129/15-92

GOVERNMENT OF BRITISH COLUMBIA

MEMORANDUM

TO: Dr. J. C. Foweraker
Hea
Groundwater Section

FROM: A. P. Kohut
Senior Geological Engineer
Groundwater Section

February 11, 1977

SUBJECT: Erskine Heights Water Supply - Saltspring Island

OUR FILE 0317588

YOUR FILE

At the request of the Comptroller of Water Rights in his memorandum of November 24, 1976, on the above subject, a review was completed of all available groundwater information for the above area to determine the possibility of developing a source of supply in the range 10 to 20 gpm. Field investigations were carried out on December 14, 1976 and January 17, 1977, to determine the exact location of existing wells and to check local geologic conditions.

Geology

The Erskine Heights Development (Figure 1) is situated in a topographically subdued area underlain primarily by Upper Cretaceous shales of the Nanaimo Group (Muller, 1971). To the north these shales are bounded by sandstones and conglomerates of corresponding age which occur in prominent topographic ridges. Older Carboniferous and/or Devonian volcanic rocks occur south of the development.

Locally the shales are massive and strongly deformed and disrupted. Although highly fractured and sheared the shales appear to have been tightly folded and compressed. Where exposed the shales are black, carbonaceous, and concretionary with iron staining common along fractures.

Existing Wells

Records are available on six wells which have been completed in the vicinity of the development. Most are completed in shale and resultant yields are generally very low (less than 5 gpm). A production well initially completed near the coast was capable of being pumped at rates in excess of 15 USgpm, but sustained use of this well has led to sea water encroachment and deterioration in water quality. Well yield in this particular case appears to be related primarily to recharge from sea water. Apart from the possibilities of sea water encroachment affecting water quality, locally, iron and the presence of hydrogen sulphide can affect water quality in the shales.

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No wells have been completed in the sandstones and conglomerates immediately flanking the development to the northwest. Fracturing including joints and possible faults within the sandstones (Figure 1) are evident. In contrast to the shales to the south, these fractures may be somewhat more open because of the relative competency of the sandstone beds to structural deformation.

Wells drilled into the volcanic rocks south of the development are not expected to yield large quantities of water. Although jointed, the rocks are relatively massive and compact with a minimum of open fracturing.

Conclusions and Recommendations

The probability of obtaining a long-term yield of 10 to 20 gpm from one well in the area is not encouraging on the basis of existing data. Chances are more favourable, however, within the sandstones and conglomerates northwest of the development. Since no wells have been completed locally in these rocks, further drilling and adequate pump testing is recommended in this area. Two proposed areas for test drilling are shown, for example, in Figure 1, although some flexibility in location could be used depending upon local topographic control, accessibility and land agreements. Sites even further to the northwest along Collins Road would be viable. An alternative to acquiring land agreements initially would be to conduct test drilling along road easements under approval from the Ministry of Highways. Where test drilling was successful, then appropriate agreements might be reached with adjacent landowners for completion of a production well.

Test drilling with a rotary drilling rig is recommended to a maximum depth of 300 feet if required. The developer should retain a groundwater consultant to supervise the drilling and pump testing. A constant rate 72-hour pump test at or in excess of the requirements from the well is recommended. Preferably, the test should be conducted during the late summer and early fall when water levels are seasonally at their lowest.

With regards to the feasibility of recharging existing poor wells from Maxwell Creek, several points should be considered:

1. The existing production wells are exceptionally close to the sea and much of the recharged water could be lost seaward (i.e., storage may be limited).

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2. Water from Maxwell Creek, particularly during the winter months, may be turbid carrying a large silt and clay load. This material would have to be removed before recharging the wells to avoid plugging the wells.

3. To inject large quantities of water into the wells at high rates may require pumping under pressure.

Although it may be feasible to recharge the existing wells from Maxwell Creek, the possibility of being able to recover these quantities at viable rates at a later date is not known. A pilot scheme might be initiated by the developer and it is recommended a consultant supervise the operation. Accurate records would have to be kept on the quantities pumped, changes in water quality and economic costs.

Reference:

Muller, J. E. (1971) - Geological Reconnaissance Map of Vancouver Island and Gulf Islands, Geological Survey of Canada, Open File Map.

