

CERTIFICATION OF WATER QUANTITY AND QUALITY FOR A DRILLED WELL
ON THE EAST LOT OF A PROPOSED SUBDIVISION
AT 30160 DEWDNEY TRUNK ROAD IN THE DISTRICT OF MISSION

(District of Mission Subdivision Application S92-073; File PRF 15-40)

Prepared for

MR. DENNIS ROBERGE
30160 Dewdney Trunk Road
MISSION, B.C. V2V 6H5

Prepared by

PACIFIC HYDROLOGY CONSULTANTS LTD.
115 - 2550 Boundary Road
BURNABY, B.C. V5M 3Z3

July 06, 1993



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Mr. Dennis Roberge
30160 Dewdney Trunk Road
MISSION, B.C. V2V 6H5

**Subject: Certification of Water Quantity and Quality for a Drilled Well on
the East Lot of a Proposed Subdivision at 30160 Dewdney Trunk Road
in the District of Mission**
District of Mission Subdivision Application S92-073; File PRF 15-40

Dear Mr. Roberge:

This letter-report is further to discussions between Mr. Dennis Roberge, Property Owner, and Ann Badry, P. Geo., Hydrogeologist of Pacific Hydrology Consultants Ltd., regarding the drilling and testing of a well to be used as a domestic water supply for the east lot created by the subdivision of the lot on which your existing residence is located.

1.0 INTRODUCTION

The purpose of this report is to show that the subject Roberge Well can satisfy requirements for a potable water supply as defined under District of Mission Bylaw No. 2203-1990. These requirements include:

1. Certification that water quantity will not be less than 2500 litres/day per parcel and that the source can provide a sustained yield of 9 litres per minute for a minimum of four hours.

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2. An assessment of the impact of the well on neighbour wells both within and adjacent to the proposed subdivision.
3. An assessment of the long term impact of the proposed well on the source aquifer.
4. Documentation showing that water quality from the well will meet the drinking water standards of B.C. Ministry of Health.

The Roberge Property proposed for subdivision, which is located along the south side of Dewdney Trunk Road approximately 300 metres east of Statim Road, is legally described as Lot 4, Section 14, Township 15, New Westminster District, Plan 10472.

The location and regional topographic setting of the Roberge Property are shown on Figure 1 in Appendix A; the subdivision layout, local topography and unsurveyed water well locations are shown on Figure 2. The driller's record for the well under discussion is contained in Appendix B.

2.0 AREA WELLS

There are a number of dug and drilled wells in the vicinity of the new Roberge Well on the East Lot to be created by subdivision. The driller's records for four existing drilled wells were examined, including the existing Well supplying the Roberge residence on the West Lot. Three of the drilled wells obtain water supply from unconsolidated overburden sediments and one well, located approximately 400 m to the east, obtains water from fractured

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bedrock. The three overburden wells range in depth from 17.7 m (58 ft) to 25 m (82 ft). The bedrock well, which was drilled to a depth of 99 m (325 ft), intersected 47.25 m (155 ft) of overburden sediments.

The Property Owner and Subdivider has stated that the existing overburden well at 30160 Dewdney Trunk Road has provided adequate potable water over its 11 year history. As shown by the driller's record, the well was bail tested at a rate of 32 i(?)gpm (145 L/min) for one hour.

3.0 HYDROGEOLOGY

A review of Geological Survey of Canada Map 1485A, **Surficial Geology Mission British Columbia**, and of water well records in the area of the proposed Roberge Subdivision, and consideration of previous Pacific Hydrology project experience in the area, indicate that the area is underlain by up to 49 m (161 ft) of unconsolidated glacial sediments and derived soils. The sediments consist of discontinuous and often interfingering lenses of ice contact till, glaciofluvial deposits and outwash sediments, all of which overlies fine-grained, fractured volcaniclastic bedrock.

The subject Roberge Property is located approximately three kilometres southeast of a northeast-trending ridge which acts as a recharge area for the water table aquifers and also for deeper confined aquifers underlying the area. Discharge areas for the water table aquifer are manifest in local seeps and springs in poorly drained areas, whereas groundwater movement through the deeper aquifers is toward Hayward Lake to the southeast.

