

PACIFIC HYDROLOGY CONSULTANTS LTD.
CONSULTING GROUNDWATER GEOLOGISTS

204 - 1929 WEST BROADWAY
VANCOUVER, B.C. V6J 1Z3
TELEPHONE: (604) 738-9232

July 19, 1989

Timberline Ranch Ltd.
22531 - 144th Avenue
MAPLE RIDGE, B. C. V2X 7E7

Attention: Mr. R. Hoskyn

Subject: Water Supply Alternatives for Timberline Ranch North
of Haney, B. C.

Dear Sirs:

This letter is further to a discussion between R. Hoskyn of Timberline Ranch Ltd. and E. Livingston, P. Eng., of Pacific Hydrology Consultants Ltd. at Pacific Hydrology's Office on July 11, and also to a discussion on July 13 at the Ranch between F. Chisholm of Timberline Ranch Ltd. and E. Livingston of Pacific Hydrology, concerning domestic water supply at the Ranch. The location of the Ranch is shown on Figure 1 in Appendix A attached to this letter.

1.0 INTRODUCTION

From the aforementioned discussions and site visit by E. Livingston, we understand that the situation concerning water supply at Timberline Ranch is as follows:

1. The Ranch is used as a summer camp for children and also during fall, winter and spring for groups, mostly on weekends.

2. The Ranch is supplied with water from two drilled wells located close to the Block House, which is shown on the sketch plan attached to this letter-report as Figure 2 in Appendix A. The combined capacity of these wells is low but, except in the summer months, is sufficient to supply the demands of the Ranch.
3. The shortage of water in the summer is made up by purchasing water from a water delivery service.
4. The amount of water required to relieve the summer shortage is estimated to be quite small, probably not more than 5000 igal per day.
5. There is an ultraviolet water treatment system presently in operation; additional water could be run through this unit.
6. The creek (Donegani Creek?) which runs through the northeast corner of the property flows throughout the year.
7. Three test wells were recently drilled by Nor-West Water Well Drilling Ltd.; two of these were dry holes and the other obtained a small amount of poor quality water from rock. The logs of these wells are attached to this letter in Appendix B.

The following sources of information were used in the preparation of this letter-report:

1. Topographic map N.T.S. 92G/7, Port Coquitlam, of scale 1:50,000.
2. Geological Survey of Canada Map 1484A, **Surficial Geology New Westminster British Columbia**, of scale 1:50,000, published in 1980.
3. Logs of the three test wells recently drilled on the Ranch by Nor-West Water Well Drilling Ltd., along with a telephone discussion between E. Livingston of Pacific Hydrology and Mr. D. (Dave) Walsh of Nor-West, who drilled the third test well.

4. Aerial photographs 61 and 62 of Roll 3653 and photo's 1 through 4 of Roll SRS3613, all from the library of the U.B.C. Experimental Forest.
5. A sketch plan of the Ranch showing the layout of the buildings and other features.

We attempted to obtain logs for the two drilled wells which are in use at the Ranch at the present time; however, there is no record of these wells in the water well inventory at the Groundwater Division of B. C. Ministry of Environment so details about well completion and subsurface conditions at the site of these wells are unknown.

2.0 SURFICIAL GEOLOGY AND TOPOGRAPHY

GSC Map 1484A shows that the area of Timberline Ranch is underlain by Salish sediments consisting of "lowland peat up to 14 m thick". However, the driller's logs of materials encountered in the three recently drilled test wells show that the Ranch is underlain by the Fort Langley Formation, which is shown on the map to underlie the area a short distance to the north. The Fort Langley Formation is described as "glaciomarine stony clayey silt to silty sand 8 to 90 m thick, commonly thinly bedded and containing marine shells". The logs of the three test wells show that the silt rests directly on the granitic rocks of the Coast Range Complex.

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The silt underlying the Ranch was deposited at the end of the last glacial event in the area when sea level was 100 m (330 ft) or more above its present level. The silt was deposited from sediment-laden water from melting ice; the stones in the silt were dropped from floating ice. The surface of the silt is almost flat. The glaciomarine silt was not deposited on steep rock slopes and it was removed by erosion from the tops of rounded rock outcrops in the Ranch area.

