



Province of
British Columbia

Ministry of
Environment
and Parks
WATER MANAGEMENT BRANCH

MEMORANDUM

To: D.A. Kasianchuk
Director
Water Management Branch

Date: Sept. 29 1988

Our File: 92 G/2 #60

Re: Groundwater Supplies, 184 Street and 29A Avenue, Surrey

As requested, a field investigation was carried out by Regional Water Management staff to obtain factual information to determine the technical nature of the groundwater supply problems in the above area and to recommend possible solutions. This memorandum summarizes the results of the information obtained, provides an analysis of the information and makes recommendations for further consideration.

Background

A number of residents relying upon wells in the area (Figure 1) claim to have been adversely affected by groundwater pumping being carried out by Mr. W.A. Poulton at 18222 - 29A Avenue. Mr. Poulton has been pumping two wells since July 1988 to provide make-up and cooling water for his fish ponds.

Results of Investigation

Eight property owners with wells located within a 1500 foot radius of Mr. Poulton's pumping wells have been adversely affected by lower water levels. These wells range from 1.5 to 2 inches in diameter and are reported to range from 65 to 210 feet in depth. When originally drilled the wells were free flowing (artesian) at various rates generally in the range <1000 to 10,000 gallons per day. The wells stopped flowing during this past summer as water levels have fallen below the top of the well casings. During periods when Mr. Poulton's pumps were shut down, landowners have recorded recovery of water levels in their wells and a subsequent lowering again when Mr. Poulton resumed pumping. The majority of the wells were reported to have been drilled about 15 years ago. They were jetted into place and not equipped with well screens. Landowners reported no significant problems with their wells until Mr. Poulton's wells were constructed in September 1987 and subsequently pumped. The capacities of Mr. Poulton's two wells are estimated at 4 and 8 gallons per minute on a long-term basis.

Discussion

The wells experiencing lowered water level conditions are situated along the toe of the north-eastern slope of the eastern extension of the Sunnyside

Upland. The area is underlain by marine and glaciomarine deposits comprised of sand, clay and till-like materials overlying glaciofluvial deposits of fine to coarse-grained sand and gravel with silt and clay interbeds. The glaciofluvial materials constitute the principle water-yielding materials (aquifers) in which the wells have been completed. These more permeable and coarser textured deposits thicken towards the west where they underlie the Sunnyside Upland which is the main source of replenishment and source of artesian pressure in the aquifer. Natural groundwater movement is generally towards the northeast, normal to the topographic slope. Aquifer materials appear to pinch out towards the north.

Based on the reported well capacities, previous rates of free flow and available drawdown data in neighbouring wells during Mr. Poulton's pumping, it would appear that the water-yielding properties of the artesian aquifer are relatively low. Transmissivity, a measure of the water transmitting capacity of the aquifer, appears to be less than 1000 gallons per day per foot width of aquifer. As such, the aquifer is relatively sensitive to changes in withdrawal. Although the water levels have been lowered, groundwater is still available by pumping from larger diameter wells of proper construction. Limited water level elevation data obtained in September 1988, (Figure 2) suggests the presence of an asymmetric cone of influence centered in the vicinity of the Poulton production wells. Wells experiencing the largest decline in water level are situated to the east of the Poulton wells. This preliminary information supports the opinions of the affected residents that Mr. Poulton's pumping is lowering the water level in their wells.

Theoretical calculations based on aquifer transmissivities in the range 500 to 1000 gallons per day per foot width, a storativity value of 0.0005, and pumping rates from 10 to 20 gallons per minute indicate that drawdown (water level lowering) at a distance of 500 feet from the Poulton wells would be from 5 to 10 feet after 30 days of pumping and 3 to 7 feet at a distance of 1000 feet. These theoretical drawdowns appear consistent with the observations of local land owners and water level measurements taken by regional staff in September. More definitive data could be obtained by conducting a pumping test of the Poulton wells while simultaneously measuring the drawdown in the neighbouring wells.

In addition to Mr. Poulton's pumping, other factors including the cumulative effects of below normal precipitation during recent years and overall discharge from all free flowing and pumping wells have also probably contributed to lowered water levels in the region.

Recommendations

There are a number of possible options for consideration which could provide assured domestic water supplies for local residents. These include:

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1. Constructing on each property affected, a new larger (6-inch) diameter well equipped with a well screen and submersible pump. Approximate costs for example for a 150 foot well complete with pumping equipment are estimated at \$7,000;
2. Constructing a small number of 6-inch diameter wells equipped with pumps and a distribution system to be jointly shared by small groups of landowners or through formation of a Improvement District or Water Utility;
3. Making application to the Municipality for providing or extending community water services to the area. The nearest municipal water line is reported to be 3/4 of a mile south at the intersection of 24th Avenue and 184th Street.