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4.0 WELL CAPACITY

4.1 General

The subject Roberge Well was pump tested under the supervision of Pacific Hydrology in order to establish that the well has adequate capacity and can meet the requirements of District of Mission Bylaw 2203-1990 as outlined in Section 1.0. The well was drilled by Field Drilling Contractors Ltd. of Aldergrove, B.C. and the pump test was carried out by Murray's Wellpoint and Pump Service.

A 1/3 HP, submersible pump was used for the pump test. Pumping was carried out for 270 minutes and the recovering water level was monitored for 36 minutes.

Pump rates during testing were confirmed by timing the filling of a container of known volume. Water levels were measured with an electric water level indicator. Data collected during the test, along with standard straight line data plots, are included as Appendix C.

4.2 Capacity Test Results

Capacity testing of the subject Well commenced at 10:44 a.m. on June 7, 1993, at an initial rate of 8.6 igpm (38.9 L/min) for the first eight minutes. When this rate caused the pump to break suction, the rate was decreased to 4 igpm (22.3 L/min) for the remainder of the test. Drawdown reached a maximum of 29.78 ft (9.0 m) in the first eight minutes and stabilized at 7.99 m (26.20 ft) after the pump rate was decreased.

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Monitoring of the recovery of the water level in the well commenced immediately after termination of pumping. Approximately 98% recovery was reached in 36 minutes indicating that there is sufficient recharge to the well to sustain the test pumping rate of 4.9 igpm (22.3 L/min). However, since 87% of the total available drawdown was used at this rate, to maintain a reasonable factor of safety on the drawdown, a well capacity of 15.9 L/min (3.5 igpm) is recommended.

5.0 GROUNDWATER QUALITY

A certificate of analysis from Canadian Lysozyme Inc., dated June 17, 1993 for a water sample collected on June 7 during the pump test, is provided in Appendix D.

Analytical results indicate that, with the exception of pH, all other parameters meet the recommended drinking water standards of B.C. Ministry of Health. The pH limit of 6.5 to 8.5 mg/L is non-health related in that water with a pH below 7 can be corrosive. The pH of 6.38 is marginally below the lower acceptable standard. A pH value of 6.38 is not expected to result in any adverse effect. In general, the groundwater from the well is fairly soft, slightly acidic and of good quality for domestic consumption.

6.0 HYDROGEOLOGIC IMPACT ASSESSMENT

The subject well, which obtains water from a confined overburden aquifer is hydraulically isolated from dug water table wells or wells in fractured bedrock; consequently use of the well will not impact on them. The nearest overburden well is 100 metres upgradient. Given this large distance

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and the amount of available drawdown in these two wells there will be little if any interference between them. In addition, owing to the highly anisotropic nature of the glacial sediments which host the overburden aquifers, it may well be that these two wells are utilizing separate aquifers which would further minimize impact.

7.0 SUMMARY AND CONCLUSIONS

1. The subject Roberge Property is located approximately 3 kms southeast of a northwest trending ridge within an area of locally flat relief.
2. The regional hydraulic gradient is southeast toward Hayward Lake. The water table aquifer discharges to surface locally.
3. The area of the proposed Roberge Subdivision is underlain by up to 49 m (161 ft) of unconsolidated glacial sediments consisting primarily of ice contact till which overlies volcaniclastic bedrock.
4. The results from the pump test of the subject Roberge Well indicate that water source requirements of District of Mission Bylaw 2203-1990 are satisfied. Well capacity is estimated at 15.9 L/min (3.5 igpm).
5. Chemical and bacteriological analyses indicate that water from the subject Well meets drinking water guidelines of the B.C. Ministry of Health with the exception of pH. This parameter, which is slightly below the recommended level, is not an health concern. Groundwater from the well, as represented by the Canadian Lysozyme Analysis, is fairly soft and moderately mineralized; it is of generally good quality for domestic consumption.
6. Under the prevailing circumstances, use of the subject well will not adversely impact nearby wells or the source aquifers, either in the short or long term.

Mr. Dennis Roberge

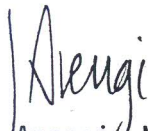
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We trust that this report satisfies requirements of the District of Mission regarding certification of water quantity and quality from the subject Well on the proposed East Lot at 30160 Dewdney Trunk Road. Please do not hesitate to contact the undersigned should you have any questions or if Pacific Hydrology can be of further assistance with Subdivision approval.

