



ENGINEERING LIMITED

1210 Fourth Avenue
Prince George, B.C. V2L 3J4
Tel. (250) 562-1977
Fax (250) 562-1967

Peace River Regional District
9505 – 100 Street
Fort St. John, BC V1J 4N4

Date: April 5th, 2023
L&M Project: 1338-06

Attention: Ashley Murphey, Planning Services Manager

Reference: Wade Group Developments – Zoning Bylaw Amendment Application

PID: 030-260-795 Legal Description: Lot 2 Section 25 Township 84 Range 20 West of the 6th Meridian Peace River District Plan EPP74992

Dear Ashley,

We are pleased to submit a new Zoning Bylaw Amendment Application package for the above-referenced properties. Enclosed with this letter you will find the following information:

- Zoning Bylaw Amendment Application;
- Contaminated Site Declaration Form;
- Certificate of Title CA6277801:
 - Covenant CA6277802
- Application Drawings:
 - RZ:01: Title Page & Location Map
 - RZ:02: Aerial Photo & Existing OCP
 - RZ:03: Existing & Proposed Zone
- L&M Engineering Servicing Brief.

SUBJECT PROPERTY

The subject property is approximately 28.4 hectares (ha) in size and is entirely located within the boundaries of the Peace River Regional District. The subject property is currently zoned A-2 (Large Agricultural Holdings) in the *Peace River Regional District Zoning Bylaw No. 1000, 1996* and is currently designated Community Residential (CR) Land Use in the *North Peace Fringe Area Official Community Plan Bylaw No. 2460, 2021*.

This Zoning Bylaw Amendment Application has been submitted in order to facilitate the development of 8 rural residential lots.

Surrounding Land Uses

The surrounding existing land uses are summarized below for clarity and convenience:

	Official Community Plan Future Land Use	Zoning Bylaw	Existing Use
North	Agriculture (AG)	R-3 (Residential 3 Zone)	Rural residential uses
South	Community Residential (CR)	A-2 (Large Agricultural Holdings Zone)	Rural residential uses
East	Park, open space, natural environment (OS)	C-4 (Recreational Commercial Zone)	Rural residential uses and a golf course
West	Community Residential (CR)	A-2 (Large Agricultural Holdings Zone)	Rural residential uses

Proposed Land Use

The property owner would like to subdivide a portion of the property to facilitate the development of 8 rural residential lots that will consist of single-family homes. The lots will be accessed directly off of Golf Course Road and will utilize the existing community sewage system. This is consistent with the existing single-family development that is located along Golf Course Road to the North of the subject property.

OFFICIAL COMMUNITY PLAN

The Subject Area is currently designated as a Community Residential Land Use in the Peace River Regional District OCP (see RZ:02). The proposed 8 single family lots are entirely consistent with the long-range policy direction of the OCP and as such, no amendment is required thereto.

ZONING BYLAW

The subject property is currently zoned A-2 (Large Agricultural Holdings Zone). In order to facilitate the development of rural single-family development on the subject property, an amendment to the Zoning Bylaw is required. **This application proposes to rezone 4.35 ha of the subject property A-2: Large Agricultural Holdings Zone to R-2: Residential 2 Zone.**

AGRICULTURAL LAND RESERVE

The subject property is currently within the Agricultural Land Reserve and is subject to ALC Application 52082, Resolution #145/2011. This Resolution permitted the parcel to the South (PID: 029-241-316) to be excluded from the ALR in 2014 and indicates that once the subject property

is appropriately zoned for a medium to high density residential zone it will then be excluded from the ALR. An additional letter from the ALC is forthcoming and will indicate support for the proposed zoning amendment on a portion of the parcel to R-2. The support is given with the notion that the remainder of the parcel will be zoned A-2 until such time that there is adequate sewer infrastructure to facilitate a higher density project. If the portion of the subject property is successfully zoned to R-2 through this proposed Zoning Bylaw Amendment Application process, it will subsequently be excluded from ALR through Resolution #145/2011 and the pending supplemental letter.

SERVICING

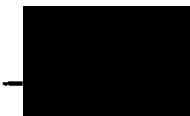
L&M has prepared a Servicing Brief that outlines the serviceability of the proposed land use amendment area. As per the enclosed Servicing Brief, the future 8 lot subdivision can be adequately serviced with individual groundwater wells or potable water cisterns located on each lot and by the existing Charlie Lake sewer system. Future stormwater runoff will be managed by the open channel ditch drainage system along Golf Course Road.

SUMMARY

Thank you for the opportunity to submit this application. We look forward to the PRRD's review and the Board's future consideration of this application. If you have any questions or require additional information, please do not hesitate to contact the undersigned directly at your convenience.

Sincerely,

L&M ENGINEERING LIMITED



Ashley Thandi, BPI
Community Planner

Copies To: Larry Wade, Wade Group Developments
Jamie Schenkeveld, P.Eng, L&M Engineering Limited.

Enclosures: As Noted.



For Office Use:
Receipt # _____
Date Received _____
File No. _____
Sign Issued: Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/>

Application for Development

1. TYPE OF APPLICATION

	FEE
<input type="checkbox"/> Official Community Plan Bylaw Amendment*	\$ 1,150.00
<input checked="" type="checkbox"/> Zoning Bylaw Amendment* #	\$ 800.00
<input type="checkbox"/> Official Community Plan / Zoning Bylaw Amendment combined* #	\$ 1,200.00
<input type="checkbox"/> Temporary Use Permit*	\$ 500.00
<input type="checkbox"/> Temporary Use Permit Renewal	\$ 350.00
<input type="checkbox"/> Development Permit #	\$ 165.00
<input type="checkbox"/> Development Variance Permit	\$ 165.00

* Sign is required for this application type.

Sign provided by the PRRD and posted pursuant to Section 6 of Bylaw No. 2449, 2021, attached.

Contaminated Site Declaration Form required for this application type.

- Exclusion from the Agricultural Land Reserve \$ 1,500.00
(Applicant responsible for additional costs associated with the advertisements, signage, and facility rental, if applicable)

2. PLEASE PRINT

Property Owner's Name Larry Wade	Authorized Agent of Owner (if applicable) L&M Engineering Limited
Address of Owner [REDACTED]	Address of Agent [REDACTED]
City/Town/Village: [REDACTED]	City/Town/Village: [REDACTED]
Postal Code: [REDACTED]	Postal Code: [REDACTED]
Telephone Number: [REDACTED]	Telephone Number: [REDACTED]
E-mail: [REDACTED]	E-mail: [REDACTED]

Notice of collection of personal information:

Personal information on this form is collected for the purpose of processing this application. The personal information is collected under the authority of the *Local Government Act* and the bylaws of the PRRD. Documentation/Information submitted in support of this application can be made available for public inspection pursuant to the *Freedom of Information and Protection of Privacy Act*.

