Province of British Columbia
Ministry of the Environment
WATER INVESTIGATIONS BRANCH

MEMORANDUM

A.P. Kohut
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Groundwater
Hydrology Section

Date: November 21, 1980

File: 92B/11 (58)

Re: Saanich Peninsula Irrigation Water Supply
Groundwater Study

INTRODUCTION

At the request of J.D.C. Fuller, Head of Engineering Section, in a memorandum dated July 3, 1980, a more detailed study of the groundwater potential of the various agricultural land reserves (ALR's) in the Saanich peninsula has been completed. In particular, this office study includes:

1. a correlation of aquifers with areas of demand.
2. an assessment and estimate of the present and potential well yields within the individual ALR areas.
3. proposed test drilling and cost estimates to determine well yields for specific sites.
4. comments regarding possible correlation between Elk Lake and the Cordova Bay aquifer.

Figure 1 has been prepared to correlate the location of the unconsolidated aquifers, and areas demanding water within each ALR. Also it shows the locations of known wells constructed in bedrock and unconsolidated materials that have reported yields in excess of 75 USgpm. Based upon the well yields of known wells in each ALR, and other hydrogeologic data, Table 1 is a summary of the present groundwater supply being used for irrigation during the irrigation season between May and October, and the additional groundwater potential that may be available for irrigation, during this season.

DISCUSSION AND RECOMMENDATIONS

In Table 1, the figures quoted in the estimated present groundwater supply being used for irrigation column, represent the total estimated actual maximum yields of wells rated at over 10 USgpm. Wells with reported yields of less than 10 USgpm (being approximately 90% of all wells in Saanich Peninsula) have not been considered because these wells are generally not used for irrigation purposes.

As can be seen in Table 1, the estimated present groundwater supply being used for irrigation within the demand areas of each ALR, and the estimated additional groundwater potential that may be available for irrigation use

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in those areas (i.e., total of approximately 4,500 USgpm), is not sufficient to meet the total required peak demand of approximately 13,400 USgpm (assuming this peak demand is during the irrigation season between May and October only). However, in two areas, the groundwater potential for further development may meet at least one-third of the required demand within that area.

The Cordova Bay aquifer, adjacent to the Red ALR may be able to provide the Red ALR, up to an estimated 1,500 USgpm from several carefully spaced wells (allowing for interference effects), constructed in the permeable, water bearing sand and gravel aquifer. The District of Saanich constructed 9 high yielding wells several years ago in this area, but subsequently abandoned them because of hardness and a high iron problem. Notwithstanding these problems, a test drilling program to better evaluate this aquifer is recommended because of the great potential. The drilling program would consist in drilling and testing at least 2 six-inch diameter test wells at a cost of $6,500.00 each. If successful, several 8-inch diameter production wells capable of at least 250 USgpm each could be constructed at a cost of approximately $7,500.00 for drilling and testing. The six-inch diameter test wells can then be used to monitor the pumping effects of the production wells. A monitoring program should be undertaken as part of any testing of the Cordova Bay aquifer.

Until recently, the Sidney Water Works District had utilized several surficial and bedrock wells (est. total yield of 400 USgpm) to supply their domestic water needs. These wells are apparently not being used at present and may provide the Yellow ALR with a potential of 400 USgpm for irrigation. In order to supply the Yellow ALR with more groundwater, further drilling would be required. However, based upon present well yields of wells in the area and the anticipated interference effects from pumping at rates greater than 75 USgpm, the groundwater potential for further development for irrigation purposes, in addition to the Sidney Water Works District wells, is not expected to be greater than 100 USgpm. This yield might be obtained from several deep bedrock wells constructed in the vicinity of Dalkeith Avenue and Falkirk Avenue, at an estimated total cost of $13,000.00 for drilling and testing.

Since the estimated groundwater potential for further development within the demand areas of each of the other ALR's (i.e., Brown, Dk. Blue, Lt. Blue, Purple, Pink and Black) is less than 25% of their respective required peak demands, further groundwater exploration or development to obtain the limited potential groundwater in these areas, would not be feasible and therefore not recommended at this time.

