

40084

GROUNDWATER DEVELOPMENT

HATCH POINT, B.C.

FOR

CRC CANADIAN RETIREMENT CORPORATION

AND

APLIN & MARTIN ENGINEERING LTD.

*Test Well 1 Now Irrigation Well 1
2 abandoned No Aquifer
3 Now Domestic Well 1
4 Now Domestic Well 2*

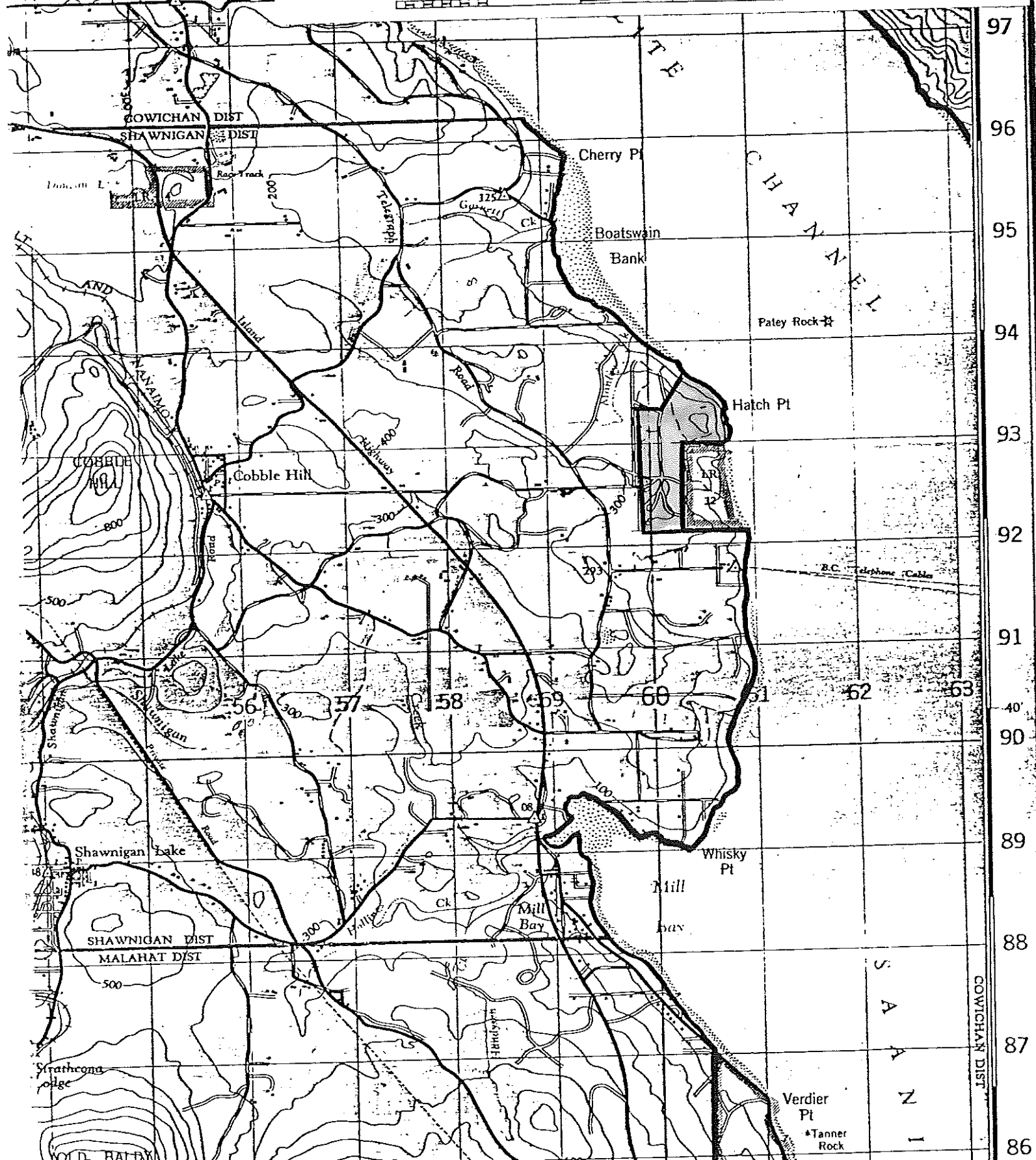
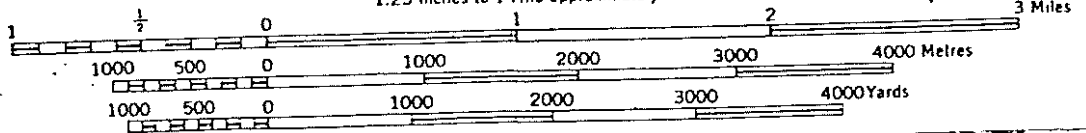
By

W.L. Brown, P. Eng.

June, 1987

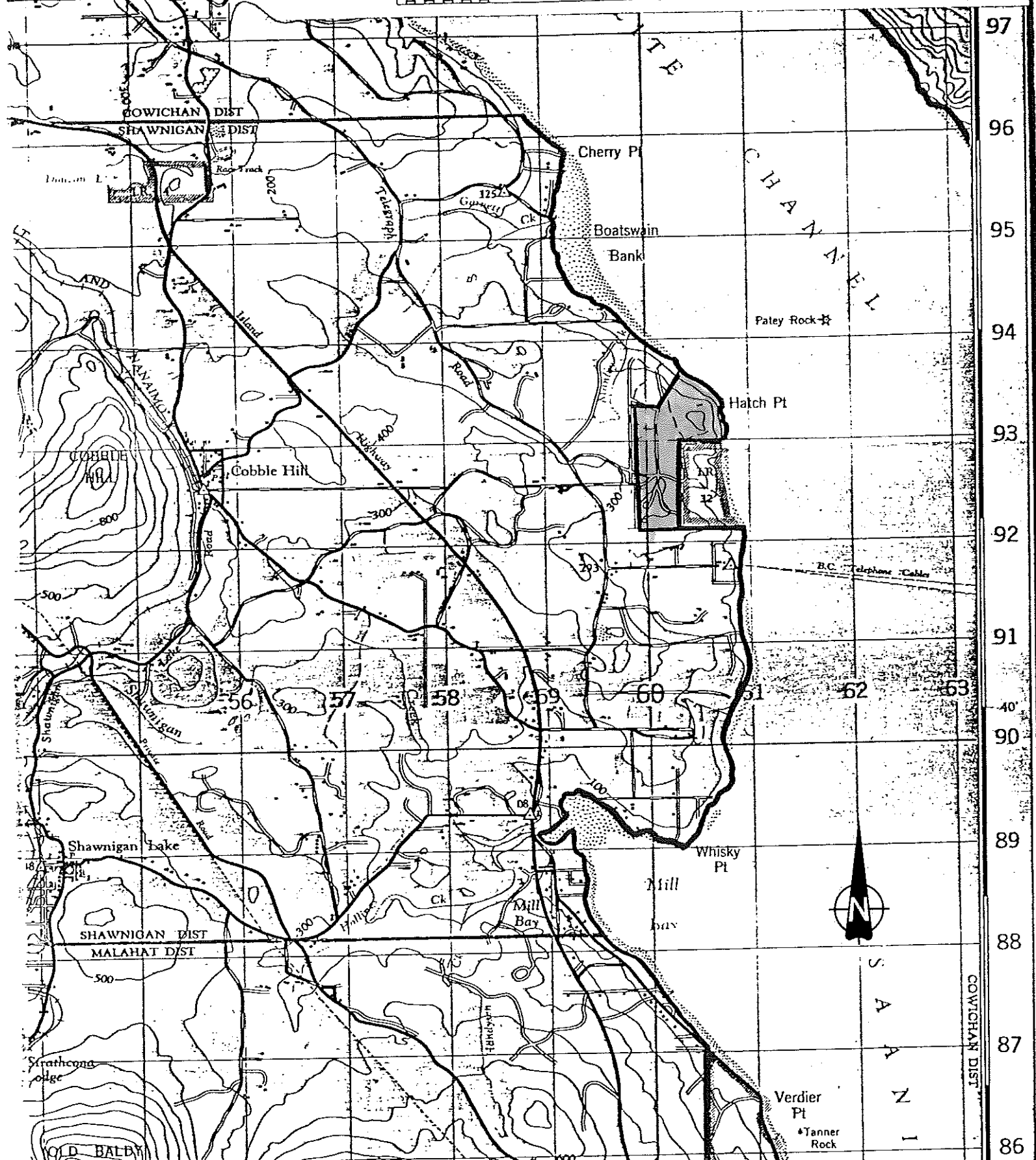
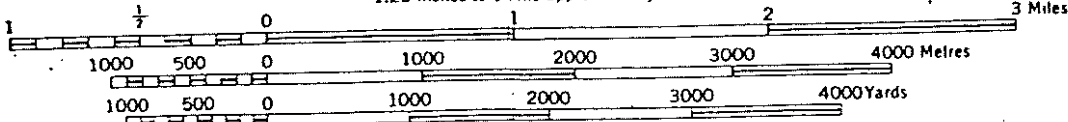
SHAWNIGAN BRITISH COLUMBIA

