THE CORPORATION OF THE CITY OF VERNON
REPORT TO COUNCIL

SUBMITTED BY: Matt Faucher
Current Planner

COUNCIL MEETING: REG ☒ COW ☐ I/C ☐
COUNCIL MEETING DATE: August 15, 2022
REPORT DATE: August 3, 2022
FILE: 3090-20 (DVP00552)

SUBJECT: **DEVELOPMENT VARIANCE PERMIT APPLICATION FOR 3351 ALEXIS PARK DRIVE**

PURPOSE:

To review Development Variance Permit application 00552 (DVP00552) to vary Zoning Bylaw 5000 to permit construction on slopes greater than 30% and decrease the number of required parking spaces at 3351 Alexis Park Drive. Additionally, the application proposes to vary Subdivision & Development Servicing Bylaw 3843 to allow all-turn access to Alexis Park Drive.

RECOMMENDATION:

THAT Council support Development Variance Permit Application 00552 (DVP00552) to vary Zoning Bylaw 5000 on LT A, DL 72, ODYD, PL KAP57410 (3351 Alexis Park Drive) as follows:

a) Section 4.16.1 to allow the construction of buildings, structures and swimming pools on slopes greater than 30%;

b) Section 7.1.2 to decrease the quantity of required parking spaces from 143 stalls to 117 stalls (reduction of 26 stalls);

AND FURTHER, that Council support Development Variance Permit Application 00552 to vary Subdivision & Development Servicing Bylaw 3843 on LT A, DL 72 ODYD, PL KAP57410 (3351 Alexis Park Drive) as follows:

a) Section 3.5.7 to permit an access to an arterial road where annual average daily traffic volumes exceed 5000 that is not limited to right in and out movements only without the provision of a designated turn lane.

AND FURTHER, that Council's support of DVP00552 is subject to the following:

a) That the site plan, intended to illustrate the siting of structures, drive access and parking (Attachment 1) in the report titled "Development Variance Permit Application for 3351 Alexis Park Drive" dated August 3, 2022 and respectfully submitted by the Current Planner, be attached to and form part of DVP00552 as Schedule 'A';

b) That a restrictive covenant be registered on title to ensure that the recommendations of the geo-technical report are implemented at the building permit stage, that the areas with slopes greater than 30% that are not required for development remain undisturbed and that the covenant terms provide for future public access through the development to Becker Park and allow establishment of infrastructure required to accommodate a future trail network.

ALTERNATIVES & IMPLICATIONS:

THAT Council not support Development Variance Permit Application 00552 (DVP00552) as outlined in the report titled "Development Variance Permit Application for 3351 Alexis Park Drive" dated August 3, 2022 and respectfully submitted by the Current Planner to vary Zoning Bylaw 5000 on LT A, DL 72, ODYD, PL KAP57410 (3351 Alexis Park Drive) as follows:

a) Section 4.16.1 to allow the construction of buildings, structures and swimming pools on slopes greater than 30%; and

b) Section 7.1.2 to decrease the quantity of required parking spaces from 143 stalls to 115 stalls (reduction of 28 stalls).

AND FURTHER, that Council not support Development Variance Permit Application 00552 to vary Subdivision & Development Servicing Bylaw 3843 on LT A, DL 72 ODYD, PL KAP57410 (3351 Alexis Park Drive) as follows:

a) Section 3.5.7 to permit an access to an arterial road where annual average daily traffic volumes exceed 5000 that is not limited to right in and out movements only without the provision of a designated turn lane.

Note: This alternative does not support the development variance permit application and would require the applicant and owner to develop the site in compliance with Zoning Bylaw 5000 and Subdivision & Development Servicing Bylaw 3843.

ANALYSIS:

A. Committee Recommendations:

At its meeting of March 15, 2022, the Advisory Planning Committee passed the following resolution:

"THAT Council support Development Variance Permit Application 00552 (DVP00552) to vary Zoning Bylaw 5000 on LT A, DL 72, ODYD, PL KAP57410 (3351 Alexis Park Drive) as follows:

a) Section 4.16.1 to allow the construction of buildings, structures and swimming pools on slopes greater than 30%;

b) Section 7.1.2 to decrease the quantity of required parking spaces from 143 stalls to 115 stalls (reduction of 28 stalls);

AND FURTHER, that Council's support of DVP00552 is subject to the following:

1. *That the site plan, intended to illustrate the siting of structures, drive access and parking (Attachment 1) in the report titled "Development Variance Permit Application for 3351 Alexis Park Drive" dated March 11, 2022 and respectfully submitted by the Current Planner, be attached to and form part of DVP00552 as Schedule 'A';*

2. *That a restrictive covenant be registered on title to ensure that the recommendations of the geo-technical report are implemented at the building permit stage, that the areas with slopes greater than 30% that are not required for development remain undisturbed and that the covenant terms provide for future public access through the development to Becker Park and allow establishment of infrastructure required to accommodate a future trail network."*

B. Rationale:

1. The subject property is located at 3351 Alexis Park Drive (Figures 1, 2 and 3). The property is approximately 11,611m^2 (2.87ac) in size.

2. The purpose of the application is to vary two provisions of Zoning Bylaw 5000 in order to construct a ten story 91-unit mixed use development on the subject property that contains 518.6m^2 of ground floor retail space (Attachment 1). The proposed tenure of the residential units is purpose built long-term rental.

3. Subsequent to the applications review by the Advisory Planning Committee, it was determined that the proposal requires a variance to Subdivision & Development Servicing Bylaw 3843. The regulation in Section 3.5.7 (Attachment 2) requires that the turning movements for the access on Alexis Park Drive be limited to right in and right out only. The applicant has provided a Transportation Impact Assessment (Attachment 3) in support of the variance recommending that an all-turns movement at the site access be permitted based on their analysis of the site conditions and available options.

Figure 1 - Property Location Map

Figure 2: Aerial Photo of Property

4. The subject property is zoned RH3 – High-Rise Apartment Residential (Attachment 4) and the subject application pertains to development regulations within Section 4.16.1 (30% slopes) and Section 7.1.2 (minimum parking requirements) of Zoning Bylaw 5000 (Attachment 5 and 6).

5. The application proposes to vary Section 4.16.1 of Zoning Bylaw 5000 in order to allow the proposed structures and access drive to be located on slopes exceeding 30% grade. Additionally, the application proposes to vary Section 7.1.2 of Zoning Bylaw 5000 in order to decrease the quantity of required parking stall from 143 to 117 stalls (reduction of 26 stalls).

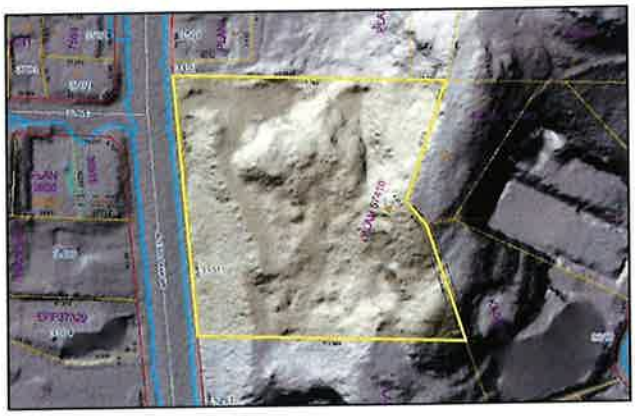


Figure 3: Lidar Imagery of Property

6. In support of the request to allow construction on slopes greater than 30%, the applicant retained a geotechnical engineer to conduct a preliminary assessment of the site and plans for the proposed development (Attachment 7). The report indicates that "from a geotechnical perspective, the proposed development is feasible, given that our recommendations presented in this report are followed as indicated and Tetra Tech is fully involved during construction to provide field reviews to confirm the work is carried out in general accordance with the intent of our recommendations."

7. To ensure that slope integrity of the remainder of the property is protected, it is recommended that a restrictive covenant be registered on the property's title to ensure that no additional development or disturbance occurs on the remaining portions of the lands with slopes greater than 30%. Future phases of the development may include trails and access to Becker Park. The covenant would be drafted to

provide public access through the development and establishment of infrastructure required to accommodate a future trail network.

8. In order to support of the request to decrease the quantity of required parking spaces from 143 stalls to 117 stalls (reduction of 26 stalls), the applicant retained WSP to review parking requirements of the development and has provided the City with a parking relaxation study report (Attachment 8) to support the reduction in parking requirements. The report states: "The maximum parking demand for the proposed mixed-use development is anticipated to be 115 spaces which is expected to be in December when the retail reaches its peak demand". The original application proposed to pursue a variance to the minimum bicycle space requirements, however, through discussion with the applicant, the proposal now includes a total of 34 Class II and 60 Class I bicycle spaces which exceeds bylaw requirements.

9. Subsequent to the applications review by the Advisory Planning Committee, Administration worked with the applicant to revise the vehicle and bicycle parking plan. The revised configuration includes the following:

    a. Two additional vehicle parking stalls reducing the requested variance to 26 stalls;
    b. Three large loading stalls suitable for a typical 15' moving truck;
    c. One commercial loading stall suitable for a typical courier delivery van;
    d. Twelve additional Class I bicycle stalls for a total of 60;
    e. Four additional Class II bicycle stalls for a total of 34;
    f. The developer has agreed to provide a new bus stop and shelter with the design and location to be coordinated with BC Transit and the City; and
    g. Provision of a ramp, designed to barrier free building code requirements, between the development and the sidewalk/bike lanes on Alexis Park Drive.

    The applicant has also provided an updated Parking Relaxation Study to support their requested variance to reduce the parking requirements for the proposed development.

10. Section 28.26(a) of the Official Community Plan (OCP) requires that any multifamily or commercial development in the Centennial Drive/Becker Park area respect a maximum elevation of 419m (1,375ft) contour line. The applicant is not seeking to increase the height of the structure beyond 419m. The application does propose to have an elevator overrun (~421.05m) that exceeds this limit but does not exceed the Becker Park top of hill (422m). Based on a review of the covenant, as well as the City's methodology utilized in determining height of a structure, the applicant has met the requirements as outlined in the covenant and OCP.

11. Administration supports the requested variances for the following reasons:

    a) The existing lot is zoned for high density residential use (RH3 – High-Rise Apartment Residential Zone);

    b) The applicant has retained a qualified geotechnical engineer to assess the site and make recommendations to safely develop the site. The site has been previously disturbed and the proposed alterations would improve existing conditions, as well as support the development. A restrictive covenant is recommended to be registered on title to ensure that the geotechnical engineering requirements are implemented at the building permit stage and disturbance of areas with slopes greater than 30% outside the requirements of the development are protected from future development;

    c) The applicant has retained a qualified traffic engineer to assess the site and make recommendations with respect to the parking demand that the proposed development would generate. The report based its recommendations on the Parking Generation Manual prepared by the Institute of Transportation Engineers (ITE), which is established as an industry standard guidance document;

d) The applicant has provided a Transportation Impact Assessment prepared by a qualified traffic engineer to confirm the design of the access and impacts on the surrounding road network.

e) The application is proposing to create 91 purpose built rental units in phase one with the potential for additional units to be created in future phases.

f) The site is well positioned for a multi-family project given its proximity to the City Centre (i.e. shopping services) and transit.

C. Attachments:

Attachment 1 – Site plan and Elevations
Attachment 2 – Schedule B – Section 3.5.7 of Subdivision & Development Servicing Bylaw 3843
Attachment 3 – Traffic Impact Assessment, prepared by Bunt & Associates
Attachment 4 – RH3 – High-Rise Apartment Residential Zone
Attachment 5 – Section 4.16.1, Section 7.1.2 of Zoning Bylaw 5000
Attachment 6 – Applicable sections of Table 7.1 and 7.3 of Zoning Bylaw 5000
Attachment 7 – Preliminary Geotechnical Assessment Report, prepared by Tetra Tech
Attachment 8 – Parking Relaxation Study, prepared by WSP

D. Council's Strategic Plan 2019 – 2022 Goals/Action Items:

The subject application involves the following goals/action items in Council's Strategic Plan 2019 – 2022:

- Support the creation of affordable and attainable housing within the City.

E. Relevant Policy/Bylaws/Resolutions:

1. The following provisions of Zoning Bylaw 5000 is relevant to the subject application:

Section 4.16.1	No construction of a building, structure or swimming pool is permitted on slopes 30% or greater.
Section 7.1.2	The minimum number of on-site vehicle parking spaces required for each use is specified in the Parking Schedule (Table 7.1) except where additional parking is required by the Ministry of Transportation and Infrastructure if the site has direct access to a provincial highway. Where the total number of parking spaces on a property exceeds 15 parking spaces, the maximum number of parking spaces for each use class may be up to 125% of the minimum number of required parking spaces..

2. The following provision of Official Community Plan 5470 is relevant to the subject application:

Section 28.26(a)	The rooflines of all buildings and structures shall not extend or project about the 419 metre (1375 feet) park elevation contour line.

3. The following provision of Subdivision & Development Servicing Bylaw 3843 is relevant to the subject application:

Section 3.5.7	Access to Arterial roads as the only, or a primary means of access or egress to development is subject to no other lower classification road access being available to that lot. Access to an Arterial road where Annual Average Daily Traffic (AADT) volumes exceed 5000 must be limited to right in and out movements only or provide a designated turn lane, where supported. Existing agricultural and low

density residential lands applying for minor additions to existing buildings are exempted from providing these works.

BUDGET/RESOURCE IMPLICATIONS:

N/A

Prepared by:

X _____
Signer 1
Matt Faucher, CPT
Planner

X _____
Signer 2
Kim Flick
Director, Community Infrastructure and Development

Approved for submission to Council:

_____
Will Pearce, CAO

Date: 10. August. 2022

REVIEWED WITH

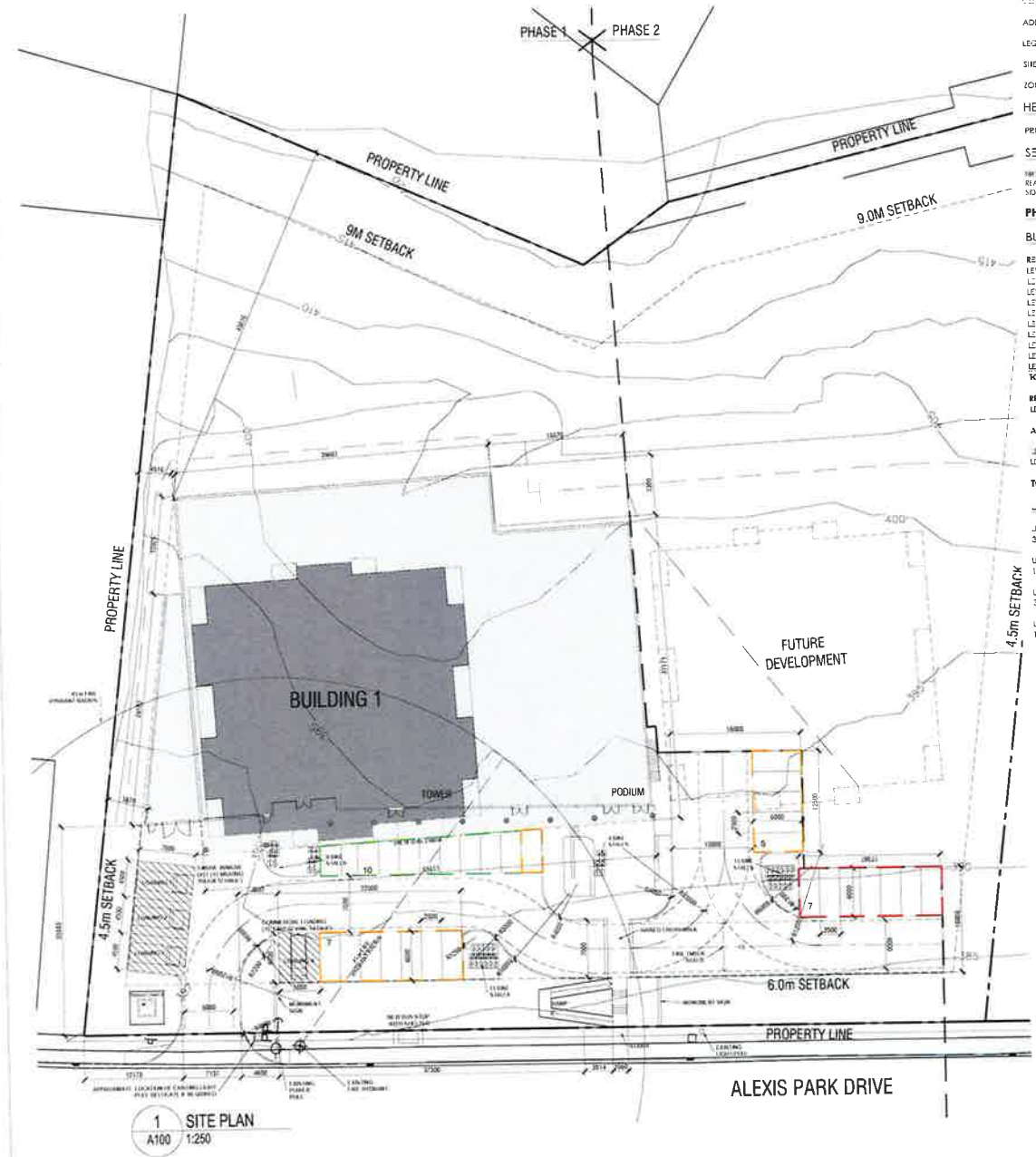
- ☐ Corporate Services
  - ☐ Bylaw Compliance
  - ☐ Real Estate
- ☐ RCMP
- ☒ Fire & Rescue Services
- ☐ Human Resources
- ☐ Financial Services
- ☒ COMMITTEE: APC (Mar.15/2022)
- ☐ OTHER:

- ☒ Operations
  - ☒ Public Works/Airport
  - ☐ Facilities
  - ☒ Utilities
- ☐ Recreation Services
- ☐ Parks

- ☒ Current Planning
- ☒ Long Range Planning & Sustainability
- ☒ Building & Licensing
- ☒ Engineering Development Services
- ☐ Infrastructure Management
- ☒ Transportation
- ☒ Economic Development & Tourism

G:\3000-3699 LAND ADMINISTRATION\3090 DEVELOPMENT VARIANCE PERMITS\20 Applications\DVP00552\2 PROC\Rpt\220803_mf_Council Rpt_DVP00552.docx

Attachment 1



1 A100 SITE PLAN 1:250

PROJECT INFORMATION:

ADDRESS: 3401, 3351 ALEXIS PARK DR.

LEGAL DESCRIPTION: LOTS 1&2 PLAN KAP57410

SITE AREA: 11,612.3 m2 (1.16 ha) 124,993 SF

ZONING: RH3 (HIGHRISE APARTMENT RESIDENTIAL)

HEIGHT:

PROPOSED HEIGHT: **33.76m**

SETBACKS:

REAR SETBACK : 9.0M
SIDE SETBACK : 4.5M

PHASE 1: TOTAL 91 UNITS

BUILDING:

RESIDENTIAL
LEVEL 1 - 204.2 m2 (2,198 SF)
LEVEL 2 - 73.3 m2 (789 SF)
LEVEL 3 - 830.6 m2 (8,940 SF)- 10 units
LEVEL 4 - 978.9 m2 (10,537 SF)- 12 units
LEVEL 5 - 978.9 m2 (10,537 SF)- 12 units
LEVEL 6 - 978.9 m2 (10,537 SF)- 12 units
LEVEL 7 - 978.9 m2 (10,537 SF)- 12 units
LEVEL 8 - 978.9 m2 (10,537 SF)- 12 units
LEVEL 9 - 978.9 m2 (10,537 SF)-12 units
LEVEL 10 - 746.1 m2 (8,030 SF)- 9 units
TOTAL - 7,727.6 m2 (83,179 SF)-91 units

RETAIL
LEVEL 1 - **462.2 m2 (4,975 SF)**

AMENITY (INDOOR)
~~LEVEL 3 - 149.0 m2 (1,604 SF)~~
LEVEL 10 - **86.3 m2 (929 SF)**

TOTAL AREA: 8,425.1 m2 (90,687 SF)

UNIT TYPES

UNIT A - 2 BEDROOM (TWO BATH)
30 UNITS - 68.43 sm (932 sf)

UNIT B - 1 BEDROOM + DEN (TWO BATH)
14 UNITS - 72.18 sm (777 sf)

UNIT C - 1 BEDROOM
31 UNITS - 69.92 sm (645 sf)

UNIT D - 1 BEDROOM+DEN (1 BATH)
16 UNITS - 66.98 sm (721 sf)

AMENITY REQUIRED:

1 BEDROOM DWELLINGS: 10 m2/ 1 UNIT = 61 UNITS X10 m2 = 610 m2 (6,566 SF)
2 BEDROOM DWELLINGS: 15 m2/ 1 UNIT = 30 UNITS X15 m2 = 450 m2 (4,843 SF)
TOTAL REQUIRED: 1,060 m2 (11,409 SF)

AMENITY PROVIDED:

AMENITY (UNIT BALCONIES)

UNIT A - **9.08 m2 (97.8 SF) X 30 UNITS = 272.4 m2 (2932 SF)**
UNIT B - **6.05 m2 (65.1 SF) X 14 UNITS = 84.7 m2 (912 SF)**
UNIT C - **6.27 m2 (67.5 SF) X 31 UNITS = 194.37 m2 (2092 SF)**
UNIT D - **6.05 m2 (65.1 SF) X 16 UNITS = 96.8 m2 (1,042 SF)**
TOTAL: 91 UNITS = 648.27 m2 (6,978 SF)

AMENITY (INDOOR)

LEVEL 3 - **149.0 m2 (1,604 SF)**
LEVEL 10 - **86.3 m2 (929 SF)**
TOTAL: 235.3 m2 (2,533 SF)

AMENITY (OUTDOOR)

LEVEL 3 - **955.52 m2 (10,286 SF)**
LEVEL 10 - **113.49 m2 (1,243 SF)**
TOTAL: 1,071.01 m2 (11,528 SF)

TOTAL AMENITY AREA: 1,942.48 m2 (20,909 SF)

PARKING:

PARKING REQUIRED BY ZONING BYLAW:
~~TIER 1: 61 UNITS X 1.25 STALLS PER UNIT = 76 STALLS~~
~~TIER 2: 30 UNITS X 1.5 STALLS PER UNIT = 45 STALLS~~
~~TOTAL: 121 STALLS~~

VISITOR PARKING REQUIRED BY ZONING BYLAW:
~~1 STALL PER 7 UNITS / 91 UNITS / 7 =~~ 13 STALLS

RETAIL PARKING REQUIRED BY ZONING BYLAW:
~~2 STALLS PER 100M2 GFA - 462.2 / 100 = 4.62 X 2 =~~ 9 STALLS

TOTAL PARKING REQUIRED: 143 STALLS

PARKING PROVIDED:
PARKADE:
LEVEL 1: 27 STALLS
7 TANDEM STALLS
(each tandem stall allotted to same unit as adjoining non tandem stall)
LEVEL 2: 59 STALLS
TOTAL: **68 STALLS**

SURFACE PARKING: 29 STALLS

TOTAL PARKING PROVIDED: 117 STALLS
(SHOW STALLS PROVIDED: 26 STALLS (22.2%))

DEFICIT PARKING STALLS:
143 STALLS - 117 STALLS = **26 STALLS (+18.1%)**

BICYCLE PARKING:
CLASS 1 (interior) STALLS: 60
CLASS 2 (exterior) STALLS : 34

TOTAL = 94 STALLS

LOADING REQUIRED BY ZONING BYLAW:

RESIDENTIAL
1 STALL PER 2,800 SM GFA = 7,727.6 / 2,800 = **3 STALLS**

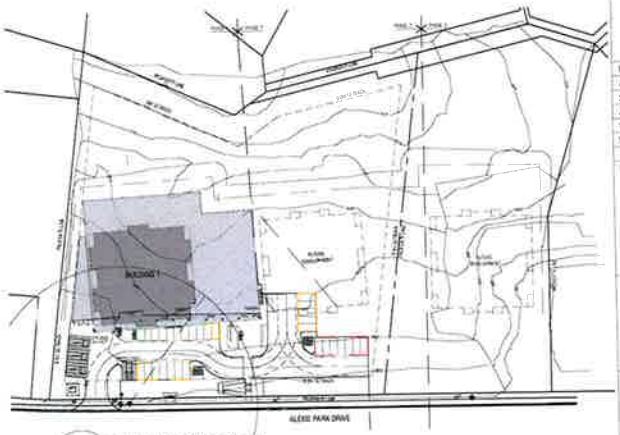
COMMERCIAL
1 STALL PER 1,900 SM GFA = 462.2 / 1,900 = **1 STALL**

TOTAL LOADING STALLS PROVIDED = 4 STALLS

PARKING ALLOTMENT

SURFACE PARKING:
9 RETAIL STALLS
14 VISITOR STALLS
6 RESIDENTIAL STALLS

PARKADE PARKING:
TOTAL = 68 RESIDENTIAL STALLS



1 A100 OVERALL SITE PLAN NTS

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NORTH

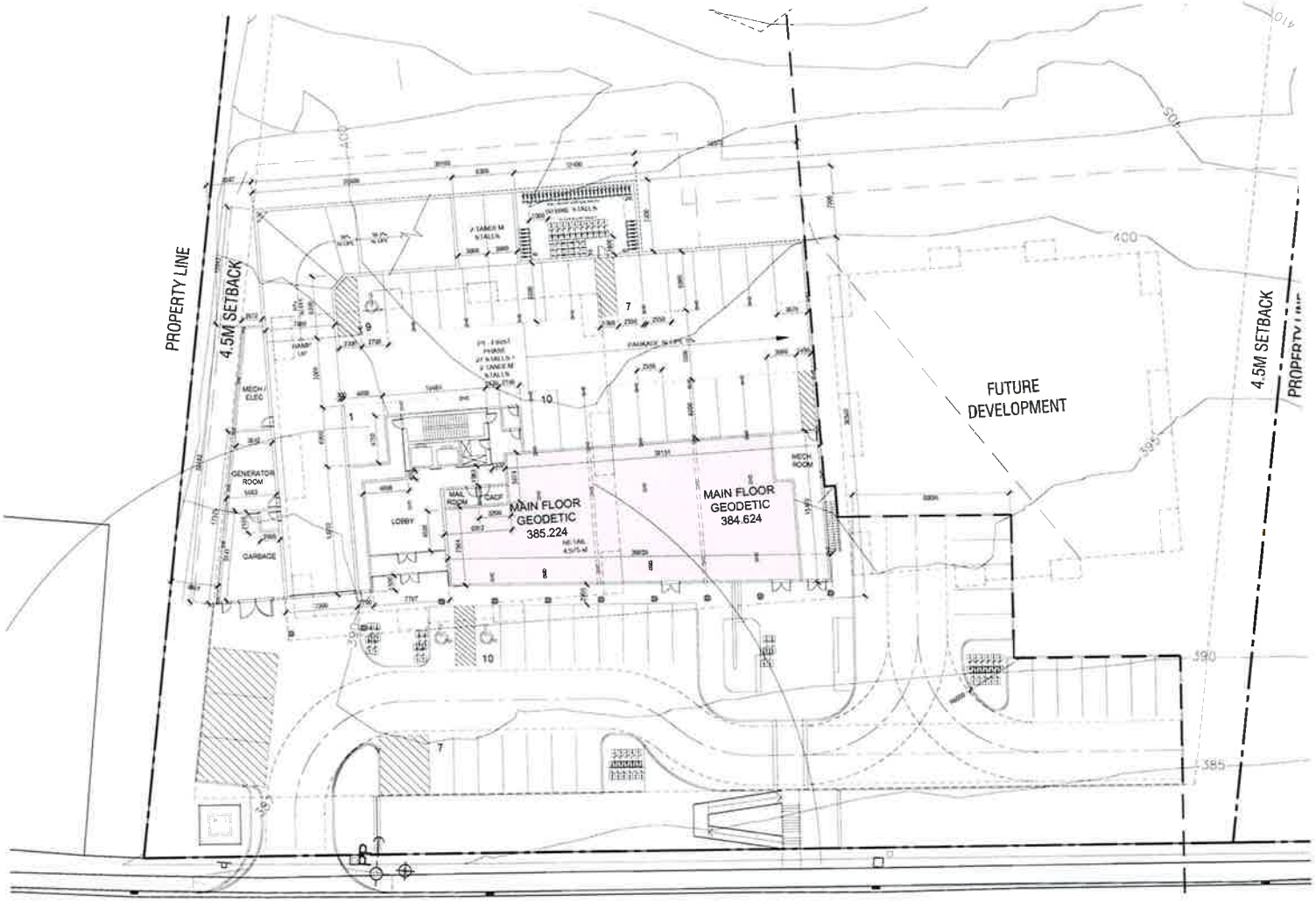
No	Issue Date	Description
REVISIONS		
5	2022-05-31	90 VISIONS DP
4	2022-05-21	SITE PLAN REVISION
3	2022-05-18	D.P. AMENDMENT
2	2022-02-07	90 ISSUED FOR D.P.
1	2021-09-08	ISSUED FOR D.P.
No	Issue Date	Description
ISSUES		

PROJECT
ALEXIS PARK DRIVE
MIXED USE RESIDENTIAL
DEVELOPMENT PHASE 1

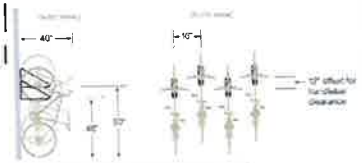
DRAWING TITLE
SITE PLAN

DRAWN: AD CHECKED: JD
DATE: AS SCALE: AS NOTED

PROJECT NO: 00076
SHEET NO: A100



1 A101 MAIN FLOOR PLAN 1:200



VERTICAL BIKE RACK SYSTEM

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NORTH

No	Issue Date	Description
REVISIONS		
5	2020-07-15	REVISED D.P.
4	2020-06-23	SITE PLAN REVISION
3	2020-03-16	D.P. AMENDMENT
2	2020-02-21	RE-ISSUED FOR D.P.
1	2020-09-09	ISSUED FOR D.P.
No	Issue Date	Description
ISSUES		

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PROJECT
ALEXIS PARK DRIVE
MIXED USE RESIDENTIAL
DEVELOPMENT PHASE 1

DRAWING TITLE
MAIN FLOOR PLAN

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DATE AS | SCALE AS NOTED

PROJECT NO 00076 | DRAWING NO A101

1 ELECTRICAL FLOOR PLAN
101A 1:200

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Josan Properties

NORTH

No.	Issue Date	Description
REVISIONS		
2	2021-07-07	RE-ISSUED FOR D.P.
1	2021-06-08	ISSUED FOR D.P.
No.	Issue Date	Description
ISSUES		

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PROJECT
ALEXIS PARK DRIVE
MIXED USE RESIDENTIAL
DEVELOPMENT PHASE 1

DRAWING TITLE
ELECTRICAL FLOOR PLAN

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PROJECT NO	SHEET NO
00076	101A

1 A102 SECOND FLOOR PLAN 1:200

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PROJECT
ALEXIS PARK DRIVE
MIXED USE RESIDENTIAL
DEVELOPMENT PHASE 1

SECOND FLOOR PLAN

DRAWN AS
CHECKED JD
DATE AS
SCALE AS NOTED

PROJECT NO 00076
SHEET NO A102

1 A103 THIRD FLOOR PLAN 1:200

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No	Issue Date	Description
2	2021-12-20	RE-ISSUED FOR D.P.
1	2021-05-05	ISSUED FOR D.P.

ISSUES

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PROJECT
ALEXIS PARK DRIVE
MIXED USE RESIDENTIAL
DEVELOPMENT PHASE 1

DRAWING TITLE
THIRD FLOOR PLAN

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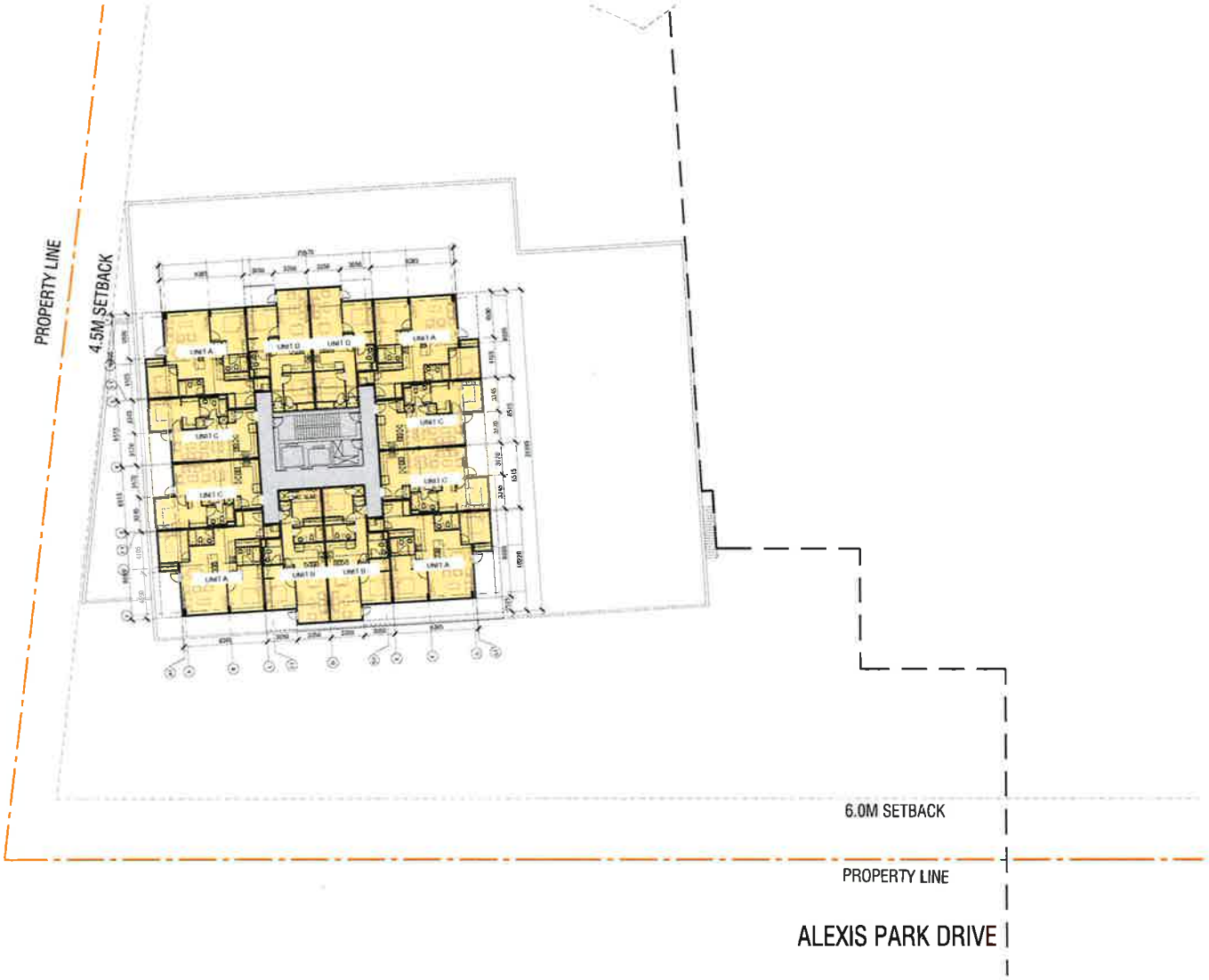
PROJECT NO 00076 | SHEET NO A103



1 A104 4TH-9TH FLOOR PLAN
1:200

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NORTH

1 2021-09-30 ISSUED FOR DP

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PROJECT
ALEXIS PARK DRIVE
MIXED USE RESIDENTIAL
DEVELOPMENT PHASE 1

DRAWING TITLE
4TH-9TH FLOOR PLAN

DRAWN AS | CHECKED JD
DATE AS | SCALE AS NOTED

PROJECT NO 00076
SHEET NO A104

1 A105 TENTH FLOOR PLAN
1:200

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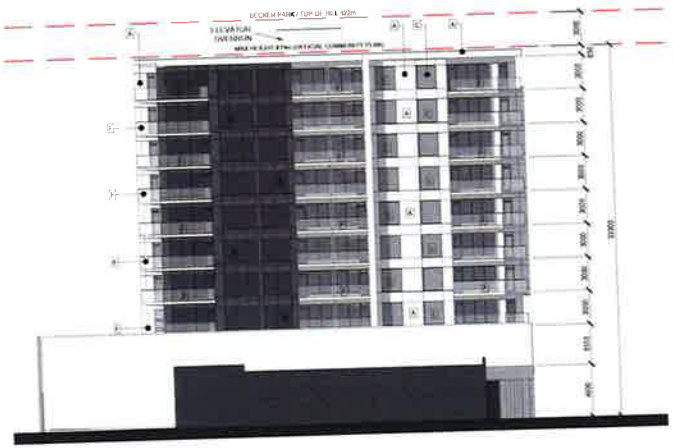
ALEXIS PARK DRIVE
MIXED USE RESIDENTIAL
DEVELOPMENT PHASE 1

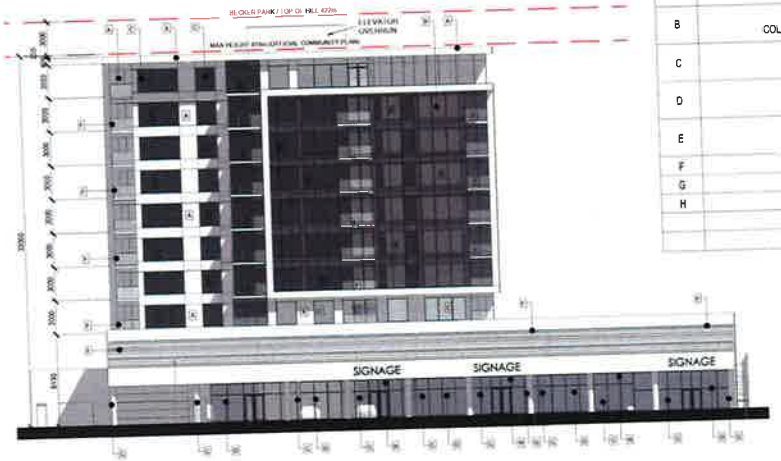
TENTH FLOOR PLAN

DRAWN AS
DATE AS

00076 A105



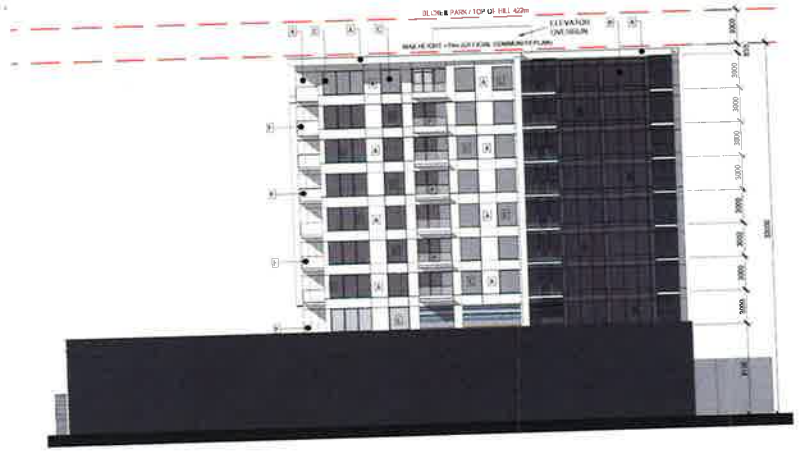
1 / A106 NORTH ELEVATION 1:200



2 / A106 WEST ELEVATION 1:200

MATERIAL LEGEND	
MARK	MATERIAL
A	METAL PANEL COLOR - WHITE
B	WINDOW WALL SYSTEM COLOR - LIGHT GREY TINTED GLASS
C	PUNCHED WINDOWS COLOR - CLEAR GLASS
D	STOREFRONT GLAZING COLOR - CLEAR GLASS
E	METAL LOUVRE COLOR - WHITE
F	GLASS RAILING
G	STRUCTURAL COLUMN
H	TENANT SIGNAGE

1 / A106 SOUTH ELEVATION 1:200



4 / A106 EAST ELEVATION 1:200

arc STUDIO

Josan Properties

No.	Issue Date	Description
1	2021-05-06	ISSUED FOR D.P.