ELK LAKE - CORDOVA BAY AQUIFER CONNECTION

According to present data, it appears that precipitation is the principle source of recharge to the Cordova Bay aquifer. As of yet, it is not definitely known whether there is any hydraulic connection between Elk Lake and the Cordova Bay aquifer; test drilling including the construction of observation wells to monitor water level fluctuations and possibly geophysical exploration would be required to determine possible correlation between the lake and the aquifer.

Marc Zubel.

Marc Zubel
Geological Engineer
Groundwater
Hydrology Section

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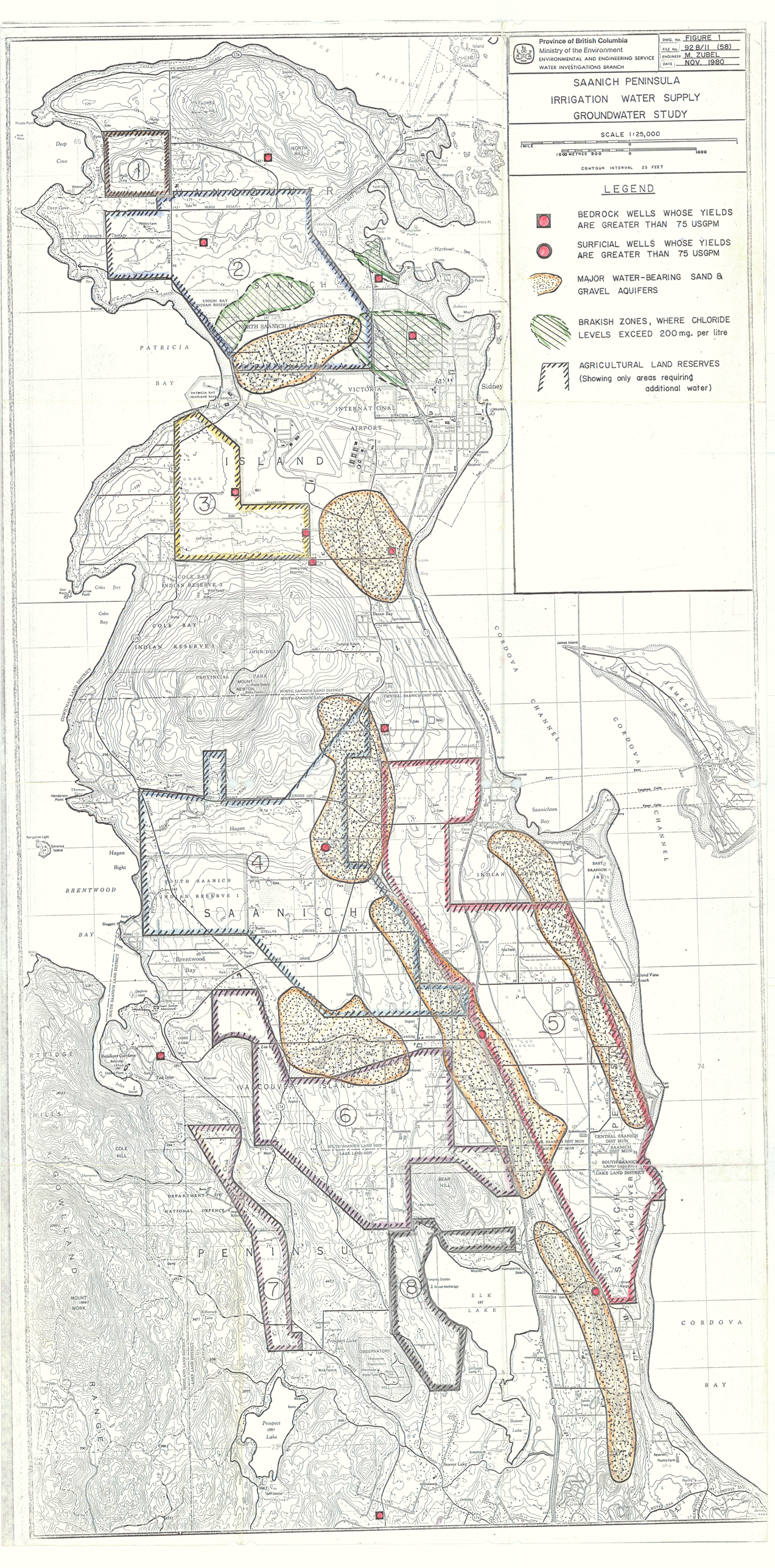
TABLE 1

