

November 29, 2016

DTC File No: J16-01416

Interior Health Authority
Box 627, 851-16th Street NE
Salmon Arm, BC
V1E 2N4

Attention: Public Health Inspection

**Re: Sewage Dispersal System Assessment
3401 Catherwood Road, Revelstoke, B.C.**

DeansTech Consulting Ltd. (DTC) was retained by Mr. Sam Lerose, property owner representative, to act as the agent for assessing a sewage dispersal system on the above noted property. DTC understands that the owner has applied for a temporary use permit to allow for onsite rentals for up to 10 occupants. The Columbia Shuswap Regional District has requested an assessment of the dispersal system to confirm whether it can meet the requirements for the new zoning amendment. The site consists of a 5 bedroom, 2240 ft² (208 m²) house with a 1 bedroom, 800 ft² (75 m²) suite over the detached garage.

The anticipated total daily effluent flow for this application based on Table III-11 of the Standard Practice Manual (Version 3) (SPM) is 420 Igpd (1900 Lpd) for the 5 bedroom home and 150 Igpd (700 Lpd) for the 1 bedroom suite for a total of 570 Igpd (2600 Lpd). The field assessment was carried out during the week of October 16, 2016.

Property Size: 3.04 hectares
Legal Description: Lot 1, Plan NEP7126, DL7, KLD
Folio: # 20 719 40890.025

General Property Description

The property currently contains a house and detached garage both of which are located at the northeast corner of the property. The remainder of the site is grass covered and the site slopes gently down to the south. The existing septic system consists of a Biocycle Treatment Unit Model 5800 that pumps treated Type 2 effluent to a distribution box, which then flows to 150 feet of dispersal field. The dispersal field consists of 3" perforated pipe over drain rock. Flows from the detached suite are collected in a lift station and pumped to the treatment unit. DTC inspected the sewerage system and the findings are summarized further in the report.

Geology

Based on DTC field experience in the area, the site soils would typically consist of sand and gravel from fluvial and glacial fluvial deposits.

Hydrogeology

Based on the topography of the area, the property, and local knowledge, the interpreted direction of the regional groundwater flow is likely to the west towards the Columbia River, which is 600 m west of the proposed dispersal area.

A water well search of the BC Groundwater Data Base was carried out and the nearest well appears to be approximately 105 metres from the proposed dispersal field area. A copy of the well map is attached for reference. An on-site well was confirmed to be located 10 m east of the southeast corner of the main house. This well is greater than 30 m away from the existing treatment tank and dispersal area.

Field Results

- Two testpits were excavated adjacent to the ends of the two outside laterals. The soils were logged by DTC on October 17, 2016. The soil observed in the testpits excavated at the existing dispersal area typically consists of loam to 3.0 feet overlying sand to 8.0 feet. The loam was fine grained, sandy, firm, damp and light brownish grey. The underlying sand was fine grained, clean, damp, with trace gravel, compact and medium brownish grey.
- The slope in the proposed dispersal area was measured to be 1%.
- Two percolation tests at 3 feet below grade produced results of 2 & 2 min/inch. Based on these results and the soil type a soil hydraulic loading rate of 1.32 Ig/ft²/day (65 litres/m²/day) for Type 2 effluent has been implemented.
- During the site assessment DTC inspected the existing dispersal field. An inline camera/transmitter was inserted into the three laterals from the distribution box. The distal ends of the existing laterals were exposed in two locations. The drainrock below the pipe appeared to be relatively clean with very little biomat. The inside of the pipe in the first lateral was observed to be clear with no sludge noted. Minor sludge was noted in the second and third laterals.

The attached Figure 1 shows the overall site layout and testpit and percolation test locations and results, Figure 2 outlines the treatment plant and lift station locations and Figure 3 presents the sewage dispersal field layout.

Site Investigation Summary:

- Soil Texture – sand,
- Soil Structure – single grain,
- Percolation Rate – 2 minutes/inch (average),
- Slope down gradient – 1%,
- Depth of porous soil – 96”,
- Coarse gravel content < 20 %

DTC –

Site Capability and System Type

The results of the field investigation were compared to Tables II-10 to II-21 of the SPM Version 3, Volume II to identify soil type, constraining factor and system solution. Based on the information from these tables, the soil type category is sand having a good permeability. The recommended system solution for the site is gravity distribution.

During the design stage for any sewage dispersal system, the determination of a linear hydraulic loading rate (LLR) is necessary in order to determine the minimum system length along a contour. Based on the calculations, a minimum length of 34 ft is required and 50 ft laterals are present, therefore the dispersal system meets linear loading.

System Design Requirements

DDF (Daily design flow):

DDF is selected as per SPM table II- 8 for a 5 bedroom residence with 208 m² living area, and a 1 bedroom suite with 75 m² living area.

$$1900 \text{ L} + 700 \text{ L} = 2600 \text{ L DDF}$$

Septic Tank Size

2600 L x 1 day of retention for Type 2 effluent = 2600 L or 570 Ig minimum.

HLR (Hydraulic loading rate selected for design):

The infiltrative surface is sized based on an HLR of 65 L/day/m² for Type 2 effluent to sand as per SPM Table II- 22.