The slight increase in topographic slope at the northern edge of the cleared area is probably due to the deposition of sediment eroded from the rocky hills to the north.

3.0 DEVELOPMENT OF ADDITIONAL WATER

The three possible options for developing additional water for the Ranch are:

1. Construct additional wells to increase the capacity of the groundwater source.
2. Develop the spring located on the northwest part of the property.
3. Obtain water from the creek (Donegani(?) Creek) which runs through the northeast corner of the property.

3.1 Additional Wells

The recent experience with the drilling of three test wells to increase the groundwater source is rather discouraging. The glaciomarine silt contains little if any water, and water from the underlying bedrock seems to be of poor quality. We believe that the best chance of obtaining water from wells is on the north part of the property where the ground slopes up to meet the rock outcrop. In that area there may be a thin layer of broken rock and other permeable sediment on the sloping rock surface or even within the silt. A site near the rifle range or near the old building east of the rifle range could be tried. Test wells would be shallow so that exploration would be relatively inexpensive; however, even if such wells are successful, their capacity would be low.

3.2 Spring Source

The spring near the archery range has obviously been used as a water supply in the past. It is not possible to estimate the capacity of such a source without carrying out some sort of testing. The water is probably coming from a fracture(s) in the bedrock which outcrops a short distance to the north. The best way to evaluate the spring is probably to excavate an hole as deep as possible with a small backhoe.

In fact, it may be necessary to excavate several holes or a trench in order to collect most of the flow. The excavation(s) should then be pump tested using a small gasoline-powered contractor's pump discharging the water through a control valve and pipe so that it flows southward on top of the ground. After the initial drawdown, the valve should be partially closed to maintain a steady water level in the excavation. Pumping should continue for 12 hours or more and the pumping rate should be measured occasionally by timing the filling of a container of known volume. If the procedure described above shows that the source has sufficient capacity in late summer to be of interest, a water sample should be taken for chemical analysis.

Development of the spring source should be based on "drain type" construction using "Big-O" drain pipe buried in fine gravel (birdseye). The drain pipe can be connected to a sump constructed of concrete rings from which it can be pumped by a simple centrifugal pump to the existing reservoir.

We estimate that there is a 30% chance that the spring can provide 5000 imperial gallons per day in the summer months.

3.3 Surface Water

The creek which flows through the northeast corner of the property certainly seems to be a feasible source for the Ranch. It is reported to run all year and there are no obvious sources of pollution on the headwaters. The most dangerous possible pollution is by cysts of giardia which are sometimes carried by beavers. However, we know of no reports of giardia in this part of the Province.

If it is possible to obtain a water licence on this creek, a gravity system delivering water to the reservoir could be developed by placing the point of diversion at an elevation above the Ranch buildings. The first step is to apply for a water license at the Surrey Regional Office of B. C. Ministry of Environment:

B. C. Ministry of Environment
Water Management Branch
10334 - 152A Street
SURREY, B. C. V3R 7P8
Telephone: 584-8822

We do not have any idea how quickly such a water license is likely to be processed; this can be determined by contacting the Regional Water Manager, J. W. McCracken, P. Eng. Even if there is likely to be a delay in obtaining such a license, there may be considerable future benefit to having access to a supply of water from the creek.

4.0 SUMMARY

Our investigation of the water supply situation at Timberline Ranch may be summarized as follows:

1. The geology of the site is not favourable for the development of wells. The best chances for developing additional groundwater appear to be in the northern part of the property.
2. It should be possible to develop a source of water from the spring located in the northwest part of the property, but the capacity of such a source can only be determined by excavation and pump testing.
3. The creek which runs through the northeast part of the property appears to be a viable source of good quality water and it may be possible to develop a gravity source based on a point of diversion at an elevation above the Ranch Buildings.

5.0 RECOMMENDATIONS

All things considered, we recommend the following course of action to increase the source of water to Timberline Ranch:

1. Apply for a water license on the creek (Donegani(?) Creek). If the application is accepted, obtain a cost estimate from civil engineers for development of this source.
2. If for some reason the creek is not a feasible source, or if a long delay is likely to occur before a water license could be obtained, carry out excavation and pumping at the spring to determine its capacity in the late summer months.
3. Drill one or more test wells in the northern part of the property at a location(s) east of the rifle range.

