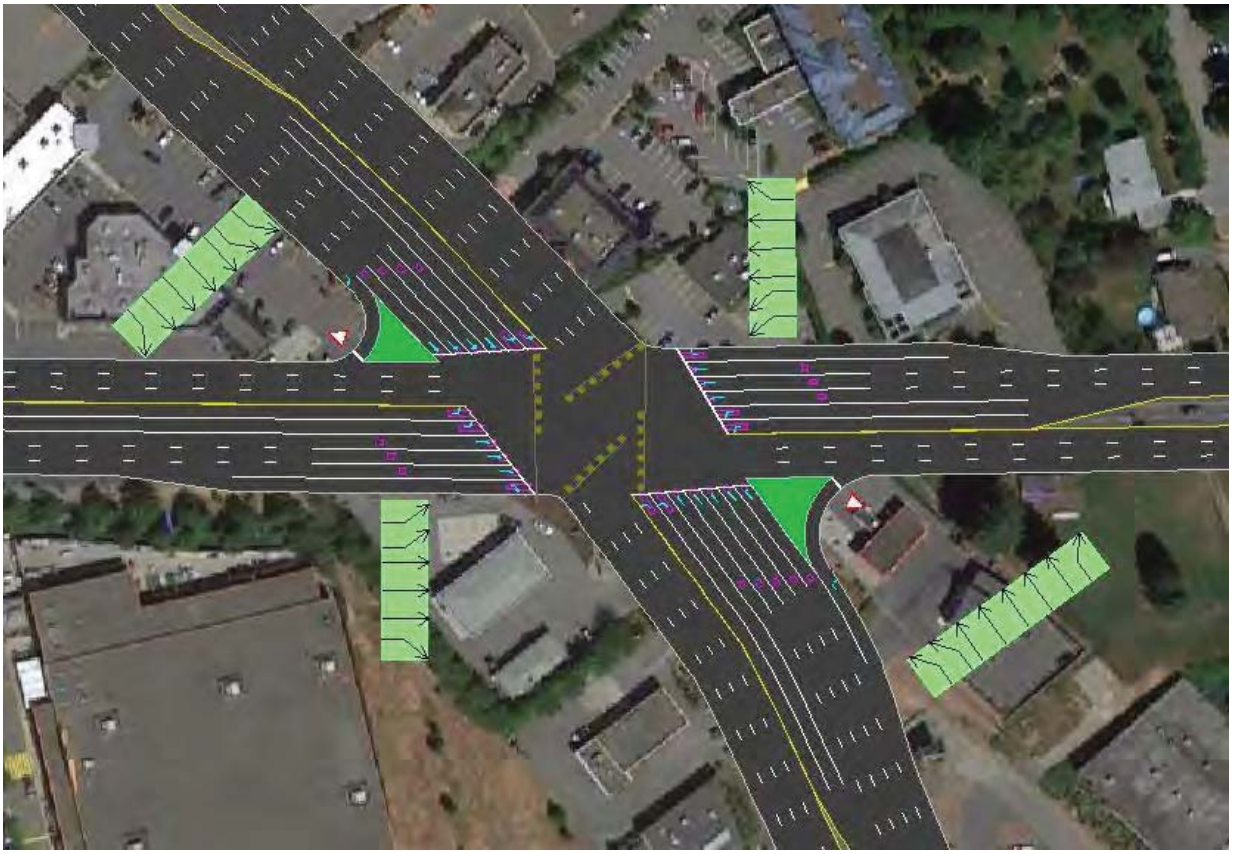
By the 2040 horizon year, with a 2% annual background growth rate assumed, the through movement and left-turn capacities at both Sumas Way & South Fraser and Sumas Way & Marshall Road were found to be insufficient and therefore additional lanes would be required at both intersections. The Background and Total 2040 mitigated intersection footprint for both intersections would far exceed the available road right-of-way and thus a significant amount of land acquisition would likely be required to add the lanes. However, introducing dual left turn lanes and three to four through lanes on several approaches is likely beyond what is practical for the area. **Figure 3.1 and 3.2** show a conceptual layout of the 2040 "Mitigated" intersection geometry from Bunt's Synchro analysis model for the Sumas Way & South Fraser Way and Sumas Way & Marshall Road intersections, respectively.

Figure 3.1: Sumas Way & South Fraser Way – Background/Total 2040 with Mitigations



Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Figure 3.2: Sumas Way & Marshall Road – Background/Total 2040 with Mitigations



When reviewing the required mitigation measures, it is important to emphasize that given the small net new site trips expected to be generated by the proposed development, no mitigation measures at the two major signalized intersections were found to be trigged by the development traffic. All mitigation measures required in the Total scenario for each horizon year were also required in the Background scenario. This indicates the need for mitigation measures are driven by the assumed 2% background growth rate and all mitigation measures would be required with or without the proposed development.

It is evident that should 2% per year background growth be realized, in order to truly achieve acceptable traffic performance at the two critical intersections along Sumas Way in the 2040 horizon year, either grade separation would be required or some combination of improvements to both the subject intersections and other intersections in the nearby road network to relieve traffic volumes at Sumas Way & South Fraser Way and Sumas Way & Marshall Road.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Grade Separation

In terms of grade separation, similar to the interchange designs north of the study area at Sumas Way & Old Yale Road and Sumas Way & Old Clayburn Road, Sumas Way could become grade separated to provide free-flow conditions for the heavy northbound and southbound through movements along Sumas Way. The feasibility, form, and operations of this grade separation would best be explored in a corridor study of Sumas Way from the Highway 1 interchange to South Fraser Way.

Improvements to Other Intersections to Relieve Traffic Volumes

Under Existing conditions, the eastbound left-turn and northbound left-turn at Sumas Way & South Fraser Way were found to be among the busiest and most congested individual movements. From a network perspective, these heavy left-turns are likely in part due to the inability for drivers to perform either a northbound left-turn or eastbound left-turn at the Sumas Way & Old Yale Road interchange, and therefore these movements are made at the Sumas Way & South Fraser Way intersection instead.

However, if the on and off ramps on the east side of the Sumas Way & Old Yale Road interchange were to be upgraded to allow northbound to westbound and eastbound to northbound left-turns then this interchange would present a viable alternative route for vehicles travelling from the east of Abbotsford toward the City Centre and for vehicles travelling from the City Centre towards the north. Therefore, improvements at the Sumas Way & Old Yale Road interchange could potentially reduce the vehicle demand, particularly for the northbound left turn and eastbound left turn movements, at the intersection of Sumas Way & South Fraser Way. These potential improvements are presented for future consideration purposes only and the detailed effects of these nearby network improvements would best be explored in a regional model, which is beyond the scope of this study.

Recommended Improvements

While the "Mitigated" intersection geometry shown in Figure 3.2 and 3.3 is likely beyond what is practical for the area, the analysis found that the even under Existing conditions both the major signalized intersections exceed the City's acceptable performance thresholds and thus some mitigation measures should be considered. Bunt recommends the City / BC MoTI consider the following mitigation measures to help improve both existing and future traffic operations:

- Sumas Way & South Fraser Way:
    - Dual eastbound left-turn lanes;
    - Protected/Permitted phasing for the westbound left turn in the PM peak hour; and,
    - Upgrade the eastbound right-turn lane from a channelized yield to a free-flow.
- Sumas Way & Marshall Road:
    - Dual eastbound and westbound left-turn lanes;
    - Dedicated right-turn lanes for the east and westbound right-turns.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

These measures would not bring the existing and future traffic operations within the City's acceptable performance thresholds. However, they would considerably improve the operations for some of the worst performing movements. These mitigation measures are considered more reasonable compared to the entire set of mitigation measures shown in Figure 3.2 and 3.3 given the local area context, available right-of-way, and extent of property acquisition. Furthermore, the recommended improvements at Sumas Way & Marshall Road follow the previously recommended improvements in the City's 2007 TMP.

Aside from these measures, Bunt recommends that the City conduct a macroscopic traffic assessment of the City's entire road network in the future to more accurately forecast Background traffic growth in this area before deciding what infrastructure upgrades at the major study intersections should be implemented. As emphasized in this report, the results of Bunt's future traffic operations analysis are based on a 2% per year growth rate assumption that we do not feel is realistic for the reasons mentioned in Section 3.12. A macroscopic model analysis would be able to account for several factors not possible in a site-specific TIA study, such as redistribution of traffic as major roadways reach capacity, area wide effects of development and infrastructure changes around the City, and potential future shifts in travel mode from reliance on private automobile trips.

3.4 Sumas Way and Marshall Road – Higher Trip Distribution Sensitivity Analysis

When the original January 2018 study for this site was conducted, the City requested that a further sensitivity analysis be conducted where a higher site trip assignment to both Marshall Road and Sumas Way was assumed. At that time, the proposed development included both a commercial and residential component and was expected to generate approximately twice as many net new vehicle trips.

The results of this previous sensitivity test indicated that even when all the site traffic were assumed to access the site through Sumas Way and none of it through Gladys Avenue, the net effect was expected to be minimal. As such, for the current study, while Bunt did not re-run the analysis, because the net new site trips for the currently proposed development (i.e., residential only) have now been reduced by half, Bunt can conclude that the effect of distributing all site traffic to Sumas Way would not have a material effect on the traffic operations of the road network.

3.5 Gladys Avenue Connector - Sensitivity Analysis

As discussed in Sections 2.3, to provide better road network connectivity and remove potential traffic congestion and safety implications of the existing merge from Gladys Avenue onto eastbound South Fraser Way, the 2007 TMP recommended the introduction of a Gladys Avenue Connector, which would be a road interconnection between Gladys Avenue and Marshall Road as a possible parallel route to Sumas Way. With the connection in place, both the merge from Gladys Avenue onto South Fraser Way and the exit route from South Fraser Way to Gladys Avenue would be closed.

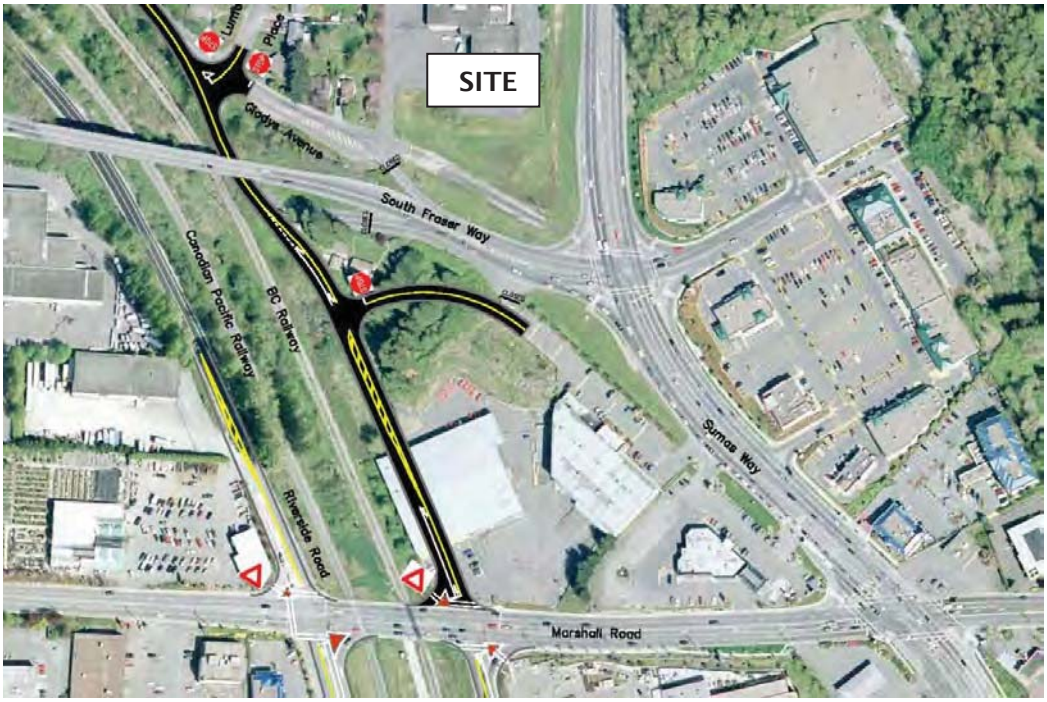
Although the Gladys Avenue Connector was not included in the recently released 2018 Transportation & Transit Master Plan (TTMP), at the outset of Bunt's original TIA study which preceded the release of the TTMP, the City requested that Bunt assess the implications on traffic operations of the Gladys Avenue

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Connector. While it appears that the Connector is no longer a priority for the City, for informational purposes, Bunt has kept the analysis of the Connector in this document and updated the results to reflect the currently proposed development plan.

To assess the implications on traffic operations of the Connector, Bunt conducted a sensitivity analysis with the connector in place for the 2031 and 2040 horizon years, as it was assumed that it would not be in place until at least 2031. It should be noted that a timeline for the implementation of the Gladys Avenue Connector was not provided in the City's 2007 TMP or Gladys Avenue Special Report. The conceptual layout of the Gladys Avenue Connector is shown once again in **Figure 3.3**.

Figure 3.3: Gladys Avenue Connector Conceptual Layout



Source: Gladys Avenue Special Report

3.5.1 Traffic Redistribution

To reflect the change in traffic patterns with the connector in place, Bunt redistributed background and site traffic volumes to take into account the closure of the ramps to/from South Fraser Way and Gladys Avenue. The resulting Background and Total traffic volumes for the 2031 and 2040 horizon years are shown in **Exhibits 3.26, 3.27, 3.28** and **3.29**.

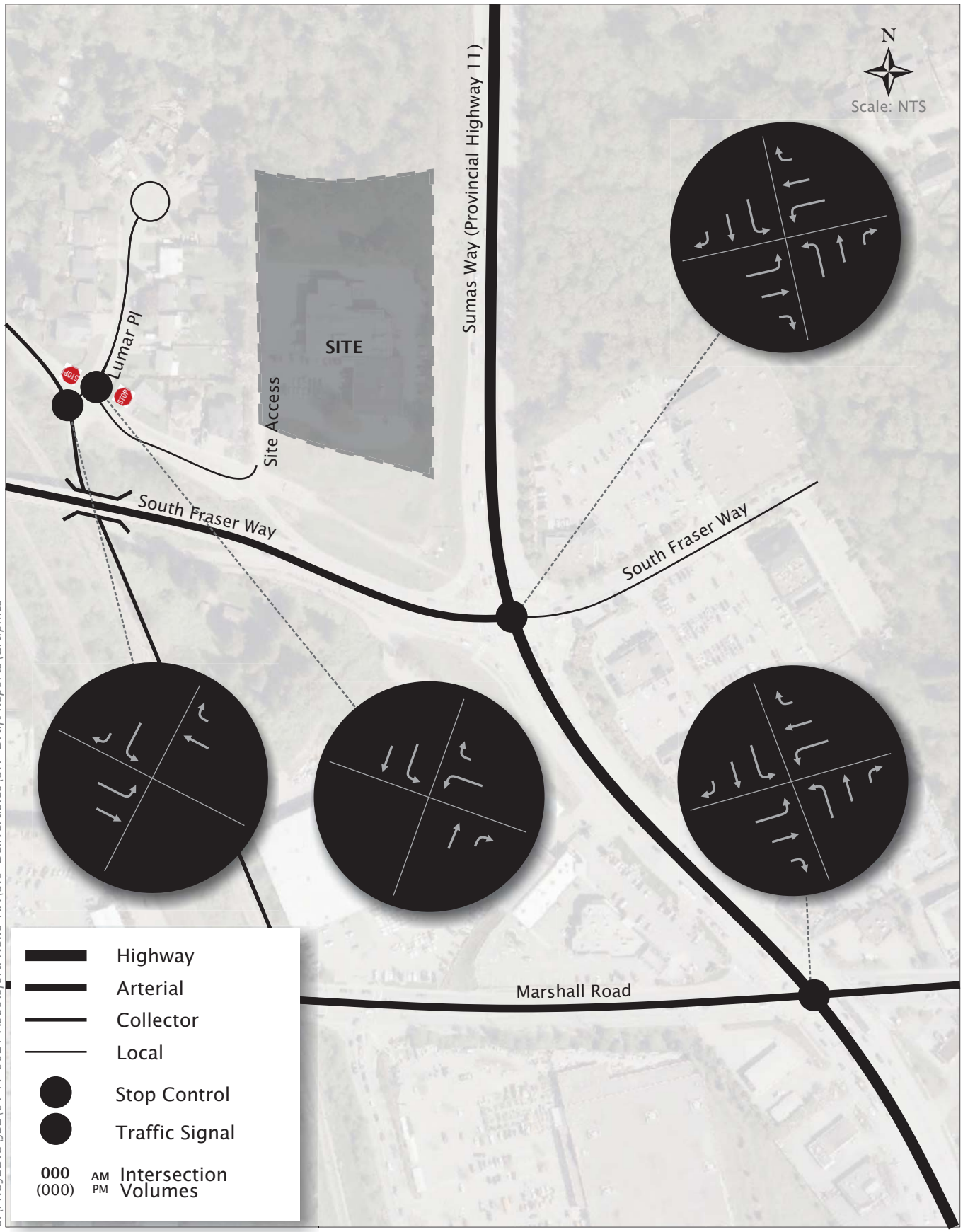


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Exhibit 3.26

Background 2031 Gladys Sensitivity Peak Hour Traffic Volumes

34375 Gladys Avenue TIA

04-17-0021 September 2018

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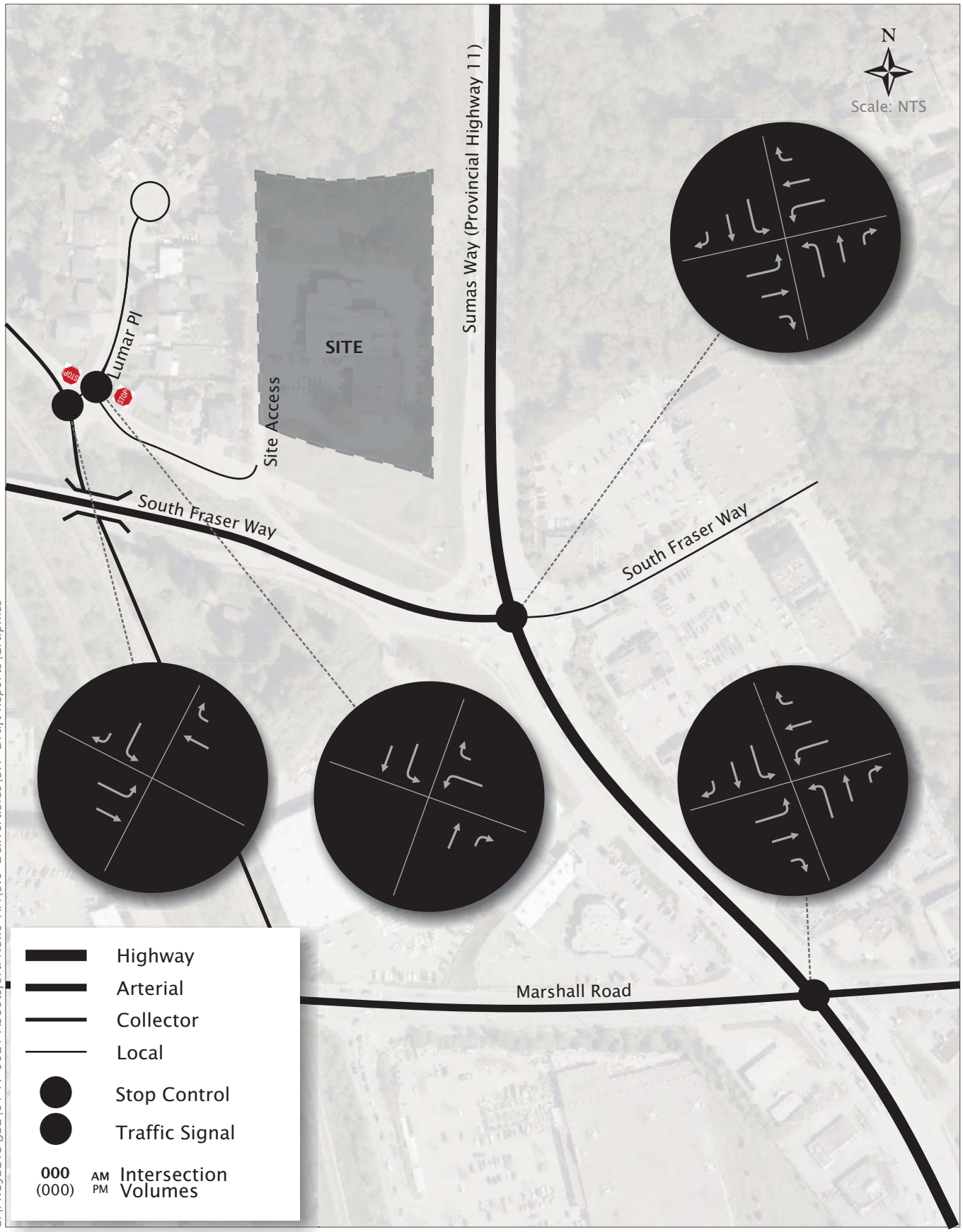

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Exhibit 3.27

Total 2031 Gladys Sensitivity Peak Hour Traffic Volumes

34375 Gladys Avenue TIA

04-17-0021 September 2018

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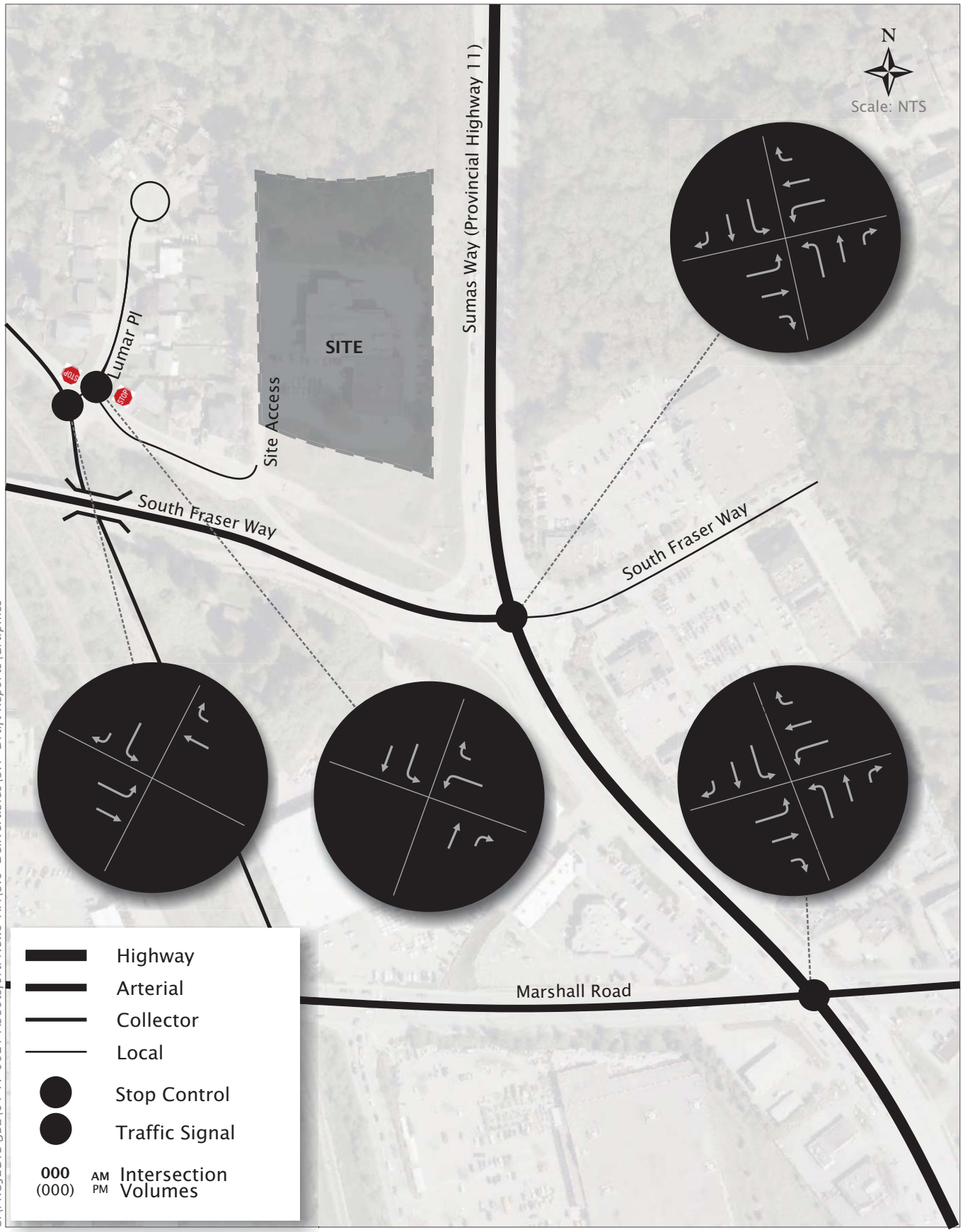

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Exhibit 3.28

Background 2040 Gladys Sensitivity Peak Hour Traffic Volumes

34375 Gladys Avenue TIA

04-17-0021 September 2018

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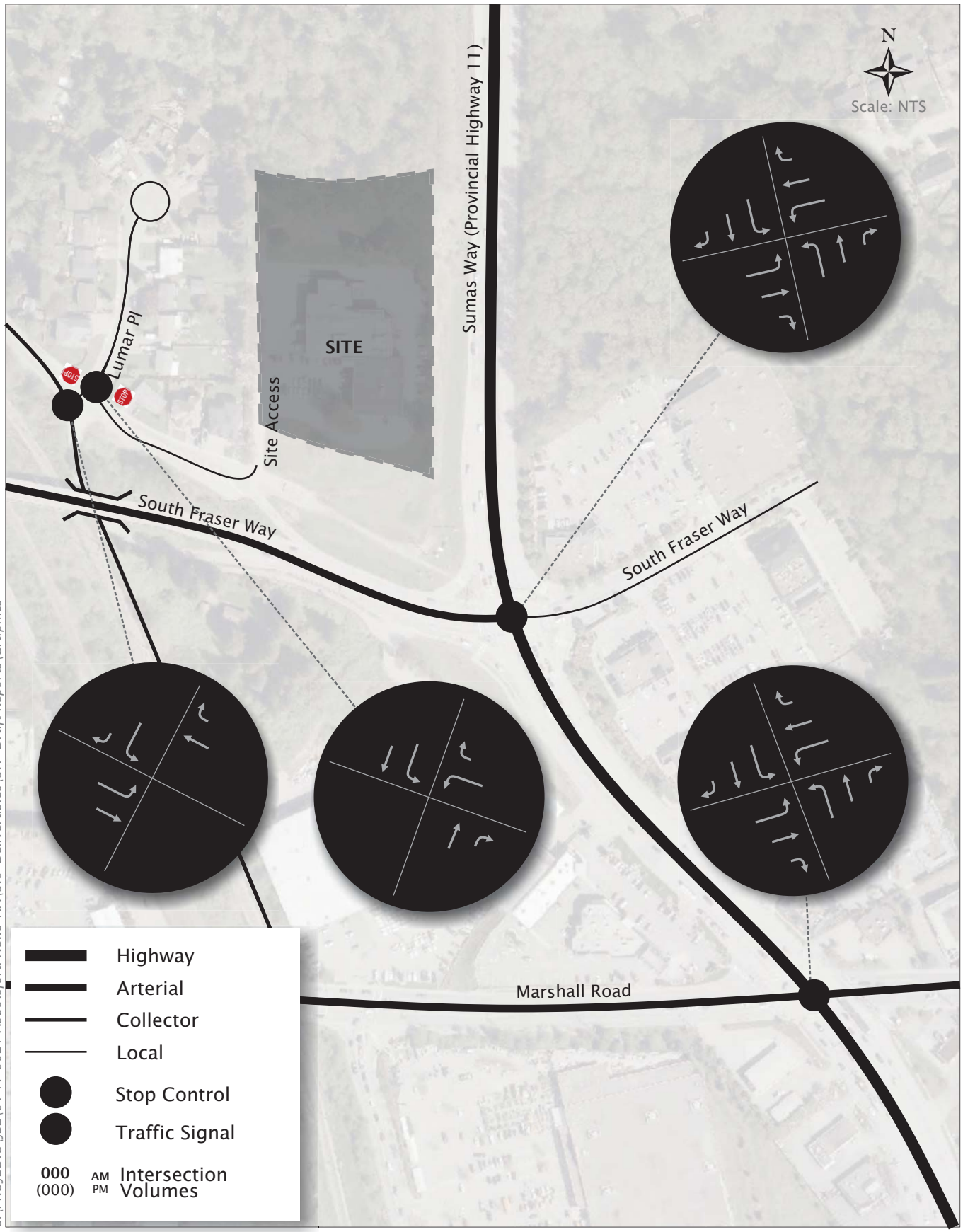

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Exhibit 3.29

Total 2040 Gladys Sensitivity Peak Hour Traffic Volumes

34375 Gladys Avenue TIA

04-17-0021 September 2018

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Specifically, background and site traffic volumes using the existing merge from Gladys Avenue onto eastbound South Fraser Way were rerouted southwards along the new connector and onto Marshall Road. Likewise, traffic volumes using the exit ramp from westbound South Fraser Way onto Gladys Avenue were re-routed to Marshall Road and then assumed to continue onto the Gladys Avenue Connector.

3.5.2 Traffic Operations Comparison

Table 3.13 below shows a comparison of the overall intersection V/C ratios and LOS ratings of the Total traffic scenario with the Gladys Avenue Connector versus the base case Total scenario with the existing road network. Of note, the results below also take into account the same mitigation measure assumptions discussed in Section 3.2.1 for each respective horizon year. With the implementation of the Gladys Avenue Connector, two unsignalized intersections are created at the Gladys Avenue and Lumar Place interface. These unsignalized intersections were found to operate within acceptable performance thresholds under all horizon years under Background and Total traffic scenarios. Traffic operations results for the Background and Total 2031 and 2040 scenarios (with mitigation) of the network with the Gladys Avenue Connector are provided in **Exhibits 3.30 to 3.37** and **Tables 3.14 to 3.17.** In addition, the full Synchro outputs for each scenario are included in **Appendix E**.

Table 3.13: Gladys Avenue Connector – 2031 and 2040 Total Traffic Operations

HORIZON YEAR & PEAK PERIOD	INTERSECTION	WITHOUT GLADYS CONNECTOR		WITH GLADYS CONNECTOR	
		OVERALL V/C	OVERALL LOS	OVERALL V/C	OVERALL LOS
2031 AM	South Fraser Way & Sumas Way	0.72	C	0.70	C
	Marshall Road & Sumas Way	0.70	**D**	0.71	**D**
2031 PM	South Fraser Way & Sumas Way	**0.81**	**D**	0.71	C
	Marshall Road & Sumas Way	0.78	**D**	**0.79**	**D**
2040 AM	South Fraser Way & Sumas Way	0.73	C	0.70	C
	Marshall Road & Sumas Way	0.76	**D**	**0.84**	**D**
2040 PM	South Fraser Way & Sumas Way	**0.85**	**D**	0.71	C
	Marshall Road & Sumas Way	**0.83**	**D**	**0.88**	**D**

Note:
Bolded results indicate a V/C ratio or LOS value that does not meet acceptable performance criteria or a 95th percentile queue that exceeds the available turning bay storage length.

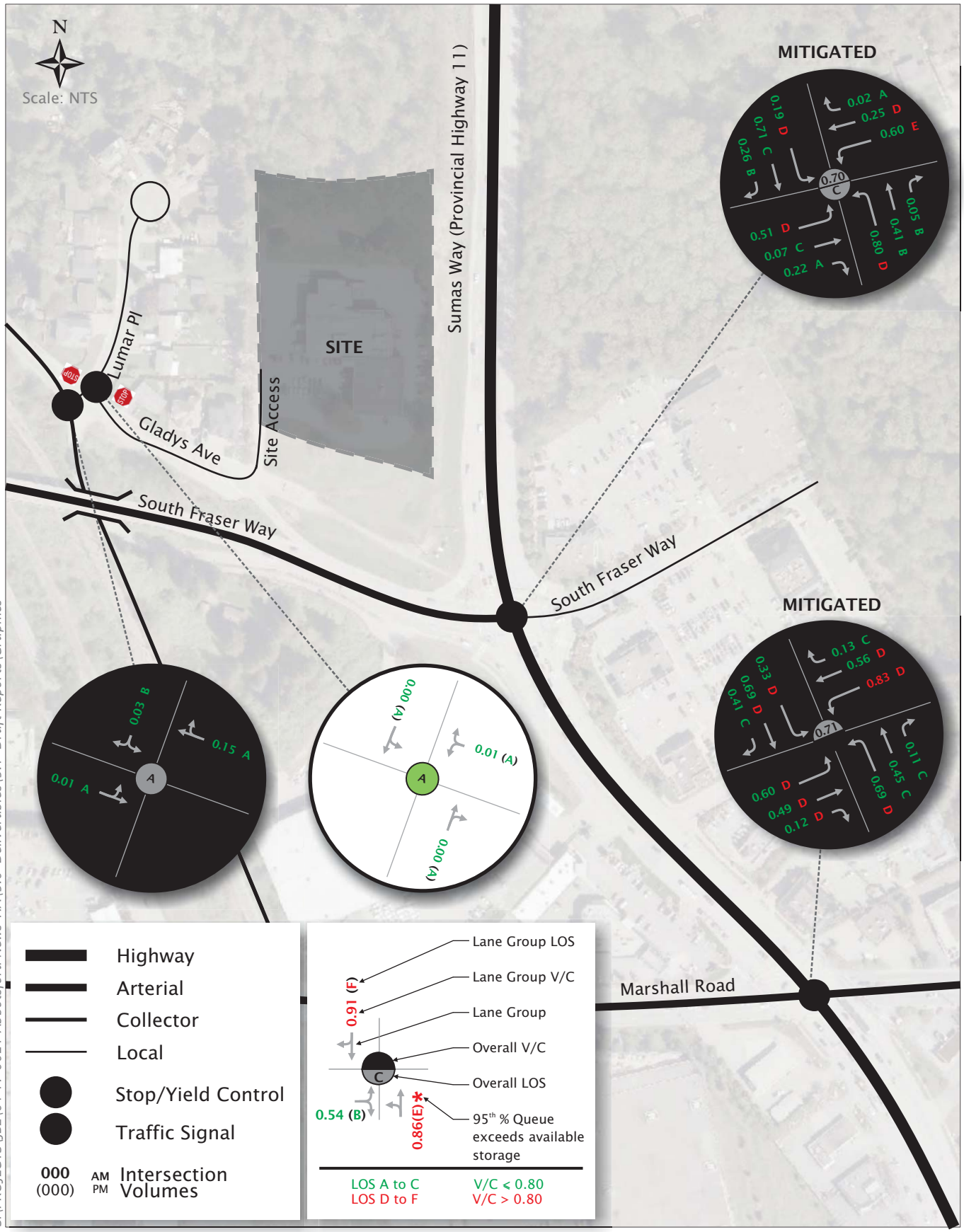

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Exhibit 3.30

2031 Gladys Sensitivity
Background AM Peak Hour Traffic Operations

34375 Gladys Avenue TIA
04-17-0021 September 2018

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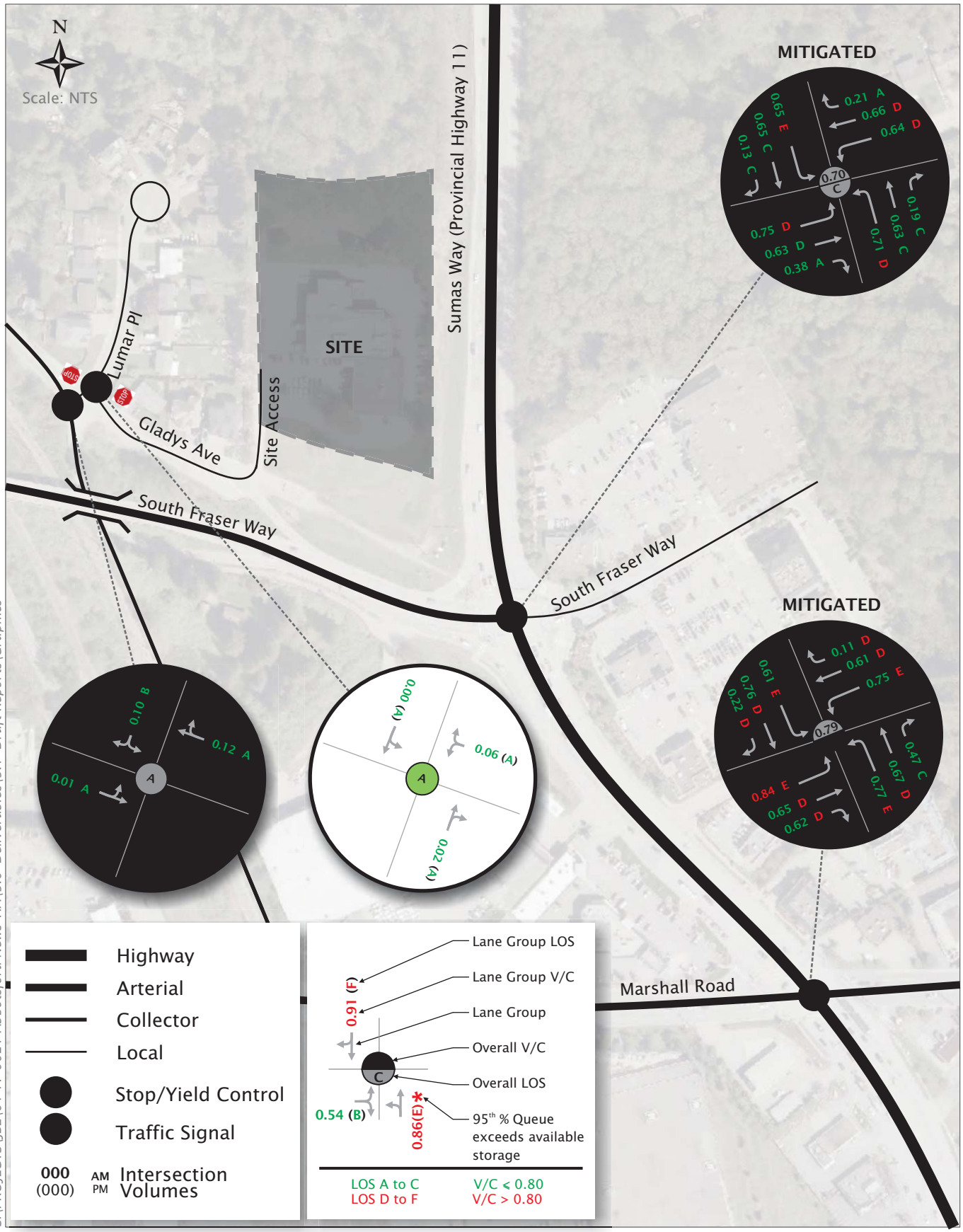

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Exhibit 3.31

2031 Gladys Sensitivity
Background PM Peak Hour Traffic Operations

34375 Gladys Avenue TIA
04-17-0021 July 2018

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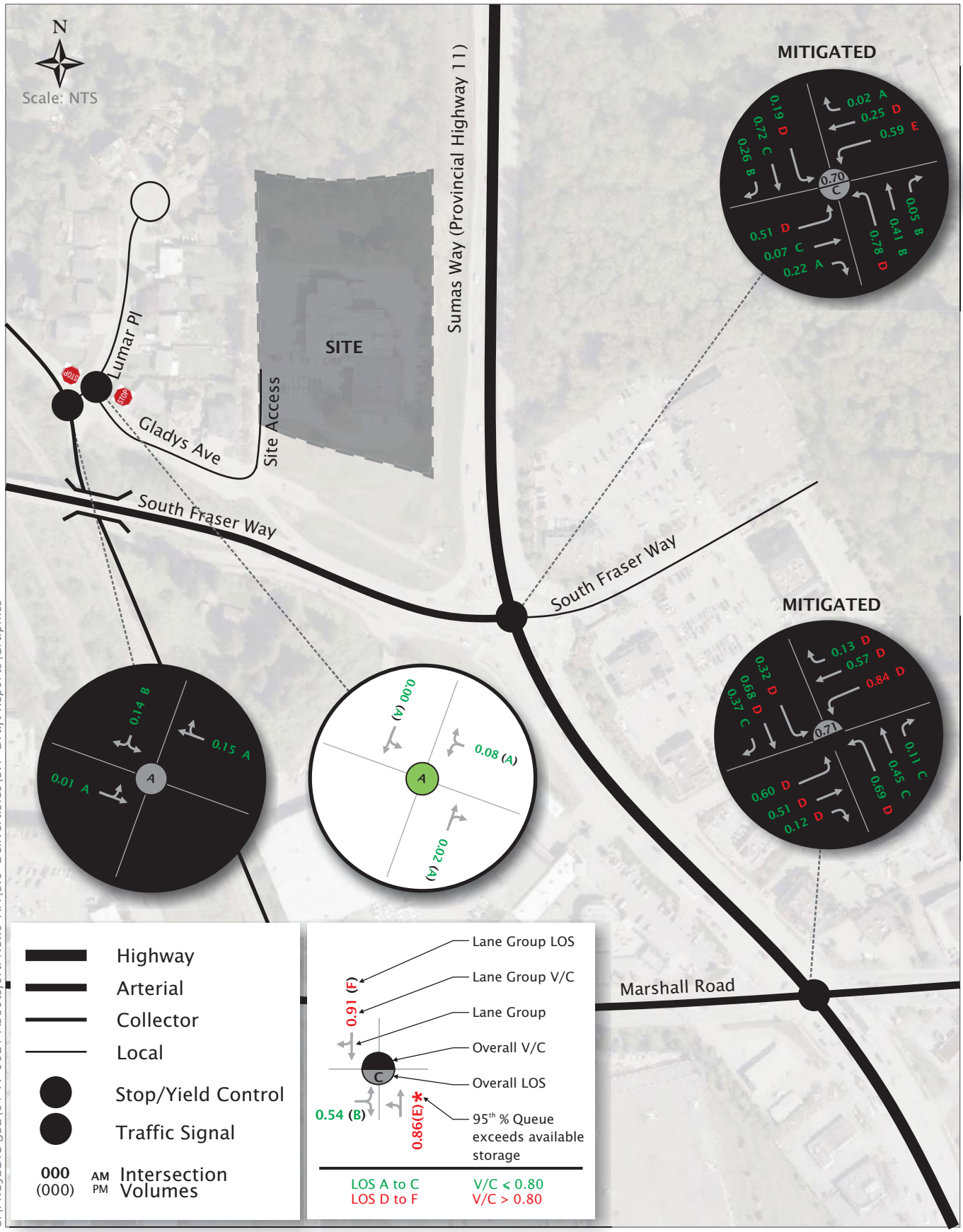

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Exhibit 3.32

2031 Gladys Sensitivity
Total AM Peak Hour Traffic Operations

34375 Gladys Avenue TIA
04-17-0021 September 2018

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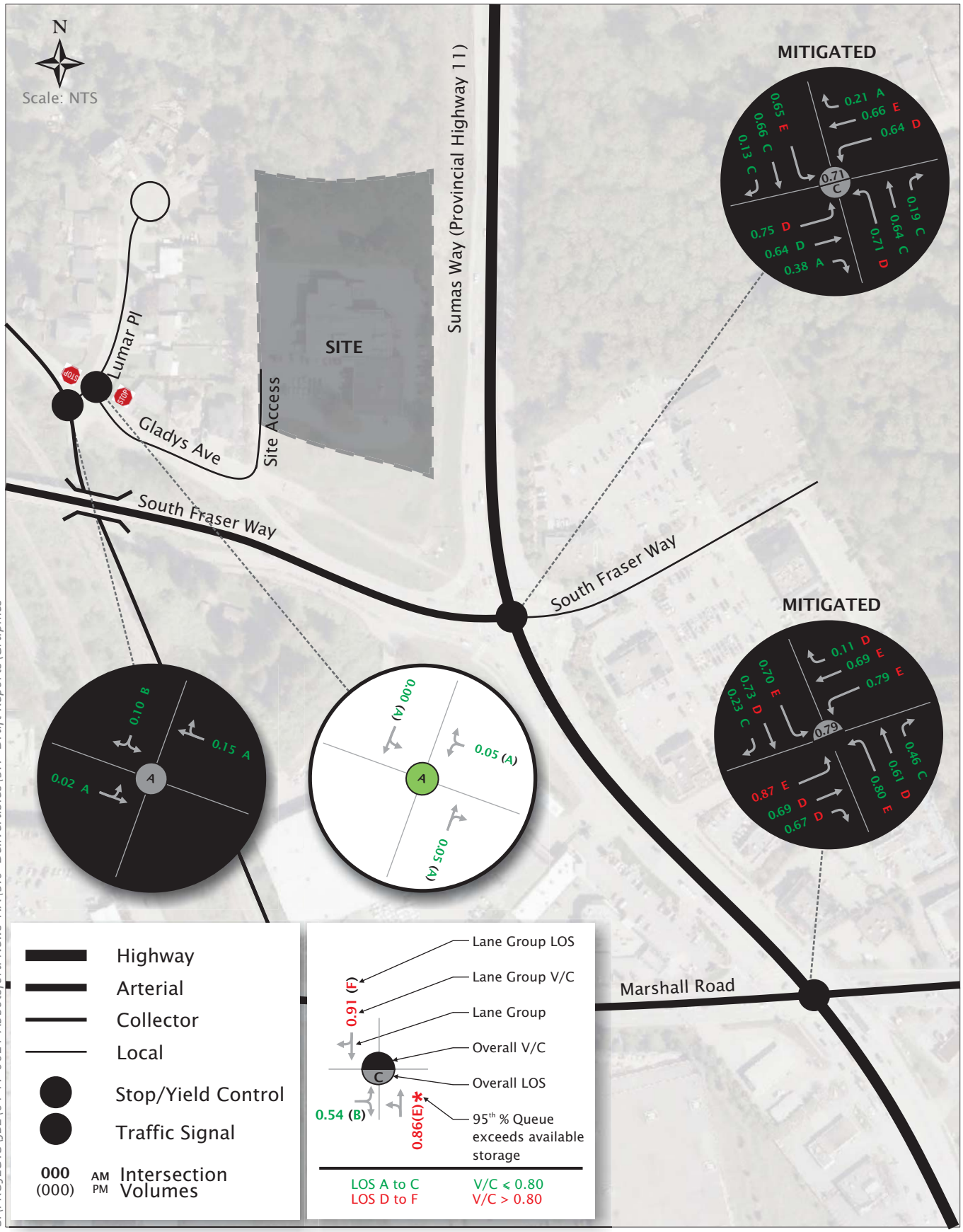

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Exhibit 3.33

2031 Gladys Sensitivity
Total PM Peak Hour Traffic Operations

34375 Gladys Avenue TIA
04-17-0021 September 2018

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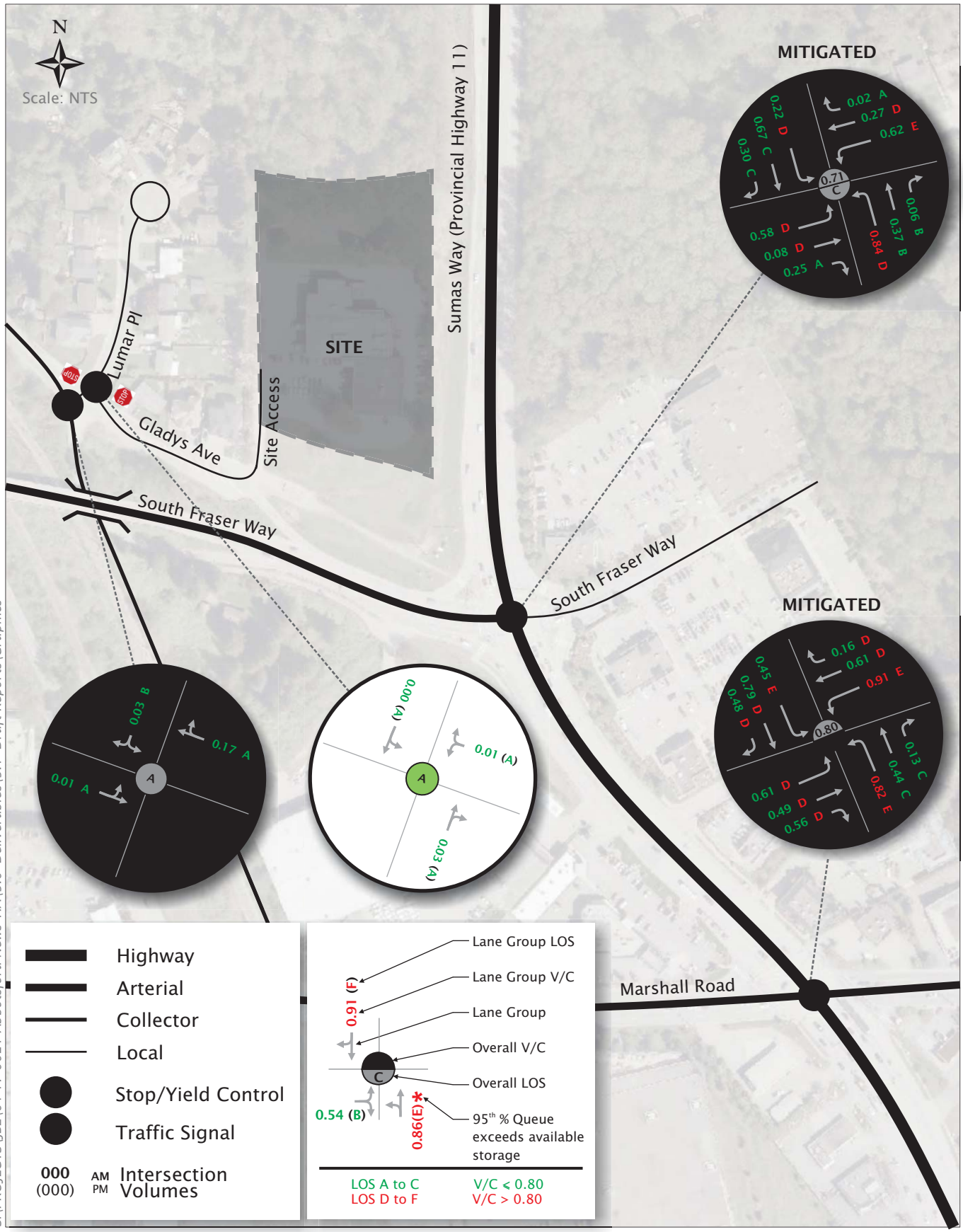

Exhibit 3.34

2040 Gladys Sensitivity
Background AM Peak Hour Traffic Operations

34375 Gladys Avenue TIA
04-17-0021 September 2018

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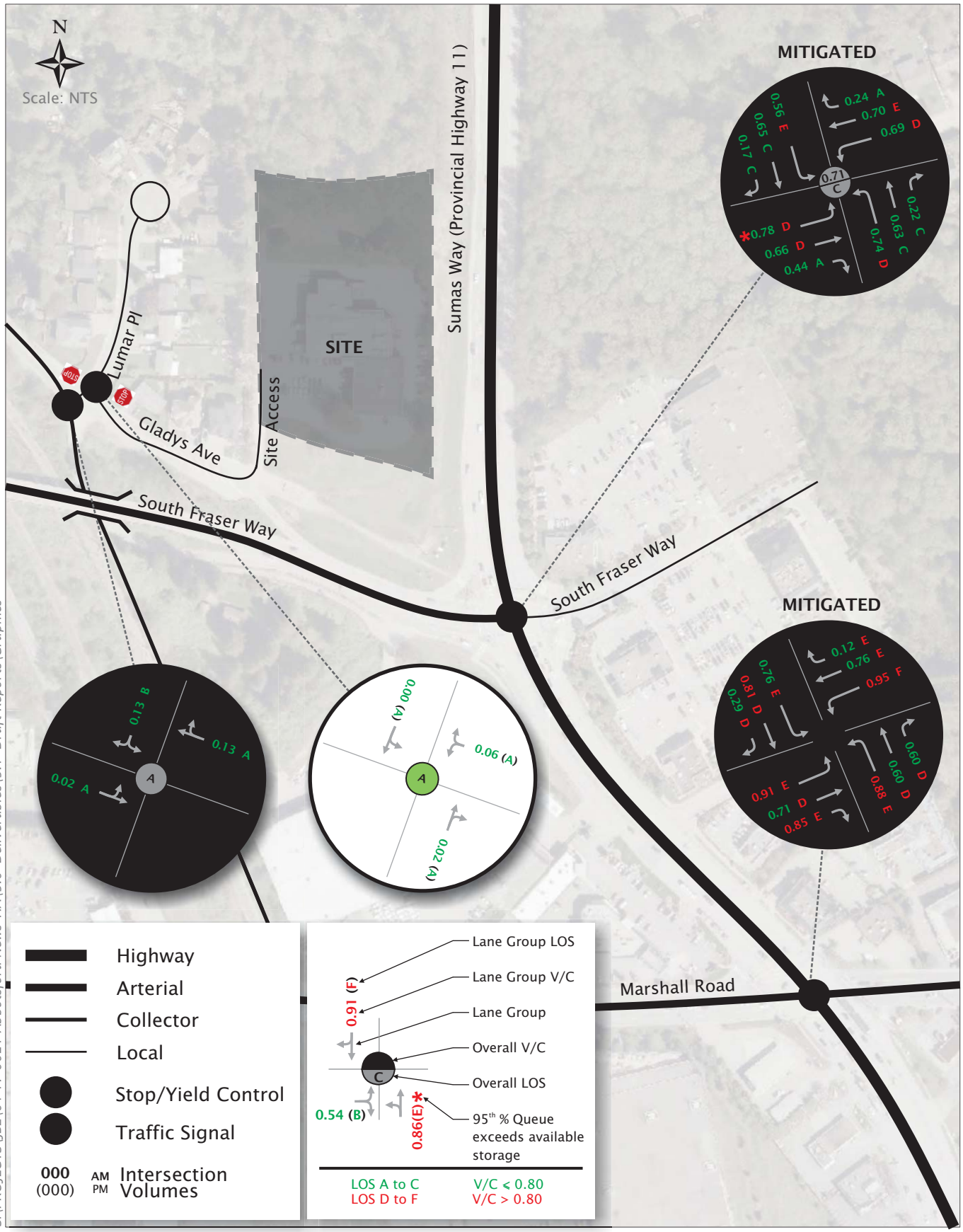

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Exhibit 3.35

2040 Gladys Sensitivity
Background PM Peak Hour Traffic Operations

34375 Gladys Avenue TIA
04-17-0021 September 2018

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Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

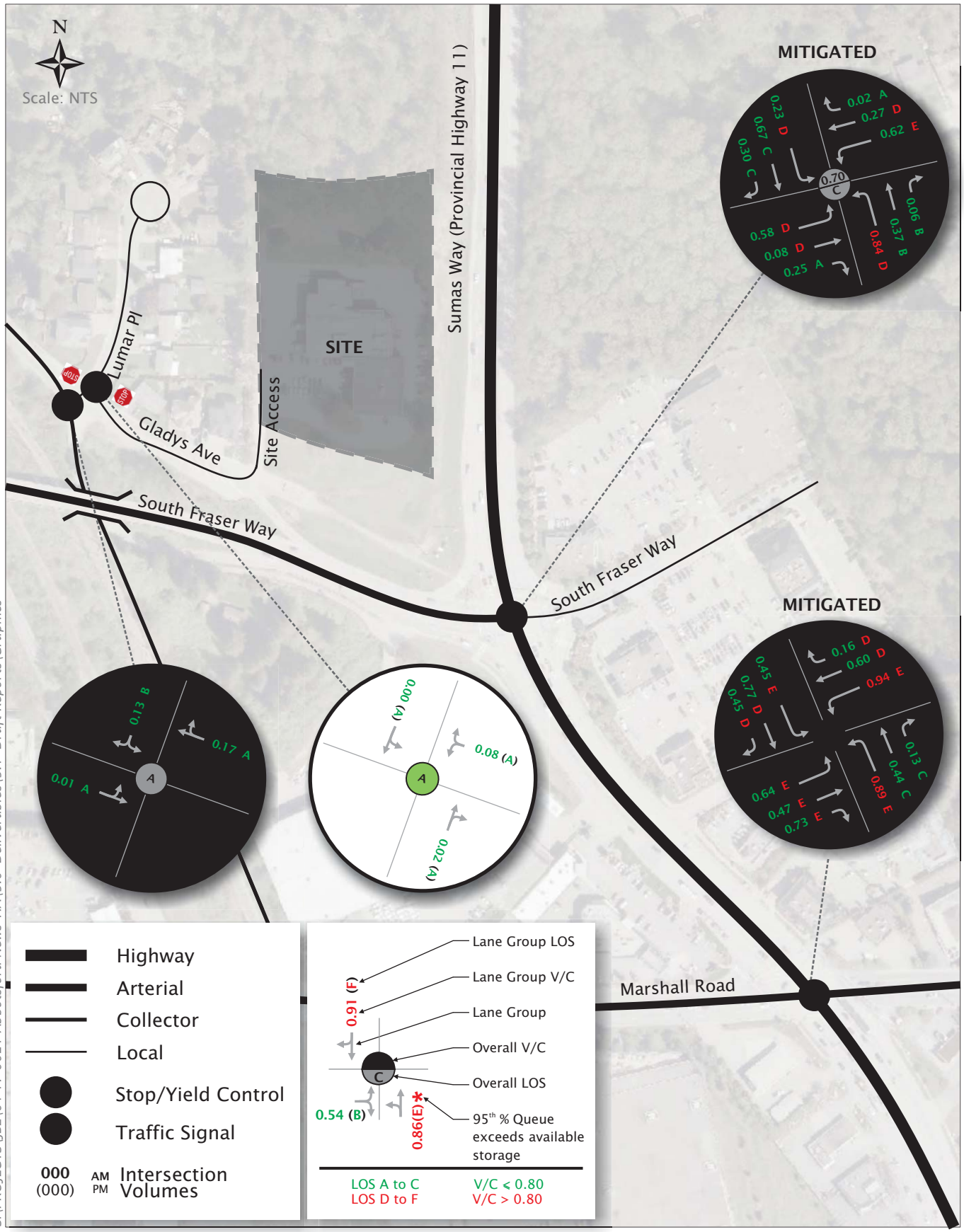

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Exhibit 3.36

2040 Gladys Sensitivity
Total AM Peak Hour Traffic Operations

34375 Gladys Avenue TIA
04-17-0021 September 2018

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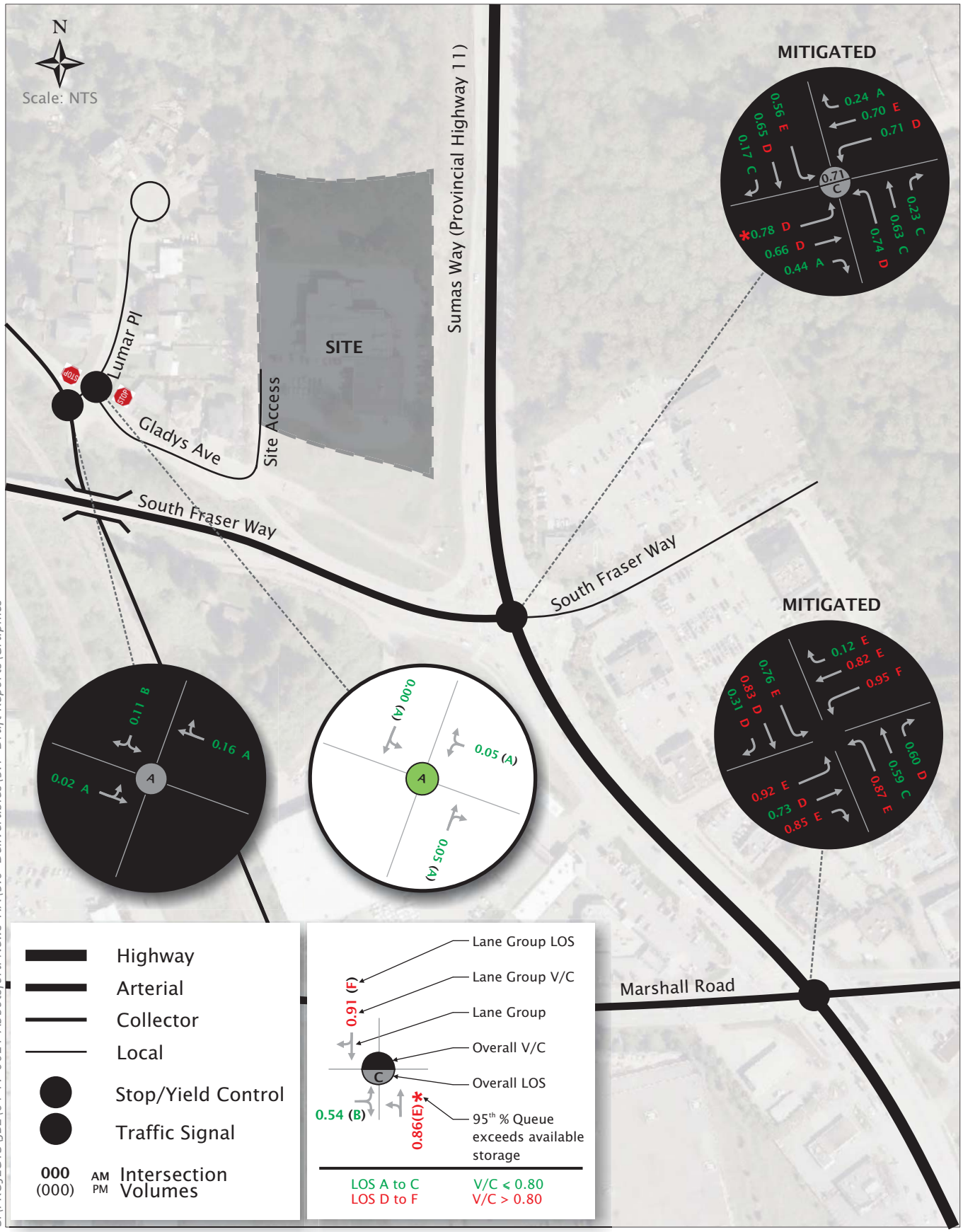

Exhibit 3.37

2040 Gladys Sensitivity
Total PM Peak Hour Traffic Operations

34375 Gladys Avenue TIA
04-17-0021 September 2018

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Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Table 3.14: Background 2031 Gladys Sensitivity 95th Percentile Queues

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM	PM
South Fraser Way & Sumas Way **(Mitigated)**	EBL	23	70
	EBT	10	67
	EBR	0	0
	WBL	23	64
	WBT	15	59
	WBR	0	0
	NBL	75	63
	NBT	64	123
	NBR	2	17
	SBL	19	38
	SBT	112	99
	SBR	21	16
Marshall Road & Sumas Way **(Mitigated)**	EBL	30	98
	EBT	27	76
	EBR	14	76
	WBL	84	51
	WBT	56	44
	WBR	11	11
	NBL	58	70
	NBT	63	107
	NBR	14	66
	SBL	16	39
	SBT	89	104
	SBR	52	23
Gladys Avenue & Lumar Place (South)	EBL/T	0	0
	WBT/R	0	0
	SBL/R	1	3
Gladys Avenue & Lumar Place (North)	WBL/R	0	1
	NBT/R	0	0
	SBT/L	0	0

Note:
Bolded results indicate 95th percentile queues that exceed the available turning bay storage length.
"-" indicates a value not applicable to that particular intersection or movement.
"#" indicates that the 95th percentile volume exceeds capacity, therefore vehicle queue may be longer than reported.
"m" indicates that volume for 95th percentile queue is metered by upstream signal

Table 3.15: Total 2031 Gladys Sensitivity 95th Percentile Queues

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM	PM
South Fraser Way & Sumas Way **(Mitigated)**	EBL	23	70
	EBT	10	67
	EBR	0	0
	WBL	23	65
	WBT	15	59
	WBR	0	0
	NBL	74	63
	NBT	65	124
	NBR	2	17
	SBL	20	38
	SBT	114	101
	SBR	23	16
Marshall Road & Sumas Way **(Mitigated)**	EBL	32	102
	EBT	28	78
	EBR	14	#86
	WBL	85	#56
	WBT	57	45
	WBR	12	11
	NBL	59	76
	NBT	62	100
	NBR	13	63
	SBL	16	40
	SBT	88	102
	SBR	47	23
Gladys Avenue & Lumar Place (South)	EBL/T	0	1
	WBT/R	0	0
	SBL/R	4	3
Gladys Avenue & Lumar Place (North)	WBL/R	2	1
	NBT/R	0	0
	SBT/L	0	0

Note:
Bolded results indicate 95th percentile queues that exceed the available turning bay storage length.
"-" indicates a value not applicable to that particular intersection or movement.
"#" indicates that the 95th percentile volume exceeds capacity, therefore vehicle queue may be longer than reported.
"m" indicates that volume for 95th percentile queue is metered by upstream signal

Table 3.16: Background 2040 Gladys Sensitivity 95th Percentile Queues

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM	PM
South Fraser Way & Sumas Way **(Mitigated)**	EBL	25	**83**
	EBT	11	78
	EBR	0	0
	WBL	25	73
	WBT	16	69
	WBR	0	0
	NBL	84	74
	NBT	55	119
	NBR	4	22
	SBL	22	44
	SBT	100	99
	SBR	26	21
Marshall Road & Sumas Way **(Mitigated)**	EBL	33	#128
	EBT	29	94
	EBR	#55	#140
	WBL	#106	#76
	WBT	64	54
	WBR	17	23
	NBL	#73	#94
	NBT	61	102
	NBR	15	102
	SBL	17	#51
	SBT	103	125
	SBR	62	32
Gladys Avenue & Lumar Place (South)	EBL/T	0	0
	WBT/R	0	0
	SBL/R	1	3
Gladys Avenue & Lumar Place (North)	WBL/R	0	2
	NBT/R	0	0
	SBT/L	0	0

Note:
Bolded results indicate 95th percentile queues that exceed the available turning bay storage length.
"-" indicates a value not applicable to that particular intersection or movement.
"#" indicates that the 95th percentile volume exceeds capacity, therefore vehicle queue may be longer than reported.
"m" indicates that volume for 95th percentile queue is metered by upstream signal

Table 3.17: Total 2040 Gladys Sensitivity 95th Percentile Queues

INTERSECTION/ TRAFFIC CONTROL	MOVEMENT	AM	PM
South Fraser Way & Sumas Way **(Mitigated)**	EBL	25	**83**
	EBT	11	78
	EBR	0	0
	WBL	25	75
	WBT	16	69
	WBR	0	0
	NBL	84	74
	NBT	55	120
	NBR	4	22
	SBL	22	44
	SBT	100	100
	SBR	26	21
Marshall Road & Sumas Way **(Mitigated)**	EBL	35	#132
	EBT	30	95
	EBR	#71	#140
	WBL	#110	#76
	WBT	64	#59
	WBR	17	23
	NBL	#80	#98
	NBT	61	101
	NBR	15	100
	SBL	17	#51
	SBT	101	127
	SBR	57	35
Gladys Avenue & Lumar Place (South)	EBL/T	0	1
	WBT/R	0	0
	SBL/R	3	3
Gladys Avenue & Lumar Place (North)	WBL/R	2	1
	NBT/R	0	0
	SBT/L	0	0

Note:
Bolded results indicate 95th percentile queues that exceed the available turning bay storage length.
"-" indicates a value not applicable to that particular intersection or movement.
"#" indicates that the 95th percentile volume exceeds capacity, therefore vehicle queue may be longer than reported.
"m" indicates that volume for 95th percentile queue is metered by upstream signal

As expected, the Gladys Avenue Connector was shown to improve operations for the eastbound approach at the Sumas Way & South Fraser Way intersection, and would benefit that intersection as a whole given the poor existing PM peak hour operations of the eastbound left-turn movement in particular. Operations at Sumas Way & South Fraser Way were found to generally improve in both the weekday AM and PM peak hours with the connector in place.

In addition, while not shown in the table, it important to highlight that because this measure would physically separate Gladys Avenue from South Fraser Way, this measure would effectively eliminate the projected long vehicle queues and traffic safety issues associated with the merge movement from the Gladys Avenue Underpass onto South Fraser Way as presented previously in the future traffic operations sections.

However, while operations at South Fraser Way and the Gladys Avenue Underpass would be improved with the Connector in place, the operations at Marshall Road were found to be slightly worsened as more background and site traffic volumes were re-routed to this intersection (e.g., a portion of vehicles currently performing a south right-turn or northbound left-turn from Sumas Way onto South Fraser Way to enter the area, and the opposite movements for exiting vehicles, would now use Marshall Road). The effects were found to be greater in the AM peak hour than the PM peak hour.

Nonetheless, the addition of the Gladys Avenue Connector is expected to generally improve traffic operations of the network as a whole.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

4. PARKING ANALYSIS

4.1 Bylaw Requirement

Table 4.1 provides a summary of the off-street parking supply required for the development based on the rates outlined in the City of Abbotsford's Zoning Bylaw.

Table 4.1: Bylaw Parking Requirement

USE	SIZE	VARIABLE	BYLAW RATE	STALLS[1]	SOURCE
Studio	18	Units	1 stall per unit	18	Section 150, Table 4, "Apartment" use.
1 bdrm loft	2	Units	1.5 stalls per unit	3	
1 bdrm	5	Units	1.5 stalls per unit	7.5	
1 bdrm + den	68	Units	1.5 stalls per unit	102	
2 bdrm	54	Units	1.5 stalls per unit	81	
2 bdrm + den	95	Units	1.5 stalls per unit	142.5	
2 bdrm + den + lockout	4	Units	1.5 stalls per unit plus 1 additional stall per lockout unit[2]	10	
3 bdrm	18	Units	1.5 stalls per unit	27	
3 bdrm + den	16	Units	1.5 stalls per unit	24	
2-Story 3 bdrm	2	Units	1.5 stalls per unit	3	
RESIDENT TOTAL	**282**	**UNITS**	-	**418**	
VISITOR TOTAL	**282**	**UNITS**	**0.2 STALLS PER UNIT**	**56.4**	
COMBINED TOTAL	**282**	**UNITS**	-	**474**	-

Notes:

1. Stall calculations have been rounded at the end when summing up the total for the residential unit types.

2. The parking rate requirement for lockout units (i.e., 1 additional stall per lockout unit in addition to the regular rate) is reflective of the rate specifically requested by City staff and is not explicitly included in the City's Bylaw.

The City's Zoning Bylaw requires that a minimum of 474 off-street parking stalls be provided for the development, including 418 resident stalls and 56 visitor stalls. Note that this calculated residential parking requirement includes the need for one additional stall per lock-out/lock-off unit, which is a requirement requested by City staff, but is not stated in the City's Bylaw.

4.2 Proposed Parking Supply

Table 4.2 summarizes the proposed parking supply for the development and compares it to the Bylaw requirement.

Table 4.2: Proposed Parking Supply Compared to Bylaw Requirement

USE	SIZE	VARIABLE	PROPOSED RATE	STALLS[1] PROPOSED	STALLS REQUIRED	DIFFERENCE
Resident	282	Units	-	418	418	0
Visitor	282	Units	0.12 stalls per unit	34	56.4	-22.4
TOTAL	**282**	**UNITS**	**-**	**452**	**474**	**-22**

As the table indicates, Elevate plans to meet the City's resident parking bylaw requirement of 418 stalls.

However, to better match the expected demand, Elevate proposes to provide residential visitor parking at a rate of 0.12 stalls per unit, which is lower than the City's Bylaw requirement of 0.20 stalls per unit. The proposed provision rate would result in a visitor parking supply of 34 stalls which would represent a shortfall of 22 stalls from the Bylaw requirement.

4.3 Visitor Parking Supply Rationale

4.3.1 Anticipated Visitor Parking Demand

While the City's bylaw requirement requires visitor parking to provided at a rate of 0.20 stalls per unit (i.e., 56 stalls), based on recommendations provided in the Metro Vancouver Apartment Parking Study (MVAPS) and the findings of Bunt's own residential visitor parking studies conducted over the years, visitor parking demand is likely to be lower than this required rate.

Metro Vancouver Apartment Parking Study (MVAPS)

The Metro Vancouver Apartment Parking Study (MVAPS) was a comprehensive parking study for multi-family housing undertaken by Metro Vancouver in 2012 which investigated emerging trends, reviewed previous studies, conducted interviews with municipal planners, engineers and developers, and included two regional surveys. These two surveys included a Parking Facility Survey (80 apartment sites) and a Household Survey (1,500 households residing in 90 apartment sites).

One of the key findings of this study was that visitor parking supply may be over supplied in the region, as observed parking demand rates were found to be below 0.10 stalls per unit, on average, compared to the typical municipal requirement of 0.20 stalls per unit, which is what the City of Abbotsford requires.

Bunt's Previous Visitor Parking Studies

Similar to the MVAPS, Bunt's own residential visitor parking studies conducted over the years in Surrey, North Vancouver, and Burnaby have indicated that visitor parking demand can be expected to be lower

than the required rate of 0.20 stalls per unit. The results of Bunt's previous visitor parking studies are presented in **Table 4.3**.

Note that during the Guildford Towers Visitor Parking surveys, which covered Friday and Saturday afternoon and evening periods at two high-rise towers, Bunt interviewed the drivers using the designated visitor parking stalls. Over 50% of these users were residents using the visitor parking for short-term convenience parking. It is our view that this may be a common occurrence, leading to higher than required visitor parking rates when such rates are based solely on direct observation.

Table 4.3: Visitor Parking Studies by Bunt

SOURCE	PEAK VISITOR PARKING DEMAND RATE (STALLS/UNIT)
One Lonsdale Corridor Rental Tower, studied on one day (City of North Vancouver)	0.05
Two Guildford Town Centre Apartment Towers, studied on 4 days (City of Surrey)	0.08
Six Metrotown Apartment Towers studied on 2 days (City of Burnaby)	0.08

Acknowledging that these rates were not collected in Abbotsford, which is less accessible by transit and other alternative modes than the sites above, it is Bunt's opinion that visitor parking demand for the proposed development would be somewhat higher than the rates indicated above, and likely be closer to 0.10 stalls per unit, consistent with the findings of the MVAPS study.

This visitor parking rate would translate to a peak parking demand of approximately 28 visitor parking stalls compared to the proposed supply of 34 stalls.

Visitor Parking Summary

Based on the data provided above from both the MVAPS study and visitor parking data collected for previous Bunt studies, it is Bunt's opinion that the proposed reduced visitor parking supply for the development would be adequate to accommodate the expected peak visitor parking demand for the site.

4.4 Bicycle Parking

The proposed bicycle parking for the development is summarized in **Table 4.4**.

Table 4.4: Bicycle Parking Supply Requirement & Provision

LAND USE	DENSITY	BYLAW RATE	BYLAW SUPPLY REQUIREMENT	PROVIDED	DIFFERENCE
Residential	282 units	0.25 space per dwelling unit	71 stalls	93 stalls (74 resident in underground parking; 19 visitor)	+22 stalls

To accommodate cyclists and encourage the use of alternative transportation modes, Elevate plans to provide bicycle parking at a level over and above the City's bylaw requirement. The proposed bicycle parking supply is 93 stalls, including 74 stalls for residents consisting of a mixture of bike racks and bike storage lockers located in the underground parking levels, and 19 stalls for visitors located both around the front entry court and in the underground visitor parking areas. Overall, the proposed number of bike stalls for residential exceeds the City's requirement by 22 stalls.

5. SITE PLAN DESIGN REVIEW

5.1 Gladys Avenue & Site Access Intersection Reconfiguration

As a requirement of this study, the City of Abbotsford requested that the development team review the configuration of the existing Gladys Avenue & Site Access intersection given its current atypical arrangement. Moreover, the City expressed concerns regarding the effect that future site traffic may have on this intersection, particularly related to the potential for traffic to queue back along the South Fraser Way Exit Ramp and back up onto South Fraser Way. The current layout of the intersection is shown in **Figure 5.1**.

Figure 5.1: Existing Gladys Avenue & Site Access Intersection

5.1.1 Analysis Findings

Bunt's review of the intersection concluded the following:

- While somewhat atypical, the current intersection layout gives priority to the correct movement, i.e., South Fraser Ramp Exit Ramp traffic operates with free flow conditions through the intersection to prevent vehicle queuing, while site traffic and Gladys Avenue traffic are forced to stop.

- In terms of traffic operations, the intersection is expected to operate well within acceptable performance thresholds in all future horizon years even with site traffic added. No vehicle queuing on the South Fraser Ramp Exit Ramp is expected as it operates as a free flow movement at all times through the intersection. Detailed traffic operations results were discussed in Section 3.2.

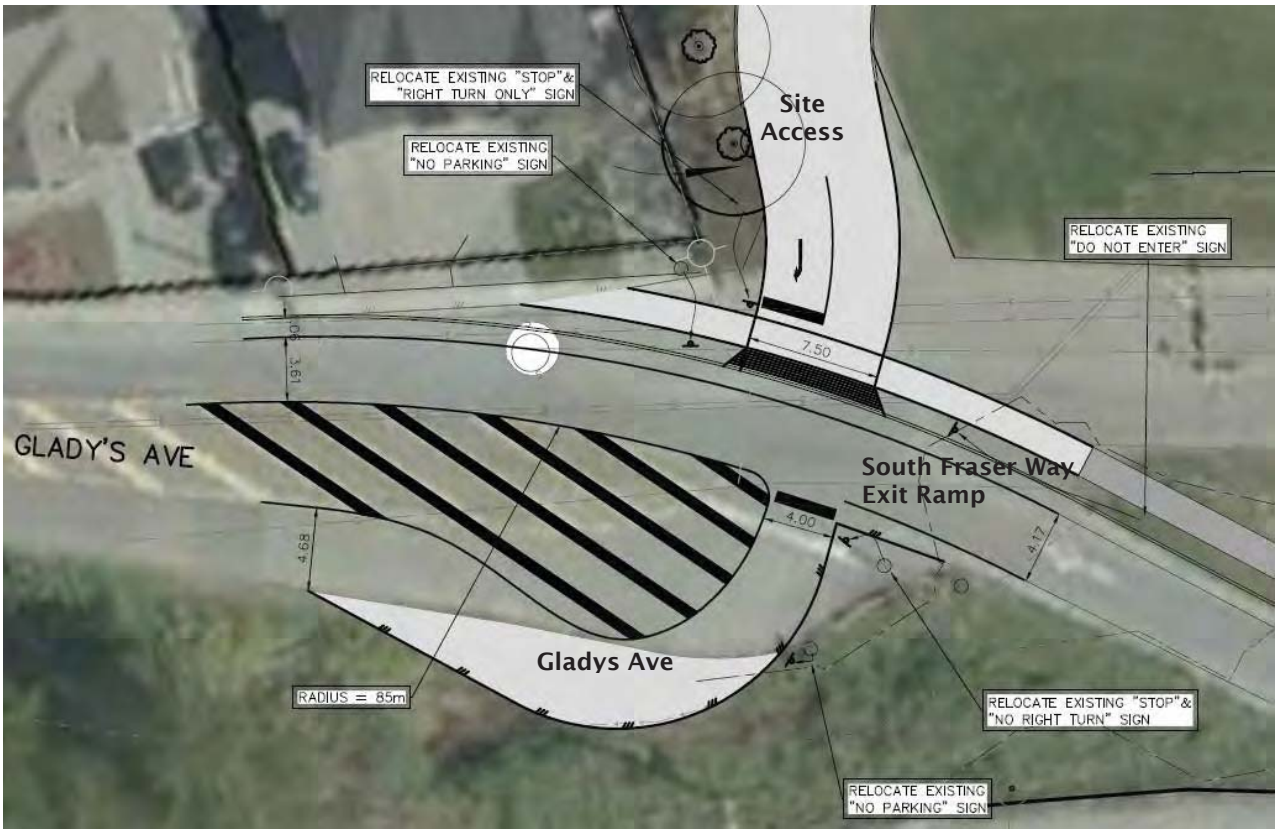
- From a traffic operations perspective, no intersection modifications are required.