AIS (Calculation of minimum area of infiltrative surface):

$$2600 \text{ L/day} \div 65 \text{ L/day/m}^2 = 40 \text{ m}^2 \text{ needed and } 41.8 \text{ m}^2 \text{ is present}$$

LLR (Linear loading rate and calculation of minimum system length):

The minimum system length on contour, based on a LLR of 250 L/m for a 0 < 5% slope, > 90 cm depth of sand with favourable structure category as per SPM Table II- 27 is,

$$2600 \text{ L DDF} \div 250 \text{ L/m} = 10.4 \text{ m minimum system length}$$

Configuration of Dispersal System:

- The existing system consists of 3 laterals 15.2 m by 0.91 m providing 41.8 m² AIS and an effective LLR of 173 L/m that exceeds minimum SPM LLR standard of 250 L/m.

DTC -

Summary:

DTC visited the property on October 17, 2016 to monitor the excavation of testpits and assess the exiting sewage dispersal system.

Based on the proposed new site use, a daily flow of 2600 L/day was established. DTC's calculations confirmed that a minimum area of infiltrative surface of 40 m² is needed and 41.8 m² is present.

The existing sewage system consists of a Biocycle 5800 Treatment Unit that treats incoming sewage to Type 2 quality before dispersal to ground. DTC contacted Bioharmony owner representative Mr. Barry Rumsey to discuss the operation of the existing onsite treatment unit. Mr. Rumsey advised DTC that the existing unit was capable of handling 2600 L/day (550 Imperial gallons). Mr. Rumsey also advised us that the treatment unit has been serviced on a regular basis and it appears to be functioning normally. Ongoing service of the treatment unit will continue to be provided by Bioharmony.

The dispersal field consists of 3 laterals that are 3 ft by 50 ft. Flows from the detached suite are collected in a lift station and pumped to the treatment unit. The existing laterals were exposed and appear to be in good operating condition.

An onsite well was located 10 m east of the southeast corner of the main house. DTC confirmed that this well is greater than 30 m away from the existing treatment tank and dispersal area, which meets SPM setbacks.

Recommendations and Inclusions

DTC recommends the following:

- Install cleanouts on the end of each lateral that extend to ground surface.
- Install a monitoring well that extends to the base of the drain rock in each trench.
- Please note that this design does not incorporate the use of a garburator or reverse osmosis water filter.
- No water softener backwash, pool or hot tub drains or roof drains can enter the septic system.
- No condensate from furnaces, appliances, compressors or any other mechanical device can enter the sewage system.
- We recommend the installation of a water meter to assist with determining the daily flow rates and development of a proper long term maintenance plan.

Use of this report is subject to the attached General Conditions. The reader's attention is specifically drawn to these conditions, as it is essential that they be followed for the proper use and interpretation of this report. We trust this report meets with your approval. Should you have any questions or comments, please contact the undersigned.

DTC –

Yours truly,
DEANSTECH CONSULTING LTD.

Prepared by,



Rich Deans, ROWP # 0340
Groundwater Technician

Attachments: Figure 1, Testing Location Plan
Figure 2, Tank Layout Plan
Figure 3, Dispersal System Layout Plan
Testpit Table
Waterwell Map
Biocycle 5800 Sewage Treatment Unit
Owner Location Report
General Conditions

