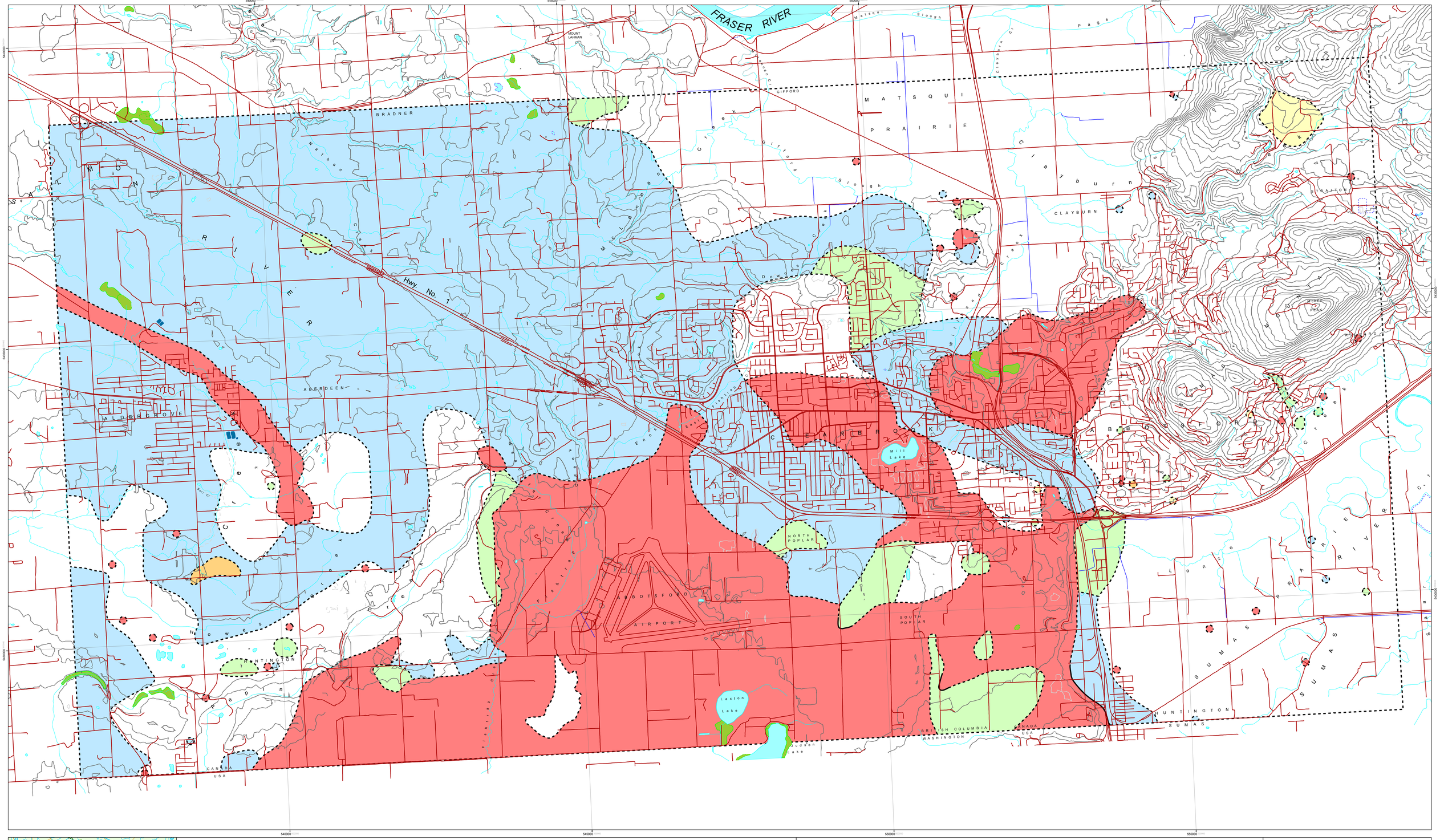

AVI Map of the Abbotsford Area

Legend

- Aquifer Vulnerability Boundary Defined
- Aquifer Vulnerability Boundary Approximate
- Coloured Circle Polygon Represents Single Point of Data

Aquifer Vulnerablility Index

- Extremely High < 1
- High 1 - 2
- Moderate 2 - 3
- Low 3 - 4
- Extremely Low > 4
- Insufficient Data or Not in Study Area

TRIM Base Maps

- Contours
- Transportation
- Water Courses

Suggested Citation: Ronneseth, K. and D. Johanson. 2006. AVI Map of the Abbotsford Area. Water Stewardship Division, Ministry of Environment, British Columbia.

