

July 21, 2021

RCE File #2119-21-00

Attention: Dionne and Davin Aspell

Re: Assessment & Feasibility of Sewage Disposal for Proposed Subdivision

Civic Address: 2996 Highmoor Rd, Port Alberni, BC

Legal Description: Lot 1, Plan VIP 83791, District Lot 19, Land District 01

As you requested, the following report addresses the suitability of your proposed lots for onsite sewage disposal systems for a three lot subdivision.

Introduction

I understand you are proposing to create two new lots with a remainder lot of 1 by subdividing Lot 1, Plan VIP83791, District Lot 19, Land District 01, see Fig. 1 & 2.

It is necessary to evaluate the proposed new lots as part of both the rezoning and subdivision applications to ensure compliance with the "Sewage System Regulation" (SSR), "Standard Practices Manual" (SPM) and that economically viable septic systems can be installed. These investigations are to ensure that there is the required vertical separation in the undisturbed soils, meet critical Horizontal Setbacks and have the required area for both Primary and Reserve areas for in-ground effluent dispersal.

It is understood this report is to be used for the Rezoning Application and will report on the soil conditions to have the capacity to provide long-term sustainable on-site sewage treatment including primary and secondary/reserve areas for onsite sewage dispersal field locations, in accordance with "Sewage System Standards Practice manual" (SPM3) published by BC Ministry of Health.

It is to be noted that these *Standards* published by Ministry of Health are requirements of both the "Sewage System Regulation" (SSR) and the "SPM". These standards are required by ACRD bylaw policy as part of this Rezoning Application.

Background and Context

The site's soils were investigated and reviewed on May 18, 2018. The site was revisited again July 10, 2021 by Tobin Laughlin of Rock Creek Environmental. Six test pits were investigated within each of the proposed lots. Groundwater conditions were observed within the wet season monitoring period. There was little to no seepage observed at this time of the test pit investigation. However, soil mottling was observed in some of the test pits indicating "Seasonal High Water Table" (SHWT).

It is understood the site will require further investigation before the subdivision application and required site reports are completed for the Ministry of Transportation.

Table 1: Property and Project Summary

PROPERTY SUMMARY			
Landowner:	Davin Aspell		
Location:	2996 Highmoor Road, Port Alberni, BC		
Map:	See Figure 1 Appendix 2		
Civic Address:	2996 Highmoor Road, Port Alberni, BC		
Legal:	LOT 1, Plan VIP83791, District Lot 19, Land District 01		
PID:027-222-179	Size:	3.36 acres / 1.37 hectares	
CONTACTS	Name & Affiliation	Address	Phone
ROWP Consultant	Tobin Laughlin	Comox	250-897-1661
SITE SERVICES	Existing	Proposed	
Land Use:	A1	RA2	
Structures:	SFD/Out Buildings	Same	
Water Supply:	Cherry Creek Waterworks	Same	

SEWAGE	Existing Sewage System	Proposed Sewage System
Design Flows:	1363	unknown
Treatment:	Type I	Type I
Discharge:	Trench	At-grade/Raised Bed
Regulation	BC Sewerage System Regulation	BC Sewerage System Regulation
Design Guides:	SSR	BC Standard Practice Manual, Version 3

SUMMARY OF PROJECT & OBJECTIVES

Objectives

The purpose of my site reconnaissance and report is to advise of the feasibility of an onsite sewage system on the proposed and remaining property. This report is to ensure that sewage dispersal system can be installed and will protect public health if all the requirements are followed as outlined in the SPM Ver 3. The specific objectives of this report are as follows:

- 1) Determine if soils and area are meeting the VIHA "Subdivision Standards" Policy.
- 2) Advise on the probability of a health hazard resulting from setback distances.
- 3) Advise on minimum allowable Vertical and Horizontal Separation, for any future development.
- 4) Determine suitable areas for onsite sewage effluent disposal.

Limitations and Responsibilities

This report provides primarily the Vertical Separation of soils as per the VIHA "Subdivision Standards" Policy. However, the report also provides feasible design parameters relative to the BC Sewerage System Regulation (SSR) and Standard Practice Manual (SPM.3), based on the review of the site. Mr. Tobin Laughlin, ROWP, is an Authorized Person under the BC Sewerage System Regulation and, as such, is responsible for the site evaluation report, any design drawings, specifications, VIHA permits, registration, and field reviews of installation. This letter is subject to the attached Statement of General Conditions (Appendix 1).