3. PROPERTY DESCRIPTION

Full legal description and PID of each property under application	Area of each lot	
PID: 030260795, Legal: Lot 2 Section 25 Township 84 Range 20 West of the 6th Meridian Peace River District Plan EPP74992	28.4/70.3	ha./acres
		ha./acres
		ha./acres
	TOTAL AREA	28.4/70.3 ha./acres

4. Civic Address or location of property: _____

5. PARTICULARS OF PROPOSED AMENDMENT

Please check the box(es) that apply to your application type:

Official Community Plan (OCP) Bylaw amendment:

Existing OCP designation: _____

Proposed OCP designation: _____

Text amendment: _____

Zoning Bylaw amendment:

Existing zone: A-2 (Large Agricultural Holdings)

Proposed zone: R-2 (Residential Zone) on a portion of the parcel along Golf Course Road (See attached zoning amendment drawing set)

Text amendment: _____

Development Variance Permit – describe proposed variance request:

Temporary Use Permit – describe proposed use:

Development Permit: Bylaw No. _____ Section No. _____

6. Describe the existing use and buildings on the subject property:

Currently vacant land

7. Describe the existing land use and buildings on all lots adjacent to and surrounding the subject property:

- (a) North R-3 and R-2, rural residential uses
- (b) East C-4, golf course
- (c) South A-2, vacant land and rural residential uses
- (d) West A-2, R-3, rural residential uses

8. Describe your proposal. Attach a separate sheet if necessary:

See attached cover letter

9. Reasons and comments in support of the application. Attach a separate sheet if necessary:

See attached cover letter

10. Describe the proposed and/or existing means of sewage disposal for the property:

See attached cover letter

11. Describe the proposed and/or existing means of water supply for the property:

See attached cover letter

THE FOLLOWING INFORMATION IS REQUIRED DEPENDING ON THE PROPOSAL/APPLICATION:

12. Proof of ownership of the subject property or properties. (For example: Certificate of State of Title, BC Land Title Office Property Title Search or recent Property Tax Notice.)
13. A Sketch Plan of the subject property or properties, showing the following:
 - (a) the legal boundaries and dimensions of the subject property;
 - (b) boundaries, dimensions and area of any proposed lots (if subdivision is being proposed);
 - (c) the location and size of existing buildings and structures on the subject property, with distances to property lines;
 - (d) the location and size of any proposed buildings, structures, or additions thereto, with distances to property lines;
 - (e) the location of any existing sewage disposal systems;
 - (f) the location of any existing or proposed water source.

ADDITIONAL OR MORE DETAILED INFORMATION MAY BE REQUESTED BY THE PEACE RIVER REGIONAL DISTRICT FOLLOWING REVIEW OF YOUR APPLICATION.

If it is necessary for the property boundaries and the location of buildings and structures to be more accurately defined, a survey plan prepared by a British Columbia Land Surveyor may be required.

15. I / We the undersigned hereby declare that the information provided in this application is complete and is, to the best of my / our knowledge, a true statement of the facts related to this application.



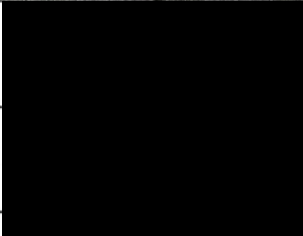
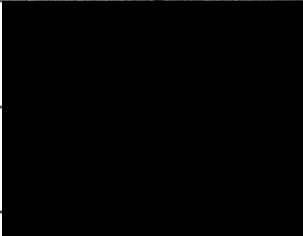
Signature of Owner

03/23/2023
Date signed

03/23/23
Date signed

16. **AGENT'S AUTHORIZATION**

If you have an agent act on your behalf in submission of this application, the following authorization **MUST** be signed by **ALL** property owners.

I / We <u>Larry Wade</u> and <u>Wade Group Development Ltd</u> hereby authorize (name of landowner) (name of landowner)	
<u>L&M Engineering Ltd.</u> to act on my/our behalf regarding this application. (name of agent)	
Signature of Owner: 	Date: <u>22/03/2023</u>
Signature of Owner: 	Date: <u>22/03/2023</u>



CONTAMINATED SITE DECLARATION FORM

I, Lawrence John Wade, hereby acknowledge that the *Environmental Management Act*, 2003, as amended, is effective as of February 1, 2021.

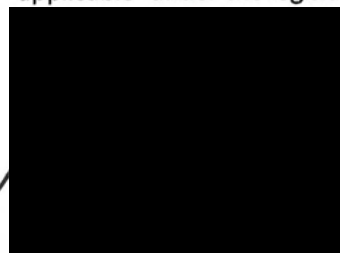
Legal Description(s):

PID: 030-260-795, Legal: Lot 2 Section 25 Township 84 Range 20 West of the 6th Meridian Peace River District Plan EPP74992

Please check only one:

- I have read [Schedule 2](#) and based on my personal knowledge of the property in question, I do not believe that it is or has been used for any of the industrial or commercial purposes and activities specified in [Schedule 2](#) of the regulations. Accordingly, I elect not to complete and submit a 'site disclosure statement', as outlined in Section 40.(1) of the Act.
- I have read [Schedule 2](#) and one or more of the identified purposes or activities is or has occurred on the land(s) legally described above.
*Please contact staff to submit a "site disclosure statement" at planning@prrd.bc.ca

I further acknowledge that this declaration does not remove any liability, which may otherwise be applicable under the legislation.



22/03/2023
dd mm yyyy

22/03/2023
dd mm yyyy

WADE GROUP DEVELOPMENTS LTD.