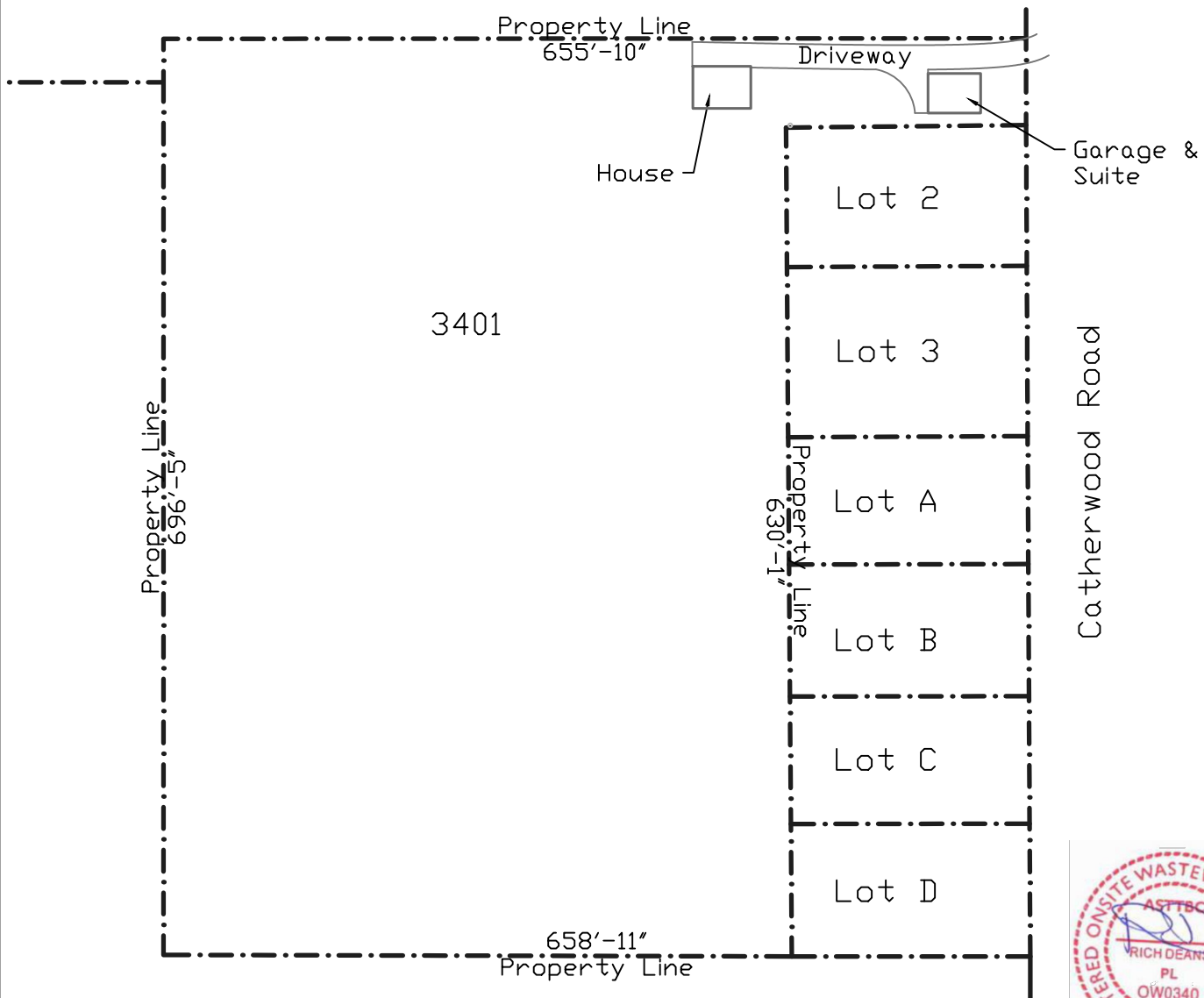
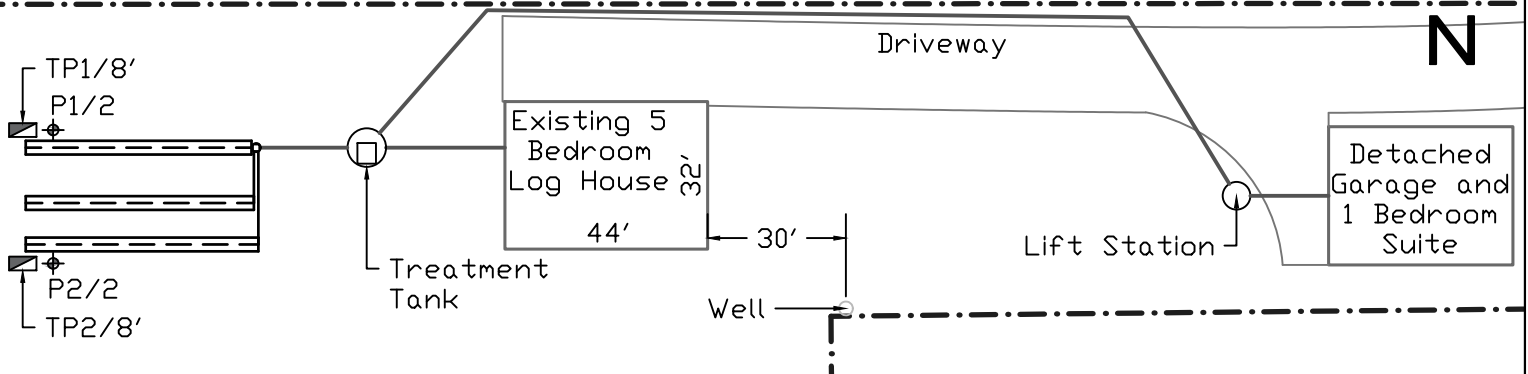
C: Stephen Revell
c/o Robert A. Lundberg Law Corporation
Barrister and Solicitor
P.O. Box 2490
119 Campbell Avenue
Revelstoke, BC
V0E 2S0