ISSUES

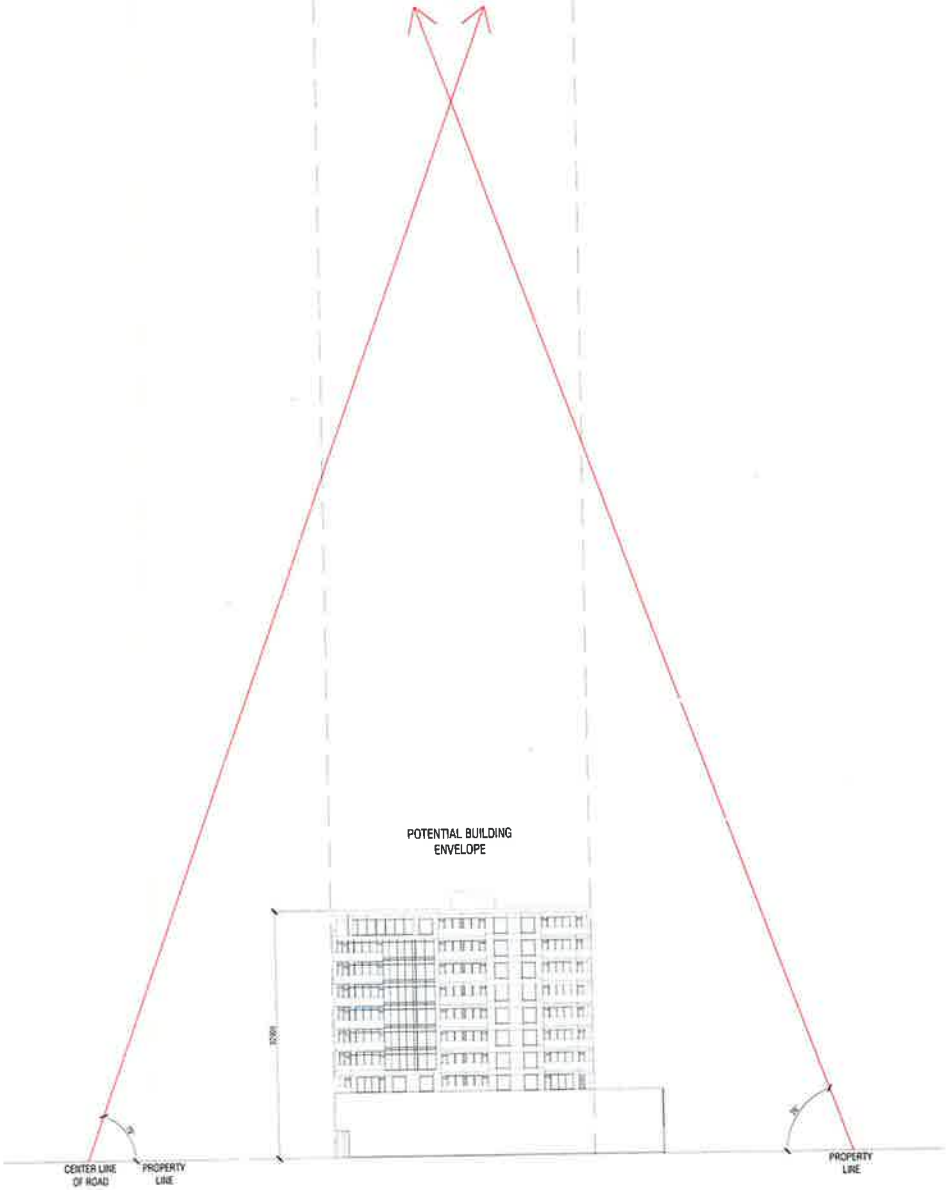
DISCLAIMER

PROJECT
ALEXIS PARK DRIVE
MIXED USE RESIDENTIAL
DEVELOPMENT PHASE 1

DRAWING TITLE
ELEVATIONS

DRAWN AS | CHECKED JD
DATE AS | SCALE AS INDICATED

PROJECT NO 00076 | SHEET NO A106



1 A107 BUILDING SHADOW ANALYSIS
1:300

arc STUDIO

Josan Properties

DISCLAIMER:

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PROJECT
ALEXIS PARK DRIVE
MIXED USE RESIDENTIAL
DEVELOPMENT PHASE 1

BUILDING SHADOW
ANALYSIS

DRAWN AS
DATE AS
CHECKED JD
SCALE AS NOTED

PROJECT NO
00076

SHEET NO
A107

3.5.7 Access to Arterial roads as the only, or a primary means of access or egress to development is subject to no other lower classification road access being available to that lot. Access to an Arterial road where Annual Average Daily Traffic (AADT) volumes exceed 5000 must be limited to right in and out movements only or provide a designated turn lane, where supported. Existing agricultural and low density residential lands applying for minor additions to existing buildings are exempted from providing these works.

3.5.8 Access to Collector roads as the only or primary means of access or egress for development is subject to no Local road or lane access being available to that lot. Access to a Collector roads where Annual Average Daily Traffic (AADT) volumes exceed 5000 must be limited to right in and out movements only, where no turn lane exists.

3.5.9 Access to rural roads where a drainage route exists, is subject to provision of ditching along the lot frontage and installation of a culvert at least 450mm in diameter across the driveway, extending a minimum of 1m beyond the toe of slope in each direction.

3.6 Lanes

When corners or T-intersections are unavoidable, additional road dedication and construction at these corners is required based on tracking of the largest anticipated vehicle utilizing the lanes. Additional road dedication required is to be based on truck turning template design or historical evidence at the location where available. Where road dedication would create a non-conformity for an existing building a SROW may be used subject to a road reserve also being registered on the area.

3.7 Cul-de-Sacs

Cul-de-sac roads shall not exceed 200m in length and provide a turn around within 30m of the end. The City Engineer may accept cul-de-sacs up to 400m in length where an emergency access road is provided at the end of the cul-de-sac, subject to provision of a mid point bulb with a turning radius on no less than 11m. Cul-de-sac turnaround bulb design must conform to standard drawing in Schedule O of this Bylaw.

3.8 Emergency Access

Emergency access roads are required in Development District 3 for road extensions more than 300m in length. A gate or removable bollard with a lock is required at both ends of an emergency access to prohibit public vehicle use. Permanent emergency access roads are to be built to lane structure standards with a minimum width of 4m. Road grades are not to exceed 15%. Horizontal

Attachment 3

TRANSPORTATION PLANNERS AND ENGINEERS

bunt & associates

The Hills Vernon

Transportation Impact Assessment

Final Report

Prepared for

Josan Ventures Inc.

Date

March 29, 2022

Project Number

02-22-0014

City File Number

DVP00552

CORPORATE AUTHORIZATION

Prepared By: Amrit Uppal, P.Eng.
Daniel Blischak, EIT

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#113 – 334 11 Avenue SE
Calgary, AB T2G 0Y2

Reviewed By: Ezekiel Dada, Ph.D., P.Eng.
Principal

Telephone: (403) 252-3343

Approved By: Amrit Uppal, P.Eng.
Associate

Date: 2022-03-29
Project #: 02-22-0014
Status: Final

Authenticated Date: July 14, 2022

EGBC Permit #: 1000468

TABLE OF CONTENTS

EXHIBITS

FIGURES

TABLES

1. EXECUTIVE SUMMARY

Josan Ventures Inc. is seeking a development variance permit for a site located at 3281, 3351, 3401 Alexis Park Drive. The City of Vernon requested a Transportation Impact Assessment (TIA) to review the transportation impacts of the proposed development.

The proposed building will have ground floor retail and above grade residential. Two potential future buildings are not part of the application; however they are accounted for in this traffic analysis to provide a conservative analysis.

Proposed densities and forecasted trip generation are summarized in **Table 1.1**. Study findings and recommendations are identified in **Table 1.2**.

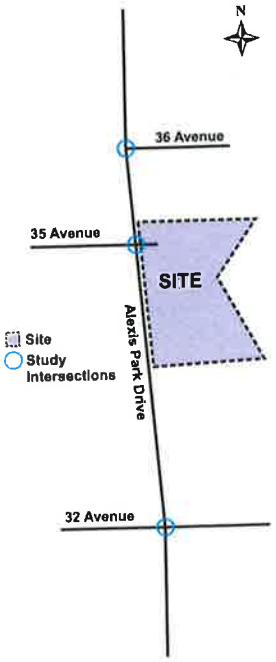


Table 1.1: Trip Generation

BUILDING	USE	DENSITY	HOURLY VEHICLE TRIPS	
			AM Peak	PM Peak
1	Multi-Family Residential	91 units	33	40
	Commercial	463 m²	5	19
2 (Future)	Multi-Family Residential	89 units	32	39
3 (Future)	Multi-Family Residential	89 units	32	39
	Commercial	463 m²	5	19
		TOTAL	107	156

Table 1.2: Findings & Recommendations

SECTION		FINDINGS
Vehicles	Intersections	*Alexis Park Drive & 35 Avenue (Site Access)* – The intersection will continue to operate acceptably after the addition of site traffic in all horizons. All-turns site access will operate acceptably without dedicated turn lanes. No traffic signal is warranted. *Alexis Park Drive & 36 Avenue* – The intersection will continue to operate acceptably after the addition of site traffic in all horizons. *Alexis Park Drive & 32 Avenue* – The intersection currently experiences delays associated with the eastbound stop-controlled movement, which will increase in the future due to background and site traffic growth. Signal warrant analysis confirms no traffic signal is warranted.
	Access	Bunt & Associates recommends all-turns movements at the site access, which will effectively operate as a fourth leg of an existing public intersection. Analysis confirms the intersection will operate acceptably. To accommodate all-turns movements, a variance from the Subdivision and Development Servicing bylaw will be needed. Bunt & Associates recommends that site access operations be re-assessed and confirmed as future phases are built.
Active	Sidewalks	No sidewalk missing links impacting site connectivity are identified.
	Crossings	No new crosswalks are needed to accommodate site users.
	Cycling	Bike lanes are provided on Alexis Park Drive.
	Transit	Bus stops are provided on Alexis Park Drive (Route 3) and 30 Ave (Route 8).

2. INTRODUCTION

2.1 Scope of Work

As discussed with the City of Vernon, the scope of work for this study was:

Development

- *Trip Generation* – Calculate development trips during the weekday AM & PM peak hours based on industry standards.
- *Trip Assignment* – Assign development trips to the network based on expected draw.

Vehicles

- *Horizons* – Identify traffic volumes for the following:
  - *Existing*
  - *Background* – For 2025 (Opening Day) and 2035 (10-Year) with a 1% growth rate applied.
  - *After Development* – Phase 1 and Full Build Out
- *Intersection Capacity* – Complete weekday peak hour analysis at:
  - Alexis Park Drive & 36 Avenue
  - Alexis Park Drive & 35 Avenue
  - Alexis Park Drive & 32 Avenue
- *Signal Warrant Analysis* – Alexis Park Drive & 35 Avenue.
- *Access Review* – Review access operations. Identifying access lane and control requirements.

Active Transportation

- *Pedestrians* – Review sidewalk connectivity and adequacy of crossing controls near the site.
- *Cyclists* – Identify connectivity to cycling facilities.
- *Transit* – Identify service levels and connectivity to transit stops.

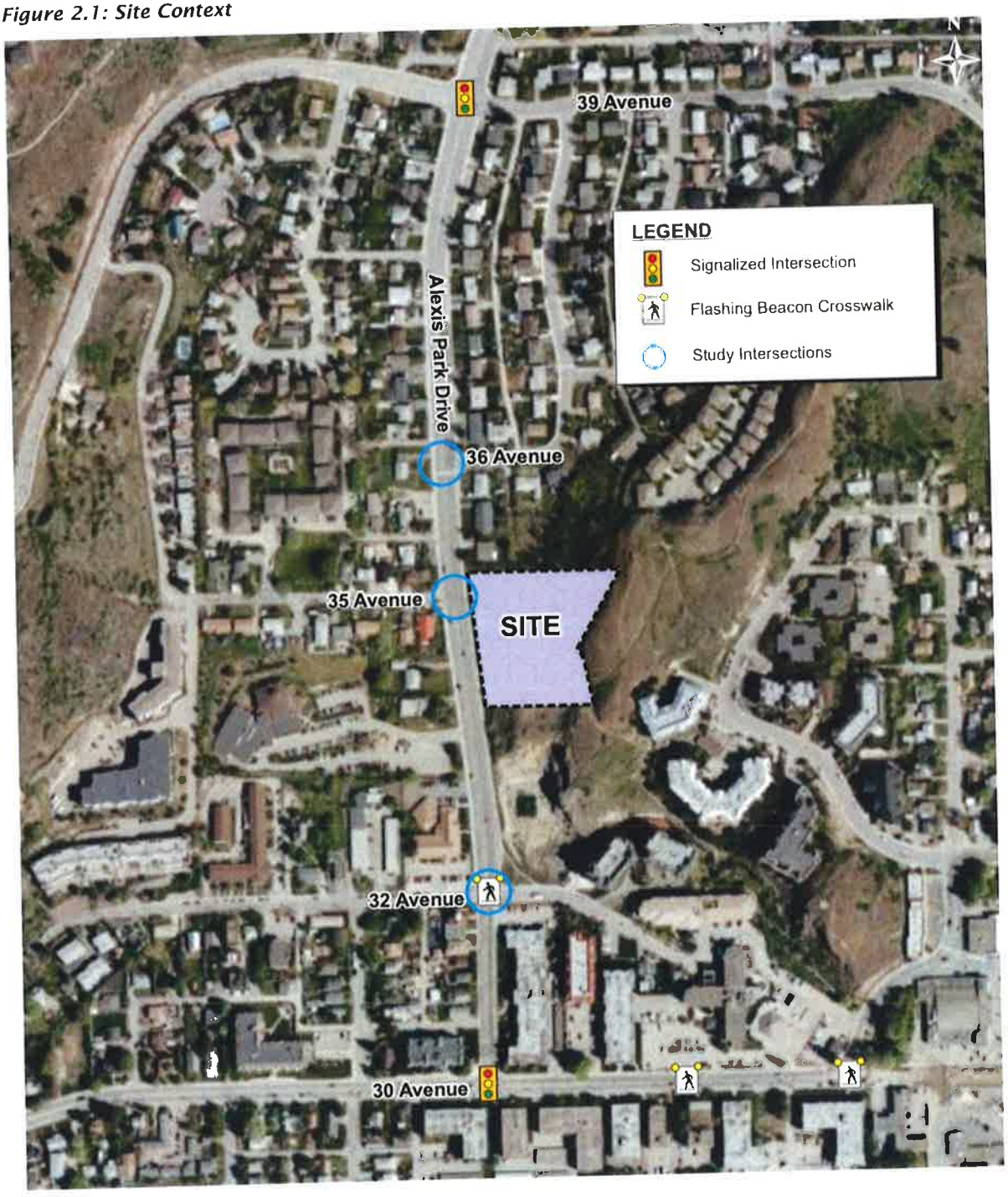
Parking

To be covered in a study submitted under separate cover.

2.2 Site Context

The site is bounded by Alexis Park Drive to the west and is zoned RH-3 (High-Rise Apartment Residential). The site context is illustrated in **Figure 2.1**.

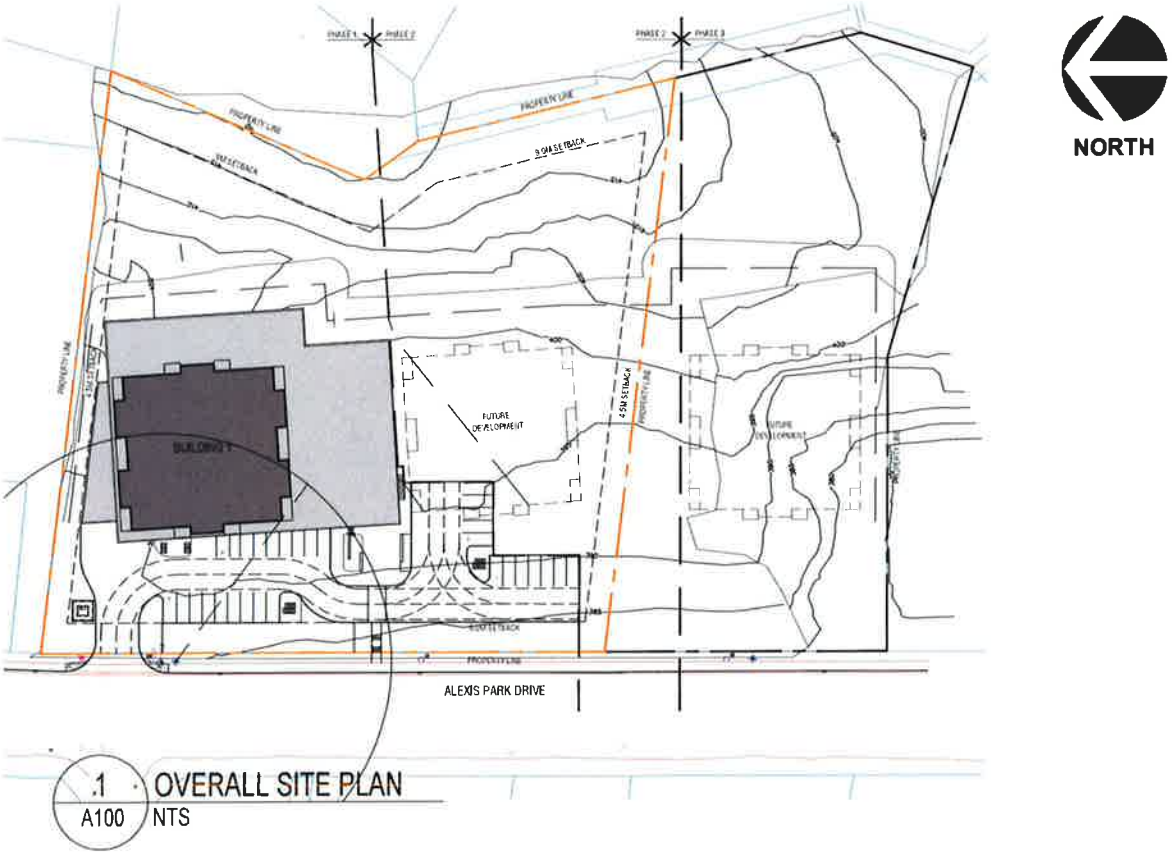
Figure 2.1: Site Context



3. DEVELOPMENT

The site plan is illustrated in **Figure 3.1**.

Figure 3.1: Site Plan



3.1 Densities

Proposed development uses and densities are summarized in **Table 3.1**. Anticipated densities are provided for future buildings.

Table 3.1: Proposed Densities

BUILDING	LAND USE	DENSITY
1	Multi-Family Residential	91 units
	Commercial - Retail	463 m² (4,975 ft²)
2 (Future)	Multi-Family Residential	89 units
3 (Future)	Multi-Family Residential	89 units
	Commercial - Retail	463 m² (4,975 ft²)

3.2 Trip Generation

The trip generation rates used in this analysis are summarized in **Table 3.2**. The trip generation rates are based on the Institute of Transportation Engineers *Trip Generation Manual (10th Edition)*. Development generated trips are summarized in **Table 3.3** (vehicles).

Table 3.2: Trip Generation Rates

USE	ITE		TRIP GENERATION RATES	
	Use #	Type	AM Peak Hour	PM Peak Hour
Multi-Family	221	General Suburban	0.36 per unit *(26% In, 74% Out)*	0.34 per unit *(61% In, 39% Out)*
Retail	820	General Suburban	0.94 per 1,000 ft	3.81 per 1,000 ft² *(48% In, 52% Out)*

Table 3.3: Vehicle Trip Generation

BUILDING	USE	DENSITY	AM PEAK HOUR			PM PEAK HOUR		
			Total	In	Out	Total	In	Out
1	Multi-Family	91 units	33	9	24	40	24	16
	Commercial	4,975 ft²	5	3	2	19	9	10
	Subtotal		*38*	*12*	*26*	*59*	*33*	*26*
2	Multi-Family	89 units	32	8	24	39	24	15
3	Multi-Family	89 units	32	8	24	39	24	15
	Commercial	4,975 ft²	5	3	2	19	9	10
	Subtotal		*38*	*12*	*26*	*58*	*33*	*25*
		TOTAL	107	31	76	156	90	66

3.3 Trip Distribution

Vehicle trips are distributed based on existing traffic patterns. The trip distribution used in this study is illustrated in **Exhibit 3.1**.

3.4 Access

Vehicle access to building 1 will be provided from a site access aligned with the intersection of Alexis Park Drive & 35 Avenue (new east leg).

With future phases, there will be a need to provide a second access on Alexis Park Drive to meet fire safety guidelines. In full build out scenarios, traffic associated with building 2 is assigned to the 35 Avenue access and traffic associated with building 3 is assigned to a future driveway access on Alexis Park Drive.

The resulting development generated traffic volumes are illustrated in **Exhibit 3.2**. Analysis is completed assuming all-turns movements and with future phases.

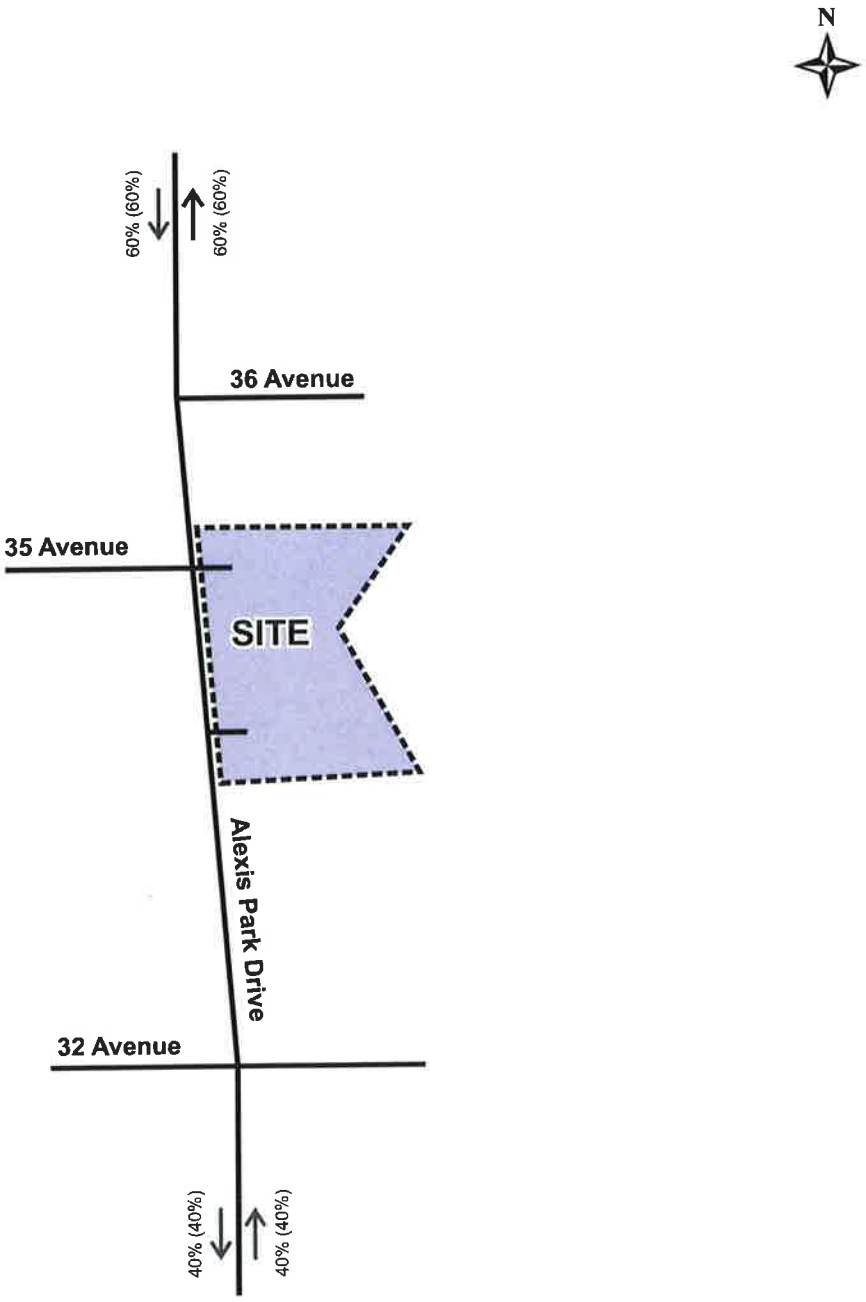


Exhibit 3.1

Site Traffic Distribution

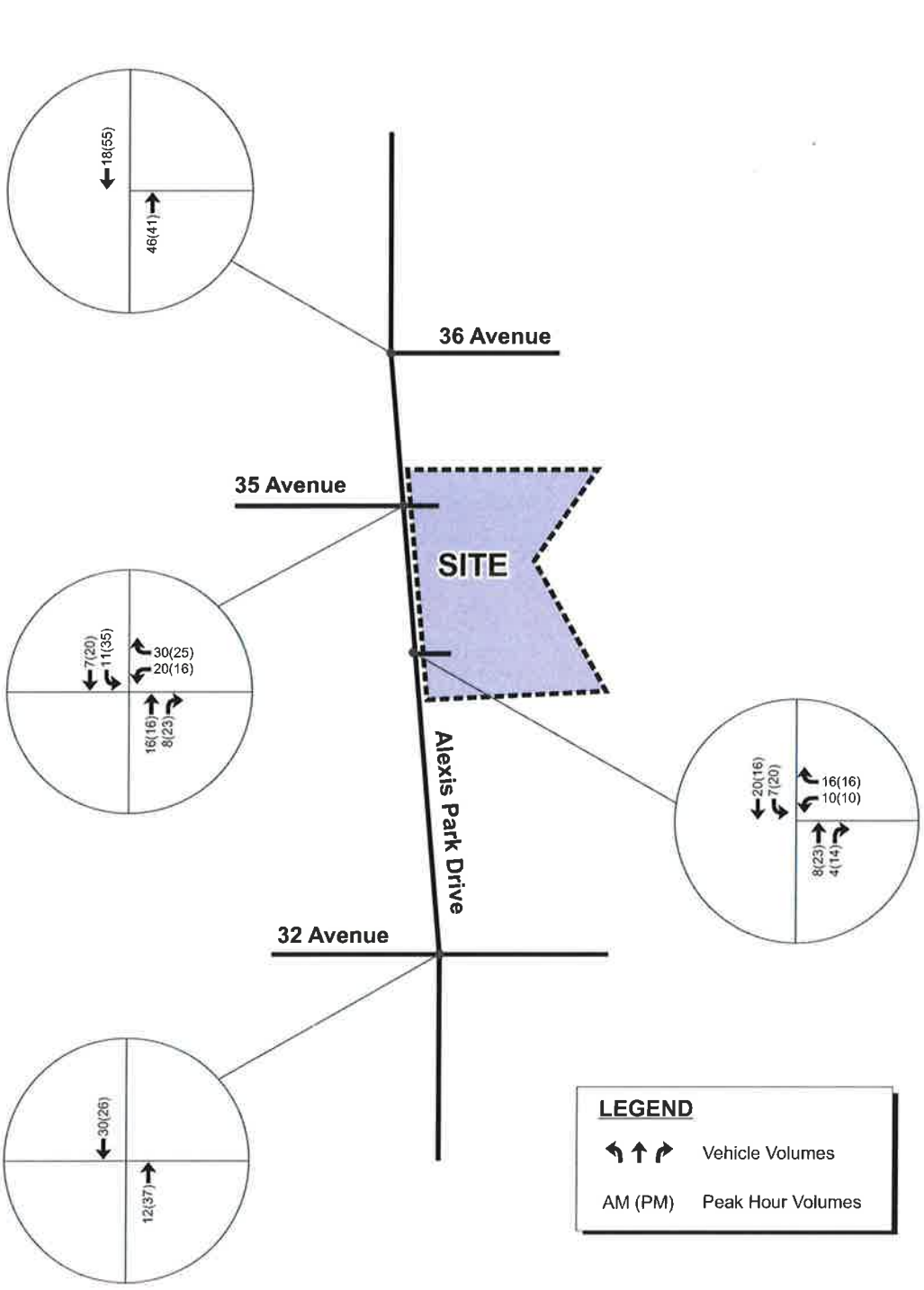


Exhibit 3.2

Site Traffic Volumes

4. VEHICLES

4.1 Road Network

The characteristics of roadways near the site are summarized in **Table 4.1**.

Table 4.1: Existing Roadway Characteristics

ROADWAY	CLASSIFICATION	CROSS-SECTION		POSTED SPEED	FACILITIES		
		# Lanes	Median		Parking	Bike Lanes	Bus Stops
Alexis Park Drive	Arterial	4	No	50 km/h	No	Yes	Yes
35 Avenue	Residential	2	No	-	Yes	No	No

The existing 4-lane (2 south + 2 north) cross-section of Alexis Park Drive is illustrated in **Figure 4.1**. The *Integrated Transportation Framework* identifies a potential future three-lane cross-section on Alexis Park Drive (1 south + 1 turn-lane + 1 north); analysis in this report is completed with the existing cross-section.

Figure 4.1: Alexis Park Drive

4.2 Intersections

Existing intersection configurations and controls at study intersections are illustrated in **Exhibit 4.1**.

4.3 Volumes

4.3.1 Existing

The traffic counts used in this study are summarized in **Table 4.2**. Traffic data is included in **Appendix A**.

Table 4.2: Traffic Data Summary

INTERSECTION	COUNT DATE	DAY OF WEEK	SOURCE
Alexis Park Drive & 35 Avenue	2022-03-01	Tuesday	Bunt & Associates
Alexis Park Drive & 36 Avenue			
Alexis Park Drive & 32 Avenue			

To account for potential COVID impacts on vehicle volumes, a review of BC Ministry of Transportation & Infrastructure (BC MoTI) Highway 97 permanent data was completed as summarized in **Table 4.3**. The data confirms that traffic volumes at the end of 2021 (4-month period September - December) had recovered to match pre-COVID conditions. Therefore, no Covid adjustment is required. The resulting Existing traffic volumes are summarized in **Exhibit 4.2**.

Table 4.3: Pre-Covid Data Comparison (Highway 97)

YEAR	MAWDT (SEPT-DEC)	
	William R. Bennet Bridge	Lake Country
2019	60,333	21,646
2021	60,421	21,562
DIFFERENCE	+88	-84

**AAWDT = Average Annual Weekday Daily Traffic*

4.3.2 Background

A growth factor of 1% was applied to estimate Opening Day (2025) and 10-Year (2035) horizon volumes. This growth factor accounts for general area development. Resulting Background traffic volumes are illustrated in **Exhibit 4.3**.

4.3.3 After Development

Development generated traffic volumes (Exhibit 3.2) were added to Existing traffic volumes (Exhibit 4.3) to forecast the After Development traffic volumes illustrated in **Exhibit 4.4**.