SUMMARY OF GROUNDWATER SUPPLY AND DEVELOPMENT POTENTIAL FOR IRRIGATION, SAANICH PENINSULA

A.L.R.	Demand Area (Acres) *1	Required Peak Demand (USgpm) *1	Estimated Present Groundwater Supply Being Used for Irrigation (USgpm)	Groundwater Supply Source(s)	Est. Additional Groundwater Potential for Irrigation (USgpm)	Potential Source
1. Brown	40	142	10	Fractured bedrock	<50	Fractured bedrock
2. Dk. Blue	430	1522	220	Fractured bedrock	200	Fractured bedrock & North Saanich aquifer.
3. Yellow	390	1381	450	Fractured bedrock	500	Fractured bedrock & unused Sidney W.W. District wells.
4. Lt. Blue	950	3363	350	Fractured bedrock	250	Fractured bedrock & Hagan Creek aquifer.
5. Red-	1290	4567	350	E. Saanich Rd. aquifer Cowichan Head "	1500	Cordova Bay aquifer.
6. Purple	470	1664	200	Fractured bedrock	200	Fractured bedrock & unused Brentwood W.W. District wells.
7. Pink	150	531	60	Fractured bedrock	<50	Fractured bedrock.
8. Black	60	212	100	Fractured bedrock surficial sediments	<50	Fractured bedrock.
TOTALS:	3,780	13,382	1,740 USgpm		2,800 USgpm	

*1 - [redacted] Saanich Pen. Irrigation Study, Estimated Water Requirements table; under total "Yes" Cleared acreage column.
(Water Supply Sect. memo to Groundwater, dated July 16, 1980 - File No. 92B/11 (58).


Province of British Columbia
Ministry of the Environment
ENVIRONMENTAL AND ENGINEERING SERVICE
WATER INVESTIGATIONS BRANCH
DWG. No. FIGURE 1
FILE No. 92 B/11 (58)
ENGINEER M. ZUBEL
DATE NOV. 1980
SAANICH PENINSULA
IRRIGATION WATER SUPPLY
GROUNDWATER STUDY
SCALE 1:25,000
1 MILE
1000 METRES 500 0 1000
CONTOUR INTERVAL 25 FEET
LEGEND
BEDROCK WELLS WHOSE YIELDS ARE GREATER THAN 75 USGPM
SURFICIAL WELLS WHOSE YIELDS ARE GREATER THAN 75 USGPM
MAJOR WATER-BEARING SAND & GRAVEL AQUIFERS
BRAKISH ZONES, WHERE CHLORIDE LEVELS EXCEED 200 mg. per litre
AGRICULTURAL LAND RESERVES (Showing only areas requiring additional water)
1
2
3
4
5
6
7
8
VANCOUVER
ISLAND
SAANICH
PENINSULA
PATRICIA BAY
VICTORIA INTERNATIONAL AIRPORT
Sidney
COLE BAY INDIAN RESERVE 3
COLE BAY INDIAN RESERVE 1
JOHN DEA PROVINCIAL PARK
MOUNT NEWTON
SOUTH SAANICH INDIAN RESERVE 1
BRENTWOOD BAY
Brentwood Bay
Saanichton Bay
EAST SAANICH INDIAN RESERVE
CORDOVA CHANNEL
JAMES ISLAND
Island View Beach
COLE HILL
BEAR HILL
ELK LAKE
Prospect Lake
Beaver Lake
MOUNT WORK
DEPARTMENT OF NATIONAL DEFENCE
OBSERVATORY
CORDOVA BAY
SAANICH INLET
SOUTH SAANICH LAND DISTRICT
NORTH SAANICH LAND DISTRICT
CENTRAL SAANICH DIST MUN
SAANICH DIST MUN
SOUTH SAANICH LAND DISTRICT
LAKE LAND DISTRICT