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Please call if you wish to discuss the contents
of this letter or if we can be of further assistance with
this matter.

Yours truly,
PACIFIC HYDROLOGY CONSULTANTS LTD.

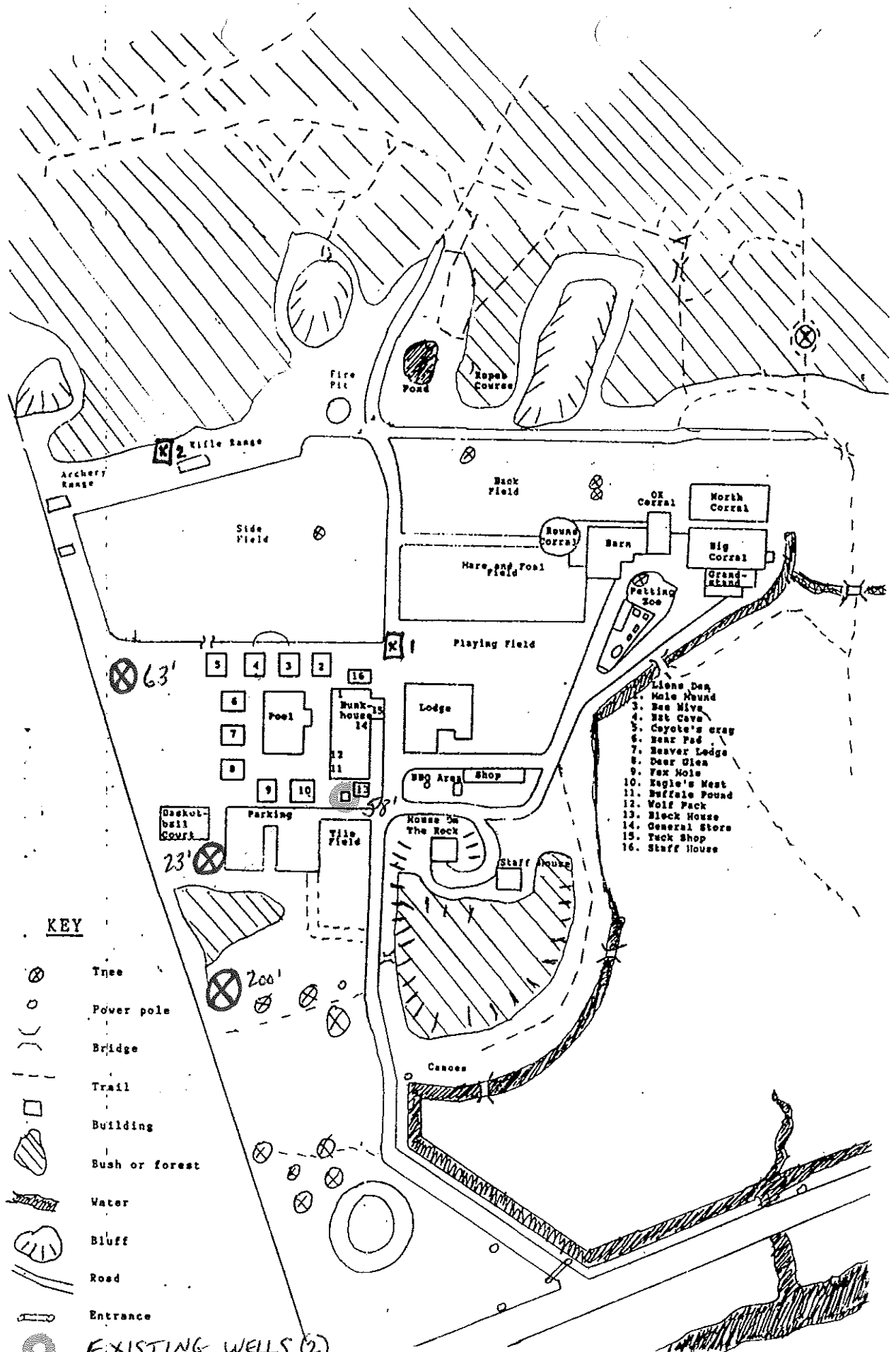
E. Livingston per AB

E. Livingston, P. Eng.

Attachments

APPENDIX A