Attn: Joanne Chayko
Phone: 250-837-5196

C: Sam Lerose
Revelstoke Septic Services
Phone: 250-837-6619

DTC -

Scale: 1:500

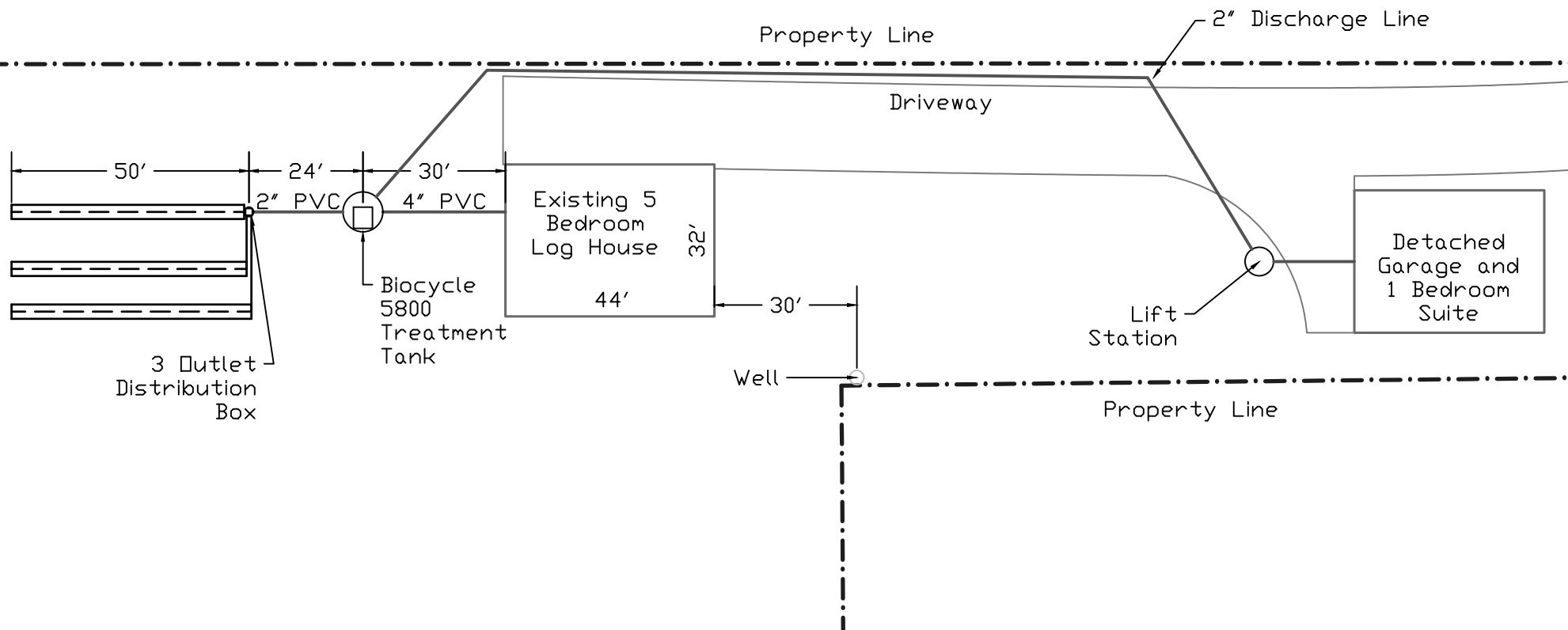


Scale: $\frac{1}{128}'' = 1'-0''$



Client: Stephen Revell			
Address: 3401 Chatterwood Rd, Revelstoke, BC			
Drawing Name: Figure 1			
Overall Lot Layout and Testing Locations			
Project #:	Scale:	Drawn by:	Date:
J16-01416	As Noted	JP	Nov 28, 2016

LEGEND	
	Testpit Location Depth (ft)
	Percolation-Minutes/Inch



Client: Stephen Revell			
Address: 3401 Chatterwood Rd, Revelstoke, BC			
Drawing Name: Figure 2 Treatment Tank and Dispersal Field Layout			
Project #:	Scale:	Drawn by:	Date:
J16-01416	1/32"=1'-0"	JP	Nov 28, 2016