Yours truly,

PACIFIC HYDROLOGY CONSULTANTS LTD.


J. Arengi, M.Sc.
Hydrogeologist


E. Livingston, P. Eng.



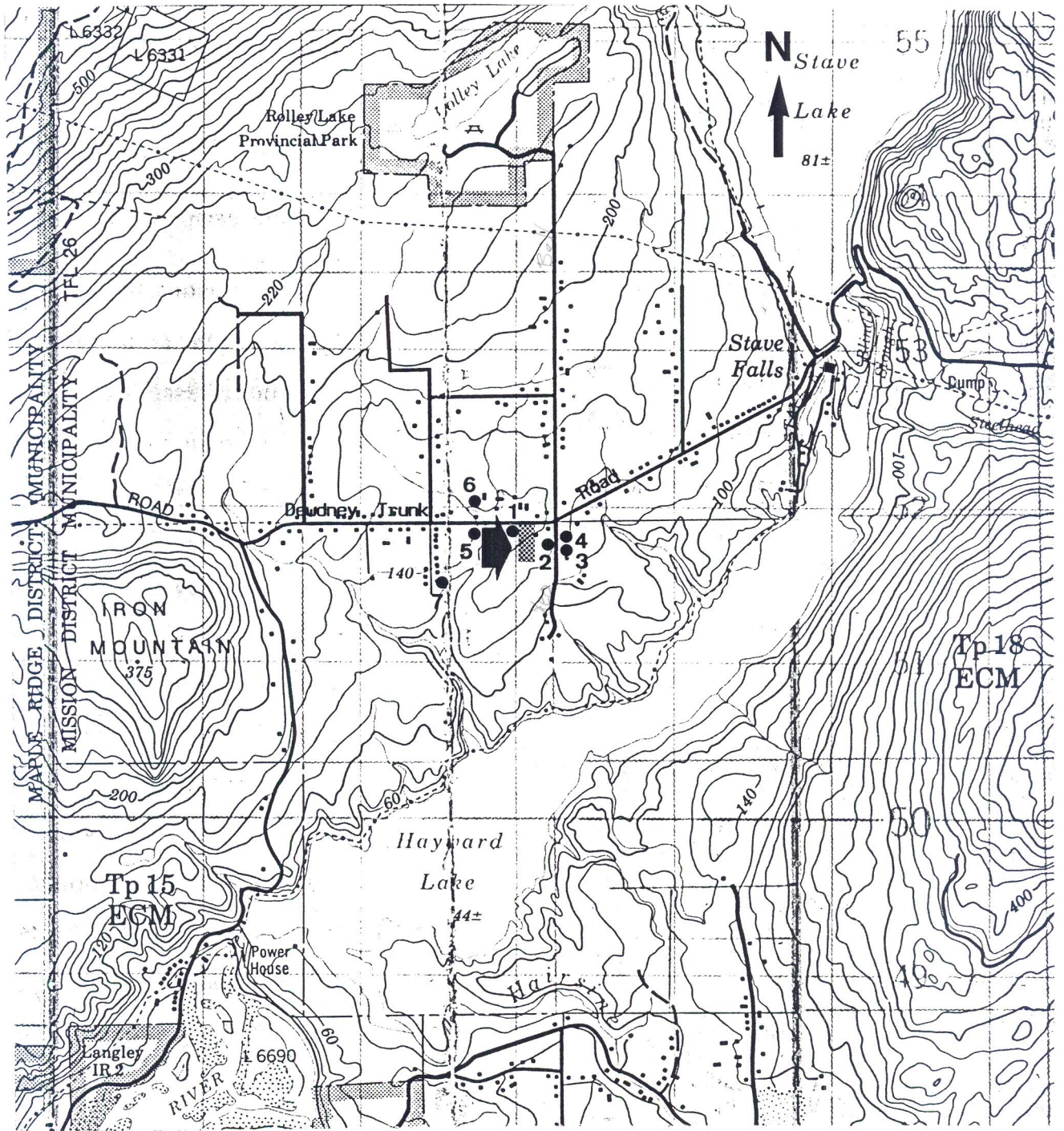
Attachments

APPENDIX A

AREA LOCATION MAP AND SUBDIVISION SITE PLAN

FIGURE 1

AREA LOCATION MAP - PROPOSED ROBERGE SUBDIVISION AT
30160 DEWDNEY TRUNK ROAD MISSION



Notes:


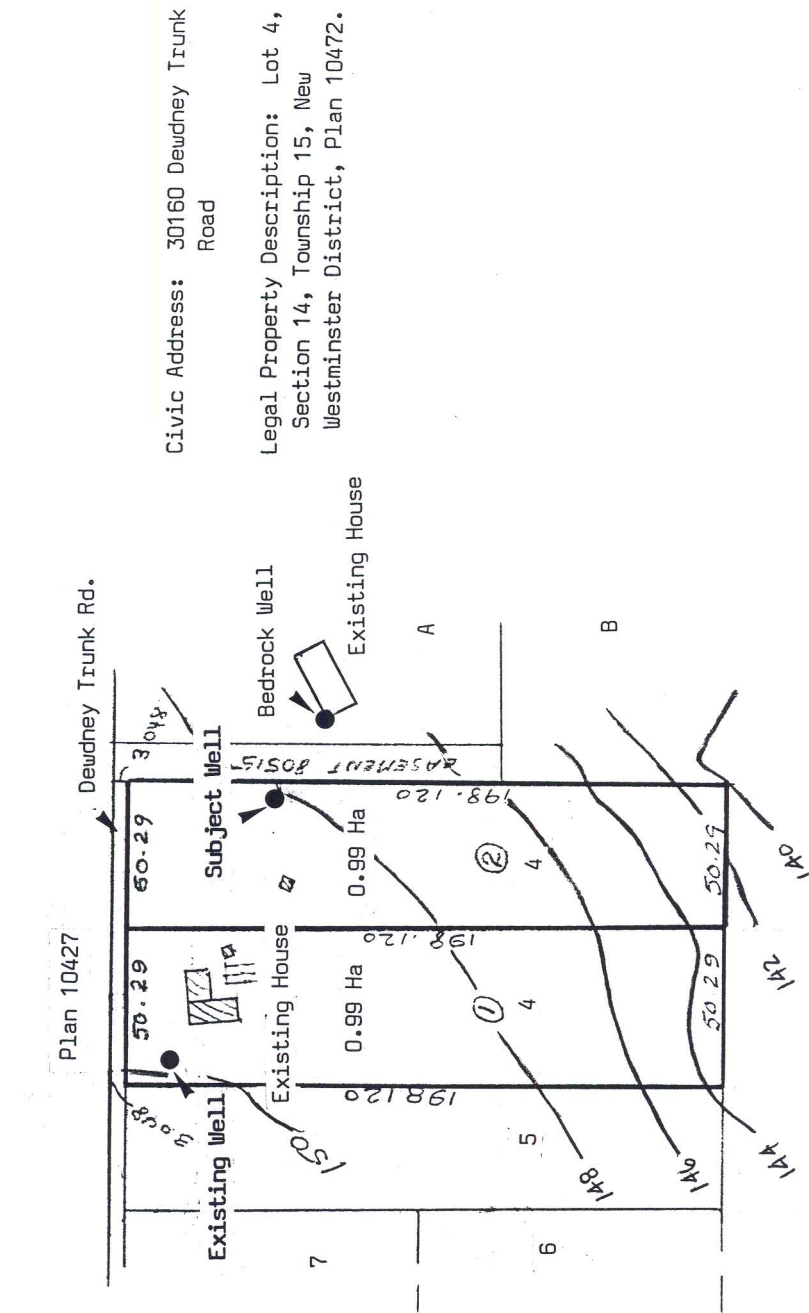
1. The base map is 1:50,000 scale topographic map N.T.S. 92 G/1, Mission, enlarged to a scale of approximately 1:30,000; contour interval is 20 meters.
2.  indicates the location of the proposed Roberge Subdivision on Dewdney Trunk Road.

FIGURE 2

PROPOSED ROBERGE SUBDIVISION LOT LAYOUT AND WATER WELL LOCATIONS



Notes:

1. The base map is a plan by J.M.C. Wade and Associates, dated February 3, 1993, of scale 1:2,500.
2. ● denotes approximate (unsurveyed) location of a water well (details in Appendix B).