TIMBERLINE RANCH AREA LOCATION MAP AND SITE PLAN



KEY

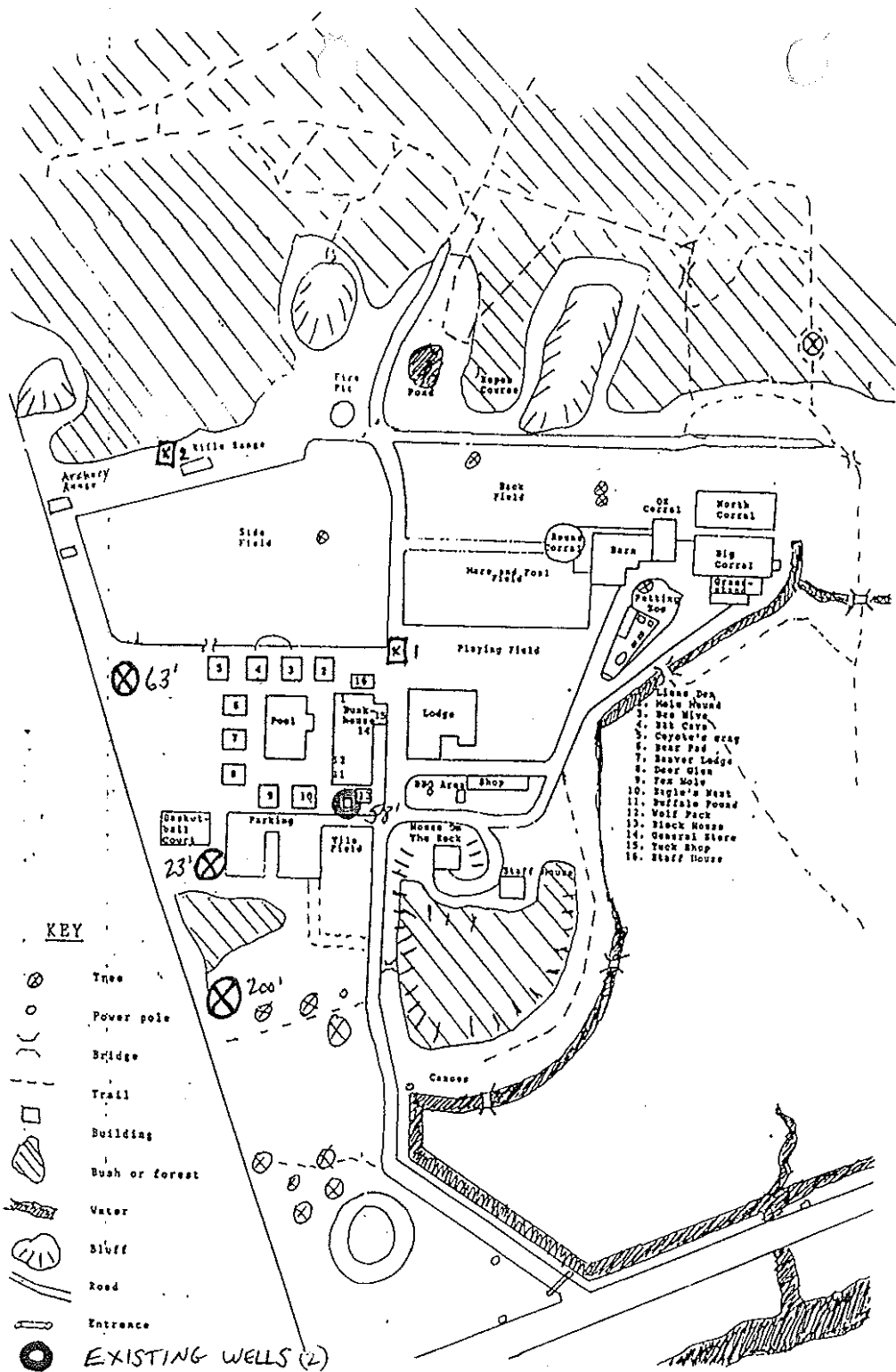
- Tree
- Power pole
- Bridge
- Trail
- Building
- Bush or forest
- Water
- Bluff
- Road
- Entrance

EXISTING WELLS (2)

DRY WELL HOLES

WELL ONE - GOT SULPHUR WATER (MANY YEARS AGO)

SPRING - STILL RUNNING BUT NOT NEAR AS MUCH AS IN PAST.