Soils

Six 70cm to 1.1m deep test pits were dug on site (see Fig 2). Soil characteristics have been confirmed to be a few inches of topsoil and grasses/forest litter over a shallow layer of brown sandy loam / loam varying from 25 cm to 80cm deep over compacted silty/ clay and till of low permeability. The proposed lots exceed the required Vertical Separation required by both the "SSR" and the "SPM3", as per the Provincial Health Act for sewage system design. **Note:** Soil logs available upon request.

Table 3: Site Evaluation Summary

Land Slope:	10% average.	
# of soil test sites:	6	
Typical soil at infiltration surface where Tested		
Texture:	Sandy Loam / Loam	
Structure:	Single-grain moderate grade slight graininess	
Consistence:	Firm	
Typical soil profile		
A:	Brown Sandy loam SG-0 to GR-2, loose.	
B:	Olive Gray silt loam, M, firm.	
C:	Silt, heavy seepage	
Typical depths in the selected dispersal area		
Roots:	45cm (AVG)	
Mottling:	few distinct mottles at 45cm (AVG)	
Seasonal Water Table:	>0.70cm	
Reference:	WL measured by TL	
Soil Permeability		
# of CHBP:	6	constant head borehole permeameter
Shallow Soils		
Measured K(fs):	mm/d median value, shallow soil depth of 20 to 30 cm	
-or, in mm/d	>460mm/d design value based on median	

Deeper Soils	
Measured k(fs):	310mm/d <i>median value, soil depth of 45 to 50cm</i>
Interpretation	
FRH:	>65cm <i>Flow Restrictive Horizon (AVG)</i>
SHWT:	>45m <i>Seasonal High Water Table (AVG)</i>

2.2 Soil Permeability

Permeability tests were conducted within the locations shown near proposed areas for future disposal fields on Lot 1(remainder) & proposed Lots 2 & 3 (see Fig 2). The permeabilities KFS ranged between 260mm/day-420mm/day amongst the areas tested within the the proposed area.

of CHBP tests: 6 Constant head borehole permeameter

SHALLOW SOILS

Measured K(fs): cm/d median value, shallow soil depth of 20 to 30 cm.

-or,inmm/d: 310 mm/d Design value based on median

2.3 Groundwater

Seasonal High Water Table (SHWT) conditions are concern within the Cherry Creek area. The site has varying drainage areas and most drainage shows signs of reasonable amounts of running or standing water. The site soils and test pits did indicate signs of a SHWT, however, there was no indication that the SHWT was beyond what a properly designed sewage system, meeting the SPM, could not manage.

The soil and ground water conditions at this site are still indicative that a standard Type 1 gravity system is not appropriate for this site. However, a Type I pressure system can met the Vertical seperation required under the SPM guidelines.

EXISTING DWELLINGS:

The existing septic system is located on the west side of the property and on the proposed remainder Lot A. This tank collects the sewage and disperses the effluent from the existing dwelling located on the upper slope east on the lot. The dispersal field will continue to service the existing dwelling as it is functioning and is located on the remainder Lot 1. No VIHA documents could be found for the existing dwelling. There is no sign of the existing sewage system to be malfunctioning or creating a public health hazard. This system will require further investigation with complete report on the system's treatment ability or replacement to satisfy the requirements of the Ministry of Transportation's approving officer before completion of the subdivision process.

Summary of Site Evaluation

Tobin Laughlin visited the site and reviewed soil conditions on May 18, 2018 and July 10, 2021. He evaluated the site, soil conditions and completed permeability tests.

Land slope: 7-10% average

The overall site is gently sloping with no steep slopes. The upper east portion of the lot has the greatest slope of 10% and levelling out to the west side of the lot. The areas tested were generally flat or gently sloping and suitable for sewage systems. There are no steep slope setback issues located on site.

System Selection

Following the Sewage System Standard Practice Manual Version 3, the options for an onsite wastewater system at a location with groundwater conditions and soils with undisturbed soils depth of 25cm are sand mound, raised bed and/or package system.