APPENDIX B

**WATER WELL RECORD
AND SUMMARY OF DRILLED WATER WELLS**

Table 1. Summary of Drilled Water Wells in Area of Proposed Roberge Subdivision at 30160 Dewdney Trunk Road in Mission

Well No.	Completed Well Depth (ft)	Static Water Level (ft)	Aquifer Material and Well Completion	Driller's Lithology	Remarks
1	58	27	Sand completed with 4 ft of 0.015" slot stainless steel screen set between 54 and 58 ft.	0 - 17 ft blue clay 17 - 37 ft boulders 37 - 48 ft gravel and sand 48 - 58 ft medium to coarse sand.	6" diameter; bail tested at 32 gpm for one hour; location - 30160 Dewdney Trunk Road.
2	325	170	Fractured bedrock; no screen.	0 - 2 ft topsoil 2 - 14 ft brown clay 14 - 31 ft till 31 - 62 ft silty brown clay; moist 62 - 83 ft grey clay; moist 83 - 92 ft grey clay with pebbles 92 - 95 ft boulder 95 - 139 ft rocks and boulders 139 - 155 ft brown silty sand with large rocks 155 - 325 ft bedrock.	6" diameter; tested capacity of 1/2 to 1/4 gpm; location - 30484 Dewdney Trunk Road.
3	39	10	Sand; completed with 0.025" slot screen, with the assembly set between 34.1 ft and 39 ft.	0 - 12 ft silt 12 - 20 ft gravel 20 - 25 ft hardpan 25 - 39 ft sand; water-bearing.	6" diameter; tested capacity of 50 gpm; location - 11930 Yeo Street.

Table 1. Summary of Drilled Water Wells in Area of Proposed Roberge Subdivision at 30160 Dewdney Trunk Road in Mission (cont'd)

Well No.	Completed Well Depth (ft)	Static Water Level (ft)	Aquifer Material and Well Completion	Driller's Litholog	Remarks
4	220	175	Sand and gravel; completed with 8 ft of 0.010" slot stainless steel screen with the assembly set between 187 and 198 ft.	0 - 10 ft brown sandy clay 10 - 20 ft grey clay 20 - 80 ft silty sand 80 - 111 ft gravel and boulders 111 - 165 ft volcanic rock 165 - 190 ft dense till 190 - 200 ft sand and gravel 200 - 215 ft silty sand and gravel 215 - 220 ft silty sand.	6" diameter; bail tested for one hour 9 USgpm with drawdown of 10 ft; location - 30471 Dewdney Trunk Road.
5	82	29	Sand; completed with 3 ft of 5" diameter galvanized screen with 0.015" slots.	0 - 18 ft dug well 18 - 59 ft till, very hard 59 - 63 ft sand and gravel; water-bearing 63 - 82 ft sand 82 - 83 ft sand with clay.	6" diameter; tested at 5 gpm with draw-down of one foot; location - Dewdney Trunk Road, west of Statim Road.
6	97	?	-	0 - 60 ft hardpan 60 - 97 ft till with boulders.	6" diameter; hole incomplete, rods broke; location - 29863 Dewdney Trunk Road (Community Hall).
7	500	?	Fractured bedrock	0 - 90 ft till with boulders 90 - 161 ft till with clay-silt 161 - 295 ft black shale 295 - 500 ft sandstone and shale.	6" diameter; driller's log notes "well making approx. 1/2 gpm; location - 21387 Dewdney Trunk Rd.

APPENDIX C

PUMPING TEST DATA AND PLOTS

Figure 3. Time-Drawdown Plot for Pumping Test of Dennis Roberge Well on East Lot 2