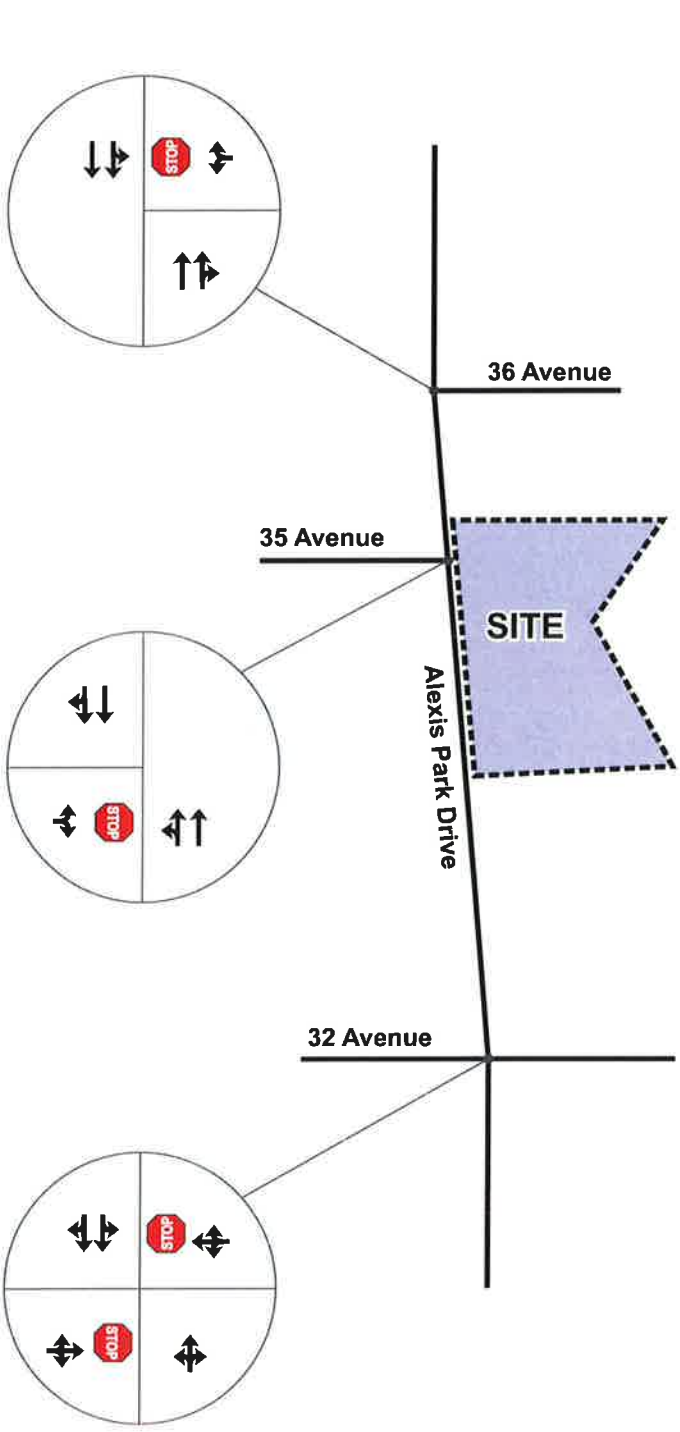


Exhibit 4.1

Existing Intersection Configurations

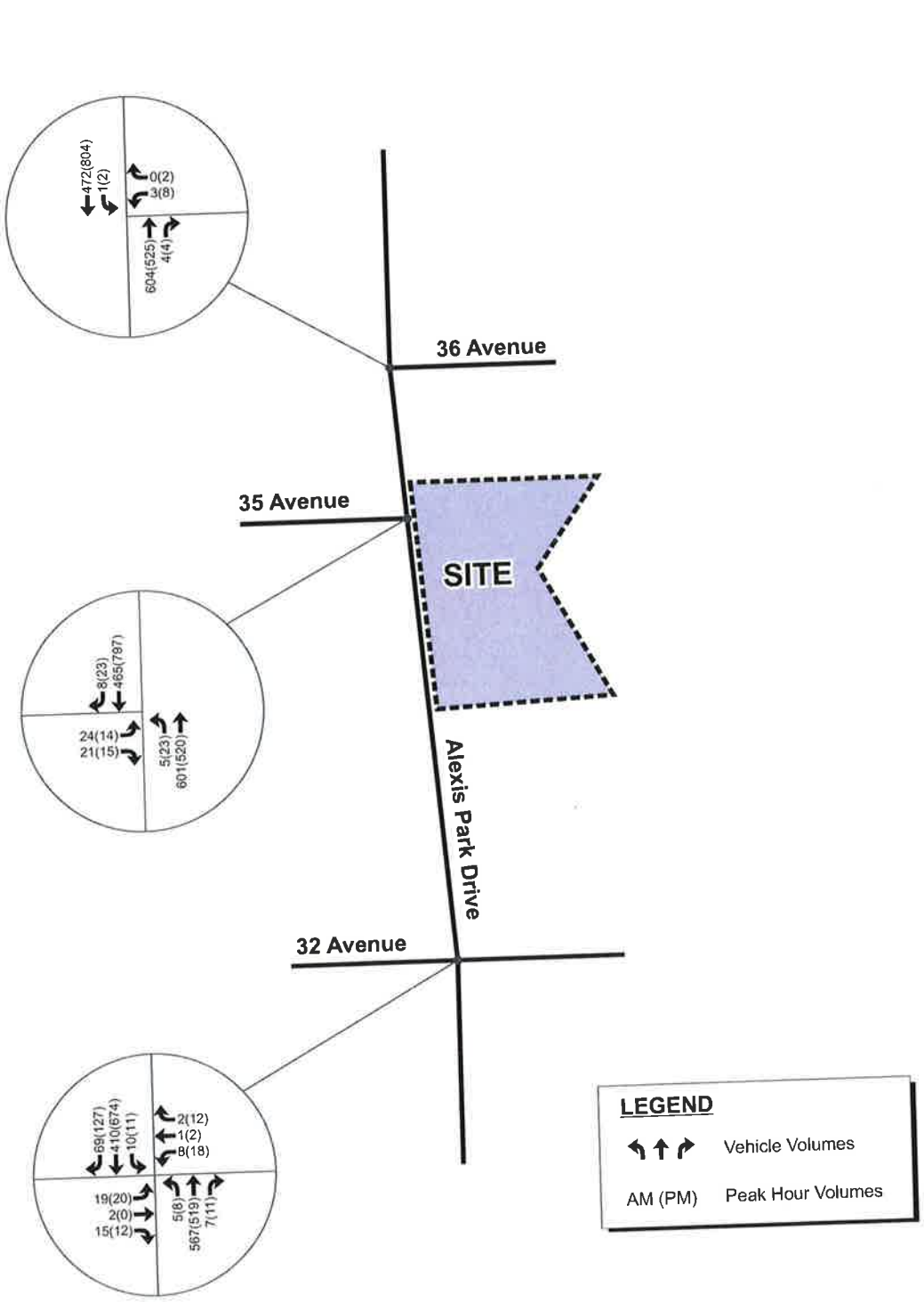


Exhibit 4.2

Existing Traffic Volumes

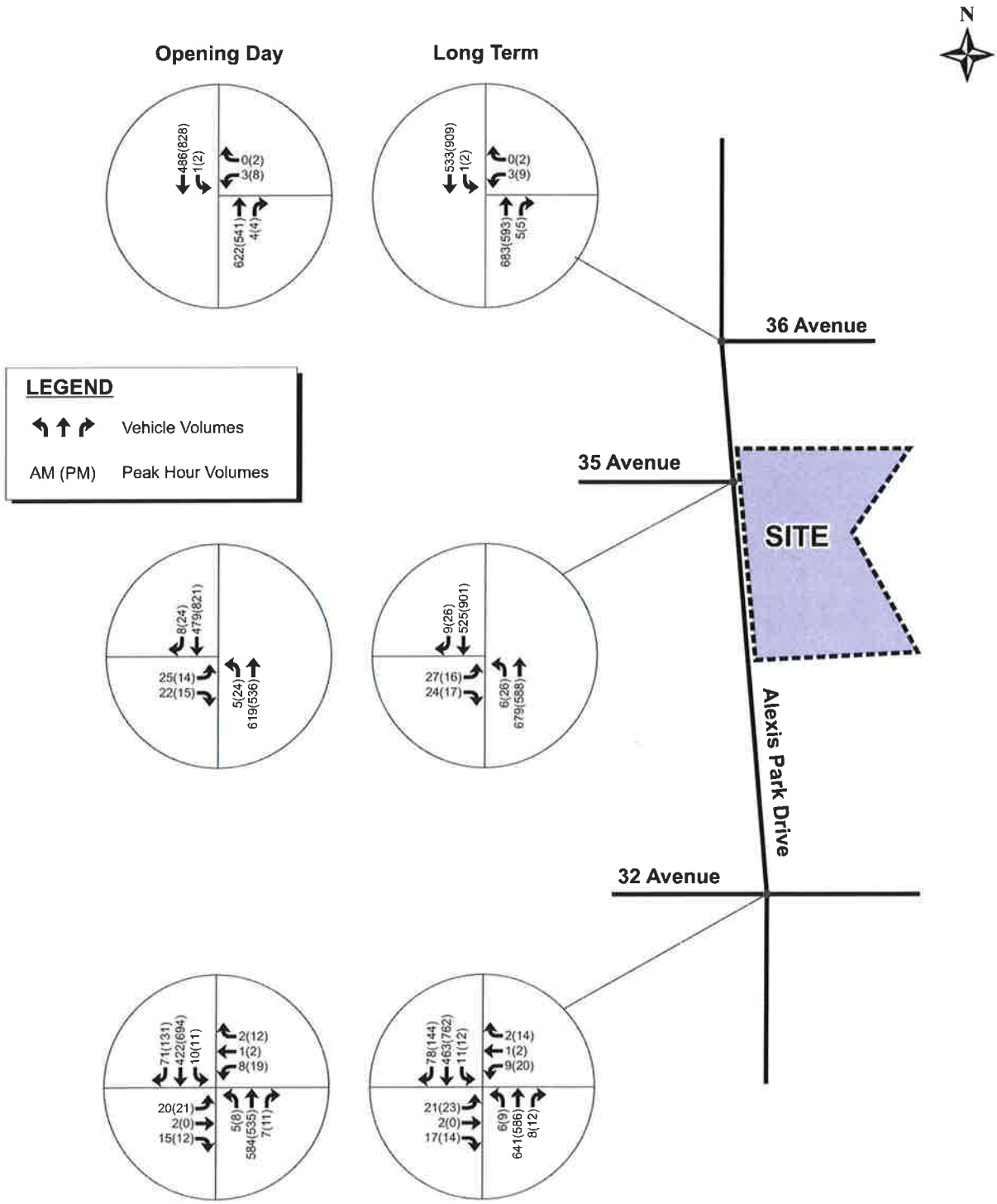


Exhibit 4.3

Background Traffic Volumes

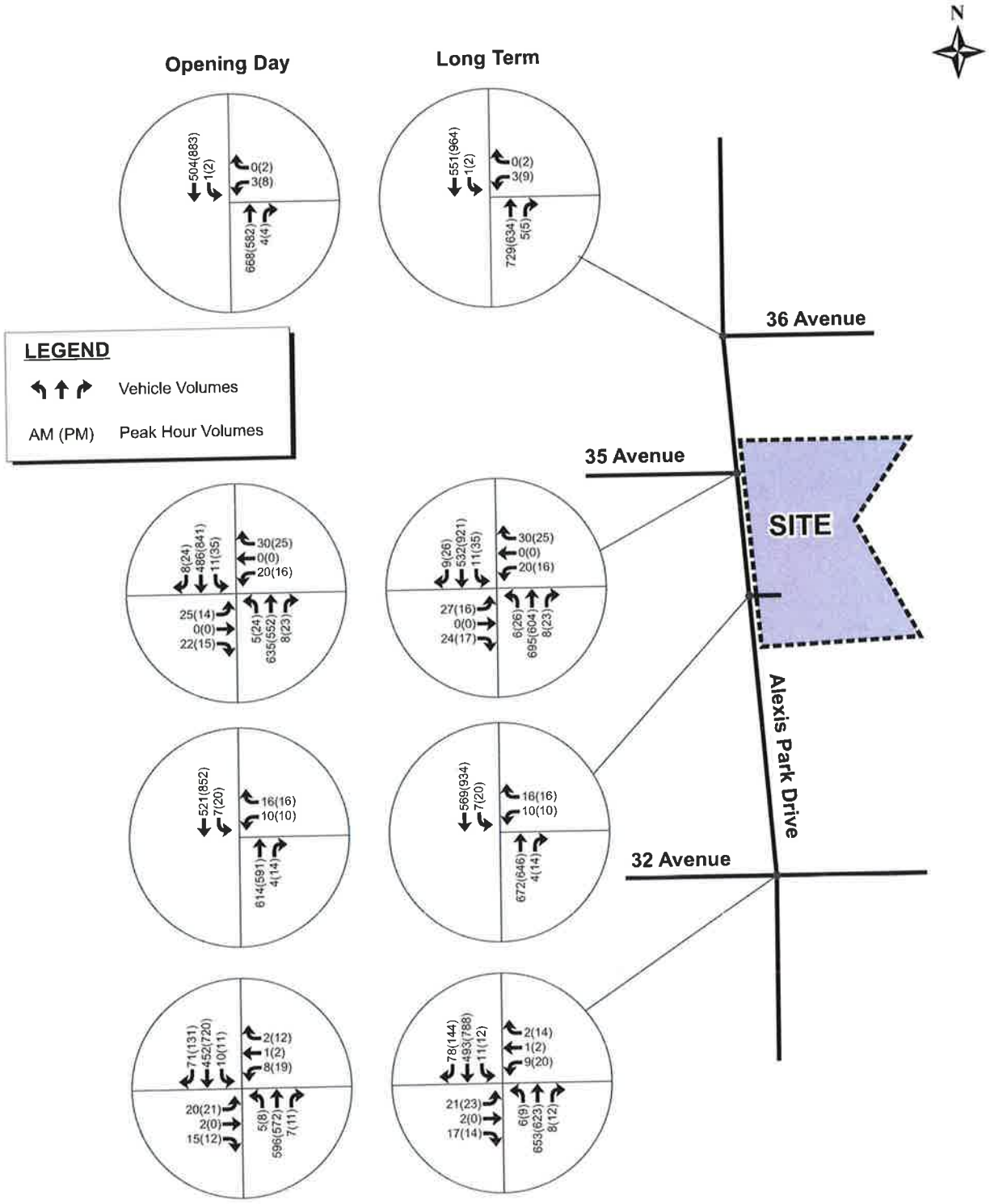


Exhibit 4.4

After Development Traffic Volumes

4.4 Intersection Analysis

Synchro 9.2 traffic analysis software was used to review intersection operational conditions based on the methods outlined in the Highway Capacity Manual. Traffic operations were assessed using the performance measures of volume-to-capacity (v/c) and Level of Service (LOS).

The volume-to-capacity (v/c) ratio of an intersection movement represents the ratio between the demand volume and available capacity. A v/c ratio over 1.0 indicates a congested intersection where drivers may have to wait through more than one signal cycle. The Level of Service (LOS) rating is based on average vehicle delays ranging from LOS A (minimal delay) to LOS F (significant delay).

The analysis is completed with a saturation flow rate of 1900 vehicles per hour. Synchro output reports are provided in **Appendix B**. The volume to capacity (v/c) ratio, level of service, average control delay (in seconds), and 95th percentile queue (in metres) are summarized for the following scenarios:

- *Alexis Park Drive & 35 Avenue* in **Table 4.4**
- *Alexis Park Drive & 36 Avenue* in **Table 4.5**
- *Alexis Park Drive & 32 Avenue* in **Table 4.6**

Table 4.4: Intersection Analysis (Alexis Park Drive & 35 Avenue)

INTERSECTION	HORIZON	MOVEMENT & LANES		AM PEAK HOUR v/c	AM LOS	AM Delay	AM Queue	PM PEAK HOUR v/c	PM LOS	PM Delay	PM Queue
Alexis Park Drive & 35 Avenue *(East-West Stop)*	Existing	EB	1	0.11	B	15	<5	0.12	C	21	<5
		NB	2	0.25	A	1	<5	0.21	A	1	<5
		SB	2	0.19	A	0	<5	0.33	A	0	<5
		Overall		-	*A*	*0.6*	-	-	*A*	*0.6*	-
	Background (2025)	EB	1	0.12	C	16	<5	0.12	C	22	<5
		NB	2	0.26	A	1	<5	0.22	A	1	<5
		SB	2	0.20	A	0	<5	0.34	A	0	<5
		Overall		-	*A*	*0.7*	-	-	*A*	*0.6*	-
	Background (2035)	EB	1	0.15	C	17	<5	0.16	C	25	<5
		NB	2	0.28	A	1	<5	0.24	A	1	<5
		SB	2	0.22	A	0	<5	0.37	A	0	<5
		Overall		-	*A*	*0.7*	-	-	*A*	*0.8*	-
	After Development (2025) *- Full Build*	EB	1	0.16	C	20	5	0.19	D	32	6
		WB	1	0.17	C	19	5	0.17	C	23	5
		NB	2	0.20	A	1	<5	0.18	A	1	<5
		SB	2	0.16	A	1	<5	0.28	A	1	<5
		Overall		-	*A*	*1.6*	-	-	*A*	*1.7*	-
	After Development (2035) *- Full Build*	EB	1	0.20	C	22	6	0.26	E	41	8
		WB	1	0.19	C	21	6	0.20	D	27	6
		NB	2	0.22	A	1	<5	0.20	A	1	<5
		SB	2	0.17	A	1	<5	0.30	A	1	<5
		Overall		-	*A*	*1.7*	-	-	*A*	*2.0*	-

Table 4.5: Intersection Analysis (Alexis Park Drive & 36 Avenue)

INTERSECTION	HORIZON	MOVEMENT & LANES		AM PEAK HOUR v/c	AM LOS	AM Delay	AM Queue	PM PEAK HOUR v/c	PM LOS	PM Delay	PM Queue
Alexis Park Drive & 36 Avenue *(West Stop)*	Existing	WB	1	<0.02	C	16	<5	0.04	C	19	<5
		NB	2	0.25	A	0	<5	0.22	A	0	<5
		SB	2	0.19	A	0	<5	0.33	A	0	<5
		Overall		-	*A*	*0.1*	-	-	*A*	*0.1*	-
	Background (2025)	WB	1	<0.02	C	16	<5	0.04	C	20	<5
		NB	2	0.26	A	0	<5	0.22	A	0	<5
		SB	2	0.20	A	0	<5	0.34	A	0	<5
		Overall		-	*A*	*0.1*	-	-	*A*	*0.1*	-
	Background (2035)	WB	1	0.02	C	18	<5	0.05	C	22	<5
		NB	2	0.28	A	0	<5	0.24	A	0	<5
		SB	2	0.22	A	0	<5	0.38	A	0	<5
		Overall		-	*A*	*0.1*	-	-	*A*	*0.2*	-
	After Development (2025) *- Phase 1*	WB	1	0.02	C	17	<5	0.04	C	22	<5
		NB	2	0.28	A	0	<5	0.24	A	0	<5
		SB	2	0.21	A	0	<5	0.36	A	0	<5
		Overall		-	*A*	*0.1*	-	-	*A*	*0.2*	-
	After Development (2025)	WB	1	0.02	C	19	<5	0.05	C	24	<5
		NB	2	0.30	A	0	<5	0.26	A	0	0
		SB	2	0.23	A	0	<5	0.40	A	0	0
		Overall		-	*A*	*0.1*	-	-	*A*	*0.2*	-

Table 4.6: Intersection Analysis (Alexis Park Drive & 32 Avenue)

INTERSECTION	HORIZON	MOVEMENT & LANES		AM PEAK HOUR v/c	AM LOS	AM Delay	AM Queue	PM PEAK HOUR v/c	PM LOS	PM Delay	PM Queue
Alexis Park Drive & 32 Avenue *(East-West Stop)*	Existing	EB	1	0.16	C	24	<5	0.27	E	42	9
		WB	1	0.05	C	22	<5	0.15	C	23	<5
		NB	1	<0.02	A	1	<5	0.01	A	1	<5
		SB	2	0.17	A	1	<5	0.29	A	1	<5
		Overall		-	*A*	*1.2*	-	-	*A*	*1.7*	-
	Background (2025)	EB	1	0.18	D	26	6	0.30	E	46	10
		WB	1	0.05	C	22	<5	0.16	C	25	5
		NB	1	<0.02	A	1	<5	<0.02	A	1	<5
		SB	2	0.17	A	1	<5	0.30	A	1	<5
		Overall		-	*A*	*1.2*	-	-	*A*	*1.9*	-
	Background (2035)	EB	1	0.22	D	30	7	0.41	F	65	14
		WB	1	0.07	D	26	<5	0.20	D	29	6
		NB	1	<0.02	A	1	<5	<0.02	A	1	<5
		SB	2	0.19	A	1	<5	0.33	A	1	<5
		Overall		-	*A*	*1.4*	-	-	*A*	*2.4*	-
	After Development (2025) *- Phase 1*	EB	1	0.19	D	27	6	0.33	F	53	11
		WB	1	0.06	C	23	<5	0.17	D	27	5
		NB	1	<0.02	A	1	<5	<0.02	A	1	<5
		SB	2	0.18	A	1	<5	0.30	A	1	<5
		Overall		-	*A*	*1.2*	-	-	*A*	*2.0*	-
	After Development (2035)	EB	1	0.24	D	32	8	0.46	F	76	16
		WB	1	0.07	D	27	<5	0.21	D	31	7
		NB	1	<0.02	A	1	<5	<0.02	A	1	<5
		SB	2	0.20	A	1	<5	0.33	A	1	<5
		Overall		-	*A*	*1.4*	-	-	*A*	*2.7*	-

Intersection capacity analysis indicates:

- *Alexis Park Drive & 35 Avenue* – The intersection will continue to operate acceptably after the addition of site traffic in all horizons. All-turns site movements at the site access will operate acceptably without dedicated turn lanes.
- *Alexis Park Drive & 36 Avenue* – The intersection will continue to operate acceptably after the addition of site traffic in all horizons.
- *Alexis Park Drive & 32 Avenue* – The intersection currently experiences delays associated with the eastbound stop-controlled movement. This will increase in the future due to background and site traffic growth. Signal warrant analysis was completed to confirm if any control changes are warranted.

4.5 Signal Warrant Analysis

Signal warrant analysis was completed based on the methods outlined in the Transportation Association of Canada (TAC) *Traffic Signal and Pedestrian Signal Head Warrant Handbook* (2014). A score of 100 points or more indicates a traffic signal is warranted. The signal warrant analysis is summarized in **Table 4.7** and included in **Appendix B**.

Table 4.7: Signal Warrant Analysis

INTERSECTION	HORIZON	SIGNAL WARRANT SCORE	COMMENT
Alexis Park Drive & 35 Avenue	Existing	20/100	Not Warranted
	After Development (Phase 1)	28/100	
	After Development (Full Build)	37/100	
Alexis Park Drive & 32 Avenue	Existing	26/100	Not Warranted
	After Development (Full Build)	32/100	

Signal warrant analysis confirms that traffic signals are not required to accommodate the development.

4.6 Access Review

The site access for Building 1 aligns with 35 Avenue. A review is completed to confirm appropriate access lane configurations and control.

Capacity Analysis

Intersection capacity analysis confirms the site access will operate acceptably with a single outbound lane and no separate turn lanes on Alexis Park Dr. A traffic signal is not required to accommodate site traffic.

Spacing

As the access is aligning with 35 Avenue, the proposed access meets spacing guidelines.

Bylaw

Subdivision and Development servicing bylaw #3843 (Schedule B) identifies the following:

Access to Arterial roads as the only, or a primary means of access or egress to development is subject to no other lower classification road access being available to that lot. Access to an Arterial road where Annual Average Daily Traffic (AADT) volumes exceed 5000 must be limited to right in and out movements only or provide a designated turn lane, where supported. Existing agricultural and low density residential lands applying for minor additions to existing buildings are exempted from providing these works.

Alexis Park Drive is classified as an Arterial Street with daily volumes exceeding 5,000 vehicles per day. Due to right-of-way constraints, a dedicated southbound left turn lane and/or a median on Alexis Park Drive cannot be provided. Therefore, the following options exist for the site access:

- *All-Turns with No Turn Lanes* – This option requires a bylaw variance as a dedicated left turn lane cannot be provided due to right-of-way constraints north of the subject site.
- *Right Turn Only Channelization/Signage* – A median cannot be provided on Alexis Park Drive due to right-of-way constraints and negative impacts to existing residents along 35 Avenue. To accommodate right-turn restrictions would require an island (channelization) at the access only with signage further restricting left turns.

Based on the analysis completed in this report, Bunt & Associates recommends all-turns movements at the site access, which will effectively operate as a fourth leg of an existing public intersection. Analysis confirms the intersection will operate acceptably with this fourth leg. To accommodate all-turns movements will require a variance from the Subdivision and Development Servicing bylaw. Bunt & Associates recommends that site access operations be re-assessed and confirmed with future phases.

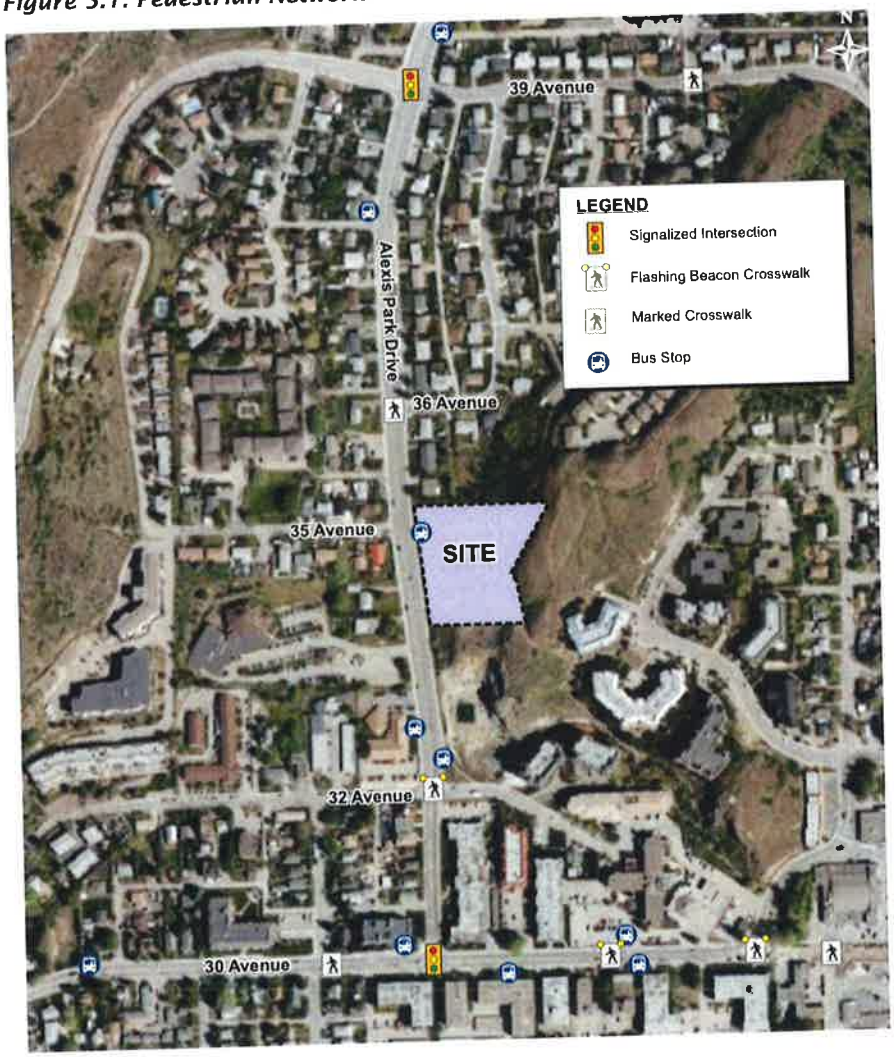
For completeness, concept drawings are provided in **Appendix C** showing the necessary changes needed to accommodate (1) A right-in/right-out access or (2) A right-in/all-turns out access.

5. ACTIVE TRANSPORTATION

5.1 Walking

Trip attractors and pedestrian infrastructure within the study area are illustrated in **Figure 5.1**.

Figure 5.1: Pedestrian Network



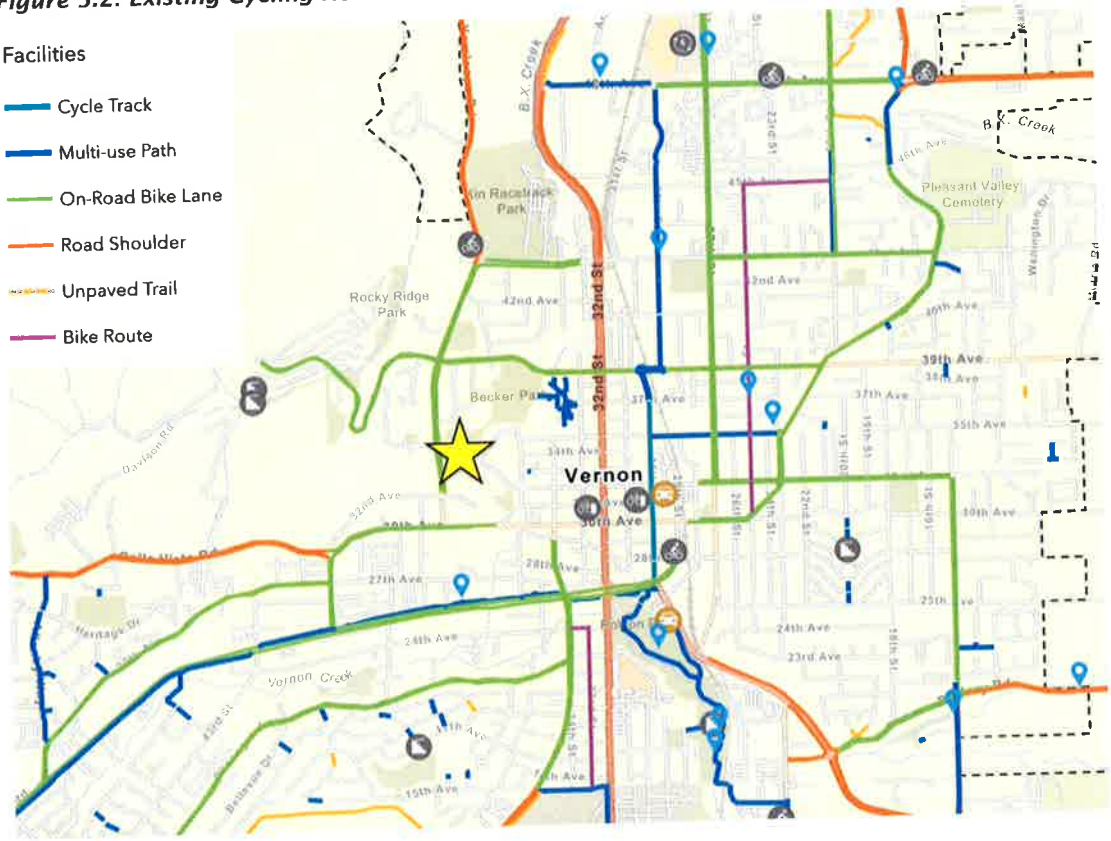
A review of pedestrian infrastructure finds:

- **Sidewalks** – No missing links impacting site connectivity are identified.
- **Crosswalks** – No additional crossings are needed. Crossings of Alexis Park Drive are provided to the north (36 Avenue – signed crosswalk) and south (32 Avenue – Rapid Flashing Beacon crosswalk).

5.2 Cycling

Cycling facilities near the site are illustrated in **Figure 5.2**. Bike lanes are provided on Alexis Park Drive.

Figure 5.2: Existing Cycling Network



5.3 Transit

Transit services are provided on Alexis Park Drive. Bus sops near the site are summarized in **Table 5.1**. The existing (2022) area transit network is illustrated in **Figure 5.3** and summarized **Table 5.2**. Sidewalk and crosswalk connectivity is provided to all stops.

Table 5.1: Existing Transit Stops

STOP LOCATION			ROUTES SERVICED	WALKING DISTANCE
Roadway	Cross-Street	Direction		
Alexis Park Drive	32 Avenue	North	3	175m
		South		260m
	35 Avenue	North		25m
30 Avenue	37 St/Alexis Park Dr	West	8	400m

Figure 5.3: Existing Transit Service

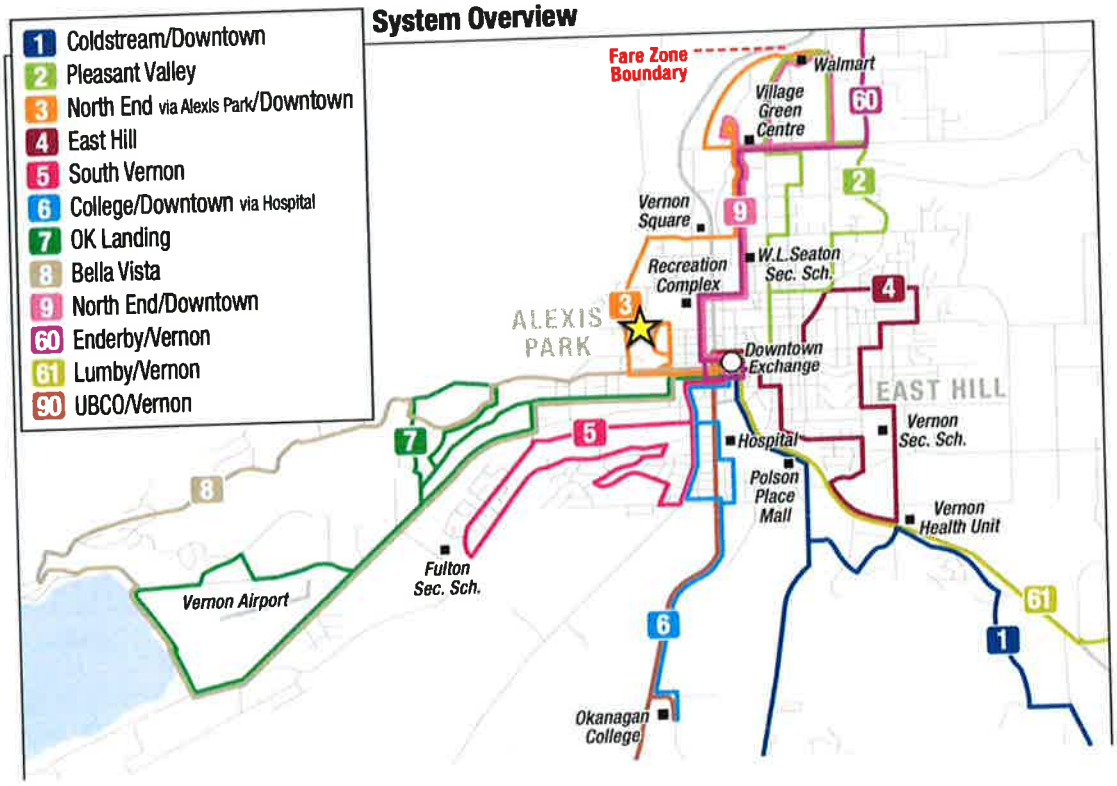


Table 5.2: Existing Transit Frequency

ROUTE		WEEKDAY SERVICE		HEADWAY (MINUTES)			
#	Name	Start	End	Day	Evening	Saturday	Sunday
3	North End	6:00	21:30	40	40	40	40
8	Bella Vista	6:20	20:40	70	70-80	70-80	140

APPENDIX A

Traffic Data

Intersection Turning Movement Count Summary: Alexis Park Drive & 35 Avenue

N/S Road:	Alexis Park Drive		***AM Peak Hr:***	7:45 AM	to 8:45 AM	***PHF (AM Peak Hr):***	0.86
E/W Road:	35 Avenue		***Mid-day Peak Hr:***	12:00 PM	to 1:00 PM	***PHF (Mid-day Peak Hr):***	0.89
Count Date:	March 1, 2022	Tuesday	***PM Peak Hr:***	4:00 PM	to 5:00 PM	***PHF (PM Peak Hr):***	0.92
Weather:	Clear						
Road Cond:	Dry						
Project #:	02-22-0014						

	Alexis Park Drive												35 Avenue														Pedestrians				Cyclists			
	Northbound (South Leg)						Southbound (North Leg)						Eastbound (West Leg)						Westbound (East Leg)																
	Left		Through		Right		Left		Through		Right		Left		Through		Right		Left		Through		Right		Total Vehicles		West	East	North	South				
Time Starting	Car	Truck	Car	Truck	Car	Truck	Car	Truck	Car	Truck	Car	Truck	Car	Truck	Car	Truck	Car	Truck	Car	Truck	Car	Truck	Car	Truck	15 Min	Hourly	Side	Side	Side	Side	NB	SB	WB	EB
6:00	1	0	31	1					22	1	0	0	1	0			2	0							59	59	0		0	0	0	0		0
6:15	1	0	39	0					21	0	3	0	3	0			0	0							67	126	1		1	0	0	0		0
6:30	2	0	83	0					46	1	2	0	3	0			3	0							140	266	1		0	0	0	0		0
6:45	1	0	70	1					62	0	1	0	1	0			3	0							139	405	0		0	0	0	0		0
7:00	1	0	72	0					48	3	1	0	1	0			2	0							128	474	1		0	0	0	0		0
7:15	0	0	85	1					63	3	1	0	6	0			3	0							162	569	1		1	0	0	0		0
7:30	2	0	126	4					66	3	3	0	7	1			3	0							215	644	0		0	0	0	0		0
7:45	0	0	140	1					100	2	1	0	5	0			6	0							255	760	5		0	0	0	0		0
8:00	0	0	147	3					124	6	3	0	7	0			7	0							297	929	0		2	0	0	0		0
8:15	3	0	176	5					126	5	3	0	7	0			3	0							328	1095	1		0	0	0	0		0
8:30	2	0	127	2					98	4	1	0	5	0			5	0							244	1124	0		1	0	0	0		0
8:45	4	0	131	6					93	3	3	0	2	0			2	0							244	1113	0		0	0	0	0		0
9:00	1	0	112	3					82	4	4	0	4	0			4	0							214	1030	1		0	0	0	0		0
9:15	5	0	108	1					79	2	1	0	7	0			6	0							209	911	3		0	0	0	0		0
9:30	2	0	122	4					75	4	3	0	2	0			3	0							215	882	2		0	0	0	0		0
9:45	2	0	109	5					98	4	3	0	5	0			7	0							233	871	1		0	1	0	0		1
10:00	2	0	101	2					89	1	2	0	1	0			5	0							203	860	0		1	0	0	0		0
10:15	3	0	104	5					110	2	2	0	4	1			5	0							236	887	3		0	0	0	0		0
10:30	0	0	99	2					130	4	5	0	5	0			5	0							250	922	0		0	0	0	0		0
10:45	3	0	121	5					111	2	8	0	4	1			5	0							260	949	6		0	0	0	0		0
11:00	2	0	97	1					97	1	3	0	0	0			4	0							205	951	0		0	0	0	0		0
11:15	3	0	96	3					126	4	7	0	2	0			0	0							241	956	2		3	0	0	0		0
11:30	3	0	100	4					125	5	6	0	1	0			3	0							247	953	0		0	0	0	0		0
11:45	4	0	99	5					145	3	2	0	3	0			3	0							264	957	0		1	0	0	0		0
12:00	6	0	112	2					113	2	3	0	2	1			4	0							245	997	0		0	0	0	0		1
12:15	5	0	96	4					123	2	5	0	6	0			6	0							247	1003	1		0	0	0	0		0
12:30	2	0	113	4					130	7	1	0	3	0			1	0							261	772	1		1	1	0	0		0
12:45	2	0	125	6					147	2	4	0	2	0			6	0							294	1047	3		1	0	0	0		0
13:00	4	0	127	1					115	5	1	0	2	0			2	0							257	1059	6		0	0	0	1		0
13:15	8	0	97	2					151	6	8	0	4	1			11	0							288	1100	1		0	0	0	0		0
13:30	5	0	120	8					129	3	7	0	3	0			5	0							280	1119	2		0	0	0	1		0
13:45	9	0	107	6					154	1	7	0	3	0			4	0							291	1116	0		0	0	0	0		0
14:00	9	0	132	6					153	3	7	0	3	1			8	0							322	1181	1		0	0	0	0		0
14:15	5	0	129	1					182	6	2	0	8	0			7	0							340	1233	2		0	0	0	0		0
14:30	6	0	120	4					156	6	10	0	1	0			3	0							306	1259	2		0	0	0	0		1
14:45	3	0	127	6					175	1	4	0	2	0			5	0							323	1291	8		0	2	0	0		0
15:00	6	0	136	3					160	6	6	0	1	0			5	0							323	1292	3		0	0	0	0		1
15:15	4	0	131	3					178	3	5	0	4	0			3	0							331	1283	6		0	0	0	0		0
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15:45	7	0	124	1					189	1	5	0	3	0			5	0							335	1315	2		0	0	0	0		1
16:00	5	0	156	0					205	2	4	0	5	0			3	0							380	1372	2		0	0	0	0		0
16:15	9	0	126	1					218	2	9	0	5	0			6	0							376	1417	2		0	0	0	1		2
16:30	4	0	128	1					192	4	5	0	0	0			5	0							339	1430	1		0	0	0	0		0
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17:00	6	0	116	0					199	0	6	0	5	0			4	0							336	1348	3		1	0	0	0		0
17:15	8	0	100	0					154	1	13	0	4	0			3	0							283	1255	1		2	0	0	0		0
17:30	4	0	90	2					164	0	10	0	2	0			5	0							277	1193	3		1	0	0	0		1
17:45	7	0	79	0					142	0	6	0	8	0			1	0							243	1139	0		1	0	0	0		0
18:00	3	0	97	0					102	1	4	0	1	0			5	0							213	1016	2		0	0	0	0		0
18:15	6	0	67	1					88	0	8	0	2	0			5	0							177	910	2		0	1	0	0		0
18:30	4	0	73	0					77	1	0	0	1	0			4	0							160	793	0		0	0	0	0		0
18:45	1	0	57	1					92	0	7	0	3	0			2	0							163	713	0		1	0	0	0		0
13 hr Total	199	0	5603	133					6375	135	227	0	175	6			215	0									88		20	5	0	3		8
13 hr Total Veh		199		5736						6510		227		181				215								13068								

Intersection Turning Movement Count Summary:

Alexis Park Drive & 35 Avenue

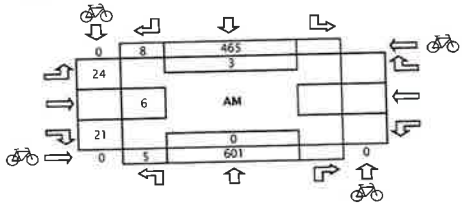
Road (North/South): Alexis Park Drive
Road (East/West): 35 Avenue
Count Date: March 1, 2022 Tuesday
Weather: Clear
Project #: 02-22-0014

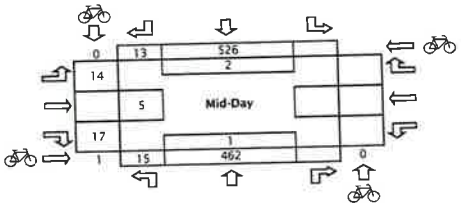
AM Peak Hour: 7:45 AM to 8:45 AM
Mid-Day Peak Hour 12:00 PM to 1:00 PM
PM Peak Hour: 4:00 PM to 5:00 PM

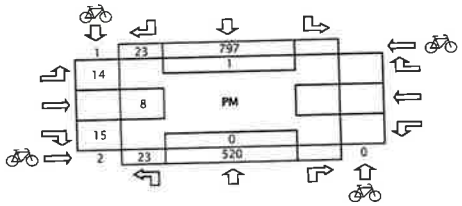
PHF (AM Peak Hour): 0.86
PHF (Mid-Day Peak Hour): 0.89
PHF (PM Peak Hour): 0.92

