

5.15 Carmacks – Tantalus School Water Supply System

Tantalus School is located in Carmacks, Yukon on the North Klondike Highway. In 2008, a new school was built, and the water system connected to a new water well completed in April 2005. The former well is included here only for information and the new well should be incorporated into this summary when data is obtained. The former water system was served by a 16.5 m deep well. The new water system supplies potable water to the school and is governed under the Sections 12.1 (a) and (b) and 17 of the *Public Health and Safety Act* and Section 5 of the *Public Health Regulations* (C.O. 1958/079, O.I.C. 2009/194), which require safety measures and inspection for water and water sources for systems that provide for human consumption.

5.15.1 Data Compilation Methodology

Tetra Tech approached stakeholders including water system operators and owners to let them know the project was in progress and to request their assistance in compiling the most complete data set possible. Through the process of compiling the data, Tetra Tech has had communication with the following water system owners, operators and proponents regarding the water systems operated and/or managed by YG PMD:

- YG Property Management Division – YG PMD has been consulted and has provided review comments and data for the compilation.
- YG Community Services (the client) – YG CS provided data for systems where proponents contacted were not able to find the documents and/or YG CS had the data readily available.
- YG Environmental Health – YG EHS was not able to provide details on the new water well or water treatment system and directed Tetra Tech to contact YG PMD.

5.15.2 Hydrogeology

The aquifer underlying the Central Carmacks Village area is a permeable, unconfined sand and gravel aquifer comprised of glaciofluvial and recent alluvial deposits. The regional groundwater flow direction in the vicinity of the Village core is inferred from topography to be northeast towards the Yukon River. From nearby well data, the static water level is estimated to be about 6 m bgs. The new school is located near the central Village and the well is likely completed in the same aquifer as the old well.

5.15.3 Well Summary

No well log was available for the old Tantalus school Well 6511-A or for Well 6511-B. The following tables summarize available data for the old water well 6511-A and the available completion characteristics of 6511-B.

Well Construction Parameters	Details	Source
Date of construction	Unknown	Tetra Tech 2006
Total well depth	16.5 m bgs	
Casing	7" (178 mm) Steel Well Casing	
Casing depth	Unknown	
Well screen	Unknown	

Table 5-36: Tantalus School, Well 6511-A Summary

Well Construction Parameters	Details	Source
Static water level	Unknown	
Sanitary seal	Likely no surface seal	
Wellhead completion	Split gasket cap	
Wellhead stickup	1.6 m bgs	
Well rated capacity	Unknown	
Well GUDI status	Unknown	Unknown
Well Construction Comments:	Based on the wellhead completion and the lack of a surface seal, the well was not constructed to meet the Canadian Groundwater Association Well