SCALE 1:50,000
1.25 Inches to 1 Mile approximately



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SCALE 1:50,000
1.25 Inches to 1 Mile approximately

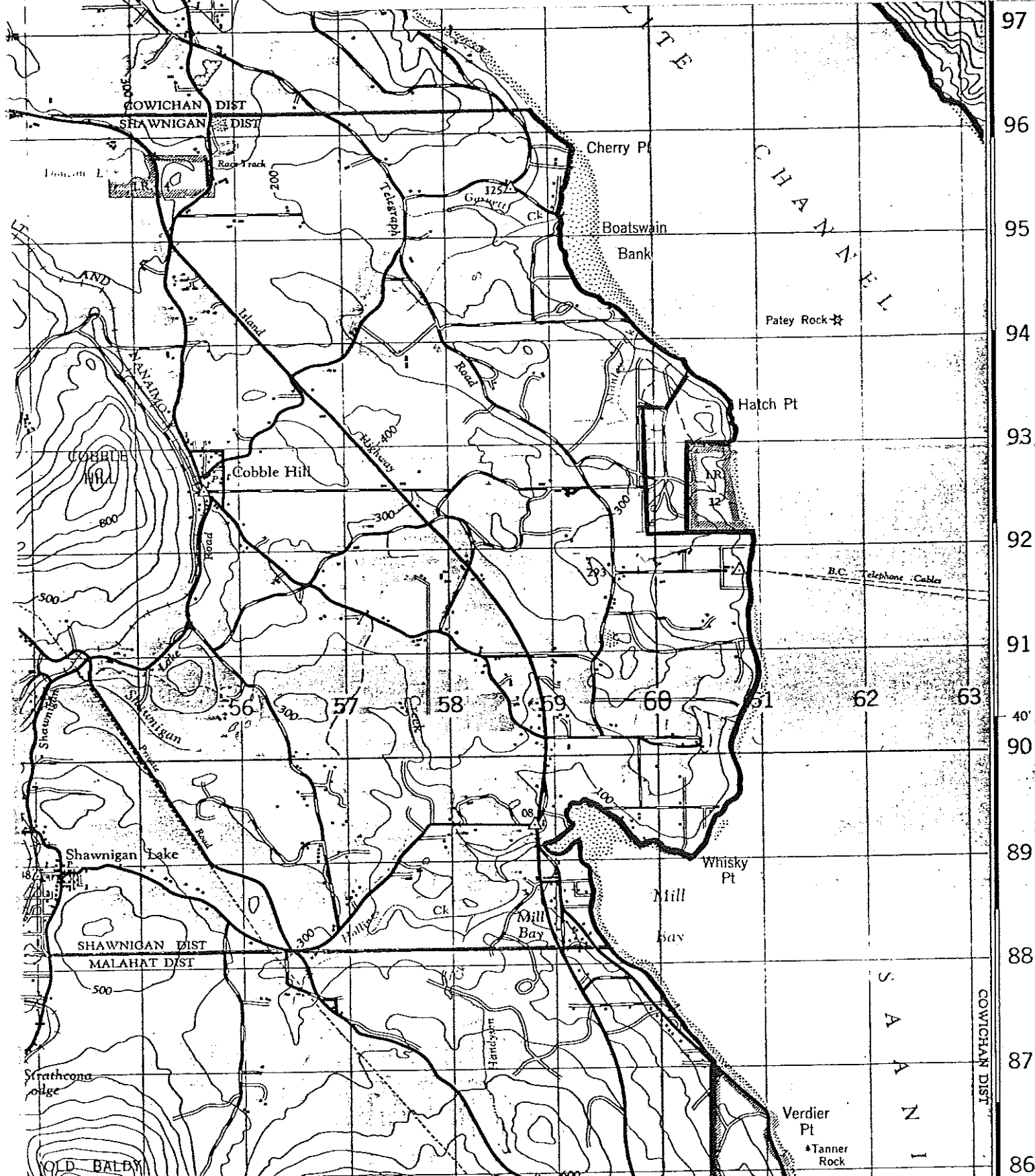
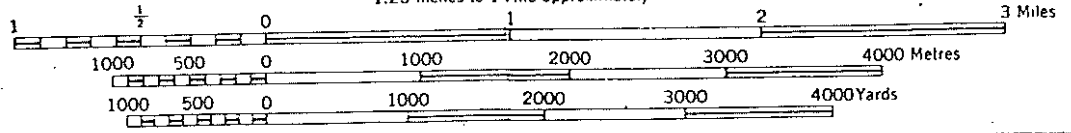


SHAWNIGAN

BRITISH COLUMBIA

SCALE 1:50,000

1.25 Inches to 1 Mile approximately



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1.0 INTRODUCTION

- 1.1 Location - The attached copy of the northeastern part of the Shawnigan topographic map 92 B/12 East Half on a scale of 1:50,000 shows that the subject Hatch Point Area lies approximately 4,500 metres east of Cobble Hill and 4,000 metres north of Mill Bay. The area is bounded on the west by Ratcliffe Road and on the east by the coastline of Satallite Channel and I.R. No. 12. Please see the area coloured orange on the attached map.
- 1.2 Topography - The western half of the area has a subdued rolling topography while the eastern part of the property falls steeply eastwards to the sea. The land surface rises to an elevation of 102 m in the southwestern part of the property.
- 1.3 Drilling and Testing - The program started in September, 1985 and continued intermittently until June, 1987. A completion production pumping test is planned for the summer of 1987 and should be completed in September, 1987. This test will be conducted during the germination of the grass on the Golf Course when all wells will be pumped continuously at their rated capacities.

2.0 HYDROGEOLOGY (Please see the sections attached)

- 2.1 Bedrock - Sandstones and shales of the Comox Formation were encountered in Wells No. 1 and 2. These rock types are observable close to ground surface in the northeastern part of the site and along the sea coast. Wells 3 and 4 encountered granitic bedrock of the Island Intrusions. This granitic bedrock was fractured but the fractures did not contain significant quantities of groundwater. Similar fractured rocks contain appreciable amounts of groundwater across the inlet on Saanich Peninsula. For this reason 80 and 50 metres of the granitic bedrock was drilled and tested for groundwater content without success.
- 2.2 Unconsolidated Sediment - Sands and gravels with interbeds of silts and clays overly a glacial till that lies on top of bedrock. The sands and gravels are water-bearing below depths of 30 to 45 metres. Two aquifers are present, an upper Water Table type aquifer and a lower Artesian Aquifer. The lower Artesian

Aquifer was only encountered in Well No. 1 where it lies below a clay bed which is approximately 12 metres thick.

- 2.3 Regional Considerations - The bedrock valley explored by the drilling program extends to the northwest from the Hatch Point site beneath the adjoining properties and the Granfield farm where an 82 metre deep well is completed in fine sand that reportedly is capable of producing approximately 900 m³/day (140 Igpm) of groundwater. The buried bedrock channel lies to the south of and trends sub-parallel to the present surface valley.

A large area of approximately 70 Km² (27 sq. miles) is available to recharge this buried valley. The precipitation in the area has been estimated to be 940 mm (37-inches). Because of the soil types, the subdued topography, and the small amount of runoff it is estimated that 15% of the precipitation that falls on the area is available to recharge the aquifer. The groundwater recharge increment of the precipitation is therefore approximately 2.6 million cubic metres (688.5 million gallons) of water per year. On a 1,440 minutes per day, 365 days per year basis, 2.6 million cubic metres of water is equivalent to 7,000 m³/day (1,100 Igpm). Although this calculation does not indicate the amount of groundwater that is available to the Hatch Point wells it does indicate that these wells are within a large recharge area and so the wells should be reliable.

- 2.4 General Considerations - The pump tests should be reliable even though they were run in May, 1987 because there is approximately 30 m of "dry" sand above the aquifers and this particular year has had a very "dry" spring.

The ratings of Well 3 and 4 are based upon the minimum specific capacities (m³/day per metre of drawdown) calculated from the pump test results. Useable drawdown is rated at 75 and 70% of the total available drawdown (top of screen minus static water level).

3.0 WELL CONSTRUCTION

Well No. 1 was drilled and developed by an air-rotary rig. Wells 3 and 4 were drilled to the water table using an air-rotary rig, and drilled through the water-bearing zones by a cable-tool rig.

Reference to the logs of the wells and their construction details will show that:

1. Well No. 1 is screened in the sands and gravels that lie below the clay zone with 152 mm (6-inch) telescopic diameter screens that vary from 30 to 10 slot openings.
2. Wells No. 3 and 4 are screened in the upper aquifer with 203 mm (8-inch) telescopic diameter screens. 178 mm (7-inch) diameter blank casing forms a pump sump below the screen that is approximately 6 m (20 feet) long and a riser above the screen that is approximately 0.6 m (2 feet) long.

This construction was used because of the low static water levels and the limited amount of Total Available Drawdown. A "shrouded" pump can be set in the sump below the screen and the water level drawdown to just above the screen. This construction has been used successfully for dewatering wells which pump clear and clean water for many years.