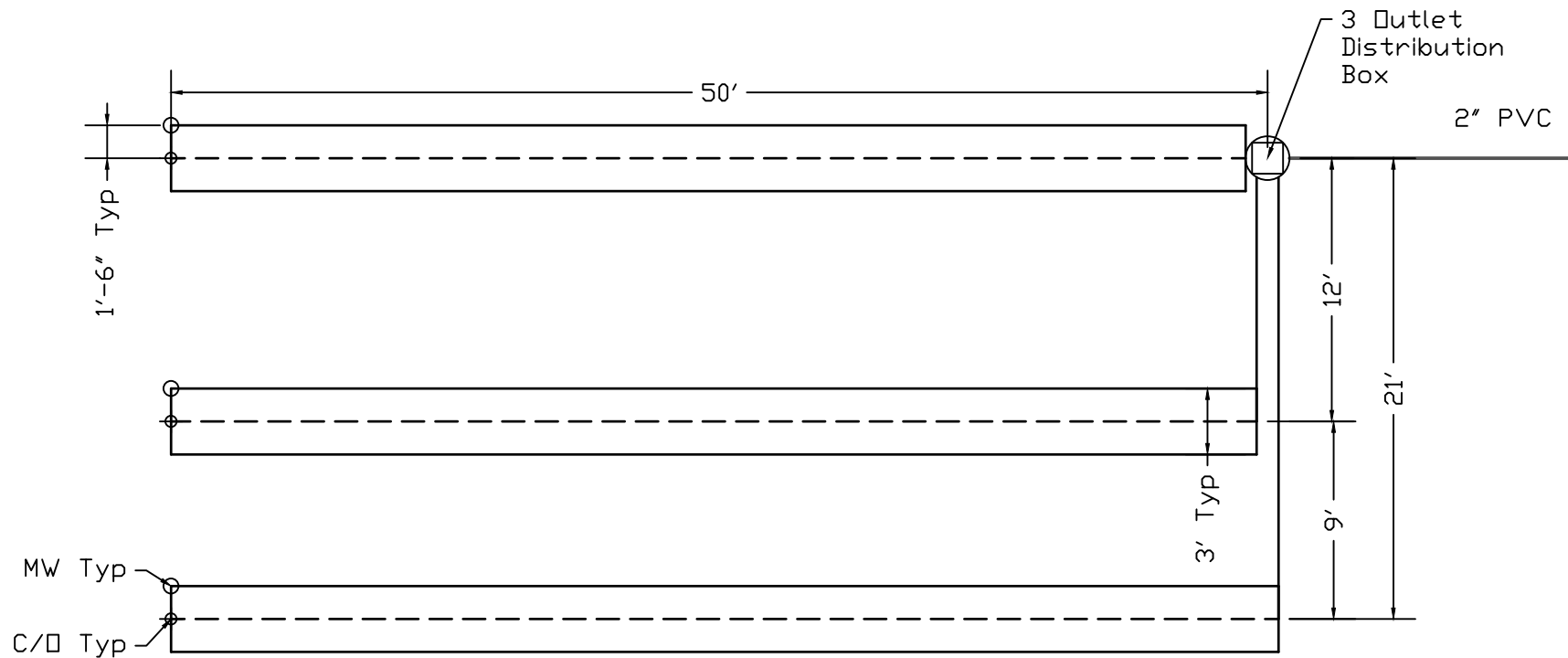
New Cleanouts and Monitoring Wells

Add at the end of each trench.

- Cleanout 4" solid PVC vertical pipe with C/W PVC cap access to surface thru valve box
- Monitoring well 4" Perforated PVC vertical pipe c/w PVC cap, access to surface through valve box

3 Existing Trenchs - 3' x 50'

4" perforated PVC surrounded by drain rock



Client: Stephen Revell			
Address: 3401 Chatterwood Rd, Revelstoke, BC			
Drawing Name: Figure 3 Dispersal Field Detail			
Project #:	Scale:	Drawn by:	Date:
J16-01416	1/8"=1'-0"	JP	Nov 28, 2016