5.1.2 Proposed Intersection Reconfiguration

While intersection modifications are not required from a traffic operations perspective, as part of the proposed development Elevate proposes to reconfigure and improve this intersection by squaring up the south side of Gladys Avenue so that it meets with the South Fraser Way Exit Ramp at more of a right angle. The proposed intersection design developed by Elevate's Civil Engineer is shown in **Figure 5.2**. A scaled drawing of the design is included in **Appendix F**.

The proposed design represents a more typical intersection alignment while maintaining the same movement priorities. Based on Bunt's analysis, a standard passenger vehicle is expected to be able to maneuver easily from the reconfigured south approach into the site or turn left to travel westbound. However, larger vehicles travelling from the south approach, e.g., loading trucks or snow plows, may need to enter the site in order to turn around depending on their size, as it may be challenging to perform a left turn to head westbound without performing a back and forth maneuver. This is the same requirement as today given the intersection's current configuration.

Figure 5.2: Proposed Gladys Avenue & Site Access Intersection Reconfiguration



Source: Wedler Enginering

Available Sight Distance

As the proposed reconfiguration of the site access intersection does not result in a significantly modified intersection orientation, change in road grades, or different vehicle priorities, the available sight distance condition is not expected to change from the existing arrangement.

Based on Transportation Association of Canada (TAC) guidelines, for a 50km/h roadway with the existing grade on South Fraser Way, the required stopping sight distance (SSD) requirement for a vehicle approaching the site from South Fraser Way is approximately 70m. A high level review of this scenario indicates that the available SSD would be adequate. To ensure that visibility is not obstructed, however, Bunt recommends that the off-site greenery located between the south approach of Gladys Avenue and the South Fraser Exit Ramp is kept trimmed so that is does not grow to a height that would obstruct the line of sight between vehicles approaching the site from the South Fraser Way exit ramp and vehicles stopped on the south approach of Gladys Avenue. **Figure 5.3** shows a view from a vehicle approaching the site intersection from the South Fraser Way Exit Ramp and circles the greenery being referred to in red.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Figure 5.3: View from Vehicle Approaching Site Intersection and Off-Site Greenery

Source: Google Maps Street View

5.2 Service Vehicle Operations

Loading

While the City of Abbotsford's Zoning Bylaw does not require residential loading stalls to be provided, when residential loading is required, loading vehicles will use the circular pick-up/drop-off area located immediately in front of the residential buildings. From here, contents can be transported directly to/from the front entrances of both residential buildings.

Garbage & Recycling Collection

The garbage and recycling bins for the residential buildings are to be located directly across from the parking gate entrances on the P1 parking levels for both the East and West residential buildings.

To perform the garbage/recycling collection, a hauler truck (i.e., typically the size of an Ford F350 or F450) would enter the P1 parking level, drive to the garbage/recycling bin room, attach the bin to the rear of the truck, and then transport the bin to a garbage/recycling bin staging area located just outside the parking gate. A full-sized garbage/recycling truck would then visit the site to transfer the contents of the garbage/recycling bins into the truck's container and then exit the site. Finally, the hauler truck would

then return to the site and take the garbage/recycling bins back to the garbage rooms for the two buildings.

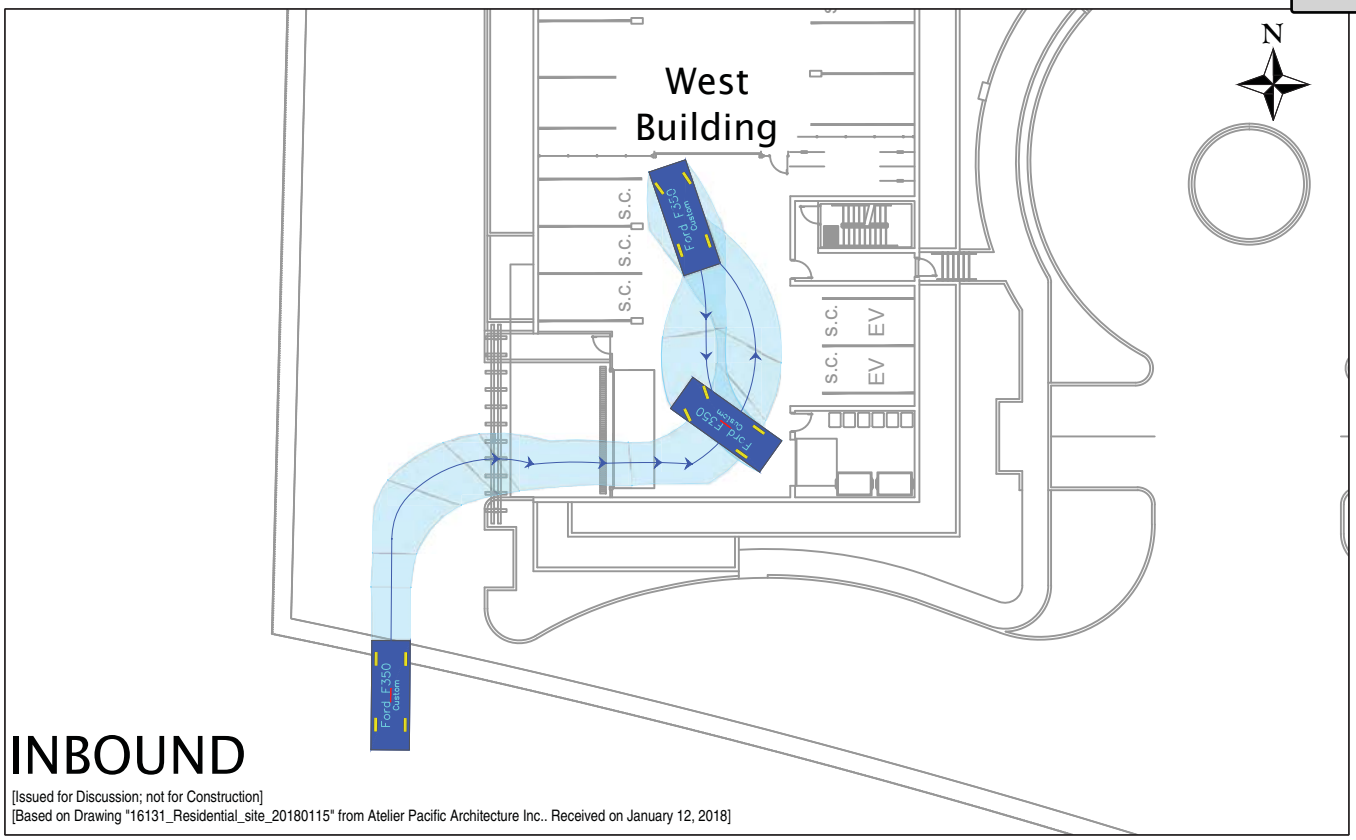
Exhibits 5.1 and **5.2** show that a hauler truck can enter the site to pick up the garbage/recycling bins to take them to the staging areas and then return them to the garbage rooms for the East and West buildings, respectively, without any manoeuvring challenges.

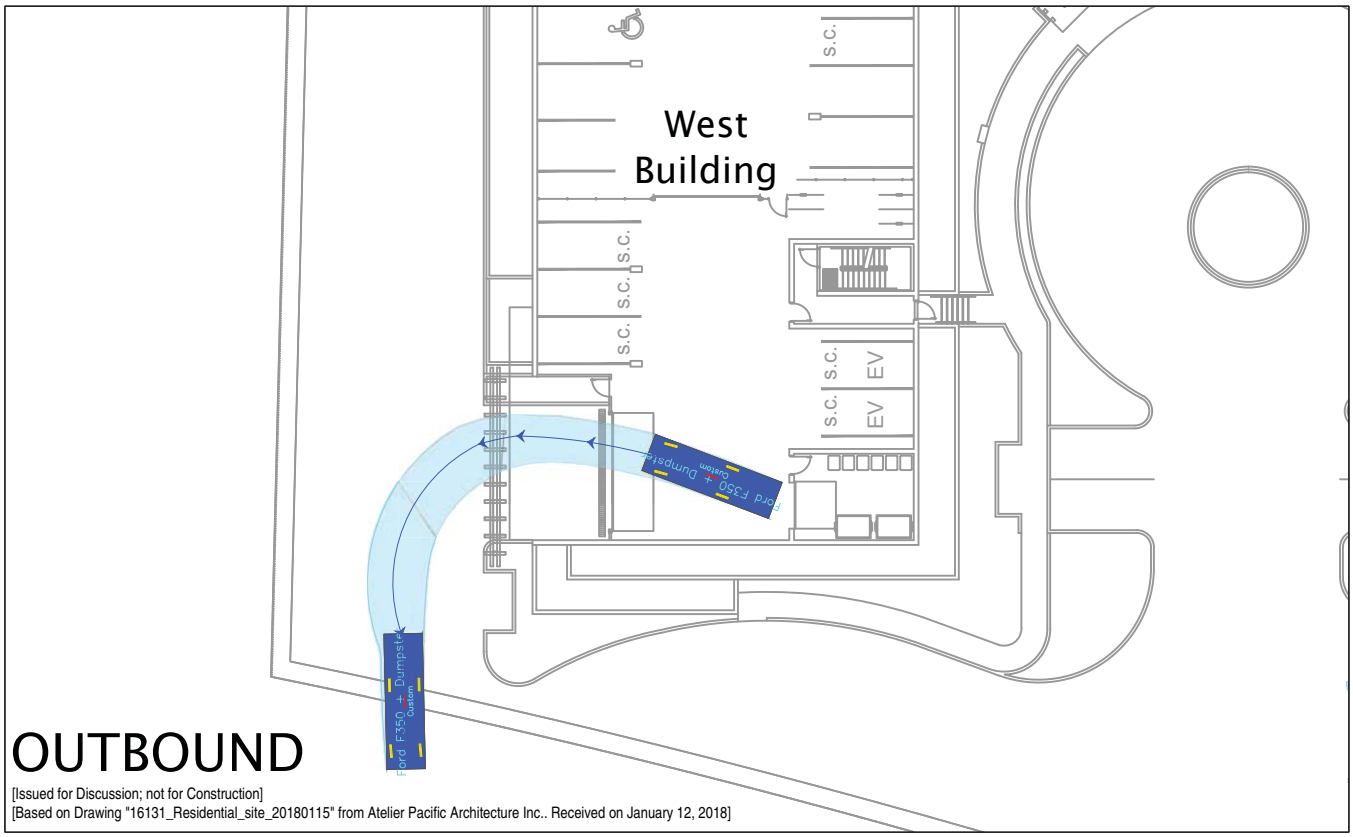
Fire Truck

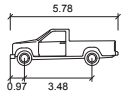
Exhibit 5.3 illustrates that a fire truck could successfully access the front of the residential buildings in the pick-up/drop-off area, and as required by BC Building Code (BCBC) guidelines, the fire truck is able to position itself within 15m of the face of both residential buildings. To exit the turnaround area, although the fire truck would be required to reverse out back onto the access road, because the distance is within 90m, this maneuver would be acceptable based on requirements provided in the BCBC and the City's Fire Lanes and Restrictions guidelines. The fire truck design vehicle used for analysis was the "Pierce 47ft Ladder Truck".

In terms of fire truck access to the internal courtyard area at the northern end of the site, **Exhibit 5.4** shows a fire truck entering and exiting this area. The T-shaped turn-around area has been designed according to the fire access design guidelines provided by City of Abbotsford Fire Department staff. As shown in the outbound movement on the exhibit, when using the turn-around area to exit the site, the rear overhang of the fire truck would need to encroach onto the curbside and the truck would need to perform one back-and-forth iteration in order to successfully reverse back into the lane and then exit.

Moreover, given the depth of the current turnaround area, a fire truck entering this area would not be able to position itself within 15m from the Amenity Building at the centre of the courtyard. As an alternative solution to this requirement, Elevate proposes to provide a standpipe/hydrant connection in this area that is located within 15m of the Amenity Building. At time of writing, Elevate is currently in discussions with the City's Fire Department to determine whether this solution would be acceptable.







Ford F350

	meters
Width	: 2.03
Track	: 1.74
Lock to Lock Time	: 6.0
Steering Angle	: 32.2

Exhibit 5.1

West Residential Building Garbage/Recycling AutoTURN Analysis

34375 Gladys Avenue TIA

04-17-0021 September 2018 Scale 1:400 on Letter Prepared by AK

bunt & associates

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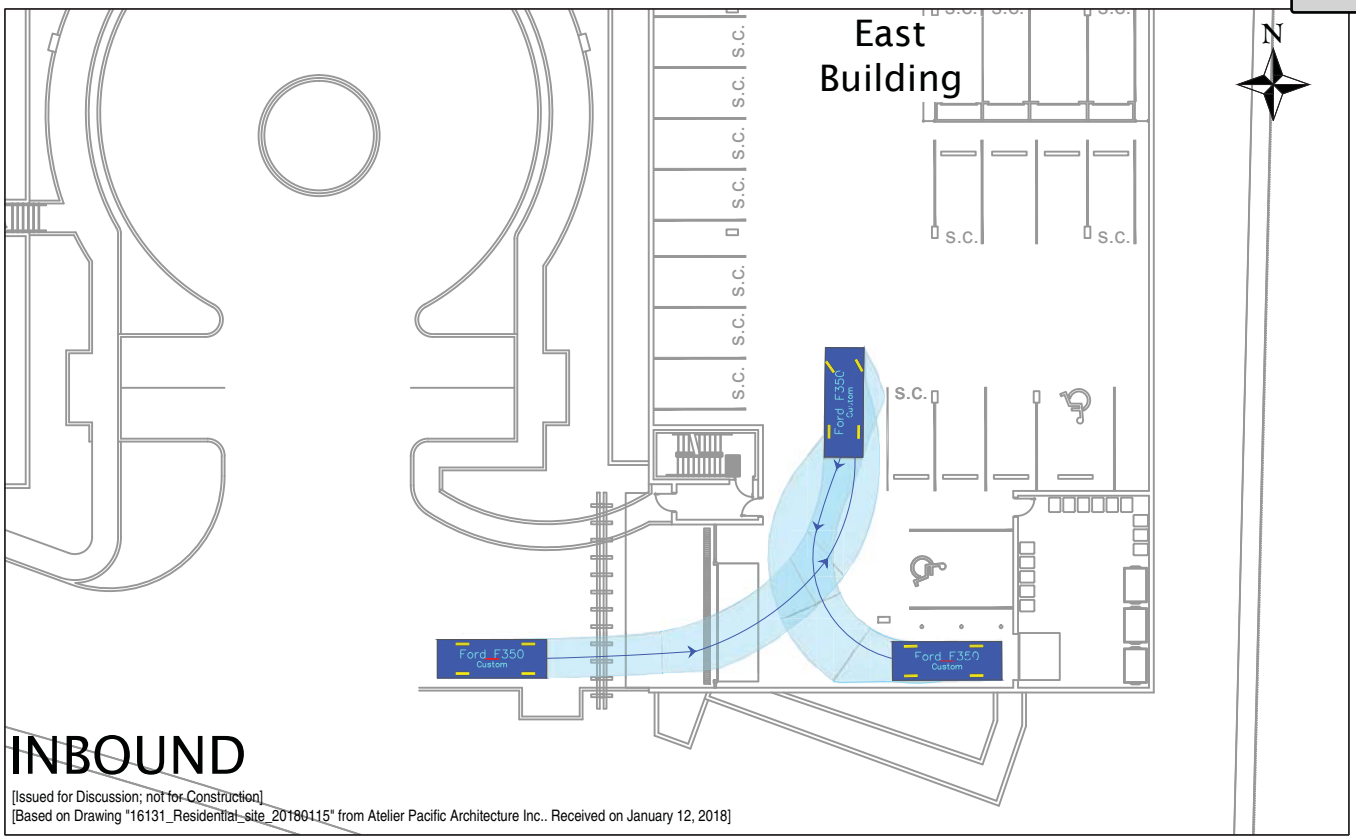

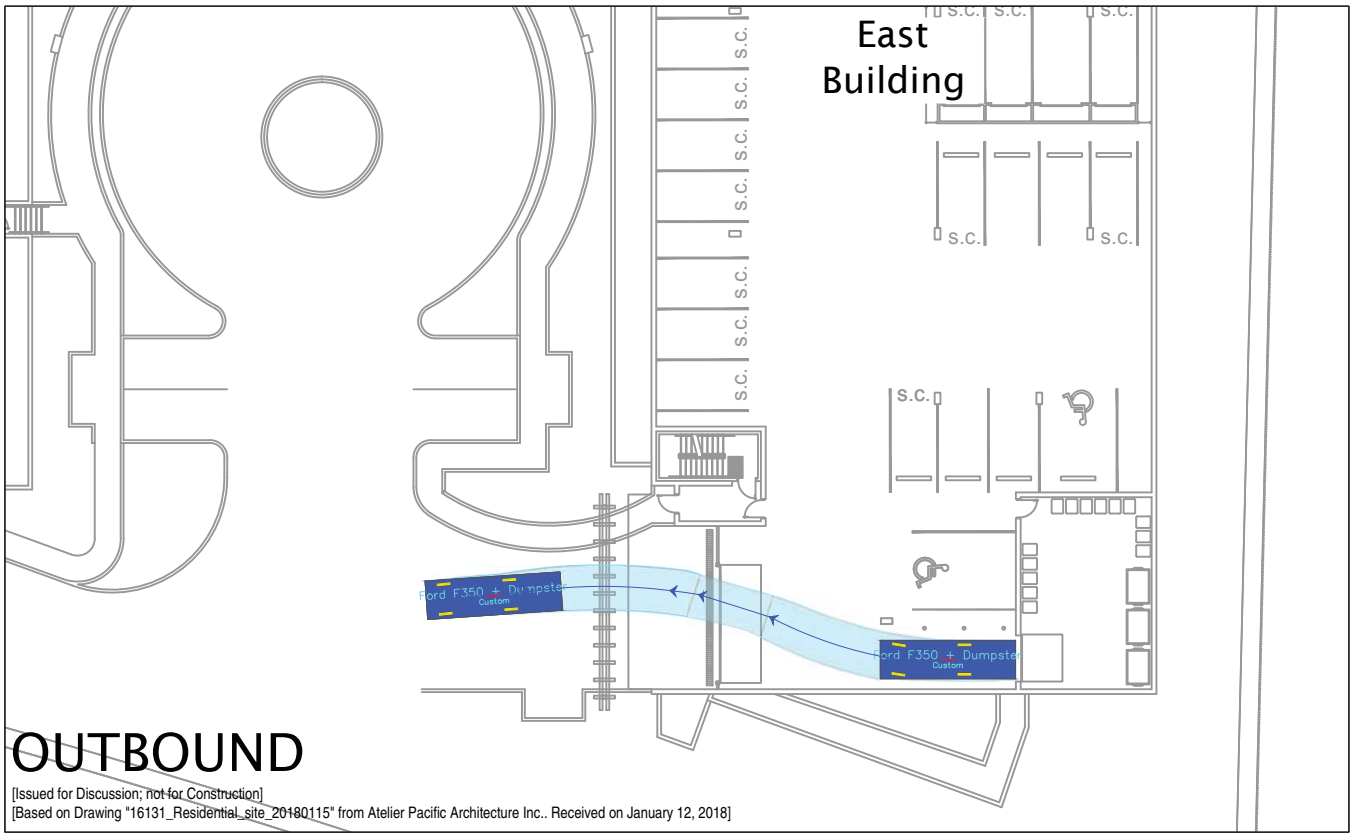

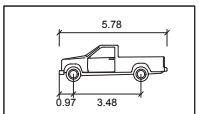

Ford F350

		meters
Width	:	2.03
Track	:	1.74
Lock to Lock Time	:	6.0
Steering Angle	:	32.2

Exhibit 5.2

East Residential Building Garbage/Recycling AutoTURN Analysis

34375 Gladys Avenue TIA

04-17-0021 September 2018 Scale 1:400 on Letter Prepared by AK

bunt & associates

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

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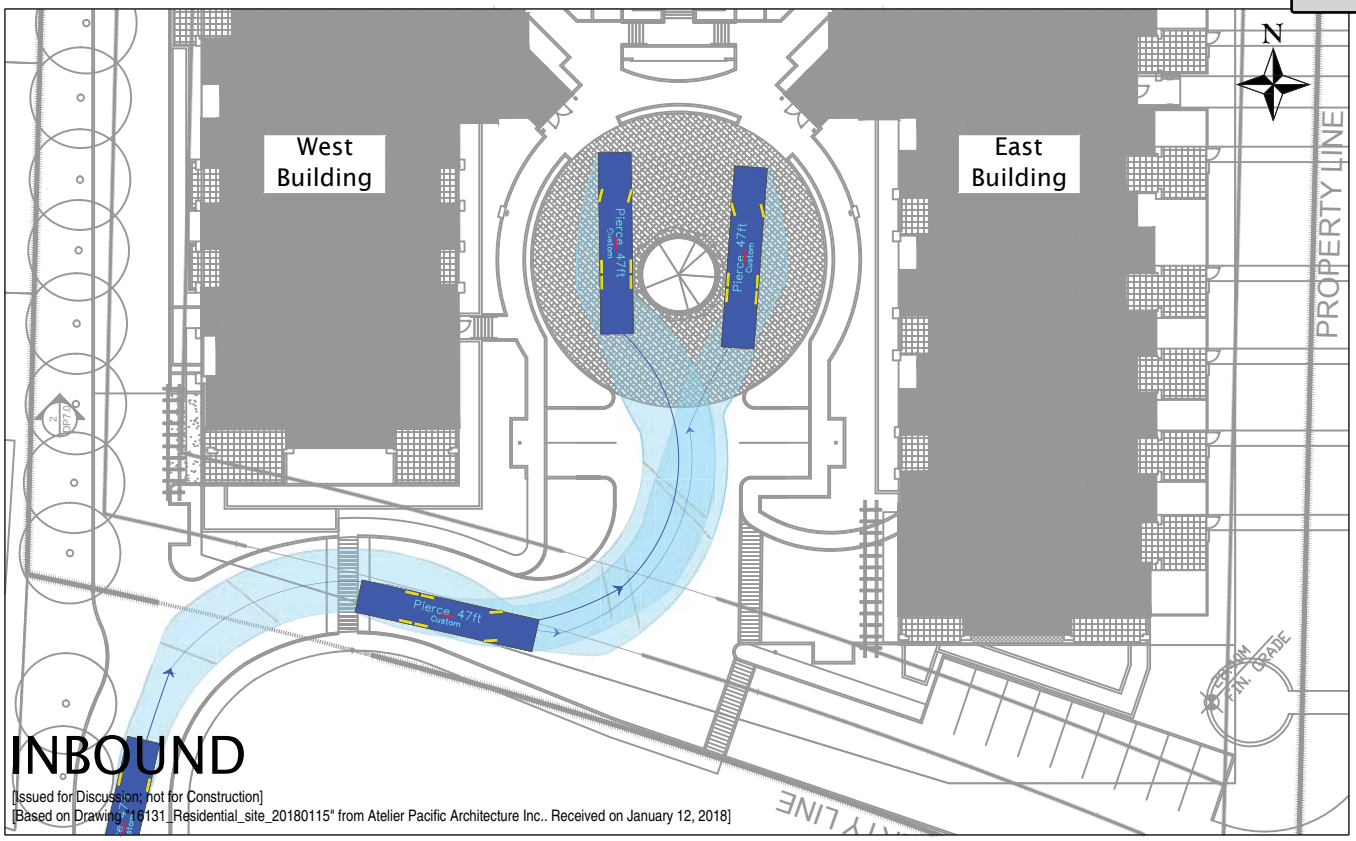

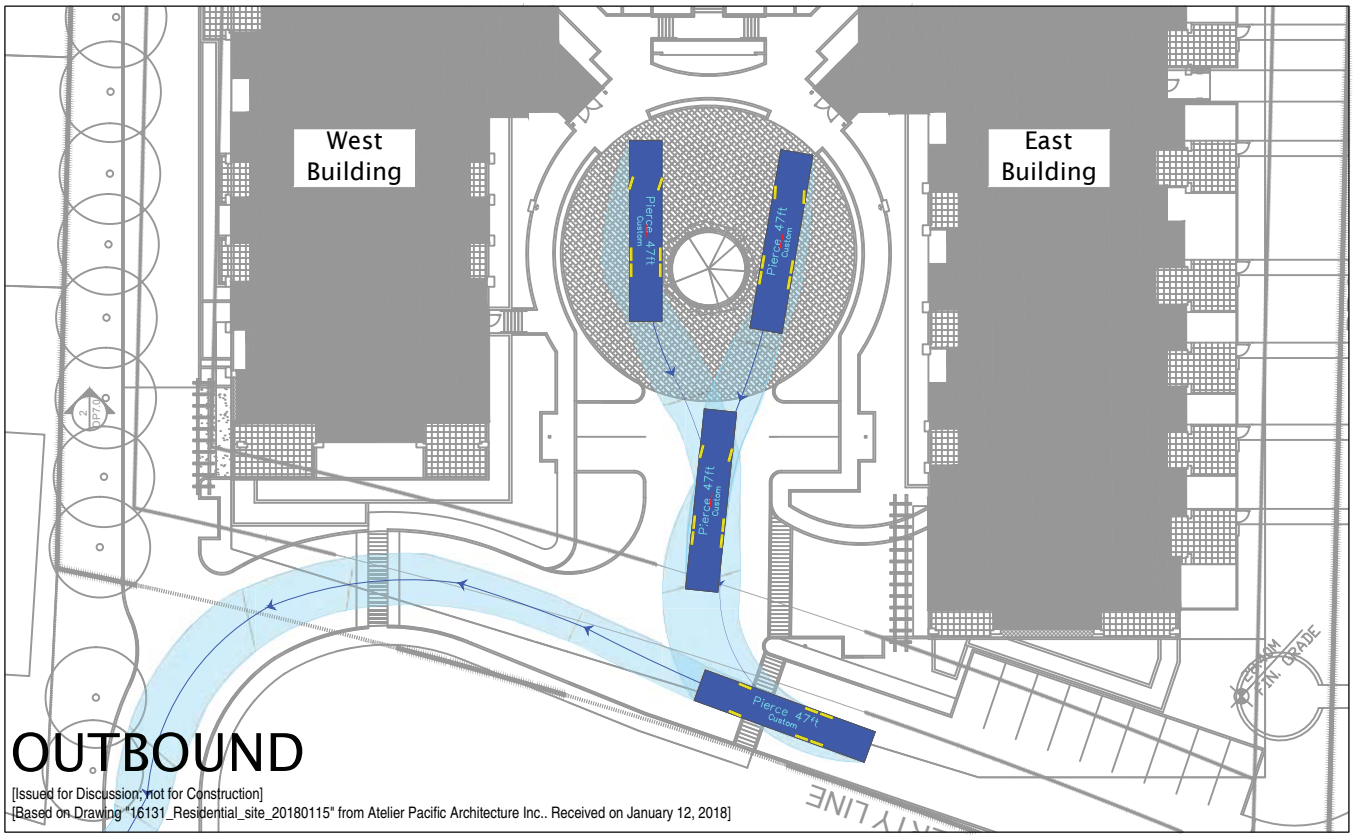

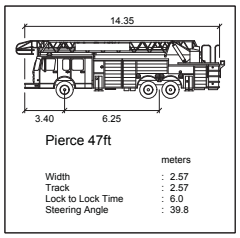

Exhibit 5.3

Residential (Front Entry) Fire Truck AutoTURN Analysis

34375 Gladys Avenue TIA

04-17-0021 September 2018 Scale 1:600 on Letter Prepared by AK

bunt & associates

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

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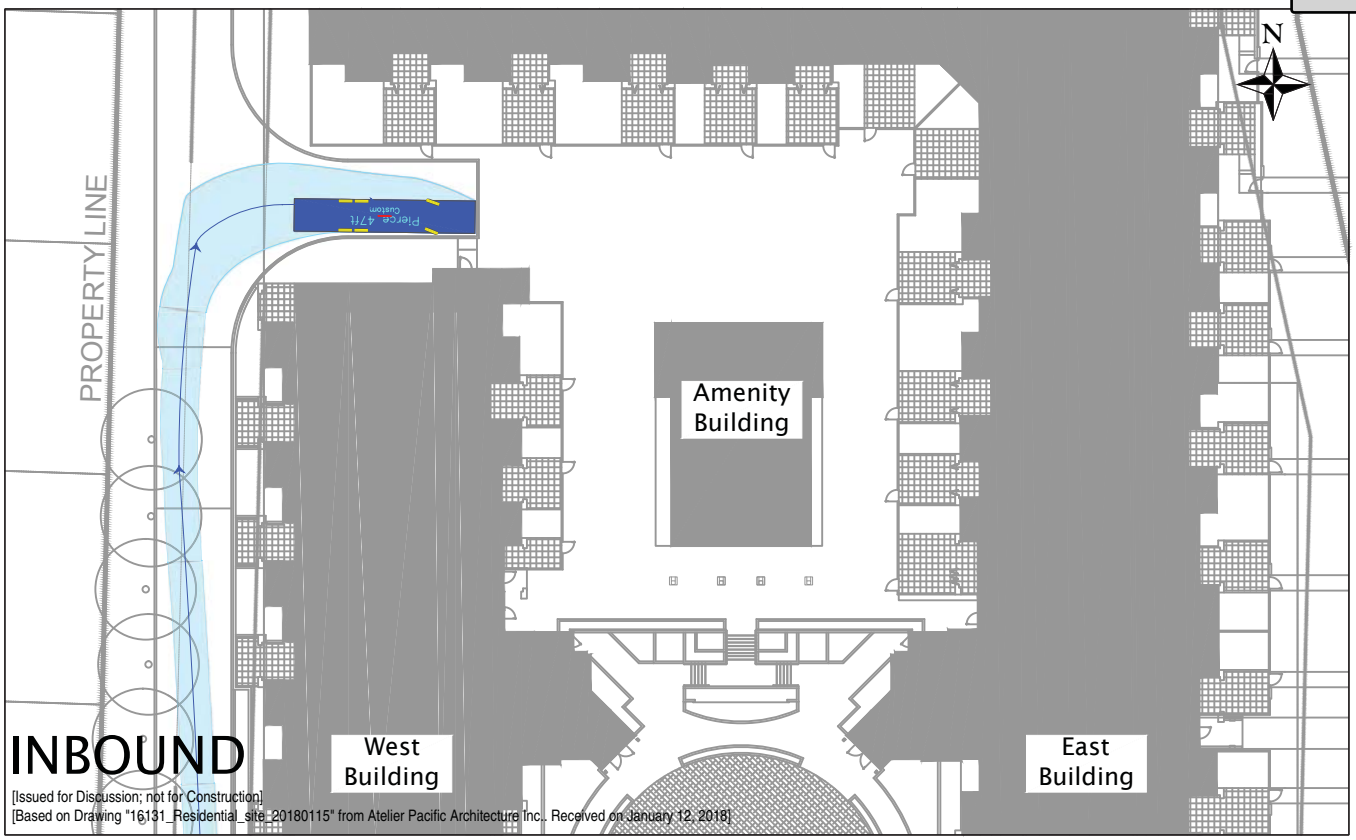

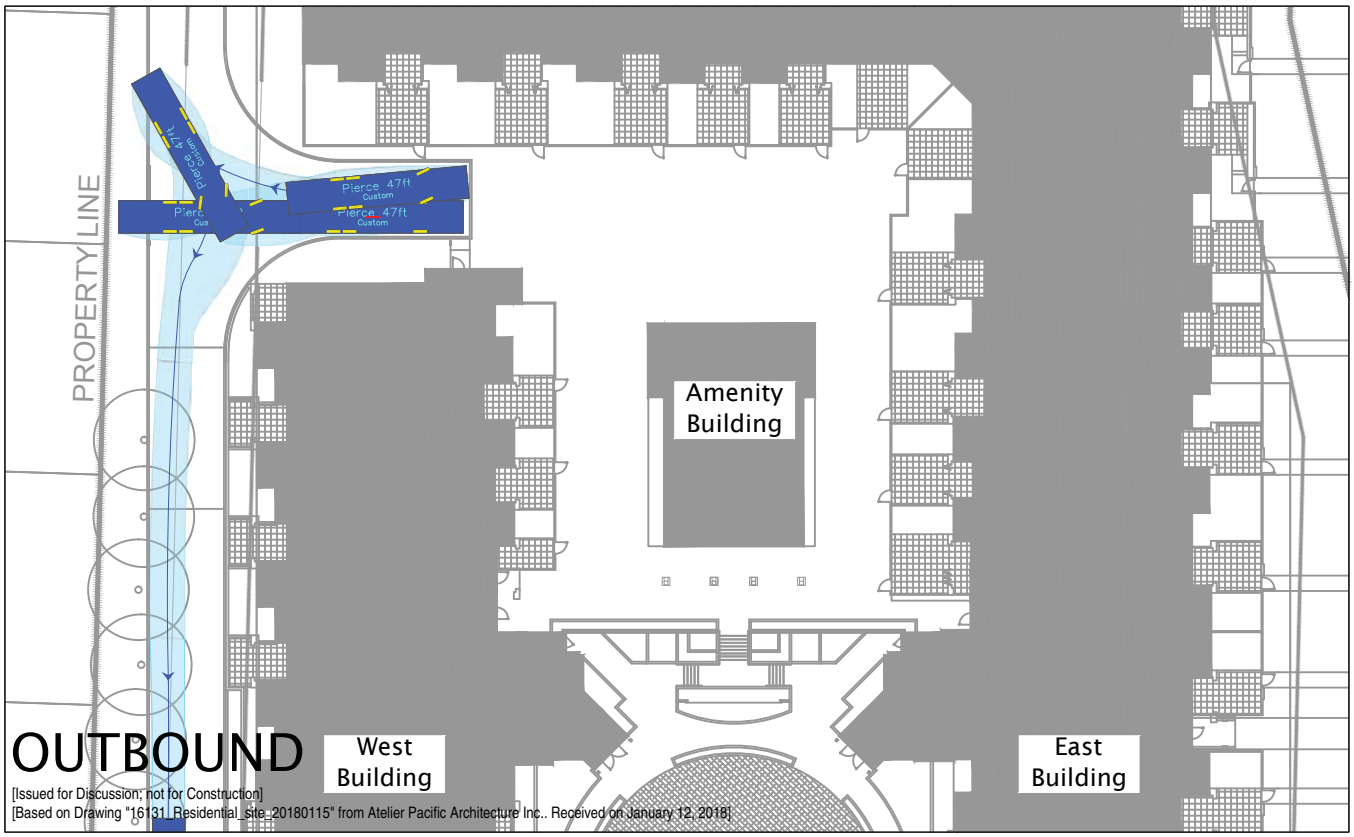

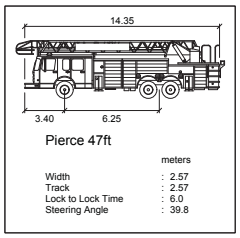

Exhibit 5.4

Residential (Courtyard) Fire Truck AutoTURN Analysis

34375 Gladys Avenue TIA

04-17-0021 September 2018 Scale 1:600 on Letter Prepared by AK

bunt & associates

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

6. OFF-SITE ROAD IMPROVEMENTS ANALYSIS

6.1 Gladys Avenue Underpass to South Fraser Way Merge

6.1.1 Existing Condition

As a requirement of this study, the City of Abbotsford requested that Bunt review the existing traffic merge point from the Gladys Avenue Underpass to eastbound South Fraser Way. Today, this movement presents both operational challenges and potential traffic safety concerns. A plan view of this merge point is highlighted in **Figure 6.1** and a photo taken at the location is shown in **Figure 6.2**.

Under existing conditions, during the AM peak hour, the yield-controlled merge from Gladys Avenue onto South Fraser Way was shown to operate within acceptable performance thresholds; however, during the PM peak hour, the movement was shown to exceed acceptable performance thresholds at LOS 'F', V/C ratio exceeding 1.0, and a 95th percentile queue of 131m.

Figure 6.1: Gladys Avenue to South Fraser Way Merge

Figure 6.2: Gladys Avenue Merge Photo

Note: View of van merging from Gladys Avenue Underpass to South Fraser Way

During a site visit to the study area, Bunt made the following observations:

- Given the sharp angle of the merge lane onto South Fraser Way, performing a shoulder check to observe oncoming vehicles when attempting to merge onto South Fraser Way from Gladys Avenue is difficult, and instead, the driver side mirror often has to be used to see vehicles approaching.
- The difficult geometry of the merge (i.e., sharp angle, limited merge distance, and grade difference between South Fraser Way and the Gladys Avenue merge causing sight distance issues) resulted in vehicles often coming to a full stop in order to merge onto South Fraser Way to avoid colliding with an oncoming vehicle on South Fraser Way.
- Contrary to the Synchro traffic operations results reported, Bunt did not observe significant vehicle queues or delays along Gladys Avenue due to vehicles attempting to merge onto South Fraser Way on the day of the site visit. However, this visit was conducted during the late summer period when traffic volumes are lower than during non-summer periods.

This merge point issue was previously identified in both the City's Transportation Master Plan (2007) and Gladys Avenue Special Report (2007). To address this issue, as well as to provide better road network connectivity, both studies proposed to introduce a Gladys Avenue Connector, which would provide for a new road connection between Gladys Avenue and Marshall Road as a possible parallel route to Sumas Way. The conceptual layout of the connection was shown earlier in Figures 2.1 and 3.1. With the connection in place, both the merge from Gladys Avenue onto South Fraser Way and the exit route from South Fraser Way to Gladys Avenue would be closed which would effectively remove the queuing issues and safety concerns at this location.

As requested by the City, Bunt's future traffic analysis included a sensitivity test of the traffic operations at the study intersections with and without this connection in place. The results of this analysis were discussed in detail in Section 3.5. In general, the results found that that the Connector would improve operations at the Sumas Way & South Fraser Way intersection, particularly for the eastbound approach. However, as a trade off, the operations at Sumas Way & Marshall Road were found to be slightly worsened as more background and site traffic volumes would be re-routed to this intersection. Nonetheless, the addition of the Gladys Avenue Connector was found to generally improve traffic operations of the network as a whole.

6.2 Alternative Options Assessment

As the City of Abbotsford's recently released Transportation & Transit Master Plan (June 2018) does not include further mention of the Gladys Avenue Connector, City staff has communicated that there are no current plans to implement the Gladys Connector. As such, City staff requested that Bunt also conduct analysis of various alternative options to reconfigure this merge condition to help mitigate the existing challenges.

While this movement was shown to perform poorly during the weekday PM peak hour in terms of traffic operations, during a meeting with the City on Monday, August 20th, 2018, the City communicated to Bunt that safety was the primary concern related to this intersection and that any recommended change to the intersection should be driven by whether safety could be improved, not necessarily to improve the traffic operations.

6.2.1 Option 1: Widening of South Fraser Way

During a meeting between Elevate and City staff on June 13th, 2018, the City requested that analysis be conducted to review the implications of widening the south side of South Fraser Way to add a new eastbound through lane which would effectively remove the "merge/diverge" situation that currently exists. The geometric change is shown conceptually in **Figure 6.3**.

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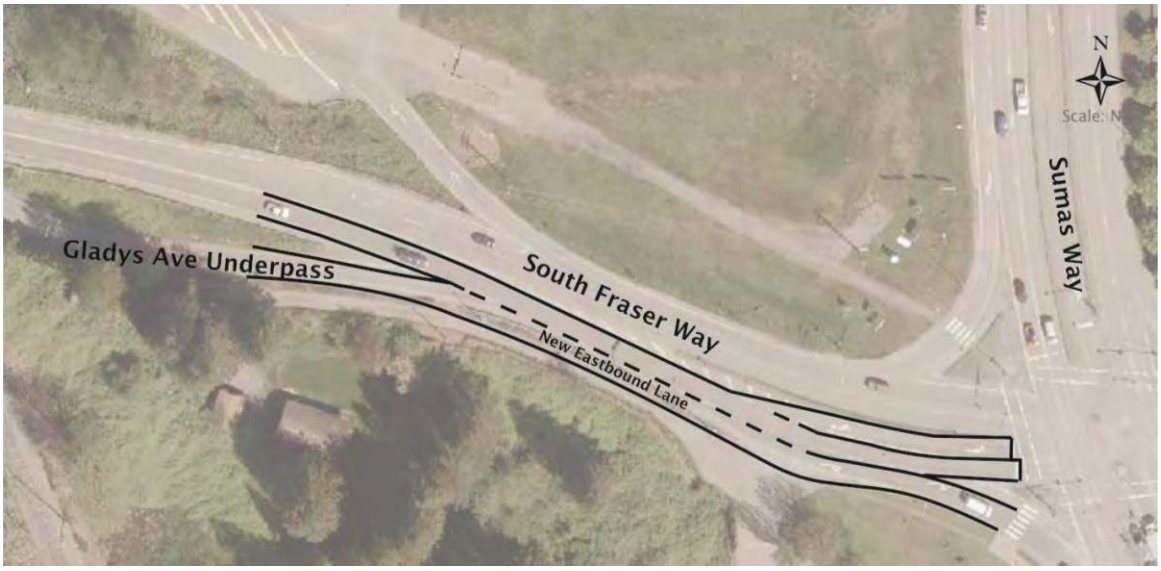
Figure 6.3: Proposed Widening of South Fraser Way



To assess the impacts of this proposed road modification, Bunt reviewed the advantages and disadvantages/challenges of this change and conducted a high level analysis of the weaving condition that would be introduced with the addition of the extra eastbound lane.

The results of Bunt's assessment are included below.

Advantages & Disadvantages/Challenges

Advantages:

- Eliminates the difficult sightline condition and associated safety concerns;
- Provides a free-flow (i.e., traffic control free) condition for vehicles originating from the Gladys Avenue Underpass;
- Provides the dominant movement for vehicles originating from the Gladys Avenue Underpass, i.e., eastbound right turn onto Sumas Way, with a direct lane, thereby eliminating the need for vehicles to first merge onto South Fraser Way and then immediately diverge as they do today; and,
- Increases the available vehicle queuing storage for the eastbound right turn movement onto Sumas Way.

Disadvantages/Challenges:

- The addition of the extra eastbound lane results in the creation of a "weaving" segment. Weaving is defined as the crossing of two or more traffic streams travelling in the same direction along a significant length of highway without the aid of traffic control devices[2],

[2] Highway Capacity Manual, 6th Ed., 2016, Transportation Research Board

- The weaving segment length is short (approximately 80m), thereby making the weaving maneuvers challenging for drivers and potentially increasing the risk of vehicle collisions; and,
- The introduction of the weaving segment changes the decision-making for a driver originating from the Gladys Avenue Underpass from occurring from a stopped position (at the yield sign before merging) to a moving position, with only a short distance available to make this decision.

Weaving Analysis

A weaving analysis was conducted for the proposed South Fraser Way road widening using Highway Capacity Manual (HCM) methodology. It is important to note that the HCM weaving methodology is intended for freeway segments with high speeds and uninterrupted flow, not for urban arterial roads such as the subject location. HCM states there are currently no generally accepted methodologies for analyzing weaving on arterial roads. While weaving situations do occur on arterial roads, they are strongly affected by the proximity and timing of signals in the adjacent road network. Regardless, to gain an order of magnitude estimate of the future operations Bunt conducted a weaving analysis using HCM methodology. However, all results presented herein should be considered high level and approximate.

The following assumptions were made for the weaving analysis:

- Free flow speed (FFS) was assumed to be the speed limit of 50 km/h. The typical default FFS is the speed limit plus 8 km/h (5m/h) for freeway segments. However, given the proximity of the adjacent signal and the fact that most vehicles are either turning left or right at the intersection (which they would slow down to complete the turn), it was assumed the FFS is closer to the speed limit along the weaving segment.

- The saturation flow rate was reduced from the HCM minimum of 2,200 veh/hr/lane to 1,800 veh/hr/lane to be consistent with previous City requirements for the intersection operations analysis.

As mentioned previously, to gain an understanding of the potential future number of weaving vehicles, Bunt conducted a 30 minute spot count during the weekday PM peak hour. **Table 6.1** shows the observed percentages of vehicles travelling left, through, and right when originating from both the Gladys Avenue Underpass and South Fraser Way.

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Table 6.1: Observed Movement Percentages

ORIGIN	MOVEMENT @ SOUTH FRASER WAY & SUMAS INTERSECTION	PERCENTAGE
Gladys Avenue Underpass	EBL	2%
	EBT	11%
	EBR	87%
South Fraser Way	EBL	32%
	EBT	13%
	EBR	55%

The count revealed that 87% of vehicles originating from the Gladys Avenue Underpass completed an eastbound right turn at the intersection of Sumas Way & South Fraser Way. In the potential future road alignment, with the new lane along South Fraser Way continuing straight into the right turn bay at Sumas Way, a large percentage of vehicles would not need to change lanes and therefore not be part of the weaving volume. The majority of vehicles that would be required to change lanes would be the 55% of vehicles originating from South Fraser Way that turn right at the intersection. The number of expected weaving vehicles is presented in **Table 6.2** below for existing conditions and was found by applying the percentages above to the full peak hour volumes collected for Bunt's January 2018 TIA.

Table 6.2: Existing Weekday PM Peak Hour Weaving Volume

ORIGIN	MOVEMENT (WEAVING VARIABLE)	VOLUME (VEH)
Gladys Avenue Underpass ("Ramp")	EBL/T (V_{RF})	42
	EBR (V_{RR})	279
South Fraser Way ("Freeway")	EBL/T (V_{FF})	381
	EBR (V_{FR})	464

This significant imbalance of "freeway to ramp" volumes compared to "ramp to freeway" volumes indicates that in reality this arterial road segment would likely operate closer to a merge condition rather than a weaving condition. This imbalance is advantageous as the majority of vehicles that would be required to change lanes originate from South Fraser Way, which is the higher volume road compared to the Gladys Avenue Underpass. Therefore, there is more likely to be gaps in the future curb lane for the higher volume movement to change lanes into, compared to the inside lane.

Using the assumptions detailed above, the observed weaving percentages, and the volumes presented in Bunt's TIA, the results of the weaving analysis for each Total traffic condition horizon year are presented below in **Table 6.3**. Note, only the PM peak hour has been analyzed as it is the busier and critical time period.

Table 6.3: Weekday PM Peak Hour Weaving Results

HORIZON YEAR	MEASURE OF EFFECTIVENESS (MOE)	RESULT
Existing	V/C	0.43
	Density (pc/mi/lane)	22.8
	LOS	C
Total 2020	V/C	0.47
	Density (pc/mi/lane)	25.3
	LOS	C
Total 2031	V/C	0.57
	Density (pc/mi/lane)	31.6
	LOS	D
Total 2040	V/C	0.64
	Density (pc/mi/lane)	37.2
	LOS	E

As the table indicates, if the subject weaving segment was a typical "freeway" condition and not an urban arterial, the weaving segment would operate at LOS 'C' under existing conditions and Total 2020 traffic conditions, and then worsen to LOS 'E' by 2040.

However, as the subject location is an arterial, therefore making the results above over optimistic, it is reasonable to assume that under existing traffic conditions, the weaving segment would likely operate at LOS 'D' or worse and potentially reach LOS 'F' by 2031, and definitely by 2040.

Summary

While difficult to prove with a formal analysis that widening South Fraser Way would result in well performing weaving operations, it is fair to acknowledge that the introduction of the additional eastbound lane would remove the difficult sightline condition, make the dominant eastbound right-turn movement onto Sumas Way easier for vehicles originating from the Gladys Avenue Underpass, and under existing conditions, result in a better LOS rating than under the current "yield" traffic control, which was shown to perform at LOS 'F' during the weekday PM peak hour.

However, widening South Fraser Way would also introduce a weaving condition which would change the decision-making for a driver originating from the Gladys Avenue Underpass from occurring from a stopped position (at the yield sign before merging) to a moving position, with only a short distance available to

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make this decision. As such, from a safety perspective, it is Bunt's opinion that the introduction of a weaving condition with a short weave distance would not result in safer traffic conditions from what exists today. As the City's key objective is to improve safety at this intersection, Bunt does not recommend that this option be pursued.

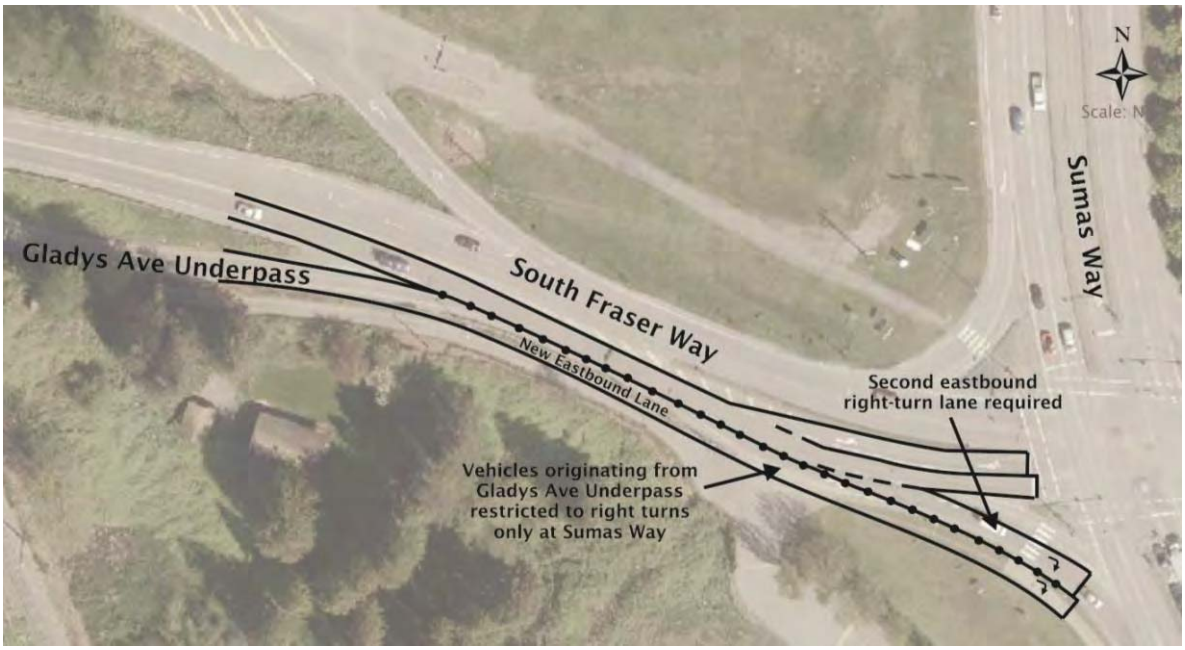
6.2.2 Other Options Considered

As Bunt's analysis indicated that widening South Fraser Way would not result in safer traffic operations, three additional options were explored which are discussed below.

Option 2: Widening South Fraser Way with Gladys Avenue Underpass Traffic Restricted to Right-Turns Only at Sumas Way

As widening South Fraser would introduce a weave condition and resulting safety concerns, one measure to prevent this problem would be to restrict vehicles originating from the Gladys Avenue Underpass to making right turns only at Sumas Way. By removing the option to turn left or through at Sumas Way, the weaving condition, and any associated vehicle conflict, would be removed. **Figure 6.4** shows a conceptual layout of this restriction.

Figure 6.4: South Fraser Way Eastbound Movement Restriction Concept



Summary

While this option would offer the benefits mentioned previously of widening South Fraser Way, upon further assessment, the disadvantages/challenges associated with this option were determined to be too great to make this a feasible solution. From an infrastructure perspective, this option would require the need to introduce a dual eastbound right turn at the Sumas Way & South Fraser Way intersection to allow vehicles originating from South Fraser Way to also turn right onto Sumas Way. This would likely require widening the southwest corner of the intersection to accommodate the extra lane. From a traffic operations perspective, this option would require that the eastbound right-turn lanes be signalized and "right turn on red" movements be restricted. The inability for the right-turn to occur permissively would result in long eastbound right-turn vehicle queues that would block the eastbound through movement along South Fraser Way. Moreover, this option would introduce a weaving condition downstream on Sumas Way with a short weave distance, which would lead to the same challenges as mentioned for the previous option. Finally, from a network connectivity perspective, this option would require both residents of the new development and any vehicle in general using the Gladys Avenue Underpass to take a very circuitous route to travel across Sumas Way to the Abbotsford Village Shopping Centre or to travel north along Sumas Way. For these reasons, Bunt does not believe that this option would be feasible.

Option 3: Installing a Partial Traffic Signal to Meter Eastbound Traffic

To prevent the interaction between merging vehicles from the Gladys Avenue Underpass and vehicles already travelling eastbound on South Fraser Way, another option considered was the installation of a partial traffic signal to meter eastbound traffic travelling on both South Fraser Way and the Gladys Avenue Underpass. This traffic signal would be applicable to only eastbound traffic and would control when vehicles from the Gladys Avenue Underpass and on South Fraser Way could travel toward the Sumas Way intersection.

The partial signal would give preference to South Fraser Way and would coordinate with the eastbound green phase at the Sumas Way & South Fraser Way intersection. The intention of this signal would be to prevent vehicles on the Gladys Avenue Underpass from merging onto South Fraser Way when there are vehicles oncoming along South Fraser Way, and instead provide these vehicles with a safe green phase to merge onto South Fraser Way where sightline issues are not a factor. Effectively, the implementation of this signal would improve operations for Gladys Avenue Underpass traffic, especially from a safety perspective, while making operations somewhat worse for eastbound traffic along South Fraser Way, which currently operates with a free flow condition until Sumas Way.

After discussing this option with City staff at the aforementioned August 20th, 2018 meeting, staff expressed concern regarding adding delay to eastbound traffic along South Fraser Way, as this movement already experiences long vehicle queues during the weekday PM peak hour. As such, City staff were not supportive of introducing any measure that would introduce further delay and a subsequent increase in the vehicle queue length along South Fraser Way. For this reason, this option was not considered feasible or explored further.

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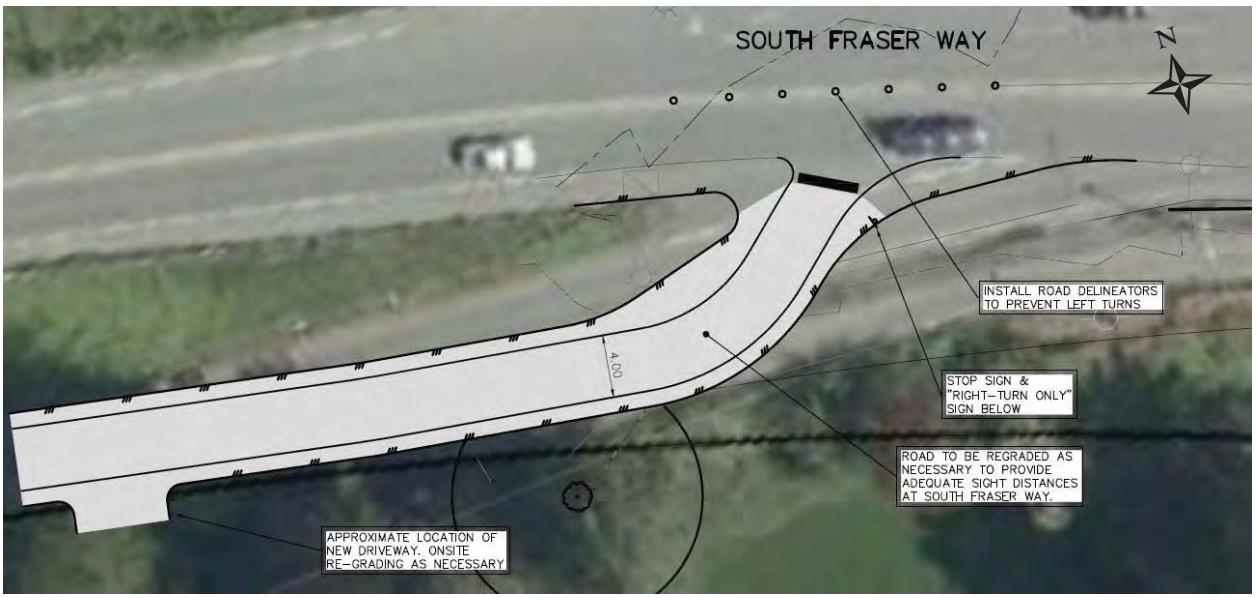
Option 4: Reconfiguring Gladys Avenue Underpass & South Fraser Way Intersection

While all the options above offered advantages, they each had disadvantages and challenges that Bunt believes would not make them feasible solutions, particularly when improving safety is the primary objective. As such, focusing on the factors contributing to the safety issues at this intersection, i.e., the sharp angle of the merge point and the grade difference between the Gladys Avenue Underpass and South Fraser Way, a more modest intersection reconfiguration concept was developed. This concept involved squaring up the Gladys Avenue Underpass with South Fraser Way to remove the sharp angle that currently exists and to design the underpass so that it reaches the same road elevation as South Fraser Way earlier. These two improvements combined would effectively address the factors currently contributing towards the intersection's safety concerns. A conceptual layout of the concept is shown in **Figure 6.5**. A scaled drawing of the design is included in **Appendix F**.

Figure 6.5: Reconfigured Gladys Avenue Underpass & South Fraser Way Intersection Concept



Source: Wedler Enginering

The advantages of this option include:

- The underpass meets with South Fraser Way at a more perpendicular angle removing the sharp angle that currently exists and resulting sight distance issues;
- The underpass road is proposed to reach the same elevation as South Fraser Way at an earlier point than the current underpass which will improve the sight distance challenges caused by the grade difference between the underpass and South Fraser Way; and,

- Drivers will make their decisions from a stopped condition as they do today, as opposed to from a moving condition which would be the case if South Fraser Way were to be widened and a weave condition introduced.

The disadvantages/challenges of this option include:

- The reconfigured intersection design would not help address the vehicle delays and long vehicles queues that exist today on the Gladys Avenue Underpass, which are projected to get worse in the future should traffic grow at the rate assumed by the City; and,
- The reconfiguration of the Gladys Avenue Underpass may require the existing private driveway located immediately south of the Gladys Avenue Underpass to be relocated.

6.2.3 Recommended Option

Taking the advantages and disadvantages/challenges of the different options discussed into, while keeping in mind the key objective of improving safety at the Gladys Avenue Underpass & South Fraser Way intersection, Bunt recommends that Option 4 be pursued. This option involves reconfiguring the intersection so that the underpass is more squared up with South Fraser Way and reaches the same elevation as South Fraser Way at an earlier point than the current design. These two improvements combined would effectively address the sight distance factors that currently exist and therefore should result in safer conditions for drivers.

While it is acknowledged that this measure does not address the vehicle delays and long vehicles queues that exist today on the Gladys Avenue Underpass, it should be noted that this recommended improvement is meant to help address the safety concerns in the short-term. Regardless of the option chosen, Bunt's analysis indicated that should traffic grow at the rate the City and the BC MoTI has assumed (i.e., 2% per year), more extensive geometric improvements would be required in the long-term to accommodate vehicle traffic and improve traffic operations. An example of a potential long-term solution would be to implement the Gladys Avenue Connector, as was discussed previously, which would effective remove the connections between South Fraser Way and Gladys Avenue at this location.

In addition, with respect to the proposed development's contribution to the traffic operations and vehicle queuing issues at this intersection, it is worth emphasizing that the site is expected to add only 4 new vehicles trips to the Gladys Avenue Underpass compared to what the site generates today during the critical PM peak hour. This translates to one new vehicle trip every 15 minutes, on average, which would not have a material impact on the intersection.

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6.3 Gladys Avenue & Lumar Place Intersection

As a requirement of this study, the City of Abbotsford also requested that Bunt review the existing layout of the Gladys Avenue & Lumar Place intersection, particularly related to the whether its current design would be able to accommodate future site traffic. The existing layout of the intersection is shown in **Figure 6.6**.

Figure 6.6: Existing Gladys Avenue & Lumar Place Intersection

Bunt's review of this intersection determined that currently no sight distance or traffic operations issues exist. Moreover, Bunt's future traffic operations analysis (as discussed in Section 3.2) indicated that this intersection is expected to operate well thing acceptable performance thresholds with development traffic added in all future horizon years. Overall, Bunt's assessment indicated that no intersection changes are needed to accommodate future traffic volumes or improve safety and therefore no intersection modifications are recommended.

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7. TRANSPORTATION DEMAND MANAGEMENT

7.1 Definition

Transportation Demand Management (TDM) is defined as the "application of strategies and policies to reduce travel demand (specifically that of single-occupancy private vehicles), or to redistribute this demand in space or in time"[3]. A successful TDM program can influence travel behaviour away from Single Occupant Vehicle (SOV) travel during peak periods towards more sustainable modes such as High Occupancy Vehicle (HOV) travel, transit, cycling or walking. The responsibility for implementation of TDM measures can range across many groups, including regional and municipal governments, transit agencies, private developers, residents/resident associations or employers.

TDM measures are often provided to support parking supply variances, as they help encourage residents and visitors to use more sustainable modes of transportation to travel to/from the site, thereby reducing the reliance on private vehicle use and subsequent parking demand.

7.2 Planned TDM Measures

7.2.1 Active Transportation Infrastructure

Walking is a realistic form of travel for most people, especially over short distances with many people willing to walk at least 5-minutes or 400m for short trips. The distance that a person is willing to walk is often related to the purpose of the journey, but is also influenced by factors such as urban form, traffic, safety, personal fitness, car ownership, and parking availability.

A person's willingness to cycle is based on a number of lifestyle factors, including health benefits, cost savings (compared to automobile use and parking) and convenience. Infrastructure also plays an important role through the safety of routes, presence or absence of steep gradients, availability of cycle storage facilities, etc. Cycling is a realistic transportation option for most people over short to medium distances, i.e. up to 8 kilometres, or a 30-35 minute cycle.

To help promote and encourage the use of these alternative travel modes, as mentioned previously in Section 1.4, Elevate plans to provide new pedestrian and cyclist connections in and around the site, which include both a pedestrian footpath running along the east side of the site and a path that runs both through and around the site that connects the development to Gladys Avenue to the south and the pedestrian footpath to the east. These new facilities will improve the pedestrian and cyclist experience, and can encourage and support the use of these sustainable modes of transportation.

[3] http://ops.fhwa.dot.gov/tdm/index.htm FHWA Travel Demand Management home page

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7.2.2 Excess Bicycle Parking Provision

To help accommodate cyclists and encourage the use of alternative modes of transportation, Elevate plans to provide bicycle parking for the development over and above the City's bylaw requirement. In total, the development will exceed the bylaw requirement by 22 stalls.

7.3 Recommended TDM Measures for Site

7.3.1 Marketing Materials & Transportation Information

Travel patterns are most pliable when residents move from one location to another. Therefore, site developers/rental companies can play a significant role in changing people's travel behaviours, through marketing materials to potential buyers/renters and through provision of information packages to new residents which stress the attractiveness and ease of alternative travel modes. In marketing materials to potential residents, clear and simple messages such as cost savings and health benefits (within the context of life style choice and urban living), along with practical information about local transit services, walking and cycle routes to key locations, carpooling and car-sharing services, would help attract residents who want to live a car-free lifestyle.

For residents who are moving into the development, a Transportation Information Package should be provided on move-in day. The package should include:

- A map showing amenities and shopping opportunities within a typical walking catchment of 800m;
- A map showing local cycling and transit routes with key destinations and travel times by different modes;
- Information about bicycle safety and local bicycle shops and repair facilities;
- Information pertaining to on-site car share provisions, car share membership sign up and procedures;
- Information pertaining to available bicycle and vehicle parking;
- Information on regional ride-share organizations, such as Jack Bell; and
- A list of websites and apps that can aid in the use of alternative transportation such as transit apps.

7.3.2 Ride Share Program

Ride-Sharing or "Carpooling" is the sharing of car journeys so that more than one person travels in a car. By having more people using one vehicle, ride-sharing reduces each person's travel costs such as fuel costs, tolls, and the stress of driving. Carpooling is also seen as a more environmentally friendly and sustainable way to travel as sharing journeys reduces carbon emissions, traffic congestion on the road, and the need for parking spaces.

There are a number of tools available that help facilitate the set up of an online ride sharing database. These tools enable people to enter their journeys, and the database will automatically search out residents or employees whose journeys match.

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8. CONCLUSIONS & RECOMMENDATIONS

Based on Bunt's review of the proposed development and its associated transportation impact, a summary of the conclusions and recommendations of the study is provided below.

8.1 Conclusions

8.1.1 Proposed Development

Development Plan

- The proposed development is to include two, six-storey buildings with a total of 282 residential strata condominium units. Vehicle access to the development will be via a driveway access connection to Gladys Avenue at the location of the existing driveway to the Abbotsford News site.

- To help promote and encourage the use of alternative travel modes, Elevate plans to provide new pedestrian and cyclist connections in and around the site, which include both a pedestrian footpath running along the east side of the site and a path that runs both through and around the site that connects the development to Gladys Avenue to the south and the pedestrian footpath to the east.

Development Trip Generation

- The proposed development is expected to generate a net increase of approximately 70 vehicle trips during both the weekday AM and PM peak hours, or just over 1 new vehicle trip per minute on average. This magnitude of traffic falls within the general volume fluctuation experienced on any given roadway on a daily basis and is not expected to have a material impact on the road network.

- The development's net site traffic is expected to account for less than 1% of total vehicle volumes at both the Sumas Way & South Fraser Way and Sumas Way & Marshall Road intersections in the future horizon years.

- The development's net site traffic is expected to account for 23% (50 vehicles) of the traffic on the Gladys Avenue Underpass onto South Fraser Way during the AM peak hour. However, during the critical PM peak hour when traffic delays and long vehicle queues exist, the development is only expected to add 4 new vehicles to this movement (i.e., one new trip every 15 minutes on average), which translates to 1% of the total traffic.

8.1.2 Traffic Operations

Existing Conditions

- Under existing conditions, the major roadways in the study area (i.e., Sumas Way, Marshall Road, and South Fraser Way) carry significant vehicle volumes and as a result, experience considerable traffic congestion and vehicle queues. Bunt's analysis indicated that the Sumas Way & South

Fraser Way and the Gladys Avenue Underpass & South Fraser Way intersections operate with overall failing conditions during the weekday PM peak hour and Sumas Way & Marshall Road performs with overall failing operations during both the weekday AM and PM peak traffic periods. Moreover, these intersections experience several failing individual movements from a V/C ratio, LOS, and 95th percentile queue perspective during both time periods.

- The mitigation measures required to improve the traffic operations at the Sumas Way & South Fraser Way intersection to largely meet the City's acceptable performance thresholds include:
  - Dual eastbound left-turn lanes;
  - Protected/permissive phasing for the westbound left-turn in the PM peak hour;
  - One new westbound right-turn lane; and,
  - Upgrade of the eastbound right-turn to "free flow" with an add lane on Sumas Way.

- The mitigation measures required to improve the traffic operations at the Sumas Way & Marshall Road intersection to meet the City's acceptable performance thresholds include:
  - Dual eastbound left-turn lanes;
  - Dual westbound left-turn lanes;
  - One new eastbound right-turn lane;
  - One new westbound right-turn lane;
  - One new northbound right-turn lane; and,
  - One new southbound right-turn lane.

Future Conditions

- Under projected future traffic conditions which assume continued year after year 2% annual growth in area background traffic, both the Sumas Way & South Fraser Way and Sumas Way & Marshall Road intersections are expected to operate with failing traffic conditions from both an overall intersection and individual movement perspective for each horizon year under both Background and Total traffic conditions. Moreover, similar to existing conditions, the Gladys Avenue Underpass & South Fraser Way intersection is expected to fail during the PM peak hour, with the 95th percentile queue for the merge movement shown to exceed the available storage by 2031. However, the two intersections immediate to the site, Lumar Place & Gladys Avenue and Gladys Avenue at the site access, were shown to operate acceptably even in 2040 with the development traffic in place.

- To largely meet the City's acceptable performance thresholds in the future horizon years when a 2% annual background traffic growth rate is assumed, a significant amount of road improvements would be required at both Sumas Way & South Fraser Way and Sumas Way & Marshall Road, particularly by 2031. These include the addition of both new through lanes and left-turn lanes on several of the approaches at both intersections. A detailed summary of the required measures was provided in Section 3.3.1.

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- Bunt's analysis indicated that the net difference in traffic operations with and without the proposed development was found to be minimal. The addition of site traffic did not trigger the need for any additional mitigation measures compared to what was required to accommodate Background traffic alone in the same horizon year.

- Should 2% per year background growth be realized, to truly achieve acceptable traffic performance at the two critical intersections along Sumas Way in the 2040 horizon year, either grade separation would be required or some combination of improvements to both the two subject intersections and other intersections in the nearby road network to relieve traffic volumes at the Sumas Way & South Fraser Way and Sumas Way & Marshall Road intersections.

- It is Bunt's opinion that the assumed 2% annual traffic growth, which triggers much of the operational issues in future horizon years, is not likely possible, especially since the major roadways are already nearing their practical capacity today. As traffic along these roads reach capacity, drivers will naturally seek alternate routes, adjust their schedules to travel during off-peak times, or elect to take alternative modes of transportation in order to reach their destinations. As such, it is likely that future traffic operations will actually be better than what has been reported in Bunt's analysis.

- Bunt's sensitivity analysis indicated that should a higher percentage of site traffic originate from/be destined to the east on Sumas Way and Marshall Road in reality than what was assumed, the net difference in traffic operations from what has been reported would be minimal.

- Bunt's analysis indicated that the implications of introducing the Gladys Avenue Connector would be:

    - Traffic operations at the Sumas Way & South Fraser Way intersection would be improved as vehicle volumes at this location would be reduced. However, despite being improved, the overall V/C ratio and LOS rating would still exceed acceptable performance thresholds except during the AM peak hour;

    - Traffic operations at the Sumas Way & Marshall Road intersection would worsen as vehicle volumes would be redistributed to now use this intersection and existing users would be re-routed from performing a north-south through movement to a turning movement. The worsening effect was found to be more impactful during the AM peak hour than the PM peak hour. However, overall operations would still be failing even without the connector in place;

    - The addition of the Gladys Avenue Connector is expected to generally improve traffic operations of the network as a whole; and,

    - Physically separating Gladys Avenue from South Fraser Way would eliminate queuing and traffic safety issues associated with the current condition with traffic using the merge ramp

from Gladys Avenue onto South Fraser Way and traffic on the eastbound approach at Sumas Way & South Fraser Way.

Parking

- The City's Zoning Bylaw requires that a minimum of 474 off-street parking stalls be provided for the site, including 418 resident stalls and 56 visitor stalls.
- Elevate proposes to meet the City's parking requirement for resident parking (418 stalls).
- To better match the expected demand, Elevate proposes to provide visitor parking at a rate of 0.12 stalls per unit (34 stalls) compared to the City's required rate of 0.20 stalls per unit (56 stalls). The proposed provision rate would require an off-street visitor parking supply variance of 22 stalls.
- The proposed reduced visitor parking supply is expected to be adequate to accommodate the peak visitor parking demand based on data from both the Metro Vancouver Apartment Parking Study (MVAPS) and previous Bunt parking studies.
- The planned bicycle parking supply includes 93 bicycle stalls (74 resident, 19 visitor), which exceeds the City's bylaw by 22 stalls.

Site Plan Design Review

- While not required from a traffic operations perspective when site traffic is added, as part of the proposed development Elevate proposes to reconfigure and improve the Gladys Avenue & Site Access intersection by squaring up the south side of Gladys Avenue so that it meets with the South Fraser Way Exit Ramp at more of a right angle. As the proposed reconfiguration would not result in a significantly modified intersection orientation, change in road grades, or different vehicle priorities, the available sight distance condition is not expected to change from the existing arrangement.
- Bunt's analysis indicated that the required vehicle turning maneuvers for garbage/recycling collection could be achieved without any manoeuvring challenges.
- The development would not require a formal loading stall based on the City's Zoning Bylaw. When residential loading is conducted, loading vehicles will use the circular pick-up/drop-off area located immediately in front of the residential buildings. From here, contents can be transported directly to/from the front entrances of both residential buildings.
- Bunt's analysis indicated that the required vehicle turning maneuvers for fire truck access could be achieved without any manoeuvring challenges.
- A fire truck would be able to position itself within 15m from the face of the buildings as required by the BC Building Code, with the exception of the Amenity Building at the north side of the

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

development. As an alternative, Elevate proposes to provide a standpipe/hydrant connection in this area that is located within 15m of the Amenity Building. At time of writing, Elevate is currently in discussions with the City's Fire Department to determine whether this solution would be acceptable.

Off-Site Road Improvements Analysis

- The existing merge point from the Gladys Avenue Underpass to eastbound South Fraser Way currently presents safety challenges due to the sharp angle of the merge and grade difference between the underpass and South Fraser Way. In addition, while the merge operates without issues during the AM peak hour, long vehicle delays and queues are experienced during the PM peak hour. Prioritizing the City's primary objective of improving safety at this location, Bunt's assessment of various options to address the existing issues concluded the following:
    - Widening South Fraser Way to add a new eastbound through lane would effectively remove the "merge" situation that currently exists and also reduce vehicle delays, but would also introduce a "weaving" segment with only a short distance to make weaving decisions from. For this reason, this option was not considered to be a feasible solution when improving safety is the primary concern.
    - The most feasible option to improve safety was determined to be squaring up the existing merge point where the Gladys Avenue Underpass meets South Fraser Way and to modify the underpass design so that it reaches the same road elevation as South Fraser Way earlier than it does today. These two improvements combined would effectively address the factors currently contributing towards the intersection's safety concerns.
- Bunt's review of the Gladys Avenue & Lumar Place intersection indicated that no sight distance issues exist and that no traffic operations issues are present today or are expected in any of the future horizon years when site traffic is added. As such, no intersection modifications were found to be required.

Transportation Demand Management (TDM)

- The proposed TDM measures for the site include:
    - Provision of a pedestrian footpath that runs along the east side of the development and a path (for pedestrians and cyclists) that runs both through and around the site to help integrate the development with the nearby pedestrian and bicycle connections; and,
    - Provision of bicycle parking at a level over and above the City's bylaw requirement to better accommodate cyclists and encourage the use of alternative modes of transportation.

8.2 Recommendations

Based on the findings of Bunt's analysis, it is recommended that:

- The City/BC MoTI consider implementing the following mitigation measures to help improve both existing and future traffic operations at the two signalized intersections in the study area:

  Sumas Way & South Fraser Way:
  - Introduce dual eastbound left-turn lanes;
  - Introduce protected/permitted phasing for the westbound left-turn in the PM peak hour; and,
  - Upgrade the eastbound right-turn lane from a channelized yield to a free-flow.

    Note: This improvement will coincidentally already be achieved given the road widening on the west side of Sumas Way being conducted by Elevate south of South Fraser Way, as required by the BC MoTI as a condition of approval for this development.

  Sumas Way & Marshall Road:
  - Introduce dual eastbound and westbound left-turn lanes; and,
  - Introduce dedicated right-turn lanes for the east and westbound right-turns.

  Note that while these measures would not bring the existing and future traffic operations within the City's acceptable performance thresholds, they would considerably improve the operations for some of the worst performing movements. Moreover, these mitigation measures are considered more reasonable compared to the full set of mitigation measures discussed in Section 3.3.1 given the local area context, available right-of-way, and extent of property acquisition. Furthermore, the recommended improvements at Sumas Way & Marshall Road follow the recommended improvements included in the City's 2007 TMP.

- Before deciding what infrastructure upgrades at the major study intersections to implement to accommodate future traffic volumes (aside from the recommended measures above), the City conduct a macroscopic traffic assessment of the City's entire future road network to more accurately forecast Background traffic growth in this area. As emphasized in this report, the results of Bunt's future traffic operations analysis are based on a 2% per year growth rate assumption that Bunt does not feel is realistic. A macroscopic model analysis would be able to account for several factors not possible in a site-specific TIA study, such as redistribution of traffic as major roadways reach capacity, area wide effects of development and infrastructure changes around the City, and potential future shifts in travel mode from reliance on private automobile trips.

- The City approve the proposed visitor parking supply variance of 22 stalls based on the findings of both the MVAPS and previous Bunt parking studies supporting the planned provision rate.

- The City ensures that the off-site greenery located between the south approach of the Gladys Avenue & Site Access intersection and the South Fraser Exit Ramp is kept trimmed so that is does not grow to a height that would obstruct the line of sight between vehicles approaching the site from the South Fraser Way exit ramp and vehicles stopped on the south approach of Gladys Avenue.

- The City consider Bunt's recommended option to square up the existing Gladys Avenue Underpass merge point onto South Fraser Way and to modify the underpass so that it reaches the same road elevation as South Fraser Way earlier. These two measures would help improve the safety issues that exist today related to sight distance caused by the sharp angle of the merge and the grade difference between South Fraser Way and the underpass.

- Elevate consider providing additional TDM measures such as marketing materials and transportation information to new residents that provide clear and simple messages such as cost savings and health benefits (within the context of life style choice and urban living), along with practical information about nearby transit services, carpooling and car-sharing services, and walking and cycling connections.

APPENDIX A

Terms of Reference

34375 Gladys Ave – Abbotsford News Redevelopment

Proposed Terms of Reference (ToR) for Transportation Study

November 1, 2017

Bunt proposes to include the following scope in the Transportation Impact Assessment (TIA) Study:

Note: the study will also include any items that are added by the BC MoTI in addition to what is included in this document.

TRAFFIC ANALYSIS

- **Study Area / Intersections Studied:**
  - South Fraser Way & Sumas Way;
  - South Fraser Way & Westbound Off-ramp connection to Gladys Ave / Site Access Driveway;
  - Gladys Ave & Lumar Pl; and,
  - Gladys Ave connection to eastbound South Fraser Way on the approach to the Sumas Way intersection. Note: Analysis will include assessment of the vehicle merging at this location, including potential queuing, sight distance issues, etc.
- **Analysis Years**
  - Existing;
  - Opening Day; and,
  - Opening Day + 10 Years.
- **Analysis Traffic Scenarios**
  - Background (without Development Traffic)
  - Total (Background + Development Traffic)
- **Time Periods**
  - Weekday AM peak hour & weekday PM peak hour
- **Key Assumptions / Issues**
  - Traffic capacity analysis will be conducted using Synchro 9.1. If necessary, SimTraffic will be used for locations with queuing issues, etc.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

- Assumed Background traffic growth will be 2% per year (as requested by BC MoTI). If analysis indicates that 2% is inappropriate based on historical traffic growth patterns, Bunt will provide a rationale why a lower growth rate should be used.
- Site-generated trips will be estimated using ITE Trip Generation Manual (10th Edition) rates. Should Bunt determine that local rates are more appropriate (e.g., trip rates observed in Metro Vancouver for previous Bunt studies for similar land uses), we will confirm that these rates are acceptable with the City prior to finalizing the analysis results.