4.0 PUMP TESTING

- IW No 1*
- 4.1 Well No. 1. - The subject well was pump tested at a constant rate of 654 m³/day (100 Igpm) for 1,600 minutes (almost 27 hours) on May 25/26, 1987. Water levels were measured and recorded during pumping and for 14.5 hours after the pump was turned off. Attached please find the pump test data including measurements made in Wells 3 and 4. *DW 1 → DW 2*

Hatch Point Well No. 1 has been dedicated for Golf Course Irrigation because it is located very close to the sewage disposal field. It will be used for a 150 day period each year.

The subject well has the following components. Please see the attached log of the well.

| <u>Component</u> | <u>Depth</u> | |
|--|---------------|-------------|
| | Metres | Feet |
| 8-inch casing | 00.00 - 72.39 | 000 - 237.5 |
| 6-inch telescopic diameter screen assembly | 71.63 - 80.46 | 235 - 264 |
| Back fill | 80.46 - 98.45 | 264 - 323 |

The test pump was set with its intake at a depth of 68.691 m (225.4 feet) and the bottom of the motor at a depth of 69.771 m (229 feet). Such a setting allowed unrestricted flow from the screen assembly to the pump intake.

Reference to the pump test data will show that the static water level in the subject well was at a depth of 30.898 m (101.4 feet) on May 25, 1987. With the pump intake at a depth of 68.7 m (225.4 feet) the Total Available Drawdown was therefore 37.80 m (124 feet).

Reference to the semi-log graphs of the drawdown and recovery water level measurements will show that:

1. The water level was slightly less than 1.5 m (5 feet) above the pump intake when the pump test ended.
2. The water was vortexing slightly as indicated by the "scallop" near the bottom of the last leg of the drawdown chart.
3. The drawdown and recovery graphs are almost identical indicating a properly run test.
4. The two graphs show the influence of negative boundaries as the "cone" around the well expands with time of pumping.
5. The effective transmissivity (field permeability) is shown on the last leg of the drawdown and top leg of the recovery charts to be 10.56 m²/d or 850 U.S.gpd/ft.
6. The Production Design chart is drawn from zero drawdown to the pump suction at a time of 150 days or 216,000 minutes. Using the effective

transmissivity of $10.56 \text{ m}^2/\text{d}$ (850 U.S.gpd/ft.) a discharge rate can be calculated at $343 \text{ m}^3/\text{day}$ (52.5 Igpm).

If the well is pumped at this rate the water level should reach pump suction after a pumping period of 150 days assuming:

- that there is no recharge to the aquifer during the 150 day period.
- that the "cone" of influence around the pumping well does not encounter any more negative boundaries.

These two assumptions should be reasonable because the irrigation demand occurs during the dry summer and fall growing season when negligible recharge should occur. The "cone" of influence was established during the pump test to be close to the pump suction where it will be after 150 days of pumping at the $325 \text{ m}^3/\text{day}$ (50 Igpm) rate. It therefore should have encountered all the various boundaries present.

- 4.2 Well No. 2 - This well did not encounter a sufficient thickness of water-bearing sands to warrant screening, developing or testing.
- 4.3 Well No. ^{DW 1}3 - A constant rate pump test was conducted on May 5/6, 1987. A discharge rate of $233.303 \text{ m}^3/\text{day}$ (35.7 Igpm) was maintained for 1450 minutes or slightly over one day. Drawdown water levels were measured and recorded during pumping and recovery water levels were measured for one hour after pumping stopped.

Please see the attached log of this well, the pump test data and the semi-log plots of the drawdown and recovery water levels. Reference to these plots will show that:

1. the drawdown water levels essentially stabilized after the first 16 minutes of pumping at a depth of 46.437 m (152.4 feet).
2. the drawdown water levels ranged from a depth of 46.377 m (152.16 feet) to 46.462 m (152.43 feet) from 16 minutes into the test to the end of the test at 1450 minutes. This 8.50 cm (3.35-inch) fluctuation was probably caused by slight pump surges.

3. the lowest depth to water reading at 46.462 m (152.43 feet) is equivalent to a drawdown of 46.462 - 43.246 or 3.216 m (10.55 feet). The minimum specific capacity of the well is therefore $233.303/3.216$ equals $72.5 \text{ m}^3/\text{day}/\text{m}$ ($35.7/10.55$ equals 3.4 Igpm per foot of drawdown).
4. The transmissivity calculated from the recovery and drawdown charts approximates $108 \text{ m}^2/\text{day}$ (8,700 U.S.gpd/ft). This value indicates that the specific capacity of the well should be $76.7 \text{ m}^3/\text{day}/\text{m}$ (3.6 Igpm per foot of drawdown). This is close to the $72.5 \text{ m}^3/\text{day}/\text{m}$ (3.4 Igpm per foot of drawdown) minimum value calculated from the test.

The safe production capacity of Well No. 3 can be calculated as follows:

| | Metres | Feet |
|---------------------------|--------|-------|
| Top of Screen | 50.90 | 167.0 |
| Static Water Level | 43.25 | 142.0 |
| Total Available Drawdown | 7.65 | 25.0 |
| Safety (approx. 70% TADD) | 2.26 | 7.4 |
| Total Useable Drawdown | 5.39 | 17.6 |

The Safe Production Capacity is therefore

$$5.4 \text{ m} \times 73 \text{ m}^3/\text{d}/\text{m} = 395 \text{ m}^3/\text{d} \text{ or}$$

$$17.6 \text{ feet} \times 3.4 \text{ Igpm}/\text{ft} = 60 \text{ Igpm}$$

The pump testing of Well No. ³/₂ had no effect on Well No. 1. The reverse will also be true.

It will be noted that Well No. 3 has a 178 mm (7-inch) diameter sump below the 203 mm (8-inch) diameter telescopic screens. A "shrouded" submersible pump can therefore be set below the screens allowing the water level to be drawdown to the top of the screens during pumping. However, the pumping rate of 60 Igpm. should use only 70% of the Total Available Drawdown.

DW 2

4.4 Well No. 4 - A constant rate pump test was conducted on this well during May 12/13, 1987 at a discharge rate of 447 m³/day (68 Igpm). Drawdown Water level readings were taken and recorded during the 1450 minute (slightly over one day) period of pumping and recovery water level measurements were recorded for 60 minutes after pumping was stopped.

Please see attached the details of the pump test, the log of the well and the semi-log plots of the drawdown and recovery readings. Reference to these plots will show that:

1. the drawdown water levels stabilized after 125 minutes into the test with a gradual rise thereafter of 0.538 m or 1.77 feet. This rise is not caused by infiltration of the pumped water because this water was discharged through a hose into the ditch along Ratcliffe Road at a distance of 120 metres (400 feet). Since surges of sandy water were discharged at times during the test the rise in the water levels is attributed to well development by pumping.
2. the effective transmissivity of the aquifer is approximately 93 m²/d or 7800 U.S.gpd/ft.
3. the maximum drawdown during pumping was 40.031-32.470 or 7.561 m (24.8 feet). The minimum specific capacity of the well was therefore 59.12 m³/day per metre of drawdown (2.8 Igpm per foot of drawdown). The transmissivity value indicates that the specific capacity should approximate 69.80 m³/day per metre (3.25 Igpm per foot) of drawdown.

The Safe Production Capacity of Well No. 4 is calculated as follows:

| | Metres | Feet |
|--------------------------|--------|-------|
| Top of Screen | 39.62 | 130.0 |
| Static Water Level | 32.47 | 106.5 |
| | <hr/> | <hr/> |
| Total Available Drawdown | 7.15 | 23.5 |
| Safety (75% of TADD) | 1.79 | 5.9 |
| | <hr/> | <hr/> |
| Total Useable Drawdown | 5.36 | 17.6 |

The Safe Productive Capacity is therefore:

$$5.36 \times 59.12 \text{ m}^3/\text{d}/\text{m} = 317 \text{ m}^3/\text{d}$$

$$\text{or } 17.6 \times 2.8 \text{ Igpm}/\text{ft} = 50 \text{ Igpm}$$

The pumping of Well No. 4 had no effect on Wells 1 or 3.

The production pump should be set in the sump below the screen to allow the water level to be drawdown to the top of the screen.

5.0 WATER QUALITY

The results of the chemical analyses run on samples of groundwater collected just before the end of the pumping tests are attached. These results show that the water meets the drinking water guidelines for the parameters tested.

The suitability of this water for other than drinking water purposes and its possible effects upon distribution and pumping components should be checked by specialists.

6.0 RECOMMENDATIONS AND CONCLUSIONS

6.1 Based upon presently available information the Safe Production Potentials of the Hatch Point Wells are:

Well No. 1 - 343 m³/day (52.5 Igpm) *Irrigation #1*
Well No. 2 - --- no aquifer
Well No. 3 - 393 m³/day (60.0 Igpm) *Domestic #1*
Well No. 4 - 317 m³/day (50.0 Igpm) *Domestic #2*

6.2 Well No. 1 with its location close to the effluent disposal field has been dedicated to golf course irrigation even though the screened interval is separated from ground surface with 50 m of soil and 12 m of clay. This well will be pumped at its design rate for 150 days per year.

6.3 Water wells should not be:

Over-pumped
Vibrated
Raw-hided

- 6.4 A long term production well field test will be conducted for several months during the Summer and Fall of 1987 when water will be used for irrigation purposes during the germination and initial growing period of the golf course grass. Results of this test will establish the safe production capacity of the Hatch Point well field under adverse groundwater conditions of no recharge during a "dry" year.