With regards to possible future legislative control of groundwater the following measures might be necessary to insure efficient utilization of groundwater resources:

- a) Controlling the flow of flowing artesian wells to preclude wastage. This may require capping of flowing artesian wells and utilization of well screens and sealed casings to prevent "sanding in" of wells and breakout of artesian flow around the well casings. Wells which cannot be effectively controlled because of initial construction techniques may require sealing and abandonment;
- b) Regulating and monitoring withdrawal from higher capacity wells used at rates in excess of individual household domestic requirements;
- c) Sealing of abandoned wells with grout to prevent the possibility of aquifer pollution.



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AES/W2973

cc: J. McCracken, Regional Water Manager, Surrey

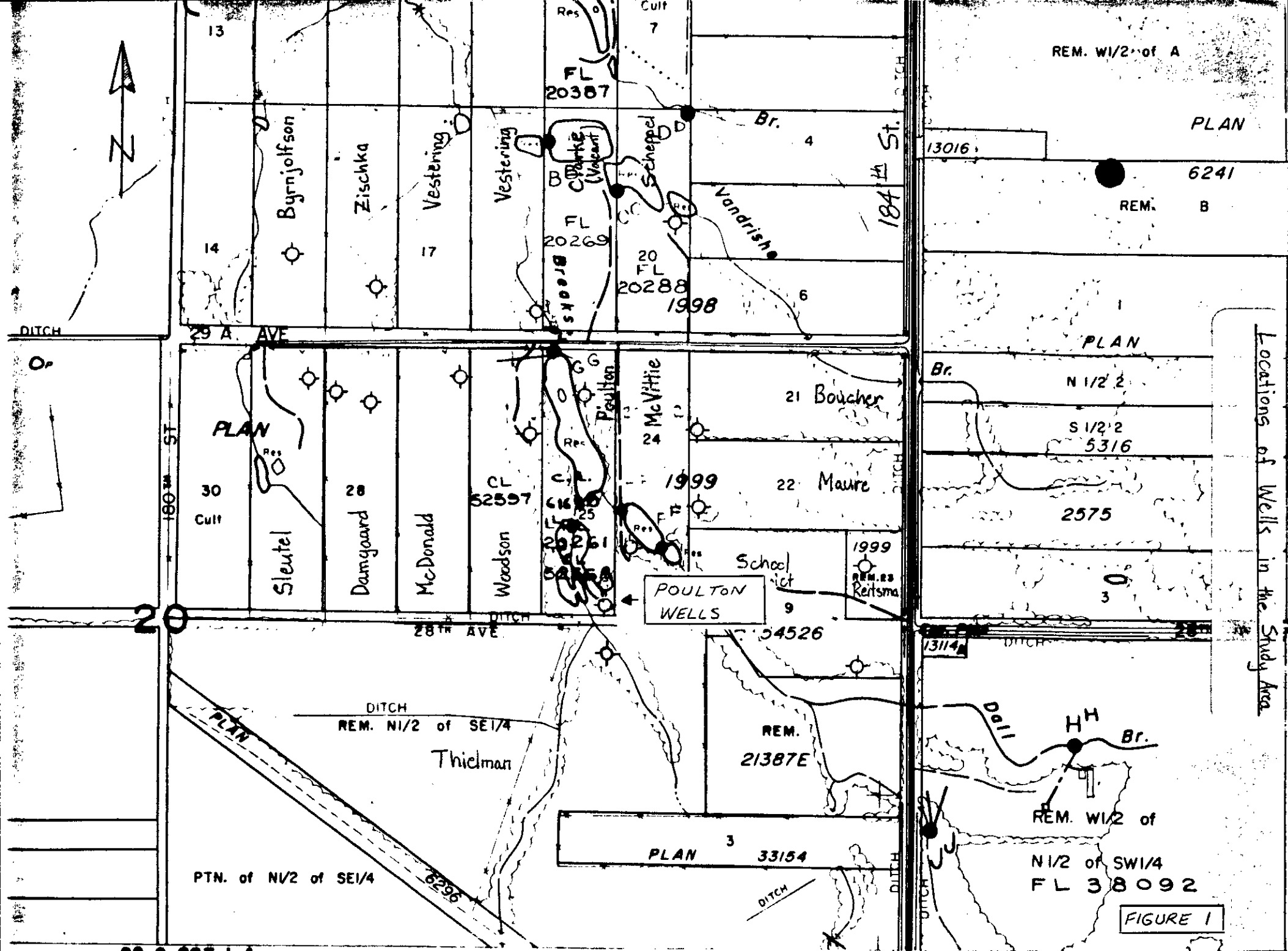
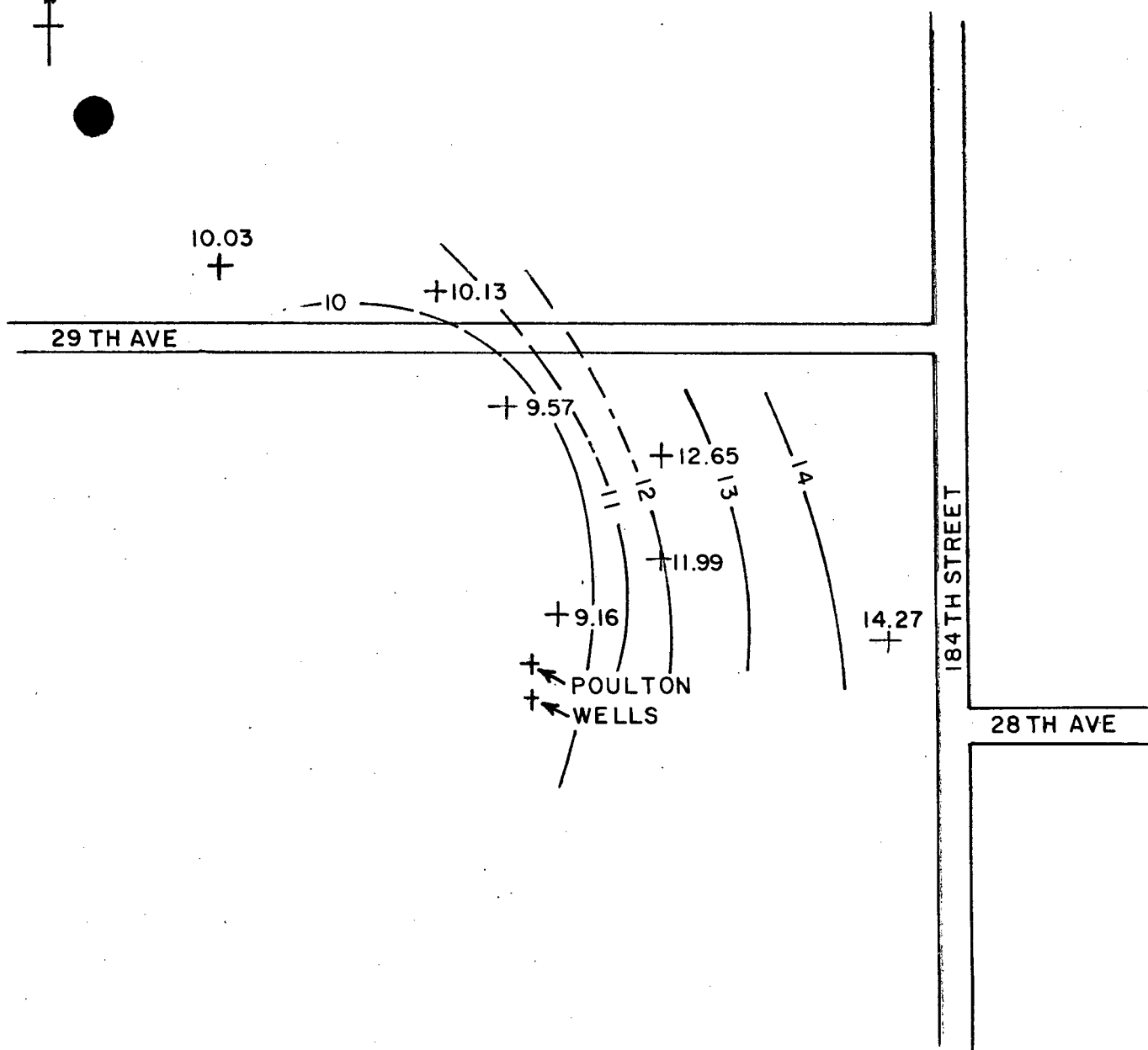


FIGURE 1

Locations of Wells in the Study Area

SCALE - 1:5000

92-6-007-1-4



LEGEND

+ 10.03 WATER LEVEL ELEVATION (m)
IN WELL
SEPT. 2,7/88



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TO ACCOMPANY REPORT ON
GROUNDWATER SUPPLIES
184 STREET AND 29A AVENUE
SURREY

SCALE: VERT.....
HOR..... **1:5000**

DATE
28/9/88

APK ENGINEER
FILE No. **92 G2 NO.60** DWG. No. **FIGURE 2**

VAN CAL 15712