PARKING & LOADING ANALYSIS

- Confirm the minimum parking supply and site loading requirements of the City of Abbotsford Zoning Bylaw as applied directly to the proposed development;
- Develop a parking supply rationale, based on Bunt database information, to support the reduced parking supply proposed for the project; and,
- Review site plan and advise on traffic circulation, parking layout and loading access using AutoTURN software to ensure that the required vehicle maneuvers can be achieved without any issues.

From: Chris Cheung
To: James Lee
Cc: Daniel Bragagnini; "Tim Hollis"; Purvez Irani; Peter Joyce; "Brian Shigetomi"
Subject: RE: 34375 Gladys Avenue (Abbotsford News) Redevelopment Transportation Study - Terms of Reference Inquiry
Date: Wednesday, December 06, 2017 3:13:25 PM
Attachments: image004.png

Hi James,

Thank you for your write-up. It would be wonderful if the road network could support the proposed development even in the worst case scenario. This makes the review process smoother. However, the City accepts your PHF proposal. I hope the City has provided Bunt enough information/direction to proceed with the TIA. Happy to chat more if you have any further conerns. Look forward to seeing your study.

Chris Cheung, **P.Eng.**
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Engineering & Regional Utilities
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From: James Lee [mailto:jlee@bunteng.com]
Sent: Wednesday, December 06, 2017 1:49 PM
To: Chris Cheung
Cc: Daniel Bragagnini; 'Tim Hollis'; Purvez Irani; Peter Joyce; 'Brian Shigetomi'
Subject: RE: 34375 Gladys Avenue (Abbotsford News) Redevelopment Transportation Study - Terms of Reference Inquiry

Hi Chris,

Further to your note below about Peak Hour Factors (PHF), when deviating from Synchro's default of 0.92 for busy intersections and corridors, we typically either apply an overall intersection PHF to all movements at the intersection, or if a corridor is congested with through movements at LOS E or F, Bunt would use an approach-based PHF ranging from 0.95 to 1.0, informed by available counts.

For minor side streets or low volume driveways, where there are not intense and recurring/predictable demand peaks created by a specific type of land uses, we believe that individual PHF factors should not be applied, due to the substantial variation in the PHF experienced in such cases on a day to day basis. For these low volume legs of the intersection, Bunt's practice is to use the Synchro default PHF of 0.92. In the context of our study, this would apply to the unsignalized intersections along Gladys Avenue that have relatively low volumes during the peak hours.

Supporting Bunt's approach, in Chapter 19 of the Highway Capacity Manual (HCM) (6th Edition), the document states that "*if peak hour factors are used, a single peak hour factor for the entire intersection is generally preferred because it will decrease the likelihood of creating demand scenarios with conflicting volumes that are disproportionate to the actual volumes during the 15-min analysis period. If PHFs for each individual movement or approach are used, they are likely to generate demand volumes from one 15-min period that are in apparent conflict with demand volumes from another 15-min period, but in reality these peaks do not occur at the same time*."

Given this reasoning, rather than applying individual movement PHFs, Bunt proposes the following:

- Major Intersections: Approach-based PHFs (this is somewhat of a middle ground between applying an Overall intersection PHF and individual movements); and,
- Minor Intersections: Synchro Default PHF of 0.92.

Please let us know your thoughts on this proposed approach.

Thanks for your assistance.

Regards,

James Lee, P.Eng., MBA, PMP | Transportation Engineer

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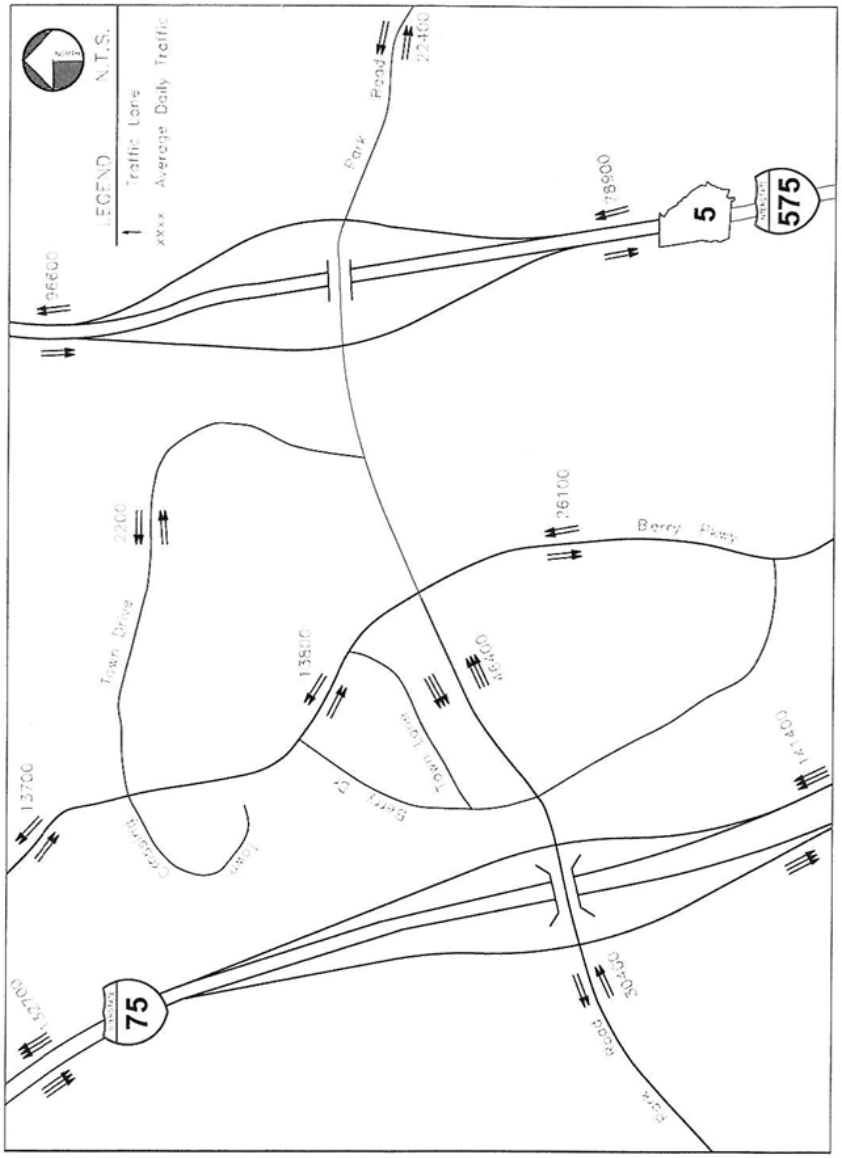
From: Chris Cheung [mailto:CCheung@abbotsford.ca]
Sent: Monday, December 04, 2017 9:04 AM
To: James Lee
Cc: Daniel Bragagnini; 'Tim Hollis'; Purvez Irani; Peter Joyce; 'Brian Shigetomi'
Subject: RE: 34375 Gladys Avenue (Abbotsford News) Redevelopment Transportation Study - Terms of Reference Inquiry

Morning James!

Hope you had a good weekend. Please see the two additional comments below.

- Assume ideal saturation flow rate of 1800 vphpl. The PHF of each movement should be based on existing traffic counts. Any deviation from Synchro defaults should be documented and confirmed by CoA and BCMOTI.
- Review the daily traffic on the study roadways at each horizon. A sample from ITE is as follows:

Figure 3–2. Current Daily Volumes and Existing Through Lanes—*sample illustration*



SOURCE: Street Smarts, Duluth, GA, USA.

Thanks,

Chris

From: James Lee [mailto:jlee@bunteng.com]
Sent: Monday, December 04, 2017 8:50 AM
To: Chris Cheung
Cc: Daniel Bragagnini; 'Tim Hollis'; Purvez Irani; Peter Joyce; 'Brian Shigetomi'
Subject: RE: 34375 Gladys Avenue (Abbotsford News) Redevelopment Transportation Study - Terms of Reference Inquiry

Hi Chris,

Thanks a lot for this.

I'll review the City's comments with the project team and let you know if we have any questions or comments.

Note that we've also been in contact with Jon Crump from MoTI and he's provided us with the signal timings you've mentioned.

Regards,

James Lee, P.Eng., MBA, PMP | Transportation Engineer

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From: Chris Cheung [mailto:CCheung@abbotsford.ca]
Sent: Friday, December 01, 2017 3:03 PM
To: James Lee
Cc: Daniel Bragagnini; 'Tim Hollis'; Purvez Irani; Peter Joyce; 'Brian Shigetomi'
Subject: RE: 34375 Gladys Avenue (Abbotsford News) Redevelopment Transportation Study - Terms of Reference Inquiry

Hi James,

Please see the City comments in green. Please note South Fraser Way/ Hwy 11 and Marshall Rd/Hwy 11 are provincial signals. Contact BCMOTI for signal timing plans.

Let me know if you have any questions or concerns.

Thanks,

Chris Cheung, P.Eng.
Transportation Engineer
Engineering & Regional Utilities
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From: Chris Cheung
Sent: Friday, December 01, 2017 2:24 PM
To: 'James Lee'
Cc: 'Daniel Bragagnini'; 'Tim Hollis'; Purvez Irani; 'Peter Joyce'; 'Brian Shigetomi'
Subject: RE: 34375 Gladys Avenue (Abbotsford News) Redevelopment Transportation Study - Terms of Reference Inquiry

Hi James,

Just wanted to give your team an update on this item. The City comments on the ToR is currently being reviewed by our senior management/engineering team. Once I get the nod, Purvez or I will send out the comments.

Let me know if there's anything I can do in the meantime to facilitate. Otherwise, have a good weekend.

Chris Cheung, P.Eng.
Transportation Engineer
Engineering & Regional Utilities
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Email: ccheung@abbotsford.ca

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Hi Chris,

Sorry, one more item I forgot to mention:

- **Right-of-Way Concerns**
  - You've briefly mentioned the City has concerns regarding the amount of City right-of-way that Elevate is planning to obtain for their site, as

it may limit the ability to widen roads, etc., in the future. When you provide your ToR responses, could you please elaborate on this a bit more, as I do not know if I have interpreted the City's concerns correctly. As you can imagine, if this concern results in Elevate needing to change their site design/size, it is very critical for them to be aware of the exact details of this and as soon as possible.

City Comment:

- South Fraser Way is classified as an Urban Arterial roadway. Please see "Urban Arterial with left lane" for the laning and ROW requirements.
- Gladys Avenue is classified as an Urban Collector roadway. Please see "Urban Collector undivided" for the laning and ROW requirements.
- Additional ROW may be required near the intersections to provide traffic capacity.
- The ROW requirement can be found at https://abbotsford.civicweb.net/filepro/documents/40783?preview=40786

Thanks.

Regards,

James Lee, P.Eng., MBA, PMP | Transportation Engineer

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From: James Lee
Sent: Wednesday, November 29, 2017 12:47 PM
To: 'Chris Cheung'
Cc: Daniel Bragagnini; 'Tim Hollis'; 'Purvez Irani'; Peter Joyce; 'Brian Shigetomi'
Subject: RE: 34375 Gladys Avenue (Abbotsford News) Redevelopment Transportation Study - Terms of Reference Inquiry

Hi Chris,

Thanks for providing me with an update over the phone just now that you are still working with your team to come up with the City's response to the TIA Terms of Reference (ToR) and hope to get back to us by end of this week. As I mentioned, because Elevate is pushing hard to get their material sent in on time to be in front of Council in January, your attention to this matter is much appreciated.

Further to our conversation, some items I hope you can discuss and provide feedback on when reviewing what Bunt's study should account for include:

- **Road Network Assumptions that were included in Transportation Master Plan (TMP):**
  - Gladys Ave Extension.
  - S.Fraser Way Extension to Eleanor Dr/Guildford Dr.
  - Addition of Dual EB & WB left-turn lanes and EB & WB right-turn lanes at the Sumas & Marshall Rd intersection (See TMP Ex.4.3D)

Note: As the TMP was written in 2007, we just wanted to confirm whether these road changes, which were being contemplated in the TMP, are still on the table or not and if so, whether we should assume they are in place for our future analysis.

City Comment:

- As I mentioned over the phone, the Urban System is currently updating the Transportation Master Plan (TMP). It has yet gone to the stage of identifying options and adopting the new TMP. 2007 TMP is the current plan adopted by the City. At this time, the City has no future information as to whether the recommendations in the 2007 TMP would be materialized.

- **City of Abbotsford's Acceptable Traffic Capacity Performance Thresholds:**
  - TMP uses **LOS C or better and V/C < 0.80**. Unless told otherwise, we will use this for our analysis, although we feel that these are quite optimistic, and will result in several failing movements/intersections under this criteria. For comparison, in Metro Vancouver the generally accepted thresholds are – Overall Intersection: LOS D or better and V/C of 0.85 or less, and individual movements: LOS E or better, and V/C ratio 0.90 or less.

City Comment:

- As mentioned previously, 2007 TMP is the current plan adopted by the City.

- **Growth Rate Assumptions**
  - The TMP does not explicitly mention the growth rate assumed and does not provide any volume information to help calculate it from. The Ministry has asked us to assume 2% on their highway. Unless the City can advise otherwise, we will assume 2% for City roads too.

City Comment:

- This proposal is acceptable. As the City does not have a long-term forecast volumes, the 2% per year is acceptable.

- **Horizon Year**
  - We typically Opening Day and Opening Day + 10 years. As you and I just discussed, because Elevate's projected Opening Day is 2020, we will just use 2031 as our future horizon year, rather than 2030, in order to be consistent with the horizon year used in the TMP.

City Comment:

- This is acceptable.

- **Trip Gen Rate**

th

- You indicated that you thought that Bunt's proposed trip gen rate based on ITE's (10 Ed) Mid-Rise Apartment use was too low – AM: 0.36/unit, PM: 0.44/unit. We will explore other residential rates in ITE to identify a potential alternative rate and will let you know. If trying to understand whether the change in trip rate would change our impact to the Gladys Ave northern intersections, when testing the ITE (9th Ed) rate for Apartment Use – AM: 0.46, PM:0.60, when applying our assumed distributions to the net new number of trips, this translates to about 7 and 12 more trips in the AM and PM, respectively, heading to/from the Gladys intersections than what we presented in our previous memo. As such, the net additional trips to these intersections would not make a significant difference to the findings in our memo.

City Comment:

- **Understood. The proposed trip rates are acceptable.**

Thanks for your attention to these items, as well as the proposed assumptions in our earlier ToR. If it would help for Bunt to meet with the City in person to discuss the ToR to help expedite the process, please do not hesitate to ask.

Regards,

James Lee, P.Eng., MBA, PMP | Transportation Engineer

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From: James Lee
Sent: Monday, November 20, 2017 9:48 AM
To: 'Chris Cheung'
Cc: Daniel Bragagnini; 'Tim Hollis'; Purvez Irani; Peter Joyce
Subject: RE: 34375 Gladys Avenue (Abbotsford News) Redevelopment Transportation Study - Terms of Reference Inquiry

Hi Chris,

Hope you had a good weekend. Thanks for this note.

Just wondering if you had any updates on the City's feedback on our ToR? In particular, we're looking for confirmation regarding whether we need to include the northern intersections following the memo we sent illustrating the relatively modest impact to those intersections in terms of vehicle trips, the trip gen rates we included in that memo, and feedback on the items I included in my proposed ToR document a few weeks ago.

Thanks in advance for your help on this.

Regards,

James Lee, P.Eng., MBA, PMP | Transportation Engineer

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From: Chris Cheung [mailto:CCheung@abbotsford.ca]
Sent: Wednesday, November 15, 2017 12:22 PM
To: James Lee
Cc: Daniel Bragagnini; 'Tim Hollis'; Purvez Irani; Peter Joyce
Subject: RE: 34375 Gladys Avenue (Abbotsford News) Redevelopment Transportation Study - Terms of Reference Inquiry

Thanks James for the update. With my current workload, I'm hoping I can get to this by the end of this week or early next week and give you feedback and City's position on the ToR.

Chris

From: James Lee [mailto:jlee@bunteng.com]
Sent: Tuesday, November 14, 2017 11:44 AM
To: Chris Cheung
Cc: Daniel Bragagnini; 'Tim Hollis'; Purvez Irani; Peter Joyce
Subject: RE: 34375 Gladys Avenue (Abbotsford News) Redevelopment Transportation Study - Terms of Reference Inquiry

Hi Chris,

As requested, to help substantiate our notion that the net impact of our site on the intersections to the north (i.e., Gladys & Essendene, Gladys & George Ferguson Way, and the "5 Points" intersection) is not significant enough to require Bunt's TIA to include them in our scope of work, my Analyst, Daniel, and I have prepared a brief memo to document our findings. I've attached a link below to download the file.

https://bunt.wetransfer.com/downloads/84a4a48235d0899e83e199d14d69470f20171114193727/96308f4d026bbfb440a168296b3eac8620171114193727/a4d81c

In summary, our development is expected to add in the order of 40 new vehicle trips to the Gladys & Essendene intersection in both weekday AM and PM peak hours, and even fewer to the other two intersections to the north and west.

Given that this number of vehicles using the intersections is within the magnitude of daily fluctuation experienced at any given intersection, we do not anticipate our development to have a material impact at these locations. While we do not have traffic volume data for the intersections to calculate a "net

percentage impact", I would expect that our ~40 trips would represent a relatively low proportion of the traffic already at these intersections.

Please review our memo and let us know if you have any questions or comments, or would like to discuss the memo further. Once you have completed your review, please let us know your thoughts on the requirements of Bunt's scope in relation to these study intersections. Note that as I mentioned previously, Bunt will be adding the Marshall Rd & Sumas Way intersection to our study as requested by the City.

City Comment:

- Please conduct a sensitivity analysis on the trip distribution to determine the impact to the road network.

Regards,

James Lee, P.Eng., MBA, PMP | Transportation Engineer

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From: Chris Cheung [mailto:CCheung@abbotsford.ca]
Sent: Friday, November 03, 2017 1:19 PM
To: James Lee
Cc: Daniel Bragagnini; 'Tim Hollis'; Purvez Irani
Subject: RE: 34375 Gladys Avenue (Abbotsford News) Redevelopment Transportation Study - Terms of Reference Inquiry

Hi James,

Thanks for the discussion this morning. Attached is Gladys Avenue study from the 2007 Transportation Master Plan. I hope this helps you with a head start.

Will let your team know once I have an update. Have a good weekend everyone and James, enjoy your trip!

Chris

From: James Lee [mailto:jlee@bunteng.com]
Sent: Friday, November 03, 2017 12:11 PM
To: Chris Cheung
Cc: Daniel Bragagnini; 'Tim Hollis'
Subject: RE: 34375 Gladys Avenue (Abbotsford News) Redevelopment Transportation Study - Terms of Reference Inquiry

Hi Chris,

It was nice speaking to you earlier this morning. To re-iterate some of the key points we discussed, as well as to confirm some of the actions items we mentioned, I've summarized some of the important notes of our conversation below. Bunt's initial response is in RED.

City's Concern

- You mentioned that one of the primary concerns regarding the development is with regards to the City's right-of-way (ROW) that Elevate is proposing to claim and construct on and how this would affect the City's ability to use this space in the future should it be required to accommodate future traffic through road widening, etc.

  BUNT: I believe you were referring to the south parcel when you mentioned this; however, could you please elaborate on this a little bit more (i.e., exact location, etc.) as it will be important for Elevate to understand this issue as it could affect their development size.

City Comment:

- Please comment on how the proposed development will impact to the Gladys Avenue extension contained in the 2007 TMP and the ability for the City to achieve the Development Bylaw cross-section on South Fraser Way with on-street bike lanes.

Requested Scope

-

- In addition to the intersections proposed by Bunt, the City would want the study to include:
  - Sumas Way & Marshall Rd
  - Gladys Ave & Essendene Ave
  - Gladys Ave & George Ferguson Way
  - W Railway St / Montvue Ave & Essendene Ave ("5 Point" intersection)

  -

  BUNT: We think that including the Sumas Way & Marshall Rd intersection is logical and Bunt can add this to our scope. However, we believe that adding the 3 intersections to the north would not be appropriate given the expected net impact to these intersections by the proposed development. Bunt will prepare some supporting information to substantiate this notion after doing some preliminary trip gen calcs. As we discussed, once Bunt has provided this info, you can follow up with your team to see whether it would be reasonable to remove these intersections from the scope.

City Comment:

- This is acceptable.

-

- Bunt's study should include some commentary on how the development will accommodate Active travel modes, e.g., how the site will connect to

the trail system and how the site is connected to nearby transit, etc.

-

BUNT: Acknowledged. We will include this in our study.

City Comment:

- This is acceptable.

Supporting Material / Other studies

- Trip Gen Rates: You mentioned that you'd like to see our proposed trip gen rates as the City does not yet have a version of the ITE Trip Gen Manual (10th Ed). BUNT: Acknowledged. We will provide you with our proposed rates and associated information shortly.

-

City Comment:

- Completed by Bunt already.

-

- 2007 Transportation Master Plan & Gladys Avenue Study: You mentioned that it would be useful to become familiar with these studies when conducting our own. BUNT: Acknowledged. I have located the 2007 Transportation Master Plan, but could not find the Gladys Ave study. Could you please provide an electronic copy of this?

City Comment:

- Completed by City already.

- Urban Systems Master Transportation Study Update: You mentioned that Urban Systems is currently conducting an update to the City's Master Plan and that you may be able to provide some volumes from this study. BUNT: Could you please provide these volumes if available as we can use them to help inform our future analysis.

City Comment:

- At this time, Urban Systems does not have forecast volumes.

- City Traffic Volumes north of site: I believe you mentioned that you may have some City traffic volumes north of our site at the 3 intersections that I mentioned above. BUNT: Could you please provide these volumes if available as we can use them to help assess what our net impact would be.

City Comment:

- The City can certainly provide the available turning movement count if the scope is acceptable to Bunt.

Action Items

- City items:
  - Provide Bunt with any traffic volume info available for the area (e.g., from Urban Systems study, etc.);

City Comment:

- See above comment.

  - Provide Bunt with the Gladys Ave Study;

City Comment:

- Completed by the City already.

  - Provide Bunt with feedback on other areas of the ToR not discussed such as horizon years, etc.

City Comment:

- See above comment.

  - Discuss with team whether intersections to the north can be removed from scope once Bunt has provided some supporting information.
- Bunt Items:
  - Provide City with supporting information to substantiate notion that the traffic impact will be minimal to the required intersections to the north.
  - Provide City with summary of proposed Trip Gen rates prior to conducting all future analysis.

City Comment:

- Completed by Bunt already.

Thanks again for your help this morning. If I've missed anything or if you have any questions, please let me know. In my absence next week, please contact the project Analyst, Daniel Bragagnini.

Have a good weekend.

Regards,

James Lee, P.Eng., MBA, PMP | Transportation Engineer

Bunt & Associates Engineering Ltd.
Suite 1550 - 1050 West Pender Street, Vancouver, BC V6E 3S7
p 604 685 6427 Ext 237 f 604 685 6579 | www.bunteng.com

From: James Lee
Sent: Thursday, November 02, 2017 4:27 PM
To: 'Chris Cheung'
Cc: Daniel Bragagnini
Subject: RE: 34375 Gladys Avenue (Abbotsford News) Redevelopment Transportation Study - Terms of Reference Inquiry

Hi Chris,

I got your voicemail and just left you a message a little while ago. As I mentioned in my voicemail, I'm here until the end of today and all day tomorrow, but will be out of the office next week.

As such, if you're available to chat sometime before end of day tomorrow that would be great. As I noted, if the City would not want us to conduct our traffic count next Tuesday at the Sumas Way & S Fraser Way intersection to obtain a seasonal variation factor to apply to our late summer counts, please let us know as we will want to cancel the count with adequate notice to our data collection team.

If you are not available to chat about the project scope before I go away, please contact the project Analyst, Daniel Bragagnini, who is copied on this email.

Thanks.

Regards,

James Lee, P.Eng., MBA, PMP | Transportation Engineer

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Suite 1550 - 1050 West Pender Street, Vancouver, BC V6E 3S7
p 604 685 6427 Ext 237 f 604 685 6579 | www.bunteng.com

From: James Lee
Sent: Wednesday, November 01, 2017 4:41 PM
To: 'Chris Cheung'; Purvez Irani
Cc: 'Tim Hollis'; Daniel Bragagnini; Blake Collins
Subject: RE: 34375 Gladys Avenue (Abbotsford News) Redevelopment Transportation Study - Terms of Reference Inquiry

Thanks Chris.

In terms of network volumes, I should note that we have also collected existing traffic volumes at the intersections that I listed in the study area. As we were pushing to move things forward at the outset of this project, this data was collected in mid/late August. As such, to adjust the volumes for seasonal variation, we were intending to re-count the Sumas Way & S Fraser Way intersection (i.e., the largest intersection in the study area) next week in order to calculate a "seasonal adjustment factor" which we will apply to the entire set of original volumes. This adjustment would be applied in case the volumes experienced currently (i.e., in the Fall) are higher than what was observed in late Summer.

Please let me know if this approach is acceptable for the purposes of our analysis.

Regards,

James Lee, P.Eng., MBA, PMP | Transportation Engineer

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p 604 685 6427 Ext 237 f 604 685 6579 | www.bunteng.com

From: Chris Cheung [mailto:CCheung@abbotsford.ca]
Sent: Wednesday, November 01, 2017 4:33 PM
To: James Lee; Purvez Irani
Cc: 'Tim Hollis'; Daniel Bragagnini; Blake Collins
Subject: RE: 34375 Gladys Avenue (Abbotsford News) Redevelopment Transportation Study - Terms of Reference Inquiry

Hi James,

Thanks for your input. We'll review your proposal. Just wanted to let you know the City is in the process of determining the sets of forecast volume to be used for your analysis. I'll let you know once I have an update.

Purvez, please chime in if I've missed anything here.

Chris Cheung, P.Eng.
Transportation Engineer
Engineering & Regional Utilities
Tel: 604-864-5535 **Fax:** 604-853-2219
Email: ccheung@abbotsford.ca

ABBOTSFORD 32315 South Fraser Way
Abbotsford, BC V2T 1W7
www.abbotsford.ca

From: James Lee [mailto:jlee@bunteng.com]
Sent: Wednesday, November 01, 2017 4:25 PM
To: Chris Cheung
Cc: 'Tim Hollis'; Daniel Bragagnini; Purvez Irani; Blake Collins
Subject: RE: 34375 Gladys Avenue (Abbotsford News) Redevelopment Transportation Study - Terms of Reference Inquiry

Hi Chris,

Further to my email this morning, on advice from Blake Collins, I've prepared a brief Terms of Reference (ToR) document that summarizes the key study tasks and assumptions that Bunt proposes to include in its Transportation Study.

I'm hoping that this document will provide a good starting point for the City to review to save you guys some time when developing the ToR for the transportation study.

Once you've had a chance to review, we can discuss in more detail if you would like. Note that I am around the rest of this week, but will be out of the office next week. However, in my absence, my project Analyst, Daniel Bragagnini, can be contacted to discuss the project. I've copied Daniel to this email and his phone number is 604-685-6427 ext. 222.

Thanks in advance for your attention to this.

Regards,

James Lee, P.Eng., MBA, PMP | Transportation Engineer

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Suite 1550 - 1050 West Pender Street, Vancouver, BC V6E 3S7
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From: James Lee
Sent: Wednesday, November 01, 2017 11:07 AM
To: 'Chris Cheung'
Cc: 'Tim Hollis'; Daniel Bragagnini; Purvez Irani
Subject: RE: 34375 Gladys Avenue (Abbotsford News) Redevelopment Transportation Study - Terms of Reference Inquiry

Hi Chris,

Thanks for the response. Acknowledging that the City will not be able to provide comments back until the end of next week, given the time sensitive nature of the project in terms of targeted submission dates, can you confirm some preliminary items of the study just to allow us to get our analysis started as we wait for the entire Terms of Reference (ToR)?

Assuming that the City will require a full traffic study (as the development is anticipated to generate greater than 100 vehicle trips), the items that we'd like to confirm are:

- We can get started on our Existing Conditions analysis for weekday AM and PM peak hours? The intersections we're planning to include are:
  - Sumas Way & S Fraser Way
  - Gladys Ave & Lumar Pl
  - Gladys Ave & Site Driveway / S Fraser Way WB Exit Ramp; and,
  - The operations (e.g., queuing, potential sight line issues, etc.) at the EB Entry Ramp onto S Fraser Way from Lumar Pl.

- We can begin estimating our future trip generation, using ITE Trip Generation Manual (10th Edition) rates as a starting point.

We can hold off on our future analysis until the City provides their full ToR, particularly the horizon years to study, growth rate assumptions, etc. Note that the MoTI has informed Bunt that they'd like to see 2% per year be used.

Please let me know if these preliminary items are okay to get started on. In addition, if you think it would be beneficial for you and your team for Bunt to provide a proposed ToR to expedite the process, we can do that as well to help you out.

Please advise.

Regards,

James Lee, P.Eng., MBA, PMP | Transportation Engineer

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From: Chris Cheung [mailto:CCheung@abbotsford.ca]
Sent: Tuesday, October 31, 2017 4:25 PM

To: James Lee
Cc: 'Tim Hollis'; Daniel Bragagnini; Purvez Irani
Subject: RE: 34375 Gladys Avenue (Abbotsford News) Redevelopment Transportation Study - Terms of Reference Inquiry

Hi James,

Sorry, I couldn't get back to you earlier. There are still ongoing discussions amount Staff on this project. I'm hoping I can get back to you by the end of next week.

Happy Halloween!

Chris Cheung, P.Eng.
Transportation Engineer
Engineering & Regional Utilities
Tel: 604-864-5535 **Fax:** 604-853-2219
Email: ccheung@abbotsford.ca

ABBOTSFORD
32315 South Fraser Way
Abbotsford, BC V2T 1W7
www.abbotsford.ca

From: James Lee [mailto:jlee@bunteng.com]
Sent: Tuesday, October 31, 2017 3:58 PM
To: Chris Cheung
Cc: 'Tim Hollis'; Daniel Bragagnini; Purvez Irani
Subject: 34375 Gladys Avenue (Abbotsford News) Redevelopment Transportation Study - Terms of Reference Inquiry

Hi Chris,

I just wanted to follow up on a couple voicemail messages I left recently with you with regards to the City's Terms of Reference (ToR) for the Transportation Study for the 34375 Gladys Ave (Abbotsford News) redevelopment project. I spoke to Purvez and he mentioned that you would be the best person to provide this information.

As Bunt is working on the Transportation Study for Elevate Development Corp, I just wanted to make sure that our study includes all of the key components that the City will be interested in before we get too far into the process. I have already spoken to Jon Crump from the MoTI to get the Ministry's requirements. As Elevate intends to submit their material in about a month's time in order to get in front of Council in January, we are hoping to get direction from the City as soon as possible.

As such, when you have a chance, please give me a call to discuss this further or email me back.

Thanks in advance for your assistance with this.

Regards,

James Lee, P.Eng., MBA, PMP | Transportation Engineer

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To: jlee@bunteng.com Remove this sender from my allow list
From: ccheung@abbotsford.ca

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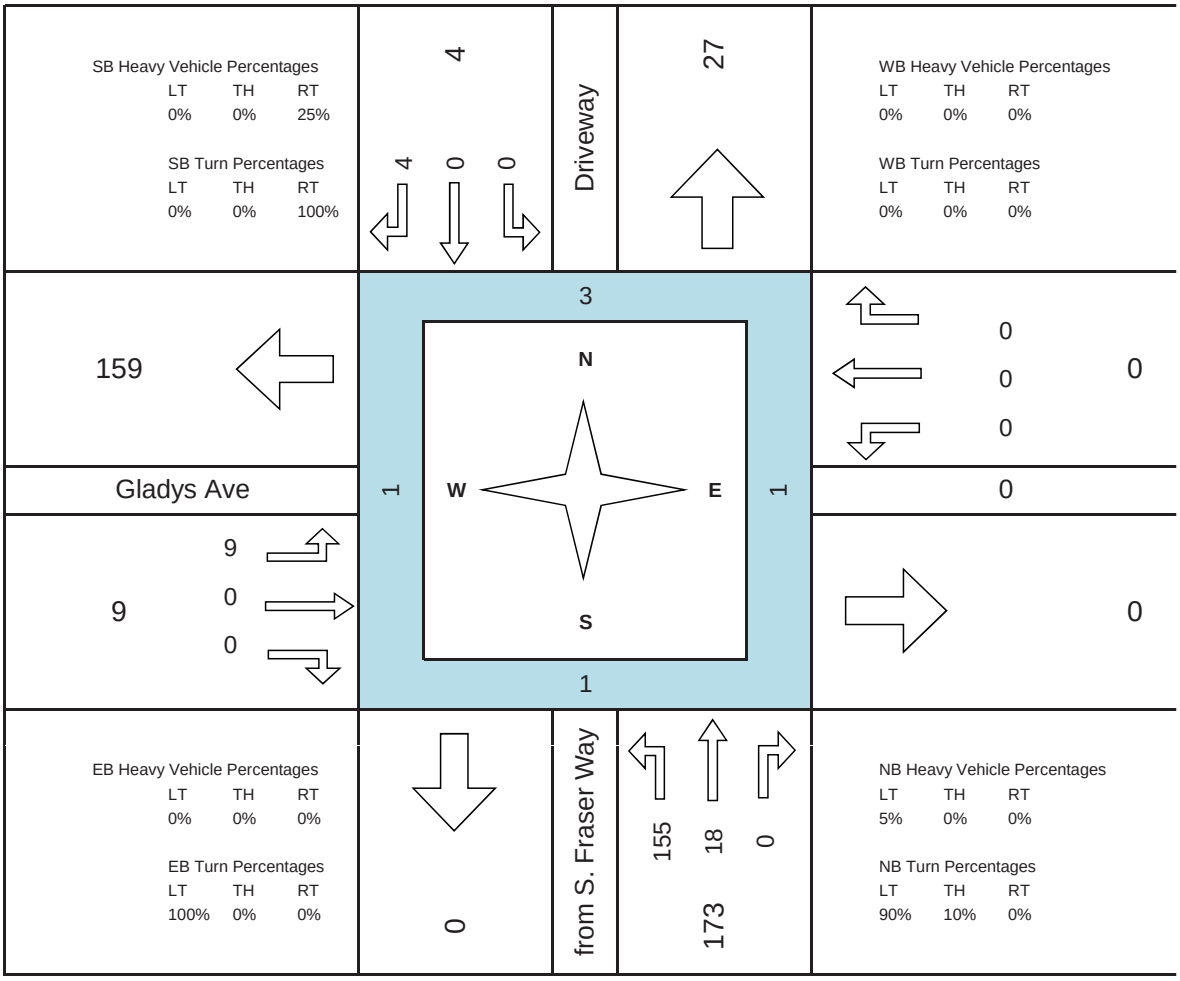
APPENDIX B

Intersection Traffic Counts

Abbotsford News Driveway @ Gladys Ave

Project #:	04-17-0021	Date:	Aug 17, 2017
Peak Hour:	07:45 — 08:45	Weather:	Sunny
Overall PHF:	0.80	Road Cond:	Dry
Notes:	0		

	Traffic Movements												Pedestrians			
Time Intervals	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	N	S	E	W
07:00 - 07:15	12	2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15 - 07:30	22	2	0	0	0	0	2	0	0	0	0	0	0	0	0	0
07:30 - 07:45	32	3	0	0	0	0	1	0	0	0	0	0	0	0	0	0
07:45 - 08:00	50	1	0	0	0	2	5	0	0	0	0	0	0	0	0	0
08:00 - 08:15	34	4	0	0	0	2	0	0	0	0	0	0	1	0	0	0
08:15 - 08:30	34	7	0	0	0	0	3	0	0	0	0	0	1	0	1	0
08:30 - 08:45	37	6	0	0	0	0	1	0	0	0	0	0	1	1	0	1
08:45 - 09:00	30	5	0	0	0	0	2	0	0	1	0	0	1	1	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak V_{15min}	50	7				2	5									
PHF	0.78	0.64				0.50	0.45									

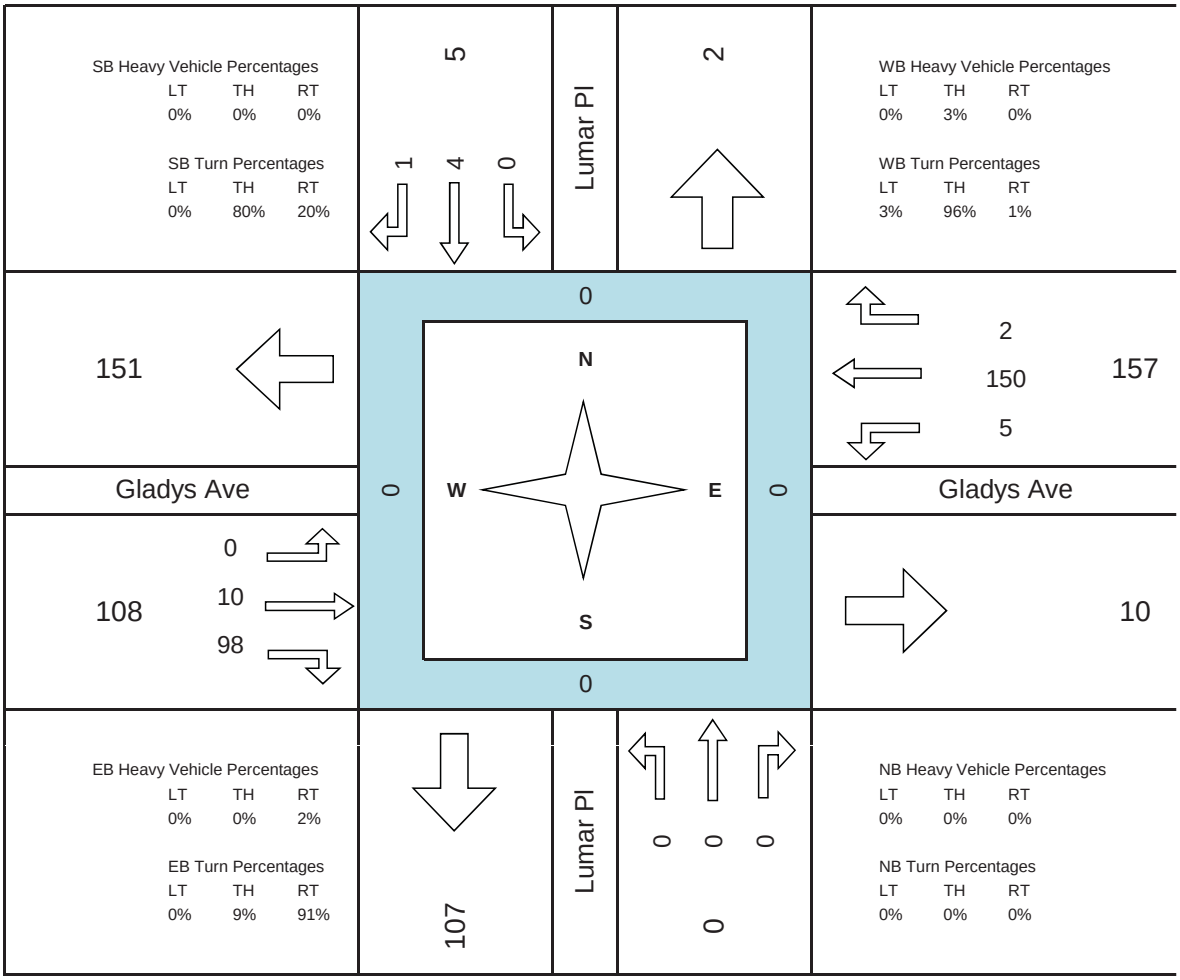


Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Lumar Pl @ Gladys Ave

Project #:	04-17-0021	Date:	Aug 17, 2017
Peak Hour:	07:45 — 08:45	Weather:	Sunny
Overall PHF:	0.78	Road Cond:	Dry
Notes:	0		

	Traffic Movements												Pedestrians			
Time Intervals	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	N	S	E	W
07:00 - 07:15	0	0	0	0	0	1	0	0	17	0	15	0	0	0	0	0
07:15 - 07:30	0	0	0	0	0	0	0	2	19	1	21	0	1	0	0	0
07:30 - 07:45	0	0	0	0	2	0	1	2	16	1	31	1	0	0	0	0
07:45 - 08:00	0	0	0	0	2	0	0	6	25	3	50	0	0	0	0	0
08:00 - 08:15	0	0	0	0	1	0	0	0	24	2	34	1	0	0	0	0
08:15 - 08:30	0	0	0	0	1	0	0	3	22	0	33	0	0	0	0	0
08:30 - 08:45	0	0	0	0	0	1	0	1	27	0	33	1	0	0	0	0
08:45 - 09:00	0	0	0	0	0	0	1	4	31	2	35	0	2	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak V_{15min}					2	1		6	27	3	50	1				
PHF					0.50	0.25		0.42	0.91	0.42	0.75	0.50				

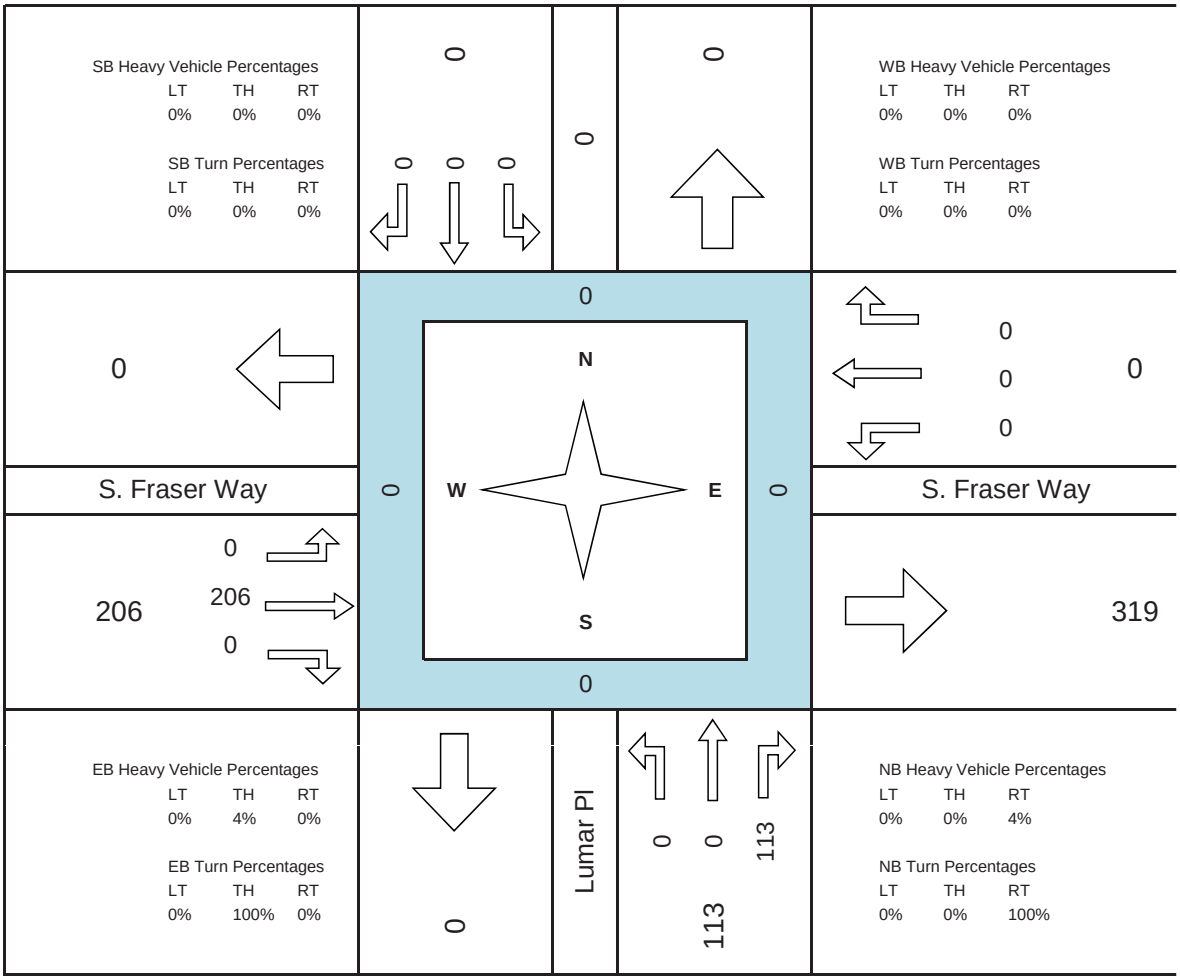


Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Lumar Pl @ S. Fraser Way

Project #:	04-17-0021	Date:	Aug 17, 2017
Peak Hour:	07:45 — 08:45	Weather:	Sunny
Overall PHF:	0.94	Road Cond:	Dry
Notes:	0		

	Traffic Movements												Pedestrians			
Time Intervals	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	N	S	E	W
07:00 - 07:15	0	0	18	0	0	0	0	31	0	0	0	0	0	0	0	0
07:15 - 07:30	0	0	19	0	0	0	0	36	0	0	0	0	0	0	0	0
07:30 - 07:45	0	0	18	0	0	0	0	33	0	0	0	0	0	0	0	0
07:45 - 08:00	0	0	27	0	0	0	0	48	0	0	0	0	0	0	0	0
08:00 - 08:15	0	0	28	0	0	0	0	51	0	0	0	0	0	0	0	0
08:15 - 08:30	0	0	27	0	0	0	0	58	0	0	0	0	0	0	0	0
08:30 - 08:45	0	0	31	0	0	0	0	49	0	0	0	0	0	0	0	0
08:45 - 09:00	0	0	27	0	0	0	0	65	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak V_{15min}			31					58								
PHF			0.91					0.89								

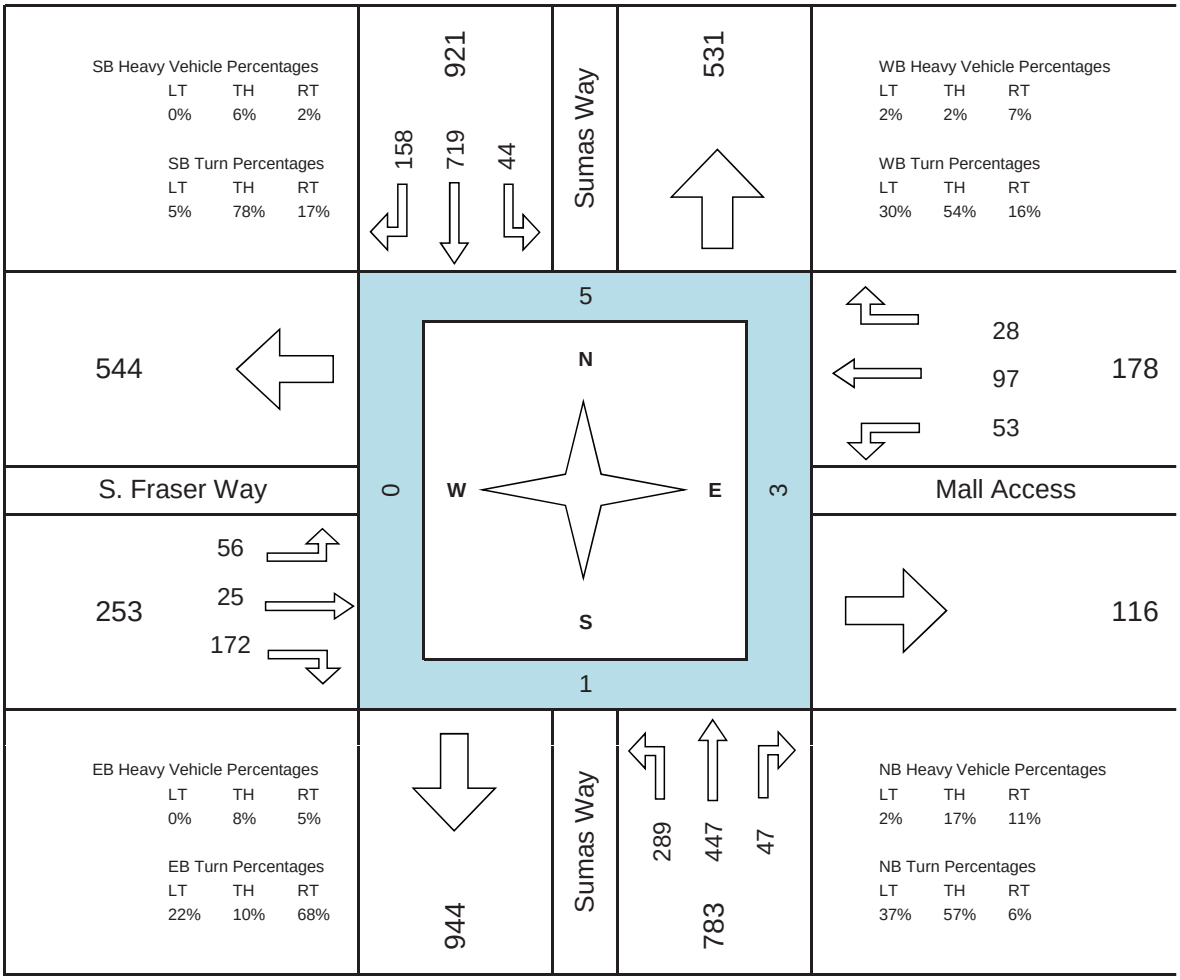


Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Sumas Way @ S. Fraser Way

Project #:	04-17-0021	Date:	Aug 17, 2017
Peak Hour:	07:45 — 08:45	Weather:	Sunny
Overall PHF:	0.96	Road Cond:	Dry
Notes:	0		

	Traffic Movements												Pedestrians			
Time Intervals	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	N	S	E	W
07:00 - 07:15	39	94	4	3	199	18	13	1	33	2	6	1	0	0	0	0
07:15 - 07:30	46	113	3	2	184	21	10	4	30	2	2	2	0	0	1	1
07:30 - 07:45	70	112	13	2	236	28	12	7	28	3	4	2	1	0	0	0
07:45 - 08:00	70	116	13	11	147	50	19	3	24	16	61	12	1	0	0	0
08:00 - 08:15	78	123	7	11	214	22	14	4	42	6	7	5	2	1	1	0
08:15 - 08:30	88	102	14	11	173	52	13	11	52	14	15	9	2	0	2	0
08:30 - 08:45	53	106	13	11	185	34	10	7	54	17	14	2	0	0	0	0
08:45 - 09:00	92	116	18	11	179	33	18	9	67	13	10	2	1	0	1	1
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak V_{15min}	88	123	14	11	214	52	19	11	54	17	61	12				
PHF	0.82	0.91	0.84	1.00	0.84	0.76	0.74	0.57	0.80	0.78	0.40	0.58				

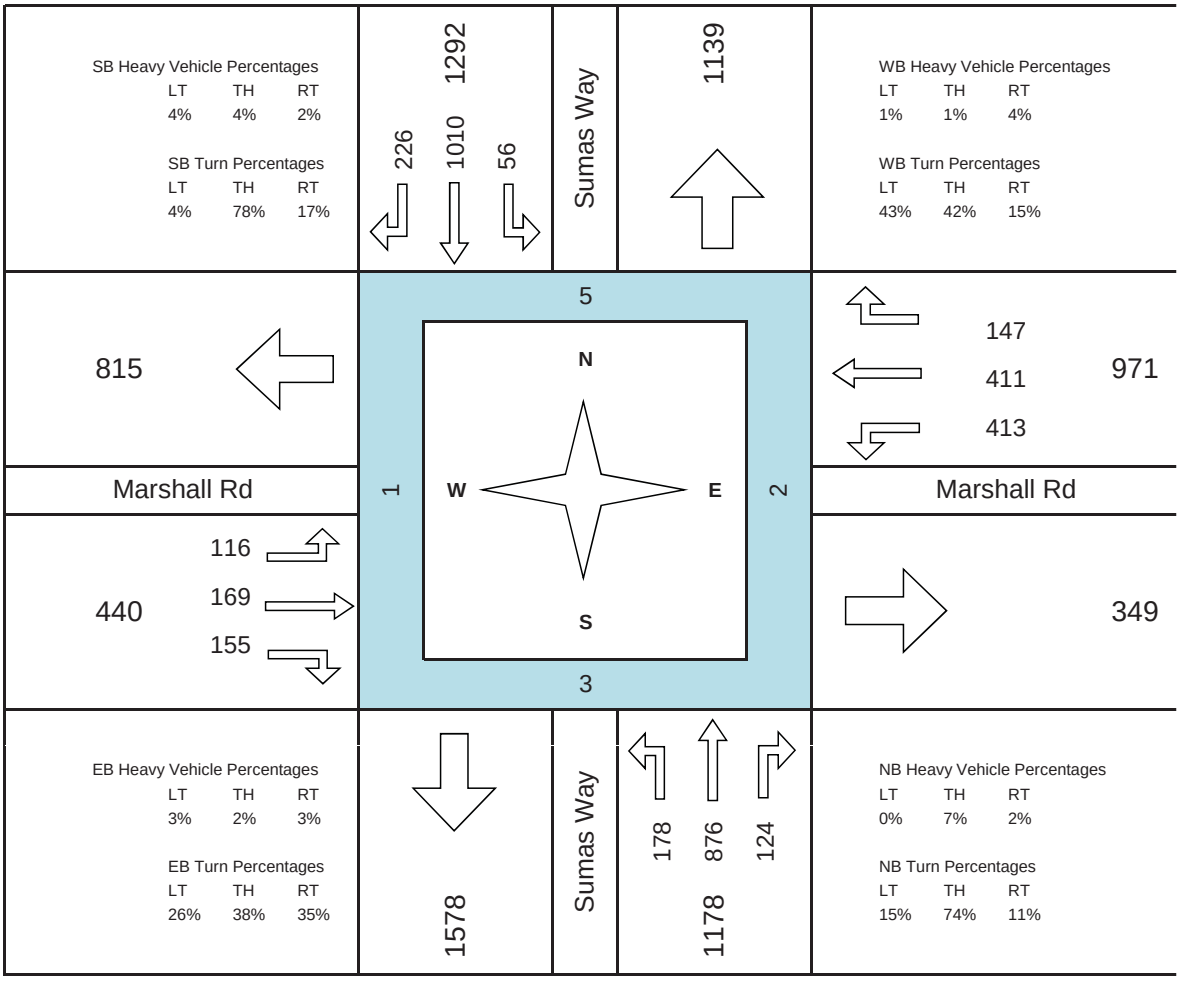


Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Sumas Way @ Marshall Rd

Project #:	04-17-0021	Date:	Nov 7, 2017
Peak Hour:	07:45 — 08:45	Weather:	Cloudy
Overall PHF:	0.96	Road Cond:	Dry
Notes:	0		

	Traffic Movements												Pedestrians			
Time Intervals	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	N	S	E	W
07:00 - 07:15	17	129	17	7	221	28	16	11	26	129	54	15	1	0	0	0
07:15 - 07:30	25	167	20	3	277	39	24	18	18	101	52	9	1	0	0	1
07:30 - 07:45	37	207	27	9	264	32	19	17	22	109	85	24	0	1	2	1
07:45 - 08:00	43	237	37	12	273	50	26	34	35	112	95	49	1	2	0	0
08:00 - 08:15	41	220	47	20	240	61	32	42	33	120	115	43	1	1	2	0
08:15 - 08:30	54	200	25	14	277	72	26	40	37	87	114	25	2	0	0	0
08:30 - 08:45	40	219	15	10	220	43	32	53	50	94	87	30	1	0	0	1
08:45 - 09:00	40	170	29	19	254	60	32	48	46	74	72	21	1	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak V_{15min}	54	237	47	20	277	72	32	53	50	120	115	49				
PHF	0.82	0.92	0.66	0.70	0.91	0.78	0.91	0.80	0.78	0.86	0.89	0.75				

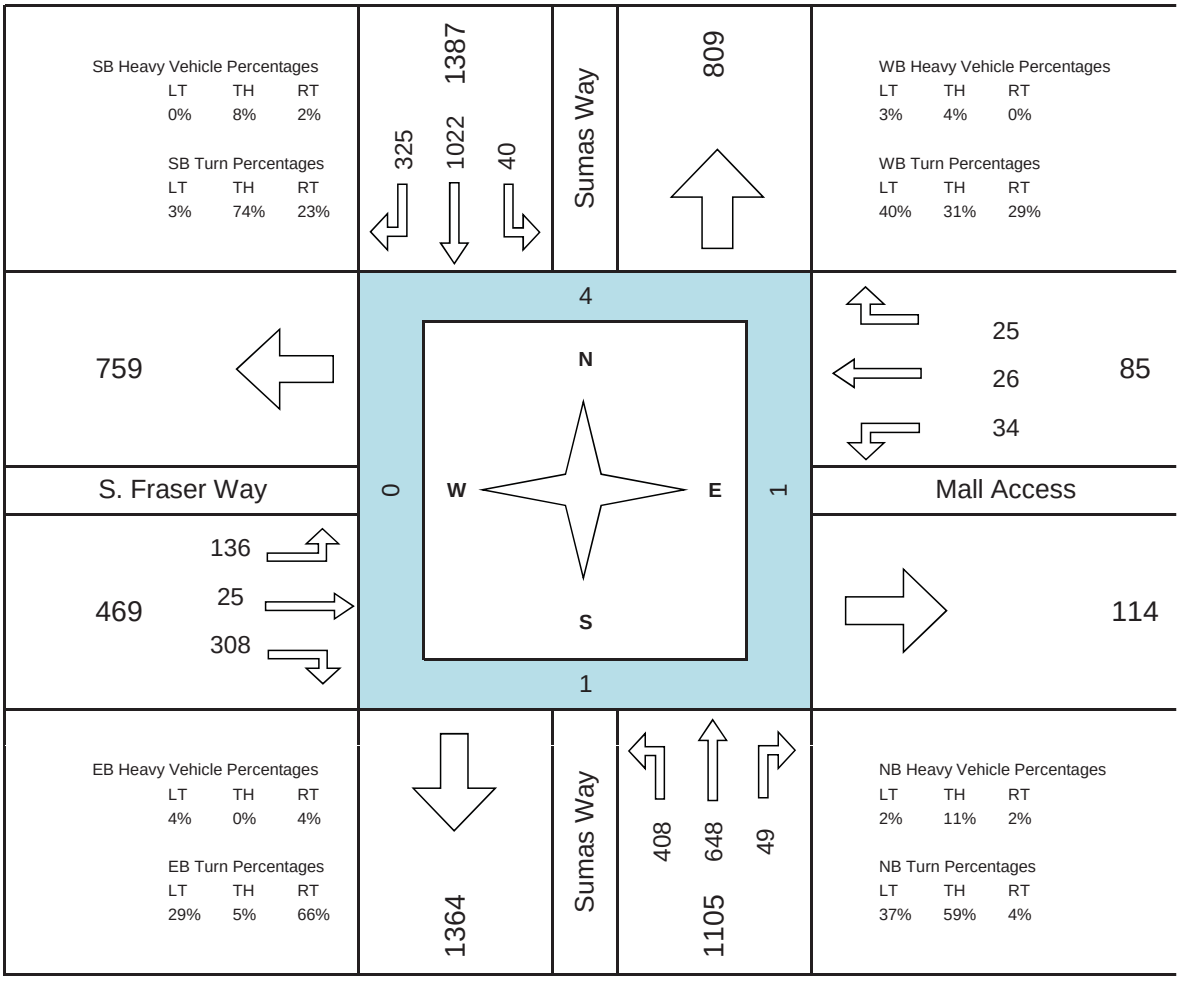


Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Sumas Way @ S. Fraser Way

Project #:	04-17-0021	Date:	Nov 7, 2017
Peak Hour:	07:45 — 08:45	Weather:	Cloudy
Overall PHF:	0.94	Road Cond:	Dry
Notes:	0		

	Traffic Movements												Pedestrians			
Time Intervals	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	N	S	E	W
07:00 - 07:15	55	110	4	6	228	33	12	1	46	2	4	0	0	0	0	0
07:15 - 07:30	49	146	4	2	247	29	14	2	61	3	2	1	1	1	1	0
07:30 - 07:45	75	173	5	5	236	42	18	5	42	10	3	1	0	0	0	0
07:45 - 08:00	107	177	14	9	261	89	37	5	66	7	3	6	2	0	0	0
08:00 - 08:15	96	181	11	3	260	94	47	5	94	8	4	5	0	1	0	0
08:15 - 08:30	99	147	9	15	281	88	30	10	71	10	5	10	1	0	1	0
08:30 - 08:45	106	143	15	13	220	54	22	5	77	9	14	4	1	0	0	0
08:45 - 09:00	111	122	11	21	238	54	28	15	68	10	12	8	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak V_{15min}	107	181	15	15	281	94	47	10	94	10	14	10				
PHF	0.95	0.90	0.82	0.67	0.91	0.86	0.72	0.63	0.82	0.85	0.46	0.63				

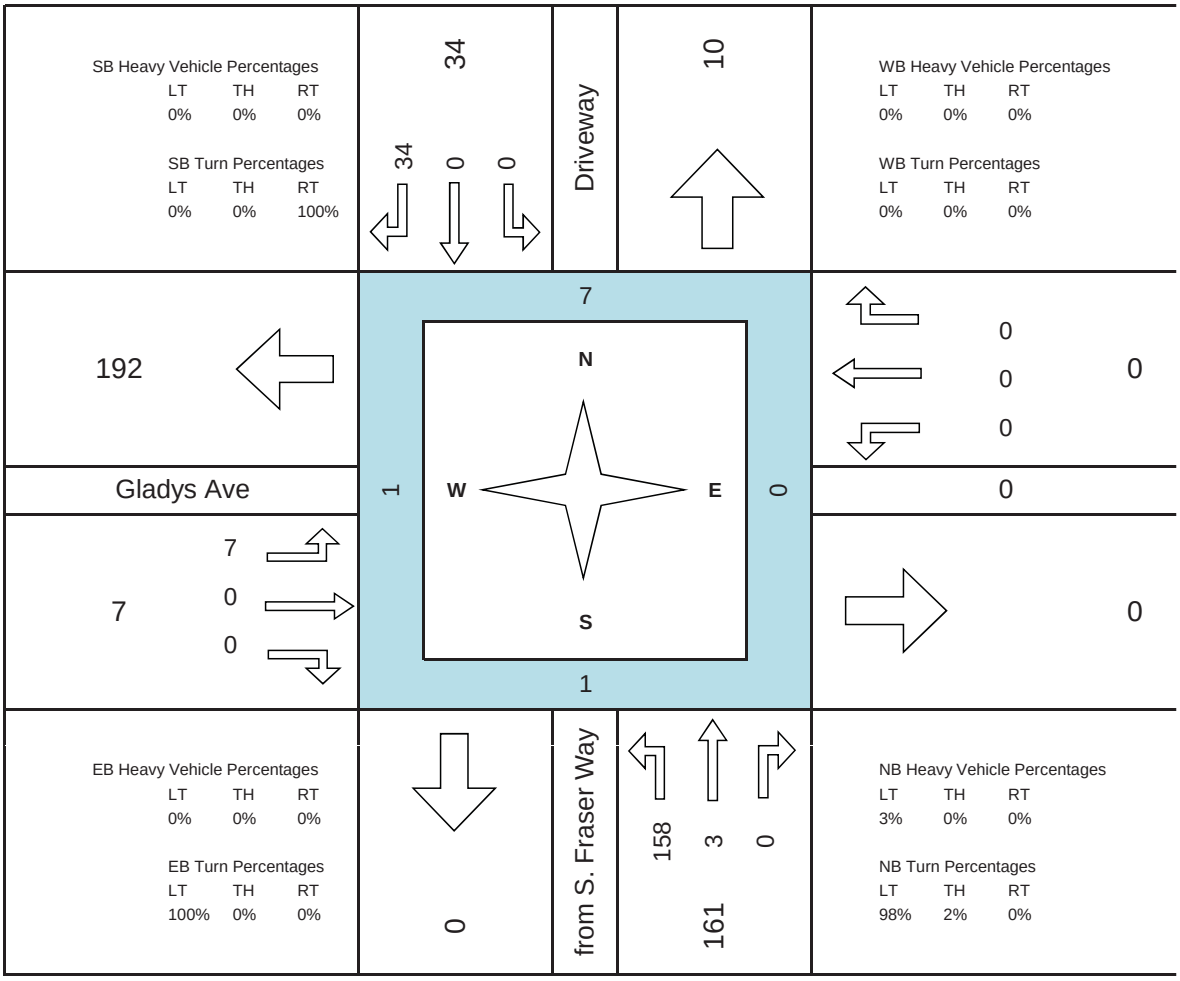


Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Abbotsford News Driveway @ Gladys Ave

Project #:	04-17-0021	Date:	Aug 17, 2017
Peak Hour:	16:15 — 17:15	Weather:	Sunny
Overall PHF:	0.84	Road Cond:	Dry
Notes:	0		

	Traffic Movements												Pedestrians			
Time Intervals	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	N	S	E	W
15:00 - 15:15	32	1	0	0	0	2	1	0	0	0	0	0	2	0	0	0
15:15 - 15:30	26	0	0	0	0	3	3	0	0	0	0	0	1	0	0	0
15:30 - 15:45	33	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
15:45 - 16:00	33	0	0	0	0	2	1	0	0	0	0	0	0	0	0	0
16:00 - 16:15	34	1	0	0	0	9	4	0	0	0	0	0	0	0	0	0
16:15 - 16:30	44	1	0	0	0	2	0	0	0	0	0	0	6	1	0	1
16:30 - 16:45	37	0	0	0	0	7	3	0	0	0	0	0	1	0	0	0
16:45 - 17:00	37	2	0	0	0	6	3	0	0	0	0	0	0	0	0	0
17:00 - 17:15	40	0	0	0	0	19	1	0	0	0	0	0	0	0	0	0
17:15 - 17:30	29	0	0	0	0	8	0	0	0	0	0	0	5	0	4	0
17:30 - 17:45	24	0	0	0	0	4	1	0	0	0	0	0	0	0	0	0
17:45 - 18:00	43	0	0	0	0	1	1	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak V_{15min}	44	2				19	3									
PHF	0.90	0.38				0.45	0.58									

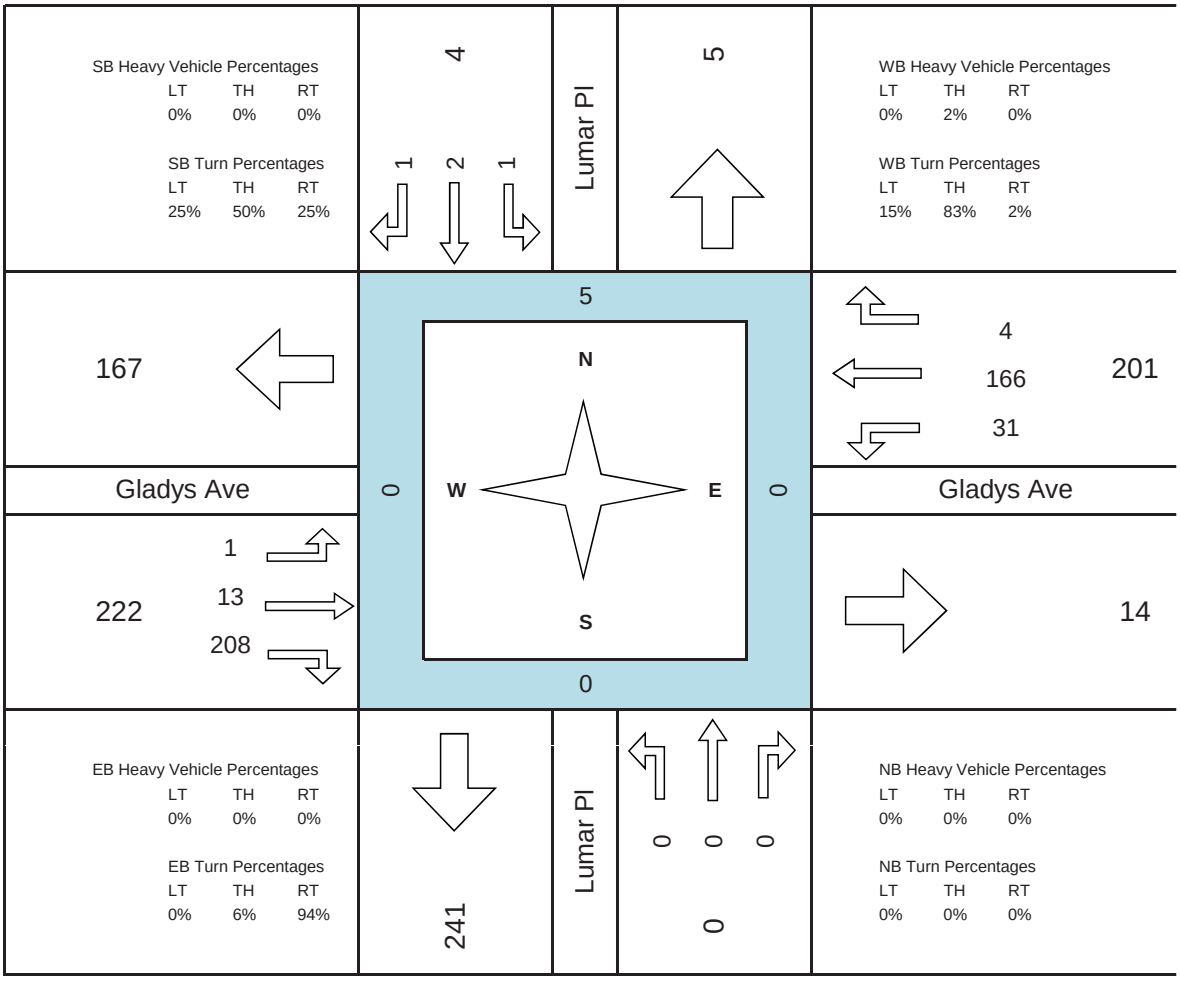


Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Lumar Pl @ Gladys Ave

Project #:	04-17-0021	Date:	Aug 17, 2017
Peak Hour:	16:15 — 17:15	Weather:	Sunny
Overall PHF:	0.96	Road Cond:	Dry
Notes:	0		

	Traffic Movements												Pedestrians			
Time Intervals	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	N	S	E	W
15:00 - 15:15	0	0	0	0	1	0	0	3	51	3	32	0	2	0	0	0
15:15 - 15:30	0	0	0	0	2	1	0	6	41	3	28	1	1	0	0	0
15:30 - 15:45	0	0	0	0	0	0	0	2	46	2	34	0	0	0	0	0
15:45 - 16:00	0	0	0	0	1	0	0	3	44	4	34	0	1	0	0	0
16:00 - 16:15	0	0	0	0	2	0	0	4	55	4	34	0	1	0	0	0
16:15 - 16:30	0	0	0	0	0	0	0	1	49	4	46	0	3	0	0	0
16:30 - 16:45	0	0	0	0	0	0	1	4	61	7	38	0	1	0	0	0
16:45 - 17:00	0	0	0	1	2	1	0	6	51	4	40	3	0	0	0	0
17:00 - 17:15	0	0	0	0	0	0	0	2	47	16	42	1	1	0	0	0
17:15 - 17:30	0	0	0	0	0	0	1	3	56	7	35	1	4	0	0	0
17:30 - 17:45	0	0	0	0	0	0	1	1	45	4	27	0	0	1	0	0
17:45 - 18:00	0	0	0	0	4	0	1	3	32	4	38	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak V_{15min}				1	2	1	1	6	61	16	46	3				
PHF				0.25	0.25	0.25	0.25	0.54	0.85	0.48	0.90	0.33				

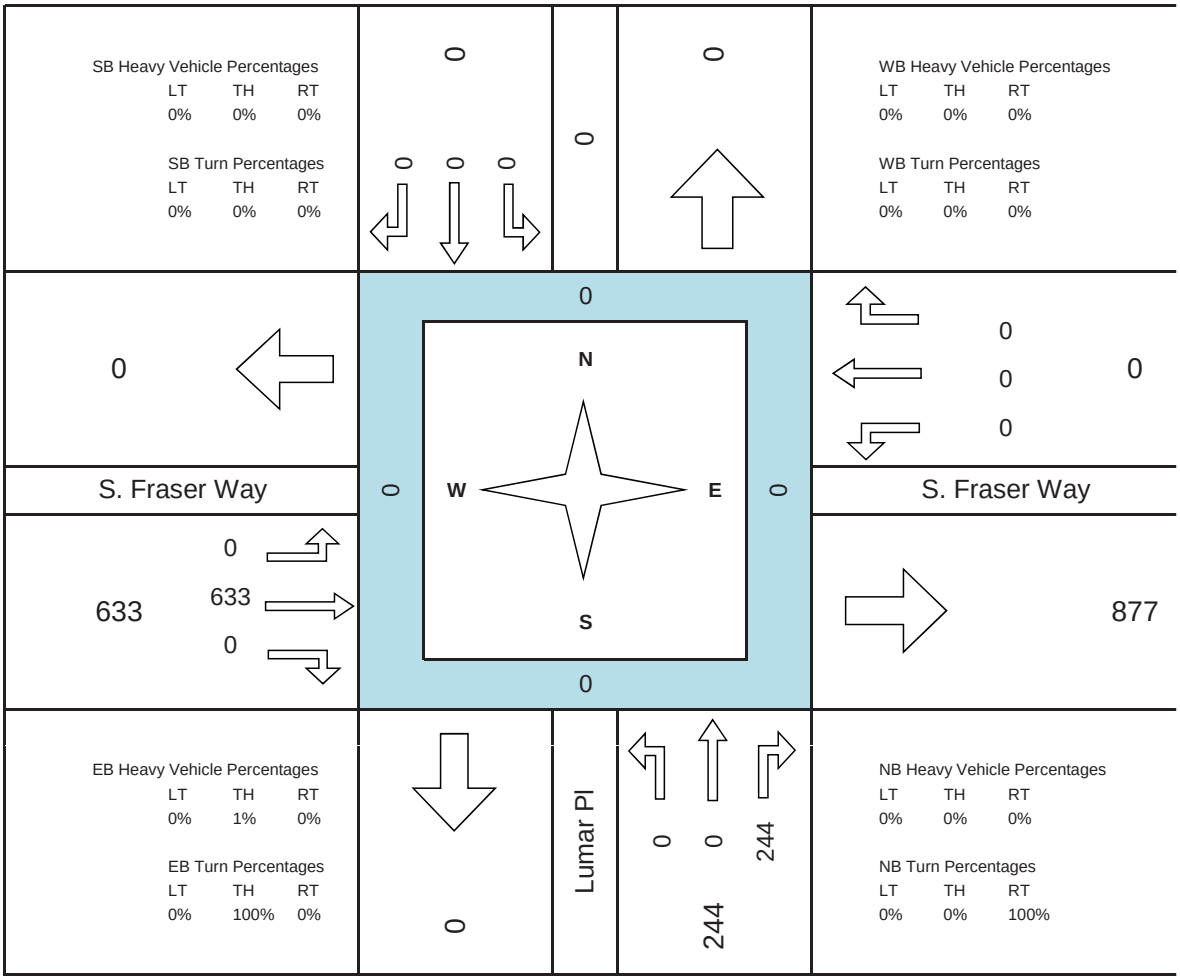


Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Lumar Pl @ S. Fraser Way

Project #:	04-17-0021	Date:	Aug 17, 2017
Peak Hour:	16:15 — 17:15	Weather:	Sunny
Overall PHF:	0.94	Road Cond:	Dry
Notes:	0		

	Traffic Movements												Pedestrians			
Time Intervals	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	N	S	E	W
15:00 - 15:15	0	0	51	0	0	0	0	126	0	0	0	0	0	0	0	0
15:15 - 15:30	0	0	51	0	0	0	0	159	0	0	0	0	0	0	0	0
15:30 - 15:45	0	0	47	0	0	0	0	142	0	0	0	0	0	0	0	0
15:45 - 16:00	0	0	60	0	0	0	0	149	0	0	0	0	0	0	0	0
16:00 - 16:15	0	0	60	0	0	0	0	163	0	0	0	0	0	0	0	0
16:15 - 16:30	0	0	59	0	0	0	0	158	0	0	0	0	0	0	0	0
16:30 - 16:45	0	0	62	0	0	0	0	146	0	0	0	0	0	0	0	0
16:45 - 17:00	0	0	67	0	0	0	0	166	0	0	0	0	0	0	0	0
17:00 - 17:15	0	0	56	0	0	0	0	163	0	0	0	0	0	0	0	0
17:15 - 17:30	0	0	53	0	0	0	0	119	0	0	0	0	0	0	0	0
17:30 - 17:45	0	0	40	0	0	0	0	136	0	0	0	0	0	0	0	0
17:45 - 18:00	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak V_{15min}			67					166								
PHF			0.91					0.95								

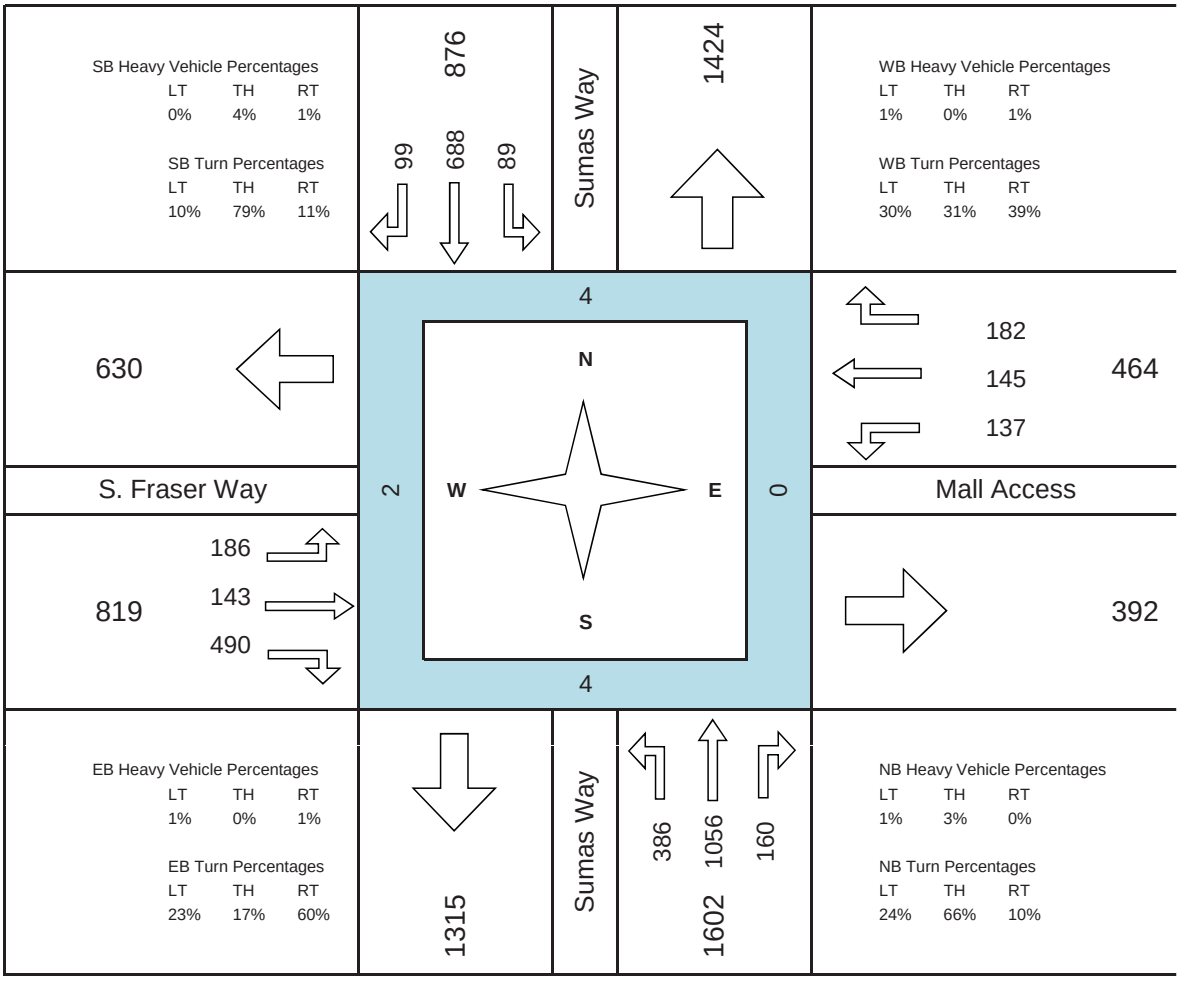


Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Sumas Way @ S. Fraser Way

Project #:	04-17-0021	Date:	Aug 17, 2017
Peak Hour:	16:15 — 17:15	Weather:	Sunny
Overall PHF:	0.97	Road Cond:	Dry
Notes:	0		