Time Starting	Alexis Park Drive Northbound (South Leg) Left Car	Left Truck	Through Car	Through Truck	Right Car	Right Truck	Southbound (North Leg) Left Car	Left Truck	Through Car	Through Truck	Right Car	Right Truck	35 Avenue Westbound (East Leg) Left Car	Left Truck	Through Car	Through Truck	Right Car	Right Truck	Eastbound (West Leg) Left Car	Left Truck	Through Car	Through Truck	Right Car	Right Truck	Total Vehicles 15 Min	Total Vehicles Hourly	Pedestrians West Side	Pedestrians East Side	Pedestrians North Side	Pedestrians South Side	Cyclists NB	Cyclists SB	Cyclists WB	Cyclists EB
7:00	1	0	72	0					48	3	1	0							1	0			2	0	128		1		0	0	0	0		0
7:15	0	0	85	1					63	3	1	0							6	0			3	0	162		1		1	0	0	0		0
7:30	2	0	126	4					66	3	3	0							7	1			3	0	215		0		0	0	0	0		0
7:45	0	0	140	1					100	2	1	0							5	0			6	0	255	760	5		0	0	0	0		0
8:00	0	0	147	3					124	6	3	0							7	0			7	0	297	929	0		2	0	0	0		0
8:15	3	0	176	5					126	5	3	0							7	0			3	0	328	1095	1		0	0	0	0		0
8:30	2	0	127	2					98	4	1	0							5	0			5	0	244	1124	0		1	0	0	0		0
8:45	4	0	131	6					93	3	3	0							2	0			2	0	244	1113	0		0	0	0	0		0
2 Hour Total	12	0	1004	22					718	29	16	0							40	1			31	0	1873		8		4	0	0	0		0
		12		1026						747		16								41				31			6		3	0	0	0		0
Peak Hour Total	5	0	590	11					448	17	8	0							24	0			21	0	1124									
		5		601						465		8								24				21										
11:00	2	0	97	1					97	1	3	0							0	0			4	0	205		0		0	0	0	0		0
11:15	3	0	96	3					126	4	7	0							2	0			0	0	241		2		3	0	0	0		0
11:30	3	0	100	4					125	5	6	0							1	0			3	0	247		0		0	0	0	0		0
11:45	4	0	99	5					145	3	2	0							3	0			3	0	264	957	0		1	0	0	0		0
12:00	6	0	112	2					113	2	3	0							2	1			4	0	245	997	0		0	0	0	0		1
12:15	5	0	96	4					123	2	5	0							3	0			6	0	247	1003	1		0	0	0	0		0
12:30	2	0	113	4					130	7	1	0							2	0			1	0	261	1017	1		1	1	0	0		0
12:45	2	0	125	6					147	2	4	0							19	1			6	0	294	1047	3		1	0	0	0		1
2 Hour Total	27	0	838	29					1006	26	31	0								20			27	0	2004		7		6	1	0	0		1
		27		867						1032		31							13	1			27				5		2	1	0	0		1
Peak Hour Total	15	0	446	16					513	13	13	0								14			17	0	1047									
		15		462						526		13												17										
16:00	5	0	156	0					205	2	4	0							5	0			3	0	380		2		0	0	0	0		0
16:15	9	0	126	1					218	2	9	0							5	0			6	0	376		2		0	0	0	1		2
16:30	4	0	128	1					192	4	5	0							0	0			5	0	339		1		0	0	0	0		0
16:45	5	0	107	1					174	0	5	0							4	0			1	0	297	1392	3		1	0	0	0		0
17:00	6	0	116	0					199	0	6	0							5	0			4	0	336	1348	3		1	0	0	0		0
17:15	8	0	100	0					154	1	13	0							4	0			3	0	283	1255	1		2	0	0	0		1
17:30	4	0	90	2					164	0	10	0							2	0			5	0	277	1193	3		1	0	0	0		0
17:45	7	0	79	0					142	0	6	0							8	0			1	0	243	1139	0		1	0	0	0		0
2 Hour Total	48	0	902	5					1448	9	58	0							33	0			28	0	2531		15		6	0	0	1		3
		48		907						1457		58								33				28			8		1	0	0	1		2
Peak Hour Total	23	0	517	3					789	8	23	0							14	0			15	0	1392									
		23		520						797		23								14				15										
6 Hour Total	87	0	2744	56					3172	64	105	0							92	2			86	0	6408		30		16	1	0	1		4
		87		2800						3236		105								94				86										

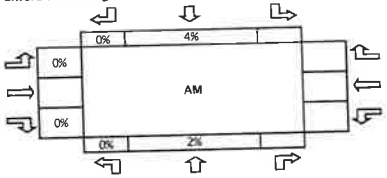
Peak Hour Volumes

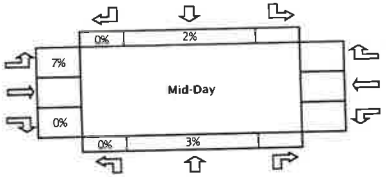


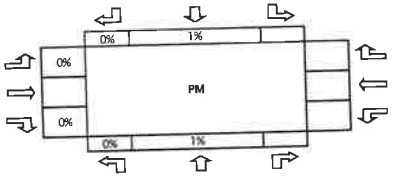




Heavy Vehicle Percentage







Intersection Turning Movement Count Summary:

Alexis Park Drive & 36 Avenue

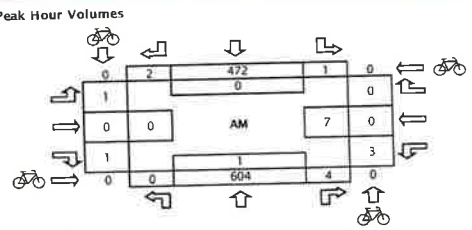
N/S Road: Alexis Park Drive
E/W Road: 36 Avenue
Count Date: March 1, 2022 Tuesday
Weather: Cloudy
Road Condition: Dry
Project #: 02-22-0014

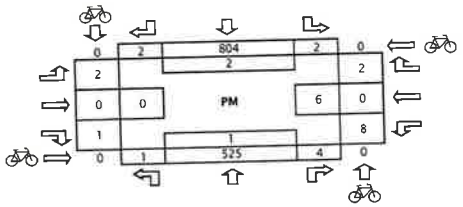
AM Peak Hour: 7:45 AM to 8:45 AM
PM Peak Hour: 4:00 PM to 5:00 PM

PHF (AM Peak Hour): 0.84
PHF (PM Peak Hour): 0.92

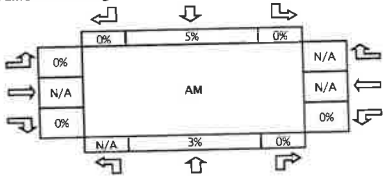
Time Starting	Alexis Park Drive Northbound (South Leg) Left Car	Left Truck	Through Car	Through Truck	Right Car	Right Truck	Southbound (North Leg) Left Car	Left Truck	Through Car	Through Truck	Right Car	Right Truck	36 Avenue Westbound (East Leg) Left Car	Left Truck	Through Car	Through Truck	Right Car	Right Truck	Eastbound (West Leg) Left Car	Left Truck	Through Car	Through Truck	Right Car	Right Truck	Total Vehicles 15 Min	Total Vehicles Hourly	Pedestrians West Side	Pedestrians East Side	Pedestrians North Side	Pedestrians South Side	Cyclists NB	Cyclists SB	Cyclists WB	Cyclists EB
7:00	0	0	69	3	0	0	0	0	48	3	1	0	0	0	0	0	0	0	2	0	0	0	0	0	126		0	2	0	1	0	0	0	0
7:15	0	0	92	1	0	0	0	0	64	3	0	0	1	0	0	0	1	0	0	0	0	0	0	0	162		0	0	0	0	0	0	0	0
7:30	0	0	129	4	0	0	0	0	66	4	0	0	2	0	0	0	1	0	0	0	0	0	0	0	206		0	0	0	0	0	0	0	0
7:45	0	0	139	3	0	0	1	0	97	5	0	0	0	0	0	0	0	0	0	0	0	0	0	0	245	739	0	2	0	0	0	0	0	0
8:00	0	0	146	5	0	0	0	0	128	6	0	0	1	0	0	0	0	0	0	0	0	0	0	0	286	899	0	3	0	0	0	0	0	0
8:15	0	0	175	7	3	0	0	0	131	5	2	0	1	0	0	0	0	0	1	0	0	0	0	0	325	1062	0	0	0	0	0	0	0	0
8:30	0	0	127	2	1	0	0	0	94	6	0	0	1	0	0	0	0	0	0	0	0	0	1	0	232	1088	0	2	0	1	0	0	0	0
8:45	0	0	126	7	1	0	0	0	94	5	1	0	0	0	0	0	1	0	0	0	0	0	1	0	236	1079	0	1	0	0	0	0	0	0
2 Hour Total	0	0	1003	32	5	0	1	0	722	37	4	0	6	0	0	0	2	0	4	0	0	0	2	0	1818		0	10	0	2	0	0	0	0
		0		1035		5		1		759		4		6		0		2		4		0		2										
Peak Hour Total	0	0	587	17	4	0	1	0	450	22	2	0	3	0	0	0	0	0	1	0	0	0	1	0	1088		0	7	0	1	0	0	0	0
		0		604		4		1		472		2		3		0		0		1		0		1										
16:00	1	0	151	2	2	0	1	0	204	5	1	0	1	0	0	0	1	0	0	0	0	0	0	0	369		0	2	0	0	0	0	0	0
16:15	0	0	125	3	1	0	1	0	224	2	0	0	2	0	0	0	0	0	0	0	0	0	1	0	360		0	1	2	1	0	0	0	0
16:30	0	0	130	3	0	0	0	0	188	6	0	0	3	0	0	0	0	0	0	0	0	0	0	0	330		0	3	0	0	0	0	0	0
16:45	0	0	108	3	1	0	0	0	174	1	1	0	2	0	0	0	0	0	1	0	0	0	0	0	292	1351	0	0	0	0	0	0	0	0
17:00	0	0	118	2	2	0	0	0	202	1	1	0	1	0	0	0	0	0	1	0	0	0	0	0	328	1310	0	2	0	2	0	0	0	0
17:15	0	0	99	0	3	0	1	0	163	2	1	0	0	0	0	0	0	0	0	0	0	0	0	0	270	1220	0	0	1	2	0	0	0	0
17:30	0	0	89	4	1	0	0	0	172	1	2	0	1	0	0	0	0	0	0	0	0	0	0	0	270	1160	0	1	0	0	0	0	0	0
17:45	0	0	83	1	1	0	1	0	139	3	0	0	2	0	0	0	0	0	2	0	0	0	0	0	232	1100	0	0	0	0	0	0	0	0
2 Hour Total	1	0	903	18	11	0	4	0	1466	21	6	0	12	0	1	0	2	0	5	0	0	0	1	0	2451		0	9	3	5	0	0	0	0
		1		921		11		4		1487		6		12		1		2		5		0		1										
Peak Hour Total	1	0	514	11	4	0	2	0	790	14	2	0	8	0	0	0	2	0	2	0	0	0	1	0	1351		0	6	2	1	0	0	0	0
		1		525		4		2		804		2		8		0		2		2		0		1										
4 Hour Total	1	0	1906	50	16	0	5	0	2188	58	10	0	18	0	1	0	4	0	9	0	0	0	3	0	4269		0	19	3	7	0	0	0	0
		1		1956		16		5		2246		10		18		1		4		9		0		3										

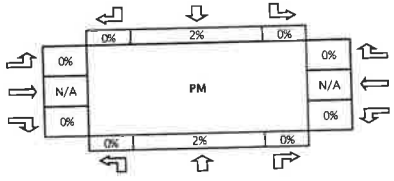
Peak Hour Volumes





Heavy Vehicle Percentage





Intersection Turning Movement Count Summary:

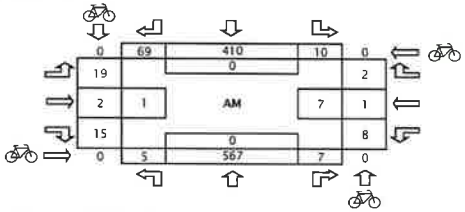
Alexis Park Drive & 32 Avenue

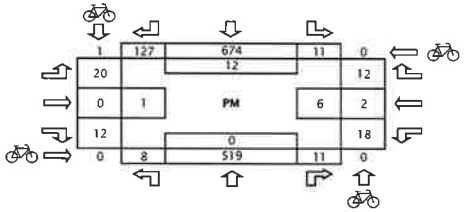
N/S Road: Alexis Park Drive
E/W Road: 32 Avenue
Count Date: March 1, 2022 Tuesday
Weather: Cloudy
Road Condition: Dry
Project #: 02-22-0014

AM Peak Hour: 8:00 AM to 9:00 AM
PM Peak Hour: 4:00 PM to 5:00 PM
PHF (AM Peak Hour): 0.85
PHF (PM Peak Hour): 0.92

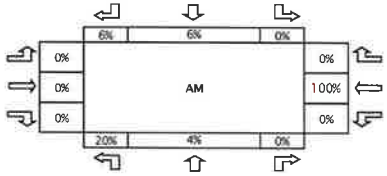
	Alexis Park Drive												32 Avenue																			
	Northbound (South Leg)						Southbound (North Leg)						Westbound (East Leg)						Eastbound (West Leg)						Total Vehicles		Pedestrians				Cyclists			
	Left		Through		Right		Left		Through		Right		Left		Through		Right		Left		Through		Right											
Time Starting	Car	Truck	Car	Truck	Car	Truck	Car	Truck	Car	Truck	Car	Truck	Car	Truck	Car	Truck	Car	Truck	Car	Truck	Car	Truck	Car	Truck	15 Min	Hourly	West Side	East Side	North Side	South Side	NB	SB	WB	EB
7:00	0	0	75	3	3	0	0	0	45	3	4	0	2	0	0	0	0	0	0	0	0	0	1	0	136		0	0	0	0	0	0	0	0
7:15	0	0	83	1	5	0	0	0	57	3	9	0	1	0	0	0	0	0	0	0	0	0	2	0	161		0	0	1	0	0	0	0	0
7:30	0	0	120	4	2	0	2	0	56	4	9	1	2	0	0	0	2	0	4	0	0	1	2	0	209		0	0	0	0	0	0	0	0
7:45	2	0	123	1	0	1	3	0	88	2	8	1	1	0	0	0	1	0	8	0	0	0	4	0	243	749	0	1	5	0	0	0	0	0
8:00	1	0	125	5	1	0	3	0	108	8	20	2	2	0	0	0	0	0	4	0	1	0	2	0	282	895	1	4	0	0	0	0	0	0
8:15	1	0	159	6	4	0	2	0	109	5	22	1	0	0	0	1	1	0	11	0	0	0	6	0	328	1062	0	0	0	0	0	0	0	0
8:30	0	1	126	3	2	0	1	0	87	5	11	1	3	0	0	0	0	0	1	0	0	0	6	0	247	1100	0	1	0	0	0	0	0	0
8:45	2	0	136	7	0	0	4	0	83	5	12	0	3	0	0	0	1	0	3	0	1	0	1	0	258	1115	0	2	0	0	0	0	0	0
2 Hour Total	6	1	947	30	17	1	15	0	633	35	95	6	14	0	0	1	5	0	31	0	2	1	24	0			1	8	6	0	0	0	0	0
		7		977		18		15		668		101		14		1		5		31		3		24	1864									
Peak Hour Total	4	1	546	21	7	0	10	0	387	23	65	4	8	0	0	1	2	0	19	0	2	0	15	0			1	7	0	0	0	0	0	0
		5		567		7		10		410		69		8		1		2		19		2		15		1115								
16:00	2	0	148	1	3	0	3	0	176	2	34	0	4	0	0	0	4	0	6	0	0	0	2	0	385		0	4	4	0	0	0	0	0
16:15	1	0	126	3	1	0	6	0	183	3	42	0	5	0	0	0	4	0	4	0	0	0	1	0	379		0	1	4	0	0	1	0	0
16:30	3	0	134	3	2	0	2	0	156	6	30	0	6	0	2	0	2	0	6	0	0	0	5	0	357		0	1	2	0	0	0	0	0
16:45	2	0	102	2	5	0	0	0	147	1	21	0	3	0	0	0	2	0	4	0	0	0	4	0	293	1414	1	0	2	0	0	0	0	0
17:00	3	0	108	2	2	0	1	0	165	1	35	0	5	0	0	0	3	0	11	0	0	0	12	0	348	1377	0	0	4	0	0	0	0	0
17:15	4	0	98	0	2	0	4	0	139	1	19	0	1	0	0	0	4	0	2	0	0	0	3	0	277	1275	1	1	3	0	0	0	0	0
17:30	1	0	93	3	1	0	1	0	133	2	27	1	2	0	0	0	0	0	2	0	0	0	2	0	268	1186	1	1	3	0	0	0	0	0
17:45	1	0	77	2	3	0	1	0	123	1	18	0	1	0	0	0	4	0	4	0	0	0	1	0	236	1129	1	0	1	0	0	0	0	0
2 Hour Total	17	0	886	16	19	0	18	0	1222	17	226	1	27	0	2	0	23	0	39	0	0	0	30	0			4	8	23	0	0	1	0	0
		17		902		19		18		1239		227		27		2		23		39		0		30	2543									
Peak Hour Total	8	0	510	9	11	0	11	0	662	12	127	0	18	0	2	0	12	0	20	0	0	0	12	0			1	6	12	0	0	1	0	0
		8		519		11		11		674		127		18		2		12		20		0		12		1414								
4 Hour Total	23	1	1833	46	36	1	33	0	1855	52	321	7	41	0	2	1	28	0	70	0	2	1	54	0			5	16	29	0	0	1	0	0
		24		1879		37		33		1907		328		41		3		28		70		3		54		4407								

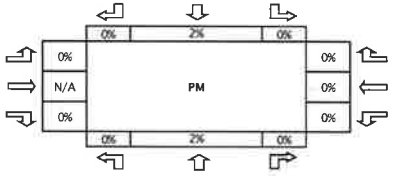
Peak Hour Volumes





Heavy Vehicle Percentage





APPENDIX B

Synchro & Warrant Outputs

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	24	21	5	601	465	8
Future Volume (Veh/h)	24	21	5	601	465	8
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	25	22	5	633	489	8
Pedestrians	10			10	10	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	1			1	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	840	268	507			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	840	268	507			
tC, single (s)	6.8	6.9	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	92	97	100			
cM capacity (veh/h)	298	717	1025			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	47	216	422	326	171
Volume Left	25	5	0	0	0
Volume Right	22	0	0	0	8
cSH	410	1025	1700	1700	1700
Volume to Capacity	0.11	0.00	0.25	0.19	0.10
Queue Length 95th (m)	3.1	0.1	0.0	0.0	0.0
Control Delay (s)	14.9	0.2	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	14.9	0.1		0.0	
Approach LOS	B				

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	33.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	3	2	604	4	2	472
Future Volume (Veh/h)	3	2	604	4	2	472
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	3	2	636	4	2	497
Pedestrians	10		10			10
Lane Width (m)	3.6		3.6			3.6
Walking Speed (m/s)	1.2		1.2			1.2
Percent Blockage	1		1			1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	910	340			650	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	910	340			650	
tC, single (s)	6.8	6.9			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	269	645			904	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	5	424	216	168	331
Volume Left	3	0	0	2	0
Volume Right	2	0	4	0	0
cSH	351	1700	1700	904	1700
Volume to Capacity	0.01	0.25	0.13	0.00	0.19
Queue Length 95th (m)	0.3	0.0	0.0	0.1	0.0
Control Delay (s)	15.4	0.0	0.0	0.1	0.0
Lane LOS	C			A	
Approach Delay (s)	15.4	0.0		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	29.7%	ICU Level of Service	A
Analysis Period (min)	15		

3: Alexis Park Drive & 32 Avenue
03/25/2022

AM Peak Hour
Existing

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	2	15	8	2	2	5	567	7	10	410	69
Future Volume (Veh/h)	19	2	15	8	2	2	5	567	7	10	410	69
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	20	2	16	8	2	2	5	597	7	11	432	73
Pedestrians		10			10			10			10	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			1			1	
Right turn flare (veh)								None			None	
Median type												
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1124	1124	272	886	1158	620	515			614		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1124	1124	272	886	1158	620	515			614		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	87	99	98	96	99	100	100			99		
cM capacity (veh/h)	152	197	713	222	188	423	1018			933		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	38	12	609	227	289
Volume Left	20	8	5	11	0
Volume Right	16	2	7	0	73
cSH	231	234	1018	933	1700
Volume to Capacity	0.16	0.05	0.00	0.01	0.17
Queue Length 95th (m)	4.6	1.3	0.1	0.3	0.0
Control Delay (s)	23.6	21.2	0.1	0.5	0.0
Lane LOS	C	C	A	A	
Approach Delay (s)	23.6	21.2	0.1	0.2	
Approach LOS	C	C			

Intersection Summary				
Average Delay	1.2			
Intersection Capacity Utilization	47.1%	ICU Level of Service	A	
Analysis Period (min)	15			

1: Alexis Park Drive & 35 Avenue
03/25/2022

PM Peak Hour
Existing

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	14	15	23	520	797	23
Future Volume (Veh/h)	14	15	23	520	797	23
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	15	16	24	547	839	24
Pedestrians	10			10	10	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	1			1	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1192	452	873			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1192	452	873			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	91	97	97			
cM capacity (veh/h)	171	546	762			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	31	206	365	559	304
Volume Left	15	24	0	0	0
Volume Right	16	0	0	0	24
cSH	265	762	1700	1700	1700
Volume to Capacity	0.12	0.03	0.21	0.33	0.18
Queue Length 95th (m)	3.1	0.8	0.0	0.0	0.0
Control Delay (s)	20.4	1.5	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	20.4	0.5		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	0.6		
Intersection Capacity Utilization	44.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	8	2	525	4	2	804
Future Volume (Veh/h)	8	2	525	4	2	804
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	8	2	553	4	2	846
Pedestrians	10		10			10
Lane Width (m)	3.6		3.6			3.6
Walking Speed (m/s)	1.2		1.2			1.2
Percent Blockage	1		1			1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1002	298			567	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1002	298			567	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	100			100	
cM capacity (veh/h)	235	686			993	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	10	369	188	284	564
Volume Left	8	0	0	2	0
Volume Right	2	0	4	0	0
cSH	270	1700	1700	993	1700
Volume to Capacity	0.04	0.22	0.11	0.00	0.33
Queue Length 95th (m)	0.9	0.0	0.0	0.0	0.0
Control Delay (s)	18.8	0.0	0.0	0.1	0.0
Lane LOS	C			A	
Approach Delay (s)	18.8	0.0		0.0	
Approach LOS	C				

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	36.4%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	2	12	18	2	12	8	519	11	11	674	127
Future Volume (Veh/h)	20	2	12	18	2	12	8	519	11	11	674	127
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	2	13	19	2	13	8	546	12	12	709	134
Pedestrians		10			10			10			10	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1402	1394	442	980	1455	572	853			568		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1402	1394	442	980	1455	572	853			568		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	77	99	98	90	98	97	99			99		
cM capacity (veh/h)	91	135	554	188	124	456	775			992		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	36	34	566	366	488
Volume Left	21	19	8	12	0
Volume Right	13	13	12	0	134
cSH	134	233	775	992	1700
Volume to Capacity	0.27	0.15	0.01	0.01	0.29
Queue Length 95th (m)	8.1	4.0	0.3	0.3	0.0
Control Delay (s)	41.4	23.0	0.3	0.4	0.0
Lane LOS	E	C	A	A	
Approach Delay (s)	41.4	23.0	0.3	0.2	
Approach LOS	E	C			

Intersection Summary				
Average Delay	1.7			
Intersection Capacity Utilization	47.3%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	25	22	5	619	479	8
Future Volume (Veh/h)	25	22	5	619	479	8
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	26	23	5	652	504	8
Pedestrians	10			10	10	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	1			1	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	864	276	522			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	864	276	522			
tC, single (s)	6.8	6.9	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	91	97	100			
cM capacity (veh/h)	287	709	1011			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	49	222	435	336	176
Volume Left	26	5	0	0	0
Volume Right	23	0	0	0	8
cSH	398	1011	1700	1700	1700
Volume to Capacity	0.12	0.00	0.26	0.20	0.10
Queue Length 95th (m)	3.3	0.1	0.0	0.0	0.0
Control Delay (s)	15.3	0.2	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	15.3	0.1		0.0	
Approach LOS	C				

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	33.4%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	3	2	622	4	2	486
Future Volume (Veh/h)	3	2	622	4	2	486
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	3	2	655	4	2	512
Pedestrians	10		10			10
Lane Width (m)	3.6		3.6			3.6
Walking Speed (m/s)	1.2		1.2			1.2
Percent Blockage	1		1			1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	937	350			669	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	937	350			669	
tC, single (s)	6.8	6.9			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	258	636			890	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	5	437	222	173	341
Volume Left	3	0	0	2	0
Volume Right	2	0	4	0	0
cSH	339	1700	1700	890	1700
Volume to Capacity	0.01	0.26	0.13	0.00	0.20
Queue Length 95th (m)	0.4	0.0	0.0	0.1	0.0
Control Delay (s)	15.8	0.0	0.0	0.1	0.0
Lane LOS	C			A	
Approach Delay (s)	15.8	0.0		0.0	
Approach LOS	C				

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	30.2%	ICU Level of Service		A
Analysis Period (min)	15			

3: Alexis Park Drive & 32 Avenue
03/25/2022

AM Peak Hour
Background (2025)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	2	15	8	2	2	5	584	7	10	422	71
Future Volume (Veh/h)	20	2	15	8	2	2	5	584	7	10	422	71
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	2	16	8	2	2	5	615	7	11	444	75
Pedestrians		10			10			10			10	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1155	1156	280	910	1190	638	529			632		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1155	1156	280	910	1190	638	529			632		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	85	99	98	96	99	100	100			99		
cM capacity (veh/h)	144	189	706	214	180	412	1005			919		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	39	12	627	233	297
Volume Left	21	8	5	11	0
Volume Right	16	2	7	0	75
cSH	217	225	1005	919	1700
Volume to Capacity	0.18	0.05	0.00	0.01	0.17
Queue Length 95th (m)	5.1	1.3	0.1	0.3	0.0
Control Delay (s)	25.1	21.9	0.1	0.5	0.0
Lane LOS	D	C	A	A	
Approach Delay (s)	25.1	21.9	0.1	0.2	
Approach LOS	D	C			

Intersection Summary				
Average Delay	1.2			
Intersection Capacity Utilization	48.0%	ICU Level of Service	A	
Analysis Period (min)	15			

1: Alexis Park Drive & 35 Avenue
03/25/2022

PM Peak Hour
Background (2025)

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	14	15	24	536	821	24
Future Volume (Veh/h)	14	15	24	536	821	24
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	15	16	25	564	864	25
Pedestrians	10			10	10	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	1			1	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1228	464	899			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1228	464	899			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	91	97	97			
cM capacity (veh/h)	162	535	745			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	31	213	376	576	313
Volume Left	15	25	0	0	0
Volume Right	16	0	0	0	25
cSH	253	745	1700	1700	1700
Volume to Capacity	0.12	0.03	0.22	0.34	0.18
Queue Length 95th (m)	3.3	0.8	0.0	0.0	0.0
Control Delay (s)	21.2	1.5	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	21.2	0.5		0.0	
Approach LOS	C				

Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	45.3%	ICU Level of Service	A	
Analysis Period (min)	15			

2: Alexis Park Drive & 36 Avenue

PM Peak Hour
Background (2025)

03/25/2022

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	8	2	541	4	2	828
Future Volume (Veh/h)	8	2	541	4	2	828
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	8	2	569	4	2	872
Pedestrians	10		10			10
Lane Width (m)	3.6		3.6			3.6
Walking Speed (m/s)	1.2		1.2			1.2
Percent Blockage	1		1			1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1031	306			583	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1031	306			583	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	100			100	
cM capacity (veh/h)	225	678			979	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	10	379	194	293	581
Volume Left	8	0	0	2	0
Volume Right	2	0	4	0	0
cSH	259	1700	1700	979	1700
Volume to Capacity	0.04	0.22	0.11	0.00	0.34
Queue Length 95th (m)	1.0	0.0	0.0	0.0	0.0
Control Delay (s)	19.4	0.0	0.0	0.1	0.0
Lane LOS	C			A	
Approach Delay (s)	19.4	0.0		0.0	
Approach LOS	C				

Intersection Summary				
Average Delay	0.1			
Intersection Capacity Utilization	37.1%	ICU Level of Service		A
Analysis Period (min)	15			

3: Alexis Park Drive & 32 Avenue

PM Peak Hour
Background (2025)

03/25/2022

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	2	12	19	2	12	8	535	11	11	694	131
Future Volume (Veh/h)	21	2	12	19	2	12	8	535	11	11	694	131
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	22	2	13	20	2	13	8	563	12	12	731	138
Pedestrians		10			10			10			10	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1443	1435	454	1008	1498	589	879			585		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1443	1435	454	1008	1498	589	879			585		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	74	98	98	89	98	97	99			99		
cM capacity (veh/h)	85	127	544	179	117	444	758			978		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	37	35	583	378	504
Volume Left	22	20	8	12	0
Volume Right	13	13	12	0	138
cSH	124	221	758	978	1700
Volume to Capacity	0.30	0.16	0.01	0.01	0.30
Queue Length 95th (m)	9.2	4.4	0.3	0.3	0.0
Control Delay (s)	46.0	24.3	0.3	0.4	0.0
Lane LOS	E	C	A	A	
Approach Delay (s)	46.0	24.3	0.3	0.2	
Approach LOS	E	C			

Intersection Summary				
Average Delay	1.9			
Intersection Capacity Utilization	48.1%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	27	24	6	679	525	9
Future Volume (Veh/h)	27	24	6	679	525	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	28	25	6	715	553	9
Pedestrians	10			10	10	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	1			1	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	947	301	572			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	947	301	572			
tC, single (s)	6.8	6.9	4.2			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	96	99			
cM capacity (veh/h)	254	684	968			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	53	244	477	369	193
Volume Left	28	6	0	0	0
Volume Right	25	0	0	0	9
cSH	361	968	1700	1700	1700
Volume to Capacity	0.15	0.01	0.28	0.22	0.11
Queue Length 95th (m)	4.1	0.1	0.0	0.0	0.0
Control Delay (s)	16.7	0.3	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	16.7	0.1		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	35.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	3	2	683	5	2	533
Future Volume (Veh/h)	3	2	683	5	2	533
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	3	2	719	5	2	561
Pedestrians	10		10			10
Lane Width (m)	3.6		3.6			3.6
Walking Speed (m/s)	1.2		1.2			1.2
Percent Blockage	1		1			1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1026	382			734	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1026	382			734	
tC, single (s)	6.8	6.9			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	226	606			840	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	5	479	245	189	374
Volume Left	3	0	0	2	0
Volume Right	2	0	5	0	0
cSH	302	1700	1700	840	1700
Volume to Capacity	0.02	0.28	0.14	0.00	0.22
Queue Length 95th (m)	0.4	0.0	0.0	0.1	0.0
Control Delay (s)	17.1	0.0	0.0	0.1	0.0
Lane LOS	C			A	
Approach Delay (s)	17.1	0.0		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	31.9%	ICU Level of Service	A
Analysis Period (min)	15		

3: Alexis Park Drive & 32 Avenue
03/25/2022

AM Peak Hour
Background (2035)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	2	17	9	2	2	6	641	8	11	463	78
Future Volume (Veh/h)	21	2	17	9	2	2	6	641	8	11	463	78
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	22	2	18	9	2	2	6	675	8	12	487	82
Pedestrians		10			10			10			10	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1266	1267	304	998	1304	699	579			693		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1266	1267	304	998	1304	699	579			693		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	81	99	97	95	99	99	99			99		
cM capacity (veh/h)	118	161	680	183	153	376	962			871		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	42	13	689	256	326
Volume Left	22	9	6	12	0
Volume Right	18	2	8	0	82
cSH	187	192	962	871	1700
Volume to Capacity	0.22	0.07	0.01	0.01	0.19
Queue Length 95th (m)	6.6	1.7	0.2	0.3	0.0
Control Delay (s)	29.7	25.1	0.2	0.6	0.0
Lane LOS	D	D	A	A	
Approach Delay (s)	29.7	25.1	0.2	0.3	
Approach LOS	D	D			

Intersection Summary				
Average Delay	1.4			
Intersection Capacity Utilization	51.9%	ICU Level of Service	A	
Analysis Period (min)	15			

1: Alexis Park Drive & 35 Avenue
03/25/2022

PM Peak Hour
Background (2035)

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	16	17	26	588	901	26
Future Volume (Veh/h)	16	17	26	588	901	26
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	17	18	27	619	948	27
Pedestrians	10			10	10	
Lane Width (m)	3.6			3.6	3.6	
Walking Speed (m/s)	1.2			1.2	1.2	
Percent Blockage	1			1	1	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1345	508	985			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1345	508	985			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	87	96	96			
cM capacity (veh/h)	135	502	691			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	35	233	413	632	343
Volume Left	17	27	0	0	0
Volume Right	18	0	0	0	27
cSH	216	691	1700	1700	1700
Volume to Capacity	0.16	0.04	0.24	0.37	0.20
Queue Length 95th (m)	4.5	1.0	0.0	0.0	0.0
Control Delay (s)	24.8	1.6	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	24.8	0.6		0.0	
Approach LOS	C				

Intersection Summary				
Average Delay	0.8			
Intersection Capacity Utilization	48.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	2	593	5	2	909
Future Volume (Veh/h)	9	2	593	5	2	909
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	9	2	624	5	2	957
Pedestrians	10		10			10
Lane Width (m)	3.6		3.6			3.6
Walking Speed (m/s)	1.2		1.2			1.2
Percent Blockage	1		1			1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1129	334			639	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1129	334			639	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	100			100	
cM capacity (veh/h)	194	650			933	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	11	416	213	321	638
Volume Left	9	0	0	2	0
Volume Right	2	0	5	0	0
cSH	222	1700	1700	933	1700
Volume to Capacity	0.05	0.24	0.13	0.00	0.38
Queue Length 95th (m)	1.2	0.0	0.0	0.1	0.0
Control Delay (s)	22.0	0.0	0.0	0.1	0.0
Lane LOS	C			A	
Approach Delay (s)	22.0	0.0		0.0	
Approach LOS	C				

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	39.4%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	2	14	20	2	14	9	586	12	12	762	144
Future Volume (Veh/h)	23	2	14	20	2	14	9	586	12	12	762	144
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	24	2	15	21	2	15	9	617	13	13	802	152
Pedestrians		10			10			10			10	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1582	1572	497	1104	1642	644	964			640		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1582	1572	497	1104	1642	644	964			640		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	64	98	97	86	98	96	99			99		
cM capacity (veh/h)	66	105	510	151	95	409	704			932		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	41	38	639	414	553
Volume Left	24	21	9	13	0
Volume Right	15	15	13	0	152
cSH	99	193	704	932	1700
Volume to Capacity	0.41	0.20	0.01	0.01	0.33
Queue Length 95th (m)	13.8	5.7	0.3	0.3	0.0
Control Delay (s)	64.5	28.2	0.3	0.4	0.0
Lane LOS	F	D	A	A	
Approach Delay (s)	64.5	28.2	0.3	0.2	
Approach LOS	F	D			

Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	51.6%	ICU Level of Service		A
Analysis Period (min)	15			

1: Alexis Park Drive & 35 Avenue
03/25/2022

AM Peak Hour
After Development: (2025) - Building 1-3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	25	0	22	20	0	30	5	635	8	11	486	8
Future Volume (Veh/h)	25	0	22	20	0	30	5	635	8	11	486	8
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	26	0	23	21	0	32	5	668	8	12	512	8
Pedestrians		10			10			10			10	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	936	1246	280	1005	1246	358	530			686		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	936	1246	280	1005	1246	358	530			686		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	87	100	97	88	100	95	100			99		
cM capacity (veh/h)	200	166	705	181	166	628	1004			876		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	49	53	339	342	268	264
Volume Left	26	21	5	0	12	0
Volume Right	23	32	0	8	0	8
cSH	301	318	1004	1700	876	1700
Volume to Capacity	0.16	0.17	0.00	0.20	0.01	0.16
Queue Length 95th (m)	4.6	4.7	0.1	0.0	0.3	0.0
Control Delay (s)	19.3	18.6	0.2	0.0	0.6	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	19.3	18.6	0.1		0.3	
Approach LOS	C	C				

Intersection Summary			
Average Delay	1.6		
Intersection Capacity Utilization	35.2%	ICU Level of Service	A
Analysis Period (min)	15		

2: Alexis Park Drive & 36 Avenue
03/25/2022

AM Peak Hour
After Development (2025) - Building 1-3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	3	2	668	4	2	504
Future Volume (Veh/h)	3	2	668	4	2	504
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	3	2	703	4	2	531
Pedestrians	10		10			10
Lane Width (m)	3.6		3.6			3.6
Walking Speed (m/s)	1.2		1.2			1.2
Percent Blockage	1		1			1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	994	374			717	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	994	374			717	
tC, single (s)	6.8	6.9			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	237	614			853	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	5	469	238	179	354
Volume Left	3	0	0	2	0
Volume Right	2	0	4	0	0
cSH	314	1700	1700	853	1700
Volume to Capacity	0.02	0.28	0.14	0.00	0.21
Queue Length 95th (m)	0.4	0.0	0.0	0.1	0.0
Control Delay (s)	16.6	0.0	0.0	0.1	0.0
Lane LOS	C			A	
Approach Delay (s)	16.6	0.0		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	31.4%	ICU Level of Service	A
Analysis Period (min)	15		

3: Alexis Park Drive & 32 Avenue
03/25/2022

AM Peak Hour
After Development (2025) - Building 1-3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	20	2	15	8	2	2	5	596	7	10	452	71
Future Volume (Veh/h)	20	2	15	8	2	2	5	596	7	10	452	71
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	2	16	8	2	2	5	627	7	11	476	75
Pedestrians		10			10			10			10	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			1			1	
Right turn flare (veh)								None			None	
Median type												
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1199	1200	296	938	1234	650	561			644		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1199	1200	296	938	1234	650	561			644		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	84	99	98	98	99	100	99			99		
cM capacity (veh/h)	133	178	689	203	170	405	978			909		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	39	12	639	249	313
Volume Left	21	8	5	11	0
Volume Right	16	2	7	0	75
cSH	203	214	978	909	1700
Volume to Capacity	0.19	0.06	0.01	0.01	0.18
Queue Length 95th (m)	5.5	1.4	0.1	0.3	0.0
Control Delay (s)	26.9	22.8	0.1	0.5	0.0
Lane LOS	D	C	A	A	
Approach Delay (s)	26.9	22.8	0.1	0.2	
Approach LOS	D	C			

Intersection Summary				
Average Delay	1.2			
Intersection Capacity Utilization	48.6%	ICU Level of Service	A	
Analysis Period (min)	15			

1: Alexis Park Drive & 35 Avenue
03/25/2022

PM Peak Hour
After Development (2025) - Building 1-3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	14	0	15	16	0	25	24	552	23	35	841	24
Future Volume (Veh/h)	14	0	15	16	0	25	24	552	23	35	841	24
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	15	0	16	17	0	26	25	581	24	37	885	25
Pedestrians		10			10			10			10	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			1			1	
Right turn flare (veh)								None			None	
Median type												
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1358	1646	475	1196	1647	322	920			615		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1358	1646	475	1196	1647	322	920			615		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	84	100	97	87	100	96	97			96		
cM capacity (veh/h)	95	90	527	126	90	662	732			953		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	31	43	316	314	480	468
Volume Left	15	17	25	0	37	0
Volume Right	16	26	0	24	0	25
cSH	164	247	732	1700	953	1700
Volume to Capacity	0.19	0.17	0.03	0.18	0.04	0.28
Queue Length 95th (m)	5.4	4.9	0.8	0.0	1.0	0.0
Control Delay (s)	31.9	22.6	1.2	0.0	1.1	0.0
Lane LOS	D	C	A		A	
Approach Delay (s)	31.9	22.6	0.6		0.6	
Approach LOS	D	C				