The preferred alternative is to establish the feasibility of a Type 1 pressure distribution system with timed or micro dosing to a raised infiltration bed. This system is relatively simple, requires low level of treatment and is easy to maintain. These systems are affordable for most sites.

It is noted that it will be the responsibility of the designated professional or qualified person for the final design for construction that will determine if this is required and if other systems or approaches may be used. This report only evaluates the feasibility of such a system being installed economically.

DISPERSAL SYSTEMS

The SPM, as issued by the Health Protection Branch of the Ministry of Health, has standards for selecting a system design for a site and for planning a system. Each of the proposed lots in the areas tested meet the

required vertical separation to an impervious layer or SHWT as required by the SPM. If the SPM design and installation standards are followed correctly within the areas tested, both the public health and the environment will be protected.

There are many system designs that could be used to treat and effectively disperse effluent on these proposed lots. It is up to the system designer to follow the SSR, SM3 and any local bylaws. However, the SPM Volume II, Table II-16 allows the use of a Type 1 seepage bed or at-grade with timed dosing and pressure distribution. The vertical separation (VS) required for this system is 45cm and as constructed 55cm as per SPM Ver.3. This system type or a Sand mound design would meet or exceed the vertical separation as required by both the SPM Standards and the VIHA Subdivision Standards Policy.

3.5 Horizontal Separation:

There is adequate area to provide for primary and secondary dispersal fields and meet the following horizontal separations as per the SPM:

The absorption fields shall be located not less than:

- three metres (ten feet) from a building
- three metres (ten feet) from a parcel boundary
- three metres (ten feet) from an uphill interceptor drain
- thirty metres (100 feet) from a source of domestic water
- thirty metres (100 feet) from a permanent fresh water body
- three metres (ten feet) from a domestic water pipeline
- fifteen metres (50 feet) from any Marine water body or a breakout (ditch, natural spring or seepage)

The septic tank shall be located not less than:

- one metre (three feet) from a building
- one metre (three feet) from a parcel boundary
- Thirty metres (100 feet) from a source of domestic water three metres (ten feet) from a domestic water pipeline

4.0 Site Drainage

To achieve greater separation it is recommended that groundwater levels be controlled on the newly proposed lot by the installation of a curtain drain to intercept groundwater above the proposed location of a new system of this type. This shall be composed of a 4" perforated pipe keyed into the till and bedded in gravel running along the slope contour above the proposed drain field and then draining to 4" solid pipe for downhill runs and runs below the field to eliminate the risk of breakout to the site groundwater drainage system. The use of interceptor drains for installations of this nature is very effective since the capacity of the trench drains is much larger than the capacity for groundwater flow.

Drain Pipes

Piping that is less than 7.5m down-slope or side slope from proposed disposal area should be solid wall pipe so no potential breakout point is created. The dispersal field, interceptor drain and hard piping for site drainage should be clearly identified on the onsite wastewater disposal plan and should be considered part of the system for purposes of responsibility and maintenance.

5.0 Requirement and Responsibility for Maintenance of Sewerage System

The following is an excerpt from Section II-7 & III-7 SPM regarding the responsibilities of the owner of a sewerage treatment:

"Section 10 of the SSR* requires that an owner of a sewerage system

- ensure that the system is maintained in accordance with the maintenance plan; and
- keeps a record of all maintenance service performed on the system;

Under the "SSR, the system must be maintained by an 'AP', so the owner commits an offence under the SSR if they maintain it without proper qualifications. The owner must also ensure that that they are in compliance with all other requirements under the SSR and with local government by-laws."

***Sewerage System Regulation **Authorized Professional**

Since the responsibilities for maintenance are clearly defined in the regulations for allowing a system to be installed, there are no concerns about requiring legal responsibility for maintenance of the sewerage system as a part of the subdivision process.

Summary

Based on the site investigation the soils meet or exceed the required vertical separation outlined in that of the SPM3 Volume II, Table II-16 and II-17. The undisturbed soils evaluated at site are consistently greater than 25m or 10" in depth. The portions of undisturbed evaluated did not include forest litter, humus or soils found to be affected by Seasonal High Water Table "SHWT". The soils are found to be primarily Sandy loams/Loam.

There is more than enough area in the areas evaluated to support both a Primary and Reserve area of greater than 600m/2.