	Traffic Movements												Pedestrians			
Time Intervals	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	N	S	E	W
15:00 - 15:15	82	201	37	27	189	14	39	40	94	37	18	14	0	1	0	0
15:15 - 15:30	87	215	32	20	107	10	20	19	101	33	29	32	0	1	5	4
15:30 - 15:45	90	245	34	11	124	6	46	42	60	44	29	62	5	2	1	5
15:45 - 16:00	76	220	42	27	165	17	48	29	109	38	35	37	4	0	1	10
16:00 - 16:15	100	269	41	18	153	9	40	50	123	38	45	43	5	0	0	0
16:15 - 16:30	111	263	30	14	182	15	52	40	106	36	35	45	1	1	0	1
16:30 - 16:45	68	271	47	29	190	27	38	38	126	39	46	51	0	0	0	0
16:45 - 17:00	94	262	43	30	158	21	48	33	108	30	33	39	0	3	0	1
17:00 - 17:15	113	260	40	16	158	36	48	32	150	32	31	47	3	0	0	0
17:15 - 17:30	77	212	49	28	184	15	49	29	114	25	23	32	1	1	0	1
17:30 - 17:45	64	264	37	18	177	18	42	16	114	32	27	49	1	0	0	1
17:45 - 18:00	88	197	37	24	149	9	47	28	117	28	21	40	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak V_{15min}	113	271	47	30	190	36	52	40	150	39	46	51				
PHF	0.85	0.97	0.85	0.74	0.91	0.69	0.89	0.89	0.82	0.88	0.79	0.89				

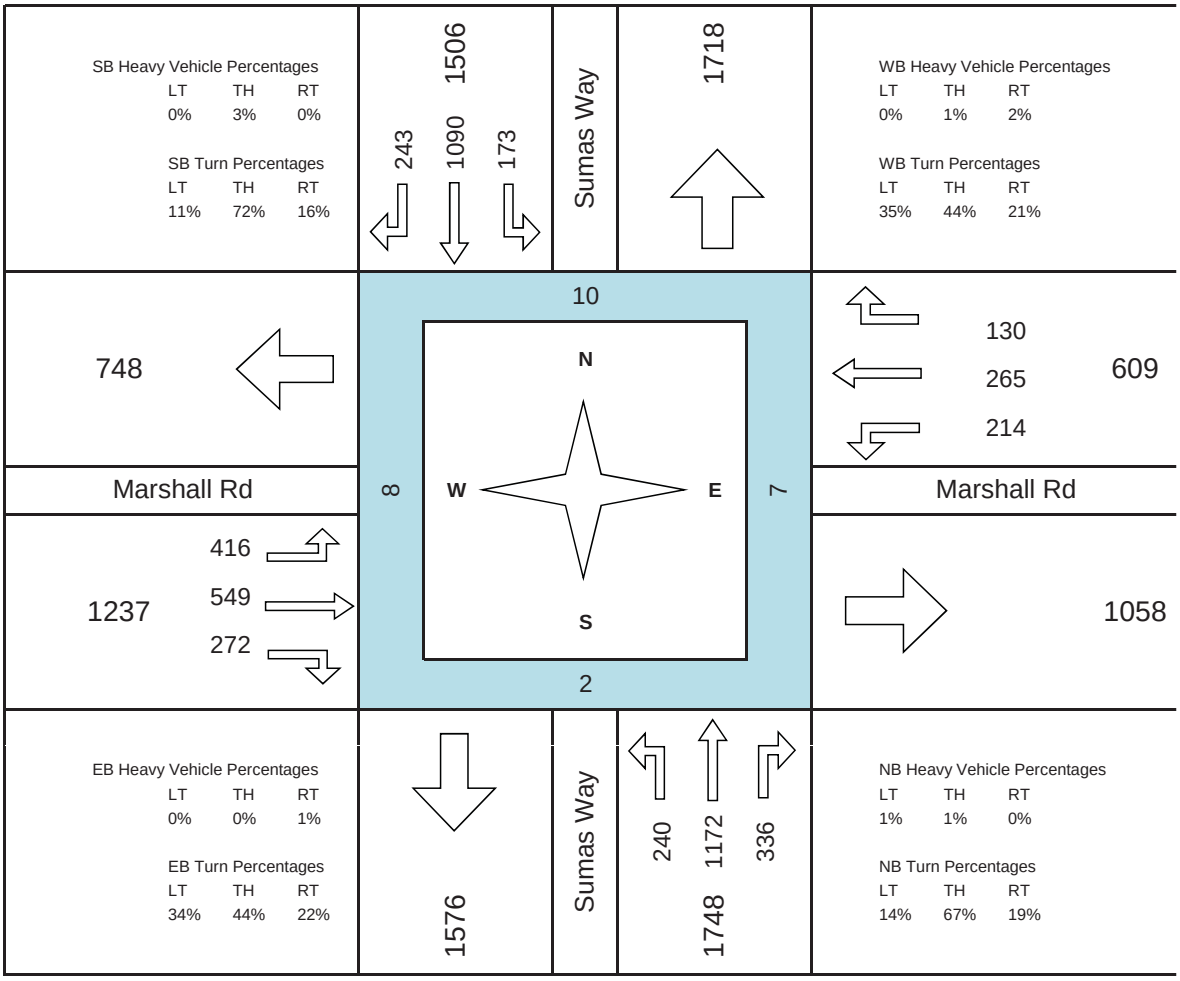


Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Sumas Way @ Marshall Rd

Project #:	04-17-0021	Date:	Nov 7, 2017
Peak Hour:	16:15 — 17:15	Weather:	Cloudy
Overall PHF:	0.97	Road Cond:	Dry
Notes:	0		

	Traffic Movements												Pedestrians			
Time Intervals	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	N	S	E	W
15:00 - 15:15	45	244	59	34	314	54	92	89	65	60	66	30	2	1	0	0
15:15 - 15:30	63	287	59	36	246	58	81	94	63	50	84	42	2	0	1	2
15:30 - 15:45	59	274	77	28	300	48	92	96	56	54	58	24	7	1	0	1
15:45 - 16:00	59	275	73	32	250	64	85	117	57	48	67	39	2	2	1	3
16:00 - 16:15	50	275	71	38	300	48	112	121	62	48	61	20	1	2	0	0
16:15 - 16:30	73	279	98	42	264	47	102	137	51	47	75	36	1	1	2	2
16:30 - 16:45	54	312	64	37	309	68	105	118	63	45	54	27	3	0	4	3
16:45 - 17:00	67	269	85	41	239	63	106	139	88	67	77	33	3	1	1	1
17:00 - 17:15	46	312	89	53	278	65	103	155	70	55	59	34	3	0	0	2
17:15 - 17:30	45	257	75	36	295	58	114	139	75	46	65	35	4	2	2	2
17:30 - 17:45	58	303	79	42	237	39	94	94	67	51	63	29	5	4	5	1
17:45 - 18:00	44	257	86	35	251	45	81	95	40	56	57	30	7	1	1	6
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak V_{15min}	73	312	98	53	309	68	106	155	88	67	77	36				
PHF	0.82	0.94	0.86	0.82	0.88	0.89	0.98	0.89	0.77	0.80	0.86	0.90				

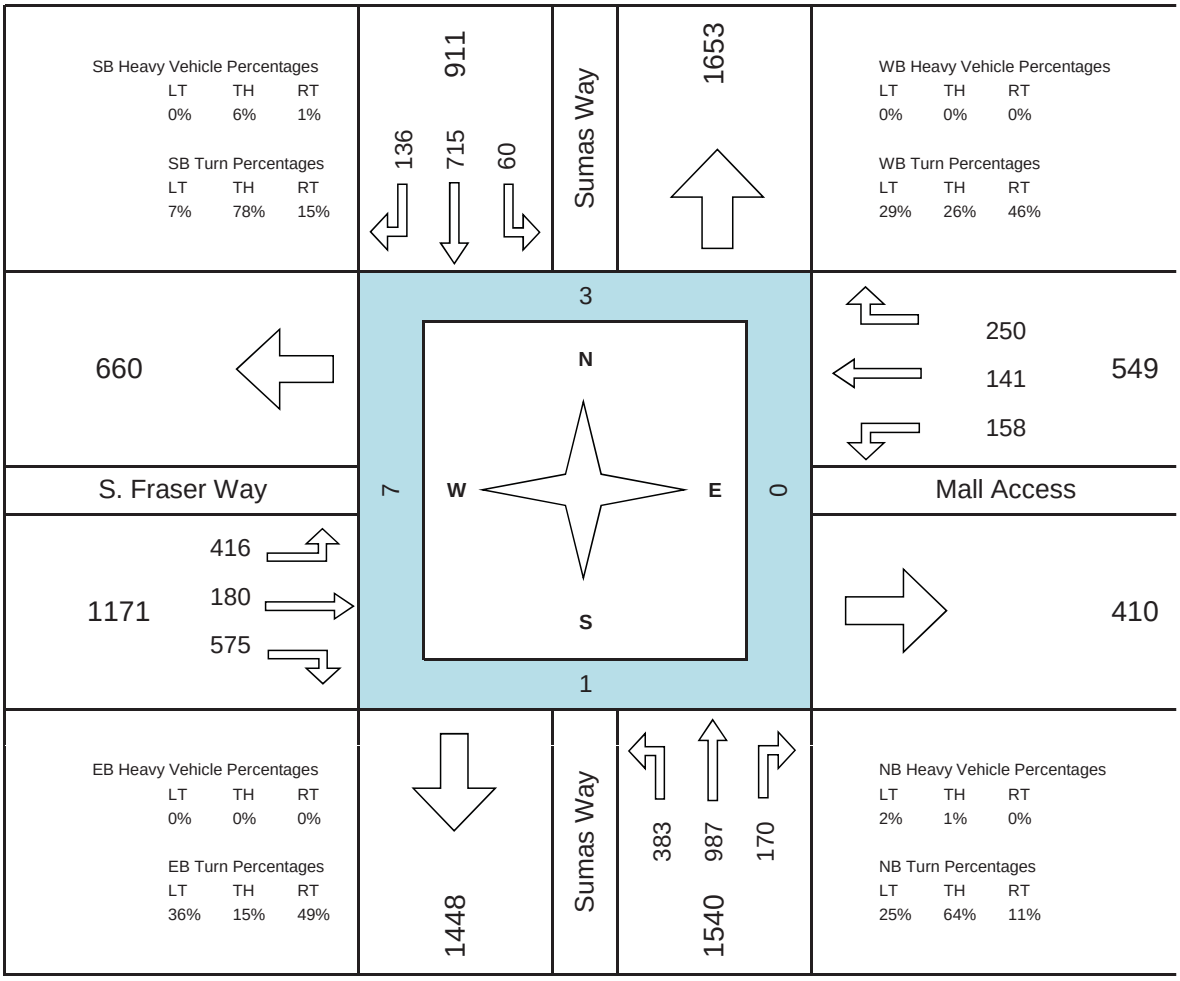


Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Sumas Way @ S. Fraser Way

Project #:	04-17-0021	Date:	Nov 7, 2017
Peak Hour:	16:15 — 17:15	Weather:	Cloudy
Overall PHF:	0.97	Road Cond:	Dry
Notes:	0		

	Traffic Movements												Pedestrians			
Time Intervals	NB LT	NB TH	NB RT	SB LT	SB TH	SB RT	EB LT	EB TH	EB RT	WB LT	WB TH	WB RT	N	S	E	W
15:00 - 15:15	85	201	45	16	206	39	46	24	154	53	36	43	0	1	0	0
15:15 - 15:30	120	253	39	15	216	44	61	21	136	36	27	33	3	0	3	0
15:30 - 15:45	88	256	41	13	199	27	74	29	159	32	25	33	3	0	0	0
15:45 - 16:00	130	214	42	23	178	36	59	28	139	35	27	51	7	0	1	0
16:00 - 16:15	83	260	41	20	170	28	55	23	145	50	32	50	2	0	0	0
16:15 - 16:30	98	242	32	16	210	39	101	65	155	36	33	52	1	1	0	0
16:30 - 16:45	90	253	46	14	174	35	104	38	147	41	47	51	1	0	0	0
16:45 - 17:00	116	240	46	17	173	47	101	33	135	39	33	80	1	0	0	0
17:00 - 17:15	79	252	46	13	158	15	110	44	138	42	28	67	0	0	0	7
17:15 - 17:30	98	247	41	27	188	36	66	14	116	39	36	60	4	0	0	0
17:30 - 17:45	84	206	45	24	164	36	58	21	117	26	23	46	1	0	0	0
17:45 - 18:00	86	215	39	12	173	32	50	20	91	38	27	56	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
N/A - N/A	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak V_{15min}	116	253	46	17	210	47	110	65	155	42	47	80				
PHF	0.83	0.98	0.92	0.88	0.85	0.72	0.95	0.69	0.93	0.94	0.75	0.78				



Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

APPENDIX C

Traffic Signal Timing Plans

SIGNAL TIMING SHEET

DATE ISSUED	FEB 17, 2017	INTERSECTION	HIGHWAY 11 AT SOUTH FRASER WAY
CONTROLLER TYPE	LMD 8000	LOCATION	CITY OF ABBOTSFORD
CABINET TYPE	"S" RACK	SHEET NUMBER & REVISION	TE-98061-3
SEQUENCE	4 PLUS 2 OVER 2	PREVIOUS STS ISSUED DATE	MARCH 3, 2008

PHASE NUMBER	1	2	3	4	5	6	7	8
PHASE SETTING	ON	ON	OFF	ON	ON	OFF	OFF	ON
DESCRIPTION	HIGHWAY 11 NBL EMERGENCY PRE-EMPTION #1	HIGHWAY 11 NB & SB		SOUTH FRASER WAY EB EMERGENCY PRE-EMPTION #4	HIGHWAY 11 SBL (LAGGING) EMERGENCY PRE-EMTPION #2			SOUTH FRASER WAY WB
FUNCTION	Ax	A		B1	Ay			B2
OVERLAP	A1	A1,A2		-	A2			-
MINIMUM GREEN	6	10		7	6			7
PASSAGE	4.0*	4.0*		3.0	4.0*			3.0
YELLOW	4.5*	4.5*		4.5*	4.5*			4.5*
RED	1.5*	1.3*		1.2*	1.3*			1.2*
MAX I/MAX II	14*	21*		24*	7			24*
MAXPLAN (1,2,3,4)	18* 22*	30* 25*		13* 32*	6* 17*			13* 32*
MAXPLAN (5,6,7,8)								
WALK	-	7		5	-			5
PEDESTRIAN CLEAR	-	13		19*	-			19
WALK	STEADY	STEADY		STEADY	STEADY			STEADY
RECALL	OFF	EXT		OFF	OFF			OFF
MEMORY	OFF	OFF		OFF	OFF			OFF
COORDINATION ON PHASE	-	-		-	-			-
FIRST GREEN DISPLAY	XXXX	-		-	-			-
INTERSECTION FLASH	RED	RED		RED	RED			RED
AWF TIME	-	-		-	-			-
AWF TIME [CH1/CH2]	- -	- -		- -	- -			- -

DELAY DETECTION TIMING	NONE	PROGRAMMING COMMENTS	
		1.	RING 2, PHASE 2 INITIALIZATION IS YELLOW
		2.	FIRST STEP OF EMERGENCY PRE-EMPTION IS 2 SEC ALL RED
		3.	
		4.	
PRE-EMPTION TYPE	EMERGENCY	OPERATIONAL COMMENTS	
DELAY TIME	NONE	1.	PHASES 1 AND 5 MUST NOT BE ON TOGETHER DUE TO GEOMETRIC CONFLICT
PRE-EMPTION TIME	SENSOR ACTIVATED	2.	HIGHWAY 11 POSTED SPEED = 50 KM/H
VOLUME LOGGING & MOES	ON 15 MIN	3.	SOUTH FRASER WAY POSTED SPEED = 50 KM/H
SCM	OFF	4.	
		5.	

PED PERMISSIVE	CYCLE (1 TO 8)							
	1	2	3	4	5	6	7	8
OFFSET (1 TO 4)								

TIME CLOCK SETTINGS

TIME OF DAY	DAY OF WEEK	MAXPLAN (1 TO 8)	CYCLE (1 TO 8)	OFFSET (1 TO 4)	SERVICEPLAN (1 TO 8)	ADDITIONAL TIME CLOCK INFORMATION
06:00-10:00	MON - FRI	1	-	-	-	-
14:00-19:00	MON - FRI	2	-	-	-	-

JONATHAN HO, P.ENG., PTOE (R.F. BINNIE)
DESIGNED BY

NOVEMBER 4, 2016
DATE

SUMIT BHASIN
CHECKED BY

FEB 17, 2017
DATE

SUMIT BHASIN
RECEIVED AND DISTRIBUTED BY MOTI

PROFESSIONAL PROVINCE OF S. BHASIN # 40421 BRITISH COLUMBIA ENGINEER

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

SIGNAL TIMING SHEET

DATE ISSUED	FEB 17, 2017	INTERSECTION	HIGHWAY 11 AT MARSHALL ROAD
CONTROLLER TYPE	LMD 8000	LOCATION	CITY OF ABBOTSFORD
CABINET TYPE	"S" RACK	SHEET NUMBER & REVISION	TE-00058-3B
SEQUENCE	NEMA DUAL RING	PREVIOUS STS ISSUED DATE	DECEMBER 12, 2014

PHASE NUMBER	1	2	3	4	5	6	7	8
PHASE SETTING	ON	ON	ON	ON	ON	ON	ON	ON
DESCRIPTION	HIGHWAY 11 SBL EMERGENCY PRE-EMPTION #2	HIGHWAY 11 NB EMERGENCY PRE-EMPTION #1	MARSHALL ROAD WBL	MARSHALL ROAD EB EMERGENCY PRE-EMPTION #4	HIGHWAY 11 NBL EMERGENCY PRE-EMTPION #1	HIGHWAY 11 SB EMERGENCY PRE-EMPTION #2	MARSHALL ROAD EBL	MARSHALL ROAD WB EMERGENCY PRE-EMTPION #5
FUNCTION	Ay	A1	B2->	B1	Ax	A2	B1->	B2
OVERLAP	-	-	-	-	-	-	-	-
MINIMUM GREEN	6	10	6	7	6	10	6	7
PASSAGE	4.0*	5.0	3.0	3.0	5.0	5.0	3.0	3.0
YELLOW*	4.9	4.5	5.0	5.0	5.0	4.5	5.0	5.0
RED*	1.5	1.3	2.0	2.0	2.1	1.3	2.0	2.0
MAX I/MAX II*	15	33	14	17	18	29	14	17
MAXPLAN (1,2,3,4)*	15 22 15	45 44 38	21 15 12	20 36 20	20 24 20	39 41 32	10 20 14	31 31 18
MAXPLAN (5,6,7,8)								
WALK	-	7*	-	5	-	7*	-	5
PEDESTRIAN CLEAR	-	17	-	28	-	17	-	28
WALK	STEADY	STEADY	STEADY	STEADY	STEADY	STEADY	STEADY	STEADY
RECALL	OFF	EXT	OFF	OFF	OFF	EXT	OFF	OFF
MEMORY	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF
COORDINATION ON PHASE	-	-	-	-	-	-	-	-
FIRST GREEN DISPLAY	-	XXXX	-	-	-	XXXX	-	-
INTERSECTION FLASH	RED	RED	-	RED	RED	RED	-	RED
AWF TIME	-	-	-	-	-	-	-	-
AWF TIME [CH1/CH2]	- -	- -	- -	- -	- -	- -	- -	- -

DELAY DETECTION TIMING	NONE	PROGRAMMING COMMENTS	
		1.	FIRST STEP FOR EMERGENCY PRE-EMPTION #4 AND #5 = 2 SEC ALL RED
		2.	
		3.	
		4.	
PRE-EMPTION TYPE	OPTICOM 722	OPERATIONAL COMMENTS	
DELAY TIME	NONE	1.	UPS INSTALLED
PRE-EMPTION TIME	SENSOR ACTIVATED	2.	HIGHWAY 11 POSTED SPEED = 50 KM/H
VOLUME LOGGING & MOES	ON	3.	MARSHALL ROAD POSTED SPEED = 50 KM/H
SCM	OFF	4.	

PED PERMISSIVE	CYCLE (1 TO 8)							
	1	2	3	4	5	6	7	8
OFFSET (1 TO 4)								

TIME CLOCK SETTINGS

TIME OF DAY	DAY OF WEEK	MAXPLAN (1 TO 8)	CYCLE (1 TO 8)	OFFSET (1 TO 4)	SERVICEPLAN (1 TO 8)	ADDITIONAL TIME CLOCK INFORMATION
06:00-10:00	MON - FRI	1	-	-	-	-
14:00-19:00*	MON - FRI	2	-	-	-	-
10:00-18:00*	SAT - SUN*	3	-	-	-	-

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Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

APPENDIX D

Synchro Reports

Queues
1: Sumas Way & S Fraser Way

2017 Existing Volumes
1/8/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	170	31	385	34	51	425	675	51	41	1054	335
v/c Ratio	0.88	0.11	0.70	0.17	0.19	0.69	0.37	0.06	0.16	0.73	0.39
Control Delay	78.6	34.6	11.6	36.2	22.7	39.0	13.6	0.4	31.0	22.9	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.6	34.6	11.6	36.2	22.7	39.0	13.6	0.4	31.0	22.9	3.1
Queue Length 50th (m)	29.4	4.7	0.0	5.2	4.0	35.2	17.7	0.0	6.9	73.6	0.0
Queue Length 95th (m)	#55.9	11.1	13.8	13.9	14.0	50.3	59.2	1.0	13.7	97.1	13.7
Internal Link Dist (m)		76.2			172.2		250.2			250.3	
Turn Bay Length (m)	36.0		45.0			95.0			100.0		60.0
Base Capacity (vph)	194	281	551	200	273	702	2113	1048	259	1589	921
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.11	0.70	0.17	0.19	0.61	0.32	0.05	0.16	0.66	0.36

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
1: Sumas Way & S Fraser Way

2017 Existing Volumes
1/8/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	136	25	308	34	26	25	408	648	49	40	1022	325
Future Volume (vph)	136	25	308	34	26	25	408	648	49	40	1022	325
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.7	5.7	5.7	5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1656	1820	1468	1677	1636		3288	3115	1496	1729	3202	1517
Flt Permitted	0.72	1.00	1.00	0.74	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1261	1820	1468	1301	1636		3288	3115	1496	1729	3202	1517
Peak-hour factor, PHF	0.80	0.80	0.80	1.00	1.00	1.00	0.96	0.96	0.96	0.97	0.97	0.97
Adj. Flow (vph)	170	31	385	34	26	25	425	675	51	41	1054	335
RTOR Reduction (vph)	0	0	328	0	21	0	0	0	23	0	0	177
Lane Group Flow (vph)	170	31	57	34	30	0	425	675	28	41	1054	158
Confl. Peds. (#/hr)	4		1	1		4			1	1		
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	4%	0%	4%	3%	4%	0%	2%	11%	2%	0%	8%	2%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8					6			2
Actuated Green, G (s)	13.1	13.1	13.1	13.1	13.1		16.0	49.1	49.1	8.9	41.8	41.8
Effective Green, g (s)	13.1	13.1	13.1	13.1	13.1		16.0	49.1	49.1	8.9	41.8	41.8
Actuated g/C Ratio	0.15	0.15	0.15	0.15	0.15		0.18	0.56	0.56	0.10	0.47	0.47
Clearance Time (s)	5.7	5.7	5.7	5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	186	269	217	192	242		595	1730	830	174	1514	717
v/s Ratio Prot		0.02			0.02		c0.13	0.22		0.02	c0.33	
v/s Ratio Perm	c0.13		0.04	0.03					0.02			0.10
v/c Ratio	0.91	0.12	0.26	0.18	0.12		0.71	0.39	0.03	0.24	0.70	0.22
Uniform Delay, d1	37.1	32.6	33.4	32.9	32.7		34.1	11.2	8.9	36.6	18.3	13.7
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	42.1	0.2	0.6	0.4	0.2		4.3	0.2	0.0	1.0	1.5	0.2
Delay (s)	79.2	32.8	34.0	33.4	32.9		38.4	11.4	8.9	37.6	19.8	13.9
Level of Service	E	C	C	C	C		D	B	A	D	B	B
Approach Delay (s)		47.1			33.1			21.2			19.0	
Approach LOS		D			C			C			B	

Intersection Summary			
HCM 2000 Control Delay	25.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	88.4	Sum of lost time (s)	17.5
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
3: On-Ramp/Lumar Pl & Gladys Ave

2017 Existing Volumes
1/8/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	10	147	8	214	3	0	0	0	0	6	1
Future Volume (Veh/h)	0	10	147	8	214	3	0	0	0	0	6	1
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	11	160	9	233	3	0	0	0	0	7	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	236			11			346	345	91	344	264	234
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	236			11			346	345	91	344	264	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			99			100	100	100	100	99	100
cM capacity (veh/h)	1343			1621			603	578	972	612	642	810

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	171	9	236	8
Volume Left	0	9	0	0
Volume Right	160	0	3	1
cSH	1343	1621	1700	659
Volume to Capacity	0.00	0.01	0.14	0.01
Queue Length 95th (m)	0.0	0.1	0.0	0.3
Control Delay (s)	0.0	7.2	0.0	10.5
Lane LOS		A		B
Approach Delay (s)	0.0	0.3		10.5
Approach LOS				B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	22.1%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

2017 Existing Volumes
1/8/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	116	324	475	641	185	1042	56	1236
v/c Ratio	0.54	0.60	1.16	0.82	0.47	0.57	0.38	0.78
Control Delay	36.5	29.3	125.6	49.7	53.1	30.0	59.5	38.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.5	29.3	125.6	49.7	53.1	30.0	59.5	38.2
Queue Length 50th (m)	17.6	18.7	~102.8	69.5	21.0	70.8	12.5	92.3
Queue Length 95th (m)	32.8	35.0	#169.3	91.9	33.4	92.3	26.4	118.0
Internal Link Dist (m)		436.0		418.0		231.9		250.2
Turn Bay Length (m)	126.0		25.0		75.0		70.0	
Base Capacity (vph)	226	666	410	898	580	1863	215	1634
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.49	1.16	0.71	0.32	0.56	0.26	0.76

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
6: Sumas Way & Marshall Rd

2017 Existing Volumes
1/8/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	116	169	155	413	411	147	178	876	124	56	1010	226
Future Volume (vph)	116	169	155	413	411	147	178	876	124	56	1010	226
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0		7.0	7.0		7.1	5.8		6.4	5.8	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.96		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1678	3110		1711	3246		3354	4575		1662	4651	
Flt Permitted	0.35	1.00		0.29	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	618	3110		520	3246		3354	4575		1662	4651	
Peak-hour factor, PHF	1.00	1.00	1.00	0.87	0.87	0.87	0.96	0.96	0.96	1.00	1.00	1.00
Adj. Flow (vph)	116	169	155	475	472	169	185	912	129	56	1010	226
RTOR Reduction (vph)	0	135	0	0	29	0	0	13	0	0	27	0
Lane Group Flow (vph)	116	189	0	475	612	0	185	1029	0	56	1209	0
Confl. Peds. (#/hr)	5		3	3		5	1		2	2		1
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	3%	2%	3%	1%	1%	4%	0%	7%	2%	4%	4%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	24.7	15.3		43.4	27.0		13.7	46.3		8.7	40.6	
Effective Green, g (s)	24.7	15.3		43.4	27.0		13.7	46.3		8.7	40.6	
Actuated g/C Ratio	0.21	0.13		0.37	0.23		0.12	0.39		0.07	0.35	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.1	5.8		6.4	5.8	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		4.0	5.0	
Lane Grp Cap (vph)	214	404		405	745		390	1801		122	1605	
v/s Ratio Prot	0.04	0.06		c0.21	0.19		c0.06	c0.22		0.03	c0.26	
v/s Ratio Perm	0.07			c0.22								
v/c Ratio	0.54	0.47		1.17	0.82		0.47	0.57		0.46	0.75	
Uniform Delay, d1	39.4	47.4		32.5	43.0		48.6	27.9		52.2	34.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.8	0.9		101.0	7.2		1.9	0.7		3.7	2.4	
Delay (s)	42.2	48.2		133.5	50.3		50.5	28.6		55.9	36.5	
Level of Service	D	D		F	D		D	C		E	D	
Approach Delay (s)		46.7			85.7			31.9			37.4	
Approach LOS		D			F			C			D	

Intersection Summary			
HCM 2000 Control Delay	49.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	117.6	Sum of lost time (s)	26.9
Intersection Capacity Utilization	89.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
7: Gladys Ave & Site Access

2017 Existing Volumes
1/8/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	221	18	0	10	0	0	0	4
Future Volume (Veh/h)	0	0	0	0	221	18	0	10	0	0	0	4
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	0	0	0	240	20	0	11	0	0	0	4
Pedestrians		1									3	
Lane Width (m)		0.0									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	263			0			255	263	0	258	253	254
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	263			0			255	263	0	258	253	254
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.5
p0 queue free %	100			100			100	98	100	100	100	99
cM capacity (veh/h)	1309			1636			697	644	1091	686	652	730

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	260	11	4
Volume Left	0	0	0
Volume Right	20	0	4
cSH	1700	644	730
Volume to Capacity	0.15	0.02	0.01
Queue Length 95th (m)	0.0	0.4	0.1
Control Delay (s)	0.0	10.7	10.0
Lane LOS		B	A
Approach Delay (s)	0.0	10.7	10.0
Approach LOS		B	A

Intersection Summary			
Average Delay		0.6	
Intersection Capacity Utilization		23.8%	ICU Level of Service	A
Analysis Period (min)		15	

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Queues
1: Sumas Way & S Fraser Way

2017 Existing Volumes
1/8/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	457	198	632	158	391	398	1025	177	70	831	158
v/c Ratio	2.77	0.35	0.81	0.49	0.70	0.69	0.70	0.23	0.34	0.74	0.26
Control Delay	828.5	32.0	20.0	38.0	34.5	47.5	28.4	3.9	47.6	34.8	4.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	828.5	32.0	20.0	38.0	34.5	47.5	28.4	3.9	47.6	34.8	4.9
Queue Length 50th (m)	~165.4	32.3	37.5	26.9	58.2	40.1	90.8	0.0	13.5	77.3	0.0
Queue Length 95th (m)	#210.5	56.3	#111.1	51.7	#102.1	58.1	122.2	12.6	26.2	96.7	11.4
Internal Link Dist (m)		76.2			172.2		250.2			250.3	
Turn Bay Length (m)	36.0		45.0			95.0			100.0		60.0
Base Capacity (vph)	165	567	781	322	560	704	1573	797	286	1334	704
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	2.77	0.35	0.81	0.49	0.70	0.57	0.65	0.22	0.24	0.62	0.22

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
1: Sumas Way & S Fraser Way

2017 Existing Volumes
1/8/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	416	180	575	158	141	250	398	1025	177	60	715	136
Future Volume (vph)	416	180	575	158	141	250	398	1025	177	60	715	136
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.7	5.7	5.7	5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.90		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1726	1820	1526	1727	1627		3288	3424	1528	1729	3262	1497
Flt Permitted	0.29	1.00	1.00	0.57	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	533	1820	1526	1035	1627		3288	3424	1528	1729	3262	1497
Peak-hour factor, PHF	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.86	0.86
Adj. Flow (vph)	457	198	632	158	141	250	398	1025	177	70	831	158
RTOR Reduction (vph)	0	0	307	0	54	0	0	0	102	0	0	102
Lane Group Flow (vph)	457	198	325	158	337	0	398	1025	75	70	831	56
Confl. Peds. (#/hr)	3		1	1		3	7					7
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	1%	0%	0%	6%	1%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8					6			2
Actuated Green, G (s)	32.3	32.3	32.3	32.3	32.3		18.2	44.4	44.4	10.9	36.9	36.9
Effective Green, g (s)	32.3	32.3	32.3	32.3	32.3		18.2	44.4	44.4	10.9	36.9	36.9
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31		0.17	0.42	0.42	0.10	0.35	0.35
Clearance Time (s)	5.7	5.7	5.7	5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	164	560	469	318	500		570	1449	646	179	1147	526
v/s Ratio Prot		0.11			0.21		0.12	c0.30		0.04	c0.25	
v/s Ratio Perm	c0.86		0.21	0.15					0.05			0.04
v/c Ratio	2.79	0.35	0.69	0.50	0.67		0.70	0.71	0.12	0.39	0.72	0.11
Uniform Delay, d1	36.3	28.2	31.9	29.7	31.7		40.8	24.9	18.3	43.9	29.6	22.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	820.7	0.4	4.4	1.2	3.6		4.0	1.7	0.1	1.9	2.5	0.1
Delay (s)	857.1	28.6	36.3	30.9	35.3		44.8	26.6	18.5	45.8	32.0	23.0
Level of Service	F	C	D	C	D		D	C	B	D	C	C
Approach Delay (s)		326.6			34.0			30.2			31.6	
Approach LOS		F			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	115.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.51		
Actuated Cycle Length (s)	104.9	Sum of lost time (s)	17.5
Intersection Capacity Utilization	102.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
3: On-Ramp/Lumar Pl & Gladys Ave

2017 Existing Volumes
1/8/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	13	278	41	184	4	0	0	0	1	2	1
Future Volume (Veh/h)	1	13	278	41	184	4	0	0	0	1	2	1
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)	1	14	302	45	200	4	0	0	0	1	2	1
Pedestrians											5	
Lane Width (m)											3.7	
Walking Speed (m/s)											1.1	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	209			14			459	466	165	464	313	207
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	209			14			459	466	165	464	313	207
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			97			100	100	100	100	100	100
cM capacity (veh/h)	1367			1617			501	481	885	496	585	834

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	317	45	204	4
Volume Left	1	45	0	1
Volume Right	302	0	4	1
cSH	1367	1617	1700	603
Volume to Capacity	0.00	0.03	0.12	0.01
Queue Length 95th (m)	0.0	0.7	0.0	0.2
Control Delay (s)	0.0	7.3	0.0	11.0
Lane LOS	A	A		B
Approach Delay (s)	0.0	1.3		11.0
Approach LOS				B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	43.2%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

2017 Existing Volumes
1/8/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	429	846	221	407	247	1554	178	1375
v/c Ratio	1.07	0.96	0.94	0.54	0.59	1.02	0.76	0.90
Control Delay	99.7	70.7	82.5	45.1	64.1	73.9	79.1	53.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	99.7	70.7	82.5	45.1	64.1	73.9	79.1	53.9
Queue Length 50th (m)	~106.0	117.6	46.6	46.6	34.2	~166.8	48.3	131.0
Queue Length 95th (m)	#156.4	#162.7	#99.3	64.5	47.3	#200.0	74.1	#167.8
Internal Link Dist (m)		436.0		418.0		231.9		250.2
Turn Bay Length (m)	126.0		25.0		75.0		70.0	
Base Capacity (vph)	400	878	236	753	568	1523	271	1522
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.07	0.96	0.94	0.54	0.43	1.02	0.66	0.90

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
6: Sumas Way & Marshall Rd

2017 Existing Volumes
1/8/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	416	549	272	214	265	130	240	1172	336	173	1090	243
Future Volume (vph)	416	549	272	214	265	130	240	1172	336	173	1090	243
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0		7.0	7.0		7.1	5.8		6.4	5.8	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.95		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1726	3260		1729	3216		3321	4740		1729	4695	
Flt Permitted	0.33	1.00		0.13	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	601	3260		235	3216		3321	4740		1729	4695	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	429	566	280	221	273	134	247	1208	346	178	1124	251
RTOR Reduction (vph)	0	42	0	0	42	0	0	36	0	0	24	0
Lane Group Flow (vph)	429	804	0	221	365	0	247	1518	0	178	1351	0
Confl. Peds. (#/hr)	10		2	2		10	8		7	7		8
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	0%	0%	1%	0%	1%	2%	1%	1%	0%	0%	3%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	56.0	36.0		46.0	31.0		17.6	44.0		19.1	44.8	
Effective Green, g (s)	56.0	36.0		46.0	31.0		17.6	44.0		19.1	44.8	
Actuated g/C Ratio	0.40	0.26		0.33	0.22		0.13	0.31		0.14	0.32	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.1	5.8		6.4	5.8	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		4.0	5.0	
Lane Grp Cap (vph)	400	836		236	710		416	1486		235	1499	
v/s Ratio Prot	c0.15	c0.25		0.10	0.11		0.07	c0.32		c0.10	0.29	
v/s Ratio Perm	c0.27			0.21								
v/c Ratio	1.07	0.96		0.94	0.51		0.59	1.02		0.76	0.90	
Uniform Delay, d1	37.4	51.5		38.7	48.0		58.0	48.2		58.4	45.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	65.7	22.1		41.0	0.6		3.4	29.0		13.8	8.3	
Delay (s)	103.1	73.5		79.7	48.7		61.4	77.1		72.2	54.0	
Level of Service	F	E		E	D		E	E		E	D	
Approach Delay (s)		83.5			59.6			75.0			56.0	
Approach LOS		F			E			E			E	

Intersection Summary			
HCM 2000 Control Delay	69.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	140.3	Sum of lost time (s)	26.9
Intersection Capacity Utilization	105.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
7: Gladys Ave & Site Access

2017 Existing Volumes
1/8/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	185	3	0	13	0	0	0	40
Future Volume (Veh/h)	0	0	0	0	185	3	0	13	0	0	0	40
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	0	0	0	201	3	0	14	0	0	0	43
Pedestrians		1									7	
Lane Width (m)		0.0									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	211			0			246	211	0	216	210	210
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	211			0			246	211	0	216	210	210
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			100	98	100	100	100	95
cM capacity (veh/h)	1362			1636			671	685	1091	724	686	829

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	204	14	43
Volume Left	0	0	0
Volume Right	3	0	43
cSH	1700	685	829
Volume to Capacity	0.12	0.02	0.05
Queue Length 95th (m)	0.0	0.5	1.2
Control Delay (s)	0.0	10.4	9.6
Lane LOS		B	A
Approach Delay (s)	0.0	10.4	9.6
Approach LOS		B	A

Intersection Summary			
Average Delay		2.1	
Intersection Capacity Utilization		21.0%	ICU Level of Service	A
Analysis Period (min)		15	

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

2017 Existing Volumes (With Mitigation)
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	457	198	632	158	141	250	398	1025	177	70	831	158
v/c Ratio	0.78	0.57	0.41	0.48	0.64	0.66	0.73	0.69	0.23	0.44	0.78	0.26
Control Delay	52.9	46.8	0.8	31.5	60.1	17.8	52.0	29.0	4.0	57.9	38.6	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.9	46.8	0.8	31.5	60.1	17.8	52.0	29.0	4.0	57.9	38.6	4.8
Queue Length 50th (m)	50.2	40.0	0.0	24.8	30.2	5.2	43.7	98.6	0.0	15.0	86.2	0.0
Queue Length 95th (m)	68.8	63.4	0.0	41.1	50.8	30.5	61.0	125.2	12.8	28.3	104.4	10.7
Internal Link Dist (m)		75.1			172.2			250.2			250.3	
Turn Bay Length (m)	70.0		45.0			45.0	95.0			100.0		60.0
Base Capacity (vph)	667	418	1528	355	270	415	606	1565	794	174	1209	659
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.47	0.41	0.45	0.52	0.60	0.66	0.65	0.22	0.40	0.69	0.24

Intersection Summary

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis 2017 Existing Volumes (With Mitigation)
1: Sumas Way & S Fraser Way 9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	416	180	575	158	141	250	398	1025	177	60	715	136
Future Volume (vph)	416	180	575	158	141	250	398	1025	177	60	715	136
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.7	4.0	4.5	5.7	5.7	6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3354	1820	1528	1728	1820	1514	3288	3424	1528	1729	3262	1497
Flt Permitted	0.95	1.00	1.00	0.63	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3354	1820	1528	1152	1820	1514	3288	3424	1528	1729	3262	1497
Peak-hour factor, PHF	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.86	0.86
Adj. Flow (vph)	457	198	632	158	141	250	398	1025	177	70	831	158
RTOR Reduction (vph)	0	0	0	0	0	197	0	0	101	0	0	105
Lane Group Flow (vph)	457	198	632	158	141	53	398	1025	76	70	831	53
Confl. Peds. (#/hr)	3		1	1		3	7					7
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	1%	0%	0%	6%	1%
Turn Type	Prot	NA	Free	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			Free	8		8			6			2
Actuated Green, G (s)	18.3	20.2	106.1	23.5	12.7	12.7	17.3	45.4	45.4	7.9	35.8	35.8
Effective Green, g (s)	18.3	20.2	106.1	23.5	12.7	12.7	17.3	45.4	45.4	7.9	35.8	35.8
Actuated g/C Ratio	0.17	0.19	1.00	0.22	0.12	0.12	0.16	0.43	0.43	0.07	0.34	0.34
Clearance Time (s)	4.5	5.7		4.5	5.7	5.7	6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	578	346	1528	313	217	181	536	1465	653	128	1100	505
v/s Ratio Prot	c0.14	c0.11		0.05	0.08		0.12	c0.30		0.04	c0.25	
v/s Ratio Perm			0.41	0.06		0.03			0.05			0.04
v/c Ratio	0.79	0.57	0.41	0.50	0.65	0.29	0.74	0.70	0.12	0.55	0.76	0.11
Uniform Delay, d1	42.1	39.0	0.0	35.4	44.6	42.6	42.3	24.8	18.3	47.4	31.3	24.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.3	2.3	0.8	1.3	6.6	0.9	5.9	1.6	0.1	5.9	3.2	0.1
Delay (s)	49.3	41.3	0.8	36.7	51.1	43.5	48.1	26.4	18.4	53.2	34.5	24.3
Level of Service	D	D	A	D	D	D	D	C	B	D	C	C
Approach Delay (s)		24.3			43.5			30.9			34.2	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	31.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	106.1	Sum of lost time (s)	22.0
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis 2017 Existing Volumes (With Mitigation)
3: On-Ramp/Lumar Pl & Gladys Ave 9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	13	278	41	184	4	0	0	0	1	2	1
Future Volume (Veh/h)	1	13	278	41	184	4	0	0	0	1	2	1
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)	1	14	302	45	200	4	0	0	0	1	2	1
Pedestrians											5	
Lane Width (m)											3.7	
Walking Speed (m/s)											1.1	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	209			14			459	466	165	464	313	207
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	209			14			459	466	165	464	313	207
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			97			100	100	100	100	100	100
cM capacity (veh/h)	1367			1617			501	481	885	496	585	834

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	317	45	204	4
Volume Left	1	45	0	1
Volume Right	302	0	4	1
cSH	1367	1617	1700	603
Volume to Capacity	0.00	0.03	0.12	0.01
Queue Length 95th (m)	0.0	0.7	0.0	0.2
Control Delay (s)	0.0	7.3	0.0	11.0
Lane LOS	A	A		B
Approach Delay (s)	0.0	1.3		11.0
Approach LOS				B

Intersection Summary				
Average Delay		0.7		
Intersection Capacity Utilization		43.2%	ICU Level of Service	A
Analysis Period (min)		15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis 2017 Existing Volumes (With Mitigation)
4: On-Ramp & S Fraser Way 9/6/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	850	0	0	487	0	321
Future Volume (Veh/h)	850	0	0	487	0	321
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	924	0	0	529	0	349
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				130		
pX, platoon unblocked						
vC, conflicting volume			924		1188	924
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			924		1188	924
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	0
cM capacity (veh/h)			735		181	271

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	924	264	264	349
Volume Left	0	0	0	0
Volume Right	0	0	0	349
cSH	1700	1700	1700	271
Volume to Capacity	0.54	0.16	0.16	1.29
Queue Length 95th (m)	0.0	0.0	0.0	131.3
Control Delay (s)	0.0	0.0	0.0	191.4
Lane LOS				F
Approach Delay (s)	0.0	0.0		191.4
Approach LOS				F

Intersection Summary			
Average Delay	37.1		
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

2017 Existing Volumes (With Mitigation)
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	429	566	280	221	273	134	247	1208	346	178	1124	251
v/c Ratio	0.77	0.80	0.54	0.72	0.61	0.41	0.62	0.73	0.51	0.73	0.67	0.36
Control Delay	56.8	53.3	9.9	66.2	54.7	9.1	56.4	38.0	11.4	65.8	34.8	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.8	53.3	9.9	66.2	54.7	9.1	56.4	38.0	11.4	65.8	34.8	5.0
Queue Length 50th (m)	50.0	66.1	2.6	26.4	32.1	0.0	28.8	93.7	14.4	40.0	82.4	0.0
Queue Length 95th (m)	66.3	86.1	26.1	#42.0	47.0	13.1	42.2	111.2	41.9	#63.9	98.2	17.1
Internal Link Dist (m)		436.0			418.0			231.9			250.2	
Turn Bay Length (m)	126.0		50.0	70.0		50.0	75.0		50.0	70.0		80.0
Base Capacity (vph)	638	777	545	319	462	332	425	1646	680	277	1723	701
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.67	0.73	0.51	0.69	0.59	0.40	0.58	0.73	0.51	0.64	0.65	0.36

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis — 2017 Existing Volumes (With Mitigation)

6: Sumas Way & Marshall Rd — 9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	416	549	272	214	265	130	240	1172	336	173	1090	243
Future Volume (vph)	416	549	272	214	265	130	240	1172	336	173	1090	243
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3354	3458	1510	3354	3424	1478	3321	4919	1513	1729	4824	1511
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3354	3458	1510	3354	3424	1478	3321	4919	1513	1729	4824	1511
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	429	566	280	221	273	134	247	1208	346	178	1124	251
RTOR Reduction (vph)	0	0	211	0	0	116	0	0	173	0	0	163
Lane Group Flow (vph)	429	566	69	221	273	18	247	1208	173	178	1124	88
Confl. Peds. (#/hr)	10		2	2		10	8		7	7		8
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	0%	0%	1%	0%	1%	2%	1%	1%	0%	0%	3%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	19.2	23.8	23.8	10.6	15.2	15.2	14.0	38.9	38.9	16.4	40.6	40.6
Effective Green, g (s)	19.2	23.8	23.8	10.6	15.2	15.2	14.0	38.9	38.9	16.4	40.6	40.6
Actuated g/C Ratio	0.17	0.21	0.21	0.09	0.13	0.13	0.12	0.34	0.34	0.14	0.35	0.35
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	4.0	5.0	5.0
Lane Grp Cap (vph)	555	710	310	306	449	193	401	1650	507	244	1689	529
v/s Ratio Prot	0.13	c0.16		0.07	c0.08		0.07	c0.25		c0.10	0.23	
v/s Ratio Perm			0.05			0.01			0.11			0.06
v/c Ratio	0.77	0.80	0.22	0.72	0.61	0.09	0.62	0.73	0.34	0.73	0.67	0.17
Uniform Delay, d1	46.3	43.8	38.3	51.2	47.5	44.3	48.4	33.9	28.9	47.6	31.9	26.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.6	6.2	0.4	8.2	2.3	0.2	4.0	2.1	0.8	11.1	1.3	0.3
Delay (s)	52.9	50.0	38.7	59.4	49.9	44.5	52.4	36.0	29.7	58.7	33.2	26.3
Level of Service	D	D	D	E	D	D	D	D	C	E	C	C
Approach Delay (s)		48.5			52.1			37.0			35.0	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	41.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	115.9	Sum of lost time (s)	26.9
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis 2017 Existing Volumes (With Mitigation)
7: Gladys Ave & Site Access 9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	185	3	0	13	0	0	0	40
Future Volume (Veh/h)	0	0	0	0	185	3	0	13	0	0	0	40
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	0	0	0	201	3	0	14	0	0	0	43
Pedestrians		1									7	
Lane Width (m)		0.0									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	211			0			246	211	0	216	210	210
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	211			0			246	211	0	216	210	210
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			100	98	100	100	100	95
cM capacity (veh/h)	1362			1636			671	685	1091	724	686	829

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	204	14	43
Volume Left	0	0	0
Volume Right	3	0	43
cSH	1700	685	829
Volume to Capacity	0.12	0.02	0.05
Queue Length 95th (m)	0.0	0.5	1.2
Control Delay (s)	0.0	10.4	9.6
Lane LOS		B	A
Approach Delay (s)	0.0	10.4	9.6
Approach LOS		B	A

Intersection Summary			
Average Delay		2.1	
Intersection Capacity Utilization		21.0%	ICU Level of Service A
Analysis Period (min)		15	

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

2017 Existing Volumes (With Mitigation)
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	170	31	385	34	26	25	425	675	51	41	1054	335
v/c Ratio	0.57	0.09	0.26	0.30	0.18	0.07	0.76	0.39	0.06	0.18	0.77	0.40
Control Delay	47.4	29.4	0.4	46.9	41.9	0.4	44.7	14.6	0.1	34.6	25.9	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.4	29.4	0.4	46.9	41.9	0.4	44.7	14.6	0.1	34.6	25.9	3.5
Queue Length 50th (m)	14.9	4.3	0.0	5.7	4.3	0.0	36.6	23.5	0.0	6.9	79.4	0.0
Queue Length 95th (m)	22.0	10.2	0.0	15.0	12.0	0.0	#56.3	60.2	0.0	14.8	104.2	14.6
Internal Link Dist (m)		76.2			172.2			250.2			250.3	
Turn Bay Length (m)	70.0		45.0			45.0	95.0			100.0		60.0
Base Capacity (vph)	298	417	1469	112	148	340	595	1944	993	226	1487	884
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.07	0.26	0.30	0.18	0.07	0.71	0.35	0.05	0.18	0.71	0.38

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis 2017 Existing Volumes (With Mitigation)
1: Sumas Way & S Fraser Way 9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	136	25	308	34	26	25	408	648	49	40	1022	325
Future Volume (vph)	136	25	308	34	26	25	408	648	49	40	1022	325
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.7	4.0	5.7	5.7	5.7	6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3225	1820	1469	1677	1750	1504	3288	3115	1496	1729	3202	1517
Flt Permitted	0.95	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3225	1820	1469	1332	1750	1504	3288	3115	1496	1729	3202	1517
Peak-hour factor, PHF	0.80	0.80	0.80	1.00	1.00	1.00	0.96	0.96	0.96	0.97	0.97	0.97
Adj. Flow (vph)	170	31	385	34	26	25	425	675	51	41	1054	335
RTOR Reduction (vph)	0	0	0	0	0	24	0	0	24	0	0	185
Lane Group Flow (vph)	170	31	385	34	26	1	425	675	27	41	1054	150
Confl. Peds. (#/hr)	4		1	1		4			1	1		
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	4%	0%	4%	3%	4%	0%	2%	11%	2%	0%	8%	2%
Turn Type	Prot	NA	Free	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8		1	6		5	2	
Permitted Phases			Free	8		8			6			2
Actuated Green, G (s)	7.8	17.6	89.4	5.3	5.3	5.3	14.4	47.6	47.6	6.9	39.9	39.9
Effective Green, g (s)	7.8	17.6	89.4	5.3	5.3	5.3	14.4	47.6	47.6	6.9	39.9	39.9
Actuated g/C Ratio	0.09	0.20	1.00	0.06	0.06	0.06	0.16	0.53	0.53	0.08	0.45	0.45
Clearance Time (s)	4.5	5.7		5.7	5.7	5.7	6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	281	358	1469	78	103	89	529	1658	796	133	1429	677
v/s Ratio Prot	c0.05	0.02			0.01		c0.13	0.22		0.02	c0.33	
v/s Ratio Perm			c0.26	0.03		0.00			0.02			0.10
v/c Ratio	0.60	0.09	0.26	0.44	0.25	0.02	0.80	0.41	0.03	0.31	0.74	0.22
Uniform Delay, d1	39.3	29.3	0.0	40.6	40.2	39.6	36.1	12.5	10.0	39.0	20.4	15.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.7	0.1	0.4	3.9	1.3	0.1	9.1	0.2	0.0	1.8	2.2	0.2
Delay (s)	43.0	29.4	0.4	44.5	41.5	39.7	45.2	12.7	10.0	40.8	22.6	15.4
Level of Service	D	C	A	D	D	D	D	B	A	D	C	B
Approach Delay (s)		14.3			42.1			24.6			21.4	
Approach LOS		B			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	21.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	89.4	Sum of lost time (s)	22.0
Intersection Capacity Utilization	67.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis 2017 Existing Volumes (With Mitigation)
3: On-Ramp/Lumar Pl & Gladys Ave 9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	10	147	8	214	3	0	0	0	0	6	1
Future Volume (Veh/h)	0	10	147	8	214	3	0	0	0	0	6	1
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	11	160	9	233	3	0	0	0	0	7	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	236			11			346	345	91	344	264	234
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	236			11			346	345	91	344	264	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			99			100	100	100	100	99	100
cM capacity (veh/h)	1343			1621			603	578	972	612	642	810

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	171	9	236	8
Volume Left	0	9	0	0
Volume Right	160	0	3	1
cSH	1343	1621	1700	659
Volume to Capacity	0.00	0.01	0.14	0.01
Queue Length 95th (m)	0.0	0.1	0.0	0.3
Control Delay (s)	0.0	7.2	0.0	10.5
Lane LOS		A		B
Approach Delay (s)	0.0	0.3		10.5
Approach LOS				B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	22.1%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis 2017 Existing Volumes (With Mitigation)
4: On-Ramp & S Fraser Way 9/6/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	308	0	0	520	0	161
Future Volume (Veh/h)	308	0	0	520	0	161
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	335	0	0	565	0	175
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				135		
pX, platoon unblocked						
vC, conflicting volume			335		618	335
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			335		618	335
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	74
cM capacity (veh/h)			1221		421	661

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	335	282	282	175
Volume Left	0	0	0	0
Volume Right	0	0	0	175
cSH	1700	1700	1700	661
Volume to Capacity	0.20	0.17	0.17	0.26
Queue Length 95th (m)	0.0	0.0	0.0	8.1
Control Delay (s)	0.0	0.0	0.0	12.4
Lane LOS				B
Approach Delay (s)	0.0	0.0		12.4
Approach LOS				B

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	34.3%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

2017 Existing Volumes (With Mitigation)
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	116	169	155	475	472	169	185	913	129	56	1010	226
v/c Ratio	0.49	0.50	0.54	0.75	0.63	0.37	0.49	0.49	0.18	0.39	0.62	0.34
Control Delay	58.2	52.7	15.2	49.4	42.1	7.7	51.5	26.8	2.9	57.9	32.1	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.2	52.7	15.2	49.4	42.1	7.7	51.5	26.8	2.9	57.9	32.1	5.3
Queue Length 50th (m)	12.6	18.5	0.0	50.5	49.3	0.0	19.5	54.4	0.0	11.6	64.8	0.0
Queue Length 95th (m)	23.5	30.8	19.1	67.0	63.0	14.5	33.2	76.9	7.9	26.0	89.2	16.8
Internal Link Dist (m)		436.0			418.0			231.9			250.2	
Turn Bay Length (m)	126.0		50.0	70.0		50.0	75.0			70.0		80.0
Base Capacity (vph)	246	448	330	848	1068	571	409	1887	700	166	1771	696
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.38	0.47	0.56	0.44	0.30	0.45	0.48	0.18	0.34	0.57	0.32

Intersection Summary

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis — 2017 Existing Volumes (With Mitigation)

6: Sumas Way & Marshall Rd — 9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	116	169	155	413	411	147	178	876	124	56	1010	226
Future Volume (vph)	116	169	155	413	411	147	178	876	124	56	1010	226
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3257	3390	1480	3321	3424	1459	3354	4644	1494	1662	4778	1496
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3257	3390	1480	3321	3424	1459	3354	4644	1494	1662	4778	1496
Peak-hour factor, PHF	1.00	1.00	1.00	0.87	0.87	0.87	0.96	0.96	0.96	1.00	1.00	1.00
Adj. Flow (vph)	116	169	155	475	472	169	185	912	129	56	1010	226
RTOR Reduction (vph)	0	0	140	0	0	132	0	0	77	0	0	147
Lane Group Flow (vph)	116	169	15	475	472	37	185	913	52	56	1010	79
Confl. Peds. (#/hr)	5		3	3		5	1		2	2		1
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	3%	2%	3%	1%	1%	4%	0%	7%	2%	4%	4%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	7.8	10.7	10.7	20.6	23.5	23.5	12.1	43.3	43.3	7.6	38.1	38.1
Effective Green, g (s)	7.8	10.7	10.7	20.6	23.5	23.5	12.1	43.3	43.3	7.6	38.1	38.1
Actuated g/C Ratio	0.07	0.10	0.10	0.19	0.22	0.22	0.11	0.40	0.40	0.07	0.35	0.35
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	4.0	5.0	5.0
Lane Grp Cap (vph)	234	334	146	631	742	316	374	1855	596	116	1679	525
v/s Ratio Prot	0.04	c0.05		c0.14	c0.14		c0.06	c0.20		0.03	c0.21	
v/s Ratio Perm			0.01			0.03			0.03			0.05
v/c Ratio	0.50	0.51	0.10	0.75	0.64	0.12	0.49	0.49	0.09	0.48	0.60	0.15
Uniform Delay, d1	48.4	46.3	44.5	41.5	38.6	34.1	45.3	24.3	20.2	48.5	28.9	24.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	1.2	0.3	5.1	1.8	0.2	2.1	0.4	0.1	4.3	0.9	0.3
Delay (s)	50.1	47.6	44.8	46.6	40.4	34.3	47.4	24.8	20.4	52.8	29.8	24.4
Level of Service	D	D	D	D	D	C	D	C	C	D	C	C
Approach Delay (s)		47.2			42.1			27.7			29.9	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	34.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	108.4	Sum of lost time (s)	26.9
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis 2017 Existing Volumes (With Mitigation)
7: Gladys Ave & Site Access 9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	221	18	0	10	0	0	0	4
Future Volume (Veh/h)	0	0	0	0	221	18	0	10	0	0	0	4
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	0	0	0	240	20	0	11	0	0	0	4
Pedestrians		1									3	
Lane Width (m)		0.0									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	263			0			255	263	0	258	253	254
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	263			0			255	263	0	258	253	254
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.5
p0 queue free %	100			100			100	98	100	100	100	99
cM capacity (veh/h)	1309			1636			697	644	1091	686	652	730

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	260	11	4
Volume Left	0	0	0
Volume Right	20	0	4
cSH	1700	644	730
Volume to Capacity	0.15	0.02	0.01
Queue Length 95th (m)	0.0	0.4	0.1
Control Delay (s)	0.0	10.7	10.0
Lane LOS		B	A
Approach Delay (s)	0.0	10.7	10.0
Approach LOS		B	A

Intersection Summary			
Average Delay		0.6	
Intersection Capacity Utilization		23.8%	ICU Level of Service A
Analysis Period (min)		15	

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

2020 Background Volumes
1/10/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	180	34	408	36	55	450	716	54	43	1116	356
v/c Ratio	0.73	0.10	0.66	0.14	0.16	0.78	0.41	0.06	0.24	0.90	0.44
Control Delay	46.1	24.4	8.9	25.4	16.0	40.4	12.0	0.1	34.0	33.4	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	46.1	24.4	8.9	25.4	16.0	40.4	12.0	0.1	34.0	33.4	4.0
Queue Length 50th (m)	23.4	3.9	0.0	4.1	3.2	31.8	22.5	0.0	5.8	77.6	0.0
Queue Length 95th (m)	37.6	9.3	12.2	11.3	11.7	#52.2	50.5	0.0	14.7	#117.6	15.2
Internal Link Dist (m)		76.2			172.2		250.2			250.3	
Turn Bay Length (m)	36.0		45.0			95.0			100.0		60.0
Base Capacity (vph)	282	408	645	291	387	587	1812	922	178	1242	806
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.08	0.63	0.12	0.14	0.77	0.40	0.06	0.24	0.90	0.44

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
1: Sumas Way & S Fraser Way

2020 Background Volumes
1/10/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	144	27	326	36	28	27	432	687	52	42	1083	345
Future Volume (vph)	144	27	326	36	28	27	432	687	52	42	1083	345
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.7	5.7	5.7	5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1657	1820	1468	1677	1637		3288	3115	1496	1729	3202	1517
Flt Permitted	0.72	1.00	1.00	0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1258	1820	1468	1297	1637		3288	3115	1496	1729	3202	1517
Peak-hour factor, PHF	0.80	0.80	0.80	1.00	1.00	1.00	0.96	0.96	0.96	0.97	0.97	0.97
Adj. Flow (vph)	180	34	408	36	28	27	450	716	54	43	1116	356
RTOR Reduction (vph)	0	0	332	0	22	0	0	0	25	0	0	208
Lane Group Flow (vph)	180	34	76	36	33	0	450	716	29	43	1116	148
Confl. Peds. (#/hr)	4		1	1		4			1	1		
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	4%	0%	4%	3%	4%	0%	2%	11%	2%	0%	8%	2%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8					6			2
Actuated Green, G (s)	14.3	14.3	14.3	14.3	14.3		12.8	41.1	41.1	3.7	31.8	31.8
Effective Green, g (s)	14.3	14.3	14.3	14.3	14.3		12.8	41.1	41.1	3.7	31.8	31.8
Actuated g/C Ratio	0.19	0.19	0.19	0.19	0.19		0.17	0.54	0.54	0.05	0.42	0.42
Clearance Time (s)	5.7	5.7	5.7	5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	235	340	274	242	306		550	1675	804	83	1332	631
v/s Ratio Prot		0.02			0.02		c0.14	0.23		0.02	c0.35	
v/s Ratio Perm	c0.14		0.05	0.03					0.02			0.10
v/c Ratio	0.77	0.10	0.28	0.15	0.11		0.82	0.43	0.04	0.52	0.84	0.23
Uniform Delay, d1	29.5	25.7	26.6	26.0	25.8		30.7	10.6	8.3	35.5	20.0	14.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.8	0.1	0.6	0.3	0.2		9.7	0.2	0.0	7.1	5.0	0.3
Delay (s)	43.3	25.8	27.2	26.2	25.9		40.3	10.8	8.3	42.6	25.0	14.7
Level of Service	D	C	C	C	C		D	B	A	D	C	B
Approach Delay (s)		31.8			26.0			21.6			23.1	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	24.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	76.4	Sum of lost time (s)	17.5
Intersection Capacity Utilization	74.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
3: On-Ramp/Lumar Pl & Gladys Ave

2020 Background Volumes
1/10/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	11	156	9	227	3	0	0	0	0	6	2
Future Volume (Veh/h)	0	11	156	9	227	3	0	0	0	0	6	2
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	12	170	10	247	3	0	0	0	0	7	2
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	250			12			370	367	97	366	280	248
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	250			12			370	367	97	366	280	248
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	100	99	100
cM capacity (veh/h)	1327			1620			582	561	965	592	627	795

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	182	10	250	9
Volume Left	0	10	0	0
Volume Right	170	0	3	2
cSH	1327	1620	1700	658
Volume to Capacity	0.00	0.01	0.15	0.01
Queue Length 95th (m)	0.0	0.1	0.0	0.3
Control Delay (s)	0.0	7.2	0.0	10.5
Lane LOS		A		B
Approach Delay (s)	0.0	0.3		10.5
Approach LOS				B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	22.8%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

2020 Background Volumes
1/10/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	123	343	503	680	197	1104	59	1311
v/c Ratio	0.59	0.87	0.97	0.78	0.80	0.71	0.53	0.93
Control Delay	33.4	45.1	58.5	35.9	66.2	29.2	58.3	42.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.4	45.1	58.5	35.9	66.2	29.2	58.3	42.4
Queue Length 50th (m)	13.2	16.2	70.7	53.2	17.6	61.5	10.1	77.3
Queue Length 95th (m)	#25.3	#39.8	#124.3	69.8	#34.8	77.4	#25.0	#105.8
Internal Link Dist (m)		436.0		418.0		231.9		250.2
Turn Bay Length (m)	126.0		25.0		75.0		70.0	
Base Capacity (vph)	208	393	517	873	245	1555	112	1410
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.87	0.97	0.78	0.80	0.71	0.53	0.93

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
6: Sumas Way & Marshall Rd

2020 Background Volumes
1/10/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	123	179	164	438	436	156	189	929	131	59	1071	240
Future Volume (vph)	123	179	164	438	436	156	189	929	131	59	1071	240
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0		7.0	7.0		7.1	5.8		6.4	5.8	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.96		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1677	3111		1711	3248		3354	4576		1662	4652	
Flt Permitted	0.57	1.00		0.29	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1009	3111		515	3248		3354	4576		1662	4652	
Peak-hour factor, PHF	1.00	1.00	1.00	0.87	0.87	0.87	0.96	0.96	0.96	1.00	1.00	1.00
Adj. Flow (vph)	123	179	164	503	501	179	197	968	136	59	1071	240
RTOR Reduction (vph)	0	151	0	0	40	0	0	19	0	0	40	0
Lane Group Flow (vph)	123	192	0	503	640	0	197	1085	0	59	1271	0
Confl. Peds. (#/hr)	5		3	3		5	1		2	2		1
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	3%	2%	3%	1%	1%	4%	0%	7%	2%	4%	4%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	13.9	7.0		37.0	23.1		6.6	30.2		4.9	27.8	
Effective Green, g (s)	13.9	7.0		37.0	23.1		6.6	30.2		4.9	27.8	
Actuated g/C Ratio	0.15	0.08		0.41	0.25		0.07	0.33		0.05	0.30	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.1	5.8		6.4	5.8	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		4.0	5.0	
Lane Grp Cap (vph)	204	238		510	821		242	1513		89	1416	
v/s Ratio Prot	0.05	0.06		c0.25	0.20		c0.06	0.24		0.04	c0.27	
v/s Ratio Perm	0.05			c0.15								
v/c Ratio	0.60	0.80		0.99	0.78		0.81	0.72		0.66	0.90	
Uniform Delay, d1	35.4	41.5		23.6	31.7		41.7	26.8		42.4	30.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.0	17.7		36.0	4.7		20.7	2.0		18.6	8.4	
Delay (s)	40.4	59.1		59.6	36.4		62.4	28.8		61.0	38.8	
Level of Service	D	E		E	D		E	C		E	D	
Approach Delay (s)		54.2			46.3			33.9			39.7	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	41.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	91.3	Sum of lost time (s)	26.9
Intersection Capacity Utilization	93.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
7: Gladys Ave & Site Access

2020 Background Volumes
1/10/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	234	19	0	11	0	0	0	4
Future Volume (Veh/h)	0	0	0	0	234	19	0	11	0	0	0	4
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	0	0	0	254	21	0	12	0	0	0	4
Pedestrians		1									3	
Lane Width (m)		0.0									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	278			0			270	278	0	274	268	268
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	278			0			270	278	0	274	268	268
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			100	98	100	100	100	99
cM capacity (veh/h)	1293			1636			682	631	1091	670	640	768

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	275	12	4
Volume Left	0	0	0
Volume Right	21	0	4
cSH	1700	631	768
Volume to Capacity	0.16	0.02	0.01
Queue Length 95th (m)	0.0	0.4	0.1
Control Delay (s)	0.0	10.8	9.7
Lane LOS		B	A
Approach Delay (s)	0.0	10.8	9.7
Approach LOS		B	A

Intersection Summary			
Average Delay		0.6	
Intersection Capacity Utilization		24.6%	ICU Level of Service	A
Analysis Period (min)		15	

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

2020 Background Volumes
1/10/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	485	210	670	167	414	422	1087	188	74	881	167
v/c Ratio	1.26	0.23	0.69	0.30	0.47	1.19	1.02	0.33	0.94	1.09	0.36
Control Delay	167.7	18.5	13.8	20.3	17.1	159.8	77.3	10.9	146.1	105.2	15.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	167.7	18.5	13.8	20.3	17.1	159.8	77.3	10.9	146.1	105.2	15.7
Queue Length 50th (m)	~157.0	29.4	56.0	24.0	49.5	~67.2	~155.4	7.8	19.3	~133.6	9.8
Queue Length 95th (m)	m#221.7	m44.4	m99.9	39.7	75.9	#99.5	#196.8	26.0	#46.4	#161.0	26.4
Internal Link Dist (m)		76.2			172.2		250.2			250.3	
Turn Bay Length (m)	36.0		45.0			95.0			100.0		60.0
Base Capacity (vph)	384	928	965	557	878	354	1064	574	79	807	458
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.26	0.23	0.69	0.30	0.47	1.19	1.02	0.33	0.94	1.09	0.36

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
1: Sumas Way & S Fraser Way

2020 Background Volumes
1/10/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	441	191	610	167	149	265	422	1087	188	64	758	144
Future Volume (vph)	441	191	610	167	149	265	422	1087	188	64	758	144
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.7	5.7	5.7	5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.99	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.90		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1726	1820	1526	1727	1626		3288	3424	1527	1729	3262	1493
Flt Permitted	0.42	1.00	1.00	0.60	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	754	1820	1526	1092	1626		3288	3424	1527	1729	3262	1493
Peak-hour factor, PHF	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.86	0.86
Adj. Flow (vph)	485	210	670	167	149	265	422	1087	188	74	881	167
RTOR Reduction (vph)	0	0	188	0	49	0	0	0	100	0	0	89
Lane Group Flow (vph)	485	210	482	167	365	0	422	1087	88	74	881	78
Confl. Peds. (#/hr)	3		1	1		3	7					7
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	1%	0%	0%	6%	1%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8					6			2
Actuated Green, G (s)	66.3	66.3	66.3	66.3	66.3		14.0	40.4	40.4	6.0	32.2	32.2
Effective Green, g (s)	66.3	66.3	66.3	66.3	66.3		14.0	40.4	40.4	6.0	32.2	32.2
Actuated g/C Ratio	0.51	0.51	0.51	0.51	0.51		0.11	0.31	0.31	0.05	0.25	0.25
Clearance Time (s)	5.7	5.7	5.7	5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	384	928	778	556	829		354	1064	474	79	807	369
v/s Ratio Prot		0.12			0.22		0.13	c0.32		0.04	c0.27	
v/s Ratio Perm	c0.64		0.32	0.15					0.06			0.05
v/c Ratio	1.26	0.23	0.62	0.30	0.44		1.19	1.02	0.19	0.94	1.09	0.21
Uniform Delay, d1	31.9	17.6	22.8	18.4	20.1		58.0	44.8	32.8	61.8	48.9	38.8
Progression Factor	1.01	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	137.7	0.1	1.5	0.3	0.4		111.0	33.2	0.3	79.9	59.6	0.4
Delay (s)	169.8	17.8	24.4	18.7	20.5		169.0	78.0	33.0	141.7	108.5	39.2
Level of Service	F	B	C	B	C		F	E	C	F	F	D
Approach Delay (s)		75.0			20.0			95.6			100.4	
Approach LOS		E			B			F			F	

Intersection Summary			
HCM 2000 Control Delay	81.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.21		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	107.3%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
3: On-Ramp/Lumar Pl & Gladys Ave

2020 Background Volumes
1/10/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	14	294	44	195	5	0	0	0	1	2	1
Future Volume (Veh/h)	1	14	294	44	195	5	0	0	0	1	2	1
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)	1	15	320	48	212	5	0	0	0	1	2	1
Pedestrians											5	
Lane Width (m)											3.7	
Walking Speed (m/s)											1.1	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	222			15			487	495	175	492	332	220
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	222			15			487	495	175	492	332	220
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			97			100	100	100	100	100	100
cM capacity (veh/h)	1352			1616			479	462	874	475	570	821

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	336	48	217	4
Volume Left	1	48	0	1
Volume Right	320	0	5	1
cSH	1352	1616	1700	585
Volume to Capacity	0.00	0.03	0.13	0.01
Queue Length 95th (m)	0.0	0.7	0.0	0.2
Control Delay (s)	0.0	7.3	0.0	11.2
Lane LOS	A	A		B
Approach Delay (s)	0.0	1.3		11.2
Approach LOS				B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	44.9%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

2020 Background Volumes
1/10/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	455	897	234	432	262	1647	189	1457
v/c Ratio	1.05	1.07	1.07	1.02	0.87	1.01	0.95	0.87
Control Delay	90.2	92.0	112.7	93.4	81.5	64.2	106.4	41.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	90.2	92.0	112.7	93.4	81.5	64.2	106.4	41.7
Queue Length 50th (m)	~101.4	~116.6	~45.4	~48.6	31.9	~141.5	44.9	113.2
Queue Length 95th (m)	#164.6	#156.8	#94.2	#82.6	#54.5	#175.9	#89.5	133.2
Internal Link Dist (m)		436.0		418.0		231.9		250.2
Turn Bay Length (m)	126.0		25.0		75.0		70.0	
Base Capacity (vph)	434	838	219	425	301	1624	198	1681
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.05	1.07	1.07	1.02	0.87	1.01	0.95	0.87

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
6: Sumas Way & Marshall Rd

2020 Background Volumes
1/10/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	441	582	288	227	281	138	254	1242	356	183	1155	258
Future Volume (vph)	441	582	288	227	281	138	254	1242	356	183	1155	258
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0		7.0	7.0		7.1	5.8		6.4	5.8	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.95		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1728	3260		1729	3216		3321	4742		1729	4696	
Flt Permitted	0.19	1.00		0.29	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	346	3260		520	3216		3321	4742		1729	4696	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	455	600	297	234	290	142	262	1280	367	189	1191	266
RTOR Reduction (vph)	0	51	0	0	50	0	0	43	0	0	30	0
Lane Group Flow (vph)	455	846	0	234	382	0	262	1604	0	189	1427	0
Confl. Peds. (#/hr)	10		2	2		10	8		7	7		8
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	0%	0%	1%	0%	1%	2%	1%	1%	0%	0%	3%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	47.0	29.0		25.0	14.0		10.9	40.0		13.8	42.2	
Effective Green, g (s)	47.0	29.0		25.0	14.0		10.9	40.0		13.8	42.2	
Actuated g/C Ratio	0.39	0.24		0.21	0.12		0.09	0.33		0.12	0.35	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.1	5.8		6.4	5.8	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		4.0	5.0	
Lane Grp Cap (vph)	434	787		219	375		301	1580		198	1651	
v/s Ratio Prot	c0.23	c0.26		0.10	0.12		0.08	c0.34		c0.11	0.30	
v/s Ratio Perm	0.18			0.12								
v/c Ratio	1.05	1.08		1.07	1.02		0.87	1.01		0.95	0.86	
Uniform Delay, d1	34.6	45.5		45.3	53.0		53.9	40.0		52.8	36.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	56.4	54.2		80.1	51.0		24.5	26.4		50.9	5.4	
Delay (s)	91.0	99.7		125.5	104.0		78.3	66.4		103.7	41.7	
Level of Service	F	F		F	F		E	E		F	D	
Approach Delay (s)		96.8			111.6			68.1			48.8	
Approach LOS		F			F			E			D	

Intersection Summary			
HCM 2000 Control Delay	74.5	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	26.9
Intersection Capacity Utilization	109.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
7: Gladys Ave & Site Access

2020 Background Volumes
1/10/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	196	3	0	14	0	0	0	42
Future Volume (Veh/h)	0	0	0	0	196	3	0	14	0	0	0	42
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	0	0	0	213	3	0	15	0	0	0	46
Pedestrians		1									7	
Lane Width (m)		0.0									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	223			0			262	223	0	229	222	222
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	223			0			262	223	0	229	222	222
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			100	98	100	100	100	94
cM capacity (veh/h)	1349			1636			653	675	1091	709	676	816

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	216	15	46
Volume Left	0	0	0
Volume Right	3	0	46
cSH	1700	675	816
Volume to Capacity	0.13	0.02	0.06
Queue Length 95th (m)	0.0	0.5	1.4
Control Delay (s)	0.0	10.5	9.7
Lane LOS		B	A
Approach Delay (s)	0.0	10.5	9.7
Approach LOS		B	A

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	21.4%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

2031 Background Volumes
1/10/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	218	40	493	44	65	544	864	66	53	1348	429
v/c Ratio	0.89	0.11	0.84	0.17	0.19	0.92	0.51	0.08	0.26	0.98	0.50
Control Delay	72.6	30.2	24.0	31.7	19.3	59.8	16.0	1.2	38.9	47.2	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.6	30.2	24.0	31.7	19.3	59.8	16.0	1.2	38.9	47.2	5.3
Queue Length 50th (m)	36.7	5.7	18.7	6.3	4.7	48.2	62.9	0.0	7.6	118.5	5.5
Queue Length 95th (m)	#62.3	12.4	40.3	15.4	15.1	#77.8	67.7	2.7	19.8	#167.7	24.7
Internal Link Dist (m)		76.2			172.2		250.2			250.3	
Turn Bay Length (m)	36.0		45.0			95.0			100.0		60.0
Base Capacity (vph)	255	373	595	264	361	589	1853	931	204	1371	863
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.11	0.83	0.17	0.18	0.92	0.47	0.07	0.26	0.98	0.50

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
1: Sumas Way & S Fraser Way

2031 Background Volumes
1/10/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	174	32	394	44	33	32	522	829	63	51	1308	416
Future Volume (vph)	174	32	394	44	33	32	522	829	63	51	1308	416
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.7	5.7	5.7	5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1656	1820	1468	1677	1636		3288	3115	1496	1729	3202	1517
Flt Permitted	0.71	1.00	1.00	0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1245	1820	1468	1290	1636		3288	3115	1496	1729	3202	1517
Peak-hour factor, PHF	0.80	0.80	0.80	1.00	1.00	1.00	0.96	0.96	0.96	0.97	0.97	0.97
Adj. Flow (vph)	218	40	492	44	33	32	544	864	66	53	1348	429
RTOR Reduction (vph)	0	0	299	0	26	0	0	0	31	0	0	208
Lane Group Flow (vph)	218	40	194	44	39	0	544	864	35	53	1348	221
Confl. Peds. (#/hr)	4		1	1		4			1	1		
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	4%	0%	4%	3%	4%	0%	2%	11%	2%	0%	8%	2%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8					6			2
Actuated Green, G (s)	17.5	17.5	17.5	17.5	17.5		16.0	48.8	48.8	8.0	40.6	40.6
Effective Green, g (s)	17.5	17.5	17.5	17.5	17.5		16.0	48.8	48.8	8.0	40.6	40.6
Actuated g/C Ratio	0.19	0.19	0.19	0.19	0.19		0.17	0.53	0.53	0.09	0.44	0.44
Clearance Time (s)	5.7	5.7	5.7	5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	237	347	280	246	312		574	1659	796	151	1419	672
v/s Ratio Prot		0.02			0.02		c0.17	0.28		0.03	c0.42	
v/s Ratio Perm	c0.18		0.13	0.03					0.02			0.15
v/c Ratio	0.92	0.12	0.69	0.18	0.13		0.95	0.52	0.04	0.35	0.95	0.33
Uniform Delay, d1	36.4	30.6	34.5	31.0	30.7		37.4	13.8	10.2	39.4	24.5	16.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	36.9	0.1	7.2	0.4	0.2		25.2	0.4	0.0	1.9	13.7	0.4
Delay (s)	73.2	30.8	41.7	31.4	30.9		62.6	14.2	10.3	41.3	38.2	17.0
Level of Service	E	C	D	C	C		E	B	B	D	D	B
Approach Delay (s)		50.3			31.1			31.9			33.3	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	35.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	91.6	Sum of lost time (s)	17.5
Intersection Capacity Utilization	85.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
3: On-Ramp/Lumar Pl & Gladys Ave

