



WTN 82603
82E 003314 #21



April 19, 2004

Our File: 2-8-16646
Your File: A03-04978 030

Regional District of Okanagan-Similkameen
101 Martin Street
Penticton British Columbia V2A 5J9

Where noted by s33 some personal information has been severed in this document to protect personal privacy under Section 33 of the FREEDOM OF INFORMATION AND PROTECTION OF PRIVACY ACT

Re: Proposed Subdivision of Lot 1, Plan KAP51492, DL 1989s, SDYD
s33 - Kruger Mountain Road west of Osoyoos

We have received the final plans for the above noted one lot subdivision proposal together with supporting documentation. I enclose copies of the well log information, a well report by Summit Environmental Consultants, and a letter from Aquila. It appears this information provides proof of compliance with your subdivision servicing bylaw requirements.

We are reviewing the file for final approval and if you have any comments or questions, please contact us as soon as possible.

Yours truly,

W. G. Sparkes, AScT
Deputy Approving Officer

16646



SUMMIT

ENVIRONMENTAL CONSULTANTS LTD. ISO 9001 AND 14001 CERTIFIED

#17A - 100 KALAMALKA LAKE RD.
VERNON, BC V1T 7M3
TEL 250 545-3672 FAX 250 545-3654
www.summit-environmental.com

January 30, 2004

Reference: 800-167.4

s33

Osoyoos, B.C.
VOH 1V0



**Re: Well Water Capacity: Lot 1, DL 19895, Plan KAP 51492 SDYD
RDOS File A-03-04979, MOT File 16646**

Introduction

Summit Environmental Consultants Ltd. was retained by Mr. s33

s33 to evaluate pump test data on a well on the above-noted property near Osoyoos, B.C. The test results are required under Regional District of Okanagan-Similkameen (RDOS) Subdivision Servicing Bylaw No. 2000, Amended by Bylaw 2189, Section 3.2.10. The bylaw requires proof that the well can produce 2,300 L/day (506 Imperial gallons/day) and a flow capacity of at least 20 L/minute (4.4 Imperial gallons/minute) for one hour, that the well is drilled and cased, and that the well is constructed in such a way as to prevent surface water from entering the well. This report presents the results of the 72-hour pump test that was completed on the well in January 2004.

Site and Well Descriptions

The subject property is within the RDOS and is located about 10 km west of Osoyoos, B.C., near the north end of Kruger Mountain Road, south of Highway #3. The new well would service a lot that is to be subdivided from an existing property.

Bedrock geology in the area is comprised of metamorphic rocks of the Kobau Group, comprised of undivided amphibolite, greschist, quartzite, mica, schist, and greenstone, and is strongly foliated¹. A search of the B.C. groundwater well database was completed on January 28, 2004. The database indicates that there is only one registered well within 10 km of the property (Well Tag Number 000000054017). The groundwater static level is given as 2.1 m, but no yield data are provided.

¹ Templemann-Kluit, D. 1989. Geology, Penticton, B.C. Geological Survey of Canada Map 1736A. Scale 1:250,000.

The well was drilled by Kelly's Water Well Drilling (250-446-2628). The well is drilled and cased with 0.15 m (6") diameter steel to the overburden-bedrock contact, which is at 4.6 m (15') depth. The well head extends above the ground by about 0.6 m and can be re-sealed. Well depth and the depth to bedrock are provided in Table 1.

72-hour Pump Test Results

Mr. Daniel Bilodeau performed the pump test on the well on January 15-19, 2004. Flow rates were measured using a calibrated pail and stopwatch, and water depths in the wells were measured using a well sounder.

The well was tested by pumping at 20.5 L/min (4.5 Igpm) for 60 minutes and then at 2.28 L/min (0.5 Igpm) for the remainder of the 72-hour period. Well recovery was then checked after 60 minutes and re-checked about 24 hours after the end of the test. The drawdown and recovery data (Appendix 1) for the well is attached, and a summary is provided in Table 1. Figure 1 shows the changes in water level over the course of the test, including the 24-hour recovery period.