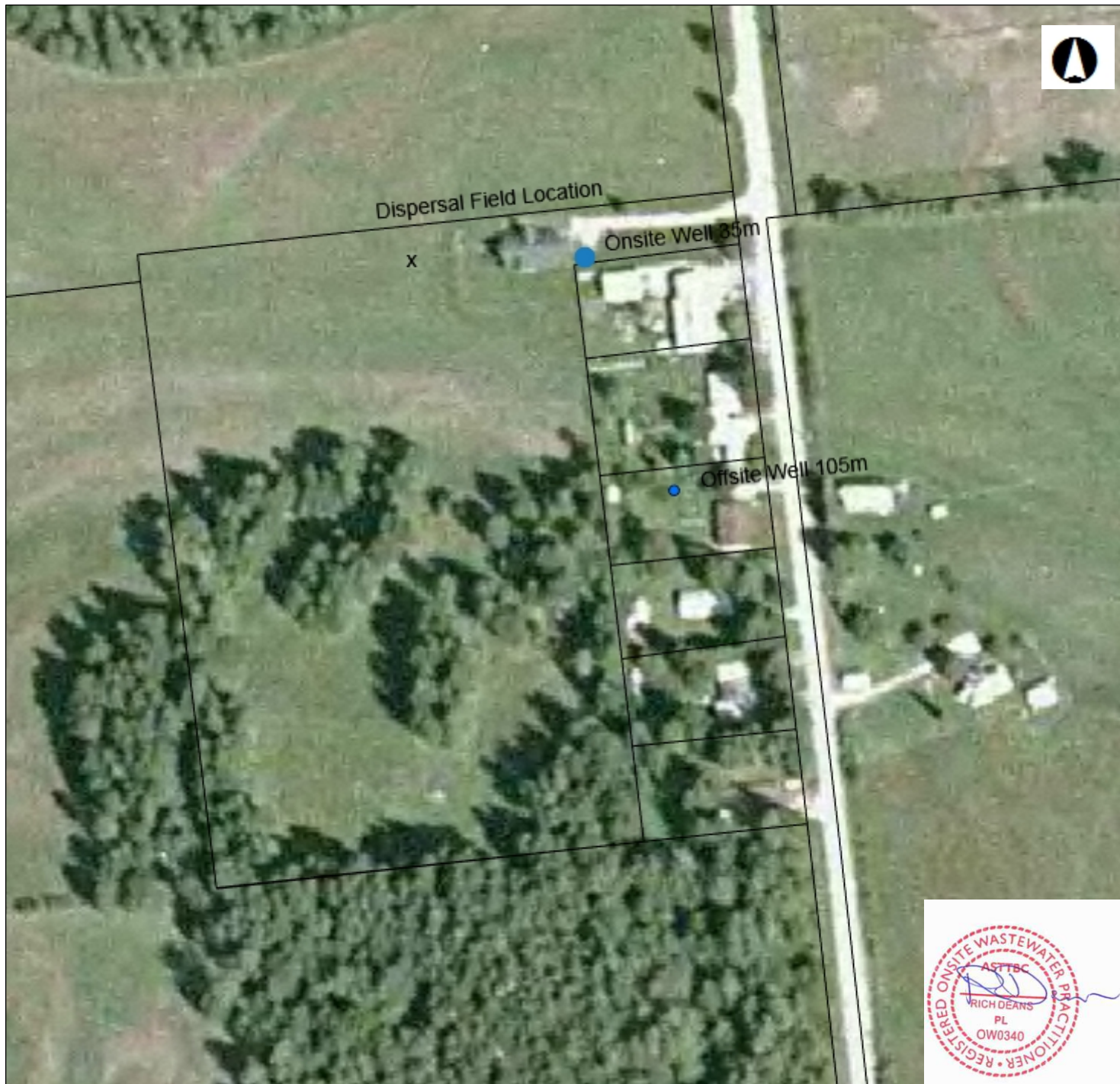
TABLE 1
SOIL DESCRIPTION

Steven Revell

3401 Catherwood Road, Revelstoke, BC

Testpit #	Depth (feet)	Location	Percolation Test Result minutes/inch	Slope Angle (%)	Soil Description, depth in inches
1	8.0	North side of septic area	Lower Sand – 2 minutes	1	0 – 4.0 – ORGANICS – topsoil, sandy, damp, loose, dark brown. 4.0 – 40.0 – LOAM – fine grain sandy, firm, damp, light greyish brown. 40.0 – 96.0 – SAND – fine grain, trace gravel in places, clean, damp, compact, medium brownish grey. No groundwater, no bedrock.