2031 Background Volumes
1/10/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	13	188	10	274	4	0	0	0	0	7	2
Future Volume (Veh/h)	0	13	188	10	274	4	0	0	0	0	7	2
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	14	204	11	298	4	0	0	0	0	8	2
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	302			14			442	440	116	438	336	300
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	302			14			442	440	116	438	336	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			100	100	100	100	99	100
cM capacity (veh/h)	1270			1617			520	511	942	530	584	744

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	218	11	302	10
Volume Left	0	11	0	0
Volume Right	204	0	4	2
cSH	1270	1617	1700	610
Volume to Capacity	0.00	0.01	0.18	0.02
Queue Length 95th (m)	0.0	0.2	0.0	0.4
Control Delay (s)	0.0	7.2	0.0	11.0
Lane LOS		A		B
Approach Delay (s)	0.0	0.3		11.0
Approach LOS				B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	25.5%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

2031 Background Volumes
1/10/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	148	414	608	821	238	1334	72	1582
v/c Ratio	0.76	1.09	1.12	0.86	0.94	0.80	0.79	1.00
Control Delay	54.0	107.2	107.0	48.8	97.7	38.4	105.8	61.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.0	107.2	107.0	48.8	97.7	38.4	105.8	61.8
Queue Length 50th (m)	21.6	~41.7	~149.7	92.3	29.2	101.1	17.1	~133.1
Queue Length 95th (m)	#49.7	#74.0	#206.6	111.8	#53.5	119.7	#42.8	#169.2
Internal Link Dist (m)		436.0		418.0		231.9		250.2
Turn Bay Length (m)	126.0		25.0		75.0		70.0	
Base Capacity (vph)	198	380	544	956	254	1661	91	1581
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	1.09	1.12	0.86	0.94	0.80	0.79	1.00

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
6: Sumas Way & Marshall Rd

2031 Background Volumes
1/10/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	216	198	529	526	188	228	1121	159	72	1293	289
Future Volume (vph)	148	216	198	529	526	188	228	1121	159	72	1293	289
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0		7.0	7.0		7.1	5.8		6.4	5.8	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.96		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1678	3110		1711	3247		3354	4575		1662	4651	
Flt Permitted	0.40	1.00		0.24	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	706	3110		424	3247		3354	4575		1662	4651	
Peak-hour factor, PHF	1.00	1.00	1.00	0.87	0.87	0.87	0.96	0.96	0.96	1.00	1.00	1.00
Adj. Flow (vph)	148	216	198	608	605	216	238	1168	166	72	1293	289
RTOR Reduction (vph)	0	121	0	0	30	0	0	15	0	0	30	0
Lane Group Flow (vph)	148	293	0	608	791	0	238	1319	0	72	1552	0
Confl. Peds. (#/hr)	5		3	3		5	1		2	2		1
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	3%	2%	3%	1%	1%	4%	0%	7%	2%	4%	4%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	19.8	10.0		51.0	34.2		9.1	43.2		6.6	40.0	
Effective Green, g (s)	19.8	10.0		51.0	34.2		9.1	43.2		6.6	40.0	
Actuated g/C Ratio	0.17	0.08		0.42	0.29		0.08	0.36		0.05	0.33	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.1	5.8		6.4	5.8	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		4.0	5.0	
Lane Grp Cap (vph)	195	259		544	925		254	1647		91	1550	
v/s Ratio Prot	0.06	0.09		c0.32	0.24		c0.07	c0.29		0.04	c0.33	
v/s Ratio Perm	0.06			c0.16								
v/c Ratio	0.76	1.13		1.12	0.86		0.94	0.80		0.79	1.00	
Uniform Delay, d1	45.9	55.0		33.3	40.6		55.2	34.5		56.0	40.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	15.5	95.9		75.1	7.8		40.4	3.3		37.8	23.2	
Delay (s)	61.4	150.9		108.4	48.4		95.6	37.8		93.8	63.2	
Level of Service	E	F		F	D		F	D		F	E	
Approach Delay (s)		127.4			73.9			46.6			64.5	
Approach LOS		F			E			D			E	

Intersection Summary			
HCM 2000 Control Delay	68.4	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	26.9
Intersection Capacity Utilization	107.9%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
7: Gladys Ave & Site Access

2031 Background Volumes
1/10/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	283	23	0	13	0	0	0	5
Future Volume (Veh/h)	0	0	0	0	283	23	0	13	0	0	0	5
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	0	0	0	308	25	0	14	0	0	0	5
Pedestrians		1									3	
Lane Width (m)		0.0									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	336			0			326	336	0	330	324	324
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	336			0			326	336	0	330	324	324
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			100	98	100	100	100	99
cM capacity (veh/h)	1231			1636			625	586	1091	612	596	714

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	333	14	5
Volume Left	0	0	0
Volume Right	25	0	5
cSH	1700	586	714
Volume to Capacity	0.20	0.02	0.01
Queue Length 95th (m)	0.0	0.6	0.2
Control Delay (s)	0.0	11.3	10.1
Lane LOS		B	B
Approach Delay (s)	0.0	11.3	10.1
Approach LOS		B	B

Intersection Summary			
Average Delay		0.6	
Intersection Capacity Utilization		27.5%	ICU Level of Service	A
Analysis Period (min)		15	

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

2031 Background Volumes
1/10/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	585	253	809	202	500	509	1312	227	90	1064	202
v/c Ratio	1.69	0.26	0.82	0.37	0.55	1.55	1.34	0.42	1.10	1.41	0.46
Control Delay	346.1	17.3	20.7	20.1	17.9	300.9	197.2	17.0	184.1	228.0	22.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	346.1	17.3	20.7	20.1	17.9	300.9	197.2	17.0	184.1	228.0	22.0
Queue Length 50th (m)	~220.5	34.6	97.8	29.0	64.0	~94.5	~230.2	16.9	~26.0	~191.8	18.1
Queue Length 95th (m)	m#198.8	m51.0	m160.8	47.4	95.5	#128.8	#272.5	39.8	#56.8	#218.2	38.1
Internal Link Dist (m)		76.2			172.2		250.2			250.3	
Turn Bay Length (m)	36.0		45.0			95.0			100.0		60.0
Base Capacity (vph)	347	970	990	548	915	328	979	536	82	757	435
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.69	0.26	0.82	0.37	0.55	1.55	1.34	0.42	1.10	1.41	0.46

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
1: Sumas Way & S Fraser Way

2031 Background Volumes
1/10/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	532	230	736	202	180	320	509	1312	227	77	915	174
Future Volume (vph)	532	230	736	202	180	320	509	1312	227	77	915	174
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.7	5.7	5.7	5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.99	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.90		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1726	1820	1526	1727	1626		3288	3424	1527	1729	3262	1493
Flt Permitted	0.36	1.00	1.00	0.57	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	650	1820	1526	1028	1626		3288	3424	1527	1729	3262	1493
Peak-hour factor, PHF	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.86	0.86
Adj. Flow (vph)	585	253	809	202	180	320	509	1312	227	90	1064	202
RTOR Reduction (vph)	0	0	177	0	49	0	0	0	100	0	0	89
Lane Group Flow (vph)	585	253	632	202	451	0	509	1312	127	90	1064	113
Confl. Peds. (#/hr)	3		1	1		3	7					7
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	1%	0%	0%	6%	1%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8					6			2
Actuated Green, G (s)	69.3	69.3	69.3	69.3	69.3		13.0	37.2	37.2	6.2	30.2	30.2
Effective Green, g (s)	69.3	69.3	69.3	69.3	69.3		13.0	37.2	37.2	6.2	30.2	30.2
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.53		0.10	0.29	0.29	0.05	0.23	0.23
Clearance Time (s)	5.7	5.7	5.7	5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	346	970	813	548	866		328	979	436	82	757	346
v/s Ratio Prot		0.14			0.28		0.15	c0.38		0.05	c0.33	
v/s Ratio Perm	c0.90		0.41	0.20					0.08			0.08
v/c Ratio	1.69	0.26	0.78	0.37	0.52		1.55	1.34	0.29	1.10	1.41	0.33
Uniform Delay, d1	30.4	16.5	24.2	17.6	19.6		58.5	46.4	36.1	61.9	49.9	41.5
Progression Factor	1.01	1.00	1.01	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	323.1	0.1	4.7	0.4	0.6		262.9	160.0	0.5	128.4	190.4	0.8
Delay (s)	353.7	16.6	29.1	18.1	20.2		321.4	206.4	36.6	190.3	240.3	42.2
Level of Service	F	B	C	B	C		F	F	D	F	F	D
Approach Delay (s)		142.5			19.6			216.2			207.5	
Approach LOS		F			B			F			F	

Intersection Summary			
HCM 2000 Control Delay	169.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.61		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	124.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
3: On-Ramp/Lumar Pl & Gladys Ave

2031 Background Volumes
1/10/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	17	355	53	236	6	0	0	0	1	3	1
Future Volume (Veh/h)	1	17	355	53	236	6	0	0	0	1	3	1
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)	1	18	386	58	257	7	0	0	0	1	3	1
Pedestrians											5	
Lane Width (m)											3.7	
Walking Speed (m/s)											1.1	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	269			18			588	598	211	594	402	266
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	269			18			588	598	211	594	402	266
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			96			100	100	100	100	99	100
cM capacity (veh/h)	1300			1612			407	401	834	404	518	774

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	405	58	264	5
Volume Left	1	58	0	1
Volume Right	386	0	7	1
cSH	1300	1612	1700	523
Volume to Capacity	0.00	0.04	0.16	0.01
Queue Length 95th (m)	0.0	0.9	0.0	0.2
Control Delay (s)	0.0	7.3	0.0	11.9
Lane LOS	A	A		B
Approach Delay (s)	0.0	1.3		11.9
Approach LOS				B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

2031 Background Volumes
1/10/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	548	1084	282	520	316	1989	228	1759
v/c Ratio	1.26	1.30	1.19	1.14	1.12	1.17	1.19	0.99
Control Delay	171.2	182.9	155.9	134.7	146.3	121.8	176.3	61.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	171.2	182.9	155.9	134.7	146.3	121.8	176.3	61.5
Queue Length 50th (m)	~175.6	~195.6	~78.0	~81.8	~51.7	~236.1	~75.6	173.5
Queue Length 95th (m)	#246.1	#238.3	#133.6	#118.4	#81.9	#265.2	#127.9	#210.0
Internal Link Dist (m)		436.0		418.0		231.9		250.2
Turn Bay Length (m)	126.0		25.0		75.0		70.0	
Base Capacity (vph)	434	835	237	456	282	1703	192	1777
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.26	1.30	1.19	1.14	1.12	1.17	1.19	0.99

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
6: Sumas Way & Marshall Rd

2031 Background Volumes
1/10/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	532	703	348	274	339	166	307	1500	430	221	1395	311
Future Volume (vph)	532	703	348	274	339	166	307	1500	430	221	1395	311
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0		7.0	7.0		7.1	5.8		6.4	5.8	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.95		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1728	3260		1729	3215		3321	4740		1729	4695	
Flt Permitted	0.16	1.00		0.22	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	291	3260		404	3215		3321	4740		1729	4695	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	548	725	359	282	349	171	316	1546	443	228	1438	321
RTOR Reduction (vph)	0	44	0	0	43	0	0	37	0	0	26	0
Lane Group Flow (vph)	548	1040	0	282	477	0	316	1952	0	228	1733	0
Confl. Peds. (#/hr)	10		2	2		10	8		7	7		8
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	0%	0%	1%	0%	1%	2%	1%	1%	0%	0%	3%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	56.0	34.0		33.0	18.0		11.9	49.2		15.6	52.2	
Effective Green, g (s)	56.0	34.0		33.0	18.0		11.9	49.2		15.6	52.2	
Actuated g/C Ratio	0.40	0.24		0.24	0.13		0.09	0.35		0.11	0.37	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.1	5.8		6.4	5.8	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		4.0	5.0	
Lane Grp Cap (vph)	434	791		237	413		282	1665		192	1750	
v/s Ratio Prot	c0.28	c0.32		0.13	0.15		0.10	c0.41		c0.13	c0.37	
v/s Ratio Perm	0.23			0.15								
v/c Ratio	1.26	1.31		1.19	1.16		1.12	1.17		1.19	0.99	
Uniform Delay, d1	42.3	53.0		49.6	61.0		64.0	45.4		62.2	43.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	135.6	150.6		119.5	94.1		90.0	84.3		124.6	19.3	
Delay (s)	177.9	203.6		169.1	155.1		154.1	129.7		186.8	62.9	
Level of Service	F	F		F	F		F	F		F	E	
Approach Delay (s)		195.0			160.1			133.1			77.1	
Approach LOS		F			F			F			E	

Intersection Summary			
HCM 2000 Control Delay	134.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.29		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	26.9
Intersection Capacity Utilization	125.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
7: Gladys Ave & Site Access

2031 Background Volumes
1/10/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	237	4	0	17	0	0	0	51
Future Volume (Veh/h)	0	0	0	0	237	4	0	17	0	0	0	51
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	0	0	0	258	4	0	18	0	0	0	55
Pedestrians		1									7	
Lane Width (m)		0.0									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	269			0			316	269	0	276	267	268
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	269			0			316	269	0	276	267	268
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			100	97	100	100	100	93
cM capacity (veh/h)	1297			1636			592	636	1091	658	638	770

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	262	18	55
Volume Left	0	0	0
Volume Right	4	0	55
cSH	1700	636	770
Volume to Capacity	0.15	0.03	0.07
Queue Length 95th (m)	0.0	0.7	1.7
Control Delay (s)	0.0	10.8	10.0
Lane LOS		B	B
Approach Delay (s)	0.0	10.8	10.0
Approach LOS		B	B

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	23.2%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

2040 Background Volumes
1/10/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	249	46	563	50	75	621	985	75	60	1538	490
v/c Ratio	1.02	0.13	1.01	0.20	0.21	1.02	0.62	0.09	0.20	1.00	0.56
Control Delay	113.1	44.0	61.1	45.9	27.2	94.3	26.6	3.7	46.8	56.2	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	113.1	44.0	61.1	45.9	27.2	94.3	26.6	3.7	46.8	56.2	11.7
Queue Length 50th (m)	~65.8	9.8	~71.6	10.8	8.7	~87.1	107.1	0.0	12.4	201.8	33.4
Queue Length 95th (m)	#99.1	18.2	#104.9	22.5	22.4	#123.2	109.4	7.3	27.3	#257.1	64.9
Internal Link Dist (m)		76.2			172.2		250.2			250.3	
Turn Bay Length (m)	36.0		45.0			95.0			100.0		60.0
Base Capacity (vph)	245	362	559	255	352	607	1912	946	313	1541	879
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.02	0.13	1.01	0.20	0.21	1.02	0.52	0.08	0.19	1.00	0.56

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
1: Sumas Way & S Fraser Way

2040 Background Volumes
1/10/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	199	37	450	50	38	37	596	946	72	58	1492	475
Future Volume (vph)	199	37	450	50	38	37	596	946	72	58	1492	475
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.7	5.7	5.7	5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1653	1820	1467	1676	1634		3288	3115	1495	1729	3202	1517
Flt Permitted	0.71	1.00	1.00	0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1232	1820	1467	1283	1634		3288	3115	1495	1729	3202	1517
Peak-hour factor, PHF	0.80	0.80	0.80	1.00	1.00	1.00	0.96	0.96	0.96	0.97	0.97	0.97
Adj. Flow (vph)	249	46	562	50	38	37	621	985	75	60	1538	490
RTOR Reduction (vph)	0	0	268	0	27	0	0	0	37	0	0	148
Lane Group Flow (vph)	249	46	295	50	48	0	621	985	38	60	1538	342
Confl. Peds. (#/hr)	4		1	1		4			1	1		
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	4%	0%	4%	3%	4%	0%	2%	11%	2%	0%	8%	2%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8					6			2
Actuated Green, G (s)	25.9	25.9	25.9	25.9	25.9		24.0	66.4	66.4	21.5	63.7	63.7
Effective Green, g (s)	25.9	25.9	25.9	25.9	25.9		24.0	66.4	66.4	21.5	63.7	63.7
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20		0.18	0.51	0.51	0.16	0.49	0.49
Clearance Time (s)	5.7	5.7	5.7	5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	243	359	289	253	322		601	1577	757	283	1555	737
v/s Ratio Prot		0.03			0.03		c0.19	0.32		0.03	c0.48	
v/s Ratio Perm	c0.20		0.20	0.04					0.03			0.23
v/c Ratio	1.02	0.13	1.02	0.20	0.15		1.03	0.62	0.05	0.21	0.99	0.46
Uniform Delay, d1	52.6	43.3	52.6	43.9	43.5		53.5	23.4	16.4	47.5	33.4	22.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	64.3	0.2	58.3	0.4	0.2		45.5	0.9	0.0	0.5	20.1	0.6
Delay (s)	116.9	43.5	110.9	44.3	43.7		99.1	24.2	16.4	48.0	53.4	23.0
Level of Service	F	D	F	D	D		F	C	B	D	D	C
Approach Delay (s)		109.0			43.9			51.5			46.1	
Approach LOS		F			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	59.3	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	131.1	Sum of lost time (s)	17.5
Intersection Capacity Utilization	94.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
3: On-Ramp/Lumar Pl & Gladys Ave

2040 Background Volumes
1/10/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	15	214	12	312	4	0	0	0	0	8	2
Future Volume (Veh/h)	0	15	214	12	312	4	0	0	0	0	8	2
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	16	233	13	339	4	0	0	0	0	9	2
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	343			16			504	502	132	500	383	341
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	343			16			504	502	132	500	383	341
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	100	98	100
cM capacity (veh/h)	1227			1615			471	471	922	482	549	706

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	249	13	343	11
Volume Left	0	13	0	0
Volume Right	233	0	4	2
cSH	1227	1615	1700	572
Volume to Capacity	0.00	0.01	0.20	0.02
Queue Length 95th (m)	0.0	0.2	0.0	0.4
Control Delay (s)	0.0	7.2	0.0	11.4
Lane LOS		A		B
Approach Delay (s)	0.0	0.3		11.4
Approach LOS				B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	27.6%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

2040 Background Volumes
1/10/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	169	473	693	937	271	1521	82	1805
v/c Ratio	0.93	1.24	1.23	0.92	1.04	0.90	0.85	1.11
Control Delay	89.1	167.5	151.8	59.2	127.2	49.1	120.7	100.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	89.1	167.5	151.8	59.2	127.2	49.1	120.7	100.3
Queue Length 50th (m)	32.0	~68.1	~221.6	127.6	~41.5	143.0	22.9	~206.3
Queue Length 95th (m)	#75.0	#103.6	#280.5	#151.7	#70.0	163.9	#53.6	#235.7
Internal Link Dist (m)		436.0		418.0		231.9		250.2
Turn Bay Length (m)	126.0		25.0		75.0		70.0	
Base Capacity (vph)	182	380	565	1022	261	1698	97	1627
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.93	1.24	1.23	0.92	1.04	0.90	0.85	1.11

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
6: Sumas Way & Marshall Rd

2040 Background Volumes
1/10/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	169	247	226	603	600	215	260	1279	181	82	1475	330
Future Volume (vph)	169	247	226	603	600	215	260	1279	181	82	1475	330
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0		7.0	7.0		7.1	5.8		6.4	5.8	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.96		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1678	3109		1711	3246		3354	4575		1662	4651	
Flt Permitted	0.33	1.00		0.21	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	589	3109		379	3246		3354	4575		1662	4651	
Peak-hour factor, PHF	1.00	1.00	1.00	0.87	0.87	0.87	0.96	0.96	0.96	1.00	1.00	1.00
Adj. Flow (vph)	169	247	226	693	690	247	271	1332	189	82	1475	330
RTOR Reduction (vph)	0	114	0	0	26	0	0	13	0	0	26	0
Lane Group Flow (vph)	169	359	0	693	911	0	271	1508	0	82	1779	0
Confl. Peds. (#/hr)	5		3	3		5	1		2	2		1
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	3%	2%	3%	1%	1%	4%	0%	7%	2%	4%	4%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	23.0	12.0		61.0	43.0		10.9	51.6		8.2	48.2	
Effective Green, g (s)	23.0	12.0		61.0	43.0		10.9	51.6		8.2	48.2	
Actuated g/C Ratio	0.16	0.09		0.44	0.31		0.08	0.37		0.06	0.34	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.1	5.8		6.4	5.8	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		4.0	5.0	
Lane Grp Cap (vph)	182	266		564	996		261	1686		97	1601	
v/s Ratio Prot	0.07	0.12		c0.37	0.28		c0.08	c0.33		0.05	c0.38	
v/s Ratio Perm	0.08			c0.17								
v/c Ratio	0.93	1.35		1.23	0.92		1.04	0.89		0.85	1.11	
Uniform Delay, d1	54.7	64.0		39.7	46.7		64.5	41.6		65.3	45.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	46.1	179.7		117.9	12.5		66.0	7.0		47.0	59.6	
Delay (s)	100.8	243.7		157.6	59.3		130.6	48.6		112.3	105.5	
Level of Service	F	F		F	E		F	D		F	F	
Approach Delay (s)		206.1			101.1			61.0			105.8	
Approach LOS		F			F			E			F	

Intersection Summary			
HCM 2000 Control Delay	101.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.20		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	26.9
Intersection Capacity Utilization	119.6%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
7: Gladys Ave & Site Access

2040 Background Volumes
1/10/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	323	26	0	15	0	0	0	6
Future Volume (Veh/h)	0	0	0	0	323	26	0	15	0	0	0	6
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	0	0	0	351	28	0	16	0	0	0	7
Pedestrians		1									3	
Lane Width (m)		0.0									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	382			0			373	382	0	376	368	369
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	382			0			373	382	0	376	368	369
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			100	97	100	100	100	99
cM capacity (veh/h)	1184			1636			580	553	1091	569	563	675

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	379	16	7
Volume Left	0	0	0
Volume Right	28	0	7
cSH	1700	553	675
Volume to Capacity	0.22	0.03	0.01
Queue Length 95th (m)	0.0	0.7	0.2
Control Delay (s)	0.0	11.7	10.4
Lane LOS		B	B
Approach Delay (s)	0.0	11.7	10.4
Approach LOS		B	B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	30.0%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

2040 Background Volumes
1/10/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	667	289	923	231	571	581	1497	258	102	1214	231
v/c Ratio	2.27	0.30	0.93	0.45	0.62	1.77	1.53	0.48	1.24	1.60	0.53
Control Delay	602.4	17.9	33.4	22.1	20.5	392.7	276.7	20.3	227.7	311.3	26.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	602.4	17.9	33.4	22.1	20.5	392.7	276.7	20.3	227.7	311.3	26.2
Queue Length 50th (m)	~203.5	40.5	148.7	35.0	81.0	~114.2	~282.1	23.9	~32.3	~233.9	25.2
Queue Length 95th (m)	m#273.2	m57.9	m#251.9	57.1	118.4	#149.9	#324.6	49.6	#64.8	#259.1	47.2
Internal Link Dist (m)		76.2			172.2		250.2			250.3	
Turn Bay Length (m)	36.0		45.0			95.0			100.0		60.0
Base Capacity (vph)	294	970	990	516	915	328	979	536	82	757	435
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	2.27	0.30	0.93	0.45	0.62	1.77	1.53	0.48	1.24	1.60	0.53

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
1: Sumas Way & S Fraser Way

2040 Background Volumes
1/10/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	607	263	840	231	206	365	581	1497	258	88	1044	199
Future Volume (vph)	607	263	840	231	206	365	581	1497	258	88	1044	199
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.7	5.7	5.7	5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.99	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.90		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1727	1820	1526	1727	1627		3288	3424	1527	1729	3262	1493
Flt Permitted	0.30	1.00	1.00	0.53	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	552	1820	1526	969	1627		3288	3424	1527	1729	3262	1493
Peak-hour factor, PHF	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.86	0.86
Adj. Flow (vph)	667	289	923	231	206	365	581	1497	258	102	1214	231
RTOR Reduction (vph)	0	0	177	0	49	0	0	0	100	0	0	89
Lane Group Flow (vph)	667	289	746	231	522	0	581	1497	158	102	1214	142
Confl. Peds. (#/hr)	3		1	1		3	7					7
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	1%	0%	0%	6%	1%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8					6			2
Actuated Green, G (s)	69.3	69.3	69.3	69.3	69.3		13.0	37.2	37.2	6.2	30.2	30.2
Effective Green, g (s)	69.3	69.3	69.3	69.3	69.3		13.0	37.2	37.2	6.2	30.2	30.2
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.53		0.10	0.29	0.29	0.05	0.23	0.23
Clearance Time (s)	5.7	5.7	5.7	5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	294	970	813	516	867		328	979	436	82	757	346
v/s Ratio Prot		0.16			0.32		0.18	c0.44		0.06	c0.37	
v/s Ratio Perm	c1.21		0.49	0.24					0.10			0.10
v/c Ratio	2.27	0.30	0.92	0.45	0.60		1.77	1.53	0.36	1.24	1.60	0.41
Uniform Delay, d1	30.4	16.8	27.7	18.6	20.9		58.5	46.4	37.0	61.9	49.9	42.3
Progression Factor	1.01	1.00	1.01	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	581.7	0.2	15.0	0.6	1.2		359.3	243.3	0.7	178.6	277.8	1.1
Delay (s)	612.3	17.0	42.9	19.2	22.1		417.8	289.7	37.7	240.5	327.7	43.4
Level of Service	F	B	D	B	C		F	F	D	F	F	D
Approach Delay (s)		241.0			21.2			293.7			279.5	
Approach LOS		F			C			F			F	

Intersection Summary			
HCM 2000 Control Delay	242.0	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	2.05		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	138.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
3: On-Ramp/Lumar Pl & Gladys Ave

2040 Background Volumes
1/10/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	19	405	60	269	6	0	0	0	2	3	2
Future Volume (Veh/h)	2	19	405	60	269	6	0	0	0	2	3	2
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	21	440	65	292	7	0	0	0	2	3	2
Pedestrians											5	
Lane Width (m)											3.7	
Walking Speed (m/s)											1.1	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	304			21			670	679	241	676	456	300
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	304			21			670	679	241	676	456	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			96			100	100	100	99	99	100
cM capacity (veh/h)	1262			1608			357	359	803	355	480	740

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	463	65	299	7
Volume Left	2	65	0	2
Volume Right	440	0	7	2
cSH	1262	1608	1700	480
Volume to Capacity	0.00	0.04	0.18	0.01
Queue Length 95th (m)	0.0	1.0	0.0	0.3
Control Delay (s)	0.1	7.3	0.0	12.6
Lane LOS	A	A		B
Approach Delay (s)	0.1	1.3		12.6
Approach LOS				B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

2040 Background Volumes
1/10/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	626	1236	322	595	361	2270	261	2006
v/c Ratio	1.44	1.48	1.36	1.30	1.28	1.33	1.36	1.13
Control Delay	244.3	259.0	219.8	195.0	199.6	189.9	236.8	105.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	244.3	259.0	219.8	195.0	199.6	189.9	236.8	105.5
Queue Length 50th (m)	~221.1	~242.5	~100.7	~104.8	~65.1	~296.1	~94.6	~233.0
Queue Length 95th (m)	#294.5	#285.5	#162.2	#142.6	#96.4	#323.9	#149.2	#262.0
Internal Link Dist (m)		436.0		418.0		231.9		250.2
Turn Bay Length (m)	126.0		25.0		75.0		70.0	
Base Capacity (vph)	434	834	237	456	282	1703	192	1777
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.44	1.48	1.36	1.30	1.28	1.33	1.36	1.13

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
6: Sumas Way & Marshall Rd

2040 Background Volumes
1/10/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	607	802	397	312	387	190	350	1711	491	253	1591	355
Future Volume (vph)	607	802	397	312	387	190	350	1711	491	253	1591	355
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0		7.0	7.0		7.1	5.8		6.4	5.8	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.95		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1728	3260		1729	3214		3321	4740		1729	4695	
Flt Permitted	0.16	1.00		0.22	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	291	3260		404	3214		3321	4740		1729	4695	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	626	827	409	322	399	196	361	1764	506	261	1640	366
RTOR Reduction (vph)	0	43	0	0	43	0	0	37	0	0	26	0
Lane Group Flow (vph)	626	1193	0	322	552	0	361	2233	0	261	1980	0
Confl. Peds. (#/hr)	10		2	2		10	8		7	7		8
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	0%	0%	1%	0%	1%	2%	1%	1%	0%	0%	3%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	56.0	34.0		33.0	18.0		11.9	49.2		15.6	52.2	
Effective Green, g (s)	56.0	34.0		33.0	18.0		11.9	49.2		15.6	52.2	
Actuated g/C Ratio	0.40	0.24		0.24	0.13		0.09	0.35		0.11	0.37	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.1	5.8		6.4	5.8	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		4.0	5.0	
Lane Grp Cap (vph)	434	791		237	413		282	1665		192	1750	
v/s Ratio Prot	c0.32	c0.37		0.15	0.17		0.11	c0.47		c0.15	c0.42	
v/s Ratio Perm	0.26			0.17								
v/c Ratio	1.44	1.51		1.36	1.34		1.28	1.34		1.36	1.13	
Uniform Delay, d1	42.3	53.0		49.6	61.0		64.0	45.4		62.2	43.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	211.8	235.2		186.3	167.4		150.5	157.7		191.6	67.0	
Delay (s)	254.1	288.2		235.9	228.4		214.5	203.1		253.8	110.9	
Level of Service	F	F		F	F		F	F		F	F	
Approach Delay (s)		276.7			231.1			204.6			127.4	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	202.5	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.48		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	26.9
Intersection Capacity Utilization	139.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
7: Gladys Ave & Site Access

2040 Background Volumes
1/10/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	270	4	0	19	0	0	0	58
Future Volume (Veh/h)	0	0	0	0	270	4	0	19	0	0	0	58
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	0	0	0	293	4	0	21	0	0	0	63
Pedestrians		1									7	
Lane Width (m)		0.0									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	304			0			359	304	0	312	302	303
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	304			0			359	304	0	312	302	303
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			100	97	100	100	100	91
cM capacity (veh/h)	1260			1636			546	608	1091	619	610	736

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	297	21	63
Volume Left	0	0	0
Volume Right	4	0	63
cSH	1700	608	736
Volume to Capacity	0.17	0.03	0.09
Queue Length 95th (m)	0.0	0.8	2.1
Control Delay (s)	0.0	11.1	10.3
Lane LOS		B	B
Approach Delay (s)	0.0	11.1	10.3
Approach LOS		B	B

Intersection Summary			
Average Delay		2.3	
Intersection Capacity Utilization		25.1%	ICU Level of Service	A
Analysis Period (min)		15	

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

Background 2040 (With Mitigation)
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	667	289	923	231	206	365	581	1497	258	102	1214	231
v/c Ratio	0.89	0.65	0.60	0.62	0.80	0.24	0.86	0.68	0.36	0.52	0.78	0.43
Control Delay	64.9	53.7	1.8	36.4	79.0	0.4	65.9	38.9	5.2	67.9	50.6	11.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.9	53.7	1.8	36.4	79.0	0.4	65.9	38.9	5.2	67.9	50.6	11.1
Queue Length 50th (m)	91.9	71.2	0.0	42.0	55.3	0.0	80.6	103.5	0.2	27.0	92.7	6.6
Queue Length 95th (m)	#119.8	103.2	0.0	62.2	#88.8	0.0	#107.6	116.8	18.5	44.0	100.4	25.2
Internal Link Dist (m)		75.1			172.2			250.2			250.3	
Turn Bay Length (m)	70.0		45.0			45.0	95.0			100.0		60.0
Base Capacity (vph)	825	483	1528	407	293	1526	722	2277	723	208	1574	544
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.60	0.60	0.57	0.70	0.24	0.80	0.66	0.36	0.49	0.77	0.42

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis — Background 2040 (With Mitigation)
1: Sumas Way & S Fraser Way — 9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	607	263	840	231	206	365	581	1497	258	88	1044	199
Future Volume (vph)	607	263	840	231	206	365	581	1497	258	88	1044	199
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.7	4.0	4.5	5.7	4.0	6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.86	1.00	1.00	0.86	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3354	1820	1528	1728	1820	1526	3288	6199	1527	1729	5906	1492
Flt Permitted	0.95	1.00	1.00	0.58	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3354	1820	1528	1060	1820	1526	3288	6199	1527	1729	5906	1492
Peak-hour factor, PHF	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.86	0.86
Adj. Flow (vph)	667	289	923	231	206	365	581	1497	258	102	1214	231
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	165	0	0	147
Lane Group Flow (vph)	667	289	923	231	206	365	581	1497	93	102	1214	84
Confl. Peds. (#/hr)	3		1	1		3	7					7
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	1%	0%	0%	6%	1%
Turn Type	Prot	NA	Free	pm+pt	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			Free	8		Free			6			2
Actuated Green, G (s)	29.9	32.4	132.8	35.1	18.8	132.8	27.2	47.3	47.3	15.0	34.9	34.9
Effective Green, g (s)	29.9	32.4	132.8	35.1	18.8	132.8	27.2	47.3	47.3	15.0	34.9	34.9
Actuated g/C Ratio	0.23	0.24	1.00	0.26	0.14	1.00	0.20	0.36	0.36	0.11	0.26	0.26
Clearance Time (s)	4.5	5.7		4.5	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	755	444	1528	362	257	1526	673	2207	543	195	1552	392
v/s Ratio Prot	c0.20	0.16		0.08	c0.11		c0.18	0.24		0.06	c0.21	
v/s Ratio Perm			0.60	0.09		0.24			0.06			0.06
v/c Ratio	0.88	0.65	0.60	0.64	0.80	0.24	0.86	0.68	0.17	0.52	0.78	0.21
Uniform Delay, d1	49.8	45.1	0.0	41.5	55.2	0.0	51.0	36.3	29.3	55.5	45.4	38.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.9	3.4	1.8	3.7	16.3	0.4	11.4	0.9	0.2	3.3	2.8	0.4
Delay (s)	61.7	48.5	1.8	45.2	71.5	0.4	62.5	37.2	29.5	58.8	48.2	38.6
Level of Service	E	D	A	D	E	A	E	D	C	E	D	D
Approach Delay (s)		30.2			31.5			42.6			47.5	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	38.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	132.8	Sum of lost time (s)	22.0
Intersection Capacity Utilization	82.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
3: On-Ramp/Lumar Pl & Gladys Ave

Background 2040 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	19	405	60	269	6	0	0	0	2	3	2
Future Volume (Veh/h)	2	19	405	60	269	6	0	0	0	2	3	2
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	21	440	65	292	7	0	0	0	2	3	2
Pedestrians											5	
Lane Width (m)											3.7	
Walking Speed (m/s)											1.1	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	304			21			670	679	241	676	456	300
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	304			21			670	679	241	676	456	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			96			100	100	100	99	99	100
cM capacity (veh/h)	1262			1608			357	359	803	355	480	740

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	463	65	299	7
Volume Left	2	65	0	2
Volume Right	440	0	7	2
cSH	1262	1608	1700	480
Volume to Capacity	0.00	0.04	0.18	0.01
Queue Length 95th (m)	0.0	1.0	0.0	0.3
Control Delay (s)	0.1	7.3	0.0	12.6
Lane LOS	A	A		B
Approach Delay (s)	0.1	1.3		12.6
Approach LOS				B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	56.3%	ICU Level of Service	B
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
4: On-Ramp & S Fraser Way

Background 2040 (With Mitigation)
9/6/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1242	0	0	711	0	468
Future Volume (Veh/h)	1242	0	0	711	0	468
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1350	0	0	773	0	509
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				130		
pX, platoon unblocked						
vC, conflicting volume			1350		1736	1350
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1350		1736	1350
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	0
cM capacity (veh/h)			506		78	140

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	1350	386	386	509
Volume Left	0	0	0	0
Volume Right	0	0	0	509
cSH	1700	1700	1700	140
Volume to Capacity	0.79	0.23	0.23	3.62
Queue Length 95th (m)	0.0	0.0	0.0	Err
Control Delay (s)	0.0	0.0	0.0	Err
Lane LOS				F
Approach Delay (s)	0.0	0.0		Err
Approach LOS				F

Intersection Summary			
Average Delay	1933.7		
Intersection Capacity Utilization	106.3%	ICU Level of Service	G
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

Background 2040 (With Mitigation)
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	626	827	409	322	399	196	361	1764	506	261	1640	366
v/c Ratio	0.89	0.81	0.76	0.81	0.72	0.58	0.78	0.64	0.67	0.72	0.79	0.50
Control Delay	68.4	59.8	24.6	76.3	67.8	14.8	70.1	36.6	19.8	72.0	44.5	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.4	59.8	24.6	76.3	67.8	14.8	70.1	36.6	19.8	72.0	44.5	8.0
Queue Length 50th (m)	86.2	80.5	30.3	45.3	39.9	0.0	50.3	99.1	50.9	36.4	119.6	7.4
Queue Length 95th (m)	#110.4	96.6	71.2	#65.5	52.2	23.7	67.4	109.7	92.8	51.3	134.0	33.0
Internal Link Dist (m)		436.0			418.0			231.9			250.2	
Turn Bay Length (m)	126.0		50.0	70.0		50.0	75.0		50.0	70.0		
Base Capacity (vph)	754	1045	548	413	553	339	479	2767	752	379	2081	730
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.83	0.79	0.75	0.78	0.72	0.58	0.75	0.64	0.67	0.69	0.79	0.50

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis — Background 2040 (With Mitigation)

6: Sumas Way & Marshall Rd — 9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	607	802	397	312	387	190	350	1711	491	253	1591	355
Future Volume (vph)	607	802	397	312	387	190	350	1711	491	253	1591	355
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.81	1.00	0.97	0.86	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3354	4969	1510	3354	4919	1474	3321	7298	1510	3354	6078	1508
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3354	4969	1510	3354	4919	1474	3321	7298	1510	3354	6078	1508
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	626	827	409	322	399	196	361	1764	506	261	1640	366
RTOR Reduction (vph)	0	0	233	0	0	174	0	0	179	0	0	215
Lane Group Flow (vph)	626	827	176	322	399	22	361	1764	327	261	1640	151
Confl. Peds. (#/hr)	10		2	2		10	8		7	7		8
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	0%	0%	1%	0%	1%	2%	1%	1%	0%	0%	3%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	29.0	28.3	28.3	16.3	15.6	15.6	19.3	52.3	52.3	14.9	47.2	47.2
Effective Green, g (s)	29.0	28.3	28.3	16.3	15.6	15.6	19.3	52.3	52.3	14.9	47.2	47.2
Actuated g/C Ratio	0.21	0.21	0.21	0.12	0.11	0.11	0.14	0.38	0.38	0.11	0.34	0.34
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	4.0	5.0	5.0
Lane Grp Cap (vph)	704	1019	309	396	556	166	464	2765	572	362	2078	515
v/s Ratio Prot	c0.19	0.17		c0.10	0.08		c0.11	0.24		0.08	c0.27	
v/s Ratio Perm			0.12			0.02			0.22			0.10
v/c Ratio	0.89	0.81	0.57	0.81	0.72	0.13	0.78	0.64	0.57	0.72	0.79	0.29
Uniform Delay, d1	52.9	52.3	49.4	59.4	59.1	55.1	57.3	35.1	34.0	59.5	40.9	33.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.1	5.0	2.4	12.0	4.4	0.4	9.3	0.7	2.2	7.4	2.4	0.7
Delay (s)	66.1	57.3	51.8	71.4	63.5	55.5	66.6	35.8	36.2	66.9	43.3	33.9
Level of Service	E	E	D	E	E	E	E	D	D	E	D	C
Approach Delay (s)		59.0			64.6			40.1			44.5	
Approach LOS		E			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	48.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	138.0	Sum of lost time (s)	26.9
Intersection Capacity Utilization	89.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues

Background 2040 (With Mitigation)

1: Sumas Way & S Fraser Way

9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	249	46	563	50	38	37	621	985	75	60	1538	490
v/c Ratio	0.65	0.12	0.38	0.47	0.26	0.02	0.81	0.36	0.09	0.19	0.70	0.59
Control Delay	53.4	32.8	0.8	62.8	51.9	0.0	46.9	22.1	0.8	35.6	30.7	8.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.4	32.8	0.8	62.8	51.9	0.0	46.9	22.1	0.8	35.6	30.7	8.3
Queue Length 50th (m)	26.5	7.6	0.0	10.4	7.8	0.0	64.1	52.2	0.0	9.4	84.6	10.8
Queue Length 95th (m)	34.7	15.0	0.0	22.9	18.1	0.0	84.2	54.9	1.4	22.0	98.4	41.4
Internal Link Dist (m)		76.2			172.2			250.2			250.3	
Turn Bay Length (m)	70.0		45.0			45.0	95.0			100.0		60.0
Base Capacity (vph)	431	492	1469	118	160	1526	880	3318	932	341	2194	832
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.09	0.38	0.42	0.24	0.02	0.71	0.30	0.08	0.18	0.70	0.59

Intersection Summary

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis — Background 2040 (With Mitigation)
1: Sumas Way & S Fraser Way — 9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	199	37	450	50	38	37	596	946	72	58	1492	475
Future Volume (vph)	199	37	450	50	38	37	596	946	72	58	1492	475
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.7	4.0	5.7	5.7	4.0	6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.86	1.00	1.00	0.86	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3225	1820	1469	1677	1750	1526	3288	5640	1495	1729	5797	1517
Flt Permitted	0.95	1.00	1.00	0.73	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3225	1820	1469	1283	1750	1526	3288	5640	1495	1729	5797	1517
Peak-hour factor, PHF	0.80	0.80	0.80	1.00	1.00	1.00	0.96	0.96	0.96	0.97	0.97	0.97
Adj. Flow (vph)	249	46	562	50	38	37	621	985	75	60	1538	490
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	40	0	0	254
Lane Group Flow (vph)	249	46	563	50	38	37	621	985	35	60	1538	236
Confl. Peds. (#/hr)	4		1	1		4			1	1		
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	4%	0%	4%	3%	4%	0%	2%	11%	2%	0%	8%	2%
Turn Type	Prot	NA	Free	Perm	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8		1	6		5	2	
Permitted Phases			Free	8		Free			6			2
Actuated Green, G (s)	12.1	23.3	106.2	6.7	6.7	106.2	24.0	49.7	49.7	15.9	41.4	41.4
Effective Green, g (s)	12.1	23.3	106.2	6.7	6.7	106.2	24.0	49.7	49.7	15.9	41.4	41.4
Actuated g/C Ratio	0.11	0.22	1.00	0.06	0.06	1.00	0.23	0.47	0.47	0.15	0.39	0.39
Clearance Time (s)	4.5	5.7		5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	367	399	1469	80	110	1526	743	2639	699	258	2259	591
v/s Ratio Prot	c0.08	0.03			0.02		c0.19	0.17		0.03	c0.27	
v/s Ratio Perm			c0.38	0.04		0.02			0.02			0.16
v/c Ratio	0.68	0.12	0.38	0.62	0.35	0.02	0.84	0.37	0.05	0.23	0.68	0.40
Uniform Delay, d1	45.2	33.2	0.0	48.5	47.6	0.0	39.2	18.2	15.4	39.8	26.9	23.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.9	0.1	0.8	14.2	1.9	0.0	8.4	0.1	0.0	0.6	0.9	0.6
Delay (s)	50.1	33.3	0.8	62.8	49.5	0.0	47.7	18.3	15.4	40.4	27.8	24.0
Level of Service	D	C	A	E	D	A	D	B	B	D	C	C
Approach Delay (s)		16.8			40.2			29.0			27.3	
Approach LOS		B			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	106.2	Sum of lost time (s)	22.0
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
3: On-Ramp/Lumar Pl & Gladys Ave

Background 2040 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	15	214	12	312	4	0	0	0	0	8	2
Future Volume (Veh/h)	0	15	214	12	312	4	0	0	0	0	8	2
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	16	233	13	339	4	0	0	0	0	9	2
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	343			16			504	502	132	500	383	341
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	343			16			504	502	132	500	383	341
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	100	98	100
cM capacity (veh/h)	1227			1615			471	471	922	482	549	706

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	249	13	343	11
Volume Left	0	13	0	0
Volume Right	233	0	4	2
cSH	1227	1615	1700	572
Volume to Capacity	0.00	0.01	0.20	0.02
Queue Length 95th (m)	0.0	0.2	0.0	0.4
Control Delay (s)	0.0	7.2	0.0	11.4
Lane LOS		A		B
Approach Delay (s)	0.0	0.3		11.4
Approach LOS				B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	27.6%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
4: On-Ramp & S Fraser Way

Background 2040 (With Mitigation)
9/6/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	450	0	0	759	0	235
Future Volume (Veh/h)	450	0	0	759	0	235
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	489	0	0	825	0	255
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				135		
pX, platoon unblocked						
vC, conflicting volume			489		902	489
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			489		902	489
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	51
cM capacity (veh/h)			1070		278	525

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	489	412	412	255
Volume Left	0	0	0	0
Volume Right	0	0	0	255
cSH	1700	1700	1700	525
Volume to Capacity	0.29	0.24	0.24	0.49
Queue Length 95th (m)	0.0	0.0	0.0	20.0
Control Delay (s)	0.0	0.0	0.0	18.2
Lane LOS				C
Approach Delay (s)	0.0	0.0		18.2
Approach LOS				C

Intersection Summary			
Average Delay	3.0		
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

Background 2040 (With Mitigation)
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	169	247	226	693	690	247	271	1332	189	82	1475	330
v/c Ratio	0.59	0.52	0.67	0.88	0.57	0.47	0.73	0.48	0.27	0.42	0.76	0.51
Control Delay	60.6	54.2	19.2	56.1	40.1	10.6	63.1	27.8	4.7	60.5	39.0	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.6	54.2	19.2	56.1	40.1	10.6	63.1	27.8	4.7	60.5	39.0	11.7
Queue Length 50th (m)	19.8	20.3	3.0	79.3	50.8	6.2	32.2	59.9	0.0	9.7	91.3	13.8
Queue Length 95th (m)	31.2	29.4	27.4	97.7	61.0	24.9	#49.6	69.9	14.7	18.0	106.1	40.8
Internal Link Dist (m)		436.0			418.0			231.9			250.2	
Turn Bay Length (m)	126.0		50.0	70.0		50.0	75.0		50.0	70.0		
Base Capacity (vph)	309	547	354	861	1360	556	373	2769	713	197	1935	649
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.45	0.64	0.80	0.51	0.44	0.73	0.48	0.27	0.42	0.76	0.51

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis — Background 2040 (With Mitigation)

6: Sumas Way & Marshall Rd — 9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	169	247	226	603	600	215	260	1279	181	82	1475	330
Future Volume (vph)	169	247	226	603	600	215	260	1279	181	82	1475	330
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.81	1.00	0.97	0.86	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3257	4871	1479	3321	4919	1459	3354	6889	1494	3225	6020	1496
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3257	4871	1479	3321	4919	1459	3354	6889	1494	3225	6020	1496
Peak-hour factor, PHF	1.00	1.00	1.00	0.87	0.87	0.87	0.96	0.96	0.96	1.00	1.00	1.00
Adj. Flow (vph)	169	247	226	693	690	247	271	1332	189	82	1475	330
RTOR Reduction (vph)	0	0	192	0	0	160	0	0	114	0	0	167
Lane Group Flow (vph)	169	247	34	693	690	87	271	1332	75	82	1475	163
Confl. Peds. (#/hr)	5		3	3		5	1		2	2		1
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	3%	2%	3%	1%	1%	4%	0%	7%	2%	4%	4%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	10.2	11.3	11.3	27.6	28.7	28.7	12.8	46.6	46.6	5.6	38.7	38.7
Effective Green, g (s)	10.2	11.3	11.3	27.6	28.7	28.7	12.8	46.6	46.6	5.6	38.7	38.7
Actuated g/C Ratio	0.09	0.10	0.10	0.24	0.24	0.24	0.11	0.40	0.40	0.05	0.33	0.33
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	4.0	5.0	5.0
Lane Grp Cap (vph)	283	469	142	781	1203	356	365	2736	593	153	1986	493
v/s Ratio Prot	c0.05	0.05		c0.21	0.14		c0.08	0.19		0.03	c0.25	
v/s Ratio Perm			0.02			0.06			0.05			0.11
v/c Ratio	0.60	0.53	0.24	0.89	0.57	0.24	0.74	0.49	0.13	0.54	0.74	0.33
Uniform Delay, d1	51.6	50.5	49.0	43.3	38.9	35.6	50.7	26.4	22.4	54.6	34.9	29.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.4	1.1	0.9	11.9	0.7	0.4	9.5	0.3	0.2	4.5	1.9	0.8
Delay (s)	54.9	51.5	49.9	55.2	39.6	35.9	60.1	26.7	22.6	59.1	36.7	30.4
Level of Service	D	D	D	E	D	D	E	C	C	E	D	C
Approach Delay (s)		51.9			45.7			31.3			36.6	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	39.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	117.3	Sum of lost time (s)	26.9
Intersection Capacity Utilization	78.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis — Background 2040 (With Mitigation)
7: Gladys Ave & Site Access — 9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	323	26	0	15	0	0	0	6
Future Volume (Veh/h)	0	0	0	0	323	26	0	15	0	0	0	6
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	0	0	0	351	28	0	16	0	0	0	7
Pedestrians		1									3	
Lane Width (m)		0.0									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	382			0			373	382	0	376	368	369
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	382			0			373	382	0	376	368	369
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.5
p0 queue free %	100			100			100	97	100	100	100	99
cM capacity (veh/h)	1184			1636			580	553	1091	569	563	626

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	379	16	7
Volume Left	0	0	0
Volume Right	28	0	7
cSH	1700	553	626
Volume to Capacity	0.22	0.03	0.01
Queue Length 95th (m)	0.0	0.7	0.3
Control Delay (s)	0.0	11.7	10.8
Lane LOS		B	B
Approach Delay (s)	0.0	11.7	10.8
Approach LOS		B	B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	30.0%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

Background 2031 (With Mitigation)
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	585	253	809	202	180	320	509	1312	227	90	1064	202
v/c Ratio	0.85	0.63	0.53	0.57	0.76	0.21	0.84	0.65	0.30	0.52	0.76	0.35
Control Delay	60.6	52.1	1.3	34.9	72.8	0.3	62.4	32.7	4.5	65.9	44.0	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.6	52.1	1.3	34.9	72.8	0.3	62.4	32.7	4.5	65.9	44.0	8.6
Queue Length 50th (m)	74.4	58.3	0.0	35.0	44.6	0.0	65.5	103.7	0.0	22.2	91.3	3.9
Queue Length 95th (m)	#96.3	87.0	0.0	54.0	#73.4	0.0	#90.6	120.7	15.9	37.8	102.0	19.2
Internal Link Dist (m)		75.1			172.2			250.2			250.3	
Turn Bay Length (m)	70.0		45.0			45.0	95.0			100.0		60.0
Base Capacity (vph)	761	446	1528	385	275	1526	651	2034	764	192	1478	594
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.57	0.53	0.52	0.65	0.21	0.78	0.65	0.30	0.47	0.72	0.34

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
1: Sumas Way & S Fraser Way

Background 2031 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	532	230	736	202	180	320	509	1312	227	77	915	174
Future Volume (vph)	532	230	736	202	180	320	509	1312	227	77	915	174
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.7	4.0	4.5	5.7	4.0	6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3354	1820	1528	1728	1820	1526	3288	4919	1528	1729	4687	1494
Flt Permitted	0.95	1.00	1.00	0.60	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3354	1820	1528	1096	1820	1526	3288	4919	1528	1729	4687	1494
Peak-hour factor, PHF	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.86	0.86
Adj. Flow (vph)	585	253	809	202	180	320	509	1312	227	90	1064	202
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	134	0	0	125
Lane Group Flow (vph)	585	253	809	202	180	320	509	1312	93	90	1064	77
Confl. Peds. (#/hr)	3		1	1		3	7					7
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	1%	0%	0%	6%	1%
Turn Type	Prot	NA	Free	pm+pt	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			Free	8		Free			6			2
Actuated Green, G (s)	25.1	27.1	123.8	30.2	16.1	123.8	22.6	50.5	50.5	10.3	38.0	38.0
Effective Green, g (s)	25.1	27.1	123.8	30.2	16.1	123.8	22.6	50.5	50.5	10.3	38.0	38.0
Actuated g/C Ratio	0.20	0.22	1.00	0.24	0.13	1.00	0.18	0.41	0.41	0.08	0.31	0.31
Clearance Time (s)	4.5	5.7		4.5	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	680	398	1528	339	236	1526	600	2006	623	143	1438	458
v/s Ratio Prot	c0.17	0.14		0.07	c0.10		c0.15	0.27		0.05	c0.23	
v/s Ratio Perm			0.53	0.08		0.21			0.06			0.05
v/c Ratio	0.86	0.64	0.53	0.60	0.76	0.21	0.85	0.65	0.15	0.63	0.74	0.17
Uniform Delay, d1	47.7	43.9	0.0	40.1	52.0	0.0	48.9	29.6	23.1	54.9	38.5	31.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.8	3.3	1.3	2.8	13.6	0.3	11.2	0.9	0.2	9.5	2.2	0.2
Delay (s)	58.5	47.2	1.3	42.9	65.6	0.3	60.1	30.5	23.3	64.4	40.6	31.6
Level of Service	E	D	A	D	E	A	E	C	C	E	D	C
Approach Delay (s)		28.7			29.3			37.0			40.9	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	34.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	123.8	Sum of lost time (s)	22.0
Intersection Capacity Utilization	79.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
3: On-Ramp/Lumar Pl & Gladys Ave

Background 2031 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	17	355	53	236	6	0	0	0	1	3	1
Future Volume (Veh/h)	1	17	355	53	236	6	0	0	0	1	3	1
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)	1	18	386	58	257	7	0	0	0	1	3	1
Pedestrians											5	
Lane Width (m)											3.7	
Walking Speed (m/s)											1.1	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	269			18			588	598	211	594	402	266
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	269			18			588	598	211	594	402	266
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			96			100	100	100	100	99	100
cM capacity (veh/h)	1300			1612			407	401	834	404	518	774

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	405	58	264	5
Volume Left	1	58	0	1
Volume Right	386	0	7	1
cSH	1300	1612	1700	523
Volume to Capacity	0.00	0.04	0.16	0.01
Queue Length 95th (m)	0.0	0.9	0.0	0.2
Control Delay (s)	0.0	7.3	0.0	11.9
Lane LOS	A	A		B
Approach Delay (s)	0.0	1.3		11.9
Approach LOS				B

Intersection Summary				
Average Delay		0.7		
Intersection Capacity Utilization		51.0%	ICU Level of Service	A
Analysis Period (min)		15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
4: On-Ramp & S Fraser Way

Background 2031 (With Mitigation)
9/6/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1089	0	0	623	0	410
Future Volume (Veh/h)	1089	0	0	623	0	410
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1184	0	0	677	0	446
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				130		
pX, platoon unblocked						
vC, conflicting volume			1184		1522	1184
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1184		1522	1184
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	0
cM capacity (veh/h)			586		109	182

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	1184	338	338	446
Volume Left	0	0	0	0
Volume Right	0	0	0	446
cSH	1700	1700	1700	182
Volume to Capacity	0.70	0.20	0.20	2.45
Queue Length 95th (m)	0.0	0.0	0.0	284.9
Control Delay (s)	0.0	0.0	0.0	710.5
Lane LOS				F
Approach Delay (s)	0.0	0.0		710.5
Approach LOS				F

Intersection Summary			
Average Delay	137.4		
Intersection Capacity Utilization	94.0%	ICU Level of Service	F
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

Background 2031 (With Mitigation)
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	548	725	359	282	349	171	316	1546	443	228	1438	321
v/c Ratio	0.81	0.71	0.63	0.70	0.57	0.48	0.68	0.70	0.60	0.63	0.75	0.46
Control Delay	58.1	50.5	12.1	63.3	56.1	9.2	59.3	37.3	14.0	62.4	41.8	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.1	50.5	12.1	63.3	56.1	9.2	59.3	37.3	14.0	62.4	41.8	5.9
Queue Length 50th (m)	69.0	62.4	6.6	35.8	30.5	0.0	39.5	99.7	26.4	28.9	97.2	0.0
Queue Length 95th (m)	86.6	77.5	36.4	50.5	42.7	14.4	55.3	114.3	62.3	42.5	112.2	21.2
Internal Link Dist (m)		436.0			418.0			231.9			250.2	
Turn Bay Length (m)	126.0		50.0	70.0		50.0	75.0		50.0	70.0		80.0
Base Capacity (vph)	810	1120	593	458	631	360	510	2205	736	394	1927	697
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.65	0.61	0.62	0.55	0.47	0.62	0.70	0.60	0.58	0.75	0.46

Intersection Summary

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis — Background 2031 (With Mitigation)

6: Sumas Way & Marshall Rd — 9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	532	703	348	274	339	166	307	1500	430	221	1395	311
Future Volume (vph)	532	703	348	274	339	166	307	1500	430	221	1395	311
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3354	4969	1510	3354	4919	1476	3321	6199	1512	3354	6078	1510
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3354	4969	1510	3354	4919	1476	3321	6199	1512	3354	6078	1510
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	548	725	359	282	349	171	316	1546	443	228	1438	321
RTOR Reduction (vph)	0	0	260	0	0	150	0	0	198	0	0	219
Lane Group Flow (vph)	548	725	99	282	349	21	316	1546	245	228	1438	102
Confl. Peds. (#/hr)	10		2	2		10	8		7	7		8
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	0%	0%	1%	0%	1%	2%	1%	1%	0%	0%	3%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	25.0	25.7	25.7	14.9	15.6	15.6	17.6	44.3	44.3	13.5	39.5	39.5
Effective Green, g (s)	25.0	25.7	25.7	14.9	15.6	15.6	17.6	44.3	44.3	13.5	39.5	39.5
Actuated g/C Ratio	0.20	0.21	0.21	0.12	0.13	0.13	0.14	0.36	0.36	0.11	0.32	0.32
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	4.0	5.0	5.0
Lane Grp Cap (vph)	672	1024	311	401	615	184	469	2203	537	363	1926	478
v/s Ratio Prot	c0.16	0.15		c0.08	0.07		0.10	c0.25		0.07	c0.24	
v/s Ratio Perm			0.07			0.01			0.16			0.07
v/c Ratio	0.82	0.71	0.32	0.70	0.57	0.12	0.67	0.70	0.46	0.63	0.75	0.21
Uniform Delay, d1	47.6	46.0	42.0	52.7	51.3	48.4	50.8	34.5	30.9	53.1	38.1	31.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.6	2.3	0.6	5.5	1.2	0.3	4.9	1.3	1.3	3.8	1.9	0.5
Delay (s)	55.1	48.2	42.6	58.2	52.5	48.7	55.7	35.8	32.2	57.0	40.0	31.6
Level of Service	E	D	D	E	D	D	E	D	C	E	D	C
Approach Delay (s)		49.3			53.7			37.8			40.6	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	43.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	124.6	Sum of lost time (s)	26.9
Intersection Capacity Utilization	81.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis — Background 2031 (With Mitigation)

7: Gladys Ave & Site Access — 9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	237	4	0	17	0	0	0	51
Future Volume (Veh/h)	0	0	0	0	237	4	0	17	0	0	0	51
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	0	0	0	258	4	0	18	0	0	0	55
Pedestrians		1									7	
Lane Width (m)		0.0									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	269			0			316	269	0	276	267	268
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	269			0			316	269	0	276	267	268
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			100	97	100	100	100	93
cM capacity (veh/h)	1297			1636			592	636	1091	658	638	770

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	262	18	55
Volume Left	0	0	0
Volume Right	4	0	55
cSH	1700	636	770
Volume to Capacity	0.15	0.03	0.07
Queue Length 95th (m)	0.0	0.7	1.7
Control Delay (s)	0.0	10.8	10.0
Lane LOS		B	B
Approach Delay (s)	0.0	10.8	10.0
Approach LOS		B	B

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	23.2%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

Background 2031 (With Mitigation)
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	218	40	493	44	33	32	544	864	66	53	1348	429
v/c Ratio	0.59	0.10	0.34	0.39	0.21	0.02	0.78	0.40	0.08	0.17	0.74	0.51
Control Delay	51.3	32.0	0.6	56.8	49.3	0.0	47.1	22.6	0.2	35.7	30.8	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.3	32.0	0.6	56.8	49.3	0.0	47.1	22.6	0.2	35.7	30.8	5.9
Queue Length 50th (m)	22.5	6.5	0.0	8.9	6.6	0.0	55.1	56.8	0.0	8.1	90.1	4.1
Queue Length 95th (m)	31.0	13.4	0.0	20.2	16.1	0.0	75.6	63.9	0.0	20.2	112.5	27.1
Internal Link Dist (m)		76.2			172.2			250.2			250.3	
Turn Bay Length (m)	70.0		45.0			45.0	95.0			100.0		60.0
Base Capacity (vph)	428	522	1469	139	190	1526	800	2631	931	330	1876	854
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.08	0.34	0.32	0.17	0.02	0.68	0.33	0.07	0.16	0.72	0.50

Intersection Summary

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis — Background 2031 (With Mitigation)
1: Sumas Way & S Fraser Way — 9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	174	32	394	44	33	32	522	829	63	51	1308	416
Future Volume (vph)	174	32	394	44	33	32	522	829	63	51	1308	416
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.7	4.0	5.7	5.7	4.0	6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3225	1820	1469	1677	1750	1526	3288	4476	1495	1729	4601	1517
Flt Permitted	0.95	1.00	1.00	0.73	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3225	1820	1469	1290	1750	1526	3288	4476	1495	1729	4601	1517
Peak-hour factor, PHF	0.80	0.80	0.80	1.00	1.00	1.00	0.96	0.96	0.96	0.97	0.97	0.97
Adj. Flow (vph)	218	40	492	44	33	32	544	864	66	53	1348	429
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	35	0	0	236
Lane Group Flow (vph)	218	40	493	44	33	32	544	864	31	53	1348	193
Confl. Peds. (#/hr)	4		1	1		4			1	1		
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	4%	0%	4%	3%	4%	0%	2%	11%	2%	0%	8%	2%
Turn Type	Prot	NA	Free	Perm	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8		1	6		5	2	
Permitted Phases			Free	8		Free			6			2
Actuated Green, G (s)	11.5	23.1	104.5	7.1	7.1	104.5	21.4	49.0	49.0	15.1	42.5	42.5
Effective Green, g (s)	11.5	23.1	104.5	7.1	7.1	104.5	21.4	49.0	49.0	15.1	42.5	42.5
Actuated g/C Ratio	0.11	0.22	1.00	0.07	0.07	1.00	0.20	0.47	0.47	0.14	0.41	0.41
Clearance Time (s)	4.5	5.7		5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	354	402	1469	87	118	1526	673	2098	701	249	1871	616
v/s Ratio Prot	c0.07	0.02			0.02		c0.17	0.19		0.03	c0.29	
v/s Ratio Perm			c0.34	0.03		0.02			0.02			0.13
v/c Ratio	0.62	0.10	0.34	0.51	0.28	0.02	0.81	0.41	0.04	0.21	0.72	0.31
Uniform Delay, d1	44.4	32.4	0.0	47.0	46.3	0.0	39.6	18.3	15.0	39.5	26.0	21.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.2	0.1	0.6	4.6	1.3	0.0	7.5	0.2	0.0	0.6	1.5	0.4
Delay (s)	47.6	32.5	0.6	51.6	47.6	0.0	47.1	18.4	15.1	40.0	27.5	21.5
Level of Service	D	C	A	D	D	A	D	B	B	D	C	C
Approach Delay (s)		15.9			35.2			28.9			26.5	
Approach LOS		B			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	104.5	Sum of lost time (s)	22.0
Intersection Capacity Utilization	69.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
3: On-Ramp/Lumar Pl & Gladys Ave

Background 2031 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	13	188	10	274	4	0	0	0	0	7	2
Future Volume (Veh/h)	0	13	188	10	274	4	0	0	0	0	7	2
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	14	204	11	298	4	0	0	0	0	8	2
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	302			14			442	440	116	438	336	300
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	302			14			442	440	116	438	336	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			100	100	100	100	99	100
cM capacity (veh/h)	1270			1617			520	511	942	530	584	744

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	218	11	302	10
Volume Left	0	11	0	0
Volume Right	204	0	4	2
cSH	1270	1617	1700	610
Volume to Capacity	0.00	0.01	0.18	0.02
Queue Length 95th (m)	0.0	0.2	0.0	0.4
Control Delay (s)	0.0	7.2	0.0	11.0
Lane LOS		A		B
Approach Delay (s)	0.0	0.3		11.0
Approach LOS				B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	25.5%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
4: On-Ramp & S Fraser Way

Background 2031 (With Mitigation)
9/6/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	394	0	0	666	0	206
Future Volume (Veh/h)	394	0	0	666	0	206
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	428	0	0	724	0	224
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				135		
pX, platoon unblocked						
vC, conflicting volume			428		790	428
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			428		790	428
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	61
cM capacity (veh/h)			1128		327	575

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	428	362	362	224
Volume Left	0	0	0	0
Volume Right	0	0	0	224
cSH	1700	1700	1700	575
Volume to Capacity	0.25	0.21	0.21	0.39
Queue Length 95th (m)	0.0	0.0	0.0	14.0
Control Delay (s)	0.0	0.0	0.0	15.2
Lane LOS				C
Approach Delay (s)	0.0	0.0		15.2
Approach LOS				C

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

Background 2031 (With Mitigation)
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	148	216	198	608	605	216	238	1168	166	72	1293	289
v/c Ratio	0.54	0.46	0.59	0.82	0.52	0.43	0.58	0.50	0.24	0.36	0.69	0.45
Control Delay	57.3	50.8	13.1	50.4	37.9	7.5	52.7	26.9	4.8	57.4	36.6	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.3	50.8	13.1	50.4	37.9	7.5	52.7	26.9	4.8	57.4	36.6	8.4
Queue Length 50th (m)	15.9	16.4	0.0	64.2	42.1	0.7	25.1	55.3	0.0	7.8	71.3	4.9
Queue Length 95th (m)	28.0	25.7	17.9	83.6	51.4	16.4	40.5	74.5	14.0	16.2	93.6	28.0
Internal Link Dist (m)		436.0			418.0			231.9			250.2	
Turn Bay Length (m)	126.0		50.0	70.0		50.0	75.0			70.0		80.0
Base Capacity (vph)	298	669	386	912	1577	612	439	2396	709	200	1864	640
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.32	0.51	0.67	0.38	0.35	0.54	0.49	0.23	0.36	0.69	0.45

Intersection Summary

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis — Background 2031 (With Mitigation)

6: Sumas Way & Marshall Rd — 9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	216	198	529	526	188	228	1121	159	72	1293	289
Future Volume (vph)	148	216	198	529	526	188	228	1121	159	72	1293	289
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3257	4871	1479	3321	4919	1459	3354	5851	1494	3225	6020	1496
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3257	4871	1479	3321	4919	1459	3354	5851	1494	3225	6020	1496
Peak-hour factor, PHF	1.00	1.00	1.00	0.87	0.87	0.87	0.96	0.96	0.96	1.00	1.00	1.00
Adj. Flow (vph)	148	216	198	608	605	216	238	1168	166	72	1293	289
RTOR Reduction (vph)	0	0	179	0	0	162	0	0	100	0	0	175
Lane Group Flow (vph)	148	216	19	608	605	54	238	1168	66	72	1293	114
Confl. Peds. (#/hr)	5		3	3		5	1		2	2		1
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	3%	2%	3%	1%	1%	4%	0%	7%	2%	4%	4%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	9.3	10.7	10.7	24.6	26.0	26.0	13.4	44.1	44.1	5.4	35.4	35.4
Effective Green, g (s)	9.3	10.7	10.7	24.6	26.0	26.0	13.4	44.1	44.1	5.4	35.4	35.4
Actuated g/C Ratio	0.08	0.10	0.10	0.22	0.23	0.23	0.12	0.40	0.40	0.05	0.32	0.32
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	4.0	5.0	5.0
Lane Grp Cap (vph)	272	469	142	736	1152	341	404	2324	593	156	1919	477
v/s Ratio Prot	c0.05	0.04		c0.18	0.12		0.07	c0.20		0.02	c0.21	
v/s Ratio Perm			0.01			0.04			0.04			0.08
v/c Ratio	0.54	0.46	0.13	0.83	0.53	0.16	0.59	0.50	0.11	0.46	0.67	0.24
Uniform Delay, d1	48.8	47.4	45.9	41.2	37.1	33.8	46.2	25.2	21.1	51.4	32.8	27.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.2	0.7	0.4	7.5	0.4	0.2	3.4	0.4	0.2	2.9	1.2	0.5
Delay (s)	51.0	48.1	46.3	48.7	37.5	34.0	49.6	25.5	21.3	54.3	34.0	28.4
Level of Service	D	D	D	D	D	C	D	C	C	D	C	C
Approach Delay (s)		48.3			41.8			28.7			33.9	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	36.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	111.0	Sum of lost time (s)	26.9
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis — Background 2031 (With Mitigation)
7: Gladys Ave & Site Access — 9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	283	23	0	13	0	0	0	5
Future Volume (Veh/h)	0	0	0	0	283	23	0	13	0	0	0	5
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	0	0	0	308	25	0	14	0	0	0	5
Pedestrians		1									3	
Lane Width (m)		0.0									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	336			0			326	336	0	330	324	324
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	336			0			326	336	0	330	324	324
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.5
p0 queue free %	100			100			100	98	100	100	100	99
cM capacity (veh/h)	1231			1636			624	586	1091	612	596	665

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	333	14	5
Volume Left	0	0	0
Volume Right	25	0	5
cSH	1700	586	665
Volume to Capacity	0.20	0.02	0.01
Queue Length 95th (m)	0.0	0.6	0.2
Control Delay (s)	0.0	11.3	10.5
Lane LOS		B	B
Approach Delay (s)	0.0	11.3	10.5
Approach LOS		B	B

Intersection Summary			
Average Delay		0.6	
Intersection Capacity Utilization		27.5%	ICU Level of Service	A
Analysis Period (min)		15	

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

Background 2020 (With Mitigation)
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	485	210	670	167	149	265	422	1087	188	74	881	167
v/c Ratio	0.82	0.59	0.44	0.53	0.70	0.71	0.80	0.70	0.24	0.54	0.80	0.27
Control Delay	56.4	48.2	0.9	34.3	65.3	21.4	57.3	28.1	3.6	66.3	38.8	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.4	48.2	0.9	34.3	65.3	21.4	57.3	28.1	3.6	66.3	38.8	5.1
Queue Length 50th (m)	54.5	42.9	0.0	26.7	32.4	8.4	47.9	104.0	0.0	16.4	92.2	0.0
Queue Length 95th (m)	#77.3	67.2	0.0	43.7	#57.1	36.1	#70.7	128.9	12.6	#33.0	108.9	12.0
Internal Link Dist (m)		75.1			172.2			250.2			250.3	
Turn Bay Length (m)	70.0		45.0			45.0	95.0			100.0		60.0
Base Capacity (vph)	646	402	1528	330	244	397	556	1616	820	140	1233	669
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.52	0.44	0.51	0.61	0.67	0.76	0.67	0.23	0.53	0.71	0.25

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis — Background 2020 (With Mitigation)

1: Sumas Way & S Fraser Way — 9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	441	191	610	167	149	265	422	1087	188	64	758	144
Future Volume (vph)	441	191	610	167	149	265	422	1087	188	64	758	144
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.7	4.0	4.5	5.7	5.7	6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3354	1820	1528	1728	1820	1513	3288	3424	1528	1729	3262	1496
Flt Permitted	0.95	1.00	1.00	0.63	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3354	1820	1528	1139	1820	1513	3288	3424	1528	1729	3262	1496
Peak-hour factor, PHF	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.86	0.86
Adj. Flow (vph)	485	210	670	167	149	265	422	1087	188	74	881	167
RTOR Reduction (vph)	0	0	0	0	0	198	0	0	104	0	0	109
Lane Group Flow (vph)	485	210	670	167	149	67	422	1087	84	74	881	58
Confl. Peds. (#/hr)	3		1	1		3	7					7
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	1%	0%	0%	6%	1%
Turn Type	Prot	NA	Free	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			Free	8		8			6			2
Actuated Green, G (s)	19.0	21.0	108.9	23.2	12.6	12.6	17.3	48.8	48.8	6.7	38.0	38.0
Effective Green, g (s)	19.0	21.0	108.9	23.2	12.6	12.6	17.3	48.8	48.8	6.7	38.0	38.0
Actuated g/C Ratio	0.17	0.19	1.00	0.21	0.12	0.12	0.16	0.45	0.45	0.06	0.35	0.35
Clearance Time (s)	4.5	5.7		4.5	5.7	5.7	6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	585	350	1528	299	210	175	522	1534	684	106	1138	522
v/s Ratio Prot	c0.14	c0.12		0.05	0.08		0.13	c0.32		0.04	c0.27	
v/s Ratio Perm			0.44	0.06		0.04			0.06			0.04
v/c Ratio	0.83	0.60	0.44	0.56	0.71	0.38	0.81	0.71	0.12	0.70	0.77	0.11
Uniform Delay, d1	43.4	40.1	0.0	37.3	46.4	44.5	44.2	24.3	17.6	50.1	31.6	24.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.5	2.8	0.9	2.3	10.5	1.4	9.4	1.6	0.1	19.4	3.6	0.1
Delay (s)	52.8	42.9	0.9	39.6	56.9	45.9	53.6	25.9	17.7	69.6	35.2	24.1
Level of Service	D	D	A	D	E	D	D	C	B	E	D	C
Approach Delay (s)		25.8			46.9			31.9			35.8	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	32.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	108.9	Sum of lost time (s)	22.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
3: On-Ramp/Lumar Pl & Gladys Ave

Background 2020 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	14	294	44	195	5	0	0	0	1	2	1
Future Volume (Veh/h)	1	14	294	44	195	5	0	0	0	1	2	1
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)	1	15	320	48	212	5	0	0	0	1	2	1
Pedestrians											5	
Lane Width (m)											3.7	
Walking Speed (m/s)											1.1	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	222			15			487	495	175	492	332	220
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	222			15			487	495	175	492	332	220
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			97			100	100	100	100	100	100
cM capacity (veh/h)	1352			1616			479	462	874	475	570	821

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	336	48	217	4
Volume Left	1	48	0	1
Volume Right	320	0	5	1
cSH	1352	1616	1700	585
Volume to Capacity	0.00	0.03	0.13	0.01
Queue Length 95th (m)	0.0	0.7	0.0	0.2
Control Delay (s)	0.0	7.3	0.0	11.2
Lane LOS	A	A		B
Approach Delay (s)	0.0	1.3		11.2
Approach LOS				B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	44.9%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
4: On-Ramp & S Fraser Way

Background 2020 (With Mitigation)
9/6/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	901	0	0	516	0	340
Future Volume (Veh/h)	901	0	0	516	0	340
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	979	0	0	561	0	370
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				130		
pX, platoon unblocked						
vC, conflicting volume			979		1260	979
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			979		1260	979
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	0
cM capacity (veh/h)			701		162	249

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	979	280	280	370
Volume Left	0	0	0	0
Volume Right	0	0	0	370
cSH	1700	1700	1700	249
Volume to Capacity	0.58	0.17	0.17	1.48
Queue Length 95th (m)	0.0	0.0	0.0	163.6
Control Delay (s)	0.0	0.0	0.0	274.7
Lane LOS				F
Approach Delay (s)	0.0	0.0		274.7
Approach LOS				F

Intersection Summary			
Average Delay	53.2		
Intersection Capacity Utilization	78.9%	ICU Level of Service	D
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

Background 2020 (With Mitigation)
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	455	600	297	234	290	142	262	1280	367	189	1191	266
v/c Ratio	0.84	0.85	0.57	0.76	0.63	0.43	0.63	0.77	0.54	0.76	0.71	0.38
Control Delay	62.7	57.8	11.5	69.3	55.4	10.3	56.3	39.3	12.5	68.5	36.2	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.7	57.8	11.5	69.3	55.4	10.3	56.3	39.3	12.5	68.5	36.2	5.0
Queue Length 50th (m)	53.8	71.8	5.2	28.1	34.5	0.0	30.4	100.1	17.5	42.8	88.8	0.0
Queue Length 95th (m)	#76.3	#97.6	30.5	#45.7	49.2	15.2	44.1	118.1	46.7	#72.5	105.5	17.5
Internal Link Dist (m)		436.0			418.0			231.9			250.2	
Turn Bay Length (m)	126.0		50.0	70.0		50.0	75.0		50.0	70.0		80.0
Base Capacity (vph)	573	738	534	314	470	335	445	1654	684	274	1705	705
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.79	0.81	0.56	0.75	0.62	0.42	0.59	0.77	0.54	0.69	0.70	0.38

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis — Background 2020 (With Mitigation)

6: Sumas Way & Marshall Rd — 9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	441	582	288	227	281	138	254	1242	356	183	1155	258
Future Volume (vph)	441	582	288	227	281	138	254	1242	356	183	1155	258
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3354	3458	1510	3354	3424	1478	3321	4919	1513	1729	4824	1511
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3354	3458	1510	3354	3424	1478	3321	4919	1513	1729	4824	1511
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	455	600	297	234	290	142	262	1280	367	189	1191	266
RTOR Reduction (vph)	0	0	215	0	0	123	0	0	175	0	0	173
Lane Group Flow (vph)	455	600	82	234	290	19	262	1280	192	189	1191	93
Confl. Peds. (#/hr)	10		2	2		10	8		7	7		8
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	0%	0%	1%	0%	1%	2%	1%	1%	0%	0%	3%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	19.0	24.0	24.0	10.8	15.8	15.8	14.8	39.5	39.5	16.9	40.9	40.9
Effective Green, g (s)	19.0	24.0	24.0	10.8	15.8	15.8	14.8	39.5	39.5	16.9	40.9	40.9
Actuated g/C Ratio	0.16	0.20	0.20	0.09	0.13	0.13	0.13	0.34	0.34	0.14	0.35	0.35
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	4.0	5.0	5.0
Lane Grp Cap (vph)	542	706	308	308	460	198	418	1655	509	248	1680	526
v/s Ratio Prot	0.14	c0.17		0.07	c0.08		0.08	c0.26		c0.11	0.25	
v/s Ratio Perm			0.05			0.01			0.13			0.06
v/c Ratio	0.84	0.85	0.27	0.76	0.63	0.10	0.63	0.77	0.38	0.76	0.71	0.18
Uniform Delay, d1	47.7	45.0	39.3	52.0	48.0	44.5	48.7	34.9	29.6	48.3	33.1	26.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.0	9.4	0.5	10.3	2.8	0.2	4.1	2.7	1.0	13.7	1.8	0.3
Delay (s)	58.7	54.4	39.8	62.3	50.8	44.8	52.8	37.6	30.6	62.0	34.9	26.9
Level of Service	E	D	D	E	D	D	D	D	C	E	C	C
Approach Delay (s)		52.6			53.6			38.4			36.7	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	43.1	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	117.4	Sum of lost time (s)	26.9
Intersection Capacity Utilization	84.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis — Background 2020 (With Mitigation)
7: Gladys Ave & Site Access — 9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	196	3	0	14	0	0	0	42
Future Volume (Veh/h)	0	0	0	0	196	3	0	14	0	0	0	42
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	0	0	0	213	3	0	15	0	0	0	46
Pedestrians		1									7	
Lane Width (m)		0.0									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	223			0			262	223	0	229	222	222
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	223			0			262	223	0	229	222	222
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			100	98	100	100	100	94
cM capacity (veh/h)	1349			1636			653	675	1091	709	676	816

