



July 30, 2020

File 19-01

Rhee Ga Holdings Ltd.  
53003 Bunker Road  
Rosedale, BC  
V0X 1X0

Attention: Mr. Doo-Jun Lee

**RE: Feasibility Assessment for Proposed On-Site Wastewater Treatment System 52964 Yale Road East, Popkum BC**

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The site plan attached to our April 9, 2019 report has been updated to reflect a new layout. No other changes have been made to our April 9, 2019 report.

Further to your request, Arden Consulting Engineers Ltd. (ACE) has completed a limited review and assessment of the subsurface conditions at 52964 Yale Road East Popkum, BC for the purpose of assessing the parcel's ability to support an onsite wastewater treatment system for the proposed new commercial development. .

**BACKGROUND**

The site is currently undeveloped has been cleared and is level. It is approximately 0.39 ha in size and bounded by a commercial property to the south, Highway 9 to the west, Yale Road East to the north and a laneway to the east. There are no surface water courses on the subject parcel nor neighboring parcels within 30m or other physical features that would preclude the development of an onsite wastewater treatment system. The parcel is serviced by the Fraser Valley Regional District's water supply system and as such there is no requirement to drill a water well. It is desired to develop the property to include 4 commercial retail units along with 3 food premises.

The corresponding design flow rate for the future development is calculated to be 9,160 Lpd based and accordingly, the discharge would be governed by the *Sewerage System Regulation* (SSR) administered by the Fraser Health Authority (FHA). The design flow rate is summarized in Table 1 below.

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<i>Item</i>	<i>units</i>	<i># of units</i>	<i>Flow per unit (L)</i>	<i>Flow (L/day)</i>	
<i>Drive Through Restaurant</i>	seat	30	60	1,800	
	employees	8	50	400	
Subtotal					2,200
<i>Bakery/coffee shop</i>	seat	20	200	4,000	
	employees	4	50	200	
Subtotal					4,200
<i>Pizza</i>	seat	5	60	300	
	employees	2	50	100	
Subtotal					400
<i>Commercial retail</i>	m <sup>2</sup>	472	5	2,360	
Subtotal					2,360
<b>Total</b>				<b>9,160</b>	

It is assumed that the both the pizza and drive through restaurants will serve fast food with paper service as opposed to washable dishware (plates and cutlery etc) and will be open less than 16 hours per day.

#### **SUBSURFACE INVESTIGATION FOR SEWAGE DISPOSAL**

A subsurface investigation was conducted by ACE on January 23, 2019 for the purpose of evaluating the subsurface conditions. Seven testpits were advanced around the perimeter of the property. The test pits were advanced using a medium sized tracked excavator to depths ranging from 1700- 2500mm Below Ground Surface (BGS) and the subsurface conditions were logged by a member of our engineering staff. The locations of the testpits were chosen to reflect the future development plans and not to encumber the development of the site.

Six percolation tests and one double ring infiltrometer test were additionally performed to assess the soil permeability. The percolation holes were presoaked for 4 hours prior to timing. The locations of the test pits, double ring infiltrometer and percolation tests are shown on the attached site plan. Only test pits 2 through 5 were judged to be suitable for effluent dispersal under the SSR. Test pit 1 contained significant amounts of clay and silt and Test pits 6 & 7 contained nonnative fill. No seepage or water table was encountered to the depths investigated.

Detailed logs of the test pits are attached. The percolation test results are presented in Table 1 below.

**Table 1- Percolation test Results**

<b>Perc Hole #</b>	<b>Rate (min/inch)</b>	<b>Depth Below Ground Surface (cm)</b>
1	19	90
2	2	90
3	30	90
4	15	40
5	2.5	86
6	10	81

The average percolation rate was 13 minutes per inch. Percolation testhole 1 was located near testhole 1 and outside of the area considered for location of the effluent dispersal field. Percolation test 6 is located outside of the effluent dispersal area shown



on the attached site plan, however, the subsurface conditions in this area are favourable and as such the effluent dispersal field could be shifted to include this area if desired. One double ring infiltrometer test was also performed using a trucked water supply yielding an infiltration rate of 10.8m/day which is considered to be very favourable an indicative that a more aggressive hydraulic loading rate (HLR) may be possible. The double ring infiltrometer test was only run for approximately 3 hours due to the limited water supply (3,000 L). A longer duration test will need to be run at the design stage.

### ***Options for Effluent Dispersal***

Given the relatively high design flow and the high percentage of proposed hard surfacing, Type 3 effluent will be required to reduce the effluent dispersal area. Type 3 effluent is treated by a sewage treatment system to achieve the following standards:

- Biochemical Oxygen Demand (BOD<sub>5</sub>) < 10 mg/L
- Total Suspended Solids (TSS) <10 mg/L.
- Fecal coliform bacteria < 400 CFU per 100mL

A Sewer Treatment Plant (STP) is typically required to produce type 3 effluent. A grease trap should proceed the STP and should be installed on the kitchen discharges of each food premise. The influent organic strength (BOD<sub>5</sub>) should be assumed to be on the order of 800 mg/L for design purposes. National Sanitation Foundation (NSF) approved package STPs designed for typical residential strength wastewater are likely not suitable for this application given the presence of the food premises.

