Aquifer Name: North Houston Bedrock

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A. AQUIFER DESCRIPTION FOR AQUIFER 0775

A.1 CONCEPTUAL UNDERSTANDING OF HYDROSTRATIGRAPHY

A.1.1 AQUIFER EXTENTS

The aquifer is located north of Houston, north of the Upper Bulkley and Bulkley rivers. The bedrock aquifer is bounded to the north by a groundwater divide and by the 900 m topographic elevation line, in the west and the south by the Bulkley and Upper Bulkley rivers, and in the east by faults, inferred to be impermeable, however this should be confirmed.

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, see Hinnell et al., 2020 Figure 7B, 7C). 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. At the surface, there is a veneer of post-glacial sediment localized within the valley bottom, composed of clean sand and gravel.

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

The bedrock aquifer consists of blocks of Eocene basaltic volcanic rocks of the Buck Creek Formation and alkaline volcanic rocks of the Goosly Lake Formation, both within 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, see Hinnell et al., 2020 Figure 7B, 7C). Well records indicate that the thickness of the clay or till units is variable, ranging from a few metres to nearly 75 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 (3.1 m) to deep (89.0 m). No provincial observation wells exist within the aquifer extents. There are two springs interpreted to be associated with the bedrock aquifer (see Hinnell et al., 2020 Figure 8B).

Static water levels in the well records suggest that the groundwater is a subdued representation of bedrock topography. Based on the conceptual understanding of groundwater flow and the observed springs groundwater is interpreted to flow towards the Upper Bulkley and Bulkley rivers with an upward seepage potential near the river.

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 from various overlying units, including the overlying Bulkley Buried Channel (0660).

A.2.3 POTENTIAL FOR HYDRAULIC CONNECTION

Groundwater is inferred to be hydraulically connected to Upper Bulkley and Bulkley Rivers. Groundwater in the bedrock may be hydraulically connected to the overlying Bulkley Buried Channel (0660) if fine-grained layers are not present between them. There are also several lakes that the bedrock aquifer may be hydraulically connected to, including Barrett, Dunalter, Mathews, 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 were wells noted to be dry within the aquifer. Stated yields in the well records range from 0.03 L/s to 0.63 L/s, with geometric mean of 0.12 L/s indicating a poorly productive aquifer with localized regions of moderate productivity.

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., LENGYEL, 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
20031126	1	Major	Initial Mapping of Aquifer	W.S. Hodge
20061117	2	N/A	N/A	A.P. Kohut
20200917	3	Major	Remapping of Aquifer	Andrew Hinnell, P.Geo., Sean Funk, and Tibor Lengyel

Mapping by W.S. Hodge assumed to be initial mapping of aquifer. N/A – The extent of revisions implemented by A.P. Kohut not documented.