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	216	15	46
Volume Left	0	0	0
Volume Right	3	0	46
cSH	1700	675	816
Volume to Capacity	0.13	0.02	0.06
Queue Length 95th (m)	0.0	0.5	1.4
Control Delay (s)	0.0	10.5	9.7
Lane LOS		B	A
Approach Delay (s)	0.0	10.5	9.7
Approach LOS		B	A

Intersection Summary			
Average Delay		2.2	
Intersection Capacity Utilization		21.4%	ICU Level of Service	A
Analysis Period (min)		15	

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

Background 2020 (With Mitigation)
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	180	34	408	36	28	27	450	716	54	43	1116	356
v/c Ratio	0.61	0.10	0.28	0.33	0.19	0.08	0.80	0.45	0.06	0.16	0.81	0.42
Control Delay	49.3	29.5	0.5	47.8	42.4	0.4	47.3	18.2	0.2	32.5	27.5	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.3	29.5	0.5	47.8	42.4	0.4	47.3	18.2	0.2	32.5	27.5	3.5
Queue Length 50th (m)	15.8	4.8	0.0	6.0	4.6	0.0	39.1	54.8	0.0	5.7	86.6	0.0
Queue Length 95th (m)	23.1	10.9	0.0	15.3	12.8	0.0	#61.8	62.1	0.0	15.6	113.4	15.0
Internal Link Dist (m)		76.2			172.2			250.2			250.3	
Turn Bay Length (m)	70.0		45.0			45.0	95.0			100.0		60.0
Base Capacity (vph)	294	411	1469	110	146	338	587	1839	948	276	1466	887
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.08	0.28	0.33	0.19	0.08	0.77	0.39	0.06	0.16	0.76	0.40

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis — Background 2020 (With Mitigation)

1: Sumas Way & S Fraser Way — 9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	144	27	326	36	28	27	432	687	52	42	1083	345
Future Volume (vph)	144	27	326	36	28	27	432	687	52	42	1083	345
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.7	4.0	5.7	5.7	5.7	6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3225	1820	1469	1677	1750	1504	3288	3115	1496	1729	3202	1517
Flt Permitted	0.95	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3225	1820	1469	1332	1750	1504	3288	3115	1496	1729	3202	1517
Peak-hour factor, PHF	0.80	0.80	0.80	1.00	1.00	1.00	0.96	0.96	0.96	0.97	0.97	0.97
Adj. Flow (vph)	180	34	408	36	28	27	450	716	54	43	1116	356
RTOR Reduction (vph)	0	0	0	0	0	25	0	0	28	0	0	199
Lane Group Flow (vph)	180	34	408	36	28	2	450	716	26	43	1116	157
Confl. Peds. (#/hr)	4		1	1		4			1	1		
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	4%	0%	4%	3%	4%	0%	2%	11%	2%	0%	8%	2%
Turn Type	Prot	NA	Free	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8		1	6		5	2	
Permitted Phases			Free	8		8			6			2
Actuated Green, G (s)	7.8	17.6	89.0	5.3	5.3	5.3	14.6	43.4	43.4	10.7	39.3	39.3
Effective Green, g (s)	7.8	17.6	89.0	5.3	5.3	5.3	14.6	43.4	43.4	10.7	39.3	39.3
Actuated g/C Ratio	0.09	0.20	1.00	0.06	0.06	0.06	0.16	0.49	0.49	0.12	0.44	0.44
Clearance Time (s)	4.5	5.7		5.7	5.7	5.7	6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	282	359	1469	79	104	89	539	1519	729	207	1413	669
v/s Ratio Prot	c0.06	0.02			0.02		c0.14	0.23		0.02	c0.35	
v/s Ratio Perm			c0.28	0.03		0.00			0.02			0.10
v/c Ratio	0.64	0.09	0.28	0.46	0.27	0.02	0.83	0.47	0.04	0.21	0.79	0.23
Uniform Delay, d1	39.2	29.2	0.0	40.5	40.0	39.4	36.0	15.2	11.9	35.3	21.3	15.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.7	0.1	0.5	4.1	1.4	0.1	11.2	0.3	0.0	0.7	3.2	0.2
Delay (s)	43.9	29.3	0.5	44.6	41.4	39.5	47.2	15.5	11.9	36.0	24.5	15.7
Level of Service	D	C	A	D	D	D	D	B	B	D	C	B
Approach Delay (s)		14.6			42.1			27.0			22.8	
Approach LOS		B			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	23.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	89.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	70.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
3: On-Ramp/Lumar Pl & Gladys Ave

Background 2020 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	11	156	9	227	3	0	0	0	0	6	2
Future Volume (Veh/h)	0	11	156	9	227	3	0	0	0	0	6	2
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	12	170	10	247	3	0	0	0	0	7	2
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	250			12			370	367	97	366	280	248
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	250			12			370	367	97	366	280	248
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	100	99	100
cM capacity (veh/h)	1327			1620			582	561	965	592	627	795

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	182	10	250	9
Volume Left	0	10	0	0
Volume Right	170	0	3	2
cSH	1327	1620	1700	658
Volume to Capacity	0.00	0.01	0.15	0.01
Queue Length 95th (m)	0.0	0.1	0.0	0.3
Control Delay (s)	0.0	7.2	0.0	10.5
Lane LOS		A		B
Approach Delay (s)	0.0	0.3		10.5
Approach LOS				B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	22.8%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
4: On-Ramp & S Fraser Way

Background 2020 (With Mitigation)
9/6/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	326	0	0	552	0	171
Future Volume (Veh/h)	326	0	0	552	0	171
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	354	0	0	600	0	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)				135		
pX, platoon unblocked						
vC, conflicting volume			354		654	354
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			354		654	354
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	71
cM capacity (veh/h)			1201		400	642

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	354	300	300	186
Volume Left	0	0	0	0
Volume Right	0	0	0	186
cSH	1700	1700	1700	642
Volume to Capacity	0.21	0.18	0.18	0.29
Queue Length 95th (m)	0.0	0.0	0.0	9.1
Control Delay (s)	0.0	0.0	0.0	12.9
Lane LOS				B
Approach Delay (s)	0.0	0.0		12.9
Approach LOS				B

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	36.0%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

Background 2020 (With Mitigation)
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	123	179	164	503	501	179	197	968	136	59	1071	240
v/c Ratio	0.49	0.51	0.55	0.78	0.66	0.39	0.53	0.52	0.19	0.42	0.66	0.36
Control Delay	57.7	53.2	14.8	51.6	43.7	7.7	53.1	27.8	3.4	59.5	33.5	5.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.7	53.2	14.8	51.6	43.7	7.7	53.1	27.8	3.4	59.5	33.5	5.3
Queue Length 50th (m)	13.5	19.9	0.0	54.3	53.4	0.0	21.2	60.2	0.0	12.4	71.6	0.0
Queue Length 95th (m)	24.4	32.2	19.4	72.0	67.8	15.1	35.0	82.2	9.3	27.0	95.7	17.3
Internal Link Dist (m)		436.0			418.0			231.9			250.2	
Turn Bay Length (m)	126.0		50.0	70.0		50.0	75.0			70.0		80.0
Base Capacity (vph)	271	469	346	797	1012	557	399	1878	698	162	1729	694
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.38	0.47	0.63	0.50	0.32	0.49	0.52	0.19	0.36	0.62	0.35

Intersection Summary

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
6: Sumas Way & Marshall Rd

Background 2020 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	123	179	164	438	436	156	189	929	131	59	1071	240
Future Volume (vph)	123	179	164	438	436	156	189	929	131	59	1071	240
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3257	3390	1479	3321	3424	1459	3354	4644	1494	1662	4778	1496
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3257	3390	1479	3321	3424	1459	3354	4644	1494	1662	4778	1496
Peak-hour factor, PHF	1.00	1.00	1.00	0.87	0.87	0.87	0.96	0.96	0.96	1.00	1.00	1.00
Adj. Flow (vph)	123	179	164	503	501	179	197	968	136	59	1071	240
RTOR Reduction (vph)	0	0	147	0	0	140	0	0	82	0	0	155
Lane Group Flow (vph)	123	179	17	503	501	39	197	968	54	59	1071	85
Confl. Peds. (#/hr)	5		3	3		5	1		2	2		1
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	3%	2%	3%	1%	1%	4%	0%	7%	2%	4%	4%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	8.4	11.2	11.2	21.3	24.1	24.1	12.2	44.2	44.2	7.7	39.0	39.0
Effective Green, g (s)	8.4	11.2	11.2	21.3	24.1	24.1	12.2	44.2	44.2	7.7	39.0	39.0
Actuated g/C Ratio	0.08	0.10	0.10	0.19	0.22	0.22	0.11	0.40	0.40	0.07	0.35	0.35
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	4.0	5.0	5.0
Lane Grp Cap (vph)	247	343	149	639	746	317	369	1855	597	115	1684	527
v/s Ratio Prot	0.04	c0.05		c0.15	c0.15		c0.06	c0.21		0.04	c0.22	
v/s Ratio Perm			0.01			0.03			0.04			0.06
v/c Ratio	0.50	0.52	0.11	0.79	0.67	0.12	0.53	0.52	0.09	0.51	0.64	0.16
Uniform Delay, d1	49.1	47.2	45.2	42.5	39.6	34.8	46.5	25.2	20.7	49.6	29.9	24.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	1.4	0.3	6.4	2.4	0.2	2.7	0.5	0.1	5.1	1.1	0.3
Delay (s)	50.7	48.6	45.5	48.9	42.0	34.9	49.2	25.7	20.8	54.7	31.0	24.9
Level of Service	D	D	D	D	D	C	D	C	C	D	C	C
Approach Delay (s)		48.1			43.9			28.7			30.9	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	35.7	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	110.6	Sum of lost time (s)	26.9
Intersection Capacity Utilization	71.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis — Background 2020 (With Mitigation)
7: Gladys Ave & Site Access — 9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	234	19	0	11	0	0	0	4
Future Volume (Veh/h)	0	0	0	0	234	19	0	11	0	0	0	4
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	0	0	0	254	21	0	12	0	0	0	4
Pedestrians		1									3	
Lane Width (m)		0.0									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	278			0			270	278	0	274	268	268
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	278			0			270	278	0	274	268	268
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.5
p0 queue free %	100			100			100	98	100	100	100	99
cM capacity (veh/h)	1293			1636			682	631	1091	670	640	716

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	275	12	4
Volume Left	0	0	0
Volume Right	21	0	4
cSH	1700	631	716
Volume to Capacity	0.16	0.02	0.01
Queue Length 95th (m)	0.0	0.4	0.1
Control Delay (s)	0.0	10.8	10.1
Lane LOS		B	B
Approach Delay (s)	0.0	10.8	10.1
Approach LOS		B	B

Intersection Summary			
Average Delay		0.6	
Intersection Capacity Utilization		24.6%	ICU Level of Service	A
Analysis Period (min)		15	

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

2020 Total Volumes
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	194	34	456	36	55	449	716	54	43	1116	354
v/c Ratio	0.77	0.09	0.73	0.14	0.16	0.78	0.41	0.06	0.24	0.90	0.44
Control Delay	49.7	24.3	12.3	25.3	15.9	40.6	12.1	0.1	34.1	34.0	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.7	24.3	12.3	25.3	15.9	40.6	12.1	0.1	34.1	34.0	4.0
Queue Length 50th (m)	25.5	3.9	4.9	4.1	3.2	31.7	22.5	0.0	5.8	77.6	0.0
Queue Length 95th (m)	#43.6	9.3	18.1	11.3	11.7	#51.9	50.5	0.0	14.7	#117.6	15.1
Internal Link Dist (m)		76.2			172.2		250.2			250.3	
Turn Bay Length (m)	36.0		45.0			95.0			100.0		60.0
Base Capacity (vph)	280	405	648	289	385	584	1801	917	178	1235	802
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.08	0.70	0.12	0.14	0.77	0.40	0.06	0.24	0.90	0.44

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
1: Sumas Way & S Fraser Way

2020 Total Volumes
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	27	365	36	28	27	431	687	52	42	1083	343
Future Volume (vph)	155	27	365	36	28	27	431	687	52	42	1083	343
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.7	5.7	5.7	5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1657	1820	1468	1677	1637		3288	3115	1496	1729	3202	1517
Flt Permitted	0.72	1.00	1.00	0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1258	1820	1468	1297	1637		3288	3115	1496	1729	3202	1517
Peak-hour factor, PHF	0.80	0.80	0.80	1.00	1.00	1.00	0.96	0.96	0.96	0.97	0.97	0.97
Adj. Flow (vph)	194	34	456	36	28	27	449	716	54	43	1116	354
RTOR Reduction (vph)	0	0	334	0	22	0	0	0	25	0	0	208
Lane Group Flow (vph)	194	34	122	36	33	0	449	716	29	43	1116	146
Confl. Peds. (#/hr)	4		1	1		4			1	1		
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	4%	0%	4%	3%	4%	0%	2%	11%	2%	0%	8%	2%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8					6			2
Actuated Green, G (s)	14.7	14.7	14.7	14.7	14.7		12.8	41.0	41.0	3.7	31.7	31.7
Effective Green, g (s)	14.7	14.7	14.7	14.7	14.7		12.8	41.0	41.0	3.7	31.7	31.7
Actuated g/C Ratio	0.19	0.19	0.19	0.19	0.19		0.17	0.53	0.53	0.05	0.41	0.41
Clearance Time (s)	5.7	5.7	5.7	5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	241	348	281	248	313		548	1665	799	83	1323	626
v/s Ratio Prot		0.02			0.02		c0.14	0.23		0.02	c0.35	
v/s Ratio Perm	c0.15		0.08	0.03					0.02			0.10
v/c Ratio	0.80	0.10	0.43	0.15	0.11		0.82	0.43	0.04	0.52	0.84	0.23
Uniform Delay, d1	29.6	25.5	27.3	25.8	25.6		30.8	10.8	8.5	35.6	20.3	14.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	17.5	0.1	1.1	0.3	0.1		9.8	0.2	0.0	7.1	5.3	0.3
Delay (s)	47.1	25.7	28.4	26.0	25.7		40.6	11.0	8.5	42.7	25.6	14.9
Level of Service	D	C	C	C	C		D	B	A	D	C	B
Approach Delay (s)		33.6			25.9			21.8			23.5	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	76.7	Sum of lost time (s)	17.5
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
3: On-Ramp/Lumar Pl & Gladys Ave

2020 Total Volumes
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	8	156	58	245	3	0	0	0	0	6	2
Future Volume (Veh/h)	0	8	156	58	245	3	0	0	0	0	6	2
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	9	170	63	266	3	0	0	0	0	7	2
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	269			9			492	489	94	488	402	268
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	269			9			492	489	94	488	402	268
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			96			100	100	100	100	99	100
cM capacity (veh/h)	1306			1624			470	464	968	479	519	776

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	179	63	269	9
Volume Left	0	63	0	0
Volume Right	170	0	3	2
cSH	1306	1624	1700	560
Volume to Capacity	0.00	0.04	0.16	0.02
Queue Length 95th (m)	0.0	0.9	0.0	0.4
Control Delay (s)	0.0	7.3	0.0	11.5
Lane LOS		A		B
Approach Delay (s)	0.0	1.4		11.5
Approach LOS				B

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	37.8%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
4: On-Ramp & S Fraser Way

2020 Total Volumes
9/6/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	327	0	0	552	0	220
Future Volume (Veh/h)	327	0	0	552	0	220
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	355	0	0	600	0	239
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				134		
pX, platoon unblocked						
vC, conflicting volume			355		655	355
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			355		655	355
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	63
cM capacity (veh/h)			1200		399	641

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	355	300	300	239
Volume Left	0	0	0	0
Volume Right	0	0	0	239
cSH	1700	1700	1700	641
Volume to Capacity	0.21	0.18	0.18	0.37
Queue Length 95th (m)	0.0	0.0	0.0	13.1
Control Delay (s)	0.0	0.0	0.0	13.9
Lane LOS				B
Approach Delay (s)	0.0	0.0		13.9
Approach LOS				B

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	39.2%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

2020 Total Volumes
9/6/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	123	343	503	681	197	1101	66	1342
v/c Ratio	0.59	0.87	1.01	0.81	0.80	0.70	0.53	0.92
Control Delay	33.8	45.1	68.9	38.6	66.2	28.6	56.5	40.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.8	45.1	68.9	38.6	66.2	28.6	56.5	40.1
Queue Length 50th (m)	13.4	16.2	~72.9	54.2	17.6	60.9	11.2	78.4
Queue Length 95th (m)	#25.9	#39.8	#127.9	71.1	#34.8	76.7	#26.6	#106.4
Internal Link Dist (m)		436.0		418.0		231.9		250.2
Turn Bay Length (m)	126.0		25.0		75.0		70.0	
Base Capacity (vph)	208	393	498	837	245	1576	125	1462
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.87	1.01	0.81	0.80	0.70	0.53	0.92

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
6: Sumas Way & Marshall Rd

2020 Total Volumes
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	123	179	164	438	436	157	189	926	131	66	1092	250
Future Volume (vph)	123	179	164	438	436	157	189	926	131	66	1092	250
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0		7.0	7.0		7.1	5.8		6.4	5.8	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.96		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1677	3111		1711	3247		3354	4576		1662	4649	
Flt Permitted	0.57	1.00		0.29	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1009	3111		515	3247		3354	4576		1662	4649	
Peak-hour factor, PHF	1.00	1.00	1.00	0.87	0.87	0.87	0.96	0.96	0.96	1.00	1.00	1.00
Adj. Flow (vph)	123	179	164	503	501	180	197	965	136	66	1092	250
RTOR Reduction (vph)	0	151	0	0	41	0	0	20	0	0	41	0
Lane Group Flow (vph)	123	192	0	503	640	0	197	1081	0	66	1301	0
Confl. Peds. (#/hr)	5		3	3		5	1		2	2		1
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	3%	2%	3%	1%	1%	4%	0%	7%	2%	4%	4%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	13.9	7.0		36.0	22.1		6.6	30.6		5.4	28.7	
Effective Green, g (s)	13.9	7.0		36.0	22.1		6.6	30.6		5.4	28.7	
Actuated g/C Ratio	0.15	0.08		0.39	0.24		0.07	0.34		0.06	0.31	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.1	5.8		6.4	5.8	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		4.0	5.0	
Lane Grp Cap (vph)	204	238		491	786		242	1535		98	1463	
v/s Ratio Prot	0.05	0.06		c0.25	0.20		c0.06	0.24		0.04	c0.28	
v/s Ratio Perm	0.05			c0.16								
v/c Ratio	0.60	0.80		1.02	0.81		0.81	0.70		0.67	0.89	
Uniform Delay, d1	35.4	41.4		24.2	32.6		41.7	26.4		42.0	29.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.0	17.7		47.0	6.5		20.7	1.9		18.1	7.5	
Delay (s)	40.3	59.1		71.2	39.1		62.4	28.2		60.2	37.3	
Level of Service	D	E		E	D		E	C		E	D	
Approach Delay (s)		54.1			52.7			33.4			38.3	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	42.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	91.2	Sum of lost time (s)	26.9
Intersection Capacity Utilization	94.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
7: Gladys Ave & Site Access

2020 Total Volumes
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	231	18	0	8	0	0	0	75
Future Volume (Veh/h)	0	0	0	0	231	18	0	8	0	0	0	75
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	0	0	0	251	20	0	9	0	0	0	82
Pedestrians		1									3	
Lane Width (m)		0.0									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	274			0			344	274	0	268	264	265
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	274			0			344	274	0	268	264	265
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			100	99	100	100	100	89
cM capacity (veh/h)	1297			1636			548	635	1091	677	643	771

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	271	9	82
Volume Left	0	0	0
Volume Right	20	0	82
cSH	1700	635	771
Volume to Capacity	0.16	0.01	0.11
Queue Length 95th (m)	0.0	0.3	2.7
Control Delay (s)	0.0	10.8	10.2
Lane LOS		B	B
Approach Delay (s)	0.0	10.8	10.2
Approach LOS		B	B

Intersection Summary			
Average Delay		2.6	
Intersection Capacity Utilization		26.0%	ICU Level of Service A
Analysis Period (min)		15	

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

2020 Total Volumes
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	486	212	668	167	420	456	1087	188	74	881	179
v/c Ratio	1.28	0.23	0.68	0.30	0.48	1.20	1.02	0.33	0.94	1.13	0.40
Control Delay	175.5	18.5	12.4	20.3	17.5	162.0	77.3	10.9	146.1	117.8	16.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	175.5	18.5	12.4	20.3	17.5	162.0	77.3	10.9	146.1	117.8	16.5
Queue Length 50th (m)	~157.6	29.2	47.0	24.0	51.4	~73.0	~155.4	7.8	19.3	~137.1	11.0
Queue Length 95th (m)	#223.0	44.4	90.5	39.7	78.2	#106.2	#196.8	26.0	#46.4	#164.5	28.6
Internal Link Dist (m)		76.2			172.2		250.2			250.3	
Turn Bay Length (m)	36.0		45.0			95.0			100.0		60.0
Base Capacity (vph)	379	928	978	555	877	379	1064	574	79	782	453
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.28	0.23	0.68	0.30	0.48	1.20	1.02	0.33	0.94	1.13	0.40

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
1: Sumas Way & S Fraser Way

2020 Total Volumes
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	442	193	608	167	155	265	456	1087	188	64	758	154
Future Volume (vph)	442	193	608	167	155	265	456	1087	188	64	758	154
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.7	5.7	5.7	5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.99	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.91		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1726	1820	1526	1727	1629		3288	3424	1527	1729	3262	1493
Flt Permitted	0.41	1.00	1.00	0.60	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	745	1820	1526	1089	1629		3288	3424	1527	1729	3262	1493
Peak-hour factor, PHF	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.86	0.86
Adj. Flow (vph)	486	212	668	167	155	265	456	1087	188	74	881	179
RTOR Reduction (vph)	0	0	200	0	48	0	0	0	100	0	0	95
Lane Group Flow (vph)	486	212	468	167	372	0	456	1087	88	74	881	84
Confl. Peds. (#/hr)	3		1	1		3	7					7
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	1%	0%	0%	6%	1%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8					6			2
Actuated Green, G (s)	66.3	66.3	66.3	66.3	66.3		15.0	40.4	40.4	6.0	31.2	31.2
Effective Green, g (s)	66.3	66.3	66.3	66.3	66.3		15.0	40.4	40.4	6.0	31.2	31.2
Actuated g/C Ratio	0.51	0.51	0.51	0.51	0.51		0.12	0.31	0.31	0.05	0.24	0.24
Clearance Time (s)	5.7	5.7	5.7	5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	379	928	778	555	830		379	1064	474	79	782	358
v/s Ratio Prot		0.12			0.23		0.14	c0.32		0.04	c0.27	
v/s Ratio Perm	c0.65		0.31	0.15					0.06			0.06
v/c Ratio	1.28	0.23	0.60	0.30	0.45		1.20	1.02	0.19	0.94	1.13	0.23
Uniform Delay, d1	31.9	17.7	22.5	18.4	20.2		57.5	44.8	32.8	61.8	49.4	39.8
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	145.8	0.1	1.3	0.3	0.4		114.0	33.2	0.3	79.9	73.0	0.5
Delay (s)	177.7	17.8	23.8	18.7	20.6		171.5	78.0	33.0	141.7	122.4	40.2
Level of Service	F	B	C	B	C		F	E	C	F	F	D
Approach Delay (s)		77.6			20.1			97.7			110.7	
Approach LOS		E			C			F			F	

Intersection Summary			
HCM 2000 Control Delay	85.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.23		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	107.7%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
3: On-Ramp/Lumar Pl & Gladys Ave

2020 Total Volumes
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	23	294	46	199	5	0	0	0	1	2	1
Future Volume (Veh/h)	1	23	294	46	199	5	0	0	0	1	2	1
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)	1	25	320	50	216	5	0	0	0	1	2	1
Pedestrians											5	
Lane Width (m)											3.7	
Walking Speed (m/s)											1.1	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	226			25			505	513	185	510	350	224
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	226			25			505	513	185	510	350	224
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			97			100	100	100	100	100	100
cM capacity (veh/h)	1348			1603			465	450	862	461	556	817

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	346	50	221	4
Volume Left	1	50	0	1
Volume Right	320	0	5	1
cSH	1348	1603	1700	572
Volume to Capacity	0.00	0.03	0.13	0.01
Queue Length 95th (m)	0.0	0.7	0.0	0.2
Control Delay (s)	0.0	7.3	0.0	11.3
Lane LOS	A	A		B
Approach Delay (s)	0.0	1.4		11.3
Approach LOS				B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	45.5%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
4: On-Ramp & S Fraser Way

2020 Total Volumes
9/6/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	901	0	0	515	0	342
Future Volume (Veh/h)	901	0	0	515	0	342
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	979	0	0	560	0	372
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				134		
pX, platoon unblocked						
vC, conflicting volume			979		1259	979
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			979		1259	979
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	0
cM capacity (veh/h)			701		163	249

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	979	280	280	372
Volume Left	0	0	0	0
Volume Right	0	0	0	372
cSH	1700	1700	1700	249
Volume to Capacity	0.58	0.16	0.16	1.49
Queue Length 95th (m)	0.0	0.0	0.0	165.2
Control Delay (s)	0.0	0.0	0.0	278.1
Lane LOS				F
Approach Delay (s)	0.0	0.0		278.1
Approach LOS				F

Intersection Summary			
Average Delay	54.1		
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

2020 Total Volumes
9/6/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	469	897	234	434	262	1666	185	1459
v/c Ratio	1.08	1.11	1.07	1.09	0.87	1.00	0.95	0.85
Control Delay	99.9	104.6	112.8	113.9	81.5	59.3	105.6	39.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	99.9	104.6	112.8	113.9	81.5	59.3	105.6	39.9
Queue Length 50th (m)	~108.2	~120.3	~45.5	~53.6	31.9	138.4	43.9	111.9
Queue Length 95th (m)	#172.5	#160.5	#94.3	#86.6	#54.5	#175.1	#87.7	131.6
Internal Link Dist (m)		436.0		418.0		231.9		250.2
Turn Bay Length (m)	126.0		25.0		75.0		70.0	
Base Capacity (vph)	434	811	219	399	301	1671	195	1720
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.08	1.11	1.07	1.09	0.87	1.00	0.95	0.85

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
6: Sumas Way & Marshall Rd

2020 Total Volumes
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	455	582	288	227	281	140	254	1260	356	179	1159	256
Future Volume (vph)	455	582	288	227	281	140	254	1260	356	179	1159	256
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0		7.0	7.0		7.1	5.8		6.4	5.8	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.95		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1728	3260		1729	3214		3321	4744		1729	4698	
Flt Permitted	0.20	1.00		0.31	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	364	3260		560	3214		3321	4744		1729	4698	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	469	600	297	234	290	144	262	1299	367	185	1195	264
RTOR Reduction (vph)	0	51	0	0	52	0	0	43	0	0	29	0
Lane Group Flow (vph)	469	846	0	234	382	0	262	1623	0	185	1430	0
Confl. Peds. (#/hr)	10		2	2		10	8		7	7		8
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	0%	0%	1%	0%	1%	2%	1%	1%	0%	0%	3%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	46.0	28.0		24.0	13.0		10.9	41.2		13.6	43.2	
Effective Green, g (s)	46.0	28.0		24.0	13.0		10.9	41.2		13.6	43.2	
Actuated g/C Ratio	0.38	0.23		0.20	0.11		0.09	0.34		0.11	0.36	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.1	5.8		6.4	5.8	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		4.0	5.0	
Lane Grp Cap (vph)	435	760		219	348		301	1628		195	1691	
v/s Ratio Prot	c0.23	c0.26		0.10	0.12		0.08	c0.34		c0.11	0.30	
v/s Ratio Perm	0.18			0.12								
v/c Ratio	1.08	1.11		1.07	1.10		0.87	1.00		0.95	0.85	
Uniform Delay, d1	34.6	46.0		46.1	53.5		53.9	39.3		52.9	35.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	65.7	68.5		80.1	77.4		24.5	21.5		49.6	4.5	
Delay (s)	100.3	114.5		126.2	130.9		78.3	60.9		102.5	39.9	
Level of Service	F	F		F	F		E	E		F	D	
Approach Delay (s)		109.6			129.2			63.2			46.9	
Approach LOS		F			F			E			D	

Intersection Summary			
HCM 2000 Control Delay	77.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	26.9
Intersection Capacity Utilization	110.5%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
7: Gladys Ave & Site Access

2020 Total Volumes
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	196	53	23	31	0	0	0	48
Future Volume (Veh/h)	0	0	0	0	196	53	23	31	0	0	0	48
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	0	0	0	213	58	25	34	0	0	0	52
Pedestrians		1									7	
Lane Width (m)		0.0									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	278			0			295	278	0	266	249	250
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	278			0			295	278	0	266	249	250
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	95	100	100	100	93
cM capacity (veh/h)	1288			1636			614	629	1091	654	653	788

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	271	59	52
Volume Left	0	25	0
Volume Right	58	0	52
cSH	1700	623	788
Volume to Capacity	0.16	0.09	0.07
Queue Length 95th (m)	0.0	2.4	1.6
Control Delay (s)	0.0	11.4	9.9
Lane LOS		B	A
Approach Delay (s)	0.0	11.4	9.9
Approach LOS		B	A

Intersection Summary			
Average Delay	3.1		
Intersection Capacity Utilization	30.7%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

2031 Total Volumes
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	230	40	541	44	65	539	864	66	53	1348	426
v/c Ratio	0.89	0.11	0.85	0.16	0.18	0.83	0.51	0.08	0.27	1.06	0.52
Control Delay	70.3	29.4	22.6	30.7	18.7	46.9	16.3	1.2	39.9	70.2	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.3	29.4	22.6	30.7	18.7	46.9	16.3	1.2	39.9	70.2	6.8
Queue Length 50th (m)	38.6	5.6	18.0	6.2	4.6	46.2	63.1	0.0	7.8	~138.0	8.1
Queue Length 95th (m)	#64.1	12.2	39.8	15.1	14.9	#70.1	68.2	2.8	20.0	#178.0	30.5
Internal Link Dist (m)		76.2			172.2		250.2			250.3	
Turn Bay Length (m)	36.0		45.0			95.0			100.0		60.0
Base Capacity (vph)	272	397	648	281	381	668	1815	915	195	1274	815
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.85	0.10	0.83	0.16	0.17	0.81	0.48	0.07	0.27	1.06	0.52

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
1: Sumas Way & S Fraser Way

2031 Total Volumes
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	184	32	433	44	33	32	517	829	63	51	1308	413
Future Volume (vph)	184	32	433	44	33	32	517	829	63	51	1308	413
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.7	5.7	5.7	5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1656	1820	1468	1677	1636		3288	3115	1496	1729	3202	1517
Flt Permitted	0.71	1.00	1.00	0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1245	1820	1468	1290	1636		3288	3115	1496	1729	3202	1517
Peak-hour factor, PHF	0.80	0.80	0.80	1.00	1.00	1.00	0.96	0.96	0.96	0.97	0.97	0.97
Adj. Flow (vph)	230	40	541	44	33	32	539	864	66	53	1348	426
RTOR Reduction (vph)	0	0	335	0	26	0	0	0	31	0	0	206
Lane Group Flow (vph)	230	40	206	44	39	0	539	864	35	53	1348	220
Confl. Peds. (#/hr)	4		1	1		4			1	1		
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	4%	0%	4%	3%	4%	0%	2%	11%	2%	0%	8%	2%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8					6			2
Actuated Green, G (s)	18.3	18.3	18.3	18.3	18.3		17.5	47.8	47.8	7.5	37.6	37.6
Effective Green, g (s)	18.3	18.3	18.3	18.3	18.3		17.5	47.8	47.8	7.5	37.6	37.6
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20		0.19	0.53	0.53	0.08	0.41	0.41
Clearance Time (s)	5.7	5.7	5.7	5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	250	366	295	259	329		633	1638	786	142	1324	627
v/s Ratio Prot		0.02			0.02		c0.16	0.28		0.03	c0.42	
v/s Ratio Perm	c0.18		0.14	0.03					0.02			0.15
v/c Ratio	0.92	0.11	0.70	0.17	0.12		0.85	0.53	0.04	0.37	1.02	0.35
Uniform Delay, d1	35.6	29.6	33.7	30.0	29.7		35.4	14.1	10.5	39.5	26.7	18.3
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	36.1	0.1	7.0	0.3	0.2		11.1	0.4	0.0	2.2	29.4	0.5
Delay (s)	71.6	29.8	40.7	30.3	29.9		46.5	14.5	10.5	41.7	56.0	18.7
Level of Service	E	C	D	C	C		D	B	B	D	E	B
Approach Delay (s)		48.9			30.1			26.1			46.9	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	39.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	90.9	Sum of lost time (s)	17.5
Intersection Capacity Utilization	86.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
3: On-Ramp/Lumar Pl & Gladys Ave

2031 Total Volumes
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	8	188	59	291	4	0	0	0	0	7	2
Future Volume (Veh/h)	0	8	188	59	291	4	0	0	0	0	7	2
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	9	204	64	316	4	0	0	0	0	8	2
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	320			9			561	559	111	557	455	318
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	320			9			561	559	111	557	455	318
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			96			100	100	100	100	98	100
cM capacity (veh/h)	1251			1624			422	423	948	431	484	727

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	213	64	320	10
Volume Left	0	64	0	0
Volume Right	204	0	4	2
cSH	1251	1624	1700	519
Volume to Capacity	0.00	0.04	0.19	0.02
Queue Length 95th (m)	0.0	0.9	0.0	0.4
Control Delay (s)	0.0	7.3	0.0	12.1
Lane LOS		A		B
Approach Delay (s)	0.0	1.2		12.1
Approach LOS				B

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
4: On-Ramp & S Fraser Way

2031 Total Volumes
9/6/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	394	0	0	665	0	255
Future Volume (Veh/h)	394	0	0	665	0	255
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	428	0	0	723	0	277
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				134		
pX, platoon unblocked						
vC, conflicting volume			428		790	428
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			428		790	428
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	52
cM capacity (veh/h)			1128		327	575

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	428	362	362	277
Volume Left	0	0	0	0
Volume Right	0	0	0	277
cSH	1700	1700	1700	575
Volume to Capacity	0.25	0.21	0.21	0.48
Queue Length 95th (m)	0.0	0.0	0.0	19.8
Control Delay (s)	0.0	0.0	0.0	16.9
Lane LOS				C
Approach Delay (s)	0.0	0.0		16.9
Approach LOS				C

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

2031 Total Volumes
9/6/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	148	414	608	821	238	1330	79	1614
v/c Ratio	0.80	1.04	1.12	0.84	0.94	0.83	0.69	1.02
Control Delay	60.6	90.6	107.0	46.8	97.7	41.0	83.6	66.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.6	90.6	107.0	46.8	97.7	41.0	83.6	66.8
Queue Length 50th (m)	21.6	~37.1	~149.7	91.1	29.2	103.2	18.5	~145.1
Queue Length 95th (m)	#53.0	#69.3	#206.6	110.4	#53.5	122.2	#41.6	#175.0
Internal Link Dist (m)		436.0		418.0		231.9		250.2
Turn Bay Length (m)	126.0		25.0		75.0		70.0	
Base Capacity (vph)	184	397	544	977	254	1595	116	1580
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.80	1.04	1.12	0.84	0.94	0.83	0.68	1.02

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
6: Sumas Way & Marshall Rd

2031 Total Volumes
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	216	198	529	526	188	228	1117	159	79	1314	300
Future Volume (vph)	148	216	198	529	526	188	228	1117	159	79	1314	300
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0		7.0	7.0		7.1	5.8		6.4	5.8	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	1.00		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.96		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1678	3110		1711	3247		3354	4575		1662	4649	
Flt Permitted	0.40	1.00		0.24	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	706	3110		424	3247		3354	4575		1662	4649	
Peak-hour factor, PHF	1.00	1.00	1.00	0.87	0.87	0.87	0.96	0.96	0.96	1.00	1.00	1.00
Adj. Flow (vph)	148	216	198	608	605	216	238	1164	166	79	1314	300
RTOR Reduction (vph)	0	138	0	0	30	0	0	16	0	0	31	0
Lane Group Flow (vph)	148	276	0	608	791	0	238	1314	0	79	1583	0
Confl. Peds. (#/hr)	5		3	3		5	1		2	2		1
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	3%	2%	3%	1%	1%	4%	0%	7%	2%	4%	4%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	19.0	10.0		51.0	35.0		9.1	41.5		8.3	40.0	
Effective Green, g (s)	19.0	10.0		51.0	35.0		9.1	41.5		8.3	40.0	
Actuated g/C Ratio	0.16	0.08		0.42	0.29		0.08	0.35		0.07	0.33	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.1	5.8		6.4	5.8	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		4.0	5.0	
Lane Grp Cap (vph)	184	259		544	947		254	1582		114	1549	
v/s Ratio Prot	0.06	0.09		c0.32	0.24		c0.07	0.29		0.05	c0.34	
v/s Ratio Perm	0.07			c0.16								
v/c Ratio	0.80	1.06		1.12	0.84		0.94	0.83		0.69	1.02	
Uniform Delay, d1	46.7	55.0		33.3	39.8		55.2	36.0		54.6	40.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	21.9	73.9		75.1	6.5		40.4	4.3		17.9	28.6	
Delay (s)	68.6	128.9		108.4	46.3		95.6	40.3		72.5	68.6	
Level of Service	E	F		F	D		F	D		E	E	
Approach Delay (s)		113.0			72.7			48.7			68.8	
Approach LOS		F			E			D			E	

Intersection Summary			
HCM 2000 Control Delay	68.6	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	26.9
Intersection Capacity Utilization	108.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
7: Gladys Ave & Site Access

2031 Total Volumes
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	279	18	0	8	0	0	0	75
Future Volume (Veh/h)	0	0	0	0	279	18	0	8	0	0	0	75
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	0	0	0	303	20	0	9	0	0	0	82
Pedestrians		1									3	
Lane Width (m)		0.0									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	326			0			396	326	0	320	316	317
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	326			0			396	326	0	320	316	317
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			100	98	100	100	100	89
cM capacity (veh/h)	1241			1636			502	594	1091	626	601	721

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	323	9	82
Volume Left	0	0	0
Volume Right	20	0	82
cSH	1700	594	721
Volume to Capacity	0.19	0.02	0.11
Queue Length 95th (m)	0.0	0.4	2.9
Control Delay (s)	0.0	11.2	10.6
Lane LOS		B	B
Approach Delay (s)	0.0	11.2	10.6
Approach LOS		B	B

Intersection Summary			
Average Delay		2.3	
Intersection Capacity Utilization		28.6%	ICU Level of Service	A
Analysis Period (min)		15	

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

2031 Total Volumes
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	585	256	802	202	507	543	1312	227	90	1064	214
v/c Ratio	1.72	0.26	0.80	0.37	0.55	1.53	1.34	0.42	1.10	1.45	0.50
Control Delay	359.1	17.4	18.4	20.1	18.4	292.3	197.2	17.0	184.1	248.4	23.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	359.1	17.4	18.4	20.1	18.4	292.3	197.2	17.0	184.1	248.4	23.3
Queue Length 50th (m)	~220.6	34.4	85.0	29.1	66.2	~100.4	~230.2	16.9	~26.0	~195.4	20.0
Queue Length 95th (m)	#204.6	51.1	147.4	47.4	98.3	#135.5	#272.5	39.8	#56.8	#221.7	41.0
Internal Link Dist (m)		76.2			172.2		250.2			250.3	
Turn Bay Length (m)	36.0		45.0			95.0			100.0		60.0
Base Capacity (vph)	341	970	1004	545	915	354	979	536	82	732	429
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.72	0.26	0.80	0.37	0.55	1.53	1.34	0.42	1.10	1.45	0.50

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
1: Sumas Way & S Fraser Way

2031 Total Volumes
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	532	233	730	202	187	320	543	1312	227	77	915	184
Future Volume (vph)	532	233	730	202	187	320	543	1312	227	77	915	184
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.7	5.7	5.7	5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.99	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.91		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1726	1820	1526	1727	1629		3288	3424	1527	1729	3262	1493
Flt Permitted	0.35	1.00	1.00	0.56	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	641	1820	1526	1023	1629		3288	3424	1527	1729	3262	1493
Peak-hour factor, PHF	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.86	0.86
Adj. Flow (vph)	585	256	802	202	187	320	543	1312	227	90	1064	214
RTOR Reduction (vph)	0	0	191	0	47	0	0	0	100	0	0	94
Lane Group Flow (vph)	585	256	611	202	460	0	543	1312	127	90	1064	120
Confl. Peds. (#/hr)	3		1	1		3	7					7
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	1%	0%	0%	6%	1%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8					6			2
Actuated Green, G (s)	69.3	69.3	69.3	69.3	69.3		14.0	37.2	37.2	6.2	29.2	29.2
Effective Green, g (s)	69.3	69.3	69.3	69.3	69.3		14.0	37.2	37.2	6.2	29.2	29.2
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.53		0.11	0.29	0.29	0.05	0.22	0.22
Clearance Time (s)	5.7	5.7	5.7	5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	341	970	813	545	868		354	979	436	82	732	335
v/s Ratio Prot		0.14			0.28		0.17	c0.38		0.05	c0.33	
v/s Ratio Perm	c0.91		0.40	0.20					0.08			0.08
v/c Ratio	1.72	0.26	0.75	0.37	0.53		1.53	1.34	0.29	1.10	1.45	0.36
Uniform Delay, d1	30.4	16.5	23.6	17.7	19.7		58.0	46.4	36.1	61.9	50.4	42.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	334.2	0.1	3.9	0.4	0.6		254.1	160.0	0.5	128.4	211.7	0.9
Delay (s)	364.5	16.6	27.6	18.1	20.3		312.1	206.4	36.6	190.3	262.1	43.4
Level of Service	F	B	C	B	C		F	F	D	F	F	D
Approach Delay (s)		145.9			19.7			215.4			223.2	
Approach LOS		F			B			F			F	

Intersection Summary			
HCM 2000 Control Delay	173.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.64		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	124.9%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
3: On-Ramp/Lumar Pl & Gladys Ave

2031 Total Volumes
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	23	355	48	237	6	0	0	0	1	3	1
Future Volume (Veh/h)	1	23	355	48	237	6	0	0	0	1	3	1
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)	1	25	386	52	258	7	0	0	0	1	3	1
Pedestrians											5	
Lane Width (m)											3.7	
Walking Speed (m/s)											1.1	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	270			25			584	594	218	590	398	266
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	270			25			584	594	218	590	398	266
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			97			100	100	100	100	99	100
cM capacity (veh/h)	1299			1603			411	405	827	408	523	773

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	412	52	265	5
Volume Left	1	52	0	1
Volume Right	386	0	7	1
cSH	1299	1603	1700	527
Volume to Capacity	0.00	0.03	0.16	0.01
Queue Length 95th (m)	0.0	0.8	0.0	0.2
Control Delay (s)	0.0	7.3	0.0	11.9
Lane LOS	A	A		B
Approach Delay (s)	0.0	1.2		11.9
Approach LOS				B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
4: On-Ramp & S Fraser Way

2031 Total Volumes
9/6/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1089	0	0	623	0	406
Future Volume (Veh/h)	1089	0	0	623	0	406
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1184	0	0	677	0	441
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				134		
pX, platoon unblocked						
vC, conflicting volume			1184		1522	1184
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1184		1522	1184
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	0
cM capacity (veh/h)			586		109	182

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	1184	338	338	441
Volume Left	0	0	0	0
Volume Right	0	0	0	441
cSH	1700	1700	1700	182
Volume to Capacity	0.70	0.20	0.20	2.43
Queue Length 95th (m)	0.0	0.0	0.0	280.3
Control Delay (s)	0.0	0.0	0.0	698.4
Lane LOS				F
Approach Delay (s)	0.0	0.0		698.4
Approach LOS				F

Intersection Summary			
Average Delay	133.8		
Intersection Capacity Utilization	93.7%	ICU Level of Service	F
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

2031 Total Volumes
9/6/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	563	1084	282	522	316	2008	223	1758
v/c Ratio	1.30	1.34	1.19	1.21	0.99	1.16	1.16	1.00
Control Delay	184.8	199.0	155.9	158.3	109.7	116.9	168.0	64.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	184.8	199.0	155.9	158.3	109.7	116.9	168.0	64.7
Queue Length 50th (m)	~184.3	~199.4	~78.0	~85.7	45.8	~236.6	~72.8	~175.0
Queue Length 95th (m)	#255.4	#242.0	#133.7	#122.5	#76.3	#265.6	#124.5	#212.0
Internal Link Dist (m)		436.0		418.0		231.9		250.2
Turn Bay Length (m)	126.0		25.0		75.0		70.0	
Base Capacity (vph)	434	811	237	433	320	1736	192	1756
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.30	1.34	1.19	1.21	0.99	1.16	1.16	1.00

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
6: Sumas Way & Marshall Rd

2031 Total Volumes
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	546	703	348	274	339	168	307	1518	430	216	1397	308
Future Volume (vph)	546	703	348	274	339	168	307	1518	430	216	1397	308
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0		7.0	7.0		7.1	5.8		6.4	5.8	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.95		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1728	3260		1729	3213		3321	4742		1729	4696	
Flt Permitted	0.17	1.00		0.24	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	303	3260		428	3213		3321	4742		1729	4696	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	563	725	359	282	349	173	316	1565	443	223	1440	318
RTOR Reduction (vph)	0	44	0	0	44	0	0	37	0	0	25	0
Lane Group Flow (vph)	563	1040	0	282	478	0	316	1971	0	223	1733	0
Confl. Peds. (#/hr)	10		2	2		10	8		7	7		8
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	0%	0%	1%	0%	1%	2%	1%	1%	0%	0%	3%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	55.0	33.0		32.0	17.0		13.5	50.2		15.6	51.6	
Effective Green, g (s)	55.0	33.0		32.0	17.0		13.5	50.2		15.6	51.6	
Actuated g/C Ratio	0.39	0.24		0.23	0.12		0.10	0.36		0.11	0.37	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.1	5.8		6.4	5.8	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		4.0	5.0	
Lane Grp Cap (vph)	434	768		237	390		320	1700		192	1730	
v/s Ratio Prot	c0.29	c0.32		0.13	0.15		0.10	c0.42		c0.13	0.37	
v/s Ratio Perm	0.22			0.14								
v/c Ratio	1.30	1.35		1.19	1.23		0.99	1.16		1.16	1.00	
Uniform Delay, d1	42.2	53.5		50.4	61.5		63.2	44.9		62.2	44.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	149.9	168.1		119.5	122.4		46.8	78.9		115.2	22.0	
Delay (s)	192.1	221.6		169.9	183.9		109.9	123.8		177.4	66.2	
Level of Service	F	F		F	F		F	F		F	E	
Approach Delay (s)		211.5			179.0			121.9			78.7	
Approach LOS		F			F			F			E	

Intersection Summary			
HCM 2000 Control Delay	137.9	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.29		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	26.9
Intersection Capacity Utilization	126.8%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
7: Gladys Ave & Site Access

2031 Total Volumes
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	237	53	0	23	0	0	0	48
Future Volume (Veh/h)	0	0	0	0	237	53	0	23	0	0	0	48
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	0	0	0	258	58	0	25	0	0	0	52
Pedestrians		1									7	
Lane Width (m)		0.0									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	323			0			340	323	0	306	294	295
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	323			0			340	323	0	306	294	295
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			100	96	100	100	100	93
cM capacity (veh/h)	1240			1636			572	594	1091	621	616	744

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	316	25	52
Volume Left	0	0	0
Volume Right	58	0	52
cSH	1700	594	744
Volume to Capacity	0.19	0.04	0.07
Queue Length 95th (m)	0.0	1.0	1.7
Control Delay (s)	0.0	11.3	10.2
Lane LOS		B	B
Approach Delay (s)	0.0	11.3	10.2
Approach LOS		B	B

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	26.2%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

2040 Total Volumes
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	261	46	610	50	75	613	985	75	60	1538	485
v/c Ratio	1.03	0.12	1.03	0.19	0.21	0.93	0.62	0.09	0.21	1.07	0.58
Control Delay	112.1	40.0	62.6	41.7	23.8	69.6	24.9	3.5	45.3	78.2	12.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	112.1	40.0	62.6	41.7	23.8	69.6	24.9	3.5	45.3	78.2	12.2
Queue Length 50th (m)	~65.8	8.9	~78.6	9.8	7.4	73.8	98.2	0.0	11.7	~211.5	31.1
Queue Length 95th (m)	#97.6	17.0	#106.5	21.1	20.3	#106.9	101.7	6.8	26.3	#253.8	63.4
Internal Link Dist (m)		76.2			172.2		250.2			250.3	
Turn Bay Length (m)	36.0		45.0			95.0			100.0		60.0
Base Capacity (vph)	253	374	595	264	365	657	1830	910	294	1435	840
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.03	0.12	1.03	0.19	0.21	0.93	0.54	0.08	0.20	1.07	0.58

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
1: Sumas Way & S Fraser Way

2040 Total Volumes
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	209	37	488	50	38	37	588	946	72	58	1492	470
Future Volume (vph)	209	37	488	50	38	37	588	946	72	58	1492	470
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.7	5.7	5.7	5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1653	1820	1467	1676	1635		3288	3115	1495	1729	3202	1517
Flt Permitted	0.71	1.00	1.00	0.73	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1233	1820	1467	1283	1635		3288	3115	1495	1729	3202	1517
Peak-hour factor, PHF	0.80	0.80	0.80	1.00	1.00	1.00	0.96	0.96	0.96	0.97	0.97	0.97
Adj. Flow (vph)	261	46	610	50	38	37	612	985	75	60	1538	485
RTOR Reduction (vph)	0	0	295	0	29	0	0	0	37	0	0	158
Lane Group Flow (vph)	261	46	315	50	46	0	613	985	38	60	1538	327
Confl. Peds. (#/hr)	4		1	1		4			1	1		
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	4%	0%	4%	3%	4%	0%	2%	11%	2%	0%	8%	2%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8					6			2
Actuated Green, G (s)	24.7	24.7	24.7	24.7	24.7		24.0	60.9	60.9	18.3	55.0	55.0
Effective Green, g (s)	24.7	24.7	24.7	24.7	24.7		24.0	60.9	60.9	18.3	55.0	55.0
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20		0.20	0.50	0.50	0.15	0.45	0.45
Clearance Time (s)	5.7	5.7	5.7	5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	251	370	298	261	333		651	1565	751	261	1453	688
v/s Ratio Prot		0.03			0.03		c0.19	0.32		0.03	c0.48	
v/s Ratio Perm	0.21		c0.21	0.04					0.03			0.22
v/c Ratio	1.04	0.12	1.06	0.19	0.14		0.94	0.63	0.05	0.23	1.06	0.47
Uniform Delay, d1	48.2	39.4	48.2	40.0	39.5		47.9	21.9	15.4	45.3	33.1	23.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	67.6	0.2	68.4	0.4	0.2		22.2	0.9	0.0	0.6	40.8	0.7
Delay (s)	115.8	39.6	116.6	40.3	39.7		70.1	22.8	15.4	45.9	73.9	23.8
Level of Service	F	D	F	D	D		E	C	B	D	E	C
Approach Delay (s)		112.5			40.0			39.8			61.4	
Approach LOS		F			D			D			E	

Intersection Summary			
HCM 2000 Control Delay	63.1	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	121.2	Sum of lost time (s)	17.5
Intersection Capacity Utilization	95.7%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
3: On-Ramp/Lumar Pl & Gladys Ave

2040 Total Volumes
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	8	214	60	329	4	0	0	0	0	8	2
Future Volume (Veh/h)	0	8	214	60	329	4	0	0	0	0	8	2
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	9	233	65	358	4	0	0	0	0	9	2
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	362			9			620	618	126	616	499	360
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	362			9			620	618	126	616	499	360
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			96			100	100	100	100	98	100
cM capacity (veh/h)	1208			1624			384	392	930	394	457	689

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	242	65	362	11
Volume Left	0	65	0	0
Volume Right	233	0	4	2
cSH	1208	1624	1700	487
Volume to Capacity	0.00	0.04	0.21	0.02
Queue Length 95th (m)	0.0	0.9	0.0	0.5
Control Delay (s)	0.0	7.3	0.0	12.6
Lane LOS		A		B
Approach Delay (s)	0.0	1.1		12.6
Approach LOS				B

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
4: On-Ramp & S Fraser Way

2040 Total Volumes
9/6/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	450	0	0	759	0	284
Future Volume (Veh/h)	450	0	0	759	0	284
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	489	0	0	825	0	309
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				134		
pX, platoon unblocked						
vC, conflicting volume			489		902	489
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			489		902	489
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	41
cM capacity (veh/h)			1070		278	525

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	489	412	412	309
Volume Left	0	0	0	0
Volume Right	0	0	0	309
cSH	1700	1700	1700	525
Volume to Capacity	0.29	0.24	0.24	0.59
Queue Length 95th (m)	0.0	0.0	0.0	28.6
Control Delay (s)	0.0	0.0	0.0	21.2
Lane LOS				C
Approach Delay (s)	0.0	0.0		21.2
Approach LOS				C

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

2040 Total Volumes
9/6/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	168	473	693	936	271	1515	89	1836
v/c Ratio	0.92	1.23	1.23	0.91	1.14	0.90	0.85	1.11
Control Delay	87.9	160.7	151.8	58.9	158.5	50.4	117.8	98.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	87.9	160.7	151.8	58.9	158.5	50.4	117.8	98.7
Queue Length 50th (m)	31.7	~66.6	~221.6	127.4	~45.1	143.5	24.9	~209.4
Queue Length 95th (m)	#74.5	#102.2	#280.5	#150.9	#73.5	164.5	#56.4	#238.9
Internal Link Dist (m)		436.0		418.0		231.9		250.2
Turn Bay Length (m)	126.0		25.0		75.0		70.0	
Base Capacity (vph)	182	385	565	1023	237	1675	105	1659
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.92	1.23	1.23	0.91	1.14	0.90	0.85	1.11

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
6: Sumas Way & Marshall Rd

2040 Total Volumes
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	247	226	603	600	214	260	1273	181	89	1496	340
Future Volume (vph)	168	247	226	603	600	214	260	1273	181	89	1496	340
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0		7.0	7.0		7.1	5.8		6.4	5.8	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.93		1.00	0.96		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1678	3109		1711	3246		3354	4575		1662	4650	
Flt Permitted	0.33	1.00		0.21	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	589	3109		379	3246		3354	4575		1662	4650	
Peak-hour factor, PHF	1.00	1.00	1.00	0.87	0.87	0.87	0.96	0.96	0.96	1.00	1.00	1.00
Adj. Flow (vph)	168	247	226	693	690	246	271	1326	189	89	1496	340
RTOR Reduction (vph)	0	119	0	0	26	0	0	13	0	0	26	0
Lane Group Flow (vph)	168	354	0	693	910	0	271	1502	0	89	1810	0
Confl. Peds. (#/hr)	5		3	3		5	1		2	2		1
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	3%	2%	3%	1%	1%	4%	0%	7%	2%	4%	4%	2%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	23.0	12.0		61.0	43.0		9.9	50.9		8.9	49.2	
Effective Green, g (s)	23.0	12.0		61.0	43.0		9.9	50.9		8.9	49.2	
Actuated g/C Ratio	0.16	0.09		0.44	0.31		0.07	0.36		0.06	0.35	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.1	5.8		6.4	5.8	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		4.0	5.0	
Lane Grp Cap (vph)	182	266		564	996		237	1663		105	1634	
v/s Ratio Prot	0.07	0.11		c0.37	0.28		c0.08	0.33		0.05	c0.39	
v/s Ratio Perm	0.08			c0.17								
v/c Ratio	0.92	1.33		1.23	0.91		1.14	0.90		0.85	1.11	
Uniform Delay, d1	54.7	64.0		39.7	46.7		65.0	42.2		64.9	45.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	45.0	172.6		117.9	12.4		102.6	7.7		44.8	58.0	
Delay (s)	99.7	236.6		157.6	59.2		167.7	49.9		109.6	103.4	
Level of Service	F	F		F	E		F	D		F	F	
Approach Delay (s)		200.7			101.0			67.8			103.7	
Approach LOS		F			F			E			F	

Intersection Summary			
HCM 2000 Control Delay	102.6	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.21		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	26.9
Intersection Capacity Utilization	120.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
7: Gladys Ave & Site Access

2040 Total Volumes
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	318	18	0	8	0	0	0	75
Future Volume (Veh/h)	0	0	0	0	318	18	0	8	0	0	0	75
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	0	0	0	346	20	0	9	0	0	0	82
Pedestrians		1									3	
Lane Width (m)		0.0									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	369			0			439	369	0	364	359	360
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	369			0			439	369	0	364	359	360
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			100	98	100	100	100	88
cM capacity (veh/h)	1197			1636			467	562	1091	586	569	682

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	366	9	82
Volume Left	0	0	0
Volume Right	20	0	82
cSH	1700	562	682
Volume to Capacity	0.22	0.02	0.12
Queue Length 95th (m)	0.0	0.4	3.1
Control Delay (s)	0.0	11.5	11.0
Lane LOS		B	B
Approach Delay (s)	0.0	11.5	11.0
Approach LOS		B	B

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	30.8%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

2040 Total Volumes
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	665	291	911	231	578	614	1497	258	102	1214	242
v/c Ratio	2.38	0.30	0.91	0.46	0.64	1.62	1.49	0.47	1.24	1.66	0.57
Control Delay	649.8	18.5	28.6	23.0	21.7	327.0	258.9	19.6	227.7	335.1	27.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	649.8	18.5	28.6	23.0	21.7	327.0	258.9	19.6	227.7	335.1	27.7
Queue Length 50th (m)	~210.2	40.8	128.3	35.7	85.3	~116.3	~278.4	23.4	~32.3	~237.4	27.4
Queue Length 95th (m)	#282.6	59.4	#239.3	58.2	124.1	#152.6	#321.0	48.8	#64.8	#262.6	50.2
Internal Link Dist (m)		76.2			172.2		250.2			250.3	
Turn Bay Length (m)	36.0		45.0			95.0			100.0		60.0
Base Capacity (vph)	280	956	1003	505	902	379	1006	548	82	732	428
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	2.38	0.30	0.91	0.46	0.64	1.62	1.49	0.47	1.24	1.66	0.57

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
1: Sumas Way & S Fraser Way

2040 Total Volumes
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	605	265	829	231	213	365	614	1497	258	88	1044	208
Future Volume (vph)	605	265	829	231	213	365	614	1497	258	88	1044	208
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	5.7	5.7	5.7	5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	0.99		1.00	1.00	0.99	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	0.91		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1727	1820	1526	1727	1629		3288	3424	1527	1729	3262	1493
Flt Permitted	0.29	1.00	1.00	0.53	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	533	1820	1526	962	1629		3288	3424	1527	1729	3262	1493
Peak-hour factor, PHF	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.86	0.86
Adj. Flow (vph)	665	291	911	231	213	365	614	1497	258	102	1214	242
RTOR Reduction (vph)	0	0	202	0	47	0	0	0	100	0	0	93
Lane Group Flow (vph)	665	291	709	231	531	0	614	1497	158	102	1214	149
Confl. Peds. (#/hr)	3		1	1		3	7					7
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	1%	0%	0%	6%	1%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4		4	8					6			2
Actuated Green, G (s)	68.3	68.3	68.3	68.3	68.3		15.0	38.2	38.2	6.2	29.2	29.2
Effective Green, g (s)	68.3	68.3	68.3	68.3	68.3		15.0	38.2	38.2	6.2	29.2	29.2
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.53		0.12	0.29	0.29	0.05	0.22	0.22
Clearance Time (s)	5.7	5.7	5.7	5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	280	956	801	505	855		379	1006	448	82	732	335
v/s Ratio Prot		0.16			0.33		0.19	c0.44		0.06	c0.37	
v/s Ratio Perm	c1.25		0.46	0.24					0.10			0.10
v/c Ratio	2.38	0.30	0.88	0.46	0.62		1.62	1.49	0.35	1.24	1.66	0.44
Uniform Delay, d1	30.9	17.4	27.4	19.3	21.7		57.5	45.9	36.2	61.9	50.4	43.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	629.7	0.2	11.4	0.7	1.4		290.9	225.0	0.7	178.6	302.4	1.3
Delay (s)	660.5	17.6	38.8	19.9	23.1		348.4	270.9	36.8	240.5	352.8	44.7
Level of Service	F	B	D	B	C		F	F	D	F	F	D
Approach Delay (s)		256.9			22.2			265.5			297.6	
Approach LOS		F			C			F			F	

Intersection Summary			
HCM 2000 Control Delay	240.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	2.12		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	17.5
Intersection Capacity Utilization	139.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
3: On-Ramp/Lumar Pl & Gladys Ave

2040 Total Volumes
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	23	405	50	269	6	0	0	0	2	3	2
Future Volume (Veh/h)	2	23	405	50	269	6	0	0	0	2	3	2
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	25	440	54	292	7	0	0	0	2	3	2
Pedestrians											5	
Lane Width (m)											3.7	
Walking Speed (m/s)											1.1	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	304			25			652	661	245	658	438	300
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	304			25			652	661	245	658	438	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			97			100	100	100	99	99	100
cM capacity (veh/h)	1262			1603			369	370	799	367	495	740

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	467	54	299	7
Volume Left	2	54	0	2
Volume Right	440	0	7	2
cSH	1262	1603	1700	493
Volume to Capacity	0.00	0.03	0.18	0.01
Queue Length 95th (m)	0.0	0.8	0.0	0.3
Control Delay (s)	0.1	7.3	0.0	12.4
Lane LOS	A	A		B
Approach Delay (s)	0.1	1.1		12.4
Approach LOS				B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
4: On-Ramp & S Fraser Way

2040 Total Volumes
9/6/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1241	0	0	711	0	458
Future Volume (Veh/h)	1241	0	0	711	0	458
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1349	0	0	773	0	498
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				134		
pX, platoon unblocked						
vC, conflicting volume			1349		1736	1349
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1349		1736	1349
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	0
cM capacity (veh/h)			506		79	141

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	1349	386	386	498
Volume Left	0	0	0	0
Volume Right	0	0	0	498
cSH	1700	1700	1700	141
Volume to Capacity	0.79	0.23	0.23	3.54
Queue Length 95th (m)	0.0	0.0	0.0	Err
Control Delay (s)	0.0	0.0	0.0	Err
Lane LOS				F
Approach Delay (s)	0.0	0.0		Err
Approach LOS				F

Intersection Summary			
Average Delay	1900.6		
Intersection Capacity Utilization	105.5%	ICU Level of Service	G
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

2040 Total Volumes
9/6/2018

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	639	1236	322	597	361	2288	254	2002
v/c Ratio	1.47	1.48	1.36	1.31	1.28	1.34	1.32	1.13
Control Delay	256.8	259.0	219.8	196.7	199.6	194.7	223.3	104.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	256.8	259.0	219.8	196.7	199.6	194.7	223.3	104.9
Queue Length 50th (m)	~228.6	~242.5	~100.7	~105.3	~65.1	~300.1	~90.6	~232.3
Queue Length 95th (m)	#302.1	#285.5	#162.2	#143.3	#96.4	#327.8	#144.6	#261.3
Internal Link Dist (m)		436.0		418.0		231.9		250.2
Turn Bay Length (m)	126.0		25.0		75.0		70.0	
Base Capacity (vph)	434	834	237	456	282	1702	192	1776
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.47	1.48	1.36	1.31	1.28	1.34	1.32	1.13

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
6: Sumas Way & Marshall Rd

2040 Total Volumes
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	620	802	397	312	387	192	350	1729	491	246	1591	351
Future Volume (vph)	620	802	397	312	387	192	350	1729	491	246	1591	351
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0		7.0	7.0		7.1	5.8		6.4	5.8	
Lane Util. Factor	1.00	0.95		1.00	0.95		0.97	0.91		1.00	0.91	
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.95		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1728	3260		1729	3213		3321	4741		1729	4696	
Flt Permitted	0.16	1.00		0.22	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	291	3260		404	3213		3321	4741		1729	4696	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	639	827	409	322	399	198	361	1782	506	254	1640	362
RTOR Reduction (vph)	0	43	0	0	44	0	0	36	0	0	25	0
Lane Group Flow (vph)	639	1193	0	322	553	0	361	2252	0	254	1977	0
Confl. Peds. (#/hr)	10		2	2		10	8		7	7		8
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	0%	0%	1%	0%	1%	2%	1%	1%	0%	0%	3%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8								
Actuated Green, G (s)	56.0	34.0		33.0	18.0		11.9	49.2		15.6	52.2	
Effective Green, g (s)	56.0	34.0		33.0	18.0		11.9	49.2		15.6	52.2	
Actuated g/C Ratio	0.40	0.24		0.24	0.13		0.09	0.35		0.11	0.37	
Clearance Time (s)	7.0	7.0		7.0	7.0		7.1	5.8		6.4	5.8	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		5.0	5.0		4.0	5.0	
Lane Grp Cap (vph)	434	791		237	413		282	1666		192	1750	
v/s Ratio Prot	c0.33	c0.37		0.15	0.17		0.11	c0.47		c0.15	c0.42	
v/s Ratio Perm	0.26			0.17								
v/c Ratio	1.47	1.51		1.36	1.34		1.28	1.35		1.32	1.13	
Uniform Delay, d1	42.3	53.0		49.6	61.0		64.0	45.4		62.2	43.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	224.8	235.2		186.3	168.6		150.5	162.2		176.9	66.2	
Delay (s)	267.1	288.2		235.9	229.6		214.5	207.6		239.1	110.1	
Level of Service	F	F		F	F		F	F		F	F	
Approach Delay (s)		281.0			231.8			208.6			124.7	
Approach LOS		F			F			F			F	

Intersection Summary			
HCM 2000 Control Delay	204.4	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.48		
Actuated Cycle Length (s)	140.0	Sum of lost time (s)	26.9
Intersection Capacity Utilization	140.3%	ICU Level of Service	H
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
7: Gladys Ave & Site Access

2040 Total Volumes
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	270	53	0	23	0	0	0	48
Future Volume (Veh/h)	0	0	0	0	270	53	0	23	0	0	0	48
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	0	0	0	293	58	0	25	0	0	0	52
Pedestrians		1									7	
Lane Width (m)		0.0									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	358			0			375	358	0	342	329	330
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	358			0			375	358	0	342	329	330
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			100	96	100	100	100	93
cM capacity (veh/h)	1204			1636			540	568	1091	588	589	711

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	351	25	52
Volume Left	0	0	0
Volume Right	58	0	52
cSH	1700	568	711
Volume to Capacity	0.21	0.04	0.07
Queue Length 95th (m)	0.0	1.0	1.8
Control Delay (s)	0.0	11.6	10.5
Lane LOS		B	B
Approach Delay (s)	0.0	11.6	10.5
Approach LOS		B	B

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	27.9%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

Total 2040 (With Mitigation)
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	665	291	911	231	213	365	614	1497	258	102	1214	242
v/c Ratio	0.89	0.66	0.60	0.62	0.82	0.24	0.88	0.68	0.37	0.51	0.80	0.45
Control Delay	65.4	53.9	1.7	36.6	81.0	0.4	66.8	39.3	5.2	67.2	52.4	11.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	65.4	53.9	1.7	36.6	81.0	0.4	66.8	39.3	5.2	67.2	52.4	11.7
Queue Length 50th (m)	91.5	71.8	0.0	42.0	57.4	0.0	85.4	103.5	0.2	27.0	93.6	7.6
Queue Length 95th (m)	#119.2	103.9	0.0	62.2	#94.0	0.0	#114.5	116.8	18.5	44.0	101.4	27.0
Internal Link Dist (m)		75.1			172.2			250.2			250.3	
Turn Bay Length (m)	70.0		45.0			45.0	95.0			100.0		60.0
Base Capacity (vph)	819	479	1528	404	291	1526	741	2260	719	206	1518	537
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.61	0.60	0.57	0.73	0.24	0.83	0.66	0.36	0.50	0.80	0.45

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
1: Sumas Way & S Fraser Way

Total 2040 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	605	265	829	231	213	365	614	1497	258	88	1044	208
Future Volume (vph)	605	265	829	231	213	365	614	1497	258	88	1044	208
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.7	4.0	4.5	5.7	4.0	6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.86	1.00	1.00	0.86	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3354	1820	1528	1728	1820	1526	3288	6199	1527	1729	5906	1492
Flt Permitted	0.95	1.00	1.00	0.57	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3354	1820	1528	1043	1820	1526	3288	6199	1527	1729	5906	1492
Peak-hour factor, PHF	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.86	0.86
Adj. Flow (vph)	665	291	911	231	213	365	614	1497	258	102	1214	242
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	166	0	0	154
Lane Group Flow (vph)	665	291	911	231	213	365	614	1497	92	102	1214	88
Confl. Peds. (#/hr)	3		1	1		3	7					7
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	1%	0%	0%	6%	1%
Turn Type	Prot	NA	Free	pm+pt	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			Free	8		Free			6			2
Actuated Green, G (s)	29.9	32.7	133.7	35.6	19.2	133.7	28.3	47.3	47.3	15.5	34.3	34.3
Effective Green, g (s)	29.9	32.7	133.7	35.6	19.2	133.7	28.3	47.3	47.3	15.5	34.3	34.3
Actuated g/C Ratio	0.22	0.24	1.00	0.27	0.14	1.00	0.21	0.35	0.35	0.12	0.26	0.26
Clearance Time (s)	4.5	5.7		4.5	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	750	445	1528	361	261	1526	695	2193	540	200	1515	382
v/s Ratio Prot	c0.20	0.16		0.08	c0.12		c0.19	0.24		0.06	c0.21	
v/s Ratio Perm			0.60	0.09		0.24			0.06			0.06
v/c Ratio	0.89	0.65	0.60	0.64	0.82	0.24	0.88	0.68	0.17	0.51	0.80	0.23
Uniform Delay, d1	50.3	45.4	0.0	41.5	55.5	0.0	51.1	36.8	29.7	55.5	46.5	39.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.2	3.4	1.7	3.7	17.6	0.4	13.1	1.0	0.2	2.9	3.3	0.4
Delay (s)	62.5	48.9	1.7	45.3	73.1	0.4	64.2	37.8	29.9	58.4	49.8	39.7
Level of Service	E	D	A	D	E	A	E	D	C	E	D	D
Approach Delay (s)		30.7			32.3			43.8			48.8	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	39.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	133.7	Sum of lost time (s)	22.0
Intersection Capacity Utilization	83.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
3: On-Ramp/Lumar Pl & Gladys Ave

Total 2040 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	2	23	405	50	269	6	0	0	0	2	3	2
Future Volume (Veh/h)	2	23	405	50	269	6	0	0	0	2	3	2
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	25	440	54	292	7	0	0	0	2	3	2
Pedestrians											5	
Lane Width (m)											3.7	
Walking Speed (m/s)											1.1	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	304			25			652	661	245	658	438	300
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	304			25			652	661	245	658	438	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			97			100	100	100	99	99	100
cM capacity (veh/h)	1262			1603			369	370	799	367	495	740

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	467	54	299	7
Volume Left	2	54	0	2
Volume Right	440	0	7	2
cSH	1262	1603	1700	493
Volume to Capacity	0.00	0.03	0.18	0.01
Queue Length 95th (m)	0.0	0.8	0.0	0.3
Control Delay (s)	0.1	7.3	0.0	12.4
Lane LOS	A	A		B
Approach Delay (s)	0.1	1.1		12.4
Approach LOS				B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
4: On-Ramp & S Fraser Way

Total 2040 (With Mitigation)
9/6/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1241	0	0	711	0	458
Future Volume (Veh/h)	1241	0	0	711	0	458
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1349	0	0	773	0	498
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				130		
pX, platoon unblocked						
vC, conflicting volume			1349		1736	1349
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1349		1736	1349
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	0
cM capacity (veh/h)			506		79	141

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	1349	386	386	498
Volume Left	0	0	0	0
Volume Right	0	0	0	498
cSH	1700	1700	1700	141
Volume to Capacity	0.79	0.23	0.23	3.54
Queue Length 95th (m)	0.0	0.0	0.0	Err
Control Delay (s)	0.0	0.0	0.0	Err
Lane LOS				F
Approach Delay (s)	0.0	0.0		Err
Approach LOS				F

Intersection Summary			
Average Delay	1900.6		
Intersection Capacity Utilization	105.5%	ICU Level of Service	G
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

Total 2040 (With Mitigation)
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	639	827	409	322	399	198	361	1782	506	254	1640	362
v/c Ratio	0.88	0.79	0.74	0.81	0.72	0.60	0.77	0.64	0.67	0.74	0.80	0.50
Control Delay	67.1	58.0	23.1	76.2	67.7	17.7	69.5	36.8	20.0	74.3	45.8	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.1	58.0	23.1	76.2	67.7	17.7	69.5	36.8	20.0	74.3	45.8	8.4
Queue Length 50th (m)	87.6	79.7	28.6	45.3	39.9	3.1	50.3	100.5	51.5	35.7	121.0	8.0
Queue Length 95th (m)	110.0	95.7	69.1	#65.5	52.2	27.6	67.4	111.2	93.5	50.4	135.6	34.2
Internal Link Dist (m)		436.0			418.0			231.9			250.2	
Turn Bay Length (m)	126.0		50.0	70.0		50.0	75.0		50.0	70.0		
Base Capacity (vph)	778	1081	560	414	554	330	480	2765	750	355	2038	717
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.77	0.73	0.78	0.72	0.60	0.75	0.64	0.67	0.72	0.80	0.50

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
6: Sumas Way & Marshall Rd

Total 2040 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	620	802	397	312	387	192	350	1729	491	246	1591	351
Future Volume (vph)	620	802	397	312	387	192	350	1729	491	246	1591	351
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.81	1.00	0.97	0.86	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3354	4969	1510	3354	4919	1474	3321	7298	1510	3354	6078	1508
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3354	4969	1510	3354	4919	1474	3321	7298	1510	3354	6078	1508
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	639	827	409	322	399	198	361	1782	506	254	1640	362
RTOR Reduction (vph)	0	0	235	0	0	165	0	0	178	0	0	213
Lane Group Flow (vph)	639	827	174	322	399	33	361	1782	328	254	1640	149
Confl. Peds. (#/hr)	10		2	2		10	8		7	7		8
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	0%	0%	1%	0%	1%	2%	1%	1%	0%	0%	3%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	29.8	29.0	29.0	16.3	15.5	15.5	19.5	52.3	52.3	14.1	46.2	46.2
Effective Green, g (s)	29.8	29.0	29.0	16.3	15.5	15.5	19.5	52.3	52.3	14.1	46.2	46.2
Actuated g/C Ratio	0.22	0.21	0.21	0.12	0.11	0.11	0.14	0.38	0.38	0.10	0.34	0.34
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	4.0	5.0	5.0
Lane Grp Cap (vph)	724	1044	317	396	552	165	469	2767	572	342	2036	505
v/s Ratio Prot	c0.19	0.17		c0.10	0.08		0.11	c0.24		0.08	c0.27	
v/s Ratio Perm			0.12			0.02			0.22			0.10
v/c Ratio	0.88	0.79	0.55	0.81	0.72	0.20	0.77	0.64	0.57	0.74	0.81	0.30
Uniform Delay, d1	52.4	51.6	48.6	59.3	59.1	55.6	57.0	35.2	33.9	60.1	41.8	33.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.3	4.2	2.1	12.0	4.7	0.6	8.8	0.7	2.2	9.0	2.8	0.7
Delay (s)	64.6	55.8	50.7	71.4	63.8	56.2	65.8	35.9	36.2	69.1	44.5	34.5
Level of Service	E	E	D	E	E	E	E	D	D	E	D	C
Approach Delay (s)		57.7			64.8			40.0			45.7	
Approach LOS		E			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	48.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	137.9	Sum of lost time (s)	26.9
Intersection Capacity Utilization	89.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
7: Gladys Ave & Site Access

Total 2040 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	270	53	0	23	0	0	0	48
Future Volume (Veh/h)	0	0	0	0	270	53	0	23	0	0	0	48
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	0	0	0	293	58	0	25	0	0	0	52
Pedestrians		1									7	
Lane Width (m)		0.0									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	358			0			375	358	0	342	329	330
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	358			0			375	358	0	342	329	330
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			100	96	100	100	100	93
cM capacity (veh/h)	1204			1636			540	568	1091	588	589	711

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	351	25	52
Volume Left	0	0	0
Volume Right	58	0	52
cSH	1700	568	711
Volume to Capacity	0.21	0.04	0.07
Queue Length 95th (m)	0.0	1.0	1.8
Control Delay (s)	0.0	11.6	10.5
Lane LOS		B	B
Approach Delay (s)	0.0	11.6	10.5
Approach LOS		B	B

Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	27.9%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

Total 2040 (With Mitigation)
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	261	46	610	50	38	37	613	985	75	60	1538	485
v/c Ratio	0.68	0.12	0.42	0.47	0.26	0.02	0.80	0.36	0.09	0.19	0.70	0.58
Control Delay	54.2	32.8	0.9	62.8	51.9	0.0	46.5	22.2	0.8	35.6	30.7	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.2	32.8	0.9	62.8	51.9	0.0	46.5	22.2	0.8	35.6	30.7	8.0
Queue Length 50th (m)	27.9	7.6	0.0	10.4	7.8	0.0	63.1	52.2	0.0	9.4	84.6	9.9
Queue Length 95th (m)	36.2	15.0	0.0	22.9	18.1	0.0	82.9	54.9	1.4	22.0	98.4	39.7
Internal Link Dist (m)		76.2			172.2			250.2			250.3	
Turn Bay Length (m)	70.0		45.0			45.0	95.0			100.0		60.0
Base Capacity (vph)	430	491	1469	118	160	1526	879	3311	931	341	2192	833
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.61	0.09	0.42	0.42	0.24	0.02	0.70	0.30	0.08	0.18	0.70	0.58

Intersection Summary

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
1: Sumas Way & S Fraser Way