The well produced more than the required 2,300 L over 24 hours (Table 1). A total of 10,943 L was pumped out in 72 hours, equal to an average rate of 3,648 L/day. The well was pumped at a rate of 20.5 L/minute for the first hour to determine if the required 1-hour flow rate of 20 L/minute could be maintained. The required 1-hour flow was obtained, but the rate of drawdown was pronounced (Figure 1). The well recovered quickly after the pumping rate was reduced to 2.28 L/min, gaining back about 10 m in the first nine hours. The water level continued to rise throughout the remainder of the test (Figure 1), indicating that the rate of re-charge exceeded the pumping rate. The rate of increase slowed after about 56 hours, indicating that the well was approaching equilibrium. The water level rebounded about 2.5 m in the first hour after pumping stopped, and had regained about 92% of the maximum drawdown by 24 hours after pumping ceased.

Conclusions

- The well is cased and the casings extend above the ground surface. This should be adequate to prevent surface water from entering the well;
- Based on the results of the 72-hour pump test, the wells produced the equivalent of the required 2,300 L/day over the course of the test and appears capable of maintaining this capacity. This conclusion assumes that the pattern of use is typical of single households; and
- Given the depth of the well, the results during the first hour, observed inflow rates during the test, and the recovery rates, the well appears capable of sustaining the required one-hour flow capacity of 20/L minute.

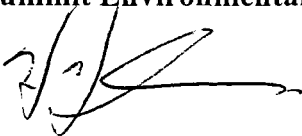
The above conclusions are subject to the attached disclaimer statement. Although the well has the capacity to sustain the required one-hour flow of 20.5 L/minute, we recommend that flows of this magnitude be limited to one hour or less. Also, the landowners should consider following



water conservation measures in landscaping and in other activities that consume large volumes of water.

We trust this completes our current assignment to you satisfaction. Please call if you have any questions.

Yours truly,
Summit Environmental Consultants Ltd.



Hugh Hamilton, Ph.D., P.Ag.
Hydrologist

Enclosures: Table 1
Appendix 1
Figure 1

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Table 1. Well Information and Pump Test Result Summary.

	Well on Lot 1
Total Well Depth (m)	46.2
Depth to bedrock (m)	4.6
Well Diameter (m)	0.15
Static Water Level (m below ground surface)	11.18
Total time of pump test (hours)	72
Pumping rate (L/min) for first 60 minutes	20.5
Pumping rate (L/min) for remainder	2.28
Maximum Drawdown during Pump Test (m)	28.1
Drawdown after 72 hours (m)	11.9
Available Drawdown (m)	35.03
72 hr. Drawdown as Percentage of Available Drawdown (%)	42%
Total volume pumped in 72 hrs (L)	10,943
Average volume pumped per day (L/day)	3,648
Depth of well remaining after 24 hours (m)	23.1
Volume remaining in well after pumping 24 hrs (L)	420
Estimated inflow to well during test (L)	10,727
Recovery in 24 hours (% of maximum drawdown)	92%

All data based on the pumping test data collected by Mr. Daniel Bilodeau.



Disclaimer

Subject to the following conditions and limitations, the investigation described in this report has been conducted in a manner consistent with a reasonable level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area.

1. The scope of the investigation described in this report has been limited by the budget set for the investigation in the work program. The scope of the investigation has been reasonable having regard to that budget constraint.
2. The investigation described in this report has been limited to the scope of work described in the work program.
3. The investigation described in this report has relied upon information provided by third parties concerning the history of well development and borehole stratigraphy and of well response to groundwater pumping (i.e. changes in water level over time). Except as stated in this report, we have not made an independent verification of such information.
4. The investigation described in this report has been made in the context of existing government regulations generally promulgated at the date of this report. Except as specifically noted, the investigation did not take account of any government regulations not in effect and generally promulgated at the date of this report.
5. The findings and conclusions are valid only for the specific properties identified in the report.
6. Since site conditions may change over time, the report is intended for immediate use.