CHARLIE LAKE, BC

REZONING APPLICATION DRAWINGS

DRAWING INDEX

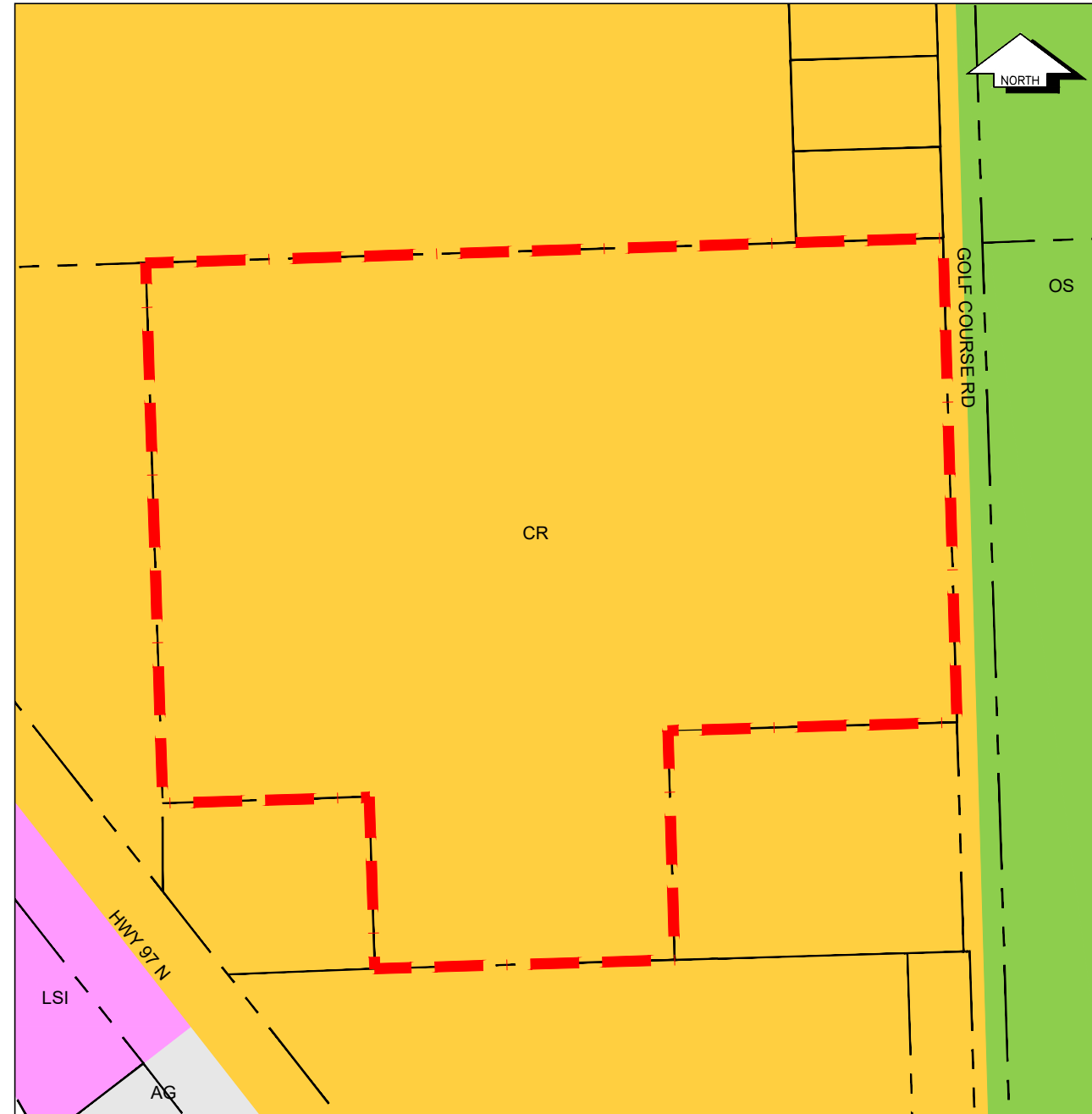
Dwg No.	Rev.	Description
RZ:01	0	TITLE PAGE
RZ:02	0	AERIAL PHOTO & EXISTING OCP
RZ:03	0	EXISTING & PROPOSED ZONING

 1210 Fourth Avenue
Prince George, B.C. V2L 3J4
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Fax (250) 562-1967
ENGINEERING LIMITED
PLANNING CENTRE

PROJECT No.:	1338-06
DATE:	27/03/23
PLANNER:	AKT
ENGINEER:	JSS
DESIGNER:	MM



AERIAL PHOTO
SCALE 1:5000



EXISTING FUTURE LAND USE
SCALE 1:5000

PROPERTY INFORMATION		
PID	LEGAL	TOTAL AREA
030260795	LOT 2 SECTION 25 TOWNSHIP 84 RANGE 20 WEST OF THE 6th MERIDIAN PEACE RIVER DISTRICT PLAN EPP74992	284625.94 m ² (28.43 ha)

LEGEND

--- SUBJECT AREA BOUNDARY

FUTURE LAND USE

- CR - COMMUNITY RESIDENTIAL
- OS - PARK, OPEN SPACE, NATURAL ENVIRONMENT
- LSI - LIGHT SERVICE INDUSTRIAL
- AG - AGRICULTURE

NO.	DATE	REVISION	DR.



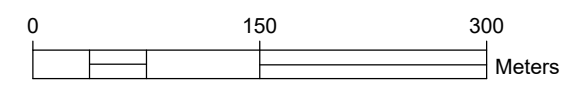
DRAWN:	MW
CHECKED:	AKT
ENGINEER:	JSS
PLANNER:	ANE
DRAWING FILE:	C3D23-1338-06_RZ.dwg
DATE:	27/03/23
SCALES:	AS NOTED

