

Aquifer Name: Barrett Hat Bedrock

Date of Mapping: October 2020

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A. AQUIFER DESCRIPTION FOR AQUIFER 0675

A.1 CONCEPTUAL UNDERSTANDING OF HYDROSTRATIGRAPHY

A.1.1 AQUIFER EXTENTS

The aquifer is located northwest of Mount Harry Davis between Fishpan Lake and Vallee Lake. The aquifer is interpreted to be connected with bedrock aquifers to the northwest (outside the study area for Hinnell et al. [2020]). The southeast boundaries of the aquifer have been assessed by Hinnell et al. (2020). Aquifer boundaries towards the north and the west are delineated based on well development and dry boreholes. The southern aquifer boundary is delineated based on an interpreted groundwater divide. The eastern boundary follows 900 m topographic elevation line.

A.1.2 GEOLOGIC FORMATION (OVERLYING MATERIALS)

Overlying materials consist of Quaternary unconsolidated sediment. Overlying sediments may be coarse grained (Fraser ice-advance glaciofluvial) or fine grained (pre-Fraser sediments, Fraser ice-advance glaciolacustrine or Fraser till). Much of the overlying material consists of finer-grained sediments. Well records also indicate that there are lenses of sand and gravel intermixed within the clay or till package.

A.1.3 GEOLOGIC FORMATION (AQUIFER) – 6B FRACTURED CRYSTALLINE ROCK

The bedrock aquifer consists of Eocene basaltic volcanic rocks of the Buck Creek Formation of the Endako Group and Jurassic calc-alkaline volcanic rocks of the Telkwa Formation of the Hazelton Group (Massey et al. 2005). Permeability is inferred to be associated with fractures.

A.1.4 VULNERABILITY - MEDIUM

Surficial geological mapping by Tipper (1976) indicates that most of the bedrock aquifer is covered by Quaternary sediments, which are interpreted to be fine grained (Fraser Glaciation till or Fraser ice advance and ice retreat glaciolacustrine sediments). Well records indicate that the thickness of the clay or till units is variable, ranging from approximately 20 m to over 90 m in some wells. Stumpf (2008) described the till in the area to contain vertical jointing and sub-horizontal fissility, which facilitates downward seepage of surface water to the aquifer. The vulnerability of the aquifer is classified as medium, where the bedrock is covered by Quaternary sediments and high where the aquifer outcrops at surface or is only covered by a thin veneer of overburden (in topographically elevated areas). Thus, the overall vulnerability of the bedrock aquifer to surface contamination is assessed as medium.

A.2 CONCEPTUAL UNDERSTANDING OF FLOW DYNAMICS

A.2.1 GROUNDWATER LEVELS AND FLOW DIRECTION

Static water levels range from shallow (5.1 m) to deep (30.5 m). No provincial observation wells exist within the aquifer extents. There are no springs or artesian wells within the footprint of the aquifer (see Hinnell et al., 2020 Figure 8B).

There are insufficient water levels in the well records to interpret the groundwater surface. However, based on the conceptual understanding of groundwater flow groundwater is interpreted to flow towards the northwest.

A.2.2 RECHARGE

Overburden cover is not continuous over the aquifer (see Tipper 1976). Where overburden is thin or absent, recharge of the aquifer could occur via distributed infiltration of precipitation. In the areas where overburden is present, the aquifer may be recharged by infiltration through fractures in the overlying fine-grained units.

A.2.3 POTENTIAL FOR HYDRAULIC CONNECTION

Groundwater is inferred to be hydraulically connected to Fishpan and Vallee Lakes.

A.3 WATER MANAGEMENT

A.3.1 ADDITIONAL INFORMATION ON WATER USE AND MANAGEMENT

There are no documented water quality concerns within this aquifer in well records. There was a well noted to be dry within the aquifer. Stated yields in the well records range from 0.12 L/s to 0.31 L/s, with geometric mean of 0.20 L/s indicating a poorly productive aquifer.

Groundwater is used primarily for domestic purposes based on 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

Geographic datasets from the BC Data Catalogue, accessed August 2020 <https://data.gov.bc.ca/>

HINNELL, A. C., LENGUEL, T., FUNK, S. P., CLAGUE, J. J. & HAMMOND, Z. M. 2020. Vanderhoof Aquifer and Houston Mapping and Hydrostratigraphic Characterization. Water Science Series. Victoria, B.C.

MASSEY, N.W.D., MACINYRE, D.G., DESJARDINS, P.J. & COONEY, R.T. 2005. Geology of British Columbia. Ministry of Energy and Mines, BC Geological Survey, Geoscience Map 2005-3.

STUMPF, A. J. 2008. Till Geochemistry and Clast Lithology Studies of the Bulkley River Valley, West-Central British Columbia (parts of NTS 093L). Geoscience BC Report.

TIPPER, H. W. 1976. Geology of Smithers Map Area, British Columbia, 1:250000. Geological Survey of Canada, Open File 351.

A.5 REVISION HISTORY

Date	Version	Revision Class	Comments	Author
20031125	1	Major	Initial Mapping of Aquifer	W.S. Hodge
20201015	2	Minor	Adjusted aquifer extents to the south and east	Andrew Hinnell, P.Geo., Sean Funk, and Tibor Lengyel

Mapping by W.S. Hodge assumed to be initial mapping of aquifer.