Total 2040 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	209	37	488	50	38	37	588	946	72	58	1492	470
Future Volume (vph)	209	37	488	50	38	37	588	946	72	58	1492	470
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.7	4.0	5.7	5.7	4.0	6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.86	1.00	1.00	0.86	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3225	1820	1469	1677	1750	1526	3288	5640	1495	1729	5797	1517
Flt Permitted	0.95	1.00	1.00	0.73	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3225	1820	1469	1283	1750	1526	3288	5640	1495	1729	5797	1517
Peak-hour factor, PHF	0.80	0.80	0.80	1.00	1.00	1.00	0.96	0.96	0.96	0.97	0.97	0.97
Adj. Flow (vph)	261	46	610	50	38	37	612	985	75	60	1538	485
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	40	0	0	255
Lane Group Flow (vph)	261	46	610	50	38	37	613	985	35	60	1538	230
Confl. Peds. (#/hr)	4		1	1		4			1	1		
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	4%	0%	4%	3%	4%	0%	2%	11%	2%	0%	8%	2%
Turn Type	Prot	NA	Free	Perm	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8		1	6		5	2	
Permitted Phases			Free	8		Free			6			2
Actuated Green, G (s)	12.3	23.5	106.3	6.7	6.7	106.3	23.9	49.6	49.6	15.9	41.4	41.4
Effective Green, g (s)	12.3	23.5	106.3	6.7	6.7	106.3	23.9	49.6	49.6	15.9	41.4	41.4
Actuated g/C Ratio	0.12	0.22	1.00	0.06	0.06	1.00	0.22	0.47	0.47	0.15	0.39	0.39
Clearance Time (s)	4.5	5.7		5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	373	402	1469	80	110	1526	739	2631	697	258	2257	590
v/s Ratio Prot	c0.08	0.03			0.02		c0.19	0.17		0.03	c0.27	
v/s Ratio Perm			c0.42	0.04		0.02			0.02			0.15
v/c Ratio	0.70	0.11	0.42	0.62	0.35	0.02	0.83	0.37	0.05	0.23	0.68	0.39
Uniform Delay, d1	45.2	33.1	0.0	48.6	47.7	0.0	39.3	18.3	15.5	39.8	27.0	23.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.7	0.1	0.9	14.2	1.9	0.0	8.0	0.1	0.0	0.6	0.9	0.6
Delay (s)	50.9	33.2	0.9	62.8	49.6	0.0	47.3	18.4	15.5	40.5	27.9	24.0
Level of Service	D	C	A	E	D	A	D	B	B	D	C	C
Approach Delay (s)		16.7			40.2			28.9			27.3	
Approach LOS		B			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	106.3	Sum of lost time (s)	22.0
Intersection Capacity Utilization	70.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
3: On-Ramp/Lumar Pl & Gladys Ave

Total 2040 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	8	214	60	329	4	0	0	0	0	8	2
Future Volume (Veh/h)	0	8	214	60	329	4	0	0	0	0	8	2
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	9	233	65	358	4	0	0	0	0	9	2
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	362			9			620	618	126	616	499	360
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	362			9			620	618	126	616	499	360
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			96			100	100	100	100	98	100
cM capacity (veh/h)	1208			1624			384	392	930	394	457	689

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	242	65	362	11
Volume Left	0	65	0	0
Volume Right	233	0	4	2
cSH	1208	1624	1700	487
Volume to Capacity	0.00	0.04	0.21	0.02
Queue Length 95th (m)	0.0	0.9	0.0	0.5
Control Delay (s)	0.0	7.3	0.0	12.6
Lane LOS		A		B
Approach Delay (s)	0.0	1.1		12.6
Approach LOS				B

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
4: On-Ramp & S Fraser Way

Total 2040 (With Mitigation)
9/6/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	450	0	0	759	0	284
Future Volume (Veh/h)	450	0	0	759	0	284
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	489	0	0	825	0	309
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				135		
pX, platoon unblocked						
vC, conflicting volume			489		902	489
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			489		902	489
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	41
cM capacity (veh/h)			1070		278	525

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	489	412	412	309
Volume Left	0	0	0	0
Volume Right	0	0	0	309
cSH	1700	1700	1700	525
Volume to Capacity	0.29	0.24	0.24	0.59
Queue Length 95th (m)	0.0	0.0	0.0	28.6
Control Delay (s)	0.0	0.0	0.0	21.2
Lane LOS				C
Approach Delay (s)	0.0	0.0		21.2
Approach LOS				C

Intersection Summary			
Average Delay	4.0		
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

Total 2040 (With Mitigation)
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	168	247	226	693	690	246	271	1326	189	89	1496	340
v/c Ratio	0.59	0.55	0.69	0.88	0.58	0.48	0.73	0.47	0.26	0.44	0.76	0.52
Control Delay	60.8	55.7	20.0	56.5	40.9	10.8	63.6	27.4	4.6	60.9	38.5	12.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.8	55.7	20.0	56.5	40.9	10.8	63.6	27.4	4.6	60.9	38.5	12.3
Queue Length 50th (m)	19.8	20.5	3.0	80.0	51.5	6.1	32.4	59.6	0.0	10.6	92.5	15.9
Queue Length 95th (m)	31.2	29.7	27.7	97.7	61.8	25.0	#49.6	68.9	14.6	19.1	106.6	43.4
Internal Link Dist (m)		436.0			418.0			231.9			250.2	
Turn Bay Length (m)	126.0		50.0	70.0		50.0	75.0		50.0	70.0		
Base Capacity (vph)	307	502	342	856	1310	544	371	2798	718	204	1976	656
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.49	0.66	0.81	0.53	0.45	0.73	0.47	0.26	0.44	0.76	0.52

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
6: Sumas Way & Marshall Rd

Total 2040 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	168	247	226	603	600	214	260	1273	181	89	1496	340
Future Volume (vph)	168	247	226	603	600	214	260	1273	181	89	1496	340
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.81	1.00	0.97	0.86	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3257	4871	1479	3321	4919	1459	3354	6889	1494	3225	6020	1496
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3257	4871	1479	3321	4919	1459	3354	6889	1494	3225	6020	1496
Peak-hour factor, PHF	1.00	1.00	1.00	0.87	0.87	0.87	0.96	0.96	0.96	1.00	1.00	1.00
Adj. Flow (vph)	168	247	226	693	690	246	271	1326	189	89	1496	340
RTOR Reduction (vph)	0	0	192	0	0	161	0	0	113	0	0	164
Lane Group Flow (vph)	168	247	34	693	690	85	271	1326	76	89	1496	176
Confl. Peds. (#/hr)	5		3	3		5	1		2	2		1
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	3%	2%	3%	1%	1%	4%	0%	7%	2%	4%	4%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	10.2	10.9	10.9	27.7	28.4	28.4	12.8	47.4	47.4	5.8	39.7	39.7
Effective Green, g (s)	10.2	10.9	10.9	27.7	28.4	28.4	12.8	47.4	47.4	5.8	39.7	39.7
Actuated g/C Ratio	0.09	0.09	0.09	0.23	0.24	0.24	0.11	0.40	0.40	0.05	0.34	0.34
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	4.0	5.0	5.0
Lane Grp Cap (vph)	281	449	136	779	1183	351	363	2767	600	158	2025	503
v/s Ratio Prot	c0.05	0.05		c0.21	0.14		c0.08	0.19		0.03	c0.25	
v/s Ratio Perm			0.02			0.06			0.05			0.12
v/c Ratio	0.60	0.55	0.25	0.89	0.58	0.24	0.75	0.48	0.13	0.56	0.74	0.35
Uniform Delay, d1	51.9	51.2	49.7	43.7	39.6	36.1	51.0	26.2	22.3	54.9	34.6	29.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.4	1.5	1.0	12.1	0.7	0.4	9.7	0.3	0.2	5.5	1.8	0.9
Delay (s)	55.3	52.7	50.7	55.8	40.3	36.5	60.7	26.4	22.5	60.4	36.3	30.3
Level of Service	E	D	D	E	D	D	E	C	C	E	D	C
Approach Delay (s)		52.7			46.3			31.2			36.4	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	39.3	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	118.0	Sum of lost time (s)	26.9
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
7: Gladys Ave & Site Access

Total 2040 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	318	18	0	8	0	75	0	6
Future Volume (Veh/h)	0	0	0	0	318	18	0	8	0	75	0	6
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	0	0	0	346	20	0	9	0	82	0	7
Pedestrians		1									3	
Lane Width (m)		0.0									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	369			0			364	369	0	364	359	360
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	369			0			364	369	0	364	359	360
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.5
p0 queue free %	100			100			100	98	100	86	100	99
cM capacity (veh/h)	1197			1636			588	562	1091	586	569	634

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	366	9	89
Volume Left	0	0	82
Volume Right	20	0	7
cSH	1700	562	589
Volume to Capacity	0.22	0.02	0.15
Queue Length 95th (m)	0.0	0.4	4.0
Control Delay (s)	0.0	11.5	12.2
Lane LOS		B	B
Approach Delay (s)	0.0	11.5	12.2
Approach LOS		B	B

Intersection Summary			
Average Delay		2.6	
Intersection Capacity Utilization		Err%	ICU Level of Service H
Analysis Period (min)		15	

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

Total 2031 (With Mitigation)
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	585	256	802	202	187	320	543	1312	227	90	1064	214
v/c Ratio	0.86	0.64	0.52	0.57	0.78	0.21	0.86	0.71	0.32	0.48	0.78	0.38
Control Delay	61.1	52.3	1.3	34.9	74.7	0.3	63.0	35.5	4.6	63.7	45.7	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.1	52.3	1.3	34.9	74.7	0.3	63.0	35.5	4.6	63.7	45.7	9.2
Queue Length 50th (m)	74.4	59.1	0.0	35.0	46.5	0.0	70.0	103.7	0.0	22.2	92.4	4.7
Queue Length 95th (m)	#96.3	88.2	0.0	54.0	#78.2	0.0	#97.3	120.7	15.9	37.8	103.2	20.8
Internal Link Dist (m)		75.1			172.2			250.2			250.3	
Turn Bay Length (m)	70.0		45.0			45.0	95.0			100.0		60.0
Base Capacity (vph)	755	442	1528	384	272	1526	673	1974	749	191	1428	586
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.58	0.52	0.53	0.69	0.21	0.81	0.66	0.30	0.47	0.75	0.37

Intersection Summary

\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
1: Sumas Way & S Fraser Way

Total 2031 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	532	233	730	202	187	320	543	1312	227	77	915	184
Future Volume (vph)	532	233	730	202	187	320	543	1312	227	77	915	184
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.7	4.0	4.5	5.7	4.0	6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3354	1820	1528	1728	1820	1526	3288	4919	1528	1729	4687	1494
Flt Permitted	0.95	1.00	1.00	0.60	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3354	1820	1528	1093	1820	1526	3288	4919	1528	1729	4687	1494
Peak-hour factor, PHF	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.86	0.86
Adj. Flow (vph)	585	256	802	202	187	320	543	1312	227	90	1064	214
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	141	0	0	134
Lane Group Flow (vph)	585	256	802	202	187	320	543	1312	86	90	1064	80
Confl. Peds. (#/hr)	3		1	1		3	7					7
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	1%	0%	0%	6%	1%
Turn Type	Prot	NA	Free	pm+pt	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			Free	8		Free			6			2
Actuated Green, G (s)	25.2	27.3	123.1	30.5	16.3	123.1	23.8	46.5	46.5	13.3	35.8	35.8
Effective Green, g (s)	25.2	27.3	123.1	30.5	16.3	123.1	23.8	46.5	46.5	13.3	35.8	35.8
Actuated g/C Ratio	0.20	0.22	1.00	0.25	0.13	1.00	0.19	0.38	0.38	0.11	0.29	0.29
Clearance Time (s)	4.5	5.7		4.5	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	686	403	1528	344	240	1526	635	1858	577	186	1363	434
v/s Ratio Prot	c0.17	0.14		0.07	c0.10		c0.17	0.27		0.05	c0.23	
v/s Ratio Perm			0.52	0.08		0.21			0.06			0.05
v/c Ratio	0.85	0.64	0.52	0.59	0.78	0.21	0.86	0.71	0.15	0.48	0.78	0.18
Uniform Delay, d1	47.2	43.4	0.0	39.4	51.7	0.0	48.0	32.5	25.2	51.7	40.0	32.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.0	3.3	1.3	2.6	14.7	0.3	11.3	1.3	0.2	2.7	3.2	0.3
Delay (s)	57.2	46.7	1.3	42.0	66.4	0.3	59.3	33.8	25.4	54.4	43.2	33.0
Level of Service	E	D	A	D	E	A	E	C	C	D	D	C
Approach Delay (s)		28.3			29.6			39.5			42.3	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	35.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	123.1	Sum of lost time (s)	22.0
Intersection Capacity Utilization	80.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
3: On-Ramp/Lumar Pl & Gladys Ave

Total 2031 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	23	355	48	237	6	0	0	0	1	3	1
Future Volume (Veh/h)	1	23	355	48	237	6	0	0	0	1	3	1
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)	1	25	386	52	258	7	0	0	0	1	3	1
Pedestrians											5	
Lane Width (m)											3.7	
Walking Speed (m/s)											1.1	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	270			25			584	594	218	590	398	266
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	270			25			584	594	218	590	398	266
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			97			100	100	100	100	99	100
cM capacity (veh/h)	1299			1603			411	405	827	408	523	773

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	412	52	265	5
Volume Left	1	52	0	1
Volume Right	386	0	7	1
cSH	1299	1603	1700	527
Volume to Capacity	0.00	0.03	0.16	0.01
Queue Length 95th (m)	0.0	0.8	0.0	0.2
Control Delay (s)	0.0	7.3	0.0	11.9
Lane LOS	A	A		B
Approach Delay (s)	0.0	1.2		11.9
Approach LOS				B

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
4: On-Ramp & S Fraser Way

Total 2031 (With Mitigation)
9/6/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1089	0	0	624	0	406
Future Volume (Veh/h)	1089	0	0	624	0	406
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1184	0	0	678	0	441
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				130		
pX, platoon unblocked						
vC, conflicting volume			1184		1523	1184
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1184		1523	1184
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	0
cM capacity (veh/h)			586		109	182

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	1184	339	339	441
Volume Left	0	0	0	0
Volume Right	0	0	0	441
cSH	1700	1700	1700	182
Volume to Capacity	0.70	0.20	0.20	2.43
Queue Length 95th (m)	0.0	0.0	0.0	280.3
Control Delay (s)	0.0	0.0	0.0	698.4
Lane LOS				F
Approach Delay (s)	0.0	0.0		698.4
Approach LOS				F

Intersection Summary			
Average Delay	133.7		
Intersection Capacity Utilization	93.7%	ICU Level of Service	F
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

Total 2031 (With Mitigation)
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	563	725	359	282	349	173	316	1565	443	223	1440	318
v/c Ratio	0.82	0.71	0.63	0.70	0.59	0.49	0.68	0.71	0.60	0.62	0.75	0.46
Control Delay	58.4	50.5	12.1	63.4	56.9	9.8	59.3	37.3	13.9	62.4	41.8	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.4	50.5	12.1	63.4	56.9	9.8	59.3	37.3	13.9	62.4	41.8	5.9
Queue Length 50th (m)	70.9	62.4	6.6	35.8	30.6	0.0	39.5	101.1	26.1	28.2	97.4	0.0
Queue Length 95th (m)	89.0	77.5	36.4	50.5	42.7	14.9	55.3	115.9	61.9	41.7	112.4	21.2
Internal Link Dist (m)		436.0			418.0			231.9			250.2	
Turn Bay Length (m)	126.0		50.0	70.0		50.0	75.0		50.0	70.0		80.0
Base Capacity (vph)	809	1119	593	458	618	356	510	2214	738	388	1928	695
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.70	0.65	0.61	0.62	0.56	0.49	0.62	0.71	0.60	0.57	0.75	0.46

Intersection Summary

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
6: Sumas Way & Marshall Rd

Total 2031 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	546	703	348	274	339	168	307	1518	430	216	1397	308
Future Volume (vph)	546	703	348	274	339	168	307	1518	430	216	1397	308
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3354	4969	1510	3354	4919	1476	3321	6199	1512	3354	6078	1510
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3354	4969	1510	3354	4919	1476	3321	6199	1512	3354	6078	1510
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	563	725	359	282	349	173	316	1565	443	223	1440	318
RTOR Reduction (vph)	0	0	260	0	0	152	0	0	199	0	0	217
Lane Group Flow (vph)	563	725	99	282	349	21	316	1565	244	223	1440	101
Confl. Peds. (#/hr)	10		2	2		10	8		7	7		8
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	0%	0%	1%	0%	1%	2%	1%	1%	0%	0%	3%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	25.5	25.7	25.7	14.9	15.1	15.1	17.6	44.5	44.5	13.4	39.6	39.6
Effective Green, g (s)	25.5	25.7	25.7	14.9	15.1	15.1	17.6	44.5	44.5	13.4	39.6	39.6
Actuated g/C Ratio	0.20	0.21	0.21	0.12	0.12	0.12	0.14	0.36	0.36	0.11	0.32	0.32
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	4.0	5.0	5.0
Lane Grp Cap (vph)	685	1024	311	400	595	178	468	2212	539	360	1930	479
v/s Ratio Prot	c0.17	0.15		c0.08	0.07		0.10	c0.25		0.07	c0.24	
v/s Ratio Perm			0.07			0.01			0.16			0.07
v/c Ratio	0.82	0.71	0.32	0.70	0.59	0.12	0.68	0.71	0.45	0.62	0.75	0.21
Uniform Delay, d1	47.4	46.0	42.1	52.8	51.8	48.9	50.8	34.5	30.8	53.2	38.1	31.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.9	2.3	0.6	5.6	1.5	0.3	5.0	1.3	1.3	3.6	1.9	0.5
Delay (s)	55.3	48.3	42.7	58.4	53.3	49.2	55.8	35.8	32.0	56.8	40.0	31.6
Level of Service	E	D	D	E	D	D	E	D	C	E	D	C
Approach Delay (s)		49.5			54.2			37.8			40.5	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	43.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	124.7	Sum of lost time (s)	26.9
Intersection Capacity Utilization	82.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
7: Gladys Ave & Site Access

Total 2031 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	237	53	0	23	0	0	0	48
Future Volume (Veh/h)	0	0	0	0	237	53	0	23	0	0	0	48
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	0	0	0	258	58	0	25	0	0	0	52
Pedestrians		1									7	
Lane Width (m)		0.0									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	323			0			340	323	0	306	294	295
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	323			0			340	323	0	306	294	295
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			100	96	100	100	100	93
cM capacity (veh/h)	1240			1636			572	594	1091	621	616	744

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	316	25	52
Volume Left	0	0	0
Volume Right	58	0	52
cSH	1700	594	744
Volume to Capacity	0.19	0.04	0.07
Queue Length 95th (m)	0.0	1.0	1.7
Control Delay (s)	0.0	11.3	10.2
Lane LOS		B	B
Approach Delay (s)	0.0	11.3	10.2
Approach LOS		B	B

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	26.2%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

Total 2031 (With Mitigation)
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	230	40	541	44	33	32	539	864	66	53	1348	426
v/c Ratio	0.64	0.11	0.37	0.47	0.26	0.02	0.78	0.39	0.08	0.15	0.70	0.49
Control Delay	53.9	35.1	0.7	67.0	54.3	0.0	47.7	22.6	0.2	33.6	28.0	4.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.9	35.1	0.7	67.0	54.3	0.0	47.7	22.6	0.2	33.6	28.0	4.5
Queue Length 50th (m)	24.5	6.9	0.0	9.3	6.9	0.0	56.0	58.3	0.0	8.0	87.8	1.4
Queue Length 95th (m)	32.6	14.1	0.0	#23.4	16.7	0.0	74.7	63.5	0.0	19.4	105.4	20.3
Internal Link Dist (m)		76.2			172.2			250.2			250.3	
Turn Bay Length (m)	70.0		45.0			45.0	95.0			100.0		60.0
Base Capacity (vph)	402	442	1469	94	127	1526	788	2756	969	360	2031	901
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.57	0.09	0.37	0.47	0.26	0.02	0.68	0.31	0.07	0.15	0.66	0.47

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
1: Sumas Way & S Fraser Way

Total 2031 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	184	32	433	44	33	32	517	829	63	51	1308	413
Future Volume (vph)	184	32	433	44	33	32	517	829	63	51	1308	413
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.7	4.0	5.7	5.7	4.0	6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3225	1820	1469	1677	1750	1526	3288	4476	1495	1729	4601	1517
Flt Permitted	0.95	1.00	1.00	0.73	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3225	1820	1469	1290	1750	1526	3288	4476	1495	1729	4601	1517
Peak-hour factor, PHF	0.80	0.80	0.80	1.00	1.00	1.00	0.96	0.96	0.96	0.97	0.97	0.97
Adj. Flow (vph)	230	40	541	44	33	32	539	864	66	53	1348	426
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	35	0	0	237
Lane Group Flow (vph)	230	40	541	44	33	32	539	864	31	53	1348	189
Confl. Peds. (#/hr)	4		1	1		4			1	1		
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	4%	0%	4%	3%	4%	0%	2%	11%	2%	0%	8%	2%
Turn Type	Prot	NA	Free	Perm	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8		1	6		5	2	
Permitted Phases			Free	8		Free			6			2
Actuated Green, G (s)	11.5	21.5	106.1	5.5	5.5	106.1	21.6	50.1	50.1	17.2	45.5	45.5
Effective Green, g (s)	11.5	21.5	106.1	5.5	5.5	106.1	21.6	50.1	50.1	17.2	45.5	45.5
Actuated g/C Ratio	0.11	0.20	1.00	0.05	0.05	1.00	0.20	0.47	0.47	0.16	0.43	0.43
Clearance Time (s)	4.5	5.7		5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	349	368	1469	66	90	1526	669	2113	705	280	1973	650
v/s Ratio Prot	c0.07	0.02			0.02		c0.16	0.19		0.03	c0.29	
v/s Ratio Perm			c0.37	0.03		0.02			0.02			0.12
v/c Ratio	0.66	0.11	0.37	0.67	0.37	0.02	0.81	0.41	0.04	0.19	0.68	0.29
Uniform Delay, d1	45.4	34.5	0.0	49.4	48.6	0.0	40.3	18.3	15.1	38.4	24.5	19.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.5	0.1	0.7	22.6	2.5	0.0	7.4	0.2	0.0	0.4	1.1	0.3
Delay (s)	49.9	34.6	0.7	72.0	51.1	0.0	47.7	18.5	15.1	38.9	25.6	20.1
Level of Service	D	C	A	E	D	A	D	B	B	D	C	C
Approach Delay (s)		16.3			44.5			29.0			24.7	
Approach LOS		B			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	106.1	Sum of lost time (s)	22.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
3: On-Ramp/Lumar Pl & Gladys Ave

Total 2031 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	8	188	59	291	4	0	0	0	0	7	2
Future Volume (Veh/h)	0	8	188	59	291	4	0	0	0	0	7	2
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	9	204	64	316	4	0	0	0	0	8	2
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	320			9			561	559	111	557	455	318
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	320			9			561	559	111	557	455	318
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			96			100	100	100	100	98	100
cM capacity (veh/h)	1251			1624			422	423	948	431	484	727

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	213	64	320	10
Volume Left	0	64	0	0
Volume Right	204	0	4	2
cSH	1251	1624	1700	519
Volume to Capacity	0.00	0.04	0.19	0.02
Queue Length 95th (m)	0.0	0.9	0.0	0.4
Control Delay (s)	0.0	7.3	0.0	12.1
Lane LOS		A		B
Approach Delay (s)	0.0	1.2		12.1
Approach LOS				B

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
4: On-Ramp & S Fraser Way

Total 2031 (With Mitigation)
9/6/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	395	0	0	665	0	254
Future Volume (Veh/h)	395	0	0	665	0	254
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	429	0	0	723	0	276
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				135		
pX, platoon unblocked						
vC, conflicting volume			429		790	429
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			429		790	429
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	52
cM capacity (veh/h)			1127		327	574

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	429	362	362	276
Volume Left	0	0	0	0
Volume Right	0	0	0	276
cSH	1700	1700	1700	574
Volume to Capacity	0.25	0.21	0.21	0.48
Queue Length 95th (m)	0.0	0.0	0.0	19.7
Control Delay (s)	0.0	0.0	0.0	16.9
Lane LOS				C
Approach Delay (s)	0.0	0.0		16.9
Approach LOS				C

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

Total 2031 (With Mitigation)
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	148	216	198	608	605	216	238	1164	166	79	1314	300
v/c Ratio	0.54	0.46	0.59	0.82	0.52	0.43	0.58	0.50	0.24	0.36	0.70	0.47
Control Delay	57.3	50.8	13.1	50.4	37.9	7.5	52.7	27.4	4.9	56.2	36.8	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.3	50.8	13.1	50.4	37.9	7.5	52.7	27.4	4.9	56.2	36.8	9.2
Queue Length 50th (m)	15.9	16.4	0.0	64.2	42.1	0.7	25.1	55.8	0.0	8.6	72.7	6.6
Queue Length 95th (m)	28.0	25.7	17.9	83.6	51.4	16.4	40.5	75.0	14.1	17.3	95.4	31.2
Internal Link Dist (m)		436.0			418.0			231.9			250.2	
Turn Bay Length (m)	126.0		50.0	70.0		50.0	75.0			70.0		80.0
Base Capacity (vph)	298	669	386	912	1577	612	439	2363	702	219	1864	640
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.50	0.32	0.51	0.67	0.38	0.35	0.54	0.49	0.24	0.36	0.70	0.47

Intersection Summary

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
6: Sumas Way & Marshall Rd

Total 2031 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	148	216	198	529	526	188	228	1117	159	79	1314	300
Future Volume (vph)	148	216	198	529	526	188	228	1117	159	79	1314	300
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3257	4871	1479	3321	4919	1459	3354	5851	1494	3225	6020	1496
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3257	4871	1479	3321	4919	1459	3354	5851	1494	3225	6020	1496
Peak-hour factor, PHF	1.00	1.00	1.00	0.87	0.87	0.87	0.96	0.96	0.96	1.00	1.00	1.00
Adj. Flow (vph)	148	216	198	608	605	216	238	1164	166	79	1314	300
RTOR Reduction (vph)	0	0	179	0	0	162	0	0	101	0	0	175
Lane Group Flow (vph)	148	216	19	608	605	54	238	1164	65	79	1314	125
Confl. Peds. (#/hr)	5		3	3		5	1		2	2		1
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	3%	2%	3%	1%	1%	4%	0%	7%	2%	4%	4%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	9.3	10.7	10.7	24.6	26.0	26.0	13.4	43.7	43.7	5.9	35.5	35.5
Effective Green, g (s)	9.3	10.7	10.7	24.6	26.0	26.0	13.4	43.7	43.7	5.9	35.5	35.5
Actuated g/C Ratio	0.08	0.10	0.10	0.22	0.23	0.23	0.12	0.39	0.39	0.05	0.32	0.32
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	4.0	5.0	5.0
Lane Grp Cap (vph)	272	469	142	735	1151	341	404	2301	587	171	1923	478
v/s Ratio Prot	c0.05	0.04		c0.18	0.12		0.07	c0.20		0.02	c0.22	
v/s Ratio Perm			0.01			0.04			0.04			0.08
v/c Ratio	0.54	0.46	0.13	0.83	0.53	0.16	0.59	0.51	0.11	0.46	0.68	0.26
Uniform Delay, d1	48.9	47.5	46.0	41.2	37.2	33.8	46.2	25.5	21.4	51.1	32.9	28.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.2	0.7	0.4	7.6	0.4	0.2	3.4	0.4	0.2	2.7	1.3	0.6
Delay (s)	51.1	48.2	46.4	48.8	37.6	34.1	49.6	25.9	21.6	53.7	34.2	28.7
Level of Service	D	D	D	D	D	C	D	C	C	D	C	C
Approach Delay (s)		48.3			41.8			29.0			34.1	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	36.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	111.1	Sum of lost time (s)	26.9
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
7: Gladys Ave & Site Access

Total 2031 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	279	18	0	8	0	0	0	75
Future Volume (Veh/h)	0	0	0	0	279	18	0	8	0	0	0	75
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	0	0	0	303	20	0	9	0	0	0	82
Pedestrians		1									3	
Lane Width (m)		0.0									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	326			0			396	326	0	320	316	317
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	326			0			396	326	0	320	316	317
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.5
p0 queue free %	100			100			100	98	100	100	100	88
cM capacity (veh/h)	1241			1636			497	594	1091	626	601	671

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	323	9	82
Volume Left	0	0	0
Volume Right	20	0	82
cSH	1700	594	671
Volume to Capacity	0.19	0.02	0.12
Queue Length 95th (m)	0.0	0.4	3.2
Control Delay (s)	0.0	11.2	11.1
Lane LOS		B	B
Approach Delay (s)	0.0	11.2	11.1
Approach LOS		B	B

Intersection Summary			
Average Delay		2.4	
Intersection Capacity Utilization		28.6%	ICU Level of Service	A
Analysis Period (min)		15	

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

Total 2020 (With Mitigation)
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	486	212	668	167	155	265	456	1087	188	74	881	179
v/c Ratio	0.83	0.60	0.44	0.53	0.72	0.70	0.83	0.70	0.24	0.54	0.81	0.29
Control Delay	57.1	48.5	0.9	34.5	67.2	21.3	58.5	28.2	3.6	66.1	40.2	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	57.1	48.5	0.9	34.5	67.2	21.3	58.5	28.2	3.6	66.1	40.2	6.3
Queue Length 50th (m)	54.7	43.3	0.0	26.7	33.9	8.4	51.8	104.0	0.0	16.4	93.6	1.6
Queue Length 95th (m)	#77.5	67.7	0.0	43.7	#60.9	36.1	#76.4	128.9	12.6	#33.0	110.6	14.5
Internal Link Dist (m)		75.1			172.2			250.2			250.3	
Turn Bay Length (m)	70.0		45.0			45.0	95.0			100.0		60.0
Base Capacity (vph)	637	396	1528	328	241	395	579	1594	811	141	1186	650
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.54	0.44	0.51	0.64	0.67	0.79	0.68	0.23	0.52	0.74	0.28

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
1: Sumas Way & S Fraser Way

Total 2020 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	442	193	608	167	155	265	456	1087	188	64	758	154
Future Volume (vph)	442	193	608	167	155	265	456	1087	188	64	758	154
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.7	4.0	4.5	5.7	5.7	6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3354	1820	1528	1728	1820	1513	3288	3424	1528	1729	3262	1496
Flt Permitted	0.95	1.00	1.00	0.63	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3354	1820	1528	1137	1820	1513	3288	3424	1528	1729	3262	1496
Peak-hour factor, PHF	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.86	0.86
Adj. Flow (vph)	486	212	668	167	155	265	456	1087	188	74	881	179
RTOR Reduction (vph)	0	0	0	0	0	198	0	0	104	0	0	110
Lane Group Flow (vph)	486	212	668	167	155	67	456	1087	84	74	881	69
Confl. Peds. (#/hr)	3		1	1		3	7					7
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	1%	0%	0%	6%	1%
Turn Type	Prot	NA	Free	pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			Free	8		8			6			2
Actuated Green, G (s)	19.1	21.4	110.1	23.5	12.9	12.9	18.3	49.4	49.4	6.9	37.8	37.8
Effective Green, g (s)	19.1	21.4	110.1	23.5	12.9	12.9	18.3	49.4	49.4	6.9	37.8	37.8
Actuated g/C Ratio	0.17	0.19	1.00	0.21	0.12	0.12	0.17	0.45	0.45	0.06	0.34	0.34
Clearance Time (s)	4.5	5.7		4.5	5.7	5.7	6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	581	353	1528	299	213	177	546	1536	685	108	1119	513
v/s Ratio Prot	c0.14	0.12		0.05	c0.09		0.14	c0.32		0.04	c0.27	
v/s Ratio Perm			0.44	0.07		0.04			0.06			0.05
v/c Ratio	0.84	0.60	0.44	0.56	0.73	0.38	0.84	0.71	0.12	0.69	0.79	0.13
Uniform Delay, d1	44.0	40.5	0.0	37.7	46.9	44.9	44.4	24.5	17.7	50.5	32.5	24.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.1	2.9	0.9	2.3	11.7	1.4	11.1	1.6	0.1	17.8	4.0	0.2
Delay (s)	54.1	43.3	0.9	40.0	58.6	46.3	55.5	26.1	17.8	68.3	36.5	25.0
Level of Service	D	D	A	D	E	D	E	C	B	E	D	C
Approach Delay (s)		26.4			47.7			33.0			36.8	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	33.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	110.1	Sum of lost time (s)	22.0
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
3: On-Ramp/Lumar Pl & Gladys Ave

Total 2020 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	1	23	294	46	199	5	0	0	0	1	2	1
Future Volume (Veh/h)	1	23	294	46	199	5	0	0	0	1	2	1
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)	1	25	320	50	216	5	0	0	0	1	2	1
Pedestrians											5	
Lane Width (m)											3.7	
Walking Speed (m/s)											1.1	
Percent Blockage											0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	226			25			505	513	185	510	350	224
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	226			25			505	513	185	510	350	224
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			97			100	100	100	100	100	100
cM capacity (veh/h)	1348			1603			465	450	862	461	556	817

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	346	50	221	4
Volume Left	1	50	0	1
Volume Right	320	0	5	1
cSH	1348	1603	1700	572
Volume to Capacity	0.00	0.03	0.13	0.01
Queue Length 95th (m)	0.0	0.7	0.0	0.2
Control Delay (s)	0.0	7.3	0.0	11.3
Lane LOS	A	A		B
Approach Delay (s)	0.0	1.4		11.3
Approach LOS				B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	45.5%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
4: On-Ramp & S Fraser Way

Total 2020 (With Mitigation)
9/6/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	901	0	0	515	0	342
Future Volume (Veh/h)	901	0	0	515	0	342
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	979	0	0	560	0	372
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				130		
pX, platoon unblocked						
vC, conflicting volume			979		1259	979
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			979		1259	979
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	0
cM capacity (veh/h)			701		163	249

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	979	280	280	372
Volume Left	0	0	0	0
Volume Right	0	0	0	372
cSH	1700	1700	1700	249
Volume to Capacity	0.58	0.16	0.16	1.49
Queue Length 95th (m)	0.0	0.0	0.0	165.2
Control Delay (s)	0.0	0.0	0.0	278.1
Lane LOS				F
Approach Delay (s)	0.0	0.0		278.1
Approach LOS				F

Intersection Summary			
Average Delay	54.1		
Intersection Capacity Utilization	79.1%	ICU Level of Service	D
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

Total 2020 (With Mitigation)
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	469	600	297	234	290	144	262	1299	367	185	1195	264
v/c Ratio	0.86	0.85	0.60	0.76	0.64	0.44	0.72	0.77	0.53	0.77	0.68	0.37
Control Delay	64.4	58.2	15.7	69.6	56.1	10.8	63.1	38.6	12.1	71.0	33.9	4.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.4	58.2	15.7	69.6	56.1	10.8	63.1	38.6	12.1	71.0	33.9	4.6
Queue Length 50th (m)	55.7	71.8	11.9	28.1	34.5	0.0	31.2	100.8	17.2	42.2	86.0	0.0
Queue Length 95th (m)	#80.4	#97.6	39.9	#45.7	49.2	15.9	#45.9	118.7	46.1	#73.6	102.0	16.7
Internal Link Dist (m)		436.0			418.0			231.9			250.2	
Turn Bay Length (m)	126.0		50.0	70.0		50.0	75.0		50.0	70.0		80.0
Base Capacity (vph)	571	735	507	313	466	334	370	1689	693	258	1805	730
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.82	0.82	0.59	0.75	0.62	0.43	0.71	0.77	0.53	0.72	0.66	0.36

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
6: Sumas Way & Marshall Rd

Total 2020 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	455	582	288	227	281	140	254	1260	356	179	1159	256
Future Volume (vph)	455	582	288	227	281	140	254	1260	356	179	1159	256
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3354	3458	1510	3354	3424	1478	3321	4919	1513	1729	4824	1511
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3354	3458	1510	3354	3424	1478	3321	4919	1513	1729	4824	1511
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	469	600	297	234	290	144	262	1299	367	185	1195	264
RTOR Reduction (vph)	0	0	188	0	0	125	0	0	173	0	0	167
Lane Group Flow (vph)	469	600	109	234	290	19	262	1299	194	185	1195	97
Confl. Peds. (#/hr)	10		2	2		10	8		7	7		8
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	0%	0%	1%	0%	1%	2%	1%	1%	0%	0%	3%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	19.2	24.0	24.0	10.8	15.6	15.6	12.9	40.4	40.4	16.3	43.1	43.1
Effective Green, g (s)	19.2	24.0	24.0	10.8	15.6	15.6	12.9	40.4	40.4	16.3	43.1	43.1
Actuated g/C Ratio	0.16	0.20	0.20	0.09	0.13	0.13	0.11	0.34	0.34	0.14	0.37	0.37
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	4.0	5.0	5.0
Lane Grp Cap (vph)	547	705	307	307	453	195	363	1688	519	239	1766	553
v/s Ratio Prot	0.14	c0.17		0.07	c0.08		0.08	c0.26		c0.11	c0.25	
v/s Ratio Perm			0.07			0.01			0.13			0.06
v/c Ratio	0.86	0.85	0.36	0.76	0.64	0.10	0.72	0.77	0.37	0.77	0.68	0.17
Uniform Delay, d1	47.9	45.1	40.2	52.2	48.4	44.9	50.7	34.5	29.1	48.9	31.4	25.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.6	9.7	0.7	10.7	3.1	0.2	8.4	2.6	0.9	15.2	1.4	0.3
Delay (s)	60.5	54.8	40.9	62.9	51.5	45.1	59.1	37.1	30.1	64.1	32.8	25.6
Level of Service	E	D	D	E	D	D	E	D	C	E	C	C
Approach Delay (s)		53.7			54.1			38.7			35.2	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	43.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	117.7	Sum of lost time (s)	26.9
Intersection Capacity Utilization	85.4%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
7: Gladys Ave & Site Access

Total 2020 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	196	53	0	23	0	0	0	48
Future Volume (Veh/h)	0	0	0	0	196	53	0	23	0	0	0	48
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	0	0	0	213	58	0	25	0	0	0	52
Pedestrians		1									7	
Lane Width (m)		0.0									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									1	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	278			0			295	278	0	262	249	250
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	278			0			295	278	0	262	249	250
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			100	96	100	100	100	93
cM capacity (veh/h)	1288			1636			614	629	1091	666	653	788

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	271	25	52
Volume Left	0	0	0
Volume Right	58	0	52
cSH	1700	629	788
Volume to Capacity	0.16	0.04	0.07
Queue Length 95th (m)	0.0	0.9	1.6
Control Delay (s)	0.0	11.0	9.9
Lane LOS		B	A
Approach Delay (s)	0.0	11.0	9.9
Approach LOS		B	A

Intersection Summary			
Average Delay		2.3	
Intersection Capacity Utilization		24.0%	ICU Level of Service	A
Analysis Period (min)		15	

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

Total 2020 (With Mitigation)
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	194	34	456	36	28	27	449	716	54	43	1116	354
v/c Ratio	0.63	0.10	0.31	0.33	0.19	0.08	0.80	0.45	0.06	0.16	0.82	0.42
Control Delay	49.5	29.1	0.6	47.8	42.4	0.4	47.2	18.2	0.2	32.8	28.1	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.5	29.1	0.6	47.8	42.4	0.4	47.2	18.2	0.2	32.8	28.1	3.6
Queue Length 50th (m)	17.1	4.7	0.0	6.0	4.6	0.0	39.0	54.8	0.0	5.7	87.3	0.0
Queue Length 95th (m)	24.5	10.8	0.0	15.3	12.8	0.0	#61.4	62.1	0.0	15.7	114.4	15.1
Internal Link Dist (m)		76.2			172.2			250.2			250.3	
Turn Bay Length (m)	70.0		45.0			45.0	95.0			100.0		60.0
Base Capacity (vph)	306	420	1469	110	145	338	586	1828	943	272	1450	881
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.08	0.31	0.33	0.19	0.08	0.77	0.39	0.06	0.16	0.77	0.40

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
1: Sumas Way & S Fraser Way

Total 2020 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	155	27	365	36	28	27	431	687	52	42	1083	343
Future Volume (vph)	155	27	365	36	28	27	431	687	52	42	1083	343
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.7	4.0	5.7	5.7	5.7	6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3225	1820	1469	1677	1750	1504	3288	3115	1496	1729	3202	1517
Flt Permitted	0.95	1.00	1.00	0.75	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3225	1820	1469	1332	1750	1504	3288	3115	1496	1729	3202	1517
Peak-hour factor, PHF	0.80	0.80	0.80	1.00	1.00	1.00	0.96	0.96	0.96	0.97	0.97	0.97
Adj. Flow (vph)	194	34	456	36	28	27	449	716	54	43	1116	354
RTOR Reduction (vph)	0	0	0	0	0	25	0	0	28	0	0	199
Lane Group Flow (vph)	194	34	456	36	28	2	449	716	26	43	1116	155
Confl. Peds. (#/hr)	4		1	1		4			1	1		
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	4%	0%	4%	3%	4%	0%	2%	11%	2%	0%	8%	2%
Turn Type	Prot	NA	Free	Perm	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8		1	6		5	2	
Permitted Phases			Free	8		8			6			2
Actuated Green, G (s)	8.1	17.9	89.0	5.3	5.3	5.3	14.6	43.3	43.3	10.5	39.0	39.0
Effective Green, g (s)	8.1	17.9	89.0	5.3	5.3	5.3	14.6	43.3	43.3	10.5	39.0	39.0
Actuated g/C Ratio	0.09	0.20	1.00	0.06	0.06	0.06	0.16	0.49	0.49	0.12	0.44	0.44
Clearance Time (s)	4.5	5.7		5.7	5.7	5.7	6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	293	366	1469	79	104	89	539	1515	727	203	1403	664
v/s Ratio Prot	c0.06	0.02			0.02		c0.14	0.23		0.02	c0.35	
v/s Ratio Perm			c0.31	0.03		0.00			0.02			0.10
v/c Ratio	0.66	0.09	0.31	0.46	0.27	0.02	0.83	0.47	0.04	0.21	0.80	0.23
Uniform Delay, d1	39.1	28.9	0.0	40.5	40.0	39.4	36.0	15.2	11.9	35.5	21.6	15.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.5	0.1	0.6	4.1	1.4	0.1	11.1	0.3	0.0	0.7	3.4	0.2
Delay (s)	44.7	29.1	0.6	44.6	41.4	39.5	47.1	15.6	12.0	36.2	25.0	15.9
Level of Service	D	C	A	D	D	D	D	B	B	D	C	B
Approach Delay (s)		14.5			42.1			27.0			23.2	
Approach LOS		B			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	23.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	89.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	70.8%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
3: On-Ramp/Lumar Pl & Gladys Ave

Total 2020 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	8	156	58	245	3	0	0	0	0	6	2
Future Volume (Veh/h)	0	8	156	58	245	3	0	0	0	0	6	2
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	9	170	63	266	3	0	0	0	0	7	2
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	269			9			492	489	94	488	402	268
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	269			9			492	489	94	488	402	268
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			96			100	100	100	100	99	100
cM capacity (veh/h)	1306			1624			470	464	968	479	519	776

Direction, Lane #	EB 1	WB 1	WB 2	SB 1
Volume Total	179	63	269	9
Volume Left	0	63	0	0
Volume Right	170	0	3	2
cSH	1306	1624	1700	560
Volume to Capacity	0.00	0.04	0.16	0.02
Queue Length 95th (m)	0.0	0.9	0.0	0.4
Control Delay (s)	0.0	7.3	0.0	11.5
Lane LOS		A		B
Approach Delay (s)	0.0	1.4		11.5
Approach LOS				B

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	37.8%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
4: On-Ramp & S Fraser Way

Total 2020 (With Mitigation)
9/6/2018

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	327	0	0	552	0	220
Future Volume (Veh/h)	327	0	0	552	0	220
Sign Control	Free			Free	Yield	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	355	0	0	600	0	239
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				135		
pX, platoon unblocked						
vC, conflicting volume			355		655	355
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			355		655	355
tC, single (s)			4.1		6.8	6.9
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	63
cM capacity (veh/h)			1200		399	641

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	355	300	300	239
Volume Left	0	0	0	0
Volume Right	0	0	0	239
cSH	1700	1700	1700	641
Volume to Capacity	0.21	0.18	0.18	0.37
Queue Length 95th (m)	0.0	0.0	0.0	13.1
Control Delay (s)	0.0	0.0	0.0	13.9
Lane LOS				B
Approach Delay (s)	0.0	0.0		13.9
Approach LOS				B

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	39.2%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

Total 2020 (With Mitigation)
9/6/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	123	179	164	503	501	180	197	965	136	66	1092	250
v/c Ratio	0.50	0.53	0.56	0.78	0.67	0.39	0.53	0.51	0.19	0.46	0.66	0.37
Control Delay	58.3	54.4	15.2	52.0	44.6	7.8	53.6	27.5	3.4	61.5	33.3	5.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.3	54.4	15.2	52.0	44.6	7.8	53.6	27.5	3.4	61.5	33.3	5.1
Queue Length 50th (m)	13.7	20.2	0.0	55.0	54.1	0.0	21.5	60.6	0.0	14.1	73.6	0.0
Queue Length 95th (m)	24.4	32.5	19.7	72.0	68.7	15.2	35.0	80.9	9.2	29.5	96.7	17.2
Internal Link Dist (m)		436.0			418.0			231.9			250.2	
Turn Bay Length (m)	126.0		50.0	70.0		50.0	75.0			70.0		80.0
Base Capacity (vph)	267	433	332	789	970	542	395	1899	704	160	1754	707
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.41	0.49	0.64	0.52	0.33	0.50	0.51	0.19	0.41	0.62	0.35

Intersection Summary

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
6: Sumas Way & Marshall Rd

Total 2020 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	123	179	164	438	436	157	189	926	131	66	1092	250
Future Volume (vph)	123	179	164	438	436	157	189	926	131	66	1092	250
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Lane Util. Factor	0.97	0.95	1.00	0.97	0.95	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3257	3390	1479	3321	3424	1459	3354	4644	1494	1662	4778	1496
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3257	3390	1479	3321	3424	1459	3354	4644	1494	1662	4778	1496
Peak-hour factor, PHF	1.00	1.00	1.00	0.87	0.87	0.87	0.96	0.96	0.96	1.00	1.00	1.00
Adj. Flow (vph)	123	179	164	503	501	180	197	965	136	66	1092	250
RTOR Reduction (vph)	0	0	148	0	0	141	0	0	81	0	0	160
Lane Group Flow (vph)	123	179	16	503	501	39	197	965	55	66	1092	90
Confl. Peds. (#/hr)	5		3	3		5	1		2	2		1
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	3%	2%	3%	1%	1%	4%	0%	7%	2%	4%	4%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	8.4	11.1	11.1	21.4	24.1	24.1	12.3	45.2	45.2	7.9	40.1	40.1
Effective Green, g (s)	8.4	11.1	11.1	21.4	24.1	24.1	12.3	45.2	45.2	7.9	40.1	40.1
Actuated g/C Ratio	0.08	0.10	0.10	0.19	0.22	0.22	0.11	0.40	0.40	0.07	0.36	0.36
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	4.0	5.0	5.0
Lane Grp Cap (vph)	244	336	146	635	738	314	369	1877	604	117	1713	536
v/s Ratio Prot	0.04	c0.05		c0.15	c0.15		c0.06	c0.21		0.04	c0.23	
v/s Ratio Perm			0.01			0.03			0.04			0.06
v/c Ratio	0.50	0.53	0.11	0.79	0.68	0.12	0.53	0.51	0.09	0.56	0.64	0.17
Uniform Delay, d1	49.7	47.9	45.9	43.1	40.3	35.3	47.0	25.0	20.6	50.3	29.8	24.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	1.6	0.3	6.7	2.5	0.2	2.7	0.5	0.1	7.4	1.1	0.3
Delay (s)	51.3	49.5	46.2	49.8	42.8	35.5	49.7	25.5	20.7	57.7	30.9	24.8
Level of Service	D	D	D	D	D	D	D	C	C	E	C	C
Approach Delay (s)		48.8			44.7			28.7			31.1	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	36.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	111.8	Sum of lost time (s)	26.9
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
7: Gladys Ave & Site Access

Total 2020 (With Mitigation)
9/6/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	0	231	18	0	8	0	0	0	75
Future Volume (Veh/h)	0	0	0	0	231	18	0	8	0	0	0	75
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	0	0	0	251	20	0	9	0	0	0	82
Pedestrians		1									3	
Lane Width (m)		0.0									3.7	
Walking Speed (m/s)		1.1									1.1	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	274			0			344	274	0	268	264	265
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	274			0			344	274	0	268	264	265
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.5
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.5
p0 queue free %	100			100			100	99	100	100	100	89
cM capacity (veh/h)	1297			1636			543	635	1091	677	643	719

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	271	9	82
Volume Left	0	0	0
Volume Right	20	0	82
cSH	1700	635	719
Volume to Capacity	0.16	0.01	0.11
Queue Length 95th (m)	0.0	0.3	2.9
Control Delay (s)	0.0	10.8	10.6
Lane LOS		B	B
Approach Delay (s)	0.0	10.8	10.6
Approach LOS		B	B

Intersection Summary			
Average Delay		2.7	
Intersection Capacity Utilization		26.0%	ICU Level of Service A
Analysis Period (min)		15	

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

APPENDIX E

Gladys Avenue Connector Analysis Results

Queues

1: Sumas Way & S Fraser Way

2031 Background Volumes - GLADYS EXT

9/7/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	143	25	324	49	28	32	544	882	77	53	1415	362
v/c Ratio	0.49	0.07	0.22	0.45	0.19	0.02	0.77	0.40	0.10	0.15	0.73	0.43
Control Delay	53.1	35.4	0.3	61.3	50.0	0.0	46.4	22.0	0.9	33.3	28.4	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.1	35.4	0.3	61.3	50.0	0.0	46.4	22.0	0.9	33.3	28.4	4.8
Queue Length 50th (m)	15.2	4.3	0.0	10.1	5.6	0.0	56.0	58.8	0.0	7.9	92.5	2.6
Queue Length 95th (m)	22.5	10.2	0.0	22.6	14.6	0.0	74.6	63.7	1.9	19.4	112.4	20.8
Internal Link Dist (m)		76.2			172.2			250.2			250.3	
Turn Bay Length (m)	70.0		45.0				95.0			100.0		60.0
Base Capacity (vph)	304	423	1469	121	163	1526	824	2809	986	363	2044	863
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.06	0.22	0.40	0.17	0.02	0.66	0.31	0.08	0.15	0.69	0.42

Intersection Summary

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis 2031 Background Volumes - GLADYS EXT
1: Sumas Way & S Fraser Way

9/7/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	20	259	49	28	32	522	847	74	51	1373	351
Future Volume (vph)	114	20	259	49	28	32	522	847	74	51	1373	351
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.7	4.0	5.7	5.7	4.0	6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3225	1820	1469	1677	1750	1526	3288	4476	1495	1729	4601	1517
Flt Permitted	0.95	1.00	1.00	0.74	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3225	1820	1469	1308	1750	1526	3288	4476	1495	1729	4601	1517
Peak-hour factor, PHF	0.80	0.80	0.80	1.00	1.00	1.00	0.96	0.96	0.96	0.97	0.97	0.97
Adj. Flow (vph)	142	25	324	49	28	32	544	882	77	53	1415	362
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	40	0	0	193
Lane Group Flow (vph)	143	25	324	49	28	32	544	882	37	53	1415	169
Confl. Peds. (#/hr)	4		1	1		4			1	1		
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	4%	0%	4%	3%	4%	0%	2%	11%	2%	0%	8%	2%
Turn Type	Prot	NA	Free	Perm	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8		1	6		5	2	
Permitted Phases			Free	8		Free			6			2
Actuated Green, G (s)	9.2	20.4	105.6	6.7	6.7	105.6	21.9	50.7	50.7	17.2	45.8	45.8
Effective Green, g (s)	9.2	20.4	105.6	6.7	6.7	105.6	21.9	50.7	50.7	17.2	45.8	45.8
Actuated g/C Ratio	0.09	0.19	1.00	0.06	0.06	1.00	0.21	0.48	0.48	0.16	0.43	0.43
Clearance Time (s)	4.5	5.7		5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	280	351	1469	82	111	1526	681	2148	717	281	1995	657
v/s Ratio Prot	c0.04	0.01			0.02		c0.17	0.20		0.03	c0.31	
v/s Ratio Perm			0.22	c0.04		0.02			0.02			0.11
v/c Ratio	0.51	0.07	0.22	0.60	0.25	0.02	0.80	0.41	0.05	0.19	0.71	0.26
Uniform Delay, d1	46.0	34.8	0.0	48.1	47.1	0.0	39.8	17.8	14.6	38.2	24.5	19.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	0.1	0.3	11.2	1.2	0.0	6.9	0.2	0.0	0.4	1.3	0.3
Delay (s)	47.6	34.9	0.3	59.3	48.3	0.0	46.6	18.0	14.7	38.6	25.7	19.3
Level of Service	D	C	A	E	D	A	D	B	B	D	C	B
Approach Delay (s)		15.8			39.1			28.2			24.8	
Approach LOS		B			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	105.6	Sum of lost time (s)	22.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

2031 Background Volumes - GLADYS EXT
9/7/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	161	221	301	608	630	191	370	1036	166	67	1190	333
v/c Ratio	0.59	0.49	0.58	0.82	0.55	0.38	0.68	0.45	0.24	0.27	0.71	0.58
Control Delay	60.0	52.9	10.6	51.5	39.6	5.6	51.7	26.9	4.6	55.0	40.1	17.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	60.0	52.9	10.6	51.5	39.6	5.6	51.7	26.9	4.6	55.0	40.1	17.0
Queue Length 50th (m)	18.2	17.4	0.0	67.2	45.4	0.0	40.4	52.4	0.0	7.3	71.1	20.0
Queue Length 95th (m)	30.3	26.9	14.0	84.3	55.6	11.4	58.4	62.7	13.5	15.5	88.8	52.4
Internal Link Dist (m)		436.0			418.0			231.9			250.2	
Turn Bay Length (m)	126.0		50.0	25.0		50.0	75.0		50.0	70.0		80.0
Base Capacity (vph)	293	526	549	897	1417	571	610	2488	730	248	1675	576
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.42	0.55	0.68	0.44	0.33	0.61	0.42	0.23	0.27	0.71	0.58

Intersection Summary

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis 2031 Background Volumes - GLADYS EXT
6: Sumas Way & Marshall Rd

9/7/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	161	221	301	529	548	166	355	995	159	67	1190	333
Future Volume (vph)	161	221	301	529	548	166	355	995	159	67	1190	333
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Lane Util. Factor	0.97	0.91	0.88	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3257	4871	2604	3321	4919	1459	3354	5851	1494	3225	6020	1496
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3257	4871	2604	3321	4919	1459	3354	5851	1494	3225	6020	1496
Peak-hour factor, PHF	1.00	1.00	1.00	0.87	0.87	0.87	0.96	0.96	0.96	1.00	1.00	1.00
Adj. Flow (vph)	161	221	301	608	630	191	370	1036	166	67	1190	333
RTOR Reduction (vph)	0	0	273	0	0	147	0	0	101	0	0	158
Lane Group Flow (vph)	161	221	28	608	630	44	370	1036	65	67	1190	175
Confl. Peds. (#/hr)	5		3	3		5	1		2	2		1
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	3%	2%	3%	1%	1%	4%	0%	7%	2%	4%	4%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	9.4	10.4	10.4	25.0	26.0	26.0	18.2	44.2	44.2	7.2	32.5	32.5
Effective Green, g (s)	9.4	10.4	10.4	25.0	26.0	26.0	18.2	44.2	44.2	7.2	32.5	32.5
Actuated g/C Ratio	0.08	0.09	0.09	0.22	0.23	0.23	0.16	0.39	0.39	0.06	0.29	0.29
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	4.0	5.0	5.0
Lane Grp Cap (vph)	270	448	239	734	1131	335	540	2288	584	205	1731	430
v/s Ratio Prot	c0.05	0.05		c0.18	0.13		c0.11	0.18		0.02	c0.20	
v/s Ratio Perm			0.01			0.03			0.04			0.12
v/c Ratio	0.60	0.49	0.12	0.83	0.56	0.13	0.69	0.45	0.11	0.33	0.69	0.41
Uniform Delay, d1	50.0	48.8	47.1	42.0	38.4	34.5	44.7	25.5	21.9	50.6	35.7	32.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.5	0.9	0.2	7.7	0.6	0.2	4.6	0.3	0.2	1.3	1.5	1.3
Delay (s)	53.5	49.7	47.3	49.6	39.0	34.7	49.3	25.8	22.1	51.9	37.2	33.8
Level of Service	D	D	D	D	D	C	D	C	C	D	D	C
Approach Delay (s)		49.5			43.0			30.9			37.1	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	38.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	113.0	Sum of lost time (s)	26.9
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis 2031 Background Volumes - GLADYS EXT
8: Gladys Ave & Lumar Pl 9/7/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	13	151	209	27	13	1
Future Volume (Veh/h)	13	151	209	27	13	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	14	164	227	29	14	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	256				434	242
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	256				434	242
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				98	100
cM capacity (veh/h)	1309				573	797

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	178	256	15
Volume Left	14	0	14
Volume Right	0	29	1
cSH	1309	1700	584
Volume to Capacity	0.01	0.15	0.03
Queue Length 95th (m)	0.2	0.0	0.6
Control Delay (s)	0.7	0.0	11.3
Lane LOS	A		B
Approach Delay (s)	0.7	0.0	11.3
Approach LOS			B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	29.7%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis 2031 Background Volumes - GLADYS EXT
9: Lumar Pl & Gladys Ave 9/7/2018

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	5	0	4	36	0	9
Future Volume (Veh/h)	5	0	4	36	0	9
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)	5	0	4	39	0	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	34	24			43	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	34	24			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 %	99	100			100	
cM capacity (veh/h)	980	1053			1566	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	5	43	10
Volume Left	5	0	0
Volume Right	0	39	0
cSH	980	1700	1566
Volume to Capacity	0.01	0.03	0.00
Queue Length 95th (m)	0.1	0.0	0.0
Control Delay (s)	8.7	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.7	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

2031 Background Volumes - GLADYS EXT
9/7/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	425	185	587	232	151	320	367	1356	289	90	1093	174
v/c Ratio	0.74	0.62	0.38	0.61	0.65	0.21	0.70	0.63	0.35	0.52	0.67	0.28
Control Delay	55.2	56.5	0.7	37.1	64.0	0.3	55.7	28.8	4.1	64.4	35.3	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.2	56.5	0.7	37.1	64.0	0.3	55.7	28.8	4.1	64.4	35.3	7.1
Queue Length 50th (m)	50.1	42.2	0.0	41.7	34.7	0.0	42.9	92.9	0.0	20.6	78.7	2.1
Queue Length 95th (m)	70.1	66.6	0.0	63.7	58.5	0.0	63.0	122.8	17.0	37.8	99.2	16.0
Internal Link Dist (m)		76.2			172.2			250.2			250.3	
Turn Bay Length (m)	70.0		45.0			45.0	95.0			100.0		60.0
Base Capacity (vph)	730	417	1528	421	312	1526	614	2230	851	206	1805	673
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.44	0.38	0.55	0.48	0.21	0.60	0.61	0.34	0.44	0.61	0.26

Intersection Summary

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis 2031 Background Volumes - GLADYS EXT

1: Sumas Way & S Fraser Way

9/7/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	387	168	534	232	151	320	367	1356	289	77	940	150
Future Volume (vph)	387	168	534	232	151	320	367	1356	289	77	940	150
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.7	4.0	4.5	5.7	4.0	6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3354	1820	1528	1728	1820	1526	3288	4919	1528	1729	4687	1495
Flt Permitted	0.95	1.00	1.00	0.58	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3354	1820	1528	1057	1820	1526	3288	4919	1528	1729	4687	1495
Peak-hour factor, PHF	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.86	0.86
Adj. Flow (vph)	425	185	587	232	151	320	367	1356	289	90	1093	174
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	163	0	0	103
Lane Group Flow (vph)	425	185	587	232	151	320	367	1356	126	90	1093	71
Confl. Peds. (#/hr)	3		1	1		3	7					7
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	1%	0%	0%	6%	1%
Turn Type	Prot	NA	Free	pm+pt	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			Free	8		Free			6			2
Actuated Green, G (s)	19.7	18.8	116.3	30.3	14.7	116.3	18.3	50.7	50.7	9.4	41.6	41.6
Effective Green, g (s)	19.7	18.8	116.3	30.3	14.7	116.3	18.3	50.7	50.7	9.4	41.6	41.6
Actuated g/C Ratio	0.17	0.16	1.00	0.26	0.13	1.00	0.16	0.44	0.44	0.08	0.36	0.36
Clearance Time (s)	4.5	5.7		4.5	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	568	294	1528	365	230	1526	517	2144	666	139	1676	534
v/s Ratio Prot	c0.13	c0.10		0.09	0.08		0.11	c0.28		0.05	c0.23	
v/s Ratio Perm			c0.38	0.08		0.21			0.08			0.05
v/c Ratio	0.75	0.63	0.38	0.64	0.66	0.21	0.71	0.63	0.19	0.65	0.65	0.13
Uniform Delay, d1	45.9	45.5	0.0	36.7	48.4	0.0	46.5	25.5	20.2	51.8	31.3	25.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.4	4.2	0.7	3.6	6.6	0.3	4.8	0.7	0.2	11.0	1.0	0.2
Delay (s)	51.3	49.7	0.7	40.3	55.0	0.3	51.2	26.2	20.4	62.9	32.3	25.3
Level of Service	D	D	A	D	D	A	D	C	C	E	C	C
Approach Delay (s)		26.3			25.3			30.0			33.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	116.3	Sum of lost time (s)	22.0
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

2031 Background Volumes - GLADYS EXT
9/7/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	623	745	505	282	362	160	415	1447	443	207	1292	334
v/c Ratio	0.84	0.66	0.79	0.75	0.61	0.46	0.76	0.67	0.62	0.61	0.76	0.50
Control Delay	58.0	46.7	21.6	67.7	57.7	7.5	60.5	37.2	15.3	63.1	45.5	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.0	46.7	21.6	67.7	57.7	7.5	60.5	37.2	15.3	63.1	45.5	6.8
Queue Length 50th (m)	78.4	62.3	29.6	36.2	32.0	0.0	52.3	92.5	29.6	26.3	89.6	0.0
Queue Length 95th (m)	97.5	76.3	75.5	51.4	44.2	10.9	70.4	106.6	66.3	39.4	104.3	23.3
Internal Link Dist (m)		436.0			418.0			231.9			250.2	
Turn Bay Length (m)	126.0		50.0	70.0		50.0	75.0		50.0	70.0		80.0
Base Capacity (vph)	862	1278	669	404	615	356	584	2157	719	363	1697	662
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.58	0.75	0.70	0.59	0.45	0.71	0.67	0.62	0.57	0.76	0.50

Intersection Summary

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis 2031 Background Volumes - GLADYS EXT

6: Sumas Way & Marshall Rd

9/7/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	604	723	490	274	351	155	403	1404	430	201	1253	324
Future Volume (vph)	604	723	490	274	351	155	403	1404	430	201	1253	324
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3354	4969	1510	3354	4919	1476	3321	6199	1512	3354	6078	1510
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3354	4969	1510	3354	4919	1476	3321	6199	1512	3354	6078	1510
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	623	745	505	282	362	160	415	1447	443	207	1292	334
RTOR Reduction (vph)	0	0	292	0	0	141	0	0	194	0	0	241
Lane Group Flow (vph)	623	745	213	282	362	19	415	1447	249	207	1292	93
Confl. Peds. (#/hr)	10		2	2		10	8		7	7		8
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	0%	0%	1%	0%	1%	2%	1%	1%	0%	0%	3%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	27.5	28.6	28.6	14.0	15.1	15.1	20.4	43.4	43.4	12.6	34.9	34.9
Effective Green, g (s)	27.5	28.6	28.6	14.0	15.1	15.1	20.4	43.4	43.4	12.6	34.9	34.9
Actuated g/C Ratio	0.22	0.23	0.23	0.11	0.12	0.12	0.16	0.35	0.35	0.10	0.28	0.28
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	4.0	5.0	5.0
Lane Grp Cap (vph)	739	1138	346	376	595	178	542	2155	525	338	1699	422
v/s Ratio Prot	c0.19	0.15		c0.08	0.07		0.12	c0.23		0.06	c0.21	
v/s Ratio Perm			0.14			0.01			0.16			0.06
v/c Ratio	0.84	0.65	0.62	0.75	0.61	0.11	0.77	0.67	0.47	0.61	0.76	0.22
Uniform Delay, d1	46.6	43.6	43.2	53.7	52.0	48.9	49.9	34.6	31.8	53.8	41.1	34.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.7	1.4	3.2	8.2	1.8	0.3	7.5	1.1	1.4	3.7	2.4	0.6
Delay (s)	55.3	45.0	46.4	61.9	53.8	49.1	57.4	35.7	33.2	57.5	43.6	35.1
Level of Service	E	D	D	E	D	D	E	D	C	E	D	D
Approach Delay (s)		48.8			55.7			39.1			43.6	
Approach LOS		D			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	44.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	124.8	Sum of lost time (s)	26.9
Intersection Capacity Utilization	85.0%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis 2031 Background Volumes - GLADYS EXT
8: Gladys Ave & Lumar Pl 9/7/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	18	253	175	9	41	14
Future Volume (Veh/h)	18	253	175	9	41	14
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	275	190	10	45	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	200				510	195
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	200				510	195
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				91	98
cM capacity (veh/h)	1372				516	846

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	295	200	60
Volume Left	20	0	45
Volume Right	0	10	15
cSH	1372	1700	571
Volume to Capacity	0.01	0.12	0.10
Queue Length 95th (m)	0.3	0.0	2.7
Control Delay (s)	0.6	0.0	12.0
Lane LOS	A		B
Approach Delay (s)	0.6	0.0	12.0
Approach LOS			B

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	37.4%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis 2031 Background Volumes - GLADYS EXT
9: Lumar Pl & Gladys Ave 9/7/2018

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	51	0	6	21	1	4
Future Volume (Veh/h)	51	0	6	21	1	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)	55	0	7	23	1	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	24	18			30	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	24	18			30	
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	100			100	
cM capacity (veh/h)	991	1060			1583	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	55	30	5
Volume Left	55	0	1
Volume Right	0	23	0
cSH	991	1700	1583
Volume to Capacity	0.06	0.02	0.00
Queue Length 95th (m)	1.3	0.0	0.0
Control Delay (s)	8.8	0.0	1.5
Lane LOS	A		A
Approach Delay (s)	8.8	0.0	1.5
Approach LOS	A		

Intersection Summary			
Average Delay	5.5		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

2040 Background Volumes - GLADYS EXT
9/10/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	163	29	369	55	32	37	621	1007	89	60	1615	412
v/c Ratio	0.56	0.08	0.25	0.48	0.21	0.02	0.81	0.36	0.11	0.18	0.69	0.49
Control Delay	55.1	34.7	0.4	61.9	49.6	0.0	47.4	21.2	1.6	34.4	28.7	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.1	34.7	0.4	61.9	49.6	0.0	47.4	21.2	1.6	34.4	28.7	5.7
Queue Length 50th (m)	17.6	5.0	0.0	11.4	6.5	0.0	63.9	52.5	0.0	9.1	85.8	4.2
Queue Length 95th (m)	25.0	11.2	0.0	24.5	15.9	0.0	84.2	54.9	4.0	21.6	100.1	26.0
Internal Link Dist (m)		76.2			172.2			250.2			250.3	
Turn Bay Length (m)	70.0		45.0			45.0	95.0			100.0		60.0
Base Capacity (vph)	300	434	1469	131	176	1526	871	3453	965	355	2343	840
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.07	0.25	0.42	0.18	0.02	0.71	0.29	0.09	0.17	0.69	0.49

Intersection Summary

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis 2040 Background Volumes - GLADYS EXT
1: Sumas Way & S Fraser Way

9/10/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	23	295	55	32	37	596	967	85	58	1567	400
Future Volume (vph)	130	23	295	55	32	37	596	967	85	58	1567	400
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.7	4.0	5.7	5.7	4.0	6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.86	1.00	1.00	0.86	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3225	1820	1469	1676	1750	1526	3288	5640	1495	1729	5797	1517
Flt Permitted	0.95	1.00	1.00	0.74	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3225	1820	1469	1303	1750	1526	3288	5640	1495	1729	5797	1517
Peak-hour factor, PHF	0.80	0.80	0.80	1.00	1.00	1.00	0.96	0.96	0.96	0.97	0.97	0.97
Adj. Flow (vph)	162	29	369	55	32	37	621	1007	89	60	1615	412
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	46	0	0	223
Lane Group Flow (vph)	163	29	369	55	32	37	621	1007	43	60	1615	189
Confl. Peds. (#/hr)	4		1	1		4			1	1		
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	4%	0%	4%	3%	4%	0%	2%	11%	2%	0%	8%	2%
Turn Type	Prot	NA	Free	Perm	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8		1	6		5	2	
Permitted Phases			Free	8		Free			6			2
Actuated Green, G (s)	9.3	21.1	107.0	7.3	7.3	107.0	24.0	51.6	51.6	17.0	44.4	44.4
Effective Green, g (s)	9.3	21.1	107.0	7.3	7.3	107.0	24.0	51.6	51.6	17.0	44.4	44.4
Actuated g/C Ratio	0.09	0.20	1.00	0.07	0.07	1.00	0.22	0.48	0.48	0.16	0.41	0.41
Clearance Time (s)	4.5	5.7		5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	280	358	1469	88	119	1526	737	2719	720	274	2405	629
v/s Ratio Prot	c0.05	0.02			0.02		c0.19	0.18		0.03	c0.28	
v/s Ratio Perm			0.25	c0.04		0.02			0.03			0.12
v/c Ratio	0.58	0.08	0.25	0.62	0.27	0.02	0.84	0.37	0.06	0.22	0.67	0.30
Uniform Delay, d1	47.0	35.0	0.0	48.5	47.3	0.0	39.7	17.5	14.8	39.2	25.4	20.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.1	0.1	0.4	13.0	1.2	0.0	9.0	0.1	0.0	0.6	0.8	0.4
Delay (s)	50.0	35.1	0.4	61.6	48.5	0.0	48.7	17.6	14.8	39.8	26.2	21.3
Level of Service	D	D	A	E	D	A	D	B	B	D	C	C
Approach Delay (s)		16.6			39.8			28.7			25.6	
Approach LOS		B			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	107.0	Sum of lost time (s)	22.0
Intersection Capacity Utilization	67.5%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

2040 Background Volumes - GLADYS EXT
9/10/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	184	253	343	693	718	218	421	1181	189	76	1358	380
v/c Ratio	0.60	0.49	0.83	0.90	0.60	0.42	0.81	0.43	0.27	0.36	0.82	0.65
Control Delay	59.8	52.2	28.2	60.0	41.2	7.9	61.4	27.5	4.7	58.4	44.8	19.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.8	52.2	28.2	60.0	41.2	7.9	61.4	27.5	4.7	58.4	44.8	19.2
Queue Length 50th (m)	21.1	20.4	12.4	79.8	53.8	1.1	49.0	50.4	0.0	8.9	86.1	26.7
Queue Length 95th (m)	33.3	29.3	#55.1	#106.4	64.4	17.4	#73.0	60.9	14.7	17.0	102.7	62.1
Internal Link Dist (m)		436.0			418.0			231.9			250.2	
Turn Bay Length (m)	126.0		50.0	70.0		50.0	75.0		50.0	70.0		
Base Capacity (vph)	337	631	440	803	1317	546	530	2761	712	213	1654	587
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.40	0.78	0.86	0.55	0.40	0.79	0.43	0.27	0.36	0.82	0.65

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis 2040 Background Volumes - GLADYS EXT
6: Sumas Way & Marshall Rd 9/10/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	184	253	343	603	625	190	404	1134	181	76	1358	380
Future Volume (vph)	184	253	343	603	625	190	404	1134	181	76	1358	380
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.81	1.00	0.97	0.86	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3257	4871	1479	3321	4919	1459	3354	6889	1494	3225	6020	1496
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3257	4871	1479	3321	4919	1459	3354	6889	1494	3225	6020	1496
Peak-hour factor, PHF	1.00	1.00	1.00	0.87	0.87	0.87	0.96	0.96	0.96	1.00	1.00	1.00
Adj. Flow (vph)	184	253	343	693	718	218	421	1181	189	76	1358	380
RTOR Reduction (vph)	0	0	256	0	0	161	0	0	115	0	0	175
Lane Group Flow (vph)	184	253	87	693	718	57	421	1181	74	76	1358	205
Confl. Peds. (#/hr)	5		3	3		5	1		2	2		1
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	3%	2%	3%	1%	1%	4%	0%	7%	2%	4%	4%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	10.9	12.4	12.4	26.8	28.3	28.3	17.9	45.7	45.7	6.2	33.3	33.3
Effective Green, g (s)	10.9	12.4	12.4	26.8	28.3	28.3	17.9	45.7	45.7	6.2	33.3	33.3
Actuated g/C Ratio	0.09	0.11	0.11	0.23	0.24	0.24	0.15	0.39	0.39	0.05	0.28	0.28
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	4.0	5.0	5.0
Lane Grp Cap (vph)	302	514	156	758	1186	352	511	2683	582	170	1709	424
v/s Ratio Prot	0.06	0.05		c0.21	0.15		c0.13	0.17		0.02	c0.23	
v/s Ratio Perm			c0.06			0.04			0.05			0.14
v/c Ratio	0.61	0.49	0.56	0.91	0.61	0.16	0.82	0.44	0.13	0.45	0.79	0.48
Uniform Delay, d1	51.2	49.5	49.9	44.1	39.5	35.1	48.2	26.4	23.0	53.9	38.8	34.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.5	0.7	4.3	15.5	0.9	0.2	11.6	0.2	0.2	2.5	3.0	1.8
Delay (s)	54.6	50.2	54.2	59.6	40.4	35.4	59.7	26.6	23.2	56.4	41.9	36.7
Level of Service	D	D	D	E	D	D	E	C	C	E	D	D
Approach Delay (s)		53.0			47.9			34.0			41.4	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	42.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	117.3	Sum of lost time (s)	26.9
Intersection Capacity Utilization	81.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis 2040 Background Volumes - GLADYS EXT
8: Gladys Ave & Lumar Pl 9/10/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	172	238	30	15	1
Future Volume (Veh/h)	15	172	238	30	15	1
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	187	259	33	16	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	292				494	276
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	292				494	276
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				97	100
cM capacity (veh/h)	1270				528	763

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	203	292	17
Volume Left	16	0	16
Volume Right	0	33	1
cSH	1270	1700	537
Volume to Capacity	0.01	0.17	0.03
Queue Length 95th (m)	0.3	0.0	0.7
Control Delay (s)	0.7	0.0	11.9
Lane LOS	A		B
Approach Delay (s)	0.7	0.0	11.9
Approach LOS			B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	32.7%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis 2040 Background Volumes - GLADYS EXT
9: Lumar Pl & Gladys Ave 9/10/2018

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	6	0	4	41	0	10
Future Volume (Veh/h)	6	0	4	41	0	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)	7	0	4	45	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	38	26			49	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	38	26			49	
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	100			100	
cM capacity (veh/h)	975	1049			1558	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	7	49	11
Volume Left	7	0	0
Volume Right	0	45	0
cSH	975	1700	1558
Volume to Capacity	0.01	0.03	0.00
Queue Length 95th (m)	0.2	0.0	0.0
Control Delay (s)	8.7	0.0	0.0
Lane LOS	A		
Approach Delay (s)	8.7	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues

1: Sumas Way & S Fraser Way

2040 Background Volumes - GLADYS EXT

9/7/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	485	210	669	264	172	365	419	1546	330	102	1247	199
v/c Ratio	0.78	0.66	0.44	0.68	0.70	0.24	0.74	0.63	0.41	0.56	0.65	0.33
Control Delay	58.4	59.1	0.9	39.6	68.5	0.4	58.1	32.9	5.1	67.9	39.2	8.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.4	59.1	0.9	39.6	68.5	0.4	58.1	32.9	5.1	67.9	39.2	8.9
Queue Length 50th (m)	59.9	50.0	0.0	48.7	41.5	0.0	51.3	88.9	0.9	24.4	76.6	3.9
Queue Length 95th (m)	83.4	77.5	0.0	73.3	69.2	0.0	74.4	119.2	21.5	43.9	98.6	20.9
Internal Link Dist (m)		76.2			172.2			250.2			250.3	
Turn Bay Length (m)	70.0		45.0			45.0	95.0			100.0		60.0
Base Capacity (vph)	808	460	1528	433	334	1526	698	2541	817	226	1971	614
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.46	0.44	0.61	0.51	0.24	0.60	0.61	0.40	0.45	0.63	0.32

Intersection Summary

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis 2040 Background Volumes - GLADYS EXT

1: Sumas Way & S Fraser Way

9/7/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	441	191	609	264	172	365	419	1546	330	88	1072	171
Future Volume (vph)	441	191	609	264	172	365	419	1546	330	88	1072	171
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.7	4.0	4.5	5.7	4.0	6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.86	1.00	1.00	0.86	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3354	1820	1528	1728	1820	1526	3288	6199	1528	1729	5906	1494
Flt Permitted	0.95	1.00	1.00	0.52	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3354	1820	1528	951	1820	1526	3288	6199	1528	1729	5906	1494
Peak-hour factor, PHF	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.86	0.86
Adj. Flow (vph)	485	210	669	264	172	365	419	1546	330	102	1247	199
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	195	0	0	118
Lane Group Flow (vph)	485	210	669	264	172	365	419	1546	135	102	1247	81
Confl. Peds. (#/hr)	3		1	1		3	7					7
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	1%	0%	0%	6%	1%
Turn Type	Prot	NA	Free	pm+pt	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			Free	8		Free			6			2
Actuated Green, G (s)	23.1	21.8	123.9	34.9	16.8	123.9	21.5	49.2	49.2	13.0	40.5	40.5
Effective Green, g (s)	23.1	21.8	123.9	34.9	16.8	123.9	21.5	49.2	49.2	13.0	40.5	40.5
Actuated g/C Ratio	0.19	0.18	1.00	0.28	0.14	1.00	0.17	0.40	0.40	0.10	0.33	0.33
Clearance Time (s)	4.5	5.7		4.5	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	625	320	1528	381	246	1526	570	2461	606	181	1930	488
v/s Ratio Prot	c0.14	c0.12		0.10	0.09		c0.13	0.25		0.06	c0.21	
v/s Ratio Perm			0.44	0.09		0.24			0.09			0.05
v/c Ratio	0.78	0.66	0.44	0.69	0.70	0.24	0.74	0.63	0.22	0.56	0.65	0.17
Uniform Delay, d1	47.9	47.6	0.0	37.8	51.1	0.0	48.5	30.0	24.7	52.8	35.6	29.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.0	4.8	0.9	5.4	8.4	0.4	5.2	0.6	0.3	4.8	0.8	0.2
Delay (s)	53.9	52.4	0.9	43.1	59.5	0.4	53.7	30.6	25.0	57.6	36.4	29.9
Level of Service	D	D	A	D	E	A	D	C	C	E	D	C
Approach Delay (s)		27.7			27.2			34.0			37.0	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	32.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	123.9	Sum of lost time (s)	22.0
Intersection Capacity Utilization	73.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