WADE GROUP DEVELOPMENTS LTD.
CHARLIE LAKE

AERIAL PHOTO &
EXISTING OCP

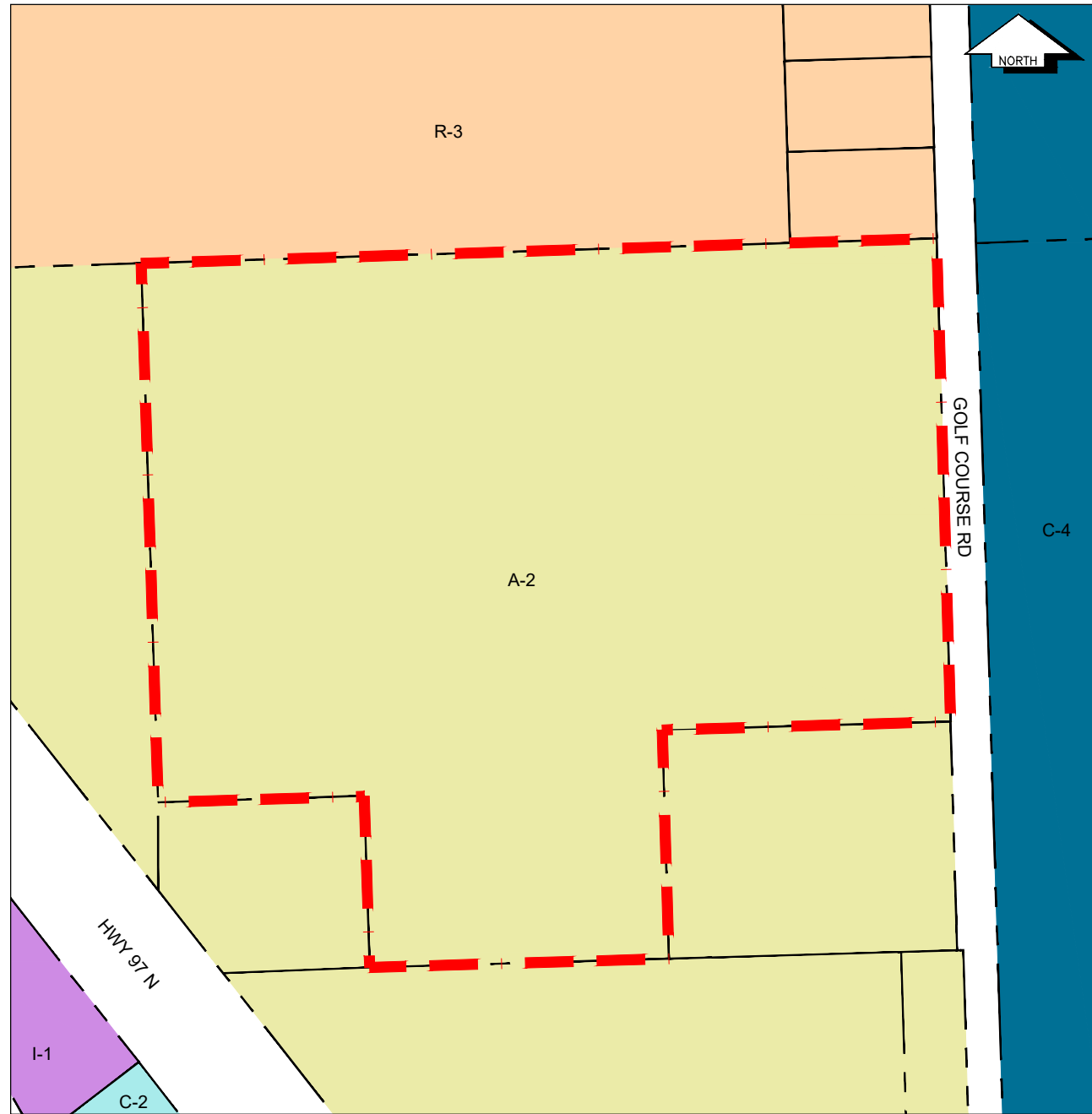
L&M PROJECT No.
1338-06

DRAWING No.
RZ:02

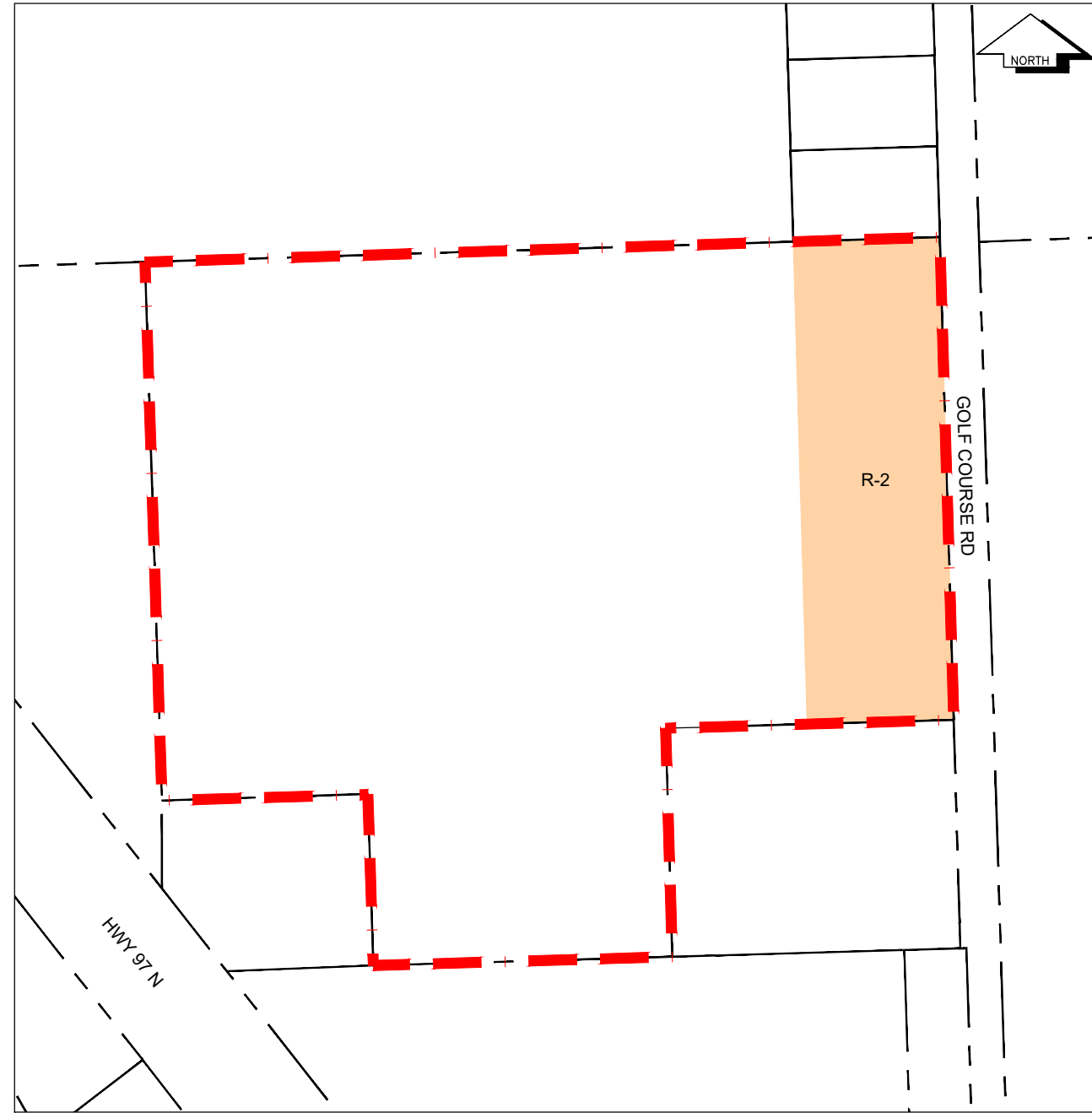


SHEET No. 2 of 3	REV. No. 0
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EXISTING ZONING
SCALE 1:5000



PROPOSED ZONING AMENDMENT
SCALE 1:5000

LEGEND

--- SUBJECT AREA BOUNDARY

CoPG ZONING

- C-4 RECREATIONAL COMMERCIAL ZONE
- A-2 LARGE AGRICULTURAL HOLDINGS ZONE
- R-2 RESIDENTIAL 2 ZONE
- R-3 RESIDENTIAL 3 ZONE
- C-2 GENERAL COMMERCIAL ZONE
- I-2 LIGHT INDUSTRIAL ZONE

NO.	DATE	REVISION	DR.