W E L L L O G S

Grd. Sfc 89m ±

HATCH POINT

WELL NO. 1 *Irrigation Well No 1*

| DEPTH (Below Ground Surface) | | DESCRIPTION | |
|------------------------------|-----------|--|--|
| Metres | Feet | | |
| 0 - 10.0 | 0 - 33 | Gravel, clean | |
| 10.0 - 34.0 | 33 - 111 | Gravel, slightly silty | |
| 34.0 - 46.0 | 111 - 150 | Sand, brown | |
| 46.0 - 50.0 | 150 - 163 | Sand, blue, silty | |
| 50.0 - 62.5 | 163 - 205 | Clay, silty | |
| 62.5 - 72.0 | 205 - 236 | Sand and gravel, silty, brown | |
| 72.0 - 75.0 | 236 - 246 | Gravel, clean, fine, <u>water-bearing</u> , static water level 30.898 m (101 feet) | |
| 75.0 - 81.0 | 246 - 265 | Sand, medium to fine, clean, <u>water-bearing</u> | |
| 81.0 - 84.0 | 265 - 275 | Sand, fine, silty | |
| 84.0 - 86.0 | 275 - 282 | Sand, some gravel | |
| 86.0 - 93.0 | 282 - 304 | Sand, very fine, silty | |
| 93.0 - 94.0 | 304 - 310 | Clay, blue, sticky | |
| 94.0 - 98.0 | 310 - 322 | Till | |
| 98.0 - 98.5 | 322 - 323 | Bedrock, sandstone | |

Construction Details

| | metres | feet |
|--|---------------|---------------|
| 203 mm (8-inch) diameter casing | 00.00 - 72.39 | 000.0 - 237.5 |
| 178 mm (7-inch) diameter riser | 71.63 - 72.54 | 235.0 - 238.0 |
| 203 mm (8-inch) telescopic diameter screens | 72.54 - 80.47 | 238.0 - 264.0 |
| Hole backfilled | 80.47 - 98.45 | 264.0 - 323.0 |

Screens - stainless steel, 30, 12, 12 and 10 slot (top to bottom)

HATCH POINT

WELL NO 2

Depth (Below Ground Surface)

| Metres | Feet | Description |
|-------------|---------|---|
| 0 - 0.9 | 0 - 3 | Top soil, brown. |
| 0.9 - 6.1 | 3 - 20 | Clay, very hard, tight, light brown |
| 6.1 - 14.0 | 20 - 46 | Sand and gravel, cleaner with depth |
| 14.0 - 17.7 | 46 - 58 | Sand, medium, clean, water-bearing at 50 feet |
| 17.7 - 26.5 | 58 - 57 | Clay with gravel |
| 26.5 - 28.3 | 87 - 93 | Silt, grey |
| 28.3 | 93 | Total depth - conglomerate and shale |

Hole backfilled and abandoned

HATCH POINT

WELL NO. 3 *Domestic Well No 1*

| DEPTH (Below Ground Surface) | | DESCRIPTION |
|------------------------------|-----------|---|
| Metres | Feet | |
| 0 - 46.6 | 0 - 153 | Sand and gravel, silty to very silty, "dry" |
| 46.6 - 57.0 | 153 - 187 | Sand, brown <u>water-bearing</u> , static water level 43.246 m (142 feet) |
| 57.0 - 66.5 | 187 - 218 | Sand, silty with clay layers |
| 66.5 - 75.9 | 218 - 249 | Till |
| 75.9 - 161.5 | 249 - 530 | Granitic bedrock, fractured but "dry" |

Construction Details - below ground surface

| | metres | feet |
|--|----------------|---------------|
| 203 mm (8-inch) diameter casing | 00.00 - 50.90 | 000.0 - 167.0 |
| 178 mm (7-inch) diameter riser | 50.20 - 50.90 | 164.7 - 167.0 |
| 203 mm (8-inch) telescopic diameter screens | 50.90 - 57.00 | 167.0 - 187.0 |
| 178 mm (7-inch) diameter sump | 57.00 - 63.09 | 187.0 - 207.0 |
| Hole backfilled | 63.09 - 161.54 | 207.0 - 530.0 |
| Screens - stainless steel, 8, 10, 15 and 20 slot (top to bottom) | | |

HATCH POINT

WELL NO. 4 *Domestic Well 2*

| DEPTH (Below Ground Surface) | | DESCRIPTION |
|------------------------------|-----------|--|
| Metres | Feet | |
| 0 - 36.6 | 0 - 120 | Sand and gravel, very silty, "dry" |
| 36.6 - 44.2 | 120 - 145 | Sand, medium to fine grained, <u>water-bearing</u> , static water level 32.470 m (106.5 feet) below ground |
| 44.2 - 52.4 | 145 - 172 | Sand, fine grained, silty |
| 52.4 - 66.4 | 172 - 218 | Silt, clayey |
| 66.4 - 73.2 | 218 - 240 | Sand, fine grained, silt interbeds |
| 73.2 - 76.8 | 240 - 252 | Sand, fine grained, very silty |
| 76.8 - 83.2 | 252 - 273 | Clay, silty |
| 83.2 - 89.3 | 273 - 293 | Till |
| 89.3 - 137.2 | 293 - 450 | Granitic bedrock, "dry" |

Construction Details - below ground surface

| | metres | feet |
|---|---------------|-----------|
| 203 mm (8-inch) diameter casing | 00.00 - 39.62 | 000 - 130 |
| 178 mm (7-inch) diameter riser | 39.01 - 39.62 | 128 - 130 |
| 203 mm (8-inch) telescopic diameter screens | 39.62 - 44.20 | 130 - 145 |
| 178 mm (7-inch) diameter sump | 44.20 - 50.29 | 145 - 165 |

Screens - stainless steel, 20, 12 and 12 slot.
(top to bottom)

P U M P T E S T

D A T A

IW 1

Hatch Point - Well #1 Constant Rate Test 25/26 May, 1987

Q = 120 U.S.gpm = 654 m³/day

| Time | Elapsed Time Min. | DTW* M. | DD** M. |
|----------|-------------------|---------|---------|
| 25/05/87 | | | |
| 15:30 | 0 | 30.898 | 0 |
| | 0.5 | 38.945 | 8.047 |
| :31 | 1 | 43.218 | 12.320 |
| | 1.5 | 45.418 | 14.520 |
| :32 | 2 | 46.600 | 15.702 |
| | 2.5 | 47.595 | 16.697 |
| :33 | 3 | 48.218 | 17.320 |
| | 3.5 | 48.666 | 17.768 |
| :34 | 4 | 49.000 | 18.102 |
| | 4.5 | 49.258 | 18.360 |
| :35 | 5 | 49.436 | 18.538 |
| :36 | 6 | 49.758 | 18.860 |
| :37 | 7 | 50.039 | 19.141 |
| :38 | 8 | 50.238 | 19.340 |
| :39 | 9 | 50.460 | 19.562 |
| 15:40 | 10 | 50.670 | 19.772 |
| :42 | 12 | 50.925 | 20.027 |
| :44 | 14 | 51.164 | 20.266 |
| :46 | 16 | 51.376 | 20.478 |
| :48 | 18 | 51.570 | 20.672 |
| 15:50 | 20 | 51.763 | 20.865 |
| :55 | 25 | 52.115 | 21.217 |
| 16:00 | 30 | 52.430 | 21.532 |
| :05 | 35 | 52.723 | 21.825 |
| 16:10 | 40 | 52.957 | 22.059 |
| :15 | 45 | 53.179 | 22.281 |
| 16:20 | 50 | 53.375 | 22.477 |
| 16:30 | 60 | 54.108 | 23.210 |
| 16:40 | 70 | 54.430 | 23.532 |
| 16:50 | 80 | 54.702 | 23.804 |
| 17:00 | 90 | 55.202 | 24.304 |
| 17:10 | 100 | 55.422 | 24.524 |
| | 125 | 55.934 | 25.036 |
| 18:00 | 150 | 56.368 | 25.470 |
| 18:50 | 200 | 57.410 | 26.512 |
| 19:40 | 250 | 58.380 | 27.482 |
| 20:30 | 300 | 59.000 | 28.102 |
| 21:20 | 350 | 59.880 | 28.982 |
| 22:10 | 400 | 60.366 | 29.468 |
| 23:00 | 490 | 60.856 | 29.952 |

| Time | Elapsed Time Min. | DTW M. | DD M. |
|----------|-------------------|--------|--------|
| 23:50 | 500 | 61.331 | 30.433 |
| 26/05/87 | | | |
| 00:40 | 550 | 62.000 | 31.102 |
| 01:30 | 600 | 62.411 | 31.513 |
| 02:20 | 650 | 62.730 | 31.832 |
| 03:10 | 700 | 63.035 | 32.137 |
| 04:00 | 750 | 63.268 | 32.370 |
| 04:50 | 800 | 63.593 | 32.695 |
| 05:40 | 850 | 64.357 | 33.459 |
| 06:30 | 900 | 64.580 | 33.682 |
| 07:20 | 950 | 64.779 | 33.881 |
| 08:10 | 1000 | 64.979 | 34.081 |
| 09:00 | 1050 | 65.170 | 34.272 |
| 09:50 | 1100 | 65.335 | 34.437 |
| 10:40 | 1150 | 65.879 | 34.981 |
| 11:30 | 1200 | 65.977 | 35.079 |
| 12:20 | 1250 | 66.113 | 35.215 |
| 13:10 | 1300 | 66.237 | 35.339 |
| 14:00 | 1350 | 66.343 | 35.445 |
| 14:50 | 1400 | 66.485 | 35.587 |
| 15:40 | 1450 | 66.989 | 36.091 |
| 16:30 | 1500 | 67.014 | 36.116 |
| 17:20 | 1550 | 67.120 | 36.222 |
| 18:10 | 1600 | 67.215 | 36.317 |