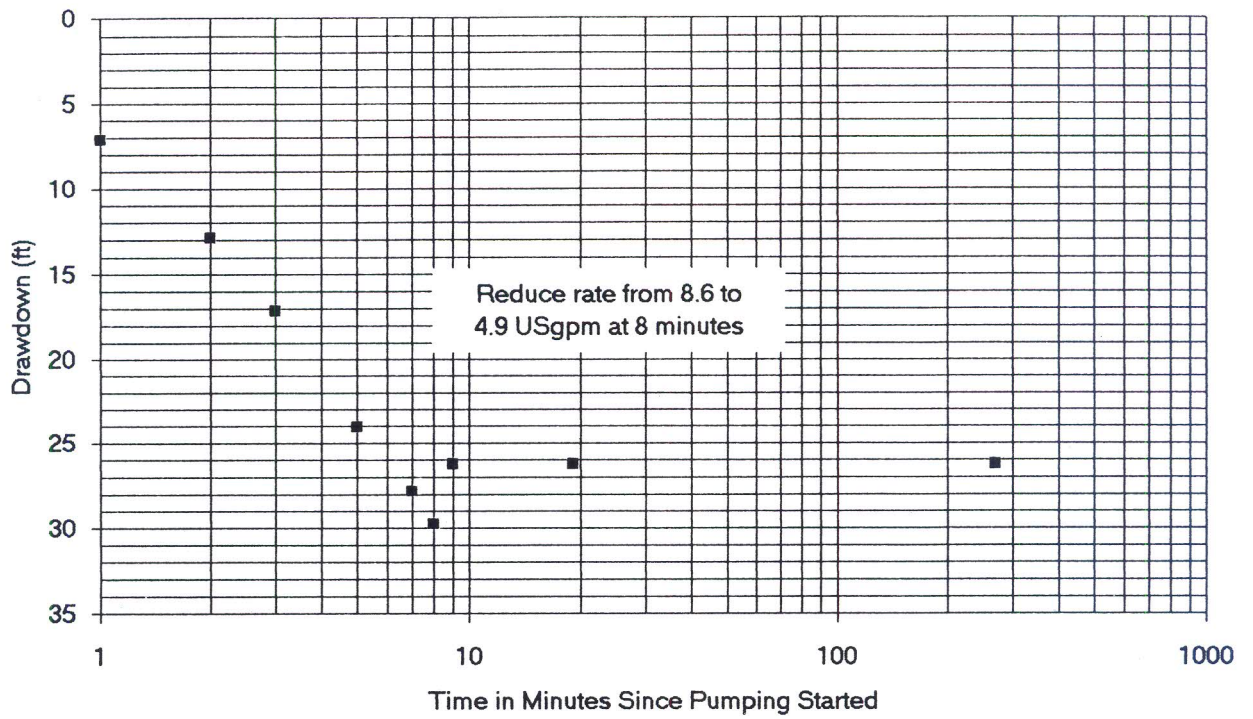
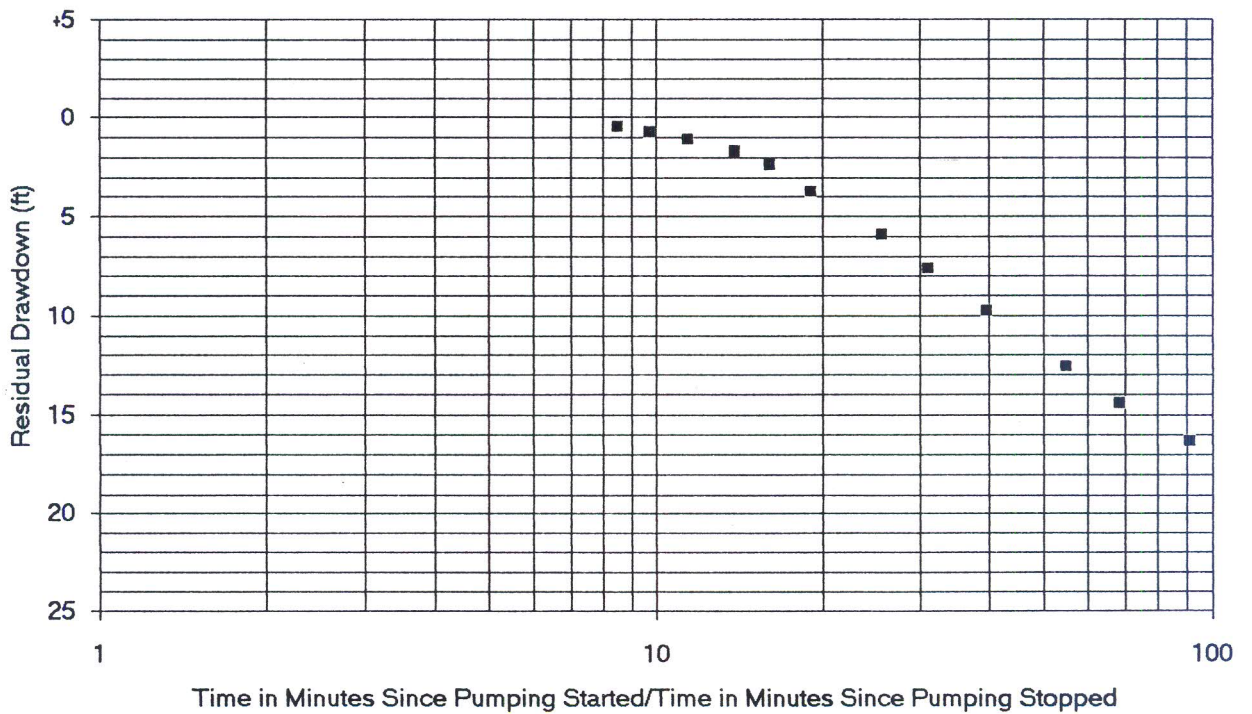