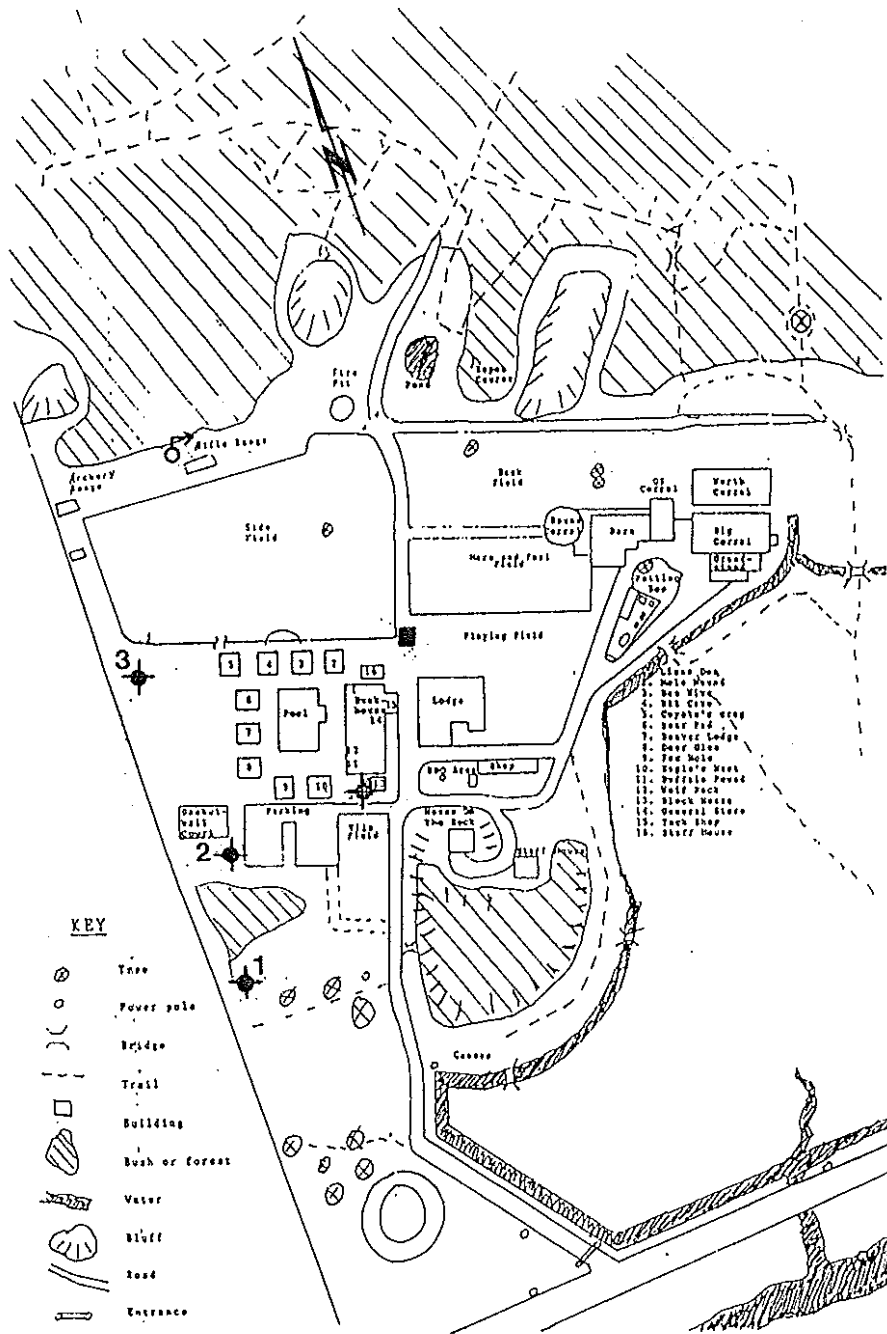
- 1. Lions Den
- 2. Hole Mound
- 3. See Mine
- 4. 2nd Cave
- 5. Coyote's den
- 6. Bear Pad
- 7. Beaver Lodge
- 8. Deer Glen
- 9. Fox Hole
- 10. Eagle's Nest
- 11. Buffalo Pound
- 12. Wolf Pack
- 13. Black House
- 14. General Store
- 15. Tuck Shop
- 16. Staff House