The proposed lots are suitable for sewage dispersal systems to be installed on the newly created lots. Following that of the Ministry of Health's SPM.

The protection of public health and the environment will be achieved on these newly proposed lots.

I hope this provides you with the information you require. Please contact me if you have any questions.

Yours truly,



ROCK CREEK ENVIRONMENTAL



Appendix 1: Statement of General Conditions

Scope of this Report

This review report satisfies only those objectives stated in the introduction. Tobin Laughlin, Rock Creek Environmental has not conducted a Hydrogeology Study, Environmental Impact Assessment or survey.

Use of this Report

This Tobin Laughlin Rock Creek Environmental (RCE) report pertains only to a specific project. If the project is modified, then our client will allow us to confirm that the report is still valid. We prepared this report only for the benefit of our Client and those agencies authorized by law to regulate our Client's activities. No others may use any part of this report without our written consent. To understand the content of this report, the reader must refer to the entire, signed report. We cannot be responsible for the consequences of anyone using only a part of the report, or referring only to a draft report. This report reflects our best judgement based on information available at the time. Any use of this report, or reliance on this report, by a third party is the responsibility of that third party. We accept no responsibility for damages, if any, suffered by a third party as a result of decisions made or actions taken based on this report.

Reliance on Provided Information

RCE has relied on the accuracy and completeness of information provided by its client and by other professionals. We are not responsible for any deficiency in this document that results from a deficiency in this information.

Logs of Test Holes or Wells and Subsurface Interpretations

Ground and ground water conditions always vary across a site and vary with time. Test hole and well logs show subsurface conditions only at the locations of the test hole or well. The precision with which geological reports show subsurface conditions depends on the method of excavation or drilling, the frequency and methods of sampling and testing, and the uniformity of subsurface conditions.

Descriptions of Geological Materials and Water Wells

This report includes descriptions of natural geological materials, including soil, rock, and ground water. RCE based these descriptions on observations at the time of the study. Unless otherwise noted, we based the report's conclusions and recommendations on these observed conditions.

Changed Conditions

Conditions encountered by others at this site may differ significantly from what we encountered, either due to natural variability of subsurface conditions, or as a result of construction activities. Our client will inform us about any such changes, and will give us an opportunity to review our recommendations. Recognizing changed soil and rock conditions, or changed well conditions, requires experience. Therefore, during construction or remediation, a qualified Person/professional should be employed to visit the site with sufficient frequency to observe whether conditions have changed significantly.

Risks and Liability

We recommend that our client engage RCE to review all design drawings and constructed works that are based on our conclusions and recommendations.

Standard of Care

We exercise a standard of care consistent with that level of skill and care ordinarily exercised by qualified persons/professionals currently practicing under similar conditions.