ACE has calculated the area required for the effluent dispersal field based on the projected design flow rate and Type 3 effluent.

**Table 3 – Summary of Area Required for Effluent Dispersal**

Area required
Type 3 (m2)
115 (3m x 39m)

The required area for a Type 3 system is shown on the attached site plan. If desired the dispersal area could be shifted as far east to the vicinity of testhole 5 and/or split into two equally sized hydraulically separated dispersal areas in order to accommodate road access. It is noted that the effluent dispersal area cannot be located beneath hard surfacing including driveways and parking areas.

### **NEIGHBORING WELLS**

A cursory field review was conducted to locate the nearest neighboring wells. The area is serviced by the Fraser Valley regional district water supply system and it was confirmed that the closest residences to the proposed effluent dispersal area on the north side of Yale road east (52975, 52945 and 52905) have a connection to the water supply system. The parcel to the east 52984 Yale Road East has not connected to the FVTD system and is still serviced by a private well. The well location is shown on the attached site plan and is outside of the required 30m setback from the proposed effluent dispersal area.



This letter has been prepared by ACE exclusively for Rhee Ga Holdings Ltd. and is intended to provide an assessment of the parcel's ability to accommodate a future septic system. The conclusions made in this report reflect ACE's best judgement in light of the information available at the time of testing. 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. ACE accepts no responsibility for damages, if any, suffered by a third party as a result of decisions made or actions based on this letter.

The findings and conclusions documented in this report have been prepared for specific application to this site and have been developed in a manner consistent with that level of care normally exercised by septic design professionals currently practicing under similar conditions in the area.

We trust that this provides the information you currently require. If you have any questions or require comment, please feel free to contact the undersigned.

Yours truly,

**ARDEN CONSULTING ENGINEERS LTD.**

**PER:**

Rob Arden, P.Eng

Encl    Site Plan  
          Test pit Logs



#### Test Pit 1

0-96" Clayey Silt and gravel, frequent cobbles and shale, occasional boulders, angular, light brown to grey, medium dense, some mottling  
No seepage

#### Test Pit 2

0-16" Silty sand and gravel, dark brown, dense, dry  
16-40" Silty sand and gravel (granular), medium dense, dark brown  
40-103" Color change to grey, broken shale, frequent cobbles, occasional boulders, angular some mottling. Localized seepage @40" due to clay pocket  
No seepage at depth

#### Test Pit 3

0-36" Silty sand and gravel, dark brown, loose to medium dense  
36-96" Silty sand and gravel, some clay, grey, frequent cobbles, angular, broken shale, occasional boulders  
No seepage, no mottling

#### Test Pit 4

0-32" Silty sand and gravel, dark brown, medium dense  
32-60" Sand and Gravel, some silt, brown, (granular), medium dense  
60-100" Silty sand and gravel, greyish brown, frequent cobbles and broken shale, angular, medium dense  
No seepage

#### Test Pit 5

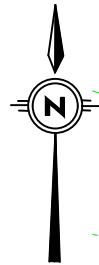
0-24" Sand and gravel, some silt, brown, medium dense  
24-90" Sand and Gravel, some silt, trace clay, medium dense, frequent cobbles and shale, occasional boulders, angular.  
No Seepage

#### Test Pit 6

0-36" Silty sand and gravel, tree debris (fill)  
36-66" Clayey silt and gravel, grey, firm.  
No Seepage

#### Test Pit 7

0-12" Sand and gravel, some silt, grey (fill)  
12-72" Silty sand and gravel, some clay, medium dense, greyish brown, frequent cobbles and shale,  
72-96" sand and gravel, some silt, brown, angular.  
No Seepage



## LEGEND

- LOCATION OF TEST PIT
- LOCATION OF PERCOLATION TEST
- LOCATION OF DOUBLE RING INFILTRMETER TEST
- LOCATION OF WELL
- LOCATION OF WATER SERVICE

0 5 10 15 20 METRES

SCALE 1:400

NOTE: ORIGINAL SEAL IN RED

SEAL

**ACE** ARDEN  
CONSULTING  
ENGINEERS LTD.

CLIENT:

**RHEE GAA HOLDINGS**

PROJECT 52964 YALE ROAD EAST

TITLE JULY 2020 SITE LAYOUT

DATE OF ISSUE  
JUL 30/20  
DWN BY: JD

PROJECT No.  
19-01

DWG. No.  
1 OF 1

REV.  
01

CANCEL PRINTS BEARING EARLIER NUMBER