* DTW - Depth to Water
 ** DD - Drawdown

Hatch Point - Well #1 Test Recovery 26/27 May, 1987

| Time | Recovery Time Min. | DTW M. | DD M. | t/t' |
|----------|--------------------|--------|--------|------|
| 18:10 | 0 | 67.215 | 36.317 | |
| :11 | 1 | 58.754 | 27.856 | 1601 |
| | 1.5 | 55.353 | 24.455 | 1068 |
| :12 | 2 | 53.289 | 22.391 | 801 |
| | 2.5 | 51.116 | 21.218 | 641 |
| :13 | 3 | 51.284 | 20.386 | 534 |
| | 3.5 | 50.692 | 19.794 | 458 |
| :14 | 4 | 50.277 | 19.379 | 401 |
| | 4.5 | 49.902 | 19.004 | 357 |
| :15 | 5 | 49.622 | 18.724 | 321 |
| :16 | 6 | 49.000 | 18.102 | 268 |
| :17 | 7 | 48.678 | 17.780 | 230 |
| :18 | 8 | 48.425 | 17.527 | 201 |
| :19 | 9 | 48.215 | 17.317 | 179 |
| 18:20 | 10 | 48.000 | 17.102 | 161 |
| :22 | 12 | 47.801 | 16.903 | 134 |
| :24 | 14 | 47.550 | 16.652 | 115 |
| :26 | 16 | 47.344 | 16.446 | 101 |
| :28 | 18 | 47.091 | 16.193 | 90 |
| 18:30 | 20 | 46.883 | 15.985 | 81 |
| :35 | 25 | 46.313 | 15.415 | 65 |
| 18:40 | 30 | 46.018 | 15.120 | 54 |
| :45 | 35 | 45.645 | 14.747 | 47 |
| 18:50 | 40 | 45.362 | 14.464 | 41 |
| 19:00 | 50 | 44.900 | 14.002 | 33 |
| 19:10 | 60 | 44.430 | 13.532 | 28 |
| 19:20 | 70 | 44.082 | 13.184 | 24 |
| 19:30 | 80 | 43.806 | 12.908 | 21 |
| 19:40 | 90 | 43.532 | 12.634 | 18.8 |
| 19:50 | 100 | 43.249 | 12.351 | 17 |
| 20:15 | 125 | 42.672 | 11.774 | 13.8 |
| 20:40 | 150 | 42.169 | 11.271 | 11.7 |
| 21:30 | 200 | 41.292 | 10.394 | 9 |
| 22:20 | 250 | 40.552 | 9.654 | 7.4 |
| 23:10 | 300 | 39.909 | 9.011 | 6.3 |
| 27/05/87 | | | | |
| 08:40 | 870 | 35.983 | 5.085 | 2.84 |

Hatch Point - Well #1 Constant Rate Test
 - Observation Wells 25/26 May, 1987

25/05/87

| Time | Elapsed Time Min. | TW No. 3 DTW, m | TW No. 4 DTW, m |
|-------|-------------------|-----------------|-----------------|
| 13:00 | - | 43.879 | 32.265 |
| 15:00 | - | 43.876 | |
| 15:30 | 0 | | 32.259 |
| | 1 | | 32.259 |
| | 2 | | 32.259 |
| | 3 | | 32.259 |
| | 4 | | 32.259 |
| | 5 | | 32.259 |
| 15:40 | 10 | | 32.258 |
| | 15 | | 32.258 |
| 15:50 | 20 | | 32.257 |
| 16:00 | 30 | | 32.257 |
| 16:10 | 40 | | 32.257 |
| 16:20 | 50 | | 32.258 |
| 16:30 | 60 | | 32.258 |
| 16:50 | 80 | | 32.258 |
| 17:10 | 100 | | 32.255 |
| 18:50 | 200 | 43.876 | 32.255 |
| 20:30 | 300 | | 32.258 |
| 21:20 | 350 | | 32.270 |
| 22:10 | 400 | 43.890 | |
| 23:00 | 450 | | 32.270 |
| 00:40 | 550 | | 32.270 |
| 01:30 | 600 | 43.890 | |
| 02:20 | 650 | | 32.270 |
| 04:00 | 750 | | 32.270 |
| 04:50 | 800 | 43.890 | |
| 05:40 | 850 | | 32.270 |
| 07:20 | 950 | | 32.270 |
| 08:10 | 1000 | 43.890 | |
| 09:00 | 1050 | | 32.270 |
| 10:40 | 1150 | 43.904 | 32.284 |
| 11:30 | 1200 | 43.890 | |
| 12:20 | 1250 | | 32.270 |
| 13:10 | 1300 | 43.890 | |
| 14:00 | 1350 | | 32.280 |
| 14:50 | 1400 | 43.892 | 32.275 |
| 15:40 | 1450 | | 32.276 |
| 16:30 | 1500 | 43.890 | 32.272 |
| 18:10 | 1600 | 43.888 | 32.269 |

- Measurements from top of casings

- Static Water Levels

26/05/87

HATCH POINT WELL NO. 2 WAS NOT TESTED

Dw 1
Hatch Point Well No. 3

Constant Rate Test May 5/6, 1987
Q = 42.8 U.S.gpm = 233.303 m³/d

| Time | Elapsed Time Min. | DTW* M. | DD** M. |
|-------|-------------------|---------|---------|
| 11:00 | 0 | 43.246 | 0 |
| | 0.5 | 45.026 | 1.780 |
| :01 | 1 | 45.700 | 2.454 |
| | 1.5 | 46.019 | 2.773 |
| :02 | 2 | 46.165 | 2.919 |
| | 2.5 | 46.258 | 3.012 |
| :03 | 3 | 46.307 | 3.061 |
| | 3.5 | 46.333 | 3.087 |
| :04 | 4 | 46.357 | 3.111 |
| | 4.5 | 46.371 | 3.125 |
| :05 | 5 | 46.391 | 3.145 |
| :06 | 6 | 46.402 | 3.156 |
| :07 | 7 | 46.408 | 3.162 |
| :08 | 8 | 46.410 | 3.164 |
| :09 | 9 | 46.420 | 3.174 |
| :10 | 10 | 46.427 | 3.181 |
| :12 | 12 | 46.432 | 3.186 |
| :14 | 14 | 46.441 | 3.195 |
| :16 | 16 | 46.437 | 3.191 |
| :18 | 18 | 46.435 | 3.189 |
| :20 | 20 | 46.435 | 3.189 |
| :25 | 25 | 46.433 | 3.187 |
| :30 | 30 | 46.430 | 3.184 |
| :35 | 35 | 46.431 | 3.185 |
| :40 | 40 | 46.425 | 3.179 |
| :45 | 45 | 46.427 | 3.181 |
| :50 | 50 | 46.426 | 3.180 |
| 12:00 | 60 | 46.426 | 3.180 |
| :10 | 70 | 46.425 | 3.179 |
| :20 | 80 | 46.422 | 3.176 |
| :30 | 90 | 46.401 | 3.155 |
| :40 | 100 | 46.403 | 3.157 |
| 13:05 | 125 | 46.406 | 3.160 |
| 13:30 | 150 | 46.377 | 3.131 |
| 14:20 | 200 | 46.387 | 3.141 |
| 15:10 | 250 | 46.379 | 3.133 |
| 16:00 | 300 | 46.387 | 3.141 |
| 16:50 | 350 | 46.388 | 3.142 |
| 17:40 | 400 | 46.388 | 3.142 |
| 18:30 | 450 | 46.387 | 3.141 |
| 19:20 | 500 | 46.387 | 3.141 |

| Time | Elapsed Time Min. | DTW M. | DD M. |
|-------|-------------------|--------|-------|
| 20:10 | 550 | 46.389 | 3.143 |
| 21:00 | 600 | 46.392 | 3.146 |
| 21:50 | 650 | 46.415 | 3.169 |
| 22:40 | 700 | 46.423 | 3.177 |
| 23:30 | 750 | 46.432 | 3.186 |
| 00:20 | 800 | 46.432 | 3.186 |
| 01:10 | 850 | 46.427 | 3.181 |
| 02:00 | 900 | 46.416 | 3.170 |
| 02:50 | 950 | 46.435 | 3.189 |
| 03:40 | 1000 | 46.442 | 3.196 |
| 04:30 | 1050 | 46.445 | 3.199 |
| 05:20 | 1100 | 46.453 | 3.207 |
| 06:10 | 1150 | 46.456 | 3.210 |
| 07:00 | 1200 | 46.460 | 3.214 |
| 07:50 | 1250 | 46.450 | 3.204 |
| 08:40 | 1300 | 46.462 | 3.216 |
| 09:30 | 1350 | 46.449 | 3.203 |
| 10:20 | 1400 | 46.439 | 3.193 |
| 11:10 | 1450 | 46.412 | 3.166 |