2040 Background Volumes - GLADYS EXT
9/7/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	710	851	576	322	412	182	474	1652	506	236	1473	380
v/c Ratio	0.91	0.71	0.91	0.95	0.76	0.56	0.88	0.60	0.69	0.76	0.81	0.54
Control Delay	68.2	51.7	40.0	98.7	70.1	15.0	74.8	36.2	22.6	77.9	49.2	8.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	68.2	51.7	40.0	98.7	70.1	15.0	74.8	36.2	22.6	77.9	49.2	8.1
Queue Length 50th (m)	97.9	78.6	68.9	46.5	41.3	0.0	66.8	91.5	58.5	33.4	110.7	4.8
Queue Length 95th (m)	#127.8	94.0	#139.7	#76.1	53.8	22.9	#94.2	101.8	101.5	#51.0	125.2	31.9
Internal Link Dist (m)		436.0			418.0			231.9			250.2	
Turn Bay Length (m)	126.0		50.0	70.0		50.0	75.0		50.0	70.0		
Base Capacity (vph)	826	1260	644	340	546	325	551	2738	731	315	1823	701
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.68	0.89	0.95	0.75	0.56	0.86	0.60	0.69	0.75	0.81	0.54

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis 2040 Background Volumes - GLADYS EXT
6: Sumas Way & Marshall Rd 9/7/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	689	825	559	312	400	177	460	1602	491	229	1429	369
Future Volume (vph)	689	825	559	312	400	177	460	1602	491	229	1429	369
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.81	1.00	0.97	0.86	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3354	4969	1510	3354	4919	1474	3321	7298	1510	3354	6078	1507
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3354	4969	1510	3354	4919	1474	3321	7298	1510	3354	6078	1507
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	710	851	576	322	412	182	474	1652	506	236	1473	380
RTOR Reduction (vph)	0	0	266	0	0	162	0	0	164	0	0	249
Lane Group Flow (vph)	710	851	310	322	412	20	474	1652	342	236	1473	131
Confl. Peds. (#/hr)	10		2	2		10	8		7	7		8
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	0%	0%	1%	0%	1%	2%	1%	1%	0%	0%	3%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	32.1	33.3	33.3	14.0	15.2	15.2	22.5	51.8	51.8	12.8	41.4	41.4
Effective Green, g (s)	32.1	33.3	33.3	14.0	15.2	15.2	22.5	51.8	51.8	12.8	41.4	41.4
Actuated g/C Ratio	0.23	0.24	0.24	0.10	0.11	0.11	0.16	0.38	0.38	0.09	0.30	0.30
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	4.0	5.0	5.0
Lane Grp Cap (vph)	779	1198	364	340	541	162	541	2737	566	310	1822	451
v/s Ratio Prot	c0.21	0.17		c0.10	0.08		c0.14	0.23		0.07	c0.24	
v/s Ratio Perm			0.21			0.01			0.23			0.09
v/c Ratio	0.91	0.71	0.85	0.95	0.76	0.12	0.88	0.60	0.60	0.76	0.81	0.29
Uniform Delay, d1	51.6	48.0	50.0	61.7	59.7	55.4	56.4	34.9	34.9	61.2	44.7	37.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.8	2.0	17.1	34.8	6.3	0.3	15.8	0.6	2.7	11.1	3.1	0.7
Delay (s)	66.4	50.0	67.1	96.5	66.0	55.8	72.3	35.4	37.5	72.3	47.8	37.8
Level of Service	E	D	E	F	E	E	E	D	D	E	D	D
Approach Delay (s)		60.1			74.7			42.5			48.8	
Approach LOS		E			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	52.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	138.1	Sum of lost time (s)	26.9
Intersection Capacity Utilization	92.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis 2040 Background Volumes - GLADYS EXT
8: Gladys Ave & Lumar Pl 9/7/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	289	200	10	47	16
Future Volume (Veh/h)	20	289	200	10	47	16
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	314	217	11	51	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	228				580	222
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	228				580	222
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				89	98
cM capacity (veh/h)	1340				468	817

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	336	228	68
Volume Left	22	0	51
Volume Right	0	11	17
cSH	1340	1700	524
Volume to Capacity	0.02	0.13	0.13
Queue Length 95th (m)	0.4	0.0	3.4
Control Delay (s)	0.7	0.0	12.9
Lane LOS	A		B
Approach Delay (s)	0.7	0.0	12.9
Approach LOS			B

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	41.0%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis 2040 Background Volumes - GLADYS EXT
9: Lumar Pl & Gladys Ave 9/7/2018

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	56	0	6	23	1	4
Future Volume (Veh/h)	56	0	6	23	1	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)	61	0	7	25	1	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	26	20			32	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	26	20			32	
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	100			100	
cM capacity (veh/h)	989	1058			1580	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	61	32	5
Volume Left	61	0	1
Volume Right	0	25	0
cSH	989	1700	1580
Volume to Capacity	0.06	0.02	0.00
Queue Length 95th (m)	1.5	0.0	0.0
Control Delay (s)	8.9	0.0	1.5
Lane LOS	A		A
Approach Delay (s)	8.9	0.0	1.5
Approach LOS	A		

Intersection Summary			
Average Delay	5.6		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

2031 Total Volumes - GLADYS EXT
9/7/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	143	25	324	49	28	32	544	895	77	53	1412	362
v/c Ratio	0.49	0.07	0.22	0.44	0.19	0.02	0.75	0.40	0.09	0.16	0.74	0.44
Control Delay	52.6	35.0	0.3	60.6	49.7	0.0	45.2	21.7	0.9	33.8	29.1	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.6	35.0	0.3	60.6	49.7	0.0	45.2	21.7	0.9	33.8	29.1	5.2
Queue Length 50th (m)	15.0	4.2	0.0	9.9	5.6	0.0	55.3	58.7	0.0	7.9	92.1	3.4
Queue Length 95th (m)	22.5	10.2	0.0	22.6	14.6	0.0	73.6	64.5	1.9	19.5	114.3	22.5
Internal Link Dist (m)		76.2			172.2			250.2			250.3	
Turn Bay Length (m)	70.0		45.0				95.0			100.0		60.0
Base Capacity (vph)	309	429	1469	123	165	1526	862	2805	985	354	2000	849
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.06	0.22	0.40	0.17	0.02	0.63	0.32	0.08	0.15	0.71	0.43

Intersection Summary

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
1: Sumas Way & S Fraser Way

2031 Total Volumes - GLADYS EXT
9/7/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	114	20	259	49	28	32	522	859	74	51	1370	351
Future Volume (vph)	114	20	259	49	28	32	522	859	74	51	1370	351
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.7	4.0	5.7	5.7	4.0	6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3225	1820	1469	1677	1750	1526	3288	4476	1495	1729	4601	1517
Flt Permitted	0.95	1.00	1.00	0.74	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3225	1820	1469	1308	1750	1526	3288	4476	1495	1729	4601	1517
Peak-hour factor, PHF	0.80	0.80	0.80	1.00	1.00	1.00	0.96	0.96	0.96	0.97	0.97	0.97
Adj. Flow (vph)	142	25	324	49	28	32	544	895	77	53	1412	362
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	40	0	0	192
Lane Group Flow (vph)	143	25	324	49	28	32	544	895	37	53	1412	170
Confl. Peds. (#/hr)	4		1	1		4			1	1		
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	4%	0%	4%	3%	4%	0%	2%	11%	2%	0%	8%	2%
Turn Type	Prot	NA	Free	Perm	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8		1	6		5	2	
Permitted Phases			Free	8		Free			6			2
Actuated Green, G (s)	9.2	20.4	104.9	6.7	6.7	104.9	22.2	50.6	50.6	16.6	44.8	44.8
Effective Green, g (s)	9.2	20.4	104.9	6.7	6.7	104.9	22.2	50.6	50.6	16.6	44.8	44.8
Actuated g/C Ratio	0.09	0.19	1.00	0.06	0.06	1.00	0.21	0.48	0.48	0.16	0.43	0.43
Clearance Time (s)	4.5	5.7		5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	282	353	1469	83	111	1526	695	2159	721	273	1964	647
v/s Ratio Prot	c0.04	0.01			0.02		c0.17	0.20		0.03	c0.31	
v/s Ratio Perm			0.22	c0.04		0.02			0.02			0.11
v/c Ratio	0.51	0.07	0.22	0.59	0.25	0.02	0.78	0.41	0.05	0.19	0.72	0.26
Uniform Delay, d1	45.7	34.5	0.0	47.8	46.7	0.0	39.1	17.6	14.4	38.3	24.8	19.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.4	0.1	0.3	10.7	1.2	0.0	6.1	0.2	0.0	0.5	1.4	0.3
Delay (s)	47.1	34.6	0.3	58.5	47.9	0.0	45.2	17.7	14.5	38.8	26.2	19.7
Level of Service	D	C	A	E	D	A	D	B	B	D	C	B
Approach Delay (s)		15.7			38.6			27.4			25.3	
Approach LOS		B			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	25.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	104.9	Sum of lost time (s)	22.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

2031 Total Volumes - GLADYS EXT
9/7/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	173	229	318	608	626	191	376	1036	166	67	1190	329
v/c Ratio	0.59	0.50	0.60	0.83	0.57	0.39	0.68	0.44	0.24	0.26	0.70	0.56
Control Delay	59.4	53.5	10.6	53.0	41.1	5.9	52.1	26.9	4.5	55.0	39.8	15.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.4	53.5	10.6	53.0	41.1	5.9	52.1	26.9	4.5	55.0	39.8	15.0
Queue Length 50th (m)	19.7	18.3	0.0	68.2	46.3	0.0	41.7	53.4	0.0	7.4	71.8	16.8
Queue Length 95th (m)	32.0	27.8	14.4	85.3	56.5	11.7	59.2	61.8	13.3	15.5	88.0	47.2
Internal Link Dist (m)		436.0			418.0			231.9			250.2	
Turn Bay Length (m)	126.0		50.0	25.0		50.0	75.0		50.0	70.0		80.0
Base Capacity (vph)	319	521	562	859	1316	545	613	2516	737	254	1697	590
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.44	0.57	0.71	0.48	0.35	0.61	0.41	0.23	0.26	0.70	0.56

Intersection Summary

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
6: Sumas Way & Marshall Rd

2031 Total Volumes - GLADYS EXT
9/7/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	173	229	318	529	545	166	361	995	159	67	1190	329
Future Volume (vph)	173	229	318	529	545	166	361	995	159	67	1190	329
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Lane Util. Factor	0.97	0.91	0.88	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3257	4871	2604	3321	4919	1459	3354	5851	1494	3225	6020	1496
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3257	4871	2604	3321	4919	1459	3354	5851	1494	3225	6020	1496
Peak-hour factor, PHF	1.00	1.00	1.00	0.87	0.87	0.87	0.96	0.96	0.96	1.00	1.00	1.00
Adj. Flow (vph)	173	229	318	608	626	191	376	1036	166	67	1190	329
RTOR Reduction (vph)	0	0	288	0	0	149	0	0	101	0	0	167
Lane Group Flow (vph)	173	229	30	608	626	42	376	1036	65	67	1190	162
Confl. Peds. (#/hr)	5		3	3		5	1		2	2		1
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	3%	2%	3%	1%	1%	4%	0%	7%	2%	4%	4%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	10.1	10.6	10.6	24.8	25.3	25.3	18.5	44.9	44.9	7.5	33.2	33.2
Effective Green, g (s)	10.1	10.6	10.6	24.8	25.3	25.3	18.5	44.9	44.9	7.5	33.2	33.2
Actuated g/C Ratio	0.09	0.09	0.09	0.22	0.22	0.22	0.16	0.39	0.39	0.07	0.29	0.29
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	4.0	5.0	5.0
Lane Grp Cap (vph)	288	452	242	722	1091	323	544	2304	588	212	1753	435
v/s Ratio Prot	c0.05	0.05		c0.18	0.13		c0.11	0.18		0.02	c0.20	
v/s Ratio Perm			0.01			0.03			0.04			0.11
v/c Ratio	0.60	0.51	0.12	0.84	0.57	0.13	0.69	0.45	0.11	0.32	0.68	0.37
Uniform Delay, d1	50.0	49.2	47.4	42.7	39.5	35.5	45.1	25.4	21.9	50.8	35.7	32.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.5	0.9	0.2	8.8	0.7	0.2	4.8	0.3	0.2	1.2	1.4	1.1
Delay (s)	53.5	50.1	47.7	51.5	40.3	35.7	49.8	25.7	22.1	52.0	37.1	33.3
Level of Service	D	D	D	D	D	D	D	C	C	D	D	C
Approach Delay (s)		49.8			44.5			31.1			36.9	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM 2000 Control Delay	39.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	114.0	Sum of lost time (s)	26.9
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
8: Gladys Ave & Lumar Pl

2031 Total Volumes - GLADYS EXT
9/7/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	9	151	209	21	58	26
Future Volume (Veh/h)	9	151	209	21	58	26
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	164	227	23	63	28
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	250				422	238
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	250				422	238
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				89	97
cM capacity (veh/h)	1316				584	800

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	174	250	91
Volume Left	10	0	63
Volume Right	0	23	28
cSH	1316	1700	637
Volume to Capacity	0.01	0.15	0.14
Queue Length 95th (m)	0.2	0.0	3.8
Control Delay (s)	0.5	0.0	11.6
Lane LOS	A		B
Approach Delay (s)	0.5	0.0	11.6
Approach LOS			B

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	27.9%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
9: Lumar Pl & Gladys Ave

2031 Total Volumes - GLADYS EXT
9/7/2018

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	75	0	4	26	0	9
Future Volume (Veh/h)	75	0	4	26	0	9
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)	82	0	4	28	0	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	28	18			32	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	28	18			32	
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	100			100	
cM capacity (veh/h)	987	1061			1580	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	82	32	10
Volume Left	82	0	0
Volume Right	0	28	0
cSH	987	1700	1580
Volume to Capacity	0.08	0.02	0.00
Queue Length 95th (m)	2.1	0.0	0.0
Control Delay (s)	9.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	9.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	14.4%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

2031 Total Volumes - GLADYS EXT
9/7/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	425	185	587	236	151	320	367	1366	291	90	1106	174
v/c Ratio	0.74	0.64	0.38	0.62	0.65	0.21	0.70	0.63	0.35	0.52	0.68	0.28
Control Delay	55.3	57.5	0.7	37.4	64.1	0.3	55.7	28.9	4.1	64.5	35.5	7.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.3	57.5	0.7	37.4	64.1	0.3	55.7	28.9	4.1	64.5	35.5	7.3
Queue Length 50th (m)	50.1	42.3	0.0	42.5	34.7	0.0	42.9	93.8	0.0	20.6	80.0	2.5
Queue Length 95th (m)	70.1	67.0	0.0	64.7	58.5	0.0	63.0	123.9	17.2	37.8	100.7	16.3
Internal Link Dist (m)		76.2			172.2			250.2			250.3	
Turn Bay Length (m)	70.0		45.0			45.0	95.0			100.0		60.0
Base Capacity (vph)	729	409	1528	424	311	1526	613	2227	851	205	1802	671
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.45	0.38	0.56	0.49	0.21	0.60	0.61	0.34	0.44	0.61	0.26

Intersection Summary

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
1: Sumas Way & S Fraser Way

2031 Total Volumes - GLADYS EXT
9/7/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	387	168	534	236	151	320	367	1366	291	77	951	150
Future Volume (vph)	387	168	534	236	151	320	367	1366	291	77	951	150
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.7	4.0	4.5	5.7	4.0	6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.91	1.00	1.00	0.91	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3354	1820	1528	1728	1820	1526	3288	4919	1528	1729	4687	1495
Flt Permitted	0.95	1.00	1.00	0.57	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3354	1820	1528	1030	1820	1526	3288	4919	1528	1729	4687	1495
Peak-hour factor, PHF	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.86	0.86
Adj. Flow (vph)	425	185	587	236	151	320	367	1366	291	90	1106	174
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	164	0	0	101
Lane Group Flow (vph)	425	185	587	236	151	320	367	1366	127	90	1106	73
Confl. Peds. (#/hr)	3		1	1		3	7					7
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	1%	0%	0%	6%	1%
Turn Type	Prot	NA	Free	pm+pt	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			Free	8		Free			6			2
Actuated Green, G (s)	19.7	18.5	116.4	30.6	14.7	116.4	18.3	50.8	50.8	9.4	41.7	41.7
Effective Green, g (s)	19.7	18.5	116.4	30.6	14.7	116.4	18.3	50.8	50.8	9.4	41.7	41.7
Actuated g/C Ratio	0.17	0.16	1.00	0.26	0.13	1.00	0.16	0.44	0.44	0.08	0.36	0.36
Clearance Time (s)	4.5	5.7		4.5	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	567	289	1528	366	229	1526	516	2146	666	139	1679	535
v/s Ratio Prot	c0.13	c0.10		0.09	0.08		0.11	c0.28		0.05	c0.24	
v/s Ratio Perm			c0.38	0.08		0.21			0.08			0.05
v/c Ratio	0.75	0.64	0.38	0.64	0.66	0.21	0.71	0.64	0.19	0.65	0.66	0.14
Uniform Delay, d1	46.0	45.8	0.0	36.6	48.5	0.0	46.5	25.6	20.2	51.9	31.4	25.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.4	4.8	0.7	3.9	6.7	0.3	4.9	0.7	0.2	11.0	1.0	0.2
Delay (s)	51.4	50.6	0.7	40.5	55.2	0.3	51.5	26.3	20.4	62.9	32.4	25.4
Level of Service	D	D	A	D	E	A	D	C	C	E	C	C
Approach Delay (s)		26.4			25.4			30.0			33.5	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	116.4	Sum of lost time (s)	22.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

2031 Total Volumes - GLADYS EXT
9/7/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	635	748	521	282	366	160	451	1447	443	207	1292	349
v/c Ratio	0.87	0.69	0.83	0.79	0.69	0.48	0.80	0.62	0.59	0.69	0.73	0.51
Control Delay	62.0	49.3	24.9	72.5	62.4	8.2	62.1	33.7	13.9	69.6	43.9	6.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.0	49.3	24.9	72.5	62.4	8.2	62.1	33.7	13.9	69.6	43.9	6.5
Queue Length 50th (m)	80.3	64.0	34.8	36.8	33.5	0.0	57.4	87.8	29.0	26.9	88.4	0.0
Queue Length 95th (m)	101.8	78.4	#86.0	#55.8	45.1	11.0	76.0	100.1	63.3	40.1	102.0	23.3
Internal Link Dist (m)		436.0			418.0			231.9			250.2	
Turn Bay Length (m)	126.0		50.0	70.0		50.0	75.0		50.0	70.0		80.0
Base Capacity (vph)	792	1173	648	369	549	338	598	2352	754	306	1776	688
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.64	0.80	0.76	0.67	0.47	0.75	0.62	0.59	0.68	0.73	0.51

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
6: Sumas Way & Marshall Rd

2031 Total Volumes - GLADYS EXT
9/7/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	616	726	505	274	355	155	437	1404	430	201	1253	339
Future Volume (vph)	616	726	505	274	355	155	437	1404	430	201	1253	339
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.86	1.00	0.97	0.86	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3354	4969	1510	3354	4919	1475	3321	6199	1512	3354	6078	1509
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3354	4969	1510	3354	4919	1475	3321	6199	1512	3354	6078	1509
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	635	748	521	282	366	160	451	1447	443	207	1292	349
RTOR Reduction (vph)	0	0	298	0	0	143	0	0	181	0	0	247
Lane Group Flow (vph)	635	748	223	282	366	17	451	1447	262	207	1292	102
Confl. Peds. (#/hr)	10		2	2		10	8		7	7		8
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	0%	0%	1%	0%	1%	2%	1%	1%	0%	0%	3%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	27.6	27.9	27.9	13.5	13.8	13.8	21.7	48.3	48.3	11.3	37.2	37.2
Effective Green, g (s)	27.6	27.9	27.9	13.5	13.8	13.8	21.7	48.3	48.3	11.3	37.2	37.2
Actuated g/C Ratio	0.22	0.22	0.22	0.11	0.11	0.11	0.17	0.38	0.38	0.09	0.29	0.29
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	4.0	5.0	5.0
Lane Grp Cap (vph)	727	1089	331	355	533	160	566	2353	574	297	1777	441
v/s Ratio Prot	c0.19	0.15		c0.08	0.07		c0.14	0.23		0.06	c0.21	
v/s Ratio Perm			0.15			0.01			0.17			0.07
v/c Ratio	0.87	0.69	0.67	0.79	0.69	0.11	0.80	0.61	0.46	0.70	0.73	0.23
Uniform Delay, d1	48.1	45.6	45.5	55.5	54.6	51.2	50.6	31.9	29.6	56.3	40.4	34.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.3	1.8	5.3	11.6	3.7	0.3	8.8	0.7	1.2	7.5	1.9	0.6
Delay (s)	59.4	47.5	50.8	67.1	58.3	51.5	59.4	32.6	30.8	63.8	42.3	34.7
Level of Service	E	D	D	E	E	D	E	C	C	E	D	C
Approach Delay (s)		52.4			60.0			37.4			43.3	
Approach LOS		D			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	45.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	127.2	Sum of lost time (s)	26.9
Intersection Capacity Utilization	86.5%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
8: Gladys Ave & Lumar Pl

2031 Total Volumes - GLADYS EXT
9/7/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	253	175	57	36	16
Future Volume (Veh/h)	25	253	175	57	36	16
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	275	190	62	39	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	252				550	221
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	252				550	221
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				92	98
cM capacity (veh/h)	1313				486	819

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	302	252	56
Volume Left	27	0	39
Volume Right	0	62	17
cSH	1313	1700	554
Volume to Capacity	0.02	0.15	0.10
Queue Length 95th (m)	0.5	0.0	2.5
Control Delay (s)	0.9	0.0	12.2
Lane LOS	A		B
Approach Delay (s)	0.9	0.0	12.2
Approach LOS			B

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
9: Lumar Pl & Gladys Ave

2031 Total Volumes - GLADYS EXT
9/7/2018

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	48	0	6	76	1	4
Future Volume (Veh/h)	48	0	6	76	1	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)	52	0	7	83	1	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	54	48			90	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	54	48			90	
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	100			100	
cM capacity (veh/h)	953	1020			1505	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	52	90	5
Volume Left	52	0	1
Volume Right	0	83	0
cSH	953	1700	1505
Volume to Capacity	0.05	0.05	0.00
Queue Length 95th (m)	1.3	0.0	0.0
Control Delay (s)	9.0	0.0	1.5
Lane LOS	A		A
Approach Delay (s)	9.0	0.0	1.5
Approach LOS	A		

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	15.0%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

2040 Total Volumes - GLADYS EXT
9/7/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	163	29	369	55	32	37	621	1019	89	60	1610	412
v/c Ratio	0.56	0.08	0.25	0.48	0.21	0.02	0.81	0.36	0.11	0.18	0.69	0.49
Control Delay	55.1	34.7	0.4	61.9	49.6	0.0	47.4	20.9	1.6	35.0	28.7	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.1	34.7	0.4	61.9	49.6	0.0	47.4	20.9	1.6	35.0	28.7	5.7
Queue Length 50th (m)	17.6	5.0	0.0	11.4	6.5	0.0	63.9	53.0	0.0	9.1	85.5	4.2
Queue Length 95th (m)	25.0	11.2	0.0	24.5	15.9	0.0	84.2	54.8	4.0	21.8	99.7	26.0
Internal Link Dist (m)		76.2			172.2			250.2			250.3	
Turn Bay Length (m)	70.0		45.0			45.0	95.0			100.0		60.0
Base Capacity (vph)	300	434	1469	131	176	1526	871	3453	965	348	2343	840
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	0.07	0.25	0.42	0.18	0.02	0.71	0.30	0.09	0.17	0.69	0.49

Intersection Summary

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis — 2040 Total Volumes - GLADYS EXT

1: Sumas Way & S Fraser Way — 9/7/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	130	23	295	55	32	37	596	978	85	58	1562	400
Future Volume (vph)	130	23	295	55	32	37	596	978	85	58	1562	400
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.7	4.0	5.7	5.7	4.0	6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.86	1.00	1.00	0.86	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3225	1820	1469	1676	1750	1526	3288	5640	1495	1729	5797	1517
Flt Permitted	0.95	1.00	1.00	0.74	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3225	1820	1469	1303	1750	1526	3288	5640	1495	1729	5797	1517
Peak-hour factor, PHF	0.80	0.80	0.80	1.00	1.00	1.00	0.96	0.96	0.96	0.97	0.97	0.97
Adj. Flow (vph)	162	29	369	55	32	37	621	1019	89	60	1610	412
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	46	0	0	223
Lane Group Flow (vph)	163	29	369	55	32	37	621	1019	43	60	1610	189
Confl. Peds. (#/hr)	4		1	1		4			1	1		
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	4%	0%	4%	3%	4%	0%	2%	11%	2%	0%	8%	2%
Turn Type	Prot	NA	Free	Perm	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4			8		1	6		5	2	
Permitted Phases			Free	8		Free			6			2
Actuated Green, G (s)	9.3	21.1	106.9	7.3	7.3	106.9	24.0	52.0	52.0	16.5	44.3	44.3
Effective Green, g (s)	9.3	21.1	106.9	7.3	7.3	106.9	24.0	52.0	52.0	16.5	44.3	44.3
Actuated g/C Ratio	0.09	0.20	1.00	0.07	0.07	1.00	0.22	0.49	0.49	0.15	0.41	0.41
Clearance Time (s)	4.5	5.7		5.7	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	280	359	1469	88	119	1526	738	2743	727	266	2402	628
v/s Ratio Prot	c0.05	0.02			0.02		c0.19	0.18		0.03	c0.28	
v/s Ratio Perm			0.25	c0.04		0.02			0.03			0.12
v/c Ratio	0.58	0.08	0.25	0.62	0.27	0.02	0.84	0.37	0.06	0.23	0.67	0.30
Uniform Delay, d1	46.9	35.0	0.0	48.5	47.3	0.0	39.6	17.2	14.5	39.6	25.4	20.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.1	0.1	0.4	13.0	1.2	0.0	8.9	0.1	0.0	0.6	0.8	0.4
Delay (s)	50.0	35.1	0.4	61.5	48.5	0.0	48.6	17.3	14.6	40.2	26.2	21.3
Level of Service	D	D	A	E	D	A	D	B	B	D	C	C
Approach Delay (s)		16.6			39.8			28.4			25.6	
Approach LOS		B			D			C			C	

Intersection Summary			
HCM 2000 Control Delay	26.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	106.9	Sum of lost time (s)	22.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

2040 Total Volumes - GLADYS EXT
9/7/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	195	260	360	693	714	218	427	1181	189	76	1358	375
v/c Ratio	0.63	0.46	0.88	0.93	0.59	0.42	0.88	0.44	0.27	0.36	0.79	0.62
Control Delay	61.3	50.9	37.9	64.5	41.1	7.9	70.0	27.8	4.7	58.7	43.2	17.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.3	50.9	37.9	64.5	41.1	7.9	70.0	27.8	4.7	58.7	43.2	17.2
Queue Length 50th (m)	23.0	20.8	21.0	82.9	53.6	1.1	51.7	52.1	0.0	9.0	86.9	24.0
Queue Length 95th (m)	35.2	29.8	#71.0	#110.0	64.1	17.4	#79.7	60.9	14.7	17.0	100.9	57.2
Internal Link Dist (m)		436.0			418.0			231.9			250.2	
Turn Bay Length (m)	126.0		50.0	25.0		50.0	75.0		50.0	70.0		
Base Capacity (vph)	334	667	432	767	1304	543	485	2756	711	212	1710	604
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	0.39	0.83	0.90	0.55	0.40	0.88	0.43	0.27	0.36	0.79	0.62

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
6: Sumas Way & Marshall Rd

2040 Total Volumes - GLADYS EXT
9/7/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	195	260	360	603	621	190	410	1134	181	76	1358	375
Future Volume (vph)	195	260	360	603	621	190	410	1134	181	76	1358	375
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.81	1.00	0.97	0.86	1.00
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3257	4871	1479	3321	4919	1459	3354	6889	1494	3225	6020	1496
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3257	4871	1479	3321	4919	1459	3354	6889	1494	3225	6020	1496
Peak-hour factor, PHF	1.00	1.00	1.00	0.87	0.87	0.87	0.96	0.96	0.96	1.00	1.00	1.00
Adj. Flow (vph)	195	260	360	693	714	218	427	1181	189	76	1358	375
RTOR Reduction (vph)	0	0	236	0	0	160	0	0	116	0	0	178
Lane Group Flow (vph)	195	260	124	693	714	58	427	1181	73	76	1358	197
Confl. Peds. (#/hr)	5		3	3		5	1		2	2		1
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	3%	2%	3%	1%	1%	4%	0%	7%	2%	4%	4%	2%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	11.1	13.6	13.6	26.3	28.8	28.8	16.9	46.0	46.0	6.2	34.6	34.6
Effective Green, g (s)	11.1	13.6	13.6	26.3	28.8	28.8	16.9	46.0	46.0	6.2	34.6	34.6
Actuated g/C Ratio	0.09	0.11	0.11	0.22	0.24	0.24	0.14	0.39	0.39	0.05	0.29	0.29
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	4.0	5.0	5.0
Lane Grp Cap (vph)	305	559	170	738	1197	355	479	2678	580	169	1760	437
v/s Ratio Prot	0.06	0.05		c0.21	0.15		c0.13	0.17		0.02	c0.23	
v/s Ratio Perm			c0.08			0.04			0.05			0.13
v/c Ratio	0.64	0.47	0.73	0.94	0.60	0.16	0.89	0.44	0.13	0.45	0.77	0.45
Uniform Delay, d1	51.7	48.9	50.6	45.2	39.6	35.2	49.8	26.7	23.2	54.4	38.2	34.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.4	0.6	14.4	19.5	0.8	0.2	19.6	0.2	0.2	2.6	2.5	1.6
Delay (s)	56.0	49.6	64.9	64.7	40.4	35.5	69.4	26.9	23.4	57.0	40.8	35.7
Level of Service	E	D	E	E	D	D	E	C	C	E	D	D
Approach Delay (s)		57.9			50.1			36.6			40.4	
Approach LOS		E			D			D			D	

Intersection Summary			
HCM 2000 Control Delay	44.2	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	118.3	Sum of lost time (s)	26.9
Intersection Capacity Utilization	81.6%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
8: Gladys Ave & Lumar Pl

2040 Total Volumes - GLADYS EXT
9/7/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	15	9	238	21	59	26
Future Volume (Veh/h)	15	9	238	21	59	26
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	10	259	23	64	28
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	282				312	270
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	282				312	270
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	99				90	96
cM capacity (veh/h)	1280				672	768

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	26	282	92
Volume Left	16	0	64
Volume Right	0	23	28
cSH	1280	1700	698
Volume to Capacity	0.01	0.17	0.13
Queue Length 95th (m)	0.3	0.0	3.4
Control Delay (s)	4.9	0.0	10.9
Lane LOS	A		B
Approach Delay (s)	4.9	0.0	10.9
Approach LOS			B

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	26.4%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
9: Lumar Pl & Gladys Ave

2040 Total Volumes - GLADYS EXT
9/7/2018

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	75	0	4	26	0	10
Future Volume (Veh/h)	75	0	4	26	0	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)	82	0	4	28	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	29	18			32	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	29	18			32	
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	100			100	
cM capacity (veh/h)	986	1061			1580	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	82	32	11
Volume Left	82	0	0
Volume Right	0	28	0
cSH	986	1700	1580
Volume to Capacity	0.08	0.02	0.00
Queue Length 95th (m)	2.1	0.0	0.0
Control Delay (s)	9.0	0.0	0.0
Lane LOS	A		
Approach Delay (s)	9.0	0.0	0.0
Approach LOS	A		

Intersection Summary			
Average Delay	5.9		
Intersection Capacity Utilization	14.4%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
1: Sumas Way & S Fraser Way

2040 Total Volumes - GLADYS EXT
9/7/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	485	210	669	268	172	365	419	1556	332	102	1259	199
v/c Ratio	0.78	0.66	0.44	0.69	0.70	0.24	0.74	0.63	0.41	0.56	0.65	0.33
Control Delay	58.6	59.5	0.9	40.3	68.6	0.4	58.2	32.9	5.2	67.9	39.3	9.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	58.6	59.5	0.9	40.3	68.6	0.4	58.2	32.9	5.2	67.9	39.3	9.2
Queue Length 50th (m)	59.9	50.1	0.0	49.6	41.5	0.0	51.3	89.7	1.2	24.4	77.6	4.2
Queue Length 95th (m)	83.4	77.5	0.0	74.6	69.2	0.0	74.4	120.1	22.0	43.9	99.7	21.4
Internal Link Dist (m)		76.2			172.2			250.2			250.3	
Turn Bay Length (m)	70.0		45.0			45.0	95.0			100.0		60.0
Base Capacity (vph)	805	459	1528	431	333	1526	696	2535	816	225	1966	612
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.60	0.46	0.44	0.62	0.52	0.24	0.60	0.61	0.41	0.45	0.64	0.33

Intersection Summary

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis
1: Sumas Way & S Fraser Way

2040 Total Volumes - GLADYS EXT
9/7/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	441	191	609	268	172	365	419	1556	332	88	1083	171
Future Volume (vph)	441	191	609	268	172	365	419	1556	332	88	1083	171
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	4.5	5.7	4.0	4.5	5.7	4.0	6.0	5.8	5.8	5.8	5.8	5.8
Lane Util. Factor	0.97	1.00	1.00	1.00	1.00	1.00	0.97	0.86	1.00	1.00	0.86	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3354	1820	1528	1728	1820	1526	3288	6199	1528	1729	5906	1494
Flt Permitted	0.95	1.00	1.00	0.52	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3354	1820	1528	941	1820	1526	3288	6199	1528	1729	5906	1494
Peak-hour factor, PHF	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	0.86	0.86	0.86
Adj. Flow (vph)	485	210	669	268	172	365	419	1556	332	102	1259	199
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	195	0	0	117
Lane Group Flow (vph)	485	210	669	268	172	365	419	1556	137	102	1259	82
Confl. Peds. (#/hr)	3		1	1		3	7					7
Confl. Bikes (#/hr)						3			1			
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	2%	1%	0%	0%	6%	1%
Turn Type	Prot	NA	Free	pm+pt	NA	Free	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			Free	8		Free			6			2
Actuated Green, G (s)	23.1	21.7	124.1	35.0	16.8	124.1	21.5	49.4	49.4	13.0	40.7	40.7
Effective Green, g (s)	23.1	21.7	124.1	35.0	16.8	124.1	21.5	49.4	49.4	13.0	40.7	40.7
Actuated g/C Ratio	0.19	0.17	1.00	0.28	0.14	1.00	0.17	0.40	0.40	0.10	0.33	0.33
Clearance Time (s)	4.5	5.7		4.5	5.7		6.0	5.8	5.8	5.8	5.8	5.8
Vehicle Extension (s)	3.0	3.0		3.0	3.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	624	318	1528	380	246	1526	569	2467	608	181	1936	489
v/s Ratio Prot	c0.14	c0.12		0.10	0.09		c0.13	0.25		0.06	c0.21	
v/s Ratio Perm			0.44	0.10		0.24			0.09			0.05
v/c Ratio	0.78	0.66	0.44	0.71	0.70	0.24	0.74	0.63	0.23	0.56	0.65	0.17
Uniform Delay, d1	48.1	47.8	0.0	37.9	51.2	0.0	48.6	30.0	24.7	52.9	35.6	29.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.1	5.1	0.9	5.9	8.4	0.4	5.3	0.6	0.3	4.8	0.9	0.2
Delay (s)	54.1	52.8	0.9	43.8	59.6	0.4	53.9	30.6	25.0	57.7	36.5	29.9
Level of Service	D	D	A	D	E	A	D	C	C	E	D	C
Approach Delay (s)		27.8			27.5			34.0			37.0	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM 2000 Control Delay	32.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	124.1	Sum of lost time (s)	22.0
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

Queues
6: Sumas Way & Marshall Rd

2040 Total Volumes - GLADYS EXT
9/7/2018

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Group Flow (vph)	723	853	592	322	416	182	508	1652	506	236	1473	397
v/c Ratio	0.92	0.73	0.92	0.95	0.82	0.58	0.87	0.59	0.69	0.76	0.83	0.57
Control Delay	69.4	52.9	39.1	99.6	75.2	15.8	72.3	35.6	22.0	78.2	50.8	8.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	69.4	52.9	39.1	99.6	75.2	15.8	72.3	35.6	22.0	78.2	50.8	8.7
Queue Length 50th (m)	100.3	79.6	66.9	46.5	42.1	0.0	71.1	90.3	57.7	33.4	111.9	5.9
Queue Length 95th (m)	#131.7	95.2	#140.2	#76.1	#59.1	23.2	#97.8	100.5	100.2	#51.0	126.5	34.5
Internal Link Dist (m)		436.0			418.0			231.9			250.2	
Turn Bay Length (m)	126.0		50.0	70.0		50.0	75.0		50.0	70.0		
Base Capacity (vph)	823	1219	654	339	506	315	596	2781	738	314	1780	701
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.70	0.91	0.95	0.82	0.58	0.85	0.59	0.69	0.75	0.83	0.57

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Signalized Intersection Capacity Analysis — 2040 Total Volumes - GLADYS EXT

6: Sumas Way & Marshall Rd — 9/7/2018

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	701	827	574	312	404	177	493	1602	491	229	1429	385
Future Volume (vph)	701	827	574	312	404	177	493	1602	491	229	1429	385
Ideal Flow (vphpl)	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800	1800
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Lane Util. Factor	0.97	0.91	1.00	0.97	0.91	1.00	0.97	0.81	1.00	0.97	0.86	1.00
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.98	1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	3354	4969	1510	3354	4919	1473	3321	7298	1510	3354	6078	1507
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	3354	4969	1510	3354	4919	1473	3321	7298	1510	3354	6078	1507
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	723	853	592	322	416	182	508	1652	506	236	1473	397
RTOR Reduction (vph)	0	0	288	0	0	163	0	0	163	0	0	260
Lane Group Flow (vph)	723	853	304	322	416	19	508	1652	343	236	1473	137
Confl. Peds. (#/hr)	10		2	2		10	8		7	7		8
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	0%	0%	1%	0%	1%	2%	1%	1%	0%	0%	3%	0%
Turn Type	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Actuated Green, G (s)	32.5	32.8	32.8	14.0	14.3	14.3	24.3	52.8	52.8	12.8	40.6	40.6
Effective Green, g (s)	32.5	32.8	32.8	14.0	14.3	14.3	24.3	52.8	52.8	12.8	40.6	40.6
Actuated g/C Ratio	0.23	0.24	0.24	0.10	0.10	0.10	0.18	0.38	0.38	0.09	0.29	0.29
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	7.1	5.8	5.8	6.4	5.8	5.8
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	5.0	5.0	5.0	4.0	5.0	5.0
Lane Grp Cap (vph)	786	1175	357	338	507	151	582	2780	575	309	1780	441
v/s Ratio Prot	c0.22	0.17		c0.10	0.08		c0.15	0.23		0.07	c0.24	
v/s Ratio Perm			0.20			0.01			0.23			0.09
v/c Ratio	0.92	0.73	0.85	0.95	0.82	0.12	0.87	0.59	0.60	0.76	0.83	0.31
Uniform Delay, d1	51.8	48.8	50.6	62.0	60.9	56.5	55.6	34.3	34.4	61.4	45.7	38.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	15.7	2.3	17.5	36.4	10.3	0.4	14.6	0.5	2.5	11.3	3.7	0.8
Delay (s)	67.5	51.0	68.1	98.4	71.1	56.8	70.3	34.8	36.9	72.7	49.5	39.0
Level of Service	E	D	E	F	E	E	E	C	D	E	D	D
Approach Delay (s)		61.2			77.8			42.0			50.1	
Approach LOS		E			E			D			D	

Intersection Summary			
HCM 2000 Control Delay	53.6	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	138.6	Sum of lost time (s)	26.9
Intersection Capacity Utilization	93.9%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
8: Gladys Ave & Lumar Pl

2040 Total Volumes - GLADYS EXT
9/7/2018

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	289	200	57	36	16
Future Volume (Veh/h)	25	289	200	57	36	16
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	314	217	62	39	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	279				616	248
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	279				616	248
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				91	98
cM capacity (veh/h)	1284				444	791

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	341	279	56
Volume Left	27	0	39
Volume Right	0	62	17
cSH	1284	1700	513
Volume to Capacity	0.02	0.16	0.11
Queue Length 95th (m)	0.5	0.0	2.8
Control Delay (s)	0.8	0.0	12.9
Lane LOS	A		B
Approach Delay (s)	0.8	0.0	12.9
Approach LOS			B

Intersection Summary			
Average Delay	1.5		
Intersection Capacity Utilization	43.9%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

HCM Unsignalized Intersection Capacity Analysis
9: Lumar Pl & Gladys Ave

2040 Total Volumes - GLADYS EXT
9/7/2018

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	48	0	6	76	1	4
Future Volume (Veh/h)	48	0	6	76	1	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)	52	0	7	83	1	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	54	48			90	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	54	48			90	
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	100			100	
cM capacity (veh/h)	953	1020			1505	

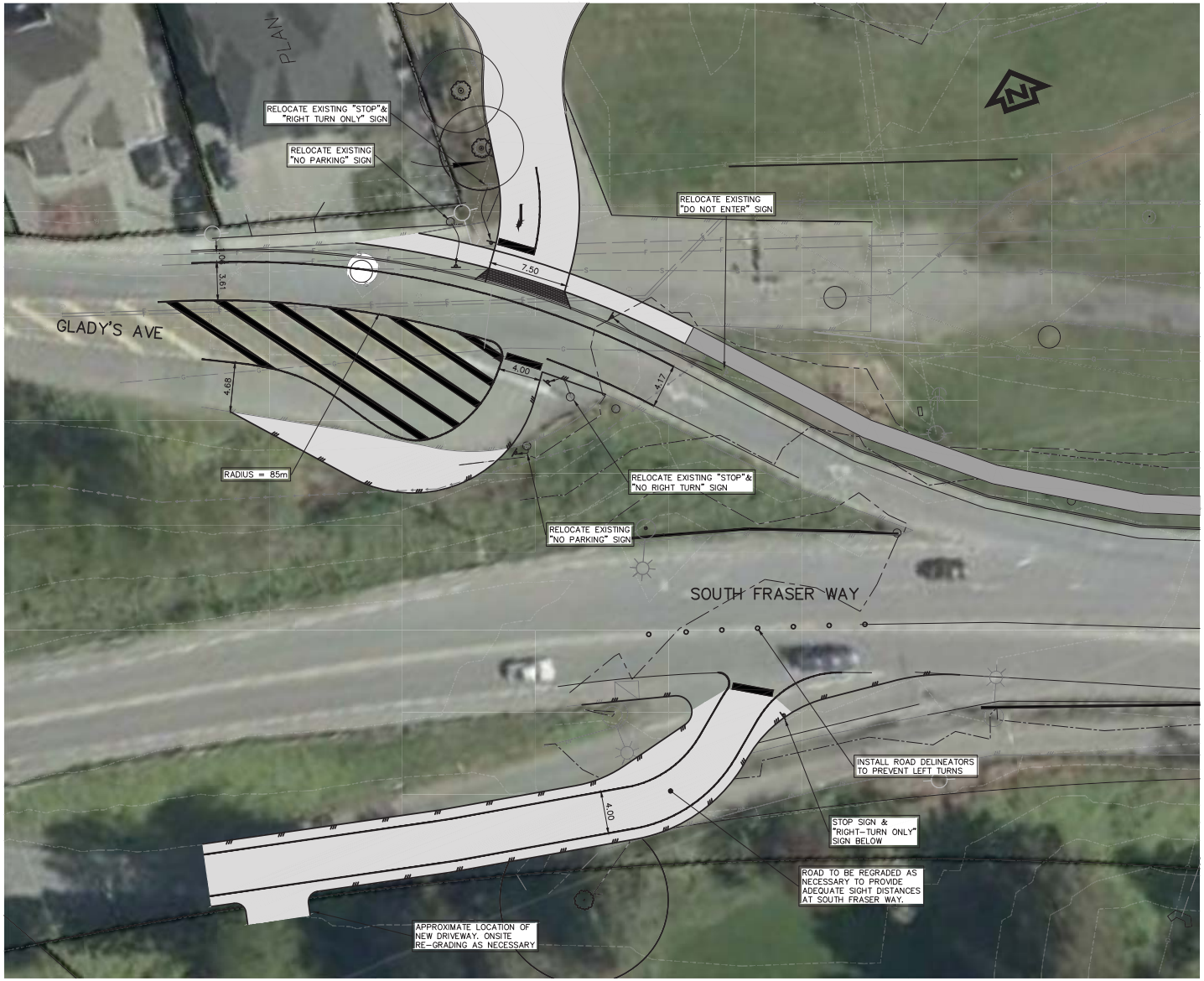
Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	52	90	5
Volume Left	52	0	1
Volume Right	0	83	0
cSH	953	1700	1505
Volume to Capacity	0.05	0.05	0.00
Queue Length 95th (m)	1.3	0.0	0.0
Control Delay (s)	9.0	0.0	1.5
Lane LOS	A		A
Approach Delay (s)	9.0	0.0	1.5
Approach LOS	A		

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	15.0%	ICU Level of Service	A
Analysis Period (min)	15		

Attachment: Attachment F: Traffic Impact Assessment (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys Avenue)

APPENDIX F

Off-Site Road Works Design Drawing



GRID NO. CITY FILE NO. SUB-

CLIENT/DEVELOPER:

ELEVATE DEVELOPMENT CORP
THE NEWS - COMMERCIAL
#202 - 15127 100 AVE
SURREY, BC

REV. 2017 01 16

ENGINEER:

WEDLER ENGINEERING
www.wedler.com

THE WEDLER GROUP
- Abbotsford 1.604.746.0300
- Chilliwack 1.604.792.0651
- Courtenay 1.250.334.3263
- Surrey 1.604.588.1919

NO.	DATE	BY	REVISIONS	TECH	ENG.
A	2018-09-10	EAG	ISSUED FOR DISCUSSION		EAG

PROJECT NO:	C17-5494/A
DATE:	2018-04-11
DWN BY:	EAG
DESIGN:	EAG
SCALE HORZ:	1:200
SCALE VERT:	1:200

SHEET NO: 1 OF 1

City of Abbotsford
Engineering Department
Reviewed for compliance with City standards.
By:..... Date:.....
☐ Released for construction
☐ Revise as noted

City of Abbotsford

ELEVATE DEVELOPMENT
OFFSITE ROAD GEOMETRY

K:\34005499\C17-5494a - Residential 34375 Gladys Ave Abby\Design\- Current Drawing Files\C17-5494A - SHEETS - MSC.dwg 2018/9/10 11:59:12 AM egalt

MEMO

DATE: October 11, 2018
PROJECT NO: 04-17-0021
PROJECT: 34375 Gladys Avenue TIA
SUBJECT: Response to City of Abbotsford Comments

TO: Tim Clark-Hollis
Elevate Development Corp

PREPARED BY: James Lee, P.Eng., MBA, PMP

Provided in the following document are Bunt & Associates Engineering Ltd.'s (Bunt's) responses to the comments provided by the City of Abbotsford (dated September 28th, 2018) in response to Bunt's 34375 Gladys Avenue Transportation Impact Assessment (TIA) report (dated September 12th, 2018). For reference, the City's email containing the comments has been included in **Appendix A**.

The following section first presents the City comment in **bold** text and then provides Bunt's response below.

1. BUNT RESPONSES TO CITY COMMENTS

1.1 Traffic Impact of Development

Development Site Traffic Volumes – The City has calculated the peak hour to generate 34vph, but the draft TIA document & recommendations reference 4vph (1 every 15mins) and therefore not a significant increase over existing conditions. The City believes these numbers are incorrect and if background volumes are adjusted this may trigger the need for the review of the recommendations and precipitate additional improvements/works.

The 4vph referenced in the report refers to the "net" number of site-generated vehicle trips (i.e., the difference in site traffic volume between what the proposed development would add compared to what the existing Abbotsford News site contributes today based on Bunt's traffic counts) added to the Gladys Avenue Underpass during the critical weekday PM peak hour. This is explained in section 3.1.4 of the TIA.

Attachment: Attachment G: Traffic Impact Assessment Response Letter (PDS 043-2019 : LUC Discharge RZ and DP with V applications for

Attachment: Attachment G: Traffic Impact Assessment Response Letter (PDS 043-2019 : LUC Discharge RZ and DP with V applications for

Bunt acknowledges, however, that the "gross" number of vehicle trips added to the underpass would be 34vph. This information is presented in Exhibit 3.6 "Development Site Traffic Volumes".

When assessing the impact of the development in relation to the existing condition, it is the "net" number of vehicle trips that is relevant as the vehicle trips generated by the existing Abbotsford News operation would of course no longer be present.

1.2 Recommended Improvements

Appears to put most of the improvements on the City/MoTI?

Bunt's analysis indicated that all identified traffic operations issues and subsequent need for improvements were required under existing and future Background traffic volume scenarios.

On account of the relatively small amount of net additional site traffic involved with this project, the addition of the proposed development's site traffic was not found to trigger the need for any additional mitigation measures compared to what was required to accommodate Background traffic alone in the same horizon year.

Option (pg. 126) The TIA proposes a stop condition for all east bound vehicles merging onto SFW, where today exists a yield condition. This is expected to create significant queues, especially when the volumes are adjusted as per the item above. Perhaps it is worthwhile to review a hybrid approach that separates the North bound movement on Hwy 11 and the South bound movement on Hwy 11 through the use of a SB through lane, and off of that, a stop condition for vehicles that will go north on Highway 11? All alternatives that improve safety and operational issues should be reviewed.

The addition of 4 net new vehicle trips and the change of intersection control from a yield to a stop control are not expected to result in a significant increase in the vehicle queue length on the Gladys Avenue Underpass compared to what exists today during the critical PM peak period.

Today, the PM peak period vehicle queues on the Gladys Avenue Underpass are experienced due to a combination of traffic queued on eastbound South Fraser Way preventing vehicles from having adequate gaps to merge onto South Fraser Way and poor sightlines available at the merge. These two factors result in the movement operating not unlike a stop control condition during these more pressured traffic periods. For this reason, the proposed formal implementation of a stop control is not expected to significantly affect traffic capacity conditions on Gladys but will, in our professional opinion, improve traffic safety.

During other periods of the day when traffic volumes on area streets are lower and vehicle queues on eastbound South Fraser Way are not of consequence to the Gladys Avenue underpass traffic, the recommended stop control on the Gladys approach will result in some additional delay and queuing; however, there is nearly 170 metres of available storage space on this section of Gladys Avenue through the underpass of South Fraser Way. As noted above, while there may be some

additional queuing on this end section of eastbound Gladys Avenue, the traffic safety of the merging of this traffic with eastbound South Fraser Way traffic will be improved.

With regards to the "hybrid" design identified by the City as described above, Bunt interprets this suggested modification to include:

- Introducing a new eastbound through lane along South Fraser Way that vehicles intending to turn right onto Highway 11 to travel southbound would use; and,
- Introducing a stop condition in this vicinity that vehicles wanting to travel northbound on Highway 11 would use.

While Bunt is uncertain of what the proposed layout would look like without a conceptual sketch provided, our initial thoughts are:

- Introducing two different control types for in effect the same traffic movement (i.e., a right-turn from the Gladys Avenue Underpass onto South Fraser Way) would be very confusing to drivers and difficult to properly sign, and therefore, Bunt does not recommend this arrangement; and,
- Unless lane delineators were installed to physically prevent vehicles travelling along the new eastbound through lane on South Fraser Way from changing lanes, a weaving condition would be introduced. As discussed in Section 6.2.1 of the TIA report, Bunt advised against introducing a new eastbound through lane on South Fraser Way for this reason (i.e., a short weaving distance creating safety concerns). Alternatively, if delineators were introduced, this would then require a second eastbound right-turn lane to be introduced at South Fraser Way & Sumas Way (Hwy 11) to allow eastbound vehicles on South Fraser Way to also turn right onto Highway 11. Due to the traffic operations issues discussed in Section 6.2.2 of the TIA for a similar option explored, this lane delineation and the introduction of second eastbound right-turn lane is not recommended.

Attachment: Attachment G: Traffic Impact Assessment Response Letter (PDS 043-2019 : LUC Discharge RZ and DP with V applications for

1.3 Site Access (pg. 110)

Conceptual drawings for access should assess safety/geometry including the stopping and sight distance from S. Fraser Way. Please ensure the TIA specifically address these items.

As the proposed reconfiguration of the site access intersection does not result in a significantly modified intersection orientation, change in road grades, or different vehicle priorities, the available sight distance condition is not expected to change from the existing arrangement.

Based on Transportation Association of Canada (TAC) guidelines, for a 50km/h roadway with the existing grade on South Fraser Way, the required stopping sight distance (SSD) requirement for a vehicle approaching the site from South Fraser Way is approximately 70m. A high level review of this scenario indicates that the available SSD would be adequate. To ensure that visibility is not obstructed, however, Bunt recommends that the off-site greenery located between the south approach of Gladys Avenue and the South Fraser Exit Ramp is kept trimmed so that is does not grow to a height that would obstruct the line of sight between vehicles approaching the site from the South Fraser Way exit ramp and vehicles stopped on the south approach of Gladys Avenue. **Figure 1.1** shows a view from a vehicle approaching the site intersection from the South Fraser Way Exit Ramp and circles the greenery being referred to in red.

Figure 1.1: View from Vehicle Approaching Site Intersection and Off-Site Greenery

Attachment: Attachment G: Traffic Impact Assessment Response Letter (PDS 043-2019 : LUC Discharge RZ and DP with V applications for

1.4 General

When the engineer completing this study feels these items have been addressed (in addition to any other refinements/adjustment that may need to under taken as result of quality control) and are prepared to submit a Final Copy of the report, please inform/remind them that the copies of the final report are to be signed and stamped by a Professional Engineer licensed in B.C. The Final Submission must include an electronic copy with associated analyses files (e.g. Synchro, Sidra files, signal warrant worksheets, etc.) in CDs or flash drives and three hard copies and must include the original terms of reference, raw traffic counts, supporting trip distribution data, existing signal timing plans, Synchro and Sidra outputs, etc., in the appendices.

Bunt will finalize the TIA report and re-submit with the supporting material listed above.

Finally, the City understands that this study was initiated while the 2007 Transportation Master Plan (TMP) was "of force". As you are likely aware in June of this year the City adopted a new revised TMP which may impact the recommendations of this proposal. Your Traffic Engineer, if they have not done so already, shall include detail and comment with regard to their review of the new TMP and provide comment as to how this revised vision document impacts (or does not impact) the results, findings and recommendations of this TIA. Should revisions be required as a result of this new TMP, the Engineer shall comment on the implications and provide an explanation.

In Section 2.3 of the TIA report, Bunt provides a discussion of the City's 2018 Transportation & Transit Master Plan (TTMP), acknowledging that the plan was introduced subsequent to the initiation of the original study. Bunt then provides a summary of how the new information in the TTMP impacts the subject study. In summary, the key points of this discussion included:

- Unlike the 2007 TMP, the 2018 TTMP does not go into significant detail about the Gladys Avenue area nearby the site, and does not discuss the concept of the Gladys Avenue Connector or the recommended specific lane upgrades at the Sumas Way & Marshall Road intersection.
- Consistent with the findings of Bunt's TIA, the TTMP identifies that the Sumas Way & South Fraser Way and Sumas Way & Marshall Road intersections are currently very congested, particularly during the PM peak hour, and will experience failing conditions in the future.
- The TTMP discusses the City's desire to transform key east-west corridors such as South Fraser Way (which runs along the south edge of the development) and Essendene Avenue into complete streets that are attractive, accessible, and convenient transportation corridors for all modes while reducing vehicular traffic on these routes. In conjunction, the City plans to conduct major network improvements to enhance other east-west routes (e.g., Maclure Road, George Ferguson Way / McKee Road, and Marshall Road) and add new connections so that these

roads can accommodate a greater portion of the vehicular traffic that currently uses South Fraser Way and Essendene Avenue.

- While the City's TTMP has stated the goal to reduce traffic along South Fraser Way in the future, Bunt's analysis has continued to assume, based on direction from City staff, a continuous growth in area/background traffic (i.e., 2% per year) on South Fraser Way until 2040.

Attachment: Attachment G: Traffic Impact Assessment Response Letter (PDS 043-2019 : LUC Discharge RZ and DP with V applications for

TRANSPORTATION PLANNERS AND ENGINEERS

bunt & associates

APPENDIX A

City of Abbotsford Comments

Attachment: Attachment G: Traffic Impact Assessment Response Letter (PDS 043-2019 : LUC Discharge RZ and DP with V applications for

James Lee

Subject: RE: Abby Daily News Site - TIA Update

From: Blake Collins <BCollins@abbotsford.ca>
Sent: Friday, September 28, 2018 4:35:42 PM
To: Tim Hollis
Cc: Kelsey Baldwin
Subject: Abby Daily News Site - TIA Update

Hi Tim,

I hope this email finds you well and enjoying this great fall weather.

Please note that our Traffic Engineering Section has completed a preliminary review of the most recent draft TIA. In support of moving this project forward and in the continued spirit of collaboration, the City can provide the preliminary feedback that I've included below. Please note that to be most efficient the City requires that following these comments that a signed and sealed traffic report with all supporting documentation to be submitted to the City. Unfortunately, further comment on draft versions cannot be accommodated.

Feedback on Draft Preliminary TIA

- Traffic Impact of Development
    - Development Site Traffic Volumes – The City has calculated the peak hour to generate 34vph, but the draft TIA document & recommendations reference 4vph (1 every 15mins) and therefore not a significant increase over existing conditions. The City believes these numbers are incorrect and if background volumes are adjusted this may trigger the need for the review of the recommendations and precipitate additional improvements/works.

- Recommended Improvements
    - Appears to put most of the improvements on the City/MoTI?
    - Option (pg. 126) The TIA proposes a stop condition for all east bound vehicles merging onto SFW, where today exists a yield condition. This is expected to create significant queues, especially when the volumes are adjusted as per the item above. Perhaps it is worthwhile to review a hybrid approach that separates the North bound movement on Hwy 11 and the South bound movement on Hwy 11 through the use of a SB through lane, and off of that, a stop condition for vehicles that will go north on Highway 11? All alternatives that improve safety and operational issues should be reviewed.

- Site Access (pg. 110)
    - Conceptual drawings for access should assess safety/geometry including the stopping and sight distance from S. Fraser Way. Please ensure the TIA specifically address these items.

When the engineer completing this study feels these items have been addressed (in addition to any other refinements/adjustment that may need to under taken as result of quality control) and are prepared to submit a **Final Copy** of the report, please inform/remind them that the copies of the final report are to be signed and stamped by a Professional Engineer licensed in B.C. The Final Submission must include an electronic copy with associated analyses files (e.g. Synchro, Sidra files, signal warrant worksheets, etc.) in CDs or flash drives and three hard copies and must include the original terms of reference, raw traffic counts, supporting trip distribution data, existing signal timing plans, Synchro and Sidra outputs, etc., in the appendices.

Finally, the City understands that this study was initiated while the 2007 Transportation Master Plan (TMP) was "of force". As you are likely aware in June of this year the City adopted a new revised TMP which may impact the recommendations of this proposal. Your Traffic Engineer, if they have not done so already, shall include detail and comment with regard to their review of the new TMP and provide comment as to how this revised vision document impacts (or does not impact) the results, findings and recommendations of this TIA. Should revisions be required as a result of this new TMP, the Engineer shall comment on the implications and provide an explanation.

I trust you will find this information helpful in finalizing this Traffic Impact Assessment.

Kindly,
Blake

Blake Collins **MEDes, MCIP, RPP**
Senior Planner
Tel: 604-851-4182
E: bcollins@abbotsford.ca

ABBOTSFORD
32315 South Fraser Way
Abbotsford, BC V2T 1W7
www.abbotsford.ca

Total Control Panel Login

To: jlee@bunteng.com Remove this sender from my allow list
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CITY OF ABBOTSFORD

LAND USE CONTRACT NO. 59 DISCHARGE BYLAW, 2019

Bylaw No. 2943-2019 PRJ17-128

WHEREAS Land Use Contract No. 59 (the "Land Use Contract"), authorized by Bylaw No. 59-1973 cited as Land Use Contract Bylaw No. 59, was lawfully entered into by the City;

AND WHEREAS the Land Use Contract was registered in the Land Title Office on January 31, 1974, under Filing Number K11197;

AND WHEREAS the registered owners of the described property have applied to the City for permission to discharge the Land Use Contract;

The Council of the City of Abbotsford, in open meeting assembled, ENACTS AS FOLLOWS:

1. CITATION

Bylaw No. 2943-2019 may be cited as "Land Use Contract No. 59 Discharge Bylaw, 2019".

2. APPROVAL OF LAND USE CONTRACT DISCHARGE AGREEMENT

The Discharge Agreement set out in the attached Appendix "A", to discharge Land Use Contract No. 59 registered against the lands as shown in Appendix "B" and located at 34375 Gladys Avenue, is approved.

READ A FIRST TIME this	day of	, 2019
READ A SECOND TIME this	day of	, 2019
PUBLIC HEARING HELD this	day of	, 2019
READ A THIRD TIME this	day of	, 2019
ADOPTED this	day of	, 2019

I hereby certify this to be
a true copy of the original
bylaw

Henry Braun
Mayor

Katie Karn
Deputy City Clerk

William Flitton
Corporate Officer

Final Draft – April 25, 2019

Attachment: Attachment H: 2943-2019 Land Use Contract No. 59, Discharge Bylaw, 2019 (Final Draft) (PDS 043-2019 : LUC Discharge RZ and DP

APPENDIX "A"

DISCHARGE AGREEMENT – LAND USE CONTRACT NO. 59

THIS AGREEMENT made this _____day of _____ , 2019.

BETWEEN: CITY OF ABBOTSFORD
32315 South Fraser Way, Abbotsford
in the Province of British Columbia V2T 1W7;

(the "City")

OF THE FIRST PART

AND:

Gladys Development Corp. Inc. (No. BC1098687)
#202, 15127 – 100 Avenue
Surrey, BC V3R 0N9;

(the "Owners")

OF THE SECOND PART

WHEREAS:

(A) The Owners are the legal and beneficial owners of a certain parcel of land more particularly known and civically described as:

34375 Gladys Avenue (the "Lands").

(B) The City is the registered owner of a certain charge known as Land Use Contract No. 59 pursuant to the *Local Government Act*;

(C) The Owners wish to discharge Land Use Contract No. 59 registered under Filing Number K11197; and

(D) The City adopted Bylaw No. 2943-2019 authorizing the discharge of Land Use Contract No. 59 registered against the Lands;

NOW THEREFORE IN CONSIDERATION of the premises and the payment of the sum of ONE DOLLAR ($1.00) of lawful money of Canada (receipt of which is acknowledged by the City) the parties agree each with the other as follows, that:

1. Pursuant to the *Local Government Act*, Land Use Contract No. 59, dated the 31st day of January, 1974, shall be discharged in respect of the Lands:

2. Such discharge of Land Use Contract No. 59 in respect of the Lands shall be registered in the New Westminster Land Title Office in accordance with the *Land Title Act*.

IN WITNESS WHEREOF the parties have set their hands or, in the case of a corporation, the corporate seal was affixed in the presence of its duly authorized officers on the date and year first above written.

THE CORPORATE SEAL OF THE CITY OF ABBOTSFORD was affixed in the presence of:)

_____
Henry Braun
Mayor

_____
William Flitton
Corporate Officer

SIGNED, SEALED, AND DELIVERED in the presence of:)

_____

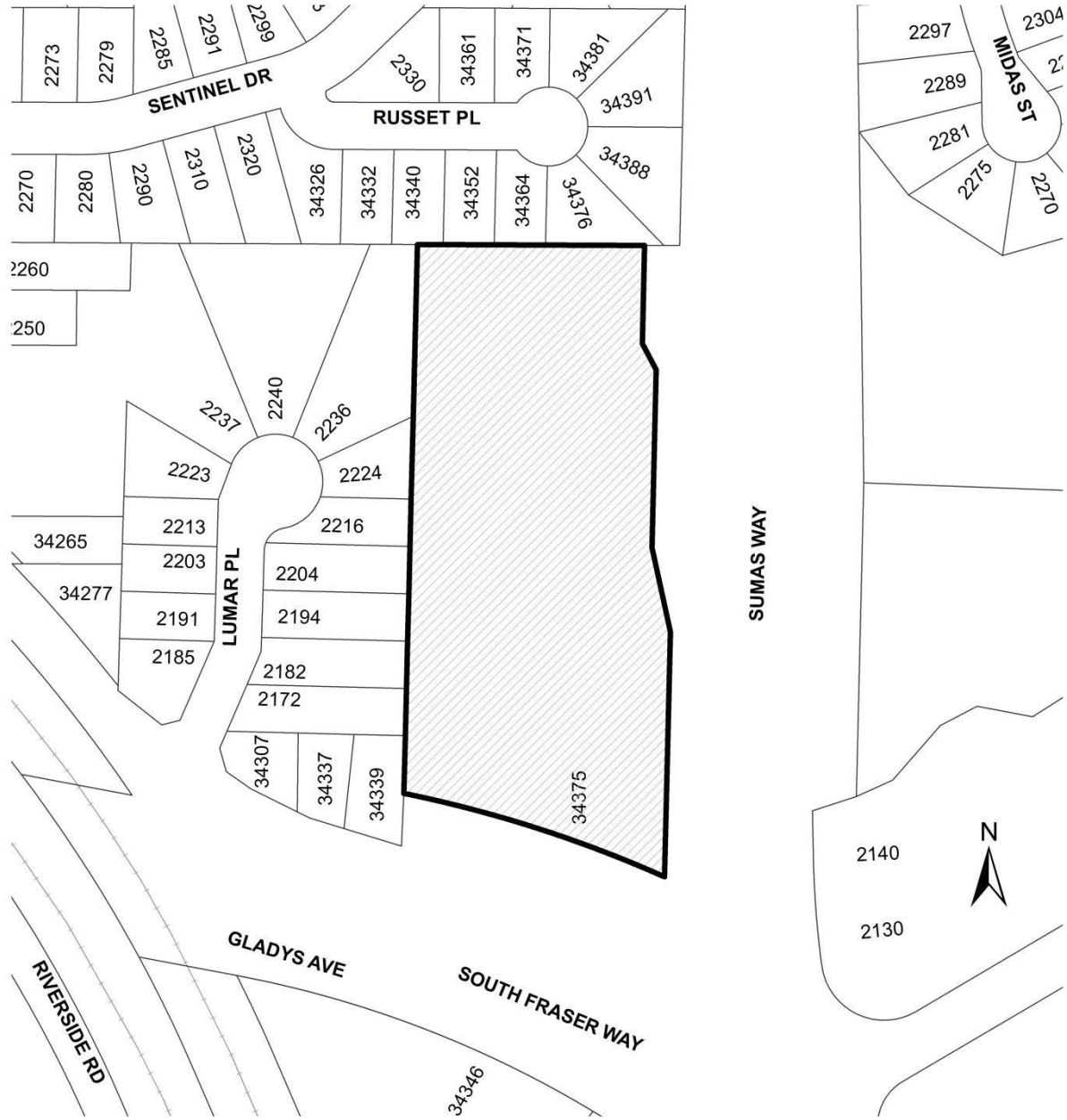
Gladys Development Corp. Inc. (No. BC1098687)
By its Authorized Signatories

_____

_____

APPENDIX "B"

SCHEDULE BYLAW NO. **2943-2019**
BEING LAND USE CONTRACT NO. **59**
DISCHARGE BYLAW, 2019



Final Draft – April 25, 2019

Attachment: Attachment H: 2943-2019 Land Use Contract No. 59, Discharge Bylaw, 2019 (Final Draft) (PDS 043-2019 : LUC Discharge RZ and DP

CITY OF ABBOTSFORD

ABBOTSFORD ZONING BYLAW, 2014, AMENDMENT BYLAW NO. 250

Bylaw No. 2942-2019 PRJ17-128

The Council of the City of Abbotsford, in open meeting assembled, ENACTS AS FOLLOWS:

1. CITATION

Bylaw No. 2942-2019 may be cited as "Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 250".

2. AMENDS ZONING MAPS

Abbotsford Zoning Bylaw, 2014, Schedule "D", Urban Area Zoning, as amended, is further amended by changing the zoning of the lands as shown in the attached Appendix "A" and located at 34375 Gladys Avenue:

From: Service Commercial Zone (C4)
To: Mid Rise Apartment Zone (RMM) and Park, Open Space and School Zone (P2)

READ A FIRST TIME this	day of	, 2019
READ A SECOND TIME this	day of	, 2019
PUBLIC HEARING HELD this	day of	, 2019
READ A THIRD TIME this	day of	, 2019
APPROVED by the Minister of Transportation and Infrastructure this	day of	, 2019
ADOPTED this	day of	, 2019

I hereby certify this to be a true copy of the original bylaw

Henry Braun
Mayor

Katie Karn
Deputy City Clerk

William Flitton
Corporate Officer

Final Draft – April 25, 2019

Attachment: Attachment I: 2942-2019 Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 250 (Final ... (PDS 043-2019 : LUC Discharge RZ

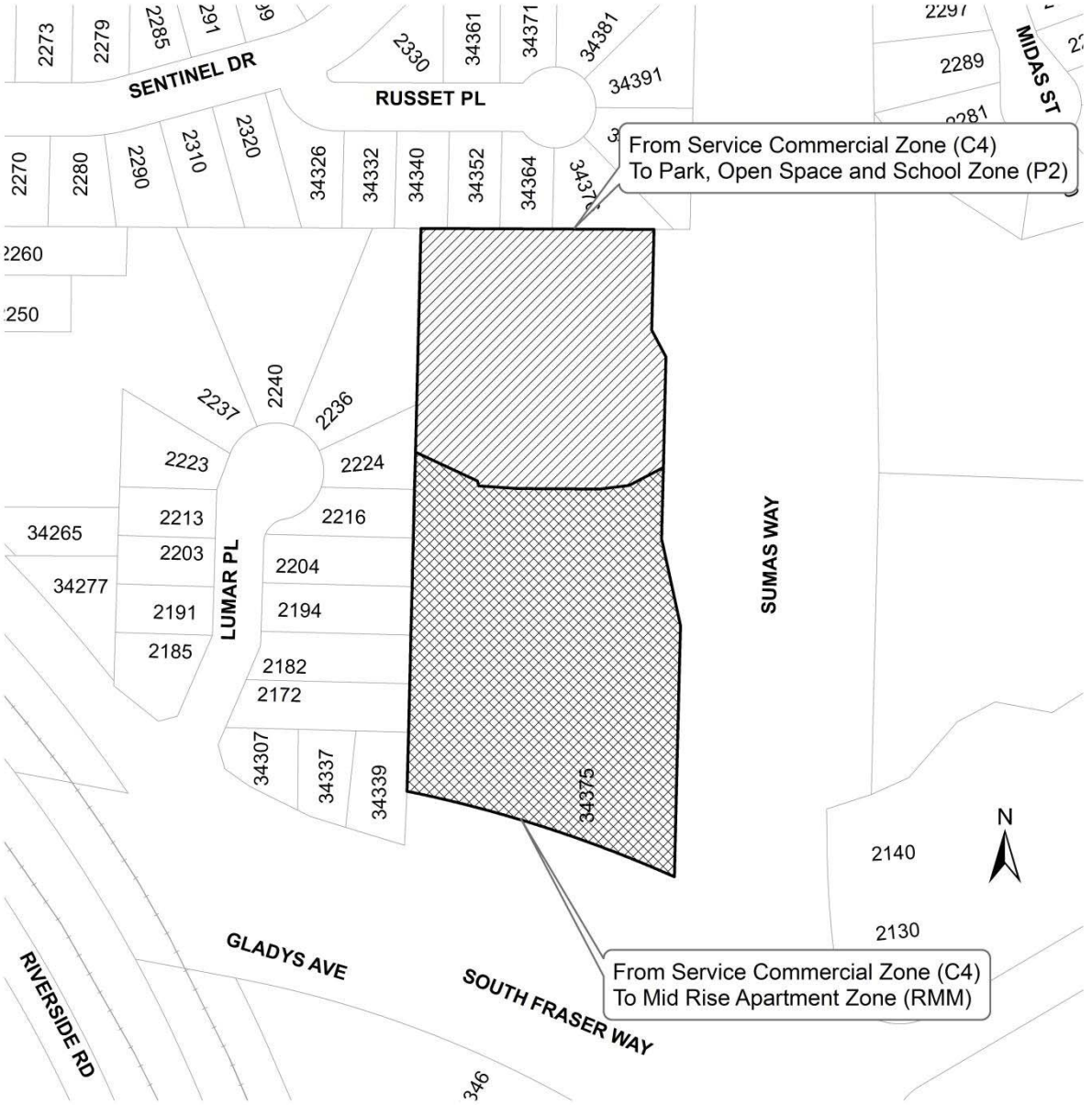
CITY OF ABBOTSFORD

ABBOTSFORD ZONING BYLAW, 2014, AMENDMENT BYLAW NO. 250

Bylaw No. 2942-2019 Page 2

APPENDIX "A"

SCHEDULE BYLAW NO. 2942-2019
BEING ABBOTSFORD ZONING BYLAW, 2014,
AMENDMENT BYLAW NO. 250
FROM: Service Commercial Zone (C4)
TO: Mid Rise Apartment Zone (RMM) &
Park, Open Space and School Zone (P2)



Final Draft – April 25, 2019

Attachment: Attachment I: 2942-2019 Abbotsford Zoning Bylaw, 2014, Amendment Bylaw No. 250 (Final ... (PDS 043-2019 : LUC Discharge RZ

ABBOTSFORD

DEVELOPMENT PERMIT NO. 2187 WITH VARIANCES

1. This Development Permit No. 2187 with variances as applied for under File No. PRJ17-128 is issued to the owner (the "Permittee") and shall apply only to that certain parcel or tract of land within the City of Abbotsford (the "City") described below, and any and all buildings, structures, and other development thereon and shall be binding on a purchaser of the Permittee's interest in the Lands, or portion thereof:

   Parcel Identifier: 007-913-613
   Legal Description: Lot 2 Except: Part on Plan 73715, Section 15 Township 16 New Westminster District Plan 6983
   (the "Lands")

2. This Development Permit with variances ("DP") is issued pursuant to the *Local Government Act* and the City of Abbotsford Official Community Plan and in accordance with the applicable bylaws of the City, except as specifically varied or supplemented by this Permit.

Development Permit

3. The following DP works, terms and conditions ("DP Measures") shall apply to the Lands:

   .1 Buildings, structures and off-street parking shall be sited and constructed in conformance with the site plan shown as Schedule X, the elevation drawings shown as Schedule X to X and the renderings shown as Schedule X as attached;

   .2 Landscaping shall be established in conformance with the Landscape Plan shown as Schedule X (the "Landscape Measures");

   .3 Tree removal and protective fencing shall be undertaken in accordance with the Arborist Report dated X prepared by van der Zalm and Associates attached as Schedule X (the "Tree Removal Measures");

   .4 Development shall occur strictly in accordance with the Geotechnical Report report prepared by Took Engineering Inc. dated X attached as Schedule X.

Fees and Securities

4. For the due and proper completion of the DP Measures the following fees and securities are required:

   .1 For the due and proper completion of the Landscape Measures as set forth in Section 3.2 of this Permit, the Permittee shall deposit and maintain with the City security in the form of an irrevocable, auto-renewing letter of credit in the sum of $SECURITY AMOUNT BASED ON COST ESTIMATE RECEIVED FROM APPLICANT'S LANDSCAPE ARCHITECT, or provide cash in the same amount (the "Security"), until all the Landscaping Measures are certified as complete by a qualified Landscape Architect. The Security may be reduced proportionately as areas of the Lands are landscaped and certified complete by a qualified Landscape Architect.

DRAFT

Attachment: Attachment J: Draft DP No. 2187 with Variances (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys

.2 In the event that the Landscaping Measures are not completed as provided for in this Permit, the City may, at its option, enter upon the Lands to carry out, and complete the Landscaping Measures, and recover the costs of so doing, including the costs of administration and supervision, from the Security deposited by the Permittee.

.3 In accordance with the Development Application and Service Fee Bylaw pay to the City, upon execution of this agreement, the sum of $2% OF THE LANDSCAPE COST ESTIMATE TO A MAXIMUM OF $2,500 in payment of all landscape inspection and administration costs associated with the Landscape Measures.

Development Variances

5. Abbotsford Zoning Bylaw, 2014 shall be varied as follows:

.1 Section 150.11 - to reduce the required number of visitor parking spaces to 34;

.2 Section 146.2 - to reduce the required landscape buffer from 3.0m to 1.5m;

.3 Section 460.3.4 – to reduce the required interior lot line setback from 6.0m to 3.0m along the north property boundary; and

.4 Section 460.3.5.b – to increase the accessory building or structure height from 4.5m to 11m

all in accordance with Schedule(s) X, attached.

Permit Limitations

6. This Permit does not constitute subdivision approval, a Soil Removal/Deposit Permit, a Building Permit or Sign Permit and does not entitle the Permittee to undertake any work without the necessary approvals or permits. Site work must be in compliance with the Soil Deposit/Removal Bylaw, the Erosion and Sediment Control Bylaw and the Blasting Regulation Bylaw; other works must be constructed in accordance with engineering plans and specifications acceptable to the City's General Manager of Engineering; and buildings and structures can only be altered, changed in occupancy or constructed in accordance with the B.C. Building Code following issuance of a Building Permit.

7. This Permit does not constitute an approval under, or relieve the Permittee from complying with, any and all federal, provincial or municipal statute, regulation or bylaw governing the Permittee's use and development of the Lands.

8. If trees on the Lands are proposed to be felled during the critical bird breeding windows:

- General: March 1st to August 31st;
- Bald Eagle: January 1st to August 31st;
- Osprey: April 1st to September 14th;
- Heron: January 16th to September 14th;
- Other Raptors: March 1st to September 31st;

then an appropriately qualified environmental professional (QEP) must monitor compliance with all applicable provisions of the:

- *Wildlife Act*;
- *Migratory Birds Convention Act, 1994*;
- any other federal or provincial environmental legislation governing the Permittee's use and development of the Lands;
- the recommendations of the Provincial document, *Develop with Care 2014: Environmental Guidelines for Urban and Rural Land Development in British Columbia (2014)*; and
- The recommendations of the Provincial document, *Guidelines for Raptor Conservation during Urban and Rural Land Development in BC (2013)*.

The nests of an eagle, peregrine falcon, gyrfalcon, osprey, heron, or burrowing owl are protected under the *Wildlife Act*, regardless of nest activity (i.e. active or inactive) and as such, even if trees are proposed to be felled outside the critical bird breeding window, it is recommended that a QEP undertake an assessment of the trees onsite to ensure that there are no nests of the aforementioned species.

Issuance / Expiry

9. This Permit expires if the permit holder does not substantially start any construction within two years from the date of issuance, in accordance with Section 504 of the *Local Government Act*.

AUTHORIZING RESOLUTION PASSED by Abbotsford City Council on the X day of X, 2019.

THIS PERMIT IS ISSUED this day of , 2019.

The Corporate Seal of the CITY OF ABBOTSFORD was hereunto affixed in the presence of:

_____
Mayor, Henry Braun

_____
Corporate Officer, William Flitton

Attachments:

Schedule List to be determined with final plan submission based on the figures contained in the Council Report.

Attachment: Attachment J: Draft DP No. 2187 with Variances (PDS 043-2019 : LUC Discharge RZ and DP with V applications for 34375 Gladys