This report is intended for the exclusive use of s33 It may not be used or relied upon in any manner whatsoever, or for any purpose whatsoever, by any other party. Summit Environmental Consultants Ltd. makes no representation of fact or opinion of any nature whatsoever to any person or entity other than s33

In accepting delivery of this report, s33 hereby agrees that any and all claims which it may have against Summit Environmental Consultants Ltd. or any of its servants, agents, or employees arising out of or in any way connected with the investigation described in this report or the preparation of this report, whether such claims are in contract or in tort, and whether such claims are based on negligence or otherwise, shall be limited to a total amount equal to the fees payable to Summit Environmental Consultants Ltd. under our contract with s33

s33



K + T WATER WELL TESTING

ARMSTRONG, BC

(250) 546-0580 Todd Mcken

(250) 546-3738 Ken Mcken

WELL^{S33}

STATIC WATER LEVEL 11.72m

PROJECT^{S33}

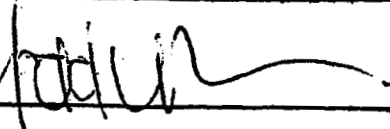
DATE	TIME	ELAPSED TIME	WATER LEVEL	PUMPING RATE	REMARKS
Nov 14	10:00 AM	10 MINS	11.72 m	4.5 GPM	CLOUDY
Nov 14	10:20	20 MINS	12.13 m	4.5 GPM	CLEARING
Nov 14	10:30	30 MINS	12.94 m	4.5 GPM	CLEAR / A LITTLE SMALL
Nov 14	11:00 AM	1 HOUR	14.33 m	4.5 GPM	CLEAR
Nov 14	12 noon	2 HOURS	14.35 m	2 GPM	CLEAR
Nov 14	2:00 PM	4 HOURS	14.33 m	2 GPM	CLEAR
Nov 14	4:00 PM	6 HOURS	14.31 m	2 GPM	CLEAR
Nov 14	6:00 PM	8 HOURS	16.47 m	2 GPM	CLEAR
Nov 14	10 PM	12 HOURS	18.71 m	2 GPM	CLEAR
Nov 15	2 AM	16 HOURS	19.41	2 GPM	CLEAR
Nov 15	6 AM	20 HOURS	21.37 m	2 GPM	CLEAR
Nov 15	10:00	24 HOURS	23.14 m	2 GPM	CLEAR
Nov 15	RECOVERY	25 HOURS	19.36 m	RECOVERY	
Nov 16	RECOVERY	48 HOURS		RECOVERY	

ADDITIONAL REMARKS

STARTED Pumping at a rate of 4.5 GPM for 60 min
AND VALVED Down to 2 GPM

RECOVERY went from 23.14 m at FINISH = 10 AM and in 60
min RECOVERED to 19.36 m

SIGNATURE



WELL LOG CONSTRUCTION RECORD

OWNER __s33

Address 050Y003 BC VCH 1V0 s33

Well Location KILPALA

Date Started 1st JULY 03

Date Completed 3rd JULY 03

Drilling Method ROTOR

Driller BOB CRAMPTON Helper IRVIN KELLY

File _____ Folio _____

Signed by *James Kelly*

KELLY'S WATER WELL DRILLING

RR#1 BRIDESVILLE BC VCH 1B0
TEL 250 446 2628

LOG OF FORMATIONS

Depth	Descriptions
0 to 15'	BURDEN
15' to 152'	BEDROCK
to	
to	
to	
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CASING RECORD

Dia. 6 ins. Wt. 15 #/ft. From _____ to _____
Dia. _____ ins. Wt. _____ #/ft. From _____ to _____
Dia. _____ ins. Wt. _____ #/ft. From _____ to _____
Shoe Welded Cemented _____

SCREEN RECORD

Make _____ Material _____
Slot opening _____ Length _____
Top _____ ft Bottom _____ ft.
Fittings Top _____ Fittings Bottom _____
Gravel pack _____ Natural _____
Development Method _____

ROCK WELL DATA

Open Bore Hole _____ Dia. 6 ins.
From 15 ft. to 152' ft.

PRODUCTION DATA

Static Level 35 ft.
Measured from TOP
Pumping level _____ ft. at _____ GPM
_____ ft. at _____ GPM
Bail Test _____ ft. at _____ GPH
_____ ft. at _____ GPH
Recommended Pump Setting 147' ft.
Recommended Max. Pump Output _____ GPM
GPH
Duration of Test 2 Hrs.

GENERAL REMARKS

2 GALLON PER MIN
WELL WAS LINED WITH 4" 160 PVI