Intersection Summary				
Average Delay	1.7			
Intersection Capacity Utilization	58.1%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	8	2	582	4	2	883
Future Volume (Veh/h)	8	2	582	4	2	883
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	8	2	613	4	2	929
Pedestrians	10		10			10
Lane Width (m)	3.6		3.6			3.6
Walking Speed (m/s)	1.2		1.2			1.2
Percent Blockage	1		1			1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1104	328			627	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1104	328			627	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	96	100			100	
cM capacity (veh/h)	202	656			943	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	10	409	208	312	619
Volume Left	8	0	0	2	0
Volume Right	2	0	4	0	0
cSH	234	1700	1700	943	1700
Volume to Capacity	0.04	0.24	0.12	0.00	0.36
Queue Length 95th (m)	1.1	0.0	0.0	0.1	0.0
Control Delay (s)	21.1	0.0	0.0	0.1	0.0
Lane LOS	C			A	
Approach Delay (s)	21.1	0.0		0.0	
Approach LOS	C				

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	38.6%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	21	2	12	19	2	12	8	572	11	11	720	131
Future Volume (Veh/h)	21	2	12	19	2	12	8	572	11	11	720	131
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	22	2	13	20	2	13	8	602	12	12	758	138
Pedestrians		10			10			10			10	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1509	1501	468	1061	1564	628	906			624		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1509	1501	468	1061	1564	628	906			624		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	71	98	98	88	98	97	99			99		
cM capacity (veh/h)	76	116	533	164	106	419	740			945		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	37	35	622	391	517
Volume Left	22	20	8	12	0
Volume Right	13	13	12	0	138
cSH	111	203	740	945	1700
Volume to Capacity	0.33	0.17	0.01	0.01	0.30
Queue Length 95th (m)	10.5	4.9	0.3	0.3	0.0
Control Delay (s)	52.7	26.4	0.3	0.4	0.0
Lane LOS	F	D	A	A	
Approach Delay (s)	52.7	26.4	0.3	0.2	
Approach LOS	F	D			

Intersection Summary				
Average Delay	2.0			
Intersection Capacity Utilization	50.0%	ICU Level of Service	A	
Analysis Period (min)	15			

1: Alexis Park Drive & 35 Avenue
03/25/2022

AM Peak Hour
After Development (2035) - Building 1-3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	0	24	20	0	30	6	695	8	11	532	9
Future Volume (Veh/h)	27	0	24	20	0	30	6	695	8	11	532	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	28	0	25	21	0	32	6	732	8	12	560	9
Pedestrians		10			10			10			10	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1018	1360	304	1097	1361	390	579			750		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1018	1360	304	1097	1361	390	579			750		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	84	100	96	86	100	95	99			99		
cM capacity (veh/h)	173	142	680	154	142	599	962			829		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	53	53	372	374	292	289
Volume Left	28	21	8	0	12	0
Volume Right	25	32	0	8	0	9
cSH	267	280	962	1700	829	1700
Volume to Capacity	0.20	0.19	0.01	0.22	0.01	0.17
Queue Length 95th (m)	5.8	5.5	0.2	0.0	0.4	0.0
Control Delay (s)	21.8	20.9	0.2	0.0	0.5	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	21.8	20.9	0.1		0.3	
Approach LOS	C	C				

Intersection Summary				
Average Delay	1.7			
Intersection Capacity Utilization	37.6%	ICU Level of Service	A	
Analysis Period (min)	15			

2: Alexis Park Drive & 36 Avenue
03/25/2022

AM Peak Hour
After Development (2035) - Building 1-3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	3	2	729	5	2	551
Future Volume (Veh/h)	3	2	729	5	2	551
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	3	2	767	5	2	580
Pedestrians	10		10			10
Lane Width (m)	3.6		3.6			3.6
Walking Speed (m/s)	1.2		1.2			1.2
Percent Blockage	1		1			1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1084	406			782	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1084	406			782	
tC, single (s)	6.8	6.9			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	208	584			806	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	5	511	261	195	387
Volume Left	3	0	0	2	0
Volume Right	2	0	5	0	0
cSH	280	1700	1700	808	1700
Volume to Capacity	0.02	0.30	0.15	0.00	0.23
Queue Length 95th (m)	0.4	0.0	0.0	0.1	0.0
Control Delay (s)	18.1	0.0	0.0	0.1	0.0
Lane LOS	C			A	
Approach Delay (s)	18.1	0.0		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	33.2%	ICU Level of Service	A
Analysis Period (min)	15		

3: Alexis Park Drive & 32 Avenue
03/25/2022

AM Peak Hour
After Deve opment (2035) - Building 1-3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	21	2	17	9	2	2	6	653	8	11	493	78
Future Volume (Veh/h)	21	2	17	9	2	2	6	653	8	11	493	78
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	22	2	18	9	2	2	6	687	8	12	519	82
Pedestrians		10			10			10			10	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1310	1311	320	1026	1348	711	611			705		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1310	1311	320	1026	1348	711	611			705		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	80	99	97	95	99	99	99			99		
cM capacity (veh/h)	110	152	664	174	144	369	936			862		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	42	13	701	272	342
Volume Left	22	9	6	12	0
Volume Right	18	2	8	0	82
cSH	175	183	936	862	1700
Volume to Capacity	0.24	0.07	0.01	0.01	0.20
Queue Length 95th (m)	7.2	1.8	0.2	0.3	0.0
Control Delay (s)	32.0	26.2	0.2	0.6	0.0
Lane LOS	D	D	A	A	
Approach Delay (s)	32.0	26.2	0.2	0.2	
Approach LOS	D	D			

Intersection Summary				
Average Delay	1.4			
Intersection Capacity Utilization	52.5%	ICU Level of Service	A	
Analysis Period (min)	15			

1: Alexis Park Drive & 35 Avenue
03/25/2022

PM Peak Hour
After Development (2035) - Building 1-3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Traffic Volume (veh/h)	16	0	17	16	0	25	26	604	23	35	921	26
Future Volume (Veh/h)	16	0	17	16	0	25	26	604	23	35	921	26
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	17	0	18	17	0	26	27	636	24	37	969	27
Pedestrians		10			10			10			10	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1474	1790	518	1298	1792	350	1006			670		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1474	1790	518	1298	1792	350	1006			670		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	78	100	96	84	100	96	96			96		
cM capacity (veh/h)	77	73	494	105	72	635	679			908		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	35	43	345	342	522	512
Volume Left	17	17	27	0	37	0
Volume Right	18	26	0	24	0	27
cSH	136	211	679	1700	908	1700
Volume to Capacity	0.26	0.20	0.04	0.20	0.04	0.30
Queue Length 95th (m)	7.7	5.9	1.0	0.0	1.0	0.0
Control Delay (s)	40.4	26.3	1.3	0.0	1.1	0.0
Lane LOS	E	D	A		A	
Approach Delay (s)	40.4	26.3	0.7		0.6	
Approach LOS	E	D				

Intersection Summary				
Average Delay	2.0			
Intersection Capacity Utilization	61.8%	ICU Level of Service	B	
Analysis Period (min)	15			

2: Alexis Park Drive & 36 Avenue

03/25/2022

PM Peak Hour
After Development (2035) - Building 1-3

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	2	634	5	2	964
Future Volume (Veh/h)	9	2	634	5	2	964
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	9	2	667	5	2	1015
Pedestrians	10		10			10
Lane Width (m)	3.6		3.6			3.6
Walking Speed (m/s)	1.2		1.2			1.2
Percent Blockage	1		1			1
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1201	356			682	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1201	356			682	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	95	100			100	
cM capacity (veh/h)	174	630			899	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	11	445	227	340	677
Volume Left	9	0	0	2	0
Volume Right	2	0	5	0	0
cSH	200	1700	1700	899	1700
Volume to Capacity	0.05	0.26	0.13	0.00	0.40
Queue Length 95th (m)	1.4	0.0	0.0	0.1	0.0
Control Delay (s)	24.0	0.0	0.0	0.1	0.0
Lane LOS	C			A	
Approach Delay (s)	24.0	0.0		0.0	
Approach LOS	C				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	40.9%	ICU Level of Service	A
Analysis Period (min)	15		

3: Alexis Park Drive & 32 Avenue

03/25/2022

PM Peak Hour
After Development (2035) - Building 1-3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	23	2	14	20	2	14	9	623	12	12	788	144
Future Volume (Veh/h)	23	2	14	20	2	14	9	623	12	12	788	144
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	24	2	15	21	2	15	9	656	13	13	829	152
Pedestrians		10			10			10			10	
Lane Width (m)		3.6			3.6			3.6			3.6	
Walking Speed (m/s)		1.2			1.2			1.2			1.2	
Percent Blockage		1			1			1			1	
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1648	1638	510	1157	1708	682	991			679		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1648	1638	510	1157	1708	682	991			679		
tC, single (s)	7.5	6.5	6.9	7.5	6.5	6.9	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	59	98	97	85	98	96	99			99		
cM capacity (veh/h)	59	95	500	137	86	385	688			901		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	41	38	678	428	566
Volume Left	24	21	9	13	0
Volume Right	15	15	13	0	152
cSH	89	177	668	901	1700
Volume to Capacity	0.46	0.21	0.01	0.01	0.33
Queue Length 95th (m)	15.5	6.3	0.3	0.4	0.0
Control Delay (s)	76.0	30.9	0.4	0.4	0.0
Lane LOS	F	D	A	A	
Approach Delay (s)	76.0	30.9	0.4	0.2	
Approach LOS	F	D			

Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

City of Vernon - Traffic Signal Warrant Analysis

Main Street (name)	Alexis Park Drive
Side Street (name)	35 Avenue
Quadrant / Int #	
for Warrant Calculation Results, please hit 'Page Down'	CHECK SHEET

Direction (EW or NS)	NS
Direction (EW or NS)	EW
Comments	

Road Authority:	City of Vernon
City:	Vernon
Analysis Date:	2022 Mar 22, Tue
Count Date:	2022 Mar 01, Tue
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Alexis Park Drive	NB		1			1		375	2
Alexis Park Drive	SB		1			1		375	2
35 Avenue	WB								
35 Avenue	EB				1				

Are the 35 Avenue WB right turns significantly impeded by through movements? (y/n)
Are the 35 Avenue EB right turns significantly impeded by through movements? (y/n) n

Demographics		
Elem. School Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	50,000
Central Business District	(y/n)	n

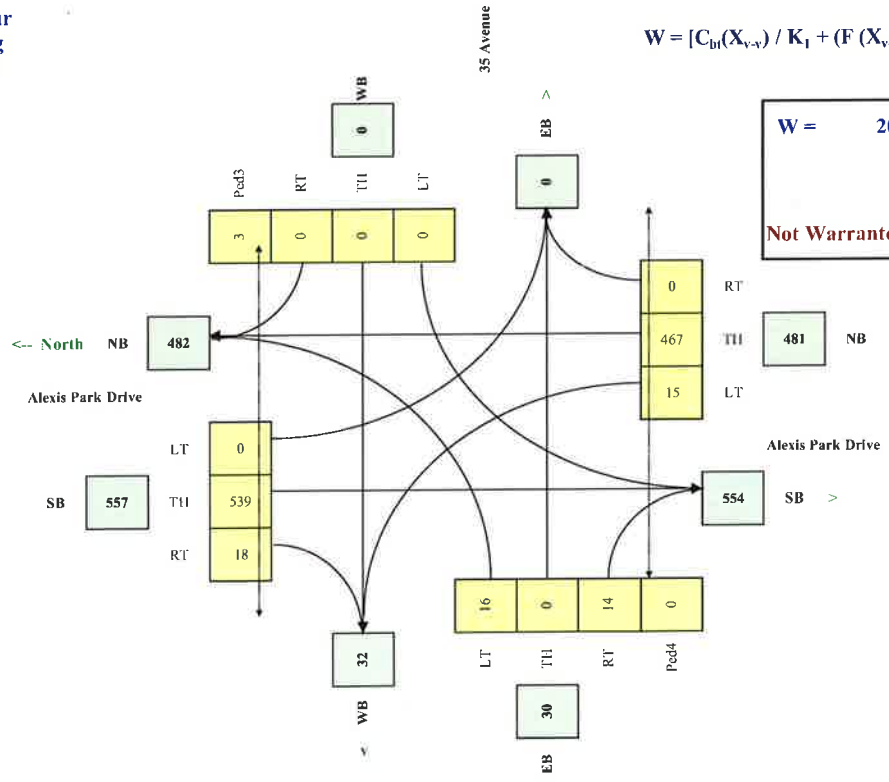
Other Input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Alexis Park Drive	NS	50	2.0%	y	0.0
35 Avenue	EW		2.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
Existing (6-Hour)	87	2800			3236	105				94		86	30		17	0
Total (6-hour peak)	87	2,800	0	0	3,236	105	0	0	0	94	0	86	30	0	17	0
Average (6-hour peak)	15	467	0	0	539	18	0	0	0	16	0	14	5	0	3	0

Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$



W =	20	17	3
		Veh	*Ped*

Not Warranted - Vs<75

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City of Vernon - Traffic Signal Warrant Analysis

Main Street (name)	Alexis Park Drive
Side Street (name)	35 Avenue
Quadrant / Int #	

for Warrant Calculation Results, please hit 'Page Down'

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Direction (EW or NS)	NS
Direction (EW or NS)	EW
Comments	After Development (Phase 1). Factor of 2.51 applied to AM+PM peak hour volumes.

Road Authority:	City of Vernon
City:	Vernon
Analysis Date:	2022 Mar 22, Tue
Count Date:	2022 Mar 01, Tue
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Alexis Park Drive	NB		1			1		375	2
Alexis Park Drive	SB		1			1		375	2
35 Avenue	WB				1				
35 Avenue	EB				1				

Are the 35 Avenue WB right turns significantly impeded by through movements? (y/n) n
Are the 35 Avenue EB right turns significantly impeded by through movements? (y/n) n

Demographics		
Elem. School Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	50,000
Central Business District	(y/n)	n

Other Input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Alexis Park Drive	NS	50	2.0%	y	0.0
35 Avenue	EW		2.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
Existing (6-Hour)	87	2800			3236	105				94		86	30		17	0
Site Phase 1 (6-Hour)			45	68			50		80					30	15	
Total (6-hour peak)	87	2,800	45	68	3,236	105	50	0	80	94	0	86	30	30	32	0
Average (6-hour peak)	15	467	8	11	539	18	8	0	13	16	0	14	5	5	5	0

Average 6-hour Peak Turning Movements

$$W = [C_{bl}(X_{v\text{-}s}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$

W =	28	22	6
		Veh	*Ped*

Not Warranted - Vs<75

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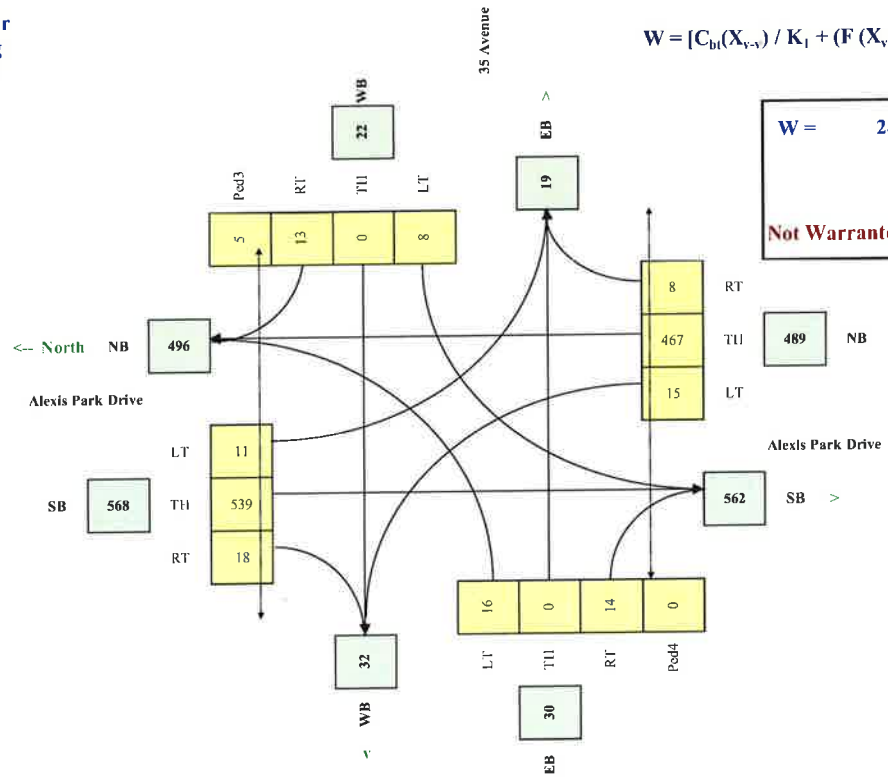

City of Vernon - Traffic Signal Warrant Analysis

Main Street (name)	Alexis Park Drive
Side Street (name)	35 Avenue
Quadrant / Int #	

for Warrant Calculation Results, please hit 'Page Down'

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Direction (EW or NS)	NS
Direction (EW or NS)	EW
Comments	After Development (Full Build). Factor of 2.51 applied to AM+PM peak hour volumes.

Road Authority:	City of Vernon
City:	Vernon
Analysis Date:	2022 Mar 22, Tue
Count Date:	2022 Mar 01, Tue
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Alexis Park Drive	NB		1			1		375	2
Alexis Park Drive	SB		1			1		375	2
35 Avenue	WB				1				
35 Avenue	EB				1				

Are the 35 Avenue WB right turns significantly impeded by through movements? (y/n) n
Are the 35 Avenue EB right turns significantly impeded by through movements? (y/n) n

Demographics		
Elem. School Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	50,000
Central Business District	(y/n)	n

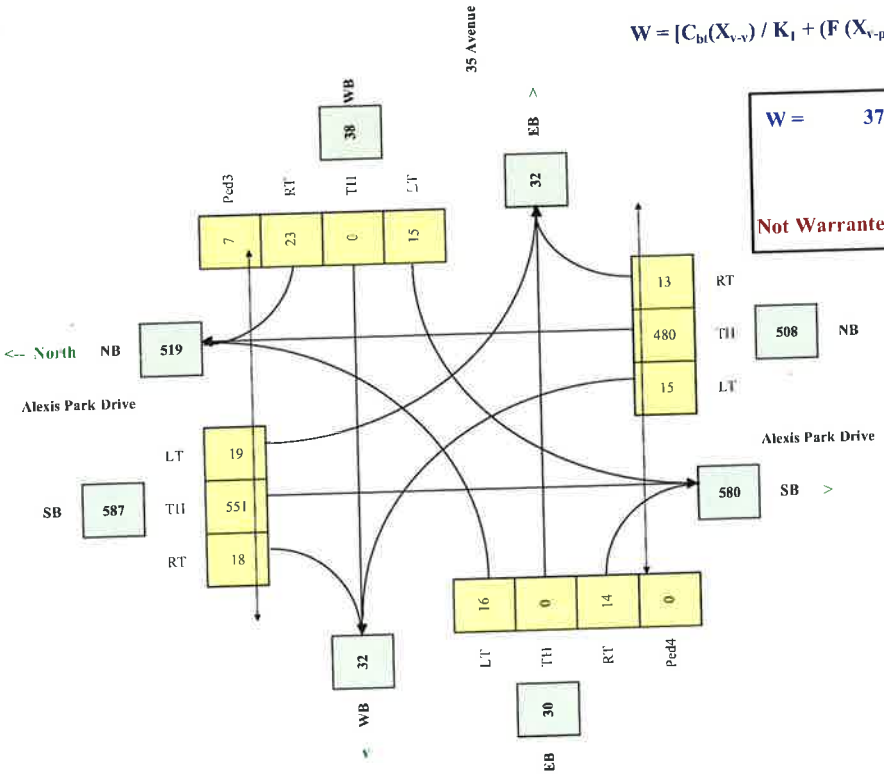
Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Alexis Park Drive	NS	50	2.0%	y	0.0
35 Avenue	EW		2.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
Existing (6-Hour)	87	2800			3236	105				94		86	30		17	0
Site Phase 1 (6-Hour)			45	68			50		80					30	15	
Site Phase 2-3 (6-Hour)		80	33	47	68		40		58					20	10	
Total (6-hour peak)	87	2,880	78	115	3,304	105	90	0	138	94	0	86	30	50	42	0
Average (6-hour peak)	15	480	13	19	551	18	15	0	23	16	0	14	5	8	7	0

Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$



W =	37	29	8
		Veh	Ped

Not Warranted - Vs<75

RESET SHEET

City of Vernon - Traffic Signal Warrant Analysis

Main Street (name)	Alexis Park Drive
Side Street (name)	32 Avenue
Quadrant / Int #	

CHECK SHEET

for Warrant Calculation Results, please hit 'Page Down'

Direction (EW or NS)	NS
Direction (EW or NS)	EW
Comments	

Road Authority:	City of Vernon
City:	Vernon
Analysis Date:	2022 Mar 22, Tue
Count Date:	2022 Mar 01, Tue
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Alexis Park Drive	NB				1			150	1
Alexis Park Drive	SB		1			1		625	2
32 Avenue	WB				1				
32 Avenue	EB				1				

Are the 32 Avenue WB right turns significantly impeded by through movements? (y/n) n
Are the 32 Avenue EB right turns significantly impeded by through movements? (y/n) n

Demographics		
Elem. School Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	50,000
Central Business District	(y/n)	n

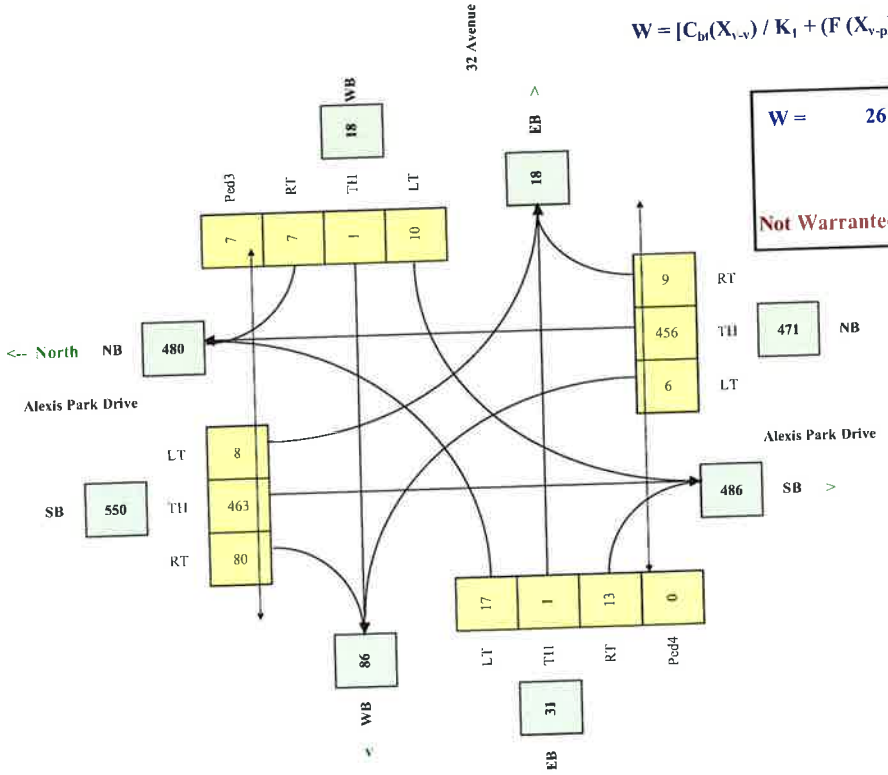
Other input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Alexis Park Drive	NS	50	2.0%	y	0.0
32 Avenue	EW		2.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS W Side	Ped2 NS E Side	Ped3 EW N Side	Ped4 EW S Side
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT				
Existing (6-Hour)	35	2734	54	48	2775	478	60	5	41	102	5	79	8	24	43	0
Total (6-hour peak)	35	2,734	54	48	2,775	478	60	5	41	102	5	79	8	24	43	0
Average (6-hour peak)	6	456	9	8	463	80	10	1	7	17	1	13	1	4	7	0

Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{t\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$



W =	26	19	7
		Veh	*Ped*

Not Warranted - Vs<75

RESET SHEET

City of Vernon - Traffic Signal Warrant Analysis

Main Street (name)	Alexis Park Drive
Side Street (name)	32 Avenue
Quadrant / Int #	
	CHECK SHEET

for Warrant Calculation Results, please hit 'Page Down'

Direction (EW or NS)	NS
Direction (EW or NS)	EW
Comments	After Development (Full Build). Factor of 2.51 applied to AM+PM peak hour volumes.

Road Authority:	City of Vernon
City:	Vernon
Analysis Date:	2022 Mar 22, Tue
Count Date:	2022 Mar 01, Tue
Date Entry Format:	(yyyy-mm-dd)

Lane Configuration		Excl LT	Th & LT	Through	Th+RT+LT	Th & RT	Excl RT	UpStream Signal (m)	# of Thru Lanes
Alexis Park Drive	NB				1			150	1
Alexis Park Drive	SB		1			1		625	2
32 Avenue	WB				1				
32 Avenue	EB				1				

Are the 32 Avenue WB right turns significantly impeded by through movements? (y/n) n
Are the 32 Avenue EB right turns significantly impeded by through movements? (y/n) n

Demographics		
Elem. School Mobility Challenged	(y/n)	n
Senior's Complex	(y/n)	n
Pathway to School	(y/n)	n
Metro Area Population	(#)	50,000
Central Business District	(y/n)	n

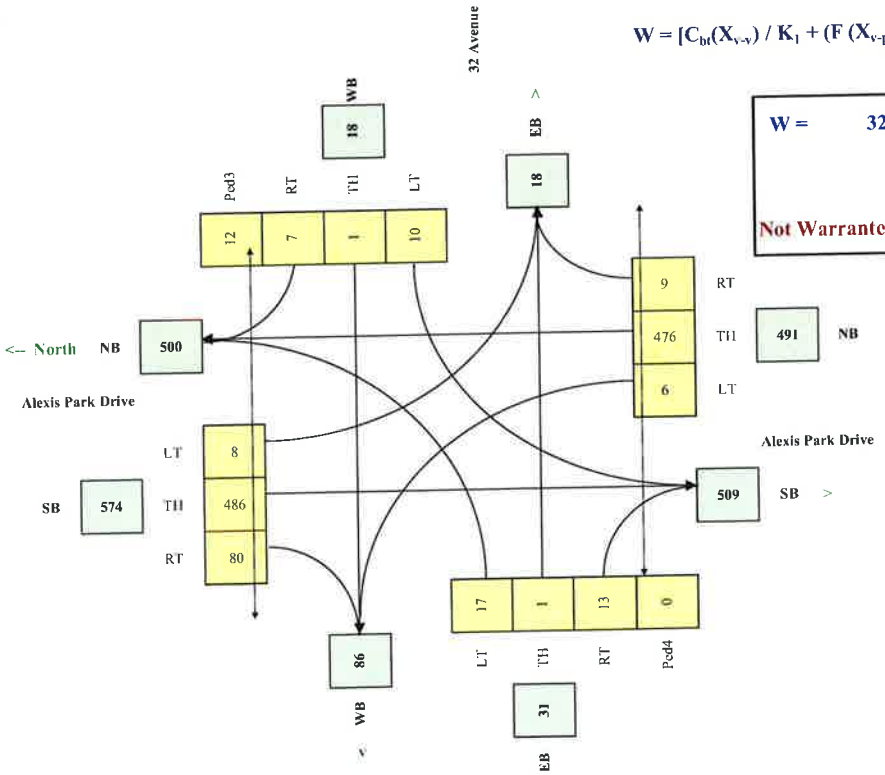
Other Input		Speed (Km/h)	Truck %	Bus Rt (y/n)	Median (m)
Alexis Park Drive	NS	50	2.0%	y	0.0
32 Avenue	EW		2.0%	n	

Set Peak Hours

Traffic Input	NB			SB			WB			EB			Ped1 NS	Ped2 NS	Ped3 EW	Ped4 EW
	LT	Th	RT	LT	Th	RT	LT	Th	RT	LT	Th	RT	W Side	E Side	N Side	S Side
Existing (6-Hour)	35	2734	54	48	2775	478	60	5	41	102	5	79	8	24	43	0
Site Phase 1-3 (6-Hour)		123			141										30	
Total (6-hour peak)	35	2,857	54	48	2,916	478	60	5	41	102	5	79	8	24	73	0
Average (6-hour peak)	6	476	9	8	486	80	10	1	7	17	1	13	1	4	12	0

Average 6-hour Peak Turning Movements

$$W = [C_{bt}(X_{v\text{-}v}) / K_1 + (F\,(X_{v\text{-}p})\,L) / K_2] \times C_i$$



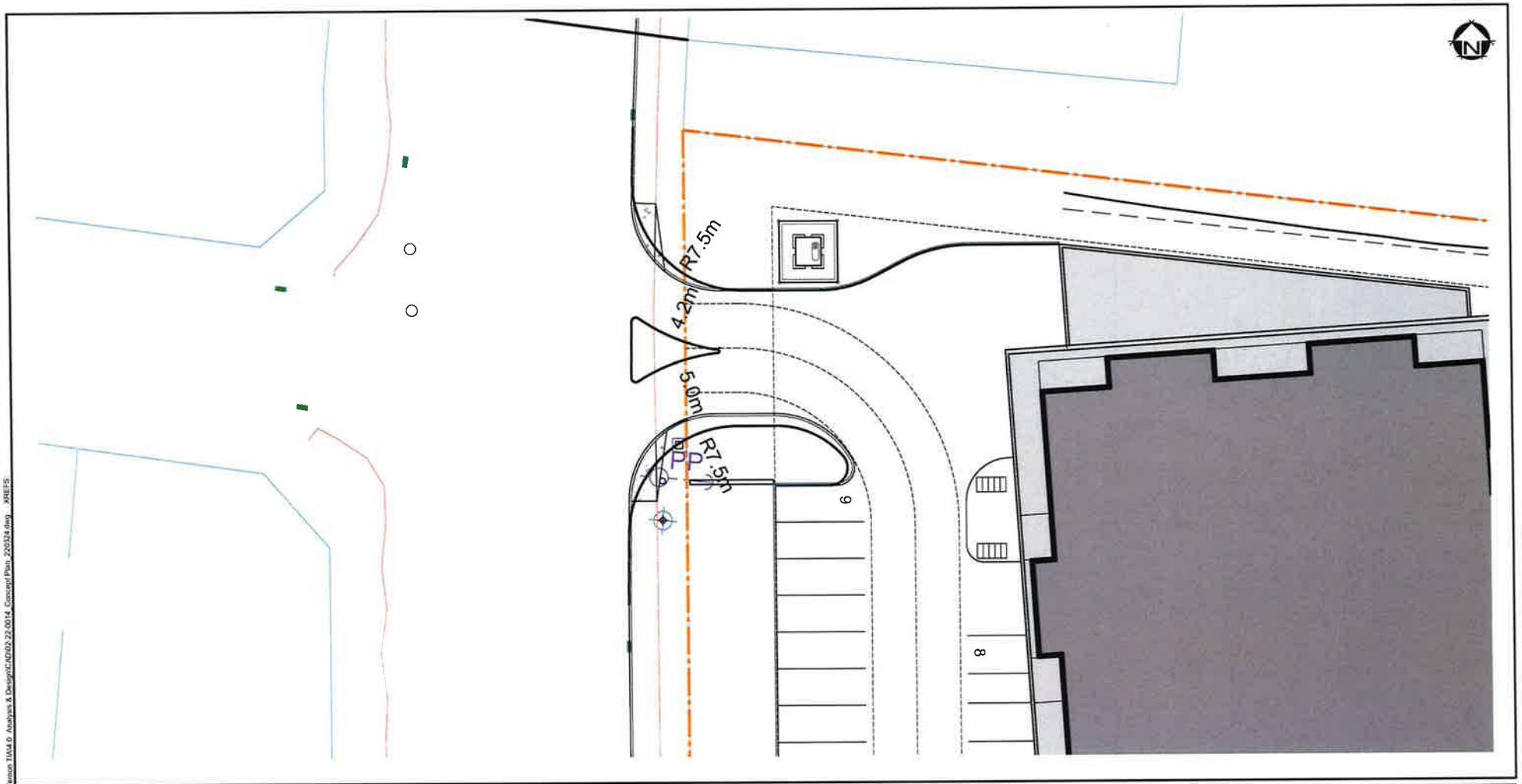
W =	32	20	12
		Veh	*Ped*

Not Warranted - Vs<75

RESET SHEET

APPENDIX C

Access Concepts



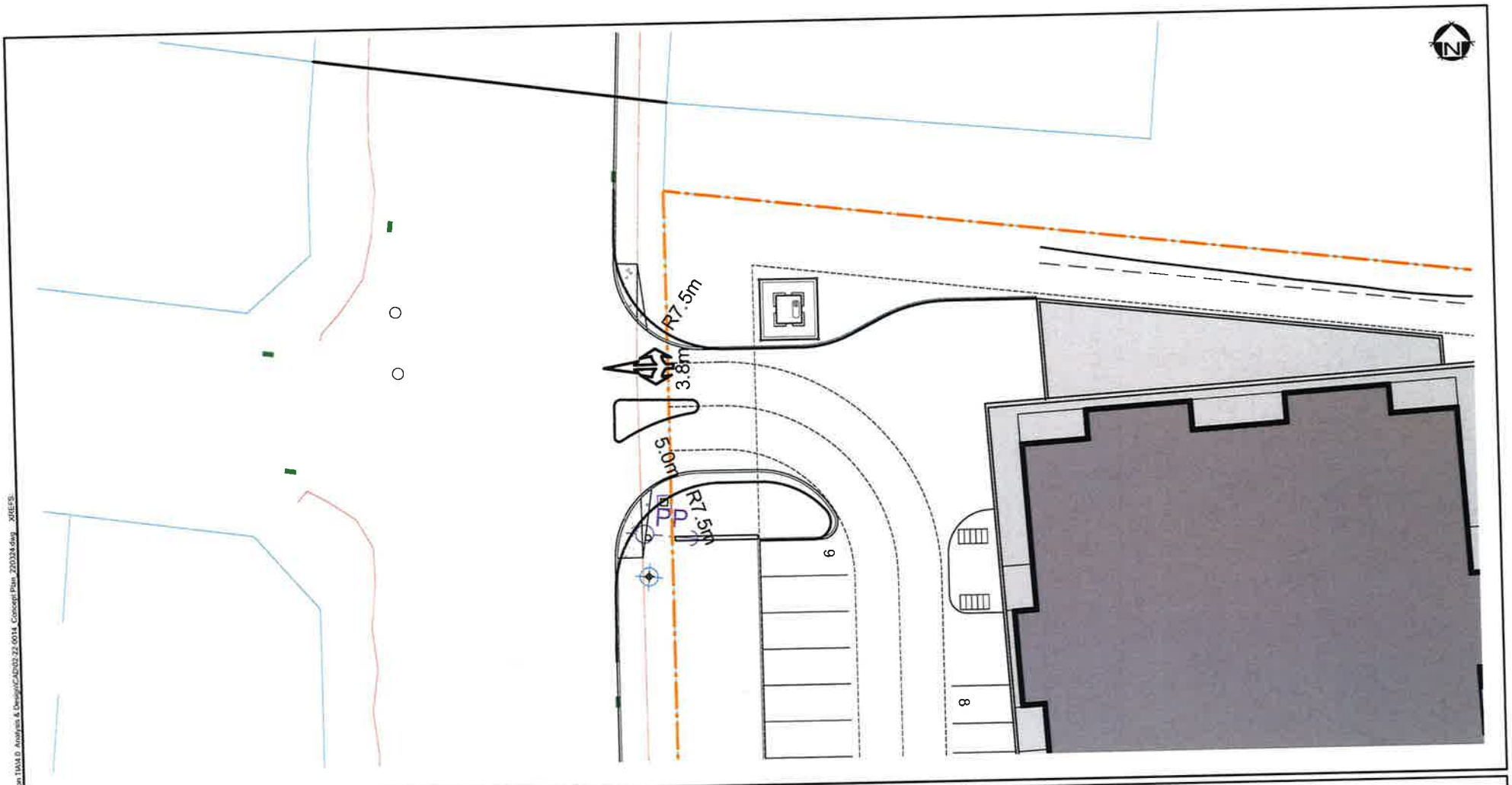
NO.	REVISION	DATE	INITIAL

PERMIT NO: P13898

The Hills Vernon TIA

Access Concept - Option 1
Right In / Right Out

DRAWN BY: LY CHECKED BY: Chkd By	SCALE: 1:250	DATE: March 24, 2022	SHEET NO. 1/2
CADD SYSTEM AutoCAD	DWG NO. 101	REV.	PROJECT 02-22-0014



NO.	REVISION	DATE	INITIAL

PERMIT NO: P13898

The Hills Vernon TIA

Access Concept - Option 2A
Right In / All Turns Out

DRAWN BY: LY CHECKED BY: Chkd By	SCALE: 1:250	DATE: March 24, 2022	SHEET NO. 2/2
CADD SYSTEM AutoCAD	DWG NO. 101	REV.	PROJECT 02-22-0014

Plot Date: Mar 24, 2022 - 11:57:06am Plotted by: hnan
M:\Operations\Dept. SIMP\Projects\2022\2014 The Hills, Vernon 11AVA.0 Analyses & Design\CAD\02 22-0014 Concept Plan_220324.dwg XREFS:

RH3

9.14 RH3 : High-Rise Apartment Residential

9.14.1 Purpose

The purpose is to provide a **zone** for high **density** apartments on urban services.

9.14.2 Primary Uses

- **apartment housing**
- **care centres, major**
- **group home, major**
- **seniors assisted housing**
- **seniors housing**
- **seniors supportive housing**
- **stacked row housing**

9.14.3 Secondary Uses

- **health services**
- **home based businesses, minor**
- **hotel/motel accommodation within a multiple residential unit**
- **personal services**
- **real estate sales centres** (in apartment and stacked row housing only)
- **retail, convenience**
- **seniors residential care**

9.14.4 Subdivision Regulations

- Minimum **lot width** is 30.0m.
- Minimum **lot area** is 1700m^2, or 10,000m^2 if not serviced by a **community sewer system**.