* DTW - Depth to Water
** DD - Drawdown

Hatch Point Well No. 3

3 Constant Rate Test May 5/6, 1987
 $Q = 42.8$ U.S. gpm = 233.303 m³/d.

| Time | Recovery Time Min. | DTW M. | t/t' | DD M. |
|-------|--------------------|--------|--------|-------|
| 11:10 | 0 | 46.412 | | 3.166 |
| | 0.5 | 44.791 | 2901 | 1.545 |
| :11 | 1 | 44.042 | 1451 | 0.796 |
| | 1.5 | 43.675 | 967.7 | 0.429 |
| :12 | 2 | 43.546 | 726 | 0.300 |
| | 2.5 | 43.456 | 581 | 0.210 |
| :13 | 3 | 43.427 | 484.3 | 0.181 |
| | 3.5 | 43.388 | 415.3 | 0.142 |
| :14 | 4 | 43.381 | 363.5 | 0.135 |
| | 4.5 | 43.355 | 323.2 | 0.109 |
| :15 | 5 | 43.340 | 291 | 0.094 |
| :16 | 6 | 43.332 | 242.7 | 0.086 |
| :17 | 7 | 43.333 | 208.1 | 0.087 |
| :18 | 8 | 43.331 | 182.3 | 0.085 |
| :19 | 9 | 43.313 | 162.1 | 0.067 |
| :20 | 10 | 43.306 | 146 | 0.060 |
| :22 | 12 | 43.302 | 121.83 | 0.056 |
| :24 | 14 | 43.298 | 104.67 | 0.052 |
| :26 | 16 | 43.300 | 91.63 | 0.054 |
| :28 | 18 | 43.298 | 81.56 | 0.052 |
| :30 | 20 | 43.298 | 73.50 | 0.052 |
| :35 | 25 | 43.295 | 59 | 0.049 |
| :40 | 30 | 43.285 | 49.33 | 0.039 |
| :45 | 35 | 43.282 | 42.43 | 0.036 |
| :50 | 40 | 43.288 | 37.25 | 0.042 |
| :55 | 45 | 43.286 | 33.22 | 0.040 |
| 12:00 | 50 | 43.282 | 30 | 0.036 |
| 12:10 | 60 | 43.279 | 25.17 | 0.033 |

DW 2
Hatch Point Well No. 4

Constant Rate Test May 12/13, 1987
Q = 82 U.S.gpm = 447 m³d

| Time | Elapsed Time Min. | DTW* M. | DD** M. |
|-------|-------------------|---------|---------|
| 10:00 | 0 | 32.470 | 0 |
| | 0.5 | 34.674 | 2.204 |
| :01 | 1 | 36.110 | 3.640 |
| | 1.5 | 37.058 | 4.588 |
| :02 | 2 | 37.552 | 5.082 |
| | 2.5 | 37.810 | 5.340 |
| :03 | 3 | 38.000 | 5.530 |
| | 3.5 | 38.139 | 5.669 |
| :04 | 4 | 38.188 | 5.718 |
| | 4.5 | 38.240 | 5.770 |
| :05 | 5 | 38.300 | 5.830 |
| :06 | 6 | 38.342 | 5.872 |
| :07 | 7 | 38.377 | 5.907 |
| :08 | 8 | 38.410 | 5.940 |
| :09 | 9 | 38.420 | 5.950 |
| :10 | 10 | 38.425 | 5.955 |
| :12 | 12 | 39.625 | 7.155 |
| :14 | 14 | 39.754 | 7.284 |
| :16 | 16 | 39.815 | 7.345 |
| :18 | 18 | 39.754 | 7.284 |
| :20 | 20 | 39.823 | 7.353 |
| :25 | 25 | 39.870 | 7.400 |
| :30 | 30 | 39.876 | 7.406 |
| :35 | 35 | 39.908 | 7.438 |
| :40 | 40 | 39.942 | 7.472 |
| :45 | 45 | 39.954 | 7.484 |
| :50 | 50 | 39.951 | 7.481 |
| 11:00 | 60 | 39.962 | 7.492 |
| 11:10 | 70 | 39.984 | 7.514 |
| 11:20 | 80 | 40.012 | 7.542 |
| 11:30 | 90 | 40.008 | 7.538 |
| 11:40 | 100 | 40.019 | 7.549 |
| 12:05 | 125 | 40.030 | 7.560 |
| 12:30 | 150 | 40.031 | 7.561 |
| 13:20 | 200 | 40.015 | 7.545 |
| 14:10 | 250 | 39.990 | 7.520 |
| 15:00 | 300 | 39.920 | 7.450 |
| 15:50 | 350 | 39.871 | 7.401 |
| 16:40 | 400 | 39.840 | 7.370 |

| Time | Elapsed Time Min. | DTW M. | DD M. |
|-------|-------------------|--------|-------|
| 17:30 | 450 | 39.822 | 7.352 |
| 18:20 | 500 | 39.810 | 7.340 |
| 19:10 | 550 | 39.782 | 7.312 |
| 20:00 | 600 | 39.762 | 7.292 |
| 20:50 | 650 | 39.735 | 7.265 |
| 21:40 | 700 | 39.715 | 7.245 |
| 22:30 | 750 | 39.702 | 7.232 |
| 23:20 | 800 | 39.678 | 7.208 |
| 00:10 | 850 | 39.650 | 7.180 |
| 01:00 | 900 | 39.641 | 7.171 |
| 01:50 | 950 | 39.622 | 7.152 |
| 02:40 | 1000 | 39.613 | 7.143 |
| 03:30 | 1050 | 39.599 | 7.129 |
| 04:20 | 1100 | 39.566 | 7.096 |
| 05:10 | 1150 | 39.588 | 7.118 |
| 06:00 | 1200 | 39.547 | 7.077 |
| 06:50 | 1250 | 39.558 | 7.088 |
| 07:40 | 1300 | 39.560 | 7.090 |
| 08:30 | 1350 | 39.560 | 7.055 |
| 09:20 | 1400 | 39.518 | 7.048 |
| 10:10 | 1450 | 39.493 | 7.023 |

* DTW - Depth to Water
** DD - Drawdown

Hatch Point - Well #4 Test Recovery May 13, 1987

| Time | Recovery Time Min. | DTW M. | DD M. | t/t' |
|-------|--------------------|--------|-------|-------|
| 10:10 | 0 | 39.493 | 7.023 | |
| | 0.5 | 36.221 | 3.751 | 2901 |
| :11 | 1 | 34.490 | 2.020 | 1451 |
| | 1.5 | 33.635 | 1.165 | 967.7 |
| :12 | 2 | 33.193 | 0.723 | 726 |
| | 2.5 | 32.975 | 0.505 | 581 |
| :13 | 3 | 32.836 | 0.366 | 484.3 |
| | 3.5 | 32.756 | 0.286 | 415.3 |
| :14 | 4 | 32.700 | 0.230 | 363.5 |
| | 4.5 | 32.661 | 0.191 | 323.2 |
| :15 | 5 | 32.647 | 0.177 | 291 |
| :16 | 6 | 32.615 | 0.145 | 242.7 |
| :17 | 7 | 32.605 | 0.135 | 208.1 |
| :18 | 8 | 32.600 | 0.130 | 182.3 |
| :19 | 9 | 32.585 | 0.115 | 162.1 |
| 10:20 | 10 | 32.575 | 0.105 | 146 |
| :22 | 12 | 32.566 | 0.096 | 121.8 |
| :24 | 14 | 32.567 | 0.097 | 104.6 |
| :26 | 16 | 32.575 | 0.105 | 91.63 |
| :28 | 18 | 32.570 | 0.100 | 81.56 |
| :30 | 20 | 32.562 | 0.092 | 73.50 |
| :35 | 25 | 32.540 | 0.070 | 59 |
| :40 | 30 | 32.538 | 0.068 | 49.33 |
| :45 | 35 | 32.550 | 0.080 | 42.43 |
| :50 | 40 | 32.554 | 0.084 | 37.25 |
| :55 | 45 | 32.540 | 0.070 | 33.22 |
| 11:00 | 50 | 32.550 | 0.080 | 30 |
| 11:10 | 60 | 32.540 | 0.070 | 25.17 |

C H E M I C A L A N A L Y S E S

Date November 12, 1985

File No. 2355A

ASL

Report On: Water Analysis

Report To: Brown & Erdmann
1409 Bewicke Avenue
North Vancouver, B. C.
V7M 3C7

We have analysed the water sample submitted by you on October 29, 1985 and report as follows:-

SAMPLE INFORMATION

The sample was submitted in a proper laboratory container labelled:-

Hatch Point #1
Oct. 25/85
Temp 9.5°C

METHODOLOGY

The analyses were carried out using procedures described in "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, 1980.