DRAWN:	MM
CHECKED:	AKT
ENGINEER:	JSS
PLANNER:	AKT
DRAWING FILE:	C3D23-1338-06_RZ.dwg
DATE:	27/03/23
SCALES:	AS NOTED

WADE GROUP DEVELOPMENTS LTD.
CHARLIE LAKE
EXISTING & PROPOSED ZONING

L&M PROJECT No.
1338-06
DRAWING No.
RZ:03

SHEET No. 3 OF 3	REV. No. 0
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ZONING AMENDMENT SUMMARY CHART				
PID	LEGAL	TOTAL AREA	AMENDMENT AREA	PROPOSED ZONING
030260795	LOT 2 SECTION 25 TOWNSHIP 84 RANGE 20 WEST OF THE 6th MERIDIAN PEACE RIVER DISTRICT PLAN EPP74992	284625.94 m ² (28.43 ha)	43512.9 m ² (4.35 ha)	R-2 RESIDENTIAL 2 ZONE

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April 2023

SERVICING BRIEF

REZONING AMENDMENT APPLICATION

**LOT 2 SECTION 25 TOWNSHIP 84 RANGE 20 WEST OF THE 6TH MERIDIAN
PEACE RIVER DISTRICT PLAN EPP74992
PID: 030-260-795**

**Client: Wade Group Developments Ltd., INC.NO. 873824
L&M Project No.: 1338-06**

**L&M Engineering Limited
1210 Fourth Avenue, Prince George, BC V2L 3J4
Phone: (250) 562-1977**

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- Appendix A: Conceptual Site Plan**
- Appendix B: Existing Well Water Reports**
- Appendix C: Catchment Areas Plan**
- Appendix D: HydroCAD 10.00 Storm Water Modeling**

1.0 INTRODUCTION

On behalf of Wade Group Development Ltd, L&M Engineering Limited (L&M) is pleased to submit this Servicing Brief for the subject property with PID 030-260-795, located in the Peace River District (PRRD), in support of a Zoning Bylaw Amendment application. The Zoning Bylaw Amendment application proposes to amend approximately 4.35 ha of the total 28.4 ha from **A-2: Large Agricultural Holdings** to **R-2: Residential 2 Zone** in the *Peace River Regional District Zoning Bylaw No. 1000, 1996*. The subject property is currently designated Community Residential (CR) Land Use in the *North Peace Fringe Area Official Community Plan Bylaw No. 2460, 2021*.

This Servicing Brief has been prepared to summarize the existing utilities in the surrounding area and demonstrate how the property can be adequately serviced with private water supply, sanitary sewer, and storm infrastructure.

2.0 BACKGROUND DATA AND REPORTS

L&M Engineering has reviewed the following reports and information in relation to the proposed rezoning amendment application:

- BC Water Resources Atlas
- Sewerage System Standard Practice Manual 3 – September 2014
- LIDAR Survey Mapping
- Peace River Regional District Interactive Web Map
- BC Sewage System Regulation
- Urban Systems, Charlie Lake Collection System Capacity Assessment Model Tool Assumptions Memorandum, December 8, 2022

3.0 EXISTING SITE CONDITIONS

3.1 TOPOGRAPHY

The site terrain slopes from the southwest property boundary to the northeast property boundary. The property has been mostly cleared and is used for agricultural purposes. There is a distinct treed area in the mid-north section of the subject property that consists of a steeper natural drainage channel that accommodates surface runoff. The zoning amendment area has been generally cleared, and the existing grades range from 3% to 8% (decreasing west to east) towards Golf Course Road.

3.2 DEVELOPMENT ACCESS

The subject property has direct frontage access to Golf Course Road along the west parcel boundary. Access to the proposed new lots will be provided off Golf Course Road as shown on the Conceptual Site Plan under Appendix A.

3.3 EXISTING SERVICES

The subject property is currently included in the Charlie Lake Sewage Service Area as shown on Schedule D of the *Peace River Regional District Subdivision and Development Servicing Bylaw No. 2474, 2022*. The Charlie Lake Sewage System is a septic tank effluent pumping (STEP) sewage collection system, operated by the Peace River Regional District.

In reference to the Charlie Lake Collection System Capacity Assessment Model Tool Assumptions Memorandum (Urban Systems, 2022), there are isolated limitations identified within the western branch of the sewer system which is downstream of the proposed development connection locations. The report identifies Branch 16 as the restrictive branch with an estimated availability of 25 new connections and notes that the receiving lift station can accommodate 90 new connections. The report indicates that the number of existing connections was based on information obtained from the PRRD GIS database in August 2016. For this assessment, L&M assumes that 25 new connections at 0.04 L/s (0.63 US gpm) would result in a maximum available instantaneous flow through Branch 16 of approximately 1 L/s (15.8 US gpm).

There is no existing community water system available in this area. L&M has been informed by the PRRD that the consistency and availability of accessible groundwater may be limited. As such, it is common for lots in this area to be serviced with cisterns. A review of the surrounding area was conducted using BC Groundwater Resources Atlas. The subject property is positioned over Aquifer 1271 which is mapped as having an area of 705.8 km². Aquifer 1271 material type is bedrock, with a subtype material consisting of fractured sedimentary rock. The aquifer is classified as having moderate productivity, moderate vulnerability to contamination, and the demand is unknown.

Groundwater well construction reports were collected for five wells within aquifer 1271 surrounding the subject property. Copies of the Well Log Reports are enclosed under Appendix B. The well log information is summarized in Table 1 below:

Table 1: Well Log Summary				
Aquifer	Well Tag	Depth (ft)	Diameter (mm)	Yield (US gpm)
1271	126915	75 ft	150 mm	30 US gpm
1271	116517	70 ft	150 mm	100 US gpm
1271	60110	74 ft	150 mm	16 US gpm
1271	102810	113 ft	150 mm	20 US gpm
1271	102813	149 ft	150 mm	4 US gpm

As can be seen in Table 1, for wells within proximity of the subject property and including (1) within the subject property, Aquifer 1271 has recorded production rates ranging from approximately 4 US gpm to 100 US. The historical well information collected provides evidence that the zoned area will likely have access to a productive groundwater source. In the event that groundwater is not available, a cistern to be routinely filled from a potable water source can be installed. The recommended minimum volume of the cistern is 1,500 US gal, which equates to approximately 6 days of the average domestic use for a four-bedroom dwelling (SPM.V3, 2014).

4.0 DESIGN POPULATION

The design population for this Servicing Brief was calculated using rates established by the Northern Health Authority requirements for a 4-bedroom home which is 4.5 people per dwelling. The future subdivision population for the subject property is as follows:

Table 2: Design Population				
Development Area	Land Use	Number of Lots	Occupancy Per Dwelling	Estimated Population
4.35 Ha	Rural Single Family	8	4.5	36

5.0 WATER AVAILABILITY ASSESSMENT

5.1 Domestic Water

The domestic water supply for the proposed new lots is proposed to be provided by either groundwater wells or individual cisterns if/ or where required. The *Peace River Regional District Bylaw 2474, 2022* indicates an average daily demand of 600 L/d/c is required. As the subject area is not on a community water system, an average daily demand of 350 L/d/c (SPM.V3, 2014) was implemented with consideration for household demand only (excluding irrigation).