9.14.5 Development Regulations

- With a housing agreement pursuant to Section 4.9, the maximum **density** shall be 170.0 units per gross hectare (69 units/gross acre).
- Where **parking spaces** are provided completely beneath habitable space of a primary **building** or beneath useable common amenity areas, providing that in all cases the **parking spaces** are screened from view, the maximum **density** shall be 195.0 units per gross hectare (79 units/gross acre). Where all the required parking is not accommodated completely beneath the habitable space of a primary **building** or useable common amenity areas, the additional density permitted shall be determined through multiplying the additional 35.0 units per gross hectare (14 units/gross acre) by the percentage of parking proposed to be provided beneath habitable space of a primary **building** or useable common amenity areas.
- Service and retail uses are restricted to the **first storey**.
- Maximum **site coverage** is 70% and together with all **buildings**, driveways, parking areas and **impermeable surfaces** shall not exceed 90%.
- Maximum **height** is the lesser of 55.0m or 16.0 **storeys**, except it is 4.5m for **secondary buildings** and **secondary structures**.
- Minimum **front yard** is 6.0m.
- Minimum **side yard** is 4.5m, except it is 6.0m from a **flanking street**. The minimum **side yard** is 0.0m for fee simple **stacked row housing**.
- Minimum **rear yard** is 9.0m, except it is 1.0m for **secondary buildings**.
- Maximum **density** is 160.0 units per gross hectare (65 units/gross acre).

9.14.6 Other Regulations

- Individual **convenience retail** services and **personal services** are limited to a maximum floor area of 300m^2 and only permitted when developed as an integral component of a primary **building**. These uses are not permitted above the ground **storey**.
- **Indoor participant recreation services** are only permitted when developed as an integral component of a primary **building**.
- For multi-unit residential housing, one **office** may be operated for the sole purpose of the management and operation of the multi-unit residential **development**. *(Bylaw 5440)*
- A minimum area of 5.0m^2 of private open space shall be provided per **bachelor dwelling**, **congregate housing bedroom** or group home **bedroom**, 10.0m^2 of private open space shall be provided per 1 **bedroom dwelling**, and 15.0m^2 of private open space shall be provided per **dwelling** with more than 1 **bedroom**.
- No continuous **building frontage** shall exceed 40.0m for a 3 to 4.5 **storey building**, or 65.0m for a two **storey building**. If the frontage is interrupted by an open courtyard equivalent in depth and width to the **building height**, the maximum continuous 3 **storey building frontage** may be 80.0m provided that no **building** section exceeds 40.0m.
- For **seniors assisted housing, seniors housing and seniors residential care and seniors supportive housing,** a safe drop-off area for patrons shall be provided on the **site.**
- In addition to the regulations listed above, other regulations may apply. These include the general **development** regulations of Section 4 (secondary **development**, **yards**, projections into **yards**, lighting, agricultural setbacks, etc.); the specific use regulations of Section 5; the **landscaping** and fencing provisions of Section 6; and, the parking and loading regulations of Section 7. *(Bylaw 5339)*
- As per Section 4.10.2 - All **buildings** and **structures**, **excluding perimeter fencing (garden walls and fences)** on **lots abutting** City Roads as identified on Schedule "B" shall not be sited closer to the City Road than the setback as per the appropriate zone measured from the offset Rights of Way as illustrated on Schedule "B".
  (Bylaw 5440)

4.15 Development Covenants

4.15.1 At the time of rezoning, prior to bylaw adoption, City Council may at its discretion require the property owner to register a covenant on the title of the property limiting the permitted uses and/or densities within the approved land use zones, so as to reflect the specific approved development plan.

4.16 Hillside Development Areas

4.16.1 Vernon's Official Community Plan (OCP) establishes Development Permit Areas (DPAs) for all areas within the City of Vernon. Vernon's Hillside Guidelines and Regulations Policy defines hillsides and provides Goals and Objectives for development of lands on hillsides and slopes under 30%. No construction of a building, structure or swimming pool is permitted on slopes 30% or greater.

4.16.2 No subdivision of land creating lots is permitted where less than $100m^2$ of contiguous buildable area which meets all bylaw regulations herein for each lot is provided, with the exception of boundary lot adjustments.
(Bylaw 5433)

7.0 Parking & Loading

7.1 On-site Vehicle Parking

7.1.1 On-site parking requirements established prior to the adoption of this Bylaw shall deem to be the applicable parking requirements for existing **development** established prior to the City of Vernon Zoning Bylaw #5000. Where any new **development** is proposed, change of **use** of existing **development**, or enlargement of existing **development** after the adoption of this Bylaw, on-site **vehicle** parking (including **accessible parking spaces** and visitor parking) shall be provided by the property owner in accordance with Table 7.1 of this Bylaw. *(Bylaw 5744)*

Number of Spaces

7.1.2 The minimum number of on-site **vehicle parking spaces** required for each **use** is specified in the Parking Schedule (Table 7.1) except where additional parking is required by the *Ministry of Transportation and Infrastructure* if the **site** has direct access to a provincial highway. Where the total number of **parking spaces** on a property exceeds 15 **parking spaces**, the maximum number of **parking spaces** for each **use** class may be up to 125% of the minimum number of required **parking spaces**.

7.1.3 Where calculation of the total number of **parking spaces** yields a fractional number over decimal .5, the required number of spaces shall be the next highest whole number.

7.1.4 Where more than one calculation of **parking space** requirements is specified for a land use, the greater requirement shall be applied.

7.1.5 Where the Parking Schedule does not clearly define requirements for a particular **development**, the single **use** class or combination of **use** classes most representative of the proposed **development** shall be used to determine the parking requirements.

7.1.6 Where a **development** consists of a mix of **use** classes, the total on-site parking requirement shall be the sum of the on-site parking requirements for each **use** class, unless supported by a shared parking study endorsed by the authority having jurisdiction (City of Vernon or *Ministry of Transportation and Infrastructure*).

7.1.7 **Accessible parking spaces**:

- For all classes, shall be designated at a rate of 2% of all required **parking spaces**, rounded upward to the nearest whole number, when on-site parking areas require 11 or more total **parking spaces**, except that assembly occupancy uses shall be designated at a rate of one for each

TABLE 7.1 - PARKING SCHEDULE

* Note: GFA = Gross Floor Area

Type of Development or Use:	Required Parking spaces:
RESIDENTIAL & RESIDENTIAL RELATED USES	
Apartment Hotels	1.0 per sleeping unit
All uses listed in the RST1 and RST2 **Apartment Housing** **Row Housing** **Stacked Row Housing** **Four-plex** **Three-plex** **Cottages** In addition to the above total required spaces for a **development**, 1 **parking space** shall be designated visitor parking for every 7 **dwelling** units	1.0 per **residential** unit 1.0 per **bachelor dwelling** unit 1.25 per 1 -**bedroom dwelling** unit 1.5 per 2-**bedroom dwelling** unit 2.0 per 3-or-more **bedroom dwelling** unit
Bed & Breakfast Homes	1 per sleeping unit, plus 2 spaces required for the corresponding primary **dwelling** unit
Boarding Rooms	1 per 2 sleeping rooms, plus 2 spaces required for the corresponding primary **dwelling** unit
Employee Housing, Dormitory In addition to the above total required spaces for a **development**, 1 additional parking space shall be provided and designated visitor parking for every 7 **sleeping units**	0.5 stalls per sleeping unit
Employee Housing, Self-Contained Dwelling In addition to the above total required spaces for a **development**, 1 additional **parking space** shall be provided and designated visitor parking for every 7 **dwelling** units.	1.0 staff per **bachelor dwelling** unit 1.25 stalls per 1 bedroom **dwelling** unit 1.5 stalls per 2 bedroom dwelling unit 2.0 stalls per 3-or-more bedroom **dwelling** unit.

Marine Equipment Rentals	1 per 1900m^2 GFA

TABLE 7.3 - BICYCLE PARKING SCHEDULE

* Note: GFA = Gross Floor Area

Type of Development or Use:	**Required Bicycle Parking spaces:**
RESIDENTIAL & RESIDENTIAL RELATED USES	
Apartment Housing **Row Housing** **Stacked Row Housing** **Employee Housing, Dormitory** **Employee Housing, Self-Contained Dwelling**	Class I: 0.5 per dwelling unit Class II: 0.25 per dwelling unit *(Bylaw 5339)*
Rooming Houses or Boarding Rooms (5 or more bedrooms)	Class I: 0.1 per bedroom
Group Homes, Major (5 or more bedrooms)	Class I: 0.1 per bedroom
Congregate Housing, Minor **Congregate Housing, Major**	Minimum 1 Class I: 0.1 per bedroom
Mobile Home Parks	Class I: 0.5 per mobile home *(Bylaw 5339)*
COMMERCIAL USES	
For a change of commercial uses in existing buildings with a zero setback, these requirements may be waived if there is no physical opportunity to provide bicycle parking.	
Amusement Arcades, Major and Minor	Class I: 0.2 per 100m^2 GFA or one per 10 employees, maximum 20 Class II: 1.0 per 100m^2 GFA
Auctioneering Establishments	Class I: 0.2 per 100m^2 GFA or one per 10 employees, maximum 20

TETRA TECH

September 7, 2021

ISSUED FOR USE
FILE: 704-ENG.KGEO03637-01
Email: rjosan@josanproperties.com

Josan Ventures Inc.
#835, 4445 Calgary Trail NW
Edmonton, AB T6H 5R7

Attention: Raka (Rocky) Josan
President

Subject: Preliminary Geotechnical Assessment Report for Phase 1 Development at 3281, 3351 and 3401 Alexis Park Drive in Vernon, BC

1.0 INTRODUCTION AND BACKGROUND

Tetra Tech Canada Inc. (Tetra Tech) have been retained by Josan Ventures Inc. (The Client) to provide geotechnical services for their anticipated upcoming development spread across three lots identified as 3281, 3351 and 3401 Alexis Park Drive in Vernon, BC.

Based on the information provided by the client, we understand that the proposed development will be comprised of a 3-phase development at the property. Phase 1 may include a 11-storey high-rise building, with a footprint of approximately 981 m^2 in size, and a 3-level podium comprised of above ground parkade/retail amenities. Phase 2 and 3 are anticipated to be similar high-rise structures but were not included in the current scope of work, as per our proposal entitled *"Geotechnical Assessment Proposal for 3281, 3351 and 3401 Alexis Park Drive"* dated July 27, 2021.

Pursuantly, Tetra Tech was requested to undertake geotechnical assessment for the Phase 1 development at 3401 Alexis Park Drive (herein referred to as "The Property") and provide foundation design recommendations, with application to the upcoming Phase 2 and 3 works. The client also provided a previous Site Inspection and Recommendations Report for the property, undertaken by Dwayne Tannant, P.Eng. dated October 15, 2015 (Tannant, 2015), that outlines the background and recommendations for the planned rock excavations at the property. Information presented in Tannant, 2015 has been used in conjunction with the outcomes of our subsurface exploration to evaluate and analyze foundation options for the intended design.

This report presents the findings of our geotechnical assessment, outlines the outcomes of our analyses, and provides the necessary recommendations for the proposed design for the Phase 1 Development.

2.0 SUBSURFACE EXPLORATION

The subsurface exploration of the property was conducted on August 12th and 25th, 2021 in a two-stage assessment employing testpitting and drilling to profile the existing ground conditions. The testpitting portion of the exploration was undertaken using a Hitachi 225 excavator provided by Big M Excavating Ltd. from Vernon, BC and the drilling stage was carried out using a truck mounted drill rig operated by On the Mark Ltd. from Kelowna, BC. A Tetra Tech field representative supervised both programs, directed the investigation depths, undertook in-situ field testing, and collected samples for laboratory testing. The exploration program included the following:

Tetra Tech Canada Inc.
150, 1715 Dickson Avenue
Kelowna, BC V1Y 9G6 CANADA
Tel 250.862.4832 Fax 250.862.2941

- Excavating nine testpits to profile the shallow bedrock stratigraphy and obtain disturbed soil and rock samples.
- Drilling one Solid Stem Auger borehole complemented with Overburden Drilling Excentric (ODEX) Air Rotary to verify bedrock depth and evaluate rock consistency in areas where shallow bedrock was not encountered.
- Completing in-situ field testing using Scala Dynamic Cone Penetration (SDCP) testing to assess strength consistency of the overlying surficial layers.

Initial exploration program included a total of nine testpits completed within the property to depths ranging from 0.7 m to 5.3 m. Testpit locations were selected based on bedrock outcrops and anticipated shallow bedrock stratigraphy. However, some of the testpits at the low-lying areas in the property did not encounter bedrock within the maximum target depth of 5.0 m. As such, a subsequent exploration program was undertaken using solid stem drilling complemented with ODEX air rotary to confirm the deeper bedrock stratigraphy.

Approximate testhole locations are shown on Figure 1 and completion details provided below in Table 2-1. Testhole stratigraphy and inferred subsurface characteristics are presented in testhole logs attached in Appendix A.

Table 2-1: Testhole Completion Details

Testhole ID	UTM Easting[1] (m)	UTM Northing[1] (m)	Surface Elevation[2]	Testhole Depth (m)	Testhole Description
BH21-01	337233	5570846	390.0	9.0	Borehole
TP21-01	337241	5570852	390.0	5.3	Test Pit
TP21-02	337259	5570801	399.0	0.7	Test Pit
TP21-03	337279	5570848	400.0	1.6	Test Pit
TP21-04	337248	5570775	396.0	0.8	Test Pit
TP21-05	337221	5570827	392.0	5.3	Test Pit
TP21-06	337229	5570837	391.0	5.3	Test Pit
TP21-07	337238	5570839	391.0	4.9	Test Pit
TP21-08	337228	5570801	394.0	4.2	Test Pit
TP21-09	337235	5570728	392.0	0.7	Test Pit

1: Coordinates are in UTM Zone 11 and obtained from City of Vernon map viewer.
2: Elevations are in Metres Above Sea Level (masl) and estimated from City of Vernon 1 m contours.

3.0 LABORATORY TESTING

Disturbed soil samples collected during subsurface exploration were sent to our laboratory for classification testing and soil characterization that included Atterberg limits, moisture contents, and sieve gradation analysis. Laboratory test results are indicated on the borehole logs with detailed laboratory test results, provided in Appendix B. A summary of the laboratory test results is presented in Table 3-1.

Table 3-1: Summary of Laboratory Results

Borehole ID	Depth (m)	USCS	Moisture Content (%)	Grain Size Analysis				Atterberg Limits			Point Load Index, $I_{s(50)}$ (MPa)
				Gravel	Sand	Fines		Liquid Limit	Plastic Limit	Plasticity Index	
						Silt	Clay				
BH21-01	4.8-5.1	GM	14.6	31	32	30	7	-	-	-	-
TP21-01	0.6-0.9	GP	7.3	54	30	16		-	-	-	-
	1.3-1.5	CI-CH	33.0	-	-	-	-	51	28	23	-
	2.8-3.0	CH	50.5	-	-	-	-	-	-	-	-
	3.6-3.8	CH	59.4	-	-	-	-	-	-	-	-
	4.5-4.6	CH	45.7	-	-	-	-	72	29	43	-
	5.0-5.3	GP-GM	8.4	49	28	23		-	-	-	-
TP21-02	0.7-0.8	Bedrock	-	-	-	-		-	-	-	7.15
TP21-03	1.0-1.2	GP-GM	4.8	36	29	35		-	-	-	-
TP21-05	2.9-3.1	CI	26.0	-	-	-	-	46	21	25	-
TP21-08	3.8-3.9	GP	2.6	78	16	6		-	-		-
	4.2-4.3	Bedrock	-	-	-	-		-	-	-	1.01
TP21-09	0.7-0.8	Bedrock	-	-	-	-		-	-	-	1.75

4.0 SITE CONDITIONS

4.1 Site Description

The Property is situated along Alexis Park Drive to the west and bounded to the east by a steep hillside outcrop. The property has a low-lying bench at the northwest corner with access from Alexis Park Drive. From the lower bench, the topography rises steeply in a southeasterly slope with multiple bedrock outcrops. Along the eastern and southwestern property lines, the topography changes to near vertical bedrock faces.

4.2 Interpreted Soil Stratigraphy

The Surficial Geology Map of Vernon, map 1392A (R.J. Fulton, 1963-65) and the Geological Map of Okanagan Watershed (Okulitch, A.V., 2013) shows that the underlying geology at the site is comprised of Lacustrine deposits comprised of silt, clay and gravel overlying the Marron bedrock formations comprised of undivided units of Andesite, Breccia and Dacite flows.

The soil conditions encountered during the geotechnical subsurface exploration are consistent with the geology discussed above. The soil profile at site generally consists of:

- Gravel, silt and clay deposits from surface to depths ranging from approximately 0.6 to 8.4 m. These deposits are highly undifferentiated and are found at the property as Gravel and Silt units or high plastic Silty Clay

deposits. These deposits were found to have a strength consistency of compact to dense and stiff to very stiff, respectively. Underlain by:

- Bedrock formations found as bedrock outcrops across the northwestern, western and southern parts of the property, with shallow bedrock encountered along the middle of the property at depths ranging from approximately 0.7 m to 2.5 m. Along the northeastern boundary, bedrock stratigraphy was encountered at deeper depths in the range of approximately 5.0 m to 10.0 m. The bedrock formations were noted to vary from weak to medium strong, based on excavator's effort and significant difficulty excavating through it.

Approximate areas of bedrock outcrops, shallow bedrock (less than 2.5 m depth) and deep bedrock zones (greater than 2.5 m depth) are presented in Figure 1.

4.3 Groundwater

Groundwater was encountered in some of the testpits at the northeastern lower bench with the depth of groundwater ranging between 3.6 m and 5.0 m below current ground level. The occurrence of groundwater was most often observed at the interface of impermeable clay layers and the underlying low permeable gravel and silt layers. A groundwater monitoring well was installed at the borehole location in the lower terrace.

5.0 SEISMIC ASSESSMENT

5.1 Seismic Hazard

Seismic hazard values corresponding to the respective design return period event for reference ground conditions at the site were obtained from the Earthquakes Canada online hazard calculator maintained by Natural Resources Canada (NRCAN, 2021). These values are developed for the 2015 National Building Code of Canada (NBCC) for a reference site classification "Class C" at a probability of exceedance in 50 years and will need to be adjusted to site-specific conditions. The earthquake ground motions at the subject site are summarized below in Table 5-1:

Table 5-1: 5% Damped Spectral Acceleration Values for Reference Site Class C Conditions (NRCAN, 2021)

Return Period (years)	Sa(0.05 s) (g)	Sa(0.10 s) (g)	Sa(0.2 s) (g)	Sa(0.50 s) (g)	Sa(1.0 s) (g)	Sa(2.0 s) (g)	Sa(5.0 s) (g)	PGA_{ref} (g)
100	0.008	0.011	0.019	0.023	0.017	0.011	0.003	0.007
475	0.025	0.037	0.051	0.051	0.039	0.025	0.010	0.023
975	0.041	0.061	0.080	0.073	0.055	0.037	0.015	0.036
2,475	0.072	0.108	0.133	0.109	0.081	0.056	0.026	0.061

Sa = spectral acceleration; g = 9.81 m/s^2

5.2 Seismic Site Classification

As per the British Columbia Building Code (BCBC, 2018), the seismic site classification can be determined using the "Average Standard Penetration Resistance" (N_{60}) in the top 30 m of soils. Based on the results of subsurface exploration, the measured average N_{60} value is estimated to be greater than 50 blows per 300 mm. Based on this

analysis, site conditions are expected to represent characteristics of "Very Dense Soil and Soft Rock" (Site Class C) conditions.

6.0 GEOTECHNICAL DISCUSSIONS

Based on our understanding of the soil conditions on-site, Tetra Tech considers that from a geotechnical perspective, the proposed development is feasible, given that our recommendations presented in this report are followed as indicated and Tetra Tech is fully involved during construction to provide field reviews to confirm that work is carried out in general accordance with the intent of our recommendations.

The recommendations below are preliminary in nature and provided without an initial design in place. Once the detailed design has occurred, the following sections should be reviewed and revised by the geotechnical engineer.

6.1 Site Preparation

Within the footprint of all buildings and roadways it is recommended that all vegetation be cleared, and all topsoil and organic mixed layers be stripped to expose bedrock. Despite removal of all overburden layers, blasting may be required to profile the bedrock to the anticipated design. The requirements and extent of blasting is to be confirmed and deemed competent on the site by Tetra Tech personnel during the site preparation.

6.2 Excavations and Rock Blasting Considerations

All work, conducted in and around excavations, should be carried out in accordance with requirements specified by WorkSafe BC Occupational Health & Safety Regulations, Part 20. Unsupported excavations greater than 1.2 m depth should be reviewed by a professional engineer in accordance with WorkSafe BC. Alternatively, service line trenches or excavations deeper than 1.2 m must be shored. Temporary trenches for underground utilities excavated within existing structural fill materials should be excavated at a slope no steeper than 1H:1V.

6.2.1 Soil Cuts

Given soil material properties observed, temporary dry soil cuts of up to 1.5 m in height may be at angles of up to 0.25H:1V. Long-term soil cut slopes should conform with the existing slopes of 2H:1V. Since groundwater was encountered spatially during site investigation, if a cut slope displays seepage the cut slope should be no greater than 3H:1V. If cuts greater than 3H:1V are required on faces with seepage, site-specific measures may be required, and site-specific slope stability analysis is recommended.

6.2.2 Rock Cuts

Cut slope stability in bedrock will be highly dependent on-site specific rock mass characteristics (e.g., spacing and orientation of rock discontinuities).

It is recommended that permanent and temporary rock cuts be evaluated on a case-by-case basis during construction by a geotechnical engineer with expertise in rock mechanics. However, general recommendations for permanent rock cut design include:

- Permanent rock cut slopes as steep as 0.4H:1V (70°) are considered suitable for design.

- Permanent rock cuts within 10 m of buildings should have their long-term stability assessed by a geotechnical engineer.
- Use of catch areas for potential rockfall may represent the most cost-effective solution to address long-term stability of permanent rock cuts. Catch areas considered suitable for design purposes should have the following minimum dimensions based on height of rock cut:
  - Rock cuts less than 3 m in height; 1.5 m wide, 0.5 m deep catch area.
  - Rock cuts between 3 m and 6 m; 2 m wide, 0.9 m deep catch ditch.
  - Rock cuts between 6 m and 10 m; 3.0 m wide, 1.2 m deep catch ditch.
  - Rock cuts between 10 m and 15 m; 4.5 m wide, 1.8 m deep catch ditch.
- Catch ditches below rock cuts should be sloped such that the deepest part of the ditch is next to the rock cut.
- Alternative options, such as rock bolting, rockfall catch fence, shotcrete or rock mesh may be used instead of catch areas if permanent infrastructure needs to be placed closer to permanent rock cuts because of site constraints. These options can be evaluated once rock cuts are exposed and assessed.

General recommendations for temporary rock cut design include:

- Temporary rock cuts less than 2 m in height can be vertical provided they are reviewed by a qualified geotechnical engineer before construction below them occurs.
- Temporary rock cuts between 2 m and 10 m in height can be as steep as 0.2H:1V provided they are reviewed by a qualified geotechnical engineer before construction below them occurs.
- All temporary (< 6 months) rock cuts should have a minimum 0.75 m high concrete barrier (e.g., lock block) placed at the base of the cut to protect infrastructure and workers during construction. The minimum offset of the edge of the barrier from the base of the temporary rock cut should be as follows:
  - Rock cut height less than 3 m; 1 m offset.
  - Rock cut height between 3 to 10 m, 2 m offset.

If site constraints require placement of buildings or construction workers closer to temporary cut faces, alternative options for protection from rockfall, or stabilization of temporary rock cuts may include rock bolting, rock removal, temporary mesh or catch fence placement.

6.3 Building Foundation

We have assumed that the proposed footings will consist of concrete strip footings with a minimum width of 1.8 m and 0.9 m for spread footings. Tetra Tech recommends dowelling the foundations into the underlying bedrock. However, given the varying bedrock profile and the changing topography at site, we anticipate that the foundation may be comprised of the following two different categories:

- Shallow bedrock foundations.
- Deep bedrock foundations.

6.3.1 Shallow Bedrock Foundations

- Excavate all existing weathered rock in order to expose fresh bedrock underneath footing footprints. The extent of excavation for bedrock exposure must be established and verified by a Geotechnical Engineer.
- Embed footings at approved bedrock elevations. Footings shall be embedded by dowelling a minimum of 600 mm into bedrock using corrosion protected dowel bars. Detailed design for layout, spacing and type of dowel bars shall be carried out by a Structural Engineer.

Provided the above preparation is undertaken, a factored ULS of 500 kPa with SLS of 300 kPa will be applicable. Under these loads, the SLS settlement will be limited to 25 mm, with the differential settlement less than 1 in 500.

6.3.2 Deep Bedrock Foundations

Along the northeastern boundary of the anticipated building, deep foundation systems may be required to socket into the underlying bedrock formations. Based on the current ground conditions and the anticipated design, it is our opinion that the following foundation options will be suitable for the proposed structure:

- Socketed Drilled Pipe Piles.
- Socketed Drilled H-Piles.

6.3.2.1 Socketed Drilled Pipe Piles

Based on the anticipated design, Tetra Tech has calculated and analysed axial resistances and lateral load response for a range of typical pipe pile sizes.

The resulting estimated unfactored and factored Ultimate Limit State (ULS) capacities for socketed pipe piles are presented in Table 6-1 below. The axial pile capacities below have been estimated for a pipe pile socketed into bedrock with an assumed minimum Rock Quality Designation (RQD) of 80% using the method described Canadian Foundation Engineering Manual (CFEM, 2006). For ULS design, the factored axial resistance of the pile shall be used for structural design purposes. The ULS pile capacity can be calculated by multiplying the unfactored ULS by an appropriate geotechnical resistance factor (GRF). Given the information available for the area, a GRF of 0.4 should be adopted for static loading. If higher factored ULS capacities are required, a GRF of 0.6 may be adopted provided a pile load test is undertaken for the proposed pile design.

Table 6-1: Estimated Axial Capacity of Socketed Pipe Piles

Pile Length[1] (m)	Unfactored Ultimate Limit State (ULS) Capacity (MN)			Factored ULS Capacity (MN) @ GRF[2] of 0.4		
	0.4 m Dia	0.45 m Dia	0.6 m Dia	0.35 m Dia	0.4 m Dia	0.45 m Dia
10.0	1.5	2.0	3.5	0.6	0.8	1.4

1 – Pile Length is assumed from bottom of pile cap.
2 – Geotechnical Reduction Factor (GRF) is based on guidelines presented in the Canadian Foundation Manual (CFEM 2006).

6.3.2.2 Socketed Drilled H-Piles

Based on the anticipated design, Tetra Tech has calculated and analysed axial resistances and lateral load response for a range of typical pipe pile sizes.

The resulting estimated unfactored and factored Ultimate Limit State (ULS) capacities for socketed H-piles are presented in Table 6-2 below. For ULS design, the factored axial resistance of the pile shall be used for structural design purposes.

Table 6-2: Estimated Axial Capacity of Socketed H-Piles

Pile Length[1] (m)	Unfactored Ultimate Limit State (ULS) Capacity (MN)			Factored ULS Capacity (MN) @ GRF[2] of 0.4		
	0.4 m Dia	0.45 m Dia	0.6 m Dia	0.4 m Dia	0.45 m Dia	0.6 m Dia
10.0	2.0	3.0	4.0	0.8	1.2	1.6

1 – Pile Length is assumed from bottom of pile cap.
2 – Geotechnical Reduction Factor (GRF) is based on guidelines presented in the Canadian Foundation Manual (CFEM 2006).

The horizontal loading is expected to impose lateral stresses on the piles. Given the lack of structural loadings at this time, a lateral load response has not been undertaken. The estimated lateral spreading for the above options will be carried out once a detailed design and structural loadings are available.

6.4 Foundation Drainage and Groundwater Management

Given the stiff nature of the underlying till material and bedrock encountered on the property, on-site re-infiltration is not considered a viable option. For this reason, we recommend that stormwater planning include collection and discharge of stormwater into any existing drainage system present at the site or in the neighbourhood.

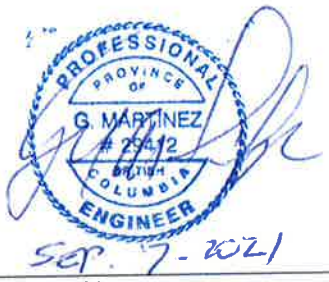
7.0 LIMITATIONS OF REPORT

This report and its contents are intended for the sole use of Josan Ventures Inc. and their agents. Tetra Tech Canada Inc. (operating as Tetra Tech) does not accept any responsibility for the accuracy of any of the data, the analysis, or the recommendations contained or referenced in the report when the report is used or relied upon by any Party other than Josan Ventures Inc., or for any Project other than the proposed development at the subject site. Any such unauthorized use of this report is at the sole risk of the user. Use of this document is subject to the Limitations on the Use of This Document attached in the Appendix C or Contractual Terms and Conditions executed by both parties.

8.0 CLOSURE

We trust this report meets your present requirements. If you have any questions or comments, please contact the undersigned.

Respectfully Submitted,
Tetra Tech Canada Inc.



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/sa

Attachments:

Figure 1	Testpit Layout Plan
Appendix A	Borehole Logs
Appendix B	Laboratory Test Results
Appendix C	Limitations on the Use of This Document

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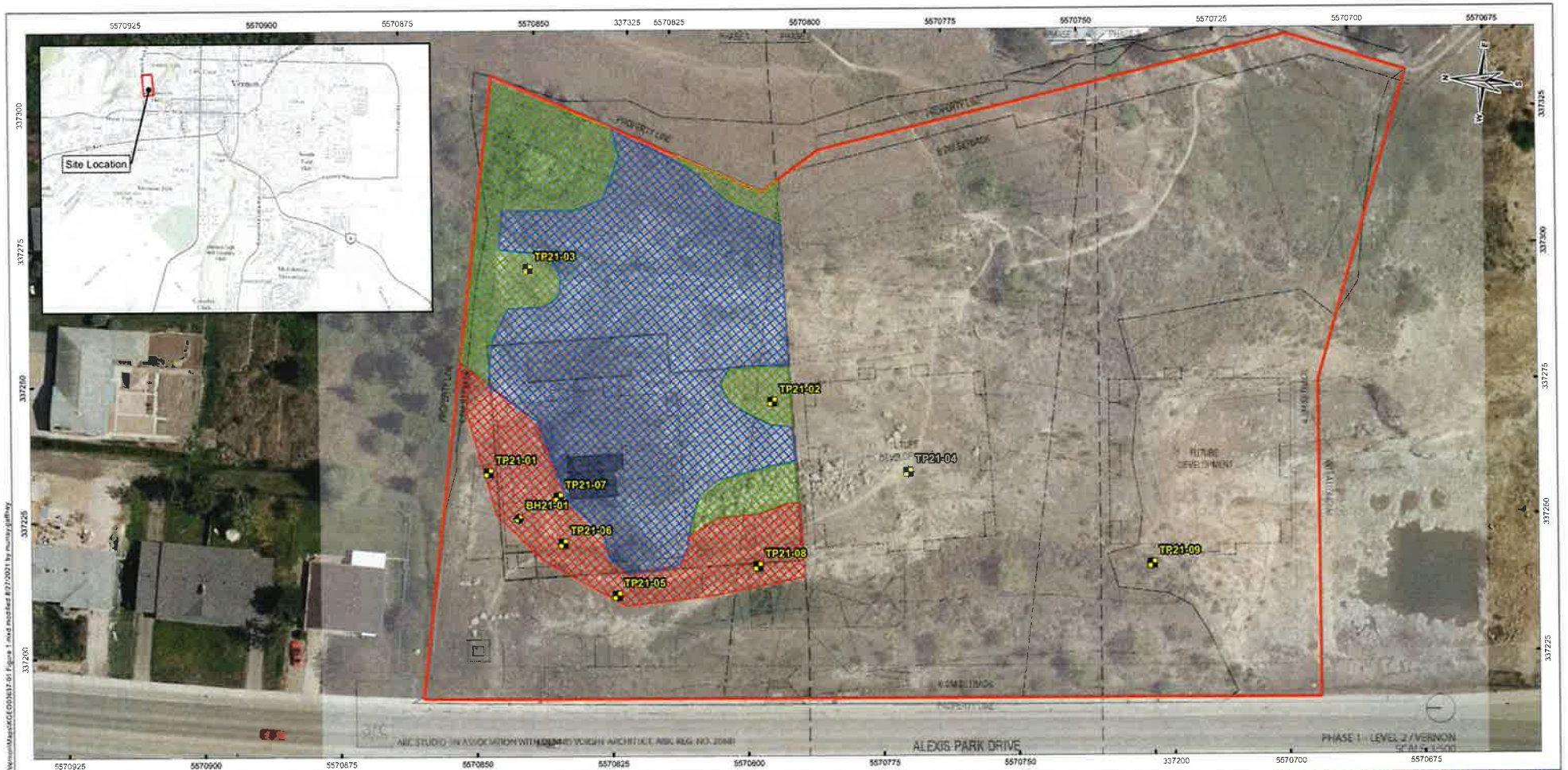
FIGURES



LEGEND

- Approximate Borehole Location
- Approximate Testpit Location
- Approximate Bedrock Outcrop (Less Than 0.5m)
- Approximate Shallow Bedrock (0.5-2.5m)
- Approximate Deeper Bedrock (Greater Than 2.5m)
- Approximate Property Boundary

NOTES
Base data source:
- Inset Map sourced from ESRI Topographic Basemap Service
- Orthoimagery provided by City of Vernon (2016)
- Site plan provided by client

STATUS
ISSUED FOR USE

3281, 3351, 3401 ALEXIS PARK DRIVE VERNON, BC

Testpit Location Plan

PROJECTION	UTM ZONE 11
DATUM	NAD83
Scale: 1:700	10 5 0 10 Metres
FILE NO.	KGEO03637-01 Figure 1.mxd
OFFICE	Kelowna
DWN	MG
CKD	-
APVD	KS
REV	0
DATE	August 27, 2021
PROJECT NO.	ENG.KGEO03637-01

CLIENT
Josan Properties Ltd.

TETRA TECH

Figure 1

APPENDIX A

BOREHOLE LOGS

Borehole No: BH21-01

Josan Properties Ltd.

Project: 3281, 3351, 3401 Alexis Park Drive - Phase 1	Project No: 704-ENG.KGEO03637-01
Location: 3401 Alexis Park Drive	Ground Elev: 390 m
Vernon, BC	UTM: 337233 E; 5570846 N; Z 11

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Laboratory USCS	Sample Type	Sample Number	Particle Size Distribution: Gravel (%)	Particle Size Distribution: Sand (%)	Particle Size Distribution: Silt & Clay (%)	Particle Size Distribution: Silt (%)	Particle Size Distribution: Clay (%)	Field Vane (kPa) Post-Peak / Peak; Plastic Limit / Moisture Content / Liquid Limit	MW21-01	Elevation (m)
0													Field Vane (kPa) Post-Peak Peak 10 20 30 40; Plastic Limit Moisture Content Liquid Limit 20 40 60 80		390
1	Solid Stem Auger		GRAVEL, sandy, some silt trace cobbles, trace to occasional boulders, dry to damp, compact, brown; fine to coarse gravel, rounded to angular, boulders up to 600mm in diameter; fine grained sand; trace rootlets in the top part of the layer.												389
2			CLAY, silty, trace rootlets, trace organics, damp to moist, firm to hard, medium to high plasticity, grey/brown.												388
3															387
4			GRAVEL and SILT, some sand, trace clay, wet, dense to very dense, reddish brown; sub-rounded to sub-angular gravel.												386
5					GM		DS1	31	32	30	7				385
6					GP		DS2								384
7	Air Rotary (ODEX) Drilling		GRAVEL and SAND (TILL), some silt, dense to very dense, dry, brown; sub-angular to sub-rounded gravel.												383
8															382
9			BEDROCK, moderately to slightly weathered, grey, moderately strong, R3.		BEDROC		DS3								381
10			END OF TESTPIT - Equipmemt refusal reached. - Coordinates estimated from GIS Data and handheld GPS unit. - Elevations estimated from City of Vernon 1 m contours.												380

8/25/2021

8/25/2021

TETRA TECH

Contractor: On The Mark Ltd.	Completion Depth: 9 m
Drilling Rig Type: Truck Mounted Drill Rig	Start Date: August 25, 2021
Logged By: RS	Completion Date: August 25, 2021
Reviewed By: RS	Page 1 of 1

Josan Properties Ltd.

Testpit No: TP21-01

Project: 3281, 3351, 3401 Alexis Park Drive - Phase 1	Project No: 704-ENG.KGEO03637-01
Location: 3401 Alexis Park Drive	Ground Elev: 390 m
Vernon, BC	UTM: 337241 E; 5570852 N; Z 11

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Laboratory USCS	Sample Type	Sample Number	Particle Size Distribution: Gravel (%)	Sand (%)	Silt & Clay (%)	Silt (%)	Clay (%)	SCALA PENETROMETER: Blow Per 50 mm Penetration	Field Vane (kPa) / Plastic Limit, Moisture Content, Liquid Limit	Elevation (m)
0	Test Pitting		GRAVEL, sandy, some silt trace cobbles, trace to occasional boulders, dry to damp, compact, brown; fine to coarse gravel, rounded to angular, boulders up to 600mm in diameter; fine grained sand; trace rootlets in the top part of the layer.		GP		DS1	54	30	16					390
1			CLAY, silty, trace rootlets, trace organics, damp to moist, firm to hard, medium to high plasticity, grey/brown.		CI-CH		DS2								389
2							DS3								388
							DS4								
3					CH		DS5								387
							DS6								
4					CH		DS7								386
							DS8								
5					CH		DS9								
8/12/2021			GRAVEL and SILT, some sand, trace clay, wet, dense to very dense, reddish brown; sub-rounded to sub-angular gravel.		GP-GM		DS10	49	28	23					385 8/12/2021
6			END OF TESTPIT - Equipmemt refusal reached. - Coordinates estimated from GIS Data and handheld GPS unit. - Elevations estimated from City of Vernon 1 m contours.												384

SCALA PENETROMETER: Blow Per 50 mm Penetration — 3 6 9 12

Field Vane (kPa): Post-Peak ◇ — ◆ Peak; 10 20 30 40

Plastic Limit — Moisture Content — Liquid Limit; 20 40 60 80

TETRA TECH

Contractor: Big M Excavating Ltd.	Completion Depth: 5.3 m
Drilling Rig Type: Hitachi 225 Excavator	Start Date: August 12, 2021
Logged By: MG	Completion Date: August 12, 2021
Reviewed By: RS	Page 1 of 1

Testpit No: TP21-02

Josan Properties Ltd.