Figure 4. Time-Recovery Plot for Pumping Test of Dennis Roberge Well on East Lot 2



APPENDIX D

WATER QUALITY CERTIFICATE



CANADIAN LYSOZYME INC.

31212 Peardonville Road
Abbotsford, B.C. V2S 5W6

CERTIFICATE OF ANALYSIS

CUSTOMER: Dennis Roberge
30160 Dewdney Trunk Road
Mission, B.C.

CERTIFICATE NO.: 3108
DATE SUBMITTED: June 7, 1993
INVOICE NO.:

We hereby certify that the sample(s) submitted have been tested, and the results are as follows:

Sample Identification:

Water - Received in glass jar

Table with 2 columns: Parameter and Value. Parameters include Total Coliform (MPN), Fecal Coliform (MPN), pH, Total Alkalinity (as CaCO3), Total Hardness (as CaCO3), and Filterable Solids.

Anions

Table with 2 columns: Anion and Value. Anions include Chloride, Sulfate, Nitrate, Fluoride, and Nitrite.

DATED: June 17, 1993

QUALITY CONTROL: [Signature]

WARRANTY AND LIMITS OF LIABILITY - Our warranty is limited to the accuracy of analyses as received. We assume no responsibility for the purposes for which the client uses the test results, nor liability for any other warranties, express or implied, including warranties of fitness for particular purpose or for merchantability made by the client.



CANADIAN LYSOZYME INC.

31212 Peardonville Road
Abbotsford, B.C. V2S 5W6

Customer: Dennis Roberge
30160 Dewdney Trunk Road
Mission, B.C.

Date: June 17, 1993

Certificate: 3108

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We hereby certify that we have tested the samples submitted and report as follows:

<u>SAMPLE IDENTIFICATION</u>		<u>DETECTION LIMIT</u>	<u>RESULTS</u>
Aluminum	Al	0.15 mg/l	<0.15
Antimony	Sb	0.15	<0.15
Arsenic	As	0.30	<0.30
Barium	Ba	0.001	0.003
Beryllium	Be	0.003	<0.003
Bismuth	Bi	0.5	<0.5
Boron	B	0.01	<0.01
Cadium	Cd	0.025	<0.025
Calcium	Ca	0.01	15.5
Chromium	Cr	0.03	<0.03
Cobalt	Co	0.02	<0.02
Copper	Cu	0.015	<0.015
Iron	Fe	0.030	0.11
Lead	Pb	0.08	<0.08
Magnesium	Mg	0.001	4.85
Manganese	Mn	0.003	0.12
Molybdenum	Mo	0.04	<0.003
Nickel	Ni	0.025	<0.025
Phosphorous	PO ₄	0.4	<0.4
Potassium	K	0.01	1.69
Silicon	SiO ₂	0.08	21.9
Silver	Ag	0.03	<0.03
Sodium	Na	0.1	6.77
Strontium	Sr	0.001	0.053
Tin	Sn	0.03	<0.03
Titanium	Ti	0.006	<0.006
Vanadium	V	0.01	<0.01
Zinc	Zn	0.015	<0.015

mg/l = milligrams per liter