Note:

The AVI (Aquifer Vulnerability Index) was developed to map aquifer vulnerability (Van Stempvoort, D., L. Ewert and L. Wassenaar. 1993. *Aquifer Vulnerability Index: A GIS Based Method for Groundwater Vulnerability Mapping.* Canada Water Resources Journal Volume 18, Number 1. 25-37.).

Aquifer vulnerability is defined here as the intrinsic susceptibility of an aquifer to potential contamination from the land surface. Vulnerability depends on the physical characteristics of the overlying soil and geological sediments. The type and intensity of human activities above an aquifer are **not** criteria in determining intrinsic susceptibility but rather in the overall assessment of an aquifer's actual risk to contamination.

In AVI, an aquifer's vulnerability index is characterized by the hydraulic resistance (c) to the vertical flow of water through the geologic sediments lying above the top of the aquifer. The hydraulic resistance is calculated from two variables: the thickness (d) of each sediment layer above the top of the uppermost aquifer and the estimated hydraulic conductivity (K) of each of the layers.

$$c = \Sigma d_i / K_i \text{, for layers 1 to } i$$

Hydraulic resistance (c) has the dimension of time (e.g. years). The lower the hydraulic resistance (c), the greater the vulnerability.

This map presents the results of applying the AVI procedure to a glaciated aquifer terrain in south-western British Columbia. The study area covers BCGS map sheets: 92G.008.2; 92G.008.4; 92G.009.1; 92G.009.2; 92G.009.3; and 92G.009.4

The AVI map is constructed by calculating the logarithm of the hydraulic resistance (log c) for available well records and correlating these values with other surficial geological information (J.E. Armstrong. 1981. *Postvashon Wisconsin glaciation, Fraser lowland, British Columbia*, Geological Survey of Canada. Bulletin 322. 34p. and E.C. Halstead. 1986. *Groundwater Supply--Fraser Lowland, British Columbia*. National Hydrology Research Institute Paper No. 26, IWD Scientific Series No. 146, National Hydrology Research Centre, Saskatoon, Saskatchewan. 80p.).

The resultant map identifies polygons of equal vulnerability that are grouped into categories listed in the table below.

AVI vulnerability categories.

Hydraulic Resistance 'c'	Log 'c'	Vulnerability Category
< 10 years	< 1	extremely high vulnerability
10 - 100 years	1 - 2	high vulnerability
100 - 1000 years	2 - 3	moderate vulnerability
1000 - 10,000 years	3 - 4	low vulnerability
> 10,000 years	> 4	extremely low vulnerability

AVI values were only calculated for wells where an aquifer had a water–bearing zone of greater than 0.6 metres thickness. Wells with poor lithology or poor well locations have been excluded.

Single AVI values were plotted as coloured circles to identify anomalous values. In some instances the AVI value for an individual well was an order of magnitude greater or lesser than the surrounding area. This magnitude difference could be real (the result of a geologic feature (e.g. a perched water table)) or artificial (variations in the interpretation of the geology by different drillers).

Solid lines are used when there is a reasonable degree of certainty associated with the location of an AVI boundary. A reasonable degree of certainty requires a sufficient density of data points (wells with well log lithology) and surficial geologic information.

Dashed lines are used when the location of an AVI boundary is inferred.

The boundaries of the AVI polygons found on this map may not always align with the vulnerability polygons delineated for other groundwater vulnerability studies in adjacent regions. Reasons can include: data variability between areas, variability of the quality of the data, different "mappers" interpret geology slightly differently, and different methodologies are employed to delineate and display a vulnerability polygon. As new information and data becomes available, more refinement within existing vulnerability polygons and the establishment of new polygons can be done.

Use: Appropriate uses of this AVI map include: promoting local understanding of the groundwater resource and supporting local governing bodies in protecting vulnerable aquifers from degradation and in carrying out their planning initiatives by providing a general hydrogeologic framework for background information to assist more detailed aquifer studies.

Limitations of Use: These maps should not be used to by themselves as a basis for site specific land-use decisions. The information on this map is subject to verification. Therefore, we cannot and do not confirm the currency, accuracy or completeness of this information nor its applicability to or suitability for individual or site specific circumstances. Persons using this information accept all responsibility for its use and interpretation and for independently verifying it. The information displayed on th's map should not be relied upon as specific advice for responding to particular circumstances, nor should it be used for decision making of any kind. Persons using this information are responsible for obtaining their own professional advice.

AVI Compilation and Geologic Interpretation by D. Johanson and K. Ronneseth, June 2006.

BRITISH COLUMBIA

Province of British Columbia

Ministry of Environment

Water Stewardship Division

Science & Information Branch

Scale 1:20,000

0 500 1,000 m

Prepared by GIS Unit

October 24, 2006