Project: 3281, 3351, 3401 Alexis Park Drive - Phase 1	Project No: 704-ENG.KGEO03637-01
Location: 3401 Alexis Park Drive	Ground Elev: 399 m
Vernon, BC	UTM: 337259 E; 5570801 N; Z 11

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Particle Size Distribution: Gravel (%)	Sand (%)	Silt & Clay (%): Silt (%)	Silt & Clay (%): Clay (%)	Field Vane (kPa) / Plastic Limit, Moisture Content, Liquid Limit	Elevation (m)
0	Test Pitting		SILT and GRAVEL, some sand, trace cobbles, trace rootlets, dry, loose to compact, brown; coarse grained gravel; fine grained sand			DS1						399
			BEDROCK, slightly weathered, grey, moderately strong, R3.									
1			END OF TESTPIT - Refusal on bedrock - Coordinates estimated from GIS Data and handheld GPS unit. - Elevations estimated from City of Vernon 1 m contours.									398
2												397
3												396
4												395
5												394
6												393

Field Vane (kPa): Post-Peak / Peak — 10 20 30 40

Plastic Limit / Moisture Content / Liquid Limit — 20 40 60 80

TETRA TECH

Contractor: Big M Excavating Ltd.	Completion Depth: 0.7 m
Drilling Rig Type: Hitachi 225 Excavator	Start Date: August 12, 2021
Logged By: MG	Completion Date: August 12, 2021
Reviewed By: RS	Page 1 of 1

Josan Properties Ltd.

Testpit No: TP21-03

Project: 3281, 3351, 3401 Alexis Park Drive - Phase 1	Project No: 704-ENG.KGEO03637-01
Location: 3401 Alexis Park Drive	Ground Elev: 400 m
Vernon, BC	UTM: 337279 E; 5570848 N; Z 11

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Laboratory USCS	Sample Type	Sample Number	Particle Size Distribution: Gravel (%)	Sand (%)	Silt & Clay (%)	Silt (%)	Clay (%)	Field Vane (kPa) Post-Peak / Peak	Plastic Limit / Moisture Content / Liquid Limit	Elevation (m)
0													10 20 30 40	20 40 60 80	400
	Test Pitting		SILT and GRAVEL, trace to some sand, trace cobbles, trace rootlets, dry, loose to compact, brown; fine grained sand.				DS1								
1			GRAVEL and SILT (TILL), sandy, dense to very dense, dry, brown; sub-angular to sub-rounded gravel.		GP-GM		DS2	36	29	35					399
			BEDROCK, slightly weathered, grey, moderately strong, R3.												
2			END OF TESTPIT - Refusal on bedrock - Coordinates estimated from GIS Data and handheld GPS unit - Elevations estimated from City of Vernon 1 m contours.												398
3															397
4															396
5															395
6															394

TETRA TECH

Contractor: Big M Excavating Ltd.	Completion Depth: 1.6 m
Drilling Rig Type: Hitachi 225 Excavator	Start Date: August 12, 2021
Logged By: MG	Completion Date: August 12, 2021
Reviewed By: RS	Page 1 of 1

Testpit No: TP21-04

Josan Properties Ltd.

Project: 3281, 3351, 3401 Alexis Park Drive - Phase 1	Project No: 704-ENG.KGEO03637-01
Location: 3351 Alexis Park Drive	Ground Elev: 396 m
Vernon, BC	UTM: 337248 E; 5570775 N; Z 11

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Particle Size Distribution: Gravel (%)	Sand (%)	Silt & Clay (%)	Silt (%)	Clay (%)	Field Vane (kPa) Post-Peak / Peak (10 20 30 40)	Plastic Limit / Moisture Content / Liquid Limit (20 40 60 80)	Elevation (m)
0	Test Pitting		SILT and GRAVEL, some sand, trace cobbles, trace rootlets, dry, loose to compact, brown; coarse grained gravel; fine grained sand			DS1								396
			BEDROCK, slightly weathered, grey, moderately strong, R3.											
1			END OF TESTPIT - Refusal on bedrock - Coordinates estimated from GIS Data and handheld GPS unit - Elevations estimated from City of Vernon 1 m contours.											395
2														394
3														393
4														392
5														391
6														390

TETRA TECH

Contractor: Big M Excavating Ltd.	Completion Depth: 0.8 m
Drilling Rig Type: Hitachi 225 Excavator	Start Date: August 12, 2021
Logged By: MG	Completion Date: August 12, 2021
Reviewed By: RS	Page 1 of 1

Testpit No: TP21-05

Josan Properties Ltd.

Project: 3281, 3351, 3401 Alexis Park Drive - Phase 1	Project No: 704-ENG.KGEO03637-01
Location: 3401 Alexis Park Drive	Ground Elev: 392 m
Vernon, BC	UTM: 337221 E; 5570827 N; Z 11

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Laboratory USCS	Sample Type	Sample Number	Particle Size Distribution: Gravel (%)	Sand (%)	Silt & Clay (%)	Silt (%)	Clay (%)	Field Vane (kPa) / Plastic Limit / Moisture Content / Liquid Limit	Elevation (m)
0													Post-Peak / Peak: 10 20 30 40; Plastic Limit / Moisture Content / Liquid Limit: 20 40 60 80	392
1	Test Pitting		SILT and GRAVEL, some sand, trace cobbles, trace rootlets, dry, loose to compact, brown; coarse grained gravel; fine grained sand											391
2			CLAY, silty, some gravel to gravelly, damp, firm to very stiff, medium plasticity, brown with white/grey.				DS1							390
3					CI		DS2							389
4			- becomes more light brown/orange colour at 4.1m				DS3							388
5			CLAY, trace silt, damp to moist, firm to hard, medium to high plasticity, grey/brown.				DS4							387
6			END OF TESTPIT - Equipment refusal reached. - Coordinates estimated from GIS Data and handheld GPS unit. - Elevations estimated from City of Vernon 1 m contours.											386

TETRA TECH

Contractor: Big M Excavating Ltd.	Completion Depth: 5.3 m
Drilling Rig Type: Hitachi 225 Excavator	Start Date: August 12, 2021
Logged By: MG	Completion Date: August 12, 2021
Reviewed By: RS	Page 1 of 1

Testpit No: TP21-06

Josan Properties Ltd.

Project: 3281, 3351, 3401 Alexis Park Drive - Phase 1	Project No: 704-ENG.KGEO03637-01
Location: 3401 Alexis Park Drive	Ground Elev: 391 m
Vernon, BC	UTM: 337229 E; 5570837 N; Z 11

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Particle Size Distribution: Gravel (%)	Sand (%)	Silt & Clay (%)	Silt (%)	Clay (%)	Field Vane (kPa) / Plastic Limit / Moisture Content / Liquid Limit	Elevation (m)
0			SILT and GRAVEL, trace to some sand, trace cobbles, occasional boulders, dry, brown; fine grained sand										391
			GRAVEL and SILT (TILL), sandy, some cobbles, dense to very dense, dry, brown; sub-angular to sub-rounded gravel.										
1													390
2			CLAY, trace silt, trace sand, damp to moist, firm to hard, medium to high plasticity, grey/brown; occasional sand lenses in the clay										389
	Test Pitting					DS1							
			- white lens in the clay at 2.7m										
3													388
						DS2							
4													387
						DS3							
						DS4							
5			- becomes wet at 4.9m										386
8/12/2021													8/12/2021
			END OF TESTPIT - Equipment refused reached. - Coordinates estimated from GIS Data and handheld GPS unit. - Elevations estimated from City of Vernon 1 m contours.										
6													385

Field Vane (kPa): Post-Peak ◇ / Peak ◆ — 10 20 30 40

Plastic Limit / Moisture Content / Liquid Limit — 20 40 60 80

TETRA TECH

Contractor: Big M Excavating Ltd.	Completion Depth: 5.3 m
Drilling Rig Type: Hitachi 225 Excavator	Start Date: August 12, 2021
Logged By: MG	Completion Date: August 12, 2021
Reviewed By: RS	Page 1 of 1

Josan Properties Ltd.

Testpit No: TP21-07

Project: 3281, 3351, 3401 Alexis Park Drive - Phase 1	Project No: 704-ENG.KGEO03637-01
Location: 3401 Alexis Park Drive	Ground Elev: 391 m
Vernon, BC	UTM: 337238 E; 5570839 N; Z 11

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Sample Type	Sample Number	Particle Size Distribution: Gravel (%)	Sand (%)	Silt & Clay (%)	Silt (%)	Clay (%)	Field Vane (kPa) Post-Peak / Peak (10 20 30 40)	Plastic Limit / Moisture Content / Liquid Limit (20 40 60 80)	Elevation (m)
0			SILT and GRAVEL, trace to some sand, trace cobbles, occasional boulders, dry, brown; fine grained sand											391
			GRAVEL and SILT (TILL), sandy, some cobbles, dense to very dense, dry, brown; sub-angular to sub-rounded gravel.											
1														390
			- rootlets from 1.6-2.1m											
2														389
			CLAY, trace silt, damp to moist, firm to hard, medium to high plasticity, grey/brown											
3														388
						DS1								
4														387
						DS2								
	▼ 8/12/2021		- becomes wet at 4.8m											▼ 8/12/2021
5	Test Pitting		END OF TESTPIT - Target depth reached - Coordinates estimated from GIS Data and handheld GPS unit - Elevations estimated from City of Vernon 1 m contours.											386
6														385

TETRA TECH

Contractor: Big M Excavating Ltd.	Completion Depth: 4.9 m
Drilling Rig Type: Hitachi 225 Excavator	Start Date: August 12, 2021
Logged By: MG	Completion Date: August 12, 2021
Reviewed By: RS	Page 1 of 1

Testpit No: TP21-08

Josan Properties Ltd.

Project: 3281, 3351, 3401 Alexis Park Drive - Phase 1	Project No: 704-ENG.KGEO03637-01
Location: 3401 Alexis Park Drive	Ground Elev: 394 m
Vernon, BC	UTM: 337228 E; 5570801 N; Z 11

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Laboratory USCS	Sample Type	Sample Number	Particle Size Distribution: Gravel (%)	Sand (%)	Silt & Clay (%)	Silt (%)	Clay (%)	Field Vane (kPa) Post-Peak / Peak; Plastic Limit / Moisture Content / Liquid Limit	Elevation (m)
0														394
	Test Pitting		SILT and GRAVEL, trace to some sand, trace cobbles, occasional boulders, dry, brown; fine grained sand				DS1							
1			CLAY, silty, some gravel to gravelly, damp, firm to very stiff, medium plasticity, brown with white/grey.											393
							DS2							
2														392
							DS3							
3														391
			GRAVEL, some sand, trace silt, trace cobbles; coarse, angular gravel, possible weathered bedrock.		GP		DS4	78	16	6				
4														390
			BEDROCK, slightly weathered, grey, moderately strong, R3.											
			END OF TESTPIT - Refusal on bedrock - Coordinates estimated from GIS Data and handheld GPS unit - Elevations estimated from City of Vernon 1 m contours.											
5														389
6														388

Field Vane (kPa): Post-Peak ◇ / Peak ◆ — 10 20 30 40

Plastic Limit / Moisture Content / Liquid Limit — 20 40 60 80

TETRA TECH

Contractor: Big M Excavating Ltd.	Completion Depth: 4.2 m
Drilling Rig Type: Hitachi 225 Excavator	Start Date: August 12, 2021
Logged By: MG	Completion Date: August 12, 2021
Reviewed By: RS	Page 1 of 1

Testpit No: **TP21-09**

Josan Properties Ltd.

Project: 3281, 3351, 3401 Alexis Park Drive - Phase 1	Project No: 704-ENG.KGEO03637-01
Location: 3281 Alexis Park Drive	Ground Elev: 392 m
Vernon, BC	UTM: 337235 E; 5570728 N; Z 11

Depth (m)	Method	Core Diameter (mm)	Soil Description	Graphical Representation	Particle Size Distribution: Gravel (%)	Sand (%)	Silt & Clay (%)	Silt (%)	Clay (%)	Field Vane (kPa) Post-Peak / Peak (10 20 30 40)	Plastic Limit / Moisture Content / Liquid Limit (20 40 60 80)	Elevation (m)
0	Test Pitting		SILT and GRAVEL, some sand, trace cobbles, trace rootlets, dry, loose to compact, brown; coarse grained gravel; fine grained sand									392
			BEDROCK, slightly weathered, grey, moderately strong, R3.									
1			END OF TESTPIT - Refusal on bedrock - Coordinates estimated from GIS Data and handheld GPS unit - Elevations estimated from City of Vernon 1 m contours									391
2												390
3												389
4												388
5												387
6												386

TETRA TECH

Contractor: Big M Excavating Ltd.	Completion Depth: 0.7 m
Drilling Rig Type: Hitachi 225 Excavator	Start Date: August 12, 2021
Logged By: MG	Completion Date: August 12, 2021
Reviewed By: RS	Page 1 of 1

APPENDIX B

LABORATORY TEST RESULTS

MOISTURE CONTENT TEST RESULTS

ASTM D2216

Project:	3281, 3351, 3401 Alexis Park Drive	Sample No.:	KS-9631
Project No.:	ENG.KGEO03637-01	Date Tested:	August 19, 2021
Client:	Josan Properties Ltd.	Tested By:	CL
Address:	3281, 3351, 3401 Alexis Park Drive, Vernon, B.C.	Page:	1 of 2

TP Location	Depth (m)	Moisture Content (%)	Visual Description of Soil
TP21-01			
DS1	0.6 - 0.9	7.3	
DS2	1.3 - 1.5	33.0	
DS3	2.1 - 2.3	38.0	
DS4	2.5 - 2.7	38.0	
DS5	2.8 - 3.0	50.5	
DS6	3.2 - 3.5	50.7	
DS7	3.6 - 3.8	59.4	
DS8	4.2 - 4.4	54.8	
DS9	4.5 - 4.6	45.7	
DS10	5.0 - 5.3	8.4	
TP21-03			
DS2	1.0 - 1.2	4.8	
TP21-05			
DS1	2.4 - 2.6	17.7	
DS2	2.9 - 3.1	26.0	
DS3	3.9 - 4.1	15.2	
DS4	4.5 - 4.9	33.2	
TP21-07			
DS1	3.7 - 3.9	46.6	
DS2	4.6 - 4.9	52.0	

Reviewed By: _____

TETRA TECH

MOISTURE CONTENT TEST RESULTS

ASTM D2216

Project:	3281, 3351, 3401 Alexis Park Drive	Sample No.:	KS-9631
Project No.:	ENG.KGEO03637-01	Date Tested:	August 19, 2021
Client:	Josan Properties Ltd.	Tested By:	CL
Address:	3281, 3351, 3401 Alexis Park Drive, Vernon, B.C.	Page:	2 of 2

TP Location	Depth (m)	Moisture Content (%)	Visual Description of Soil
TP21-06			
DS1	2.5 - 2.8	36.4	
DS2	3.5 - 3.7	40.2	
DS3	4.2 - 4.4	39.9	
DS4	4.7 - 4.9	41.2	
TP21-08			
DS2	1.6 - 1.8	23.0	
DS3	2.7 - 2.9	17.8	
DS4	3.8 - 3.9	2.6	

Reviewed By: _____

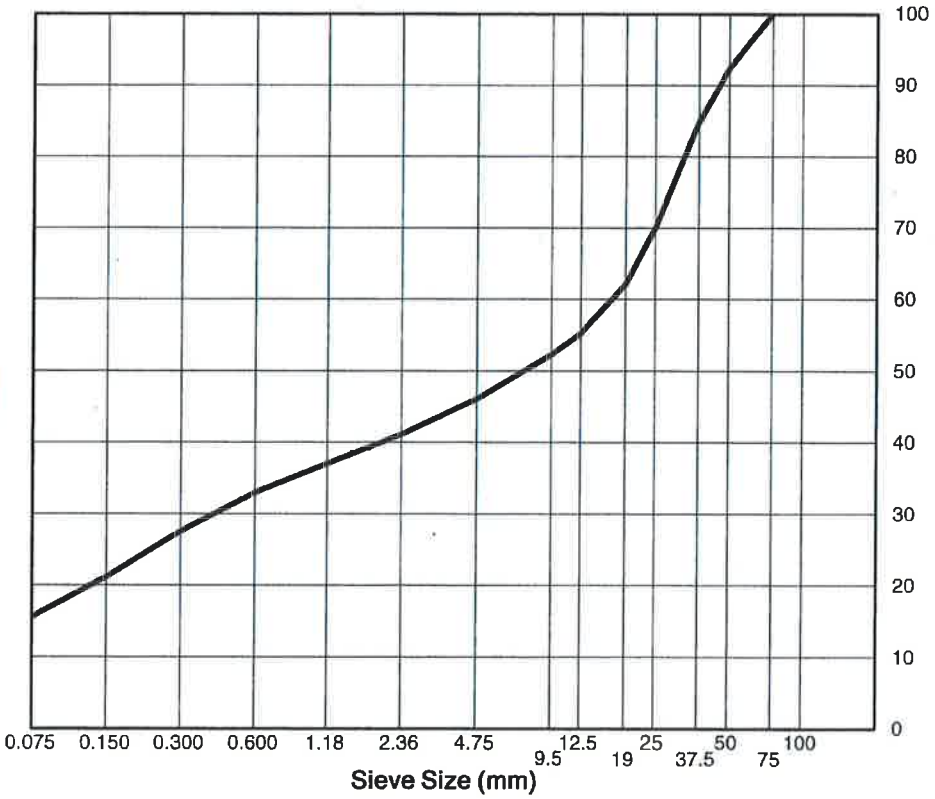
TETRA TECH

SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.:	ENG.KGEO03637-01	Sample No.:	KS-9635
Project:	3281, 3351, 3401 Alexis Park Drive	Date Sampled:	August 12, 2021
		Sampled by:	MG
Client:	Josan Properties Ltd.	Date Tested:	August 23, 2021
Attention:	See e-mail distribution	Tested by:	CL Office: Kelowna
Email:	See e-mail distribution	Moisture Content (as received):	7.3%
Description:	75 mm (-) GRAVEL, sandy, some silt	No. Crushed Faces:	One (1) or Two (2)
Source:	TP21-01, DS1	By particle mass:	
Supplier:	N/A		
Depth:	0.6 - 0.9 m		
Specification:	N/A		

Sieve Size	Percent Passing
75	100
50	92
37.5	85
25	70
19	62
12.5	55
9.5	52
4.75	46
2.36	41
1.18	37
0.600	33
0.300	28
0.150	21
0.075	15.6



Remarks:

Reviewed By: _____

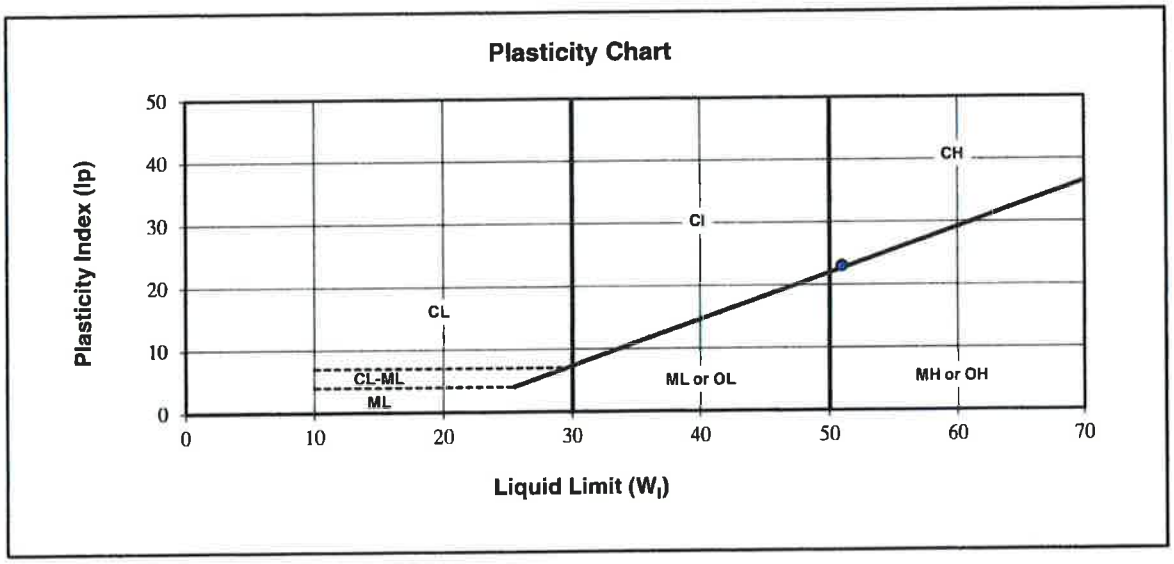
TETRA TECH

ATTERBERG LIMITS TEST REPORT

ASTM D4318

Project:	3281, 3351, 3401 Alexis Park Drive	Sample Number:	KS-9632
		Sample Location:	TP21-01, DS2
Project No:	ENG.KGEO03637-01	Depth:	1.3 - 1.5 m
Client:	Josan Properties Ltd.	Sampled By:	MG Tested By: TJ
Attention:	See e-mail distribution.	Date Sampled:	August 12, 2021
Email:	See e-mail distribution.	Date Tested:	August 23, 2021

Sample Description: CLAY, Medium to High Plasticity (CI-CH)



Liquid Limit ($W_{1)}$:	51	Natural Moisture (%)	33.0
Plastic Limit :	28	Soil Plasticity:	Medium to High
Plasticity Index (Ip) :	23	Mod.USCS Symbol:	CI-CH

Remarks:

Reviewed By:

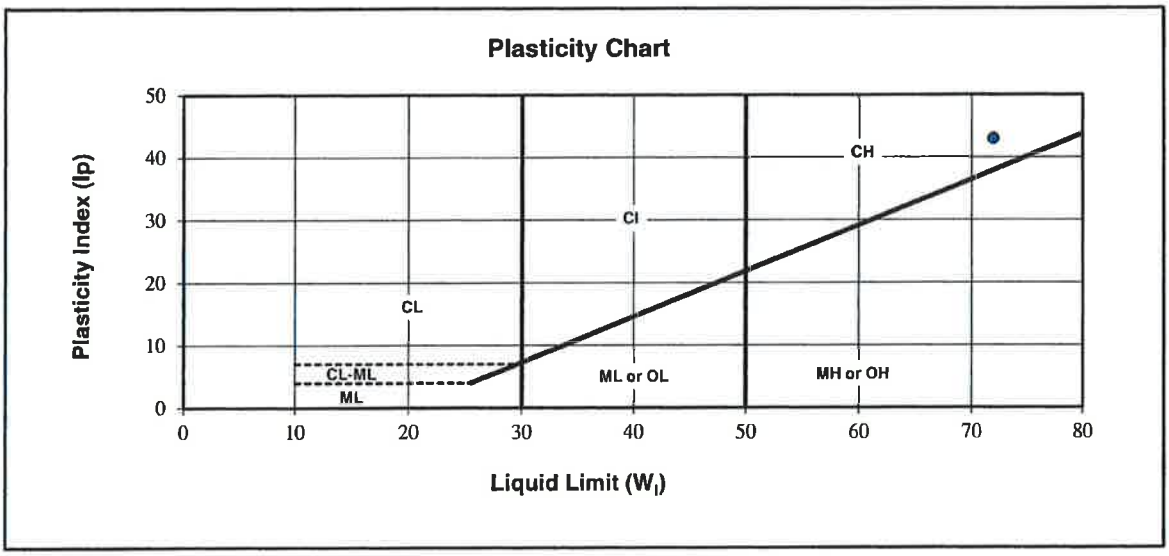
TETRA TECH

ATTERBERG LIMITS TEST REPORT

ASTM D4318

Project:	3281, 3351, 3401 Alexis Park Drive	Sample Number:	KS-9633
		Sample Location:	TP21-01, DS9
Project No:	ENG.KGEO03637-01	Depth:	4.5 - 4.6 m
Client:	Josan Properties Ltd.	Sampled By:	MG Tested By: TJ
Attention:	See e-mail distribution.	Date Sampled:	August 12, 2021
Email:	See e-mail distribution.	Date Tested:	August 23, 2021

Sample Description: CLAY, High Plasticity (CH)



Liquid Limit ($W_{1)}$:	72	Natural Moisture (%)	45.7
Plastic Limit :	29	Soil Plasticity:	High
Plasticity Index (Ip) :	43	Mod.USCS Symbol:	CH

Remarks:

Reviewed By:

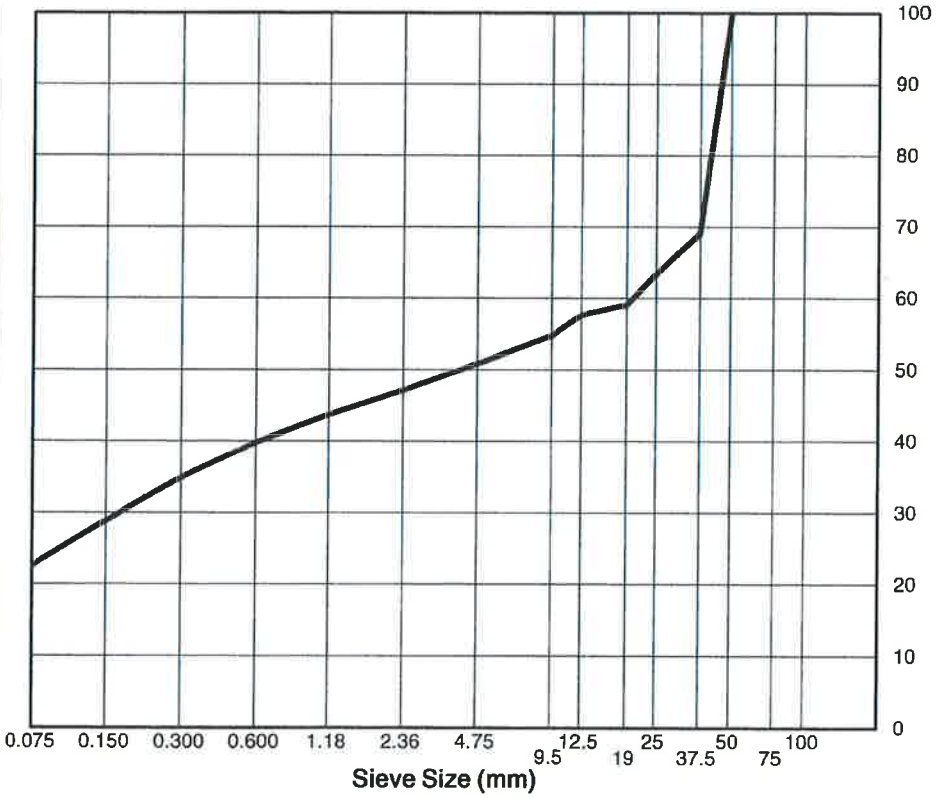
TETRA TECH

SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.:	ENG.KGEO03637-01	Sample No.:	KS-9636
Project:	3281, 3351, 3401 Alexis Park Drive	Date Sampled:	August 12, 2021
		Sampled by:	MG
Client:	Josan Properties Ltd.	Date Tested:	August 23, 2021
Attention:	See e-mail distribution	Tested by:	CL Office: Kelowna
Email:	See e-mail distribution	Moisture Content (as received):	8.4%
Description:	50 mm (-) GRAVEL, sandy, silty	No. Crushed Faces:	One (1) or Two (2)
Source:	TP21-01, DS10	By particle mass:	
Supplier:	N/A		
Depth:	5.0 - 5.3 m		
Specification:	N/A		

Sieve Size	Percent Passing
50	100
37.5	69
25	63
19	59
12.5	58
9.5	55
4.75	51
2.36	47
1.18	44
0.600	40
0.300	35
0.150	29
0.075	22.5



Remarks:

Reviewed By: _____

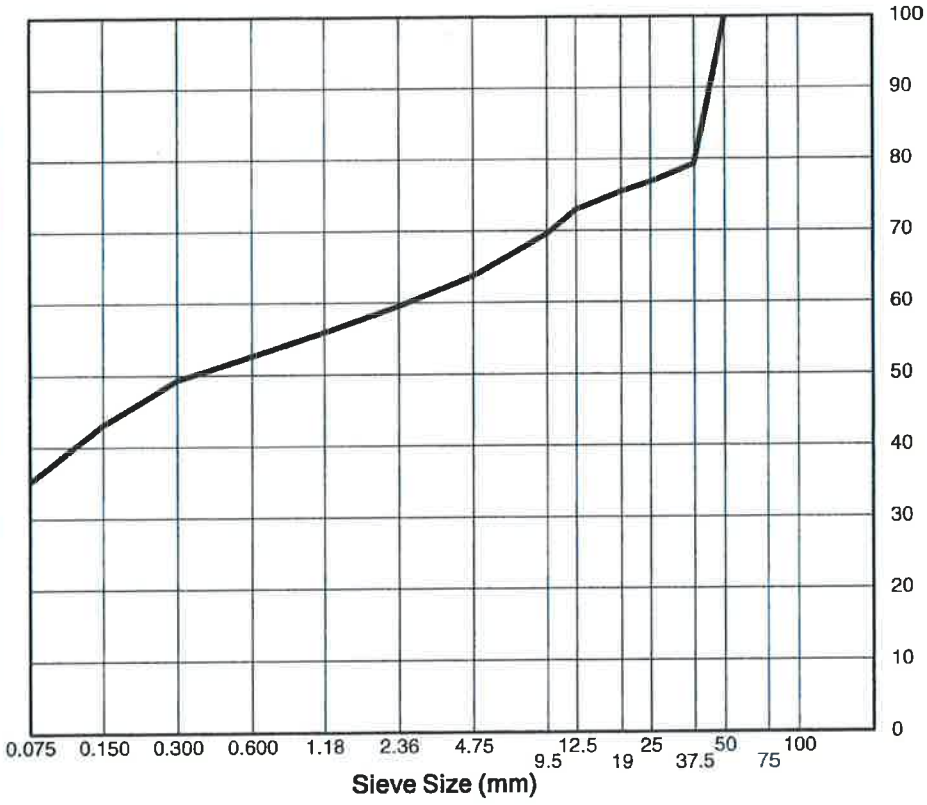
TETRA TECH

SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.:	ENG.KGEO03637-01	Sample No.:	KS-9637
Project:	3281, 3351, 3401 Alexis Park Drive	Date Sampled:	August 12, 2021
		Sampled by:	MG
Client:	Josan Properties Ltd.	Date Tested:	August 23, 2021
Attention:	See e-mail distribution	Tested by:	CL Office: Kelowna
Email:	See e-mail distribution	Moisture Content (as received):	4.8%
Description:	50 mm (-) GRAVEL and SILT, sandy	No. Crushed Faces:	One (1) or Two (2)
Source:	TP21-03, DS2	By particle mass:	
Supplier:	N/A		
Depth:	1.0 - 1.2 m		
Specification:	N/A		

Sieve Size	Percent Passing
50	100
37.5	79
25	77
19	75
12.5	73
9.5	70
4.75	64
2.36	60
1.18	56
0.600	53
0.300	49
0.150	43
0.075	35.2



Remarks:

Reviewed By: _____

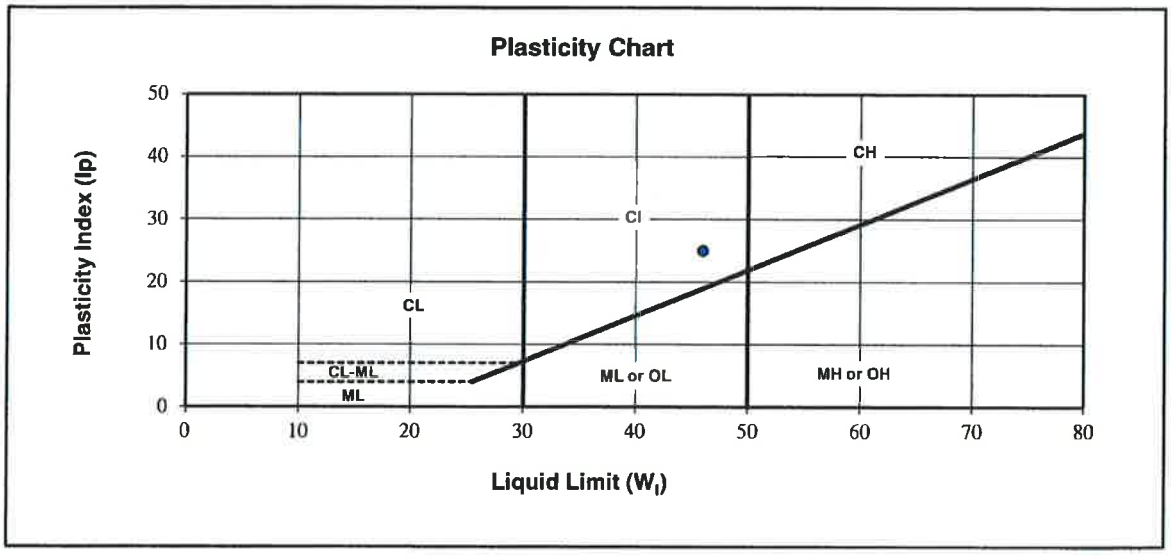
TETRA TECH

ATTERBERG LIMITS TEST REPORT

ASTM D4318

Project:	3281, 3351, 3401 Alexis Park Drive	Sample Number:	KS-9634
		Sample Location:	TP21-05, DS2
Project No:	ENG.KGEO03637-01	Depth:	2.9 - 3.1 m
Client:	Josan Properties Ltd.	Sampled By:	MG Tested By: TJ
Attention:	See e-mail distribution.	Date Sampled:	August 12, 2021
Email:	See e-mail distribution.	Date Tested:	August 23, 2021

Sample Description: CLAY, Medium Plasticity (CI)



Liquid Limit ($W_{1)}$:	46	Natural Moisture (%)	26.0
Plastic Limit :	21	Soil Plasticity:	Medium
Plasticity Index (Ip) :	25	Mod.USCS Symbol:	CI

Remarks:

Reviewed By:

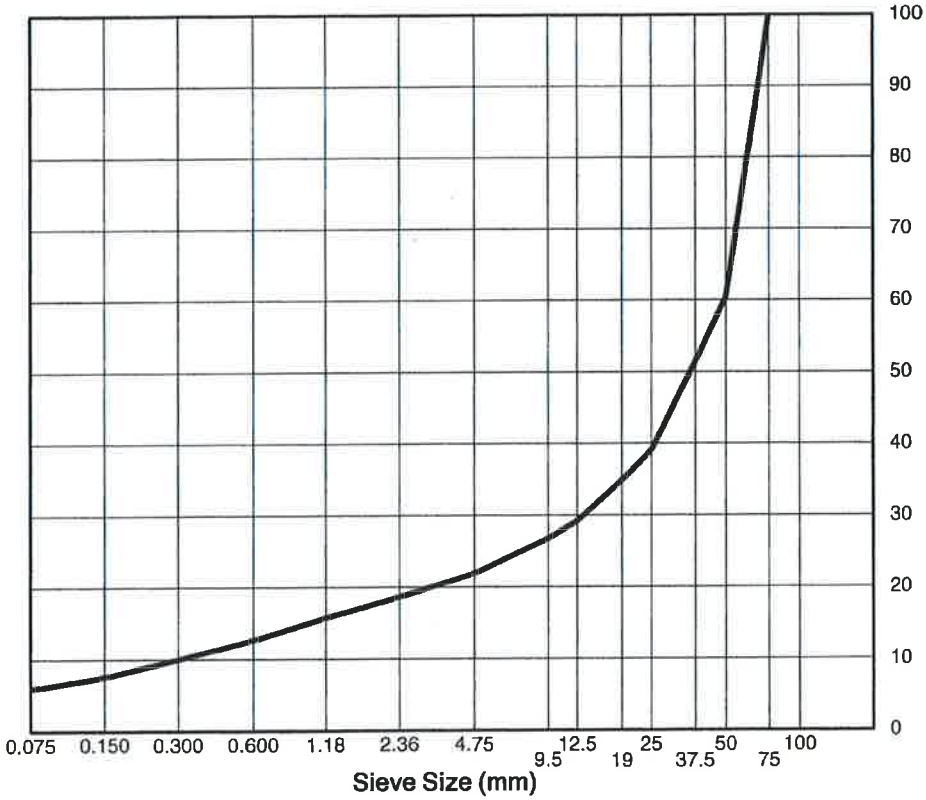
TETRA TECH

SIEVE ANALYSIS REPORT

Washed Sieve: ASTM C136 and C117

Project No.:	ENG.KGEO03637-01	Sample No.:	KS-9638
Project:	3281, 3351, 3401 Alexis Park Drive	Date Sampled:	August 12, 2021
		Sampled by:	MG
Client:	Josan Properties Ltd.	Date Tested:	August 23, 2021
Attention:	See e-mail distribution	Tested by:	CL Office: Kelowna
Email:	See e-mail distribution	Moisture Content (as received):	2.6%
Description:	75 mm (-) GRAVEL, some sand, trace silt	No. Crushed Faces:	One (1) or Two (2)
Source:	TP21-08, DS4	By particle mass:	
Supplier:	N/A		
Depth:	3.8 - 3.9 m		
Specification:	N/A		

Sieve Size	Percent Passing
75	100
50	60
37.5	51
25	39
19	35
12.5	29
9.5	27
4.75	22
2.36	19
1.18	16
0.600	13
0.300	10
0.150	8
0.075	6.0



Remarks:

Reviewed By: _____

TETRA TECH

POINT LOAD STRENGTH INDEX

Project: 3281, 3351, 3401 Alexis Park Drive
Project No: ENG.KGEO03637-01
Client: Josan Properties

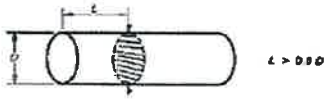
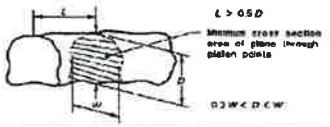
Borehole/Pit No.: See TP Location Below
Sampled Date: 16-Aug-21
Sampled By: MG

Sample No.: KS-9639, KS-9640, KS-9641
Date Tested: 20-Aug-21
Tested By: TJ

TP Location	Depth (m)	Rock Description (Including nature and orientation of any defects or planes of weakness)	Moisture Condition	Type of Test (Axial, Diametral or Irregular)	Plate Seperation, D (mm)	Length or Width (mm)	Failure Load, P (kN)	Description of Failed Sample	Cross Sectional Area (mm^2)	Equivalent Core Diameter, D_e (mm)	Point Load Index, I_s (Mpa)	Mean Point Load Index, $I_{s(50)}$ (Mpa)
TP21-02	0.7 - 0.8	N/A	Dry	Irregular	35	70	21.21	2 way break	2450	55.85	6.80	7.15
TP21-08	4.2 - 4.3	N/A	Dry	Irregular	45	190	7.86	1 way break	8550	104.34	0.72	1.01
TP21-09	0.7 - 0.8	N/A	Dry	Irregular	45	130	10.22	1 way break	5850	86.30	1.37	1.75

Remarks:

Reviewed By: P.Eng.