This results in a per dwelling daily demand of 1,575 L/d. Groundwater wells intended to service a four-bedroom dwelling should provide a minimum yield of 5 US gpm to provide peak demand flow, which is supported by historical well records. If the groundwater well has a minimum yield of 3 US gpm or less, increased pressurized expansion tank volume to supplement peak hour demand volumes should be considered.

Where a cistern is required or implemented, the ideal maximum retention time is 3-4 days to ensure water is fresh and any chlorine residuals from municipal water systems are maintained. This results in a minimum recommended water storage capacity for a 4-bedroom dwelling of 6,300 L (1,660 US gal) and a maximum recommended water storage capacity of 11,000 L (2,900 US gal).

Table 3: Estimated Domestic Water Demands for 8 Lots			
Variable	Result		Notes
People per Dwelling	4.5	ppl	SPM. V3, 2014
Domestic Avg Daily Demand	350	L/d/c	SPM. V3, 2014
Maximum Daily Demand	1,575	l/d	= Ppl/ dwelling * Domestic Avg Daily Demand
Min. Recommended Water Storage Capacity	6,300	L	4 days minimum
Max. Recommended Water Storage Capacity	11,000	L	7 days maximum

6.0 SANITARY COLLECTION SYSTEM

L&M Engineering Limited has completed a review of the available reports and information on the Charlie Lake Sewer (STEP) System and determined that sewage design flows the initial phase of development, consisting of 8 lots can be accommodated provided certain discharge rates are maintained.

6.1 Daily Design Flows

The sanitary daily design flow for the proposed zoning area has been established based on the Sewage System Standard Practice Manual V.3 (SPM.V3). The SPM.V3 suggests a per capita flow rate of 350L/d/p and an occupancy of 4.5 people per 4-bedroom dwelling resulting in a daily design flow of 1,575L/d per 4-bedroom dwelling.

6.2 Sanitary Design Flows

The proposed zoning area has an estimated development density of 8 residential lots, resulting in a totally daily design flows are 12,600 l/d (MMCD) which is an average daily flow of 0.14 L/s (2.35 US gpm).

The Charlie Lake Sanitary Sewer System has identified capacity restrictions with the most restrictive being Branch 16 at 15.8 US gpm (Urban Systems, 2022). In order for the proposed development to be serviced by the community STEP sewage system, each lot would need to discharge at a maximum of approximately 2 US gpm to avoid exceeding the capacity of Branch 16. This discharge rate is inadequate to ensure cleansing velocity, therefore, dwellings will be restricted to a maximum discharge rate of 15 US gpm with a minimum pump chamber capacity equal to three times the daily design flow for the dwelling. The calculation for the estimated daily design flows are summarized in Table 3.

Table 3: Estimated Sewage Design Flow Demands (Per Lot)			
Variable	Result		Notes
Population	4.5	ppl	Ppl per dwelling
Domestic Avg Daily per Capita	350	l/d	Peace River RD Servicing Bylaw 2474, 2022
Total Avg. Daily Design Flow	1575	l/d	= Population * Avg. Flow per Capita
Permitted Discharge	15	US gpm	Permitted discharge/ Lot to Branch 16
Septic Tank Volume per Lot	4,725	L	= 3 * Avg. Daily Design Flow
Pump Tank Volume per Lot	4,725	L	= 3 * Avg. Daily Design Flow

6.3 Sewage System Recommendations

The recommended method of sewage treatment and disposal to support future development will be with a septic tank effluent pumping (STEP) sewage collection system on each future lot. Each individual lot tank system will be connected to the Charlie Lake Community STEP System. Each lot will have a two-compartment septic tank and a single-compartment pump tank. Each tank must be designed to accommodate a minimum of three times the daily design flow. For a typical four-bedroom dwelling (SPM.V3, 2014), this results in a minimum tank size of 4,725 L (1,250 US gal). Wastewater from each future dwelling will flow by gravity to the first septic tank, which will allow solids to settle and effluent to pass through an effluent filter and into the pump tank. The pump tank will ensure a maximum discharge rate of 15 US gpm per lot into the Charlie Lake Community STEP system for a maximum period of 1.5hrs per day to ensure flows from the proposed development do not exceed the capacity within Branch 16.

Each future residence will be required to acquire a Ministry of Health Sewerage System Record and receive a Letter of Certification from the Qualified Professional prior to discharge to the Charlie Lake Sewage System.

7.0 STORM WATER SYSTEM

7.1 Existing System

The existing storm water conveyance system surrounding the subject area consists of an open channel ditch drainage system for the road network. The general flow of storm water conveyance is in a southwest to northeast direction. Eventually the storm water is discharged into Charlie Lake near the intersection of Golf Course Road and the golf course entrance road.

L&M has prepared a catchment plan for the proposed development based on the existing topography that flows toward the Golf Course Road ditch network. The area was separated into three drainage catchments. The North Catchment Area encompasses the majority of the subject property but only a small portion of the proposed development. The Central Catchment Area is 3.0 Ha and encompass the majority of the proposed lots. The South Catchment Area is 4.5 Ha and encompasses two and half of the proposed lots as well as the overland flow from the adjacent property to the south. The storm runoff travels across all catchment areas in a northeast direction and directly into the north-flowing Golf Course Road ditch. There is culvert for each catchment area, that directs the flows from the west ditch across the road to the east ditch. The catchment plan is enclosed in Appendix C.

Additional, within the subject property, there are two other drainage catchment areas including one distinct natural drainage channel. These catchment areas will not be impacted by the proposed development and therefore were not analysed as part of this assessment.

7.2 Proposed Storm Servicing

The proposed plan for storm water management for proposed zoning area will be to direct overland flows following existing topography into an open channel ditch drainage system within the Golf Course Road ditch network. For the receiving ditch system on Gold Course Road, an assessment was performed to evaluate peak flows and velocities from 2, 5, 10, 25 and 100 year storm events during the pre and post-development conditions.

HydroCAD software was used to estimate the pre-and-post development peak runoffs generated during a 2, 5, 10, 25, and 100-year, 24-hour return period storm. The following inputs were used during the analysis:

Pre-Development

- Soil Class - HSG D
- CN value of 80 (Pasture/grassland/range, Good)
- Concentration Time = 15 minutes (BC MOTI TAC Supplemental)
- Storm Type: SCS Type II
- Area = 18.5 HA (Catchment Areas impacted by development)

Post-Development

- Soil Class - HSG D
- CN value of 82 (1-2 acre lots, 12% impervious)
- Concentration Time = 10 minutes (BC MOTI TAC Supplemental)
- Storm Type: SCS Type II
- Area = 18.5 HA (Catchment Areas impacted by development)

At Ministry of Transportation and Infrastructure’s (MoTI) request, the HydroCAD modelling was completed using the IDF curves provided by the IDF_CC Tool with an 80-year projection to factor in climate change (RCP 8.5 scenario).