Appendix 2

Figure 1 Location of Subject Property

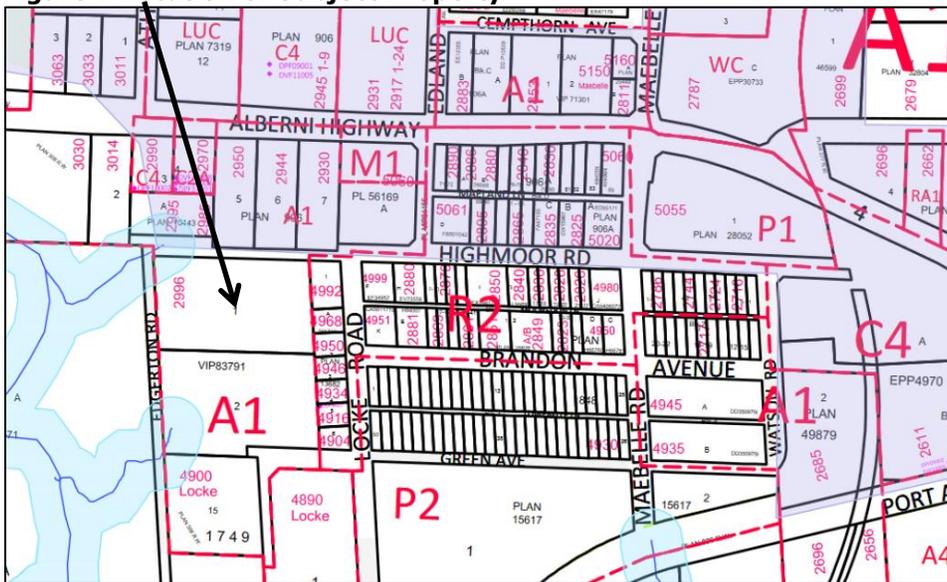


Figure 2 A TEST PITS PLAN VIEW

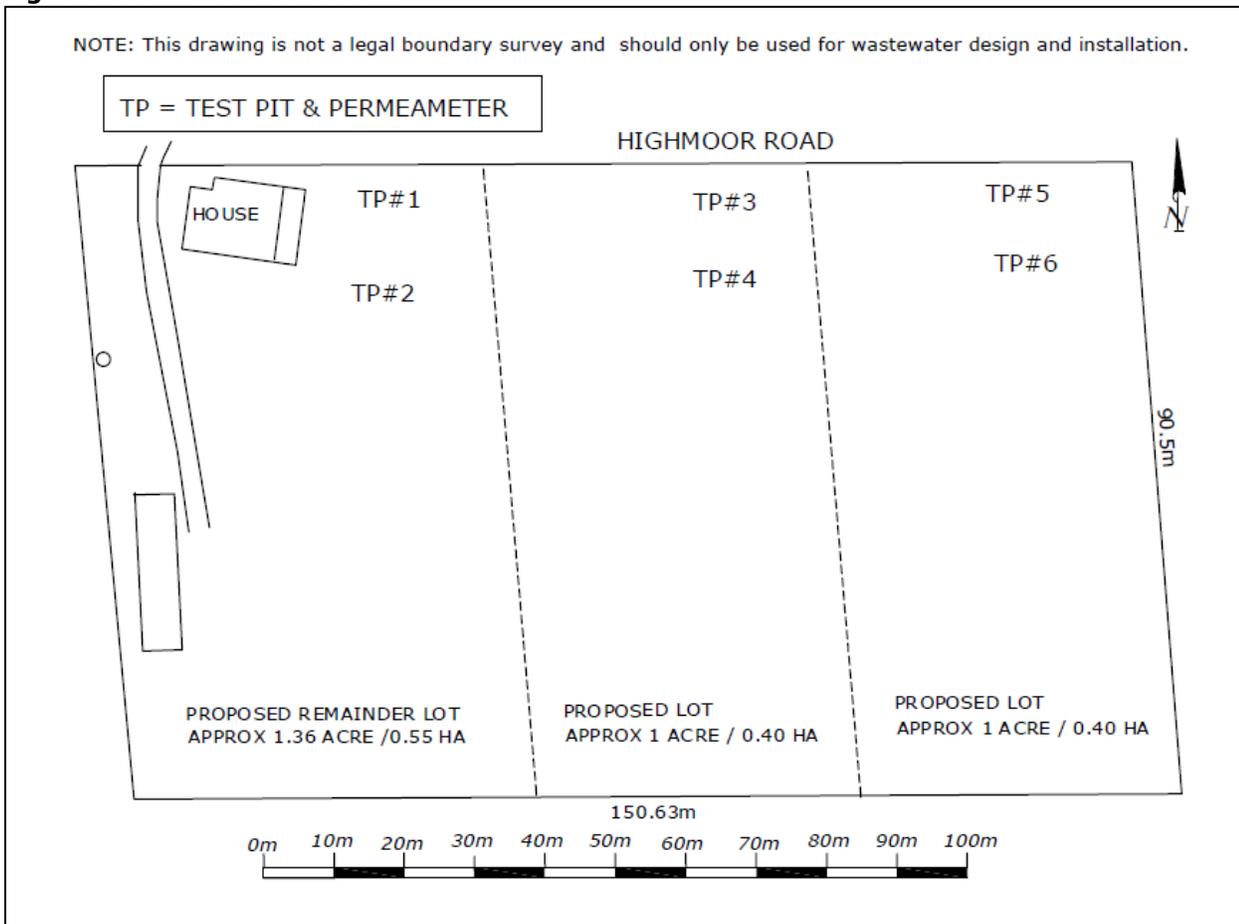


Figure 2 B TEST PITS AERIAL MAP VIEW Note:TP# = Test Pit and Permeameter