2	8.0	South side of septic area	Lower Sand – 2 minutes	1	0 – 4.0 – ORGANICS – topsoil, sandy, damp, loose, dark brown. 4.0 – 36.0 – LOAM – fine grain sandy, firm, damp, light greyish brown. 36.0 – 96.0 – SAND – fine grain, trace gravel in places, clean, damp, compact, medium brownish grey. No groundwater, no bedrock.





3401 Catherwood Road

Revelstoke
Legend

- Water Wells - All
- Integrated Cadastral Fabric
TileCache

0 0.04 0.08 km

1: 1,923

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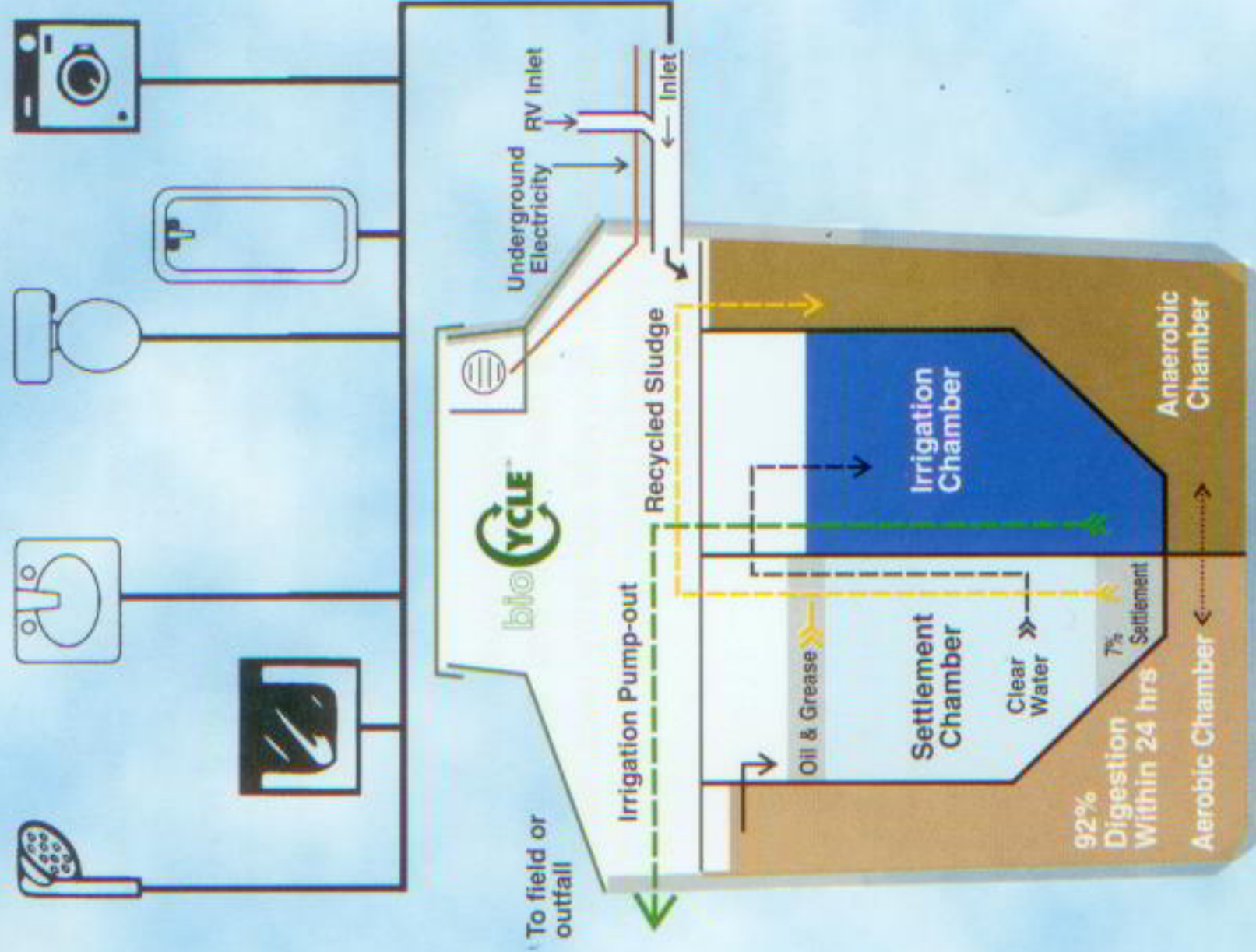
Datum: NAD83