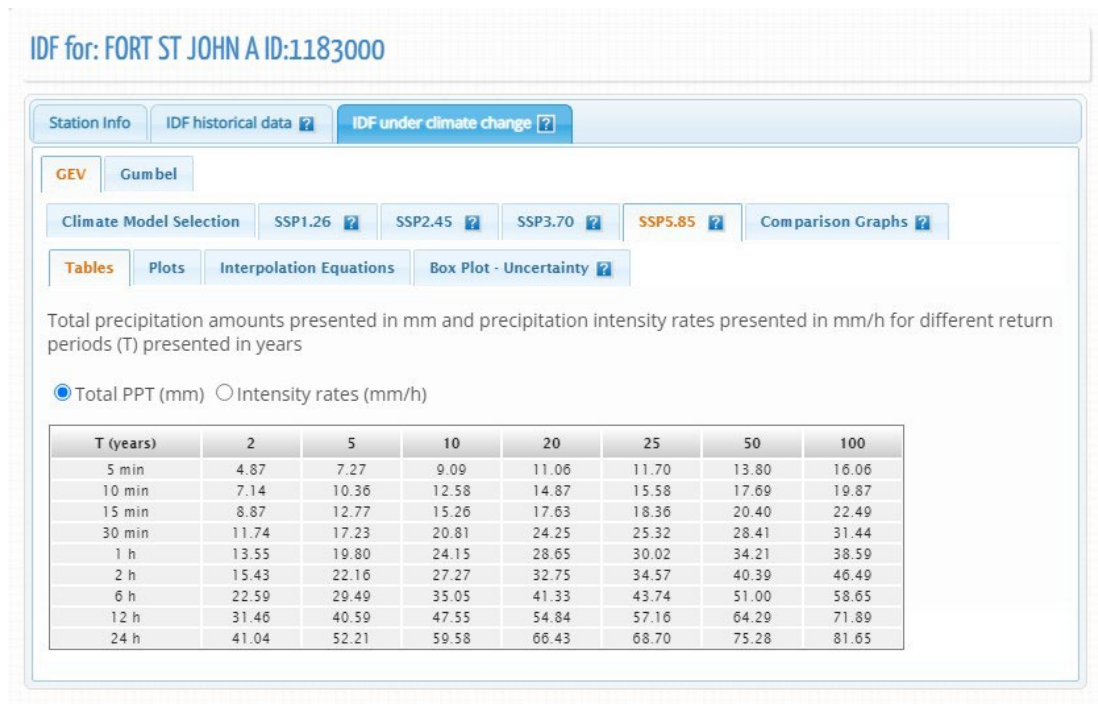


Table 4 summarizes the results from the HydroCAD analysis for a 2, 5, 10, 25, and 100-year storm events. The BC Supplement to TAC requires that all post-development discharge rates be less than or equal to the 5-year pre-development discharge rate and/or to demonstrate that the increased flow will not have a significant adverse impact on MoTI’s infrastructure. The 5-year post-development is 0.871 m³/s which is 10% higher than the pre-development flow. As illustrated in Table 4, the post-development discharge rate is similar to the pre-development flow rate for the largest storms including the 25-year and 100-year storms.

Table 4: HydroCAD Results			
Catchment Area (Ha)	Pre-Development Flow Rate	Post-Development Flow Rate	Change in Peak Flow Rate
	(m³/s)	(m³/s)	
2-Year Storm			
18.5	0.389	0.445	14.2%
5-Year Storm			
18.5	0.790	0.871	10.2%
10-Year Storm			
18.5	1.122	1.219	8.7%
25-Year Storm			
18.5	1.513	1.540	1.8%
100-Year Storm			
18.5	1.760	1.780	1.1%

In addition to analyzing the peak flow rates, the downstream ditch network was modelled to ensure that the flows would not increase the energy within the highway drainage channel. The drainage channel along the east side of the road varies in uniformity and ranges between depths of 1.0 m and 2.0 m. The analysis modelled the ditch at its most restricting point, which was at the 1.0 m depth location. The approximate side slopes of the ditch were 2:1 and the ditch bottom width was approximately 0.5m (varied between 0.3m and 0.8m). Table 5 summarizes the pre-development roadway ditch velocities and the post-development velocities.

Table 5: Peak Downstream Channel Velocities		
Roadway East Ditch Pre-Development Velocity (m/s)	Roadway East Ditch Post-Development Velocity (m/s)	Change in Velocity
2-Year Storm		
1.74	1.80	3.4%
5-Year Storm		
2.09	2.15	2.9%
10-Year Storm		
2.23	2.27	1.8%
25-Year Storm		
2.48	2.49	0.4%
100-Year Storm		
2.57	2.58	0.4%

As seen in Table 5, the post-development stormwater velocities in the road’s east ditch are similar to the pre-development stormwater velocities during all design storms. The most significant increase in velocity is 0.06 m/s during the 2yr and 5yr 24-hr event which is considered insignificant relative to the existing pre-development velocities.

The BC Supplement to TAC’s maximum permissible velocity in a vegetal-lined channel (grass-mixture) is 1.22 m/s for easily eroded soils. Based on the analysis of the pre-development eastern ditch flows, the velocities during all storm events are already above the maximum permissible velocity. Given that the theoretical post-development velocities will be within 4% of the pre-development velocities, the proposed rezoning area should not trigger improvements within the road ditch network. If erosion is taking place, consideration should be given by the Ministry of Transportation to mitigate erosion for sections of the east ditch network that exceed 1.22 m/s or for sections with visible erosion. Refer to Appendix C, for the HydroCAD modelling.

Additionally, the culverts that convey the flow from each catchment area from the west to the road’s east ditch were evaluated. Table 6 summarizes the culvert capacity during the storm events for the pre-development and post-development flow conditions.

