

Aquifer Name: Kitchener Creek Overburden Aquifer

Aquifer Number: 1279

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## **A. AQUIFER DESCRIPTION FOR AQUIFER 1279**

### **A.1 CONCEPTUAL UNDERSTANDING OF HYDROSTRATIGRAPHY**

#### **A.1.1 AQUIFER EXTENTS**

The aquifer is located along the upper reaches of the Goat River, and Kitchener, Crackerjack, and Kid creeks (see Figure 1; Lengyel et al. 2024). The aquifer boundaries were delineated based on the drainage basin encompassing high yielding overburden groundwater wells and using surficial mapping of alluvium by Fulton et al. (1984). Aquifer 1279 is separated from aquifer 0984 in the west by inferred bedrock outcrops separating the overburden aquifers.

#### **A.1.2 GEOLOGIC FORMATION (OVERLYING MATERIALS)**

Based on surficial mapping (Fulton et al. 1984) and borehole records, alluvium (sand and gravel) occurs at the surface. In some boreholes there is a thin layer of clay or clay and gravel from surface to 7 m below ground surface. There is one borehole that indicates a confining clay layer from surface to 18 m below ground surface. Generally, the aquifer material consisting of sand and gravel appears to begin at the surface and overlying materials only occur in portions of the mapped aquifer.

#### **A.1.3 GEOLOGIC FORMATION (AQUIFER) – SUBTYPE: 3 – ALLUVIAL**

The aquifer is comprised of alluvial sand and gravel, in most cases, starting from the surface.

#### **A.1.4 VULNERABILITY – HIGH**

The depth to groundwater varies from shallow to moderately deep, with an average depth to water of 8.8 m. While the permeability of the aquifer has not been tested, it is expected to be high based on the type of aquifer material (alluvial sand and gravel). The aquifer typically begins at or near the surface, with only some boreholes indicating confinement by clay or clay and gravel. The overall vulnerability of the aquifer has been qualitatively assessed as high.

## **A.2    CONCEPTUAL UNDERSTANDING OF FLOW DYNAMICS**

### **A.2.1    GROUNDWATER LEVELS AND FLOW DIRECTION**

Static groundwater levels recorded in the provincial groundwater wells database (GWELLS) range from artesian to moderately deep (33.5 m). No provincial observation well is within the aquifer extents. Artesian condition was indicated at one well.

The groundwater surface is interpreted to be a subdued representation of the topography based on regional interpolation of groundwater surface elevations. Groundwater is inferred to flow generally from the north to the south, from Crackerjack and Kid Creek toward Kitchener Creek and Goat River (i.e., from locations of high head to locations of low head) with a southerly, southwesterly, and westerly component influenced by the slope of the river valley.

### **A.2.2    RECHARGE**

Recharge to the aquifer could occur via direct infiltration of precipitation and snowmelt as the aquifer is exposed at surface. Much of the recharge is expected to occur in the spring associated with snowmelt. Overlying surface water features also directly recharge the aquifer where no fine-grained layers separate them. The aquifer may also be recharged by deep groundwater flow associated with mountain block recharge in adjacent mountain ranges via the underlying bedrock aquifer (0488). However, the spatial and temporal understanding of recharge mechanisms is uncertain and further investigation is required to confirm hydraulic connections.

### **A.2.3    POTENTIAL FOR HYDRAULIC CONNECTION**

Groundwater is inferred to be hydraulically connected to the Kitchener, Crackerjack, and Kid creeks and the Goat River. The aquifer may also be connected to the underlying bedrock aquifer (0488).

## **A.3    WATER MANAGEMENT**

### **A.3.1    ADDITIONAL INFORMATION ON WATER USE AND MANAGEMENT**

Reported well yields for 57 out of 65 (excluding eight wells that had no reported well yield) wells within the aquifer range between 0.3 L/s and 6.3 L/s, with a geometric mean of 0.96 L/s, indicating an aquifer with generally moderate productivity with localized zones of low and high productivity. No water quality or quantity concerns were noted in the water quality comments of the GWELLS database.

The intended use of groundwater, where recorded, was for domestic and commercial purposes based on land use and well records.

### **A.3.2    ADDITIONAL ASSESSMENTS OR MANAGEMENT ACTIONS**

No water availability or water budget studies have been completed in the area.

#### **A.4     AQUIFER REFERENCES**

Berardinucci J. and K. Ronneseth, 2002. Guide to Using the BC Aquifer Classification Maps for the Protection and Management of Groundwater. BC Ministry of Water, Land and Air Protection, Water Air and Climate Change Branch, Water Protection Section.

Fulton, R.J., Shetsen, I., and Rutter, N.W., 1984. Surficial geology, Kootenay Lake, British Columbia-Alberta. Geological Survey of Canada, Open File 1084, 1:1,000,000 scale.

Geographic datasets from the BC Data Catalogue, accessed December 2022 <https://data.gov.bc.ca/>.

Lengyel, T., Verma, S., Deri-Takacs, J., and Hinnell, A. 2024. Aquifer Mapping in the Kootenay/Boundary Region of British Columbia: Creston, Rossland, Castlegar, and Salmo. Water Science Series, WSS2024-05. Prov. B.C., Victoria B.C.

#### **A.5     REVISION HISTORY**

Date	Version	Revision Class	Comments	Author
20221230	1	Major	Initial Mapping of Aquifer	Tibor Lengyel, M.Sc., P.Geo., Simrat Verma, M.Sc., and Andrew Hinnell, Ph.D., P.Geo.