RESULTS

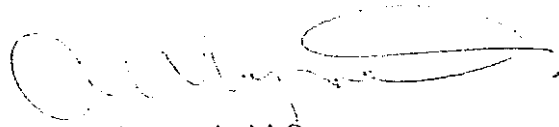
See table following page.

REMARKS

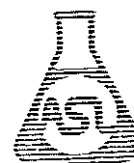
The water as represented by the sample submitted can be characterized as moderate with respect to dissolved mineralization and hardness.

The water sample met British Columbia drinking water guidelines for all parameters analysed.

ASL ANALYTICAL SERVICE LABORATORIES LTD.


A. W. Maynard, M.Sc.
Senior Partner

AWM/mm



analytical service laboratories

CONSULTING CHEMISTS & ANALYSTS
1650 Pandora Street
Vancouver, B.C. • V5L 1L6

RESULTS OF ANALYSIS *Irrigation Well No 1*

| PARAMETER | SAMPLE IDENTIFICATION | | | Drinking Water Guidelines*1 |
|---------------------------------|-----------------------|--|--|-----------------------------|
| Physical Parameters | | | | |
| pH | 7.62 | | | 6.5 - 8.5 |
| Specific conductance (umhos/cm) | 153. | | | -- |
| Color (CU) | L5.0 | | | 15. |
| Turbidity (JTU) | L1.0 | | | 5. |
| Suspended Solids (mg/L) | 5.0 | | | -- |
| Dissolved Solids (mg/L) | 101. | | | 500. |
| Total Hardness (mg/L) | 56.6 | | | -- |
| Dissolved Anions (mg/L) | | | | |
| Bicarbonate HCO ₃ | 73.2 | | | -- |
| Carbonate CO ₃ | - | | | -- |
| Chloride Cl ⁻ | 1.96 | | | 250. |
| Sulfate SO ₄ | L1.0 | | | 500. |
| Fluoride F | 0.076 | | | 1.5 |
| Nitrate + Nitrite N | L0.003 | | | 10.0 |
| Phosphate P | 0.07 | | | -- |
| Dissolved Metals (mg/L) | | | | |
| Calcium Ca | 14.2 | | | -- |
| Magnesium Mg | 5.14 | | | -- |
| Sodium Na | 5.89 | | | -- |
| Potassium K | 0.82 | | | -- |
| Cadmium Cd | L0.002 | | | 0.005 |
| Copper Cu | L0.005 | | | 1.0 |
| Lead Pb | L0.05 | | | 0.05 |
| Zinc Zn | 0.017. | | | 5.0 |
| Iron Fe | L0.03 | | | -- |
| Manganese Mn | L0.005 | | | -- |
| Total Metals (mg/L) | | | | |
| Iron Fe | L0.03 | | | 0.3 |
| Manganese Mn | L0.005 | | | 0.05 |
| | | | | |

L = Less than mg/L = milligrams per liter

*1 "Maximum acceptable concentration" as published by Health & Welfare Canada, 1978

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RESULTS OF ANALYSIS

Domestic Well No. 1 File No. 4134
Page 2 of 2

| Physical Parameters | Drinking #1 Water Guidelines | 1 |
|--------------------------------|------------------------------------|---------|
| pH | 6.5-8.5 | 7.50 |
| Conductivity (µmhos/cm) | - | 220. |
| Colour (CU) | 15. | <5. |
| Turbidity (NTU) | 5. | <1.0 |
| Total Hardness (mg/L) | (*2) | 102. |
| Dissolved Solids (mg/L) | 500. | 178. |
| Suspended Solids (mg/L) | - | <1.0 |
| Dissolved Anions (mg/L) | | |
| Bicarbonate HCO ₃ | - | 109. |
| Carbonate CO ₃ | - | - |
| Chloride Cl | 250. | 7.50 |
| Sulfate SO ₄ | 500. | 6.2 |
| Fluoride F | 1.5 | 0.083 |
| Nitrate + Nitrite N | 10.0 | 1.10 |
| Silicate SiO ₂ | - | 3.9 |
| Dissolved Metals (mg/L) | | |
| Calcium Ca | - | 27.2 |
| Magnesium Mg | - | 8.26 |
| Sodium Na | (*3) | 11.5 |
| Potassium K | - | 0.68 |
| Iron Fe | - | <0.03 |
| Manganese Mn | - | 0.050 |
| Arsenic As | 0.05 | 0.0012 |
| Barium Ba | 1.0 | <0.005 |
| Cadmium Cd | 0.005 | <0.0002 |
| Chromium Cr | 0.05 | <0.005 |
| Copper Cu | 1.0 | <0.005 |
| Lead Pb | 0.05 | <0.001 |
| Zinc Zn | 5.0 | 0.014 |
| Total Metals (mg/L) | | |
| Iron Fe | 0.30 | <0.03 |
| Manganese Mn | 0.05 | 0.050 |

< = Less than
mg/L = milligrams per liter

*1 "Maximum acceptable concentration" as published by Health & Welfare Canada, 1985



Date: June 9, 1987

File No. 4173A

Report On: Water Analysis

Report To: Brown Erdman & Turner Ltd.
1409 Bewicke Avenue
North Vancouver, B. C.
V7M 2W0

We have analysed the water sample submitted by you on May 20, 1987 and report as follows:-

SAMPLE INFORMATION

The sample was submitted in proper laboratory container labelled:-

Hatch Point
May 13/87
Test Well No. 4

METHODOLOGY

The analyses were carried out using procedures described in "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, 1985.

RESULTS

See attached table.

REMARKS

The water as represented by the sample submitted can be characterized as moderate with respect to dissolved mineralization.

The water sample met Canadian and British Columbia drinking water guidelines for all parameters analysed. Nitrate nitrogen was higher than normal and should be periodically checked.

ASL ANALYTICAL SERVICE LABORATORIES LTD.

A. W. Maynard, M.Sc.
Senior Partner

AWM/mm



analytical service laboratories

CONSULTING CHEMISTS & ANALYSTS

1650 Pandora Street
Vancouver, B.C. • V5L 1L6
(604) 253-4188

RESULTS OF ANALYSIS *Domestic Well No 2* File No. 4173A
Page 2 of 2

| Physical Parameters | Drinking *1 Water Guidelines | Well #4 |
|--------------------------------|------------------------------------|---------|
| pH | 6.5-8.5 | 6.95 |
| Conductivity (μ mhos/cm) | - | 176. |
| Colour (CU) | 15. | <5. |
| Turbidity (NTU) | 5. | <1.0 |
| Total Hardness (mg/L) | (*2) | 90.8 |
| Dissolved Solids (mg/L) | 500. | 170. |
| Suspended Solids (mg/L) | - | <1.0 |
| Dissolved Anions (mg/L) | | |
| Bicarbonate HCO_3 | - | 90.1 |
| Carbonate CO_3 | - | - |
| Chloride Cl | 250. | 8.00 |
| Sulfate SO_4 | 500. | 6.9 |
| Fluoride F | 1.5 | 0.13 |
| Nitrate + Nitrite N | 10.0 | 1.79 |
| Silicate SiO_2 | - | 22.1 |
| Dissolved Metals (mg/L) | | |
| Calcium Ca | - | 23.7 |
| Magnesium Mg | - | 7.59 |
| Sodium Na | (*3) | 5.33 |
| Potassium K | - | 1.05 |
| Iron Fe | - | <0.03 |
| Manganese Mn | - | 0.011 |
| Arsenic As | 0.05 | 0.0010 |
| Barium Ba | 1.0 | 0.004 |
| Cadmium Cd | 0.005 | <0.001 |
| Chromium Cr | 0.05 | <0.010 |
| Copper Cu | 1.0 | <0.005 |
| Lead Pb | 0.05 | <0.001 |
| Zinc Zn | 5.0 | 0.013 |
| Total Metals (mg/L) | | |
| Iron Fe | 0.30 | <0.03 |
| Manganese Mn | 0.05 | 0.011 |

< = Less than

mg/L = milligrams per liter

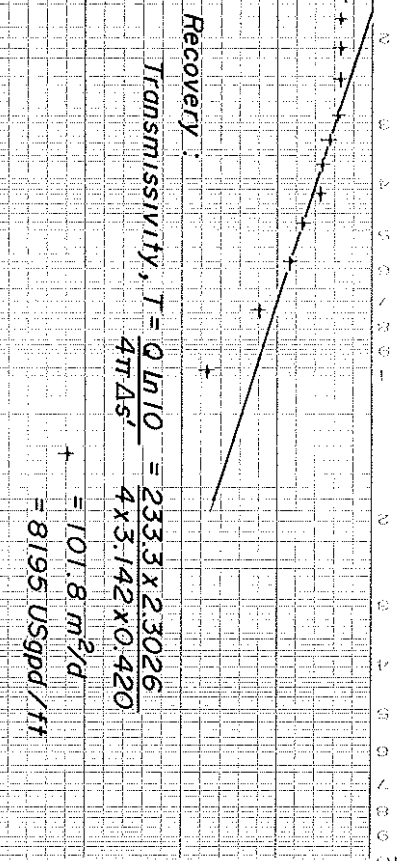
*1 "Maximum acceptable concentration" as published by Health & Welfare Canada, 1980