KEY

- Tree
- Power pole
- Bridge
- Trail
- Building
- Bush or forest
- Water
- Bluff
- Road
- Entrance
- EXISTING WELLS (2)
- DRY WELL HOLES
- WELL OUT - GOT SULPHUR WATER (MANY YEARS AGO)
- SPRING - STILL RUNNING BUT NOT WITH AS MUCH AS IN PAST.

FIGURE 2

TIMBERLINE RANCH SITE PLAN



Notes:

1. ⊕ designates the location of the existing drilled wells.
2. ⊕ designates the approximate location of a 1989 unsuccessful test well, as identified.
3. ⊕ designates the respective approximate location of a previously used dug well and spring.

APPENDIX B

TIMBERLINE RANCH 1989 TEST WELLS

NOR-WEST WATER WELL DRILLING LTD.

1969/89

P.O. Box 3446
Langley 534-4108

23191 Fraser Highway, Langley
Evenings: Langley 534-4222

WELL LOG

OWNER TIMCOPLINE RANCH
ADDRESS 22351 - 144th AVE
MAPLE RIDGE, B. C.
LOCATION SAME
"HOLE" #1
JUNE 14th, 19 89

Date Began JUNE 9/89 Completed JUNE 13/89
Yield Gallons per minute
Static Water Level FLOWING 1/2 G.P.M. feet from surface
Pumping Water Level feet from surface
Casing Used 62FT. 8 INCHES OF 6 INCH
Bottom of Casing 60FT. 8 INCHES feet from surface
Stick-up above ground 2FT feet
Screen Used NONE
Top of Screen N/A feet from surface
Bottom of Screen N/A feet from surface
Sources of Water 1/2 g.p.m. at 60 - 70 feet
Sources of Water 1 g.p.m. at 150 - 170 feet
Sources of Water g.p.m. at feet
Sources of Water g.p.m. at feet
Rig No. MB #2
Driller T.E. WALSH & T. OSTER
RECOMMENDED PUMP SET AT 100 FT. RATE G.P.M.

Depth	Material
0	TOP SOIL
6	BROWN CLAY, SOME STONES
8	GRAY CLAY
14	GRAY CLAY
25	BLACK CLAY WITH SEAMS OF WET SAND
33	HARD GREENISH CLAY
50	SOFT GRAY CLAY
65	BEDROCK (PURPLE GRANITE, VERY HARD)
72	VERY HARD GREEN & WHITE GRANITE, SOME WATER
150	VERY HARD PURPLE GRANITE SOME FRACTURES
170	VERY HARD GREEN & WHITE GRANITE (SOME FRACTURES AND SOME WATER)
200	VERY HARD PURPLE GRANITE SOME FRACTURES
	<i>"PULLED CASING OUT + ABANDONED WELL"</i>

NOR-WEST WATER WELL DRILLING LTD.

1978/89

P.O. Box 3446
Langley 534-4108

23191 Fraser Highway, Langley
Evenings: Langley 534-4222

WELL LOG

OWNER EMERALD RANCH

ADDRESS 23751 - 144th AVENUE
MABLE RIDGE, B.C.

LOCATION SAFE

"HOLE # 3"

JULY 11 19 89

Date Begun JULY 8/89 Completed JULY 10/89
Yield NIL Gallons per minute
Static Water Level NIL feet from surface
Pumping Water Level NIL feet from surface
Casing Used 65FT 7 INCH
Bottom of Casing 62FT feet from surface
Stickup above ground 3FT 2 INCH feet
Screen Used
Top of Screen feet from surface
Bottom of Screen feet from surface
Sources of Water NIL g.p.m. at feet
Sources of Water g.p.m. at feet
Sources of Water g.p.m. at feet
Sources of Water g.p.m. at feet

Dig No. 20/W

Driller D.H. WALSH, D. GREENAWAY

RECOMMENDED PUMP SET AT FT. RATE G.P.M.

Depth

Material