Projection: BC Albers

Key Map of British Columbia



Model 5800



HYDRAULIC LOADING/SHOCK LOADING

Design Total Daily Flow	2,500 L
Average Daily per Capita Flow	250 L
Maximum per Capita 2 Hr Flow	125 L
Maximum Instantaneous Flow	10.4 L/minute

EFFLUENT QUALITY

Effluent meets or exceeds regulatory standards for removal of BOD₅, Suspended Solids and faecal coliform.

WARRANTIES

Apart from the air and effluent pumps, which are covered under separate manufacturers' warranties, and for the irrigation network which is external to the System, the Biocycle Model 5800 is covered by a Limited Ten Year Warranty. Warranties on commercial systems vary according to design specifications.



For more information contact your locally independently owned and operated dealer:

Head Office:

BioHarmony Inc.
P.O. Box 1398
Vernon, B.C.
V1T 6N6

Phone: (250) 558-5566

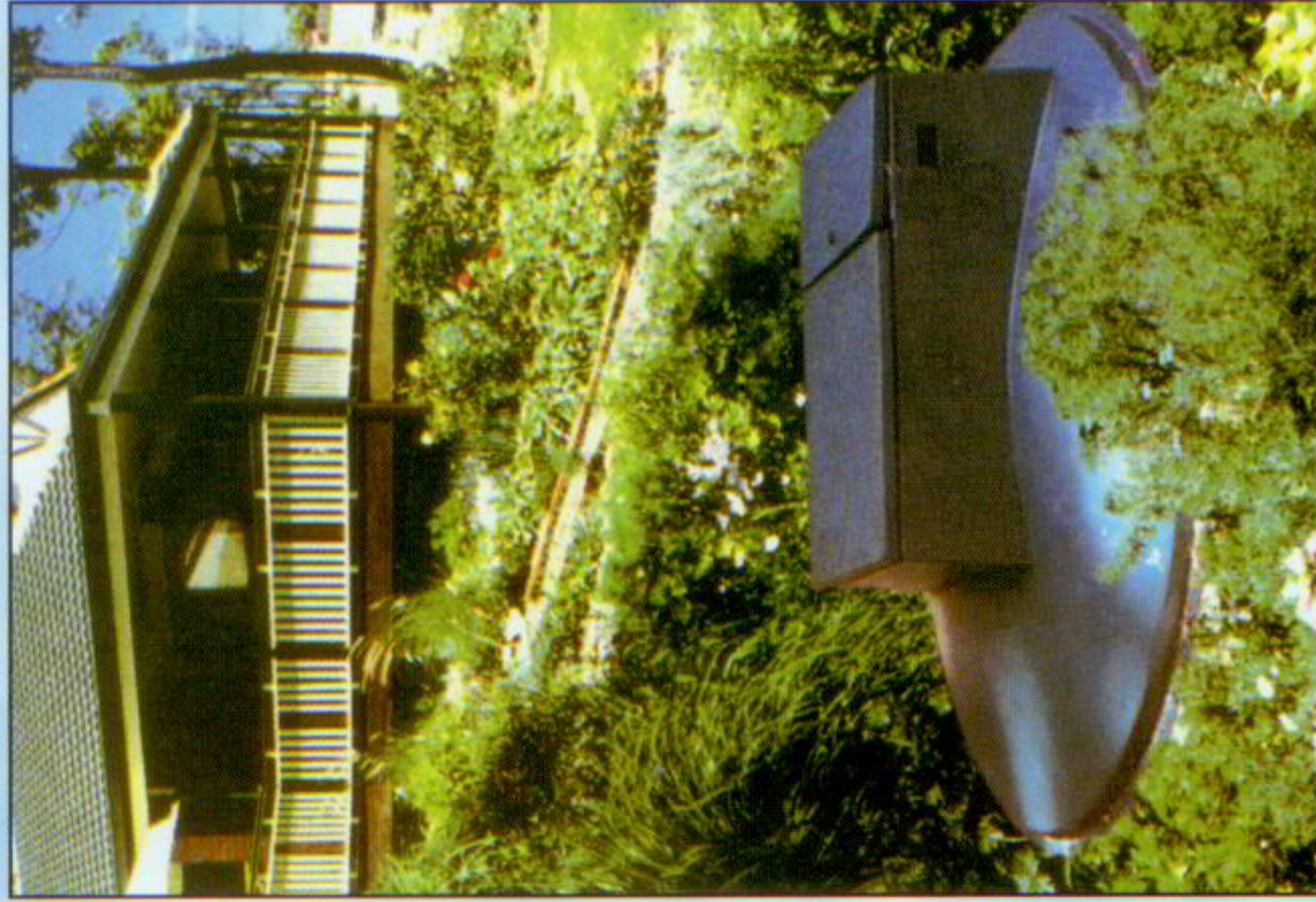
Fax: (250) 549-5050

email: bh@bioharmony.ca

Website: www.bioharmony.ca



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Biocycle

Aerated Wastewater Treatment Systems

Owner Location Report**Disclaimer**

This information is obtained from various sources and is determined as of the specific dates set out in the Assessment Act. As a result, BC Assessment cannot warrant that it is current or accurate, and provides it for your convenience only. Use of this information without verification from original sources is at your own risk.

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Report Date:	Nov 23, 2016	Report Time:	03:01:29 PM
Folio:		For:	PA80303
Roll Year:	2016	Roll Number:	40890.025
Area:	20	Jurisdiction:	719
School District:	19		
Neighbourhood:	140 - SOUTH - AIRPORT TO WHISKEY PT		
Property Address:	3401 CATHERWOOD RD REVELSTOKE BC		
Owner Name:	STEPHEN MICHAEL REVELL	# of Owners:	1
Owner Address:	HIGH MILL HOUSE, HIGH LORTON COCKERMOUTH CA13 9UB		
Document No:	CA571088		
PID:	014-006-511		
Legal Description:	Lot 1, Plan NEP7126, Section 11, Township 23, Range 2, Meridian W6, Kootenay Land District, Except Plan 7169		
Additional Owners:	No Additional Owners	Associated PIDs:	

This report incorporates and is subject to these “General Conditions”.

1. USE OF REPORT AND OWNERSHIP

This sewage dispersal report pertains to a specific site, a specific development and a specific scope of work. It is not applicable to any other sites nor should it be relied upon for types of development other than that to which it refers. Any variation from the site or development would necessitate a supplementary assessment. This report and the recommendations contained in it are intended for the sole use of DeansTech’s client. DeansTech does not accept any responsibility for the accuracy of any of the data, the analyses or the recommendations contained or referenced in the report when the report is used or relied upon by any party other than DeansTech’s client unless otherwise authorized in writing by DeansTech. Any unauthorized use of the report is at the sole risk of the user. This report is subject to copyright and shall not be reproduced either wholly or in part without the prior, written permission of DeansTech. Additional copies of the report, if required, may be obtained upon request.

2. NATURE AND EXACTNESS OF DATA

Some data reviewed during this assessment was produced by others and has been relied upon by DeansTech to form opinions of the site. The accuracy of the data reviewed has not been confirmed. Some data was collected from sources readily available to the public. Other data and information was obtained from the client for use in this report.

3. LOGS OF TEST HOLES AND WATER WELL RECORDS

The test hole logs are a compilation of conditions and classification of soils and rocks as obtained from field observations and laboratory testing of selected samples carried out by others. 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.

4. STRATIGRAPHIC AND GEOLOGICAL INFORMATION

The stratigraphic and geological information indicated on drawings contained in this report are inferred from the information reviewed. Stratigraphy is known only at the location of the drill hole/testpit or other drill holes/testpits in the area. Actual geology and stratigraphy between drill holes/testpits and/or exposures may vary from that shown on these drawings. Natural variations in geological conditions are inherent and are a function of the historic environment. DeansTech 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 investigation and review may be necessary.

5. SURFACE WATER AND GROUNDWATER CONDITIONS

Surface and groundwater conditions mentioned in this report are those observed at the times recorded in the report. These conditions vary with geological detail between observation sites; annual, seasonal and special meteorologic conditions; and with development activity. Interpretation of water conditions from observations and records is judgmental and constitutes an evaluation of circumstances as influenced by geology, meteorology and development activity. Deviations from these observations may occur during the course of development activities.

6. WATER QUALITY

Water quality information was based on the results of water samples obtained from the well(s). The chemical analysis results can vary from season to season and at different depths within a well.

7. STANDARD OF CARE

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