*2 "Maximum level not established - water supplies with a hardness exceeding 200 mg/L are considered poor but will be tolerated. Not a health consideration

*3 Maximum level not established - of concern to consumers with sodium restricted diet. Levels exceeding 20 mg/L may be of concern in this circumstance

S E M I - L O G P L O T S

CRC CANADIAN RETIREMENT CORPORATION
HATCH POINT TEST WELL NO. 3
 PUMPING TEST 5-6 MAY 1987

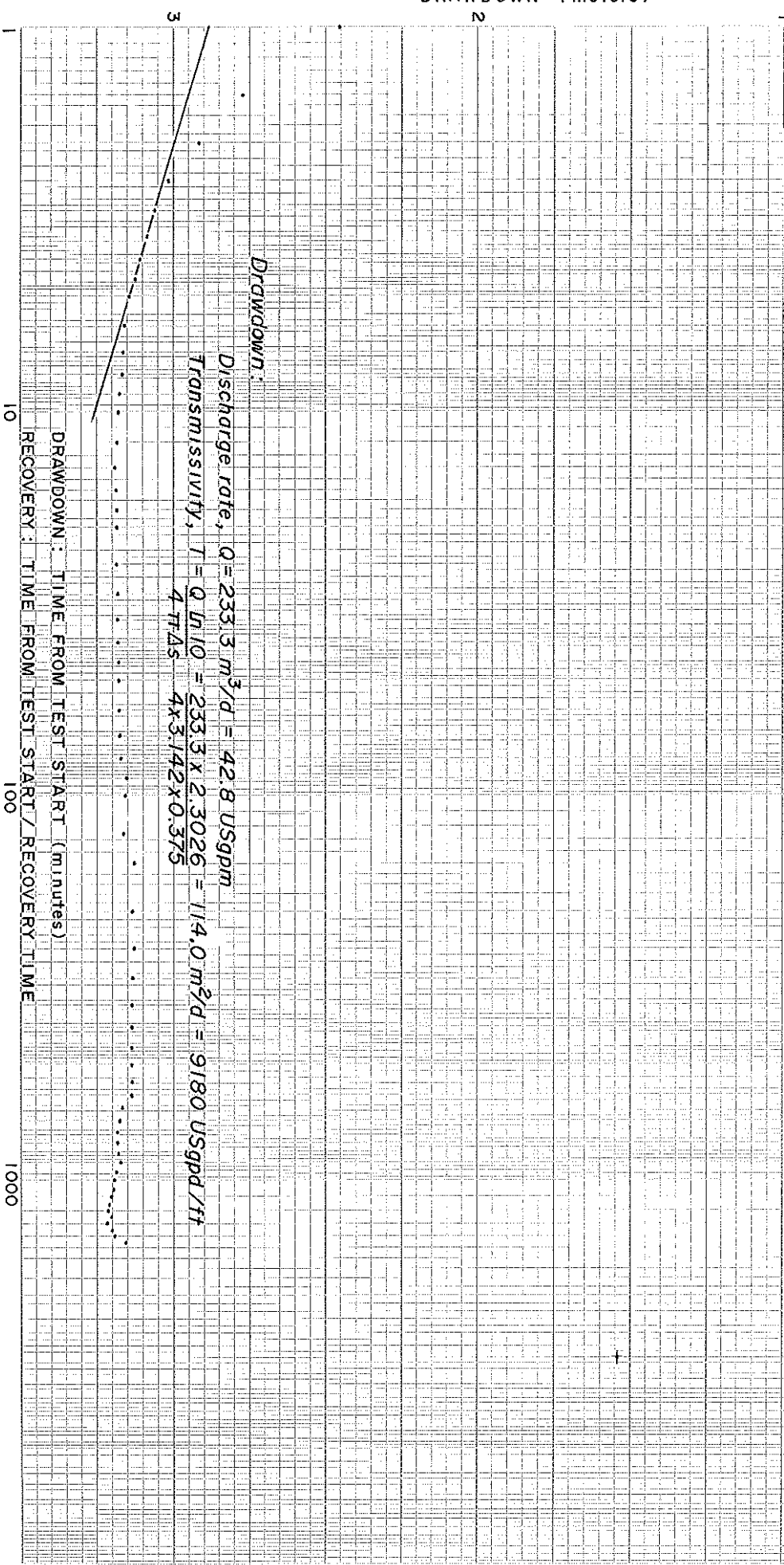


Recovery:

$$\text{Transmissivity, } T = \frac{Q \ln 10}{4\pi \Delta s} = \frac{233.3 \times 2.3026}{4 \times 3.142 \times 0.420}$$

$$= 101.8 \text{ m}^2/\text{d}$$

$$= 8195 \text{ USgpd/ft}$$



Drawdown:

$$\text{Discharge rate, } Q = 233.3 \text{ m}^3/\text{d} = 42.8 \text{ USgpm}$$

$$\text{Transmissivity, } T = \frac{Q \ln 10}{4\pi \Delta s} = \frac{233.3 \times 2.3026}{4 \times 3.142 \times 0.375}$$

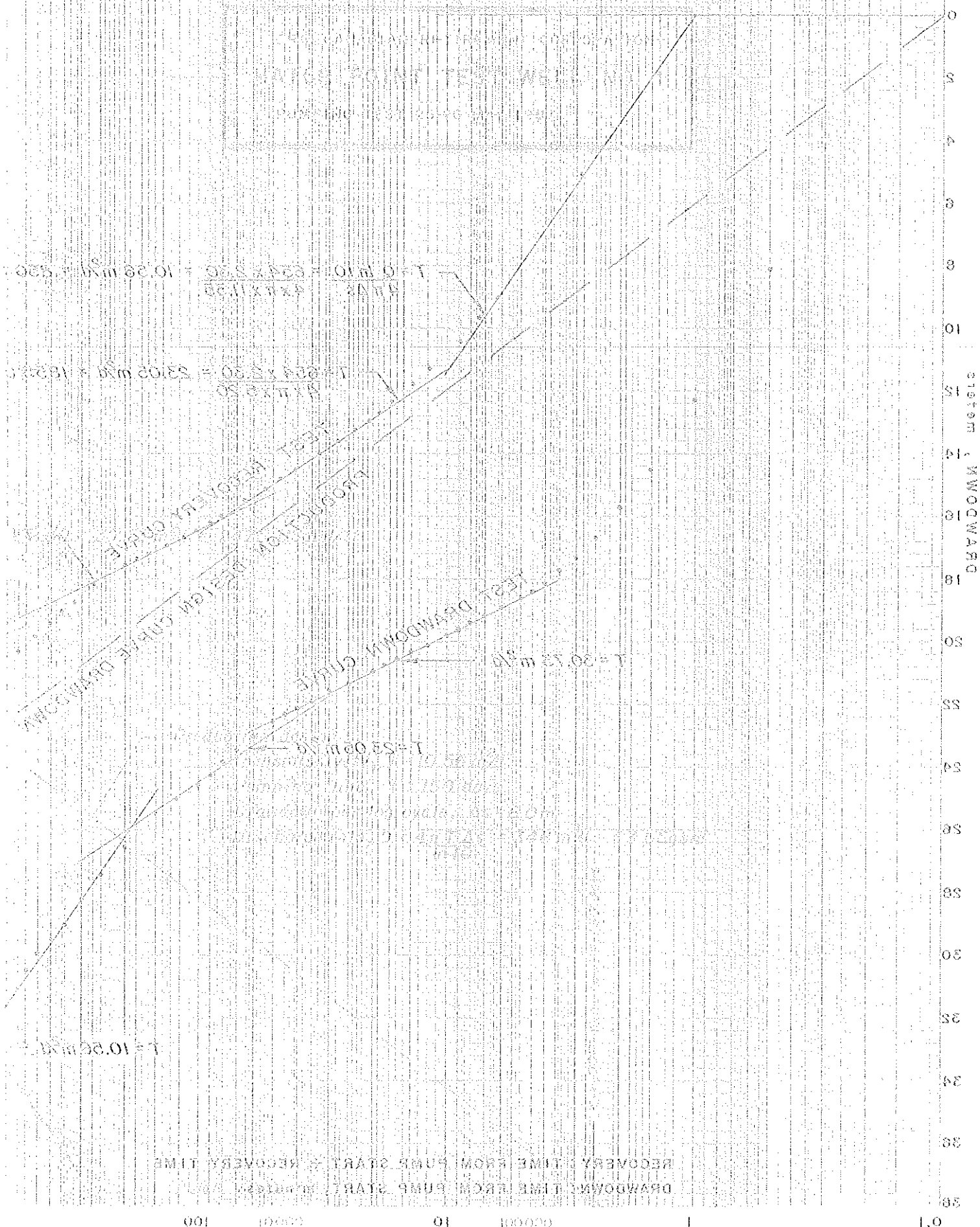
$$= 114.0 \text{ m}^2/\text{d} = 9180 \text{ USgpd/ft}$$

DRAWDOWN: TIME FROM TEST START (minutes)
 RECOVERY: TIME FROM TEST START/RECOVERY TIME

DRAWDOWN (meters)

10

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CRC CANADIAN RETIREMENT CORPORATION
HATCH POINT TEST WELL NO. 4
 PUMPING TEST 12-13 MAY 1987

