Aquifer Name: Dawson Creek Overburden Aquifer

Aquifer Number: 0851

Date of Mapping: February 10, 2023

Authors: Tibor Lengyel, M.Sc., P.Geo., Judit Deri-Takacs, Ph.D., and Andrew Hinnell, Ph.D., P.Geo.

A. AQUIFER DESCRIPTION FOR AQUIFER 0851

A.1 CONCEPTUAL UNDERSTANDING OF HYDROSTRATIGRAPHY

A.1.1 AQUIFER EXTENTS

The aquifer is between the Kiskatinaw River and the Pouce Coupé River. It was delineated based on well log records and is bounded by rivers in rolling uplands away from the incised river valleys. The rolling uplands were mapped as glacial and glaciolacustrine sediments of generally lower thickness (<15 m, see Figure 4 in Lengyel et al. 2023). The boundaries are not well defined and were adjusted to include all unconsolidated wells (Lowen Hydrogeology Consultants Ltd. [LHC] 2011).

A.1.2 GEOLOGIC FORMATION (OVERLYING MATERIALS)

The aquifer is overlain by till, glaciolacustrine and alluvial deposits. Forty-four of the 47 wells associated with the aquifer reported fine-grained material (clay, till), while three reported coarse-grained sediments (gravel) on the surface. The thickness of the overlying material ranges from less than 3 meters to more than 30 meters.

A.1.3 GEOLOGIC FORMATION (AQUIFER) – 4B - CONFINED GLACIOFLUVIAL AQUIFER

Aquifer 0851 is primarily a low conductivity unit comprised of glaciolacustrine clay/glacial till with localized discontinuous coarse-grained sediments (fine- to medium-grained sand) that may locally support lower intensity groundwater production from low yield wells (Lengyel et al., 2023 Figure 1 and Figure 5A, B).

A.1.4 VULNERABILITY

Depth to groundwater varies from shallow to deep. The permeability of the aquifer has not been tested, but it is expected to be medium where discontinuous sand units are present (fine- to medium-sand). The permeability of the fine-grained material surrounding the coarse-grained lenses is expected to be low. The sand lenses are expected to be the main producing zone within the aquifer. Surficial mapping by Reimchen (1980) and borehole logs indicate that the aquifer material is dominantly covered by fine-grained material (clay, till). The overall vulnerability of the aquifer to surface contamination has been qualitatively assessed to be moderate.

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 shallow (0.5 m) to deep (98.5 m[1]). There is one well reported with artesian flow conditions (WTN 80273). No active provincial monitoring wells exist in the aquifer.

The groundwater surface is interpreted to be a subdued representation of the topography based on regional interpolation of groundwater surface elevations. Groundwater is interpreted to flow primarily towards the Kiskatinaw and Pouce Coupé rivers.

A.2.2 RECHARGE

Recharge to the aquifer could occur via distributed infiltration of precipitation and snowmelt through the thin overburden (Baye et al 2016). Much of the recharge is expected to occur in the spring associated with snowmelt. The aquifer may also be recharged by the overlying minor tributaries of the Kiskatinaw and Pouce Coupé rivers; however, the spatial and temporal understanding of these recharge pathways are uncertain and further investigation is required to evaluate these hydraulic connections.

A.2.3 POTENTIAL FOR HYDRAULIC CONNECTION

Groundwater may be hydraulically connected with minor tributaries of the Kiskatinaw and Pouce Coupé rivers, however, further investigation is required to evaluate the magnitude and level of hydraulic connectivity. Groundwater is also inferred to be hydraulically connected with the underlying bedrock aquifers (0593 and 0633) where they are not separated by layers of fine-grained sediment.

A.3 WATER MANAGEMENT

A.3.1 ADDITIONAL INFORMATION ON WATER USE AND MANAGEMENT

Baye et al. (2016) reported exceedances for arsenic, iron, manganese, sulphate, and hardness in some of the overburden wells within the area of aquifer 0851. Stated yields in the well records range from 0.09 to 1.8 L/s, with a geometric mean of 0.34 L/s indicating moderate productivity with pockets of low productivity. Groundwater is used primarily for domestic purposes, where the purpose is reported in GWELLS.

A.3.2 ADDITIONAL ASSESSMENTS OR MANAGEMENT ACTIONS

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

[1] Based on a research well (see Goetz 2021, EERI-27).

A.4 AQUIFER REFERENCES

Baye, A., Rathfelder, K., Wei, M., and Yin, J., 2016. Hydrostratigraphic, hydraulic and hydrogeochemical descriptions of Dawson Creek-Groundbirch areas, Northeast BC. Victoria, Prov of B.C. Water Science Series 2016-04.

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Lengyel, T., Deri-Takacs, J., Hinnell, A. C, & Clague, J. J. 2023. Kiskatinaw-Peace Aquifer Mapping and Hydrostratigraphic Characterization. Victoria, B.C.

LHC (Lowen Hydrogeology Consulting Ltd.) 2011. Aquifer Classification Mapping in the Peace River Region for the Montney Water Project. File No. 1026. June 2011.

Reimchen, T.H.F, 1980. Surficial Geology Dawson Creek; Geological Survey of Canada, Map 1467A, 1:250000 scale map.

A.5 REVISION HISTORY

Date	Version	Revision Class	Comments	Author
2011	1	Major	Initial mapping of aquifer	Lowen Hydrogeology Consulting Ltd. 2011
02/10/2023	2	Major	Update to the conceptual understanding of the aquifer	Tibor Lengyel, M.Sc., P.Geo., Judit Deri-Takacs, Ph.D., Andrew Hinnell, Ph.D., P.Geo.