Table 6: Existing Culvert Capacities					
Catchment Area A		Catchment Area B		Catchment Area C	
Pre-Development % of Capacity	Post-Development % of Capacity	Pre-Development % of Capacity	Post-Development % of Capacity	Pre-Development % of Capacity	Post-Development % of Capacity
2-Year Storm					
38%	39%	14%	18%	25%	27%
5-Year Storm					
70%	71%	24%	33%	45%	47%
10-Year Storm					
95%	97%	36%	44%	61%	63%
25-Year Storm					
126%	127%	48%	58%	79%	82%
100-Year Storm					
173%	175%	67%	79%	108%	112%

Although two culvert capacities are exceeded during 25-yr and/or 100-yr storm events, this is the case for both the pre-development flow conditions and the post-development flow conditions. The post-development flow conditions contribute a maximum of 4% increase to the already undersized culverts under these storm scenarios. Therefore, the proposed rezoning should not trigger developer upgrades to the existing culverts. If the estimated culvert capacities limitations under pre-development conditions are of concern, the Ministry of Transportation should consider improvements as part of their future asset planning.

8.0 SUMMARY

L&M Engineering Limited has provided a subdivision suitability assessment for the development of an 8-lot residential subdivision. It is our opinion that the proposed first phase of development, can be adequately serviced with individual groundwater wells or potable water cisterns on each lot and by the Charlie Lake STEP Sewerage System. Discharge rates from each lot will be pumped at a specified rate of not more than 15 US gpm into the Charlie Lake STEP Sewerage System. Future storm water runoff will be managed by the open channel ditch drainage system in Golf Course Road.

9.0 CLOSURE

This Servicing Brief has been prepared for the Wade Development Group Ltd. and for the benefit of the Peace River Regional District and the Ministry of Transportation and Infrastructure. The information and recommendations in the report can be relied on when making decisions on

applications for the proposed subdivision and development of the land. Any use which a third party makes of this report or any reliance on or decisions to be made based on it are the responsibility of such third parties. L&M Engineering Limited accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this study.

The information and data contained within this document represent L&M Engineering Limited's professional judgment in accordance with the knowledge and information available to L&M Engineering Limited at the time of the report preparation. No other warranty, expressed or implied, is made.

Sincerely,

L&M ENGINEERING LTD

Prepared by:



Jamie Schenkeveld, P. Eng
Partner

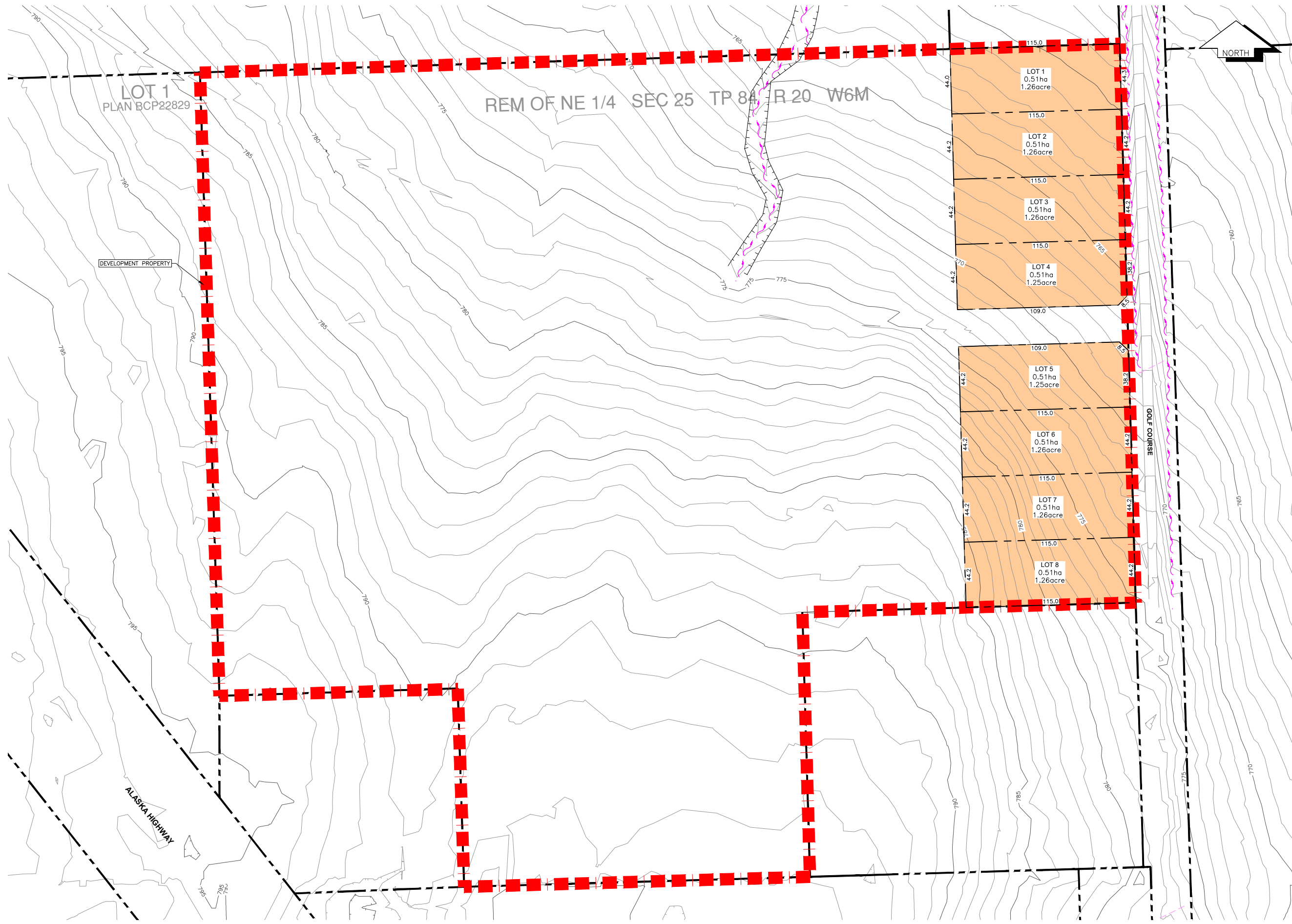
Reviewed by:



Terry Fjellstrom, P. Eng
President

**Appendix A:
Conceptual Site Plan**





LEGEND

EXISTING

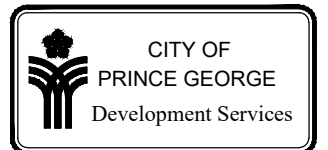
- EX. LEGAL LINE
- EX. TOP OF SLOPE
- EX. DITCH or SWALE
- EX. FENCE
- EX. FENCE

PROPOSED

- PR. LEGAL LINE
- PR. LEGAL R.O.W. & EASEMENT

NO.	DATE (D/M/Y)	REVISION	BY

NOT FOR CONSTRUCTION



CONSULTANTS PROJECT No.: 1338-06

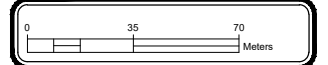
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DATE: 5/12/22	
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SCALE: HALF 1:6000	

WADE GROUP DEVELOPMENT LTD
CHARLIE LAKE

CONCEPTUAL SITE PLAN

DRAWING No.

001



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