Shape of Specimen	Cylinder Core		
Direction of Loading	Diametral	Axial	Irregular
Required Shape Proportions of Test Specimens			

Bieniawski, Z.T. 1973. "Engineering Classification of Jointed Rock Masses" Transactions of the South African Institution of Civil Engineers, Vol. 15, No. 12, pp. 335 - 344

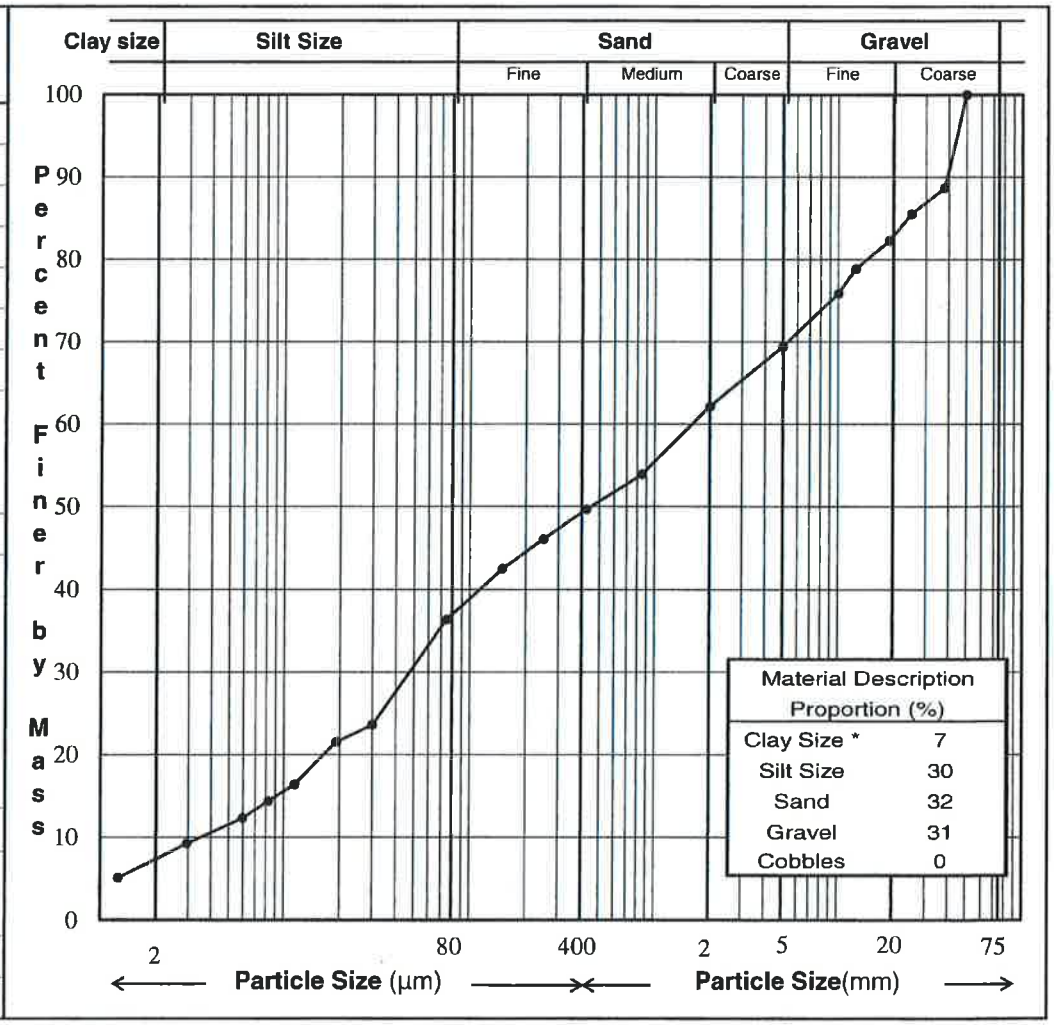
TETRA TECH

PARTICLE SIZE ANALYSIS (Hydrometer) TEST REPORT

ASTM D7928

Project:	3281, 3351, 3401 Alexis Park Drive	Sample No.:	KS-9656
Client:	Josan Properties Ltd.	Borehole/ TP:	BH21-01, DS1
Project No.:	ENG.KGEO03637-01	Depth:	4.8 - 5.1 m
Location:	3281, 3351, 3401 Alexis Park Drive, Vernon, B.C.	Date Tested	August 26, 2021
Description **:	SAND, gravelly, silty, trace clay	Tested By:	CL

Particle Size	Percent Passing
100 mm	
75 mm	
50 mm	100
38 mm	89
25 mm	86
19 mm	82
13 mm	79
10 mm	76
5 mm	69
2 mm	62
850 µm	54
425 µm	50
250 µm	46
150 µm	43
75 µm	36
30 µm	24
19 µm	22
11 µm	16
8 µm	14
6 µm	12
3 µm	9
1 µm	5



Remarks: * The description is behaviour based & subject to Tetra Tech description protocols.

Reviewed By: _____ P.Eng.

TETRA TECH

APPENDIX C

LIMITATIONS ON THE USE OF THIS DOCUMENT

LIMITATIONS ON USE OF THIS DOCUMENT

GEOTECHNICAL

1.1 USE OF DOCUMENT AND OWNERSHIP

This document pertains to a specific site, a specific development, and a specific scope of work. The document may include plans, drawings, profiles and other supporting documents that collectively constitute the document (the "Professional Document").

The Professional Document is intended for the sole use of TETRA TECH's Client (the "Client") as specifically identified in the TETRA TECH Services Agreement or other Contractual Agreement entered into with the Client (either of which is termed the "Contract" herein). TETRA TECH does not accept any responsibility for the accuracy of any of the data, analyses, recommendations or other contents of the Professional Document when it is used or relied upon by any party other than the Client, unless authorized in writing by TETRA TECH.

Any unauthorized use of the Professional Document is at the sole risk of the user. TETRA TECH accepts no responsibility whatsoever for any loss or damage where such loss or damage is alleged to be or, is in fact, caused by the unauthorized use of the Professional Document.

Where TETRA TECH has expressly authorized the use of the Professional Document by a third party (an "Authorized Party"), consideration for such authorization is the Authorized Party's acceptance of these Limitations on Use of this Document as well as any limitations on liability contained in the Contract with the Client (all of which is collectively termed the "Limitations on Liability"). The Authorized Party should carefully review both these Limitations on Use of this Document and the Contract prior to making any use of the Professional Document. Any use made of the Professional Document by an Authorized Party constitutes the Authorized Party's express acceptance of, and agreement to, the Limitations on Liability.

The Professional Document and any other form or type of data or documents generated by TETRA TECH during the performance of the work are TETRA TECH's professional work product and shall remain the copyright property of TETRA TECH.

The Professional Document is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of TETRA TECH. Additional copies of the Document, if required, may be obtained upon request.

1.2 ALTERNATIVE DOCUMENT FORMAT

Where TETRA TECH submits electronic file and/or hard copy versions of the Professional Document or any drawings or other project-related documents and deliverables (collectively termed TETRA TECH's "Instruments of Professional Service"), only the signed and/or sealed versions shall be considered final. The original signed and/or sealed electronic file and/or hard copy version archived by TETRA TECH shall be deemed to be the original. TETRA TECH will archive a protected digital copy of the original signed and/or sealed version for a period of 10 years.

Both electronic file and/or hard copy versions of TETRA TECH's Instruments of Professional Service shall not, under any circumstances, be altered by any party except TETRA TECH. TETRA TECH's Instruments of Professional Service will be used only and exactly as submitted by TETRA TECH.

Electronic files submitted by TETRA TECH have been prepared and submitted using specific software and hardware systems. TETRA TECH makes no representation about the compatibility of these files with the Client's current or future software and hardware systems.

1.3 STANDARD OF CARE

Services performed by TETRA TECH for the Professional Document have been conducted in accordance with the Contract, in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions in the jurisdiction in which the services are provided. Professional judgment has been applied in developing the conclusions and/or recommendations provided in this Professional Document. No warranty or guarantee, express or implied, is made concerning the test results, comments, recommendations, or any other portion of the Professional Document.

If any error or omission is detected by the Client or an Authorized Party, the error or omission must be immediately brought to the attention of TETRA TECH.

1.4 DISCLOSURE OF INFORMATION BY CLIENT

The Client acknowledges that it has fully cooperated with TETRA TECH with respect to the provision of all available information on the past, present, and proposed conditions on the site, including historical information respecting the use of the site. The Client further acknowledges that in order for TETRA TECH to properly provide the services contracted for in the Contract, TETRA TECH has relied upon the Client with respect to both the full disclosure and accuracy of any such information.

1.5 INFORMATION PROVIDED TO TETRA TECH BY OTHERS

During the performance of the work and the preparation of this Professional Document, TETRA TECH may have relied on information provided by third parties other than the Client.

While TETRA TECH endeavours to verify the accuracy of such information, TETRA TECH accepts no responsibility for the accuracy or the reliability of such information even where inaccurate or unreliable information impacts any recommendations, design or other deliverables and causes the Client or an Authorized Party loss or damage.

1.6 GENERAL LIMITATIONS OF DOCUMENT

This Professional Document is based solely on the conditions presented and the data available to TETRA TECH at the time the data were collected in the field or gathered from available databases.

The Client, and any Authorized Party, acknowledges that the Professional Document is based on limited data and that the conclusions, opinions, and recommendations contained in the Professional Document are the result of the application of professional judgment to such limited data.

The Professional Document is not applicable to any other sites, nor should it be relied upon for types of development other than those to which it refers. Any variation from the site conditions present, or variation in assumed conditions which might form the basis of design or recommendations as outlined in this document, at or on the development proposed as of the date of the Professional Document requires a supplementary exploration, investigation, and assessment.

TETRA TECH is neither qualified to, nor is it making, any recommendations with respect to the purchase, sale, investment or development of the property, the decisions on which are the sole responsibility of the Client.

1.7 ENVIRONMENTAL AND REGULATORY ISSUES

Unless stipulated in the report, TETRA TECH has not been retained to explore, address or consider and has not explored, addressed or considered any environmental or regulatory issues associated with development on the subject site.

1.8 NATURE AND EXACTNESS OF SOIL AND ROCK DESCRIPTIONS

Classification and identification of soils and rocks are based upon commonly accepted systems, methods and standards employed in professional geotechnical practice. This report contains descriptions of the systems and methods used. Where deviations from the system or method prevail, they are specifically mentioned.

Classification and identification of geological units are judgmental in nature as to both type and condition. TETRA TECH does not warrant conditions represented herein as exact, but infers accuracy only to the extent that is common in practice.

Where subsurface conditions encountered during development are different from those described in this report, qualified geotechnical personnel should revisit the site and review recommendations in light of the actual conditions encountered.

1.9 LOGS OF TESTHOLES

The testhole logs are a compilation of conditions and classification of soils and rocks as obtained from field observations and laboratory testing of selected samples. Soil and rock zones have been interpreted. Change from one geological zone to the other, indicated on the logs as a distinct line, can be, in fact, transitional. The extent of transition is interpretive. Any circumstance which requires precise definition of soil or rock zone transition elevations may require further investigation and review.

1.10 STRATIGRAPHIC AND GEOLOGICAL INFORMATION

The stratigraphic and geological information indicated on drawings contained in this report are inferred from logs of test holes and/or soil/rock exposures. Stratigraphy is known only at the locations of the test hole or exposure. Actual geology and stratigraphy between test holes and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historical environment. TETRA TECH does not represent the conditions illustrated as exact but recognizes that variations will exist. Where knowledge of more precise locations of geological units is necessary, additional exploration and review may be necessary.

1.11 PROTECTION OF EXPOSED GROUND

Excavation and construction operations expose geological materials to climatic elements (freeze/thaw, wet/dry) and/or mechanical disturbance which can cause severe deterioration. Unless otherwise specifically indicated in this report, the walls and floors of excavations must be protected from the elements, particularly moisture, desiccation, frost action and construction traffic.

1.12 SUPPORT OF ADJACENT GROUND AND STRUCTURES

Unless otherwise specifically advised, support of ground and structures adjacent to the anticipated construction and preservation of adjacent ground and structures from the adverse impact of construction activity is required.

1.13 INFLUENCE OF CONSTRUCTION ACTIVITY

Construction activity can impact structural performance of adjacent buildings and other installations. The influence of all anticipated construction activities should be considered by the contractor, owner, architect and prime engineer in consultation with a geotechnical engineer when the final design and construction techniques, and construction sequence are known.

1.14 OBSERVATIONS DURING CONSTRUCTION

Because of the nature of geological deposits, the judgmental nature of geotechnical engineering, and the potential of adverse circumstances arising from construction activity, observations during site preparation, excavation and construction should be carried out by a geotechnical engineer. These observations may then serve as the basis for confirmation and/or alteration of geotechnical recommendations or design guidelines presented herein.

1.15 DRAINAGE SYSTEMS

Unless otherwise specified, it is a condition of this report that effective temporary and permanent drainage systems are required and that they must be considered in relation to project purpose and function. Where temporary or permanent drainage systems are installed within or around a structure, these systems must protect the structure from loss of ground due to mechanisms such as internal erosion and must be designed so as to assure continued satisfactory performance of the drains. Specific design details regarding the geotechnical aspects of such systems (e.g. bedding material, surrounding soil, soil cover, geotextile type) should be reviewed by the geotechnical engineer to confirm the performance of the system is consistent with the conditions used in the geotechnical design.

1.16 DESIGN PARAMETERS

Bearing capacities for Limit States or Allowable Stress Design, strength/stiffness properties and similar geotechnical design parameters quoted in this report relate to a specific soil or rock type and condition. Construction activity and environmental circumstances can materially change the condition of soil or rock. The elevation at which a soil or rock type occurs is variable. It is a requirement of this report that structural elements be founded in and/or upon geological materials of the type and in the condition used in this report. Sufficient observations should be made by qualified geotechnical personnel during construction to assure that the soil and/or rock conditions considered in this report in fact exist at the site.

1.17 SAMPLES

TETRA TECH will retain all soil and rock samples for 30 days after this report is issued. Further storage or transfer of samples can be made at the Client's expense upon written request, otherwise samples will be discarded.

1.18 APPLICABLE CODES, STANDARDS, GUIDELINES & BEST PRACTICE

This document has been prepared based on the applicable codes, standards, guidelines or best practice as identified in the report. Some mandated codes, standards and guidelines (such as ASTM, AASHTO Bridge Design/Construction Codes, Canadian Highway Bridge Design Code, National/Provincial Building Codes) are routinely updated and corrections made. TETRA TECH cannot predict nor be held liable for any such future changes, amendments, errors or omissions in these documents that may have a bearing on the assessment, design or analyses included in this report.

July 21, 2022

Raka Josan, President
Josan Ventures Inc.
835-4445 Calgary Trail NW
Edmonton, Ab, T6H 5R7

Parking Relaxation Study for 3401, 3351, and 3281 Alexis Park Drive in Vernon, BC - Final

WSP has been retained as a transportation planning and engineering consultant to conduct a parking relaxation study for the proposed ten-storey mixed-use residential development located at 3401, 3351, and 3281 Alexis Park Drive in Vernon, BC. This development is anticipated to include 91 residential units and 462 m^2 (4,975 ft^2) of retail. The developer is proposing to provide 117 on-site parking spaces as shown in **Appendix A**, which does not meet the City of Vernon's current off-street parking requirements of 143 spaces.

This technical memorandum presents the number of parking spaces recommended for the proposed development, as well as supporting rationale.

OBJECTIVES OF PARKING STANDARDS

Parking design and availability affects land use and development patterns, as well as travel behaviour. Therefore, parking is a complex policy issue involving many interests and viewpoints. Historically, parking standards have been used by cities to specify the minimum amount of parking that must be provided for new development to ensure that ample off-street spaces are available to meet the development's own parking needs. These standards have often been developed under the approach that more parking is better. However, with a growing desire to build higher-density, pedestrian-friendly neighbourhoods, support urban redevelopment, and encourage non-auto modes of transportation, it is recognized that responsible parking standards should represent a balance of transportation and development objectives. In this study, parking standards are viewed as tools to ensure sufficient off-street parking and to minimize impact to the neighbourhood.

APPROACH TO DEVELOPING PARKING RATIOS

Parking standards are commonly developed by either reviewing or borrowing standards from other jurisdictions or from published sources to determine actual parking requirements for various uses. The parking ratios presented in this study were developed from published sources, namely:

- ✓ *The City of Vernon Zoning Bylaw No. 5000, 2003, Section 7.0*

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F: +1 604 683-8655
wsp.com

- ✓ *City of Kelowna Zoning Bylaw 8000, 2021*
- ✓ *City of Parksville Zoning and Development Bylaw, 1994, No. 2000*
- ✓ *City of Penticton Zoning Bylaw No.2017-08*
- ✓ *City of North Vancouver, Zoning Bylaw 1995, No. 6700*
- ✓ *ITE Parking Generation, 5th Edition (Washington, DC: Institute of Transportation Engineers (ITE), 2010)*

CITY OF VERNON – PARKING REQUIREMENTS

The City of Vernon's vehicle off-street parking requirements are detailed in Zoning Bylaw No. 5000, 2003, specifically under Section 7.0. This requirement is summarized in Table 1 and illustrates that the proposed **117 vehicle parking spaces** do not meet the City's current requirements of **143 parking spaces**.

Table 1 – City of Vernon Bylaw Parking Requirements

USE	VARIABLE	BYLAW PARKING RATIO	REQUIRED SPACES	PROPOSED SPACES
One Bedroom Dwelling Unit	61 units	1.25 per 1-bedroom dwelling unit	76	95 (88 parkade parking and 7 surface parking)
Two Bedroom Dwelling Unit	30 units	1.5 per 2-bedroom dwelling unit	45	
Retail Store	462 m^2	2 per 100 m^2	9	9 (surface parking)
Visitor	91 units	1 Parking Space for every 7 dwelling units	13	13 (surface parking)
Total	-	-	143	117

Based on the City of Vernon's Bicycle Bylaw Parking Requirements, the total required bicycle parking spaces for **Class I and Class II are 47 and 26 spaces**, respectively (Table 2). The developer is proposing to provide **60 Class I and 34 Class II bicycle spaces**.

Table 2 -- City of Vernon Bicycle Bylaw Parking Requirements

USE	VARIABLE	BYLAW PARKING RATIO	REQUIRED SPACES	PROPOSED SPACES
Apartment Housing	91 units	Class I: 0.5 per dwelling unit Class II: 0.25 per dwelling unit	Class I: 46 spaces Class II: 23 spaces	-
Retail Store	462 m^2	Class I: 0.2 per 100 m^2 Class II: 0.6 per 100 m^2	Class I: 1 space Class II: 3 spaces	-
Total	-	-	Class I: 47 spaces Class II: 26 spaces	Class I: 60 spaces Class II: 34 spaces

Based on the City of Vernon Zoning Bylaw No. 5000, under Section 7.0, **3 loading spaces** are required for this development (Table 3). The developer is proposing to provide **4 loading spaces**.

Table 3 – City of Vernon Bylaw Loading Requirements

USE	VARIABLE	BYLAW LOADING RATIO	REQUIRED SPACES	PROPOSED SPACES
Apartment Housing	7,728 m^2	1 per 2800m^2 GFA	3	3
Retail Store	462 m^2	1 per 1900m^2 GFA	0	1
Total	-	-	3	4

COMPARABLE CITIES – PARKING REQUIREMENTS

To analyze the reasonableness of the proposed 117 parking spaces for the proposed mixed-use development, parking requirements at four comparable municipalities in British Columbia were applied. The municipalities were selected based on similar available public transportation services in reference to the City of Vernon. Some of the selected municipalities for comparison purposes have identified mixed-use residential developments. Table 4 summarizes the number of parking spaces required if a mixed-use 91- rental unit residential development were to be built in each respective location.

Table 4 – Parking Requirements at Comparable Cities

MUNICIPALITY	USE	Variable	BYLAW PARKING RATIO	REQUIRED SPACES
City of Kelowna	Apartment (1 Bedroom)	61	1.25 space per 1 bedroom dwelling unit	76
	Apartment (2+ Bedrooms)	30	1.5 space per 2 bedroom dwelling unit	45
	Visitor Parking	91	0.14 space per dwelling unit	13
	Retail	462sq.m.	*	
	Total			**134**
City of Parksville	Apartment including Visitor , Customer and Client Parking	91	1.5 space per dwelling unit	137
	Total			**137**
City of Penticton	Dwelling Unit in Commercial Building	91	1 space per dwelling unit	91
	Commercial	462sq.m.	1 per 50 sq.m.	9
	Total			**101**
City of North Vancouver	Rental Apartment Residential Use	91	0.6 space per dwelling unit	55
	Visitor Parking	91	0.1 space per dwelling unit	9
	Commercial	462sq.m.	1 per 50 sq.m.	9
	Total			**73**

*Notwithstanding Section 8.2.17, in mixed-use developments the parking spaces required for Offices and other commercial related land uses can be shared with the residential visitor parking requirements. Parking spaces must be available for both land uses (commercial and visitor) at all times.

As shown above, similar municipalities require **minimum 73 parking spaces and maximum 137 parking spaces** for similar land use. The visitor parking and the retail parking spaces required for the mixed-use residential development are either shared in these municipalities or part of the

required number of spaces for dwelling units. With reference to the four cities and parking requirements depicted in Table 4, the average required number of **parking spaces is 111**, lower than the 143 spaces required by the City of Vernon.

Also note that the proposed development's units are proposed to be all rentals. Based on the City of North Vancouver's zoning bylaw, the required number of parking spaces for rental units are expected to be 40% lower than non-rental units. Accordingly, a high-level estimate postulates that around 95 spaces will be required assuming that all the units are rentals.

ITE PARKING GENERATION, 5TH EDITION – PARKING REQUIREMENTS

The *ITE Parking Generation, 5th Edition, (ITE: Washington, DC, 2020)* provides guidelines to determined parking demand for proposed development. The maximum parking demand for the proposed mixed-use development is anticipated to be **115 spaces** which is expected to be in December when the retail reaches its peak demand. The following assumptions are used for this study:

- The study location is "General Urban/Suburban" with no nearby rail transit.
- Based on the information provided by the Client, 10 of 31 "Unit C" units are affordable units which are incorporated into this study.
- The peak period of parking demand for retail (5 PM to 7 PM on a weekday) overlaps with the peak of parking demand for residential (11 PM to 7 AM on a Saturday). This is a conservative approach.

The generated parking demand results are summarized in Table 5 below.

Table 5 – ITE Parking Generation Parking Requirements

LAND USE	CODE	VARIABLE	RATIO	SPACES
Apartment Building	Multifamily Housing (Mid Rise) (221)	126 bedroom*	0.77 per bedroom	97
Affordable Housing	Affordable Housing (Income Limits) (223)	10 Affordable Units	0.66 per unit	7
Retail	Variety Store (814)	4,975 Sq.ft.	2.31 per 1000 sq.ft.	11
* Den is assumed to be half bedroom			**TOTAL**	**115**

INCENTIVES TO REDUCE PARKING DEMAND

Reducing the parking supply and efficiently managing parking provided would greatly benefit the City of Vernon in the long-term. Accommodating the expected future regional growth by incorporation high density land-use, sustainable modes of transportation, and reduced parking

requirements will encourage non-auto transportation modes which is aligned with the City of Vernon's Transportation Demand Management (TDM) Strategy. Based on the City of Vernon's TDM strategy, the active modes of transportation are targeted to increase to 38% in 2040 from 30% in 2013. On the other hand, parking induces further driving. Automobile dependency increases driving and road congestion. Therefore, there is a range of incentives for reducing parking demands for this development. The recommended workable solution for managing parking on this development is to provide on-site secure cycling storage. The developer is proposing to provide **60 Class I and 34 Class II bicycle spaces**.

FURTHER STUDIES

It is noted in the City of Vernon's "25 Year Master Transportation Plan" (MTP) prepared in 2013 that the demographics of the City of Vernon and vehicle use trends are changing. The two largest age groups in Vernon are the baby boomers (born between 1946 and 1964) and millennials (born between 1980 and 2004). For different reasons both groups are reducing vehicle use and ownership. As people retire their vehicle usage reduces by 40%. Vernon has a higher proportion of seniors, aged 65 and older, than the British Columbia average, a trend that is projected to continue. These residents will need routes with pedestrian facilities, suitable ramps at crosswalks and accessible transit. Pedestrian facilities such as sidewalks enable all residents, including those with mobility impairments, to access nearby services or the fully accessible transit network. The expected increase in the numbers of mobility scooters and motorised wheelchairs must also be accommodated. The millennials use social networking to a greater extent and tend to prefer to live where they can walk, cycle or take transit to work resulting in a reduced vehicle usage and a deferral of vehicle ownership. Based on the information provided by the Client, the expected residence of the proposed development will include:

- 40% of tenants are expected to be Baby Boomers
- 30% of the tenants are expected to be Geneartion X
- 30% of the tenants are expected to be Millennials

So, the majority of the expected residence of the proposed development are to be baby boomers and millennials, and both groups are reducing vehicle use and ownership based on the MTP prepared in 2013. Consequently, it is expected that fewer parking stalls will be required than the number of parking spaces required by the City of Vernon Zoning Bylaw No. 5000 (2003). A high-level estimate postulates that around 120 spaces will be required assuming that if the 40% baby boomer tenants retire, their vehicle usage reduces by 40%.

SUMMARY

- The City of Vernon zoning bylaw requires 143 vehicle parking spaces while the current proposed development plan shows 117 vehicle parking spaces.
- Based on the City of Vernon Zoning Bylaw No. 5000, under Section 7.0, 3 loading spaces are required for this development. The developer is proposing to provide 4 loading spaces.
- Similar municipalities require minimum 73 parking spaces and maximum 137 parking spaces for similar land use. The visitor parking and the retail parking spaces required for the mixed-use residential development are either shared in these municipalities or part of the required number of spaces for dwelling units. With reference to the four cities and their parking requirements, the average required number of parking spaces is 111, lower than the 143 spaces required by the City of Vernon.
- The proposed development's units are proposed to be all rentals. Based on the City of North Vancouver's zoning bylaw, the required number of parking spaces for rental units are expected to be 40% lower than non-rental units. Accordingly, a high-level estimate postulates that around 95 spaces will be required assuming that all the units are rentals.
- The parking demand by the proposed development during peak parking occupancy hours is expected to be 115 spaces based on the Parking Generation Manual, 5th Edition occuring in December when the retail experiences its peak demand.
- There is a range of incentives for reducing parking demands for this development. The recommended workable solution for managing parking on this development is to provide on-site secure cycling storage. The developer is proposing to provide 60 Class I and 34 Class II bicycle spaces. Based on the City of Vernon's Bicycle Bylaw Parking Requirements, the total required bicycle parking spaces for Class I and Class II are 47 and 26 spaces, respectively.
- 40% of the expected residence of the proposed development are to be baby boomers and 30% to be millennials, and both groups are reducing vehicle use and ownership based on the City of Vernon's "25 Year Master Transportation Plan" prepared in 2013. Consequently, it is expected that fewer parking stalls will be required than the number of parking spaces required by the City of Vernon Zoning Bylaw No. 5000 (2003). A high-level estimate postulates that around 120 spaces will be required assuming that if the 40% baby boomer tenants retire, their vehicle usage reduces by 40%.

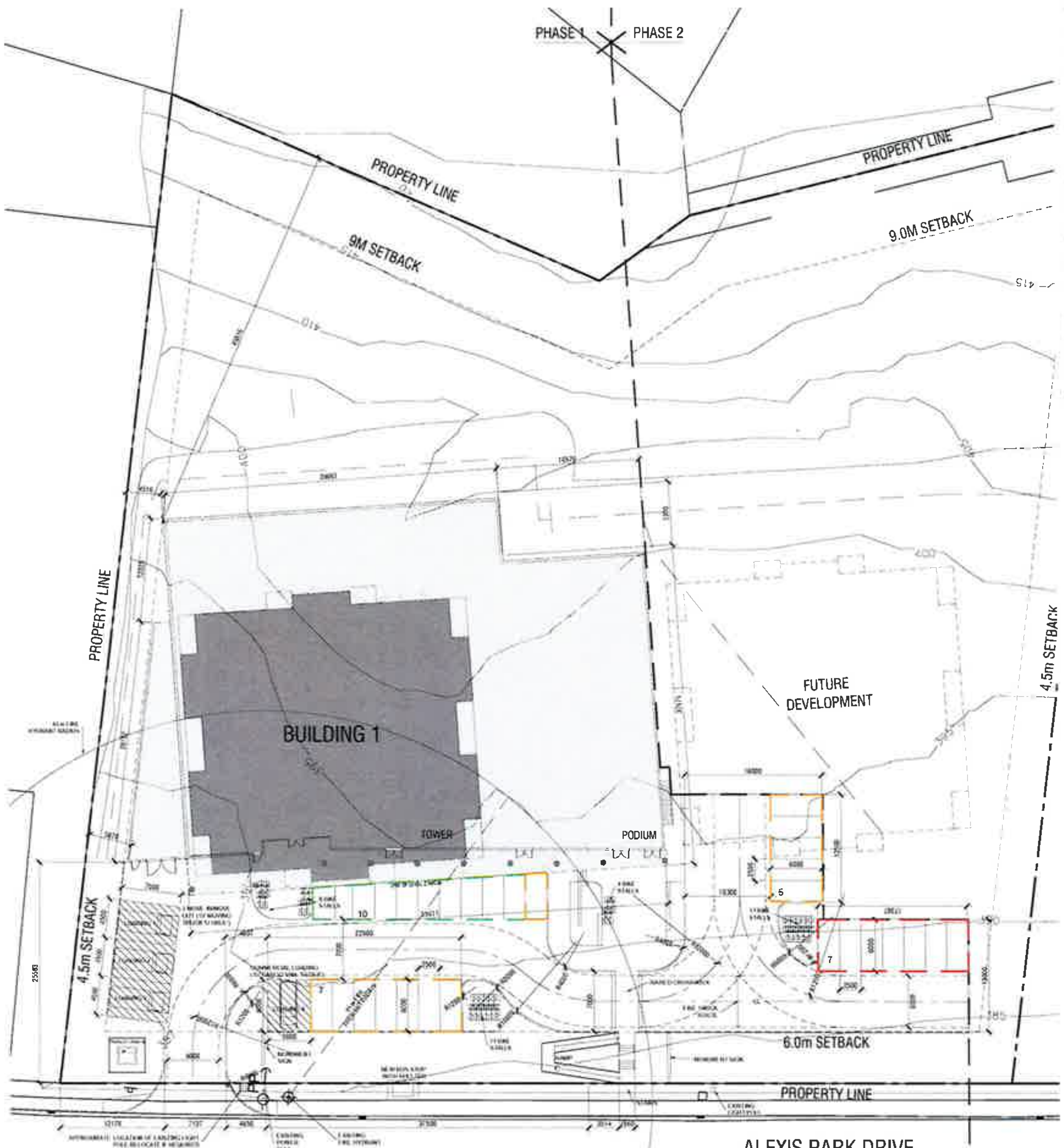
* * * * * *

We trust that this review has been completed to your satisfaction. If you have any questions regarding this memo, please contact me at 604.631.9671 or email me at souzan.saadat@wsp.com.

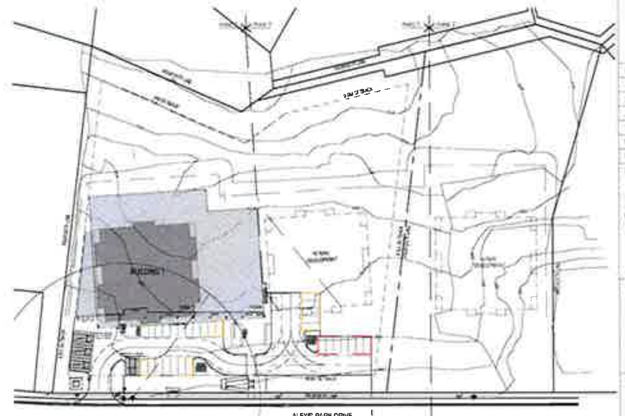
Yours sincerely,

Souzan Saadat, M.Eng., P.Eng., PTOE
Transportation Planning Engineer
SS

2022-07-21



1 SITE PLAN
A100 1:250



1 OVERALL SITE PLAN
A100 NTS

PROJECT INFORMATION:

ADDRESS: 3401, 3351 ALEXIS PARK DR

LEGAL DESCRIPTION: LOTS 1&2 PLAN KAP5/410

SITE AREA: 11,612.3 m2 (1.16 ha) 124,993 SF

ZONING: RH3 (HIGHRISE APARTMENT RESIDENTIAL)

HEIGHT:

PROPOSED HEIGHT: **33.76m**

SETBACKS:

FRONT SETBACK: 6.0M
REAR SETBACK: 9.0M
SIDE SETBACK: 4.5M

PHASE 1: TOTAL 91 UNITS

BUILDING:

RESIDENTIAL

LEVEL 1 -	204.2 m2 (2,198 SF)	
LEVEL 2 -	73.3 m2 (789 SF)	
LEVEL 3 -	830.6 m2 (8,940 SF)	- 10 units
LEVEL 4 -	978.9 m2 (10,537 SF)	- 12 units
LEVEL 5 -	978.9 m2 (10,537 SF)	- 12 units
LEVEL 6 -	978.9 m2 (10,537 SF)	- 12 units
LEVEL 7 -	978.9 m2 (10,537 SF)	- 12 units
LEVEL 8 -	978.9 m2 (10,537 SF)	- 12 units
LEVEL 9 -	978.9 m2 (10,537 SF)	- 12 units
LEVEL 10 -	[illegible]	[illegible]
TOTAL -	**7,727.6 m2 (83,179 SF)**	**- 91 units**

RETAIL
LEVEL 1 - **462.2 m2 (4,975 SF)**

AMENITY (INDOOR)

LEVEL 3 - **149.0 m2 (1,604 SF)**
LEVEL 10 - **86.3 m2 (929 SF)**

TOTAL AREA: 8,425.1 m2 (90,687 SF)

UNIT TYPES

UNIT A - 2 BEDROOM (TWO BATH)
30 UNITS - 88.43 sm (952 sf)

UNIT B - 1 BEDROOM + DEN (TWO BATH)
14 UNITS - 72.18 sm (777 sf)

UNIT C - 1 BEDROOM
31 UNITS - 59.92 sm (645 sf)

UNIT D - 1 BEDROOM+DEN (1 BATH)
16 UNITS - 66.98 sm (721 sf)

AMENITY REQUIRED:

1 BEDROOM DWELLINGS: 10 m2/ 1 UNIT = 61 UNITS X10 m2 = 610 m2 (6,566 SF)
2 BEDROOM DWELLINGS: 15 m2/ 1 UNIT = 30 UNITS X15 m2 = 450 m2 (4,843 SF)
TOTAL REQUIRED: 1,060 m2 (11,409 SF)

AMENITY PROVIDED:

AMENITY (UNIT BALCONIES)

UNIT A - **9.08 m2 (97.8 SF) X 30 UNITS = 272.4 m2 (2932 SF)**
UNIT B - **6.05 m2 (65.1 SF) X 14 UNITS = 84.7 m2 (912 SF)**
UNIT C - **6.27 m2 (67.5 SF) X 31 UNITS = 194.37 m2 (2092 SF)**
UNIT D - **6.05 m2 (65.1 SF) X 16 UNITS = 96.8 m2 (1,042 SF)**
TOTAL: 91 UNITS = 648.27 m2 (6,978 SF)

AMENITY (INDOOR)

LEVEL 3 - **149.0 m2 (1,604 SF)**
LEVEL 10 - **86.3 m2 (929 SF)**
TOTAL: 235.3 m2 (2,533 SF)

AMENITY (OUTDOOR)

LEVEL 3 - **955.52 m2 (10,285 SF)**
LEVEL 10 - 115.49 **m2 (1,243 SF)**
TOTAL: 1,071.01 **m2 (11,528 SF)**

TOTAL AMENITY AREA: 1,942.48 m2 (20,909 SF)

PARKING:

PARKING REQUIRED BY ZONING BYLAW:
[illegible]
2BED 30 UNITS X 1.5 STALLS PER UNIT 45 STALLS
TOTAL: **121 STALLS**

VISITOR PARKING REQUIRED BY ZONING BYLAW:
[illegible] **13 STALLS**

RETAIL PARKING REQUIRED BY ZONING BYLAW:
2 STALLS PER 100SM GFA - 462.2 / 100 - 4.622 X 2 - **9 STALLS**

TOTAL PARKING REQUIRED: 143 STALLS

PARKING PROVIDED:
PARKADE:
LEVEL 1: [illegible] STALLS
[illegible] TANDEM STALLS
([illegible] in stall allotted to [illegible] adjoining [illegible] stall)
LEVEL 2: [illegible] STALLS
TOTAL: **88 STALLS**

SURFACE PARKING: 29 STALLS

TOTAL PARKING PROVIDED: 117 STALLS
(SHORT STALLS PROVIDED: 26 STALLS (22.2%)

DEFICIT PARKING STALLS:
143 STALLS - 117 STALLS - **26 STALLS (+18.1%)**

BICYCLE PARKING:
CLASS 1 (interior) STALLS: 60
CLASS 2 (exterior) STALLS : 34

TOTAL = 94 STALLS

LOADING REQUIRED BY ZONING BYLAW:

RESIDENTIAL
1 STALL PER 2,000 SM GFA - 7,727.6 / 2,000 - **3 STALLS**

COMMERCIAL
1 STALL PER 1,900 SM GFA - 462.2 / 1,900 - **1 STALL**

TOTAL LOADING STALLS PROVIDED = 4 STALLS

PARKING ALLOTMENT

SURFACE PARKING:
9 RETAIL STALLS
13 VISITOR STALLS
7 RESIDENTIAL STALLS

PARKADE PARKING:
TOTAL = 88 RESIDENTIAL STALLS

arc STUDIO

Josan Properties

NORTH

No	Issue Date	Description
5	[illegible]	REVISIONS DP
4	2022-06-23	SITE PLAN REVISION
3	2022-03-18	D.P. AMENDMENT
2	2022-02-22	RE-ISSUED FOR D.P.
1	2021-09-08	ISSUED FOR D.P.

ISSUES

DISCLAIMER

[illegible] DIMENSIONS. ADVISE ARCHITECT IN WRITING OF ANY DISCREPANCIES. FAILURE TO DO SO SHALL NOT BE GROUNDS FOR EXTRA COSTS.
[illegible] EITHER SEALED OR ADVISED IN WRITING BY THE ARCHITECT. THESE DRAWINGS ARE INSTRUMENTS OF THE ARCHITECTS SERVICES TO THE CLIENT. DESIGN AND DRAWINGS AT ALL TIMES REMAINS THE EXCLUSIVE PROPERTY OF ARC STUDIO [illegible]

PROJECT

ALEXIS PARK DRIVE
MIXED USE RESIDENTIAL
DEVELOPMENT PHASE 1

DRAWING TITLE

SITE PLAN

DRAWN: JD CHECKED: JD
DATE: JD SCALE: AS NOTED

PROJECT NO: 00076
SHEET NO: A100