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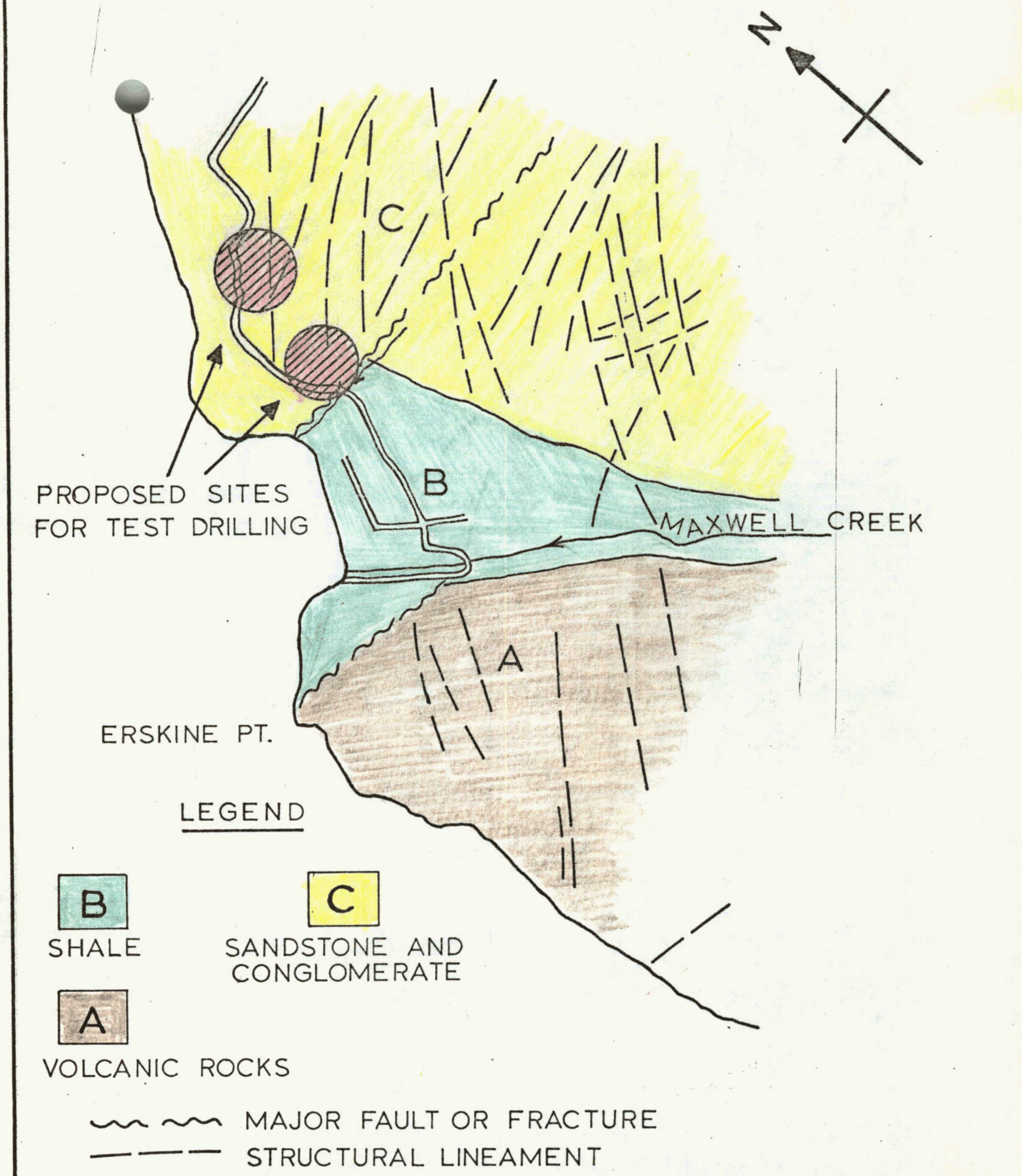

BRITISH COLUMBIA
MINISTRY OF THE ENVIRONMENT
WATER INVESTIGATIONS BRANCH

TO ACCOMPANY REPORT ON
ERSKINE HEIGHTS DEVELOPMENT
SALTSPRING ISLAND

SCALE: VERT. / HOR. 1"≈1320'	DATE FEB.11/77	A.P. KOHUT ENGINEER	
		FILE No. 0317588	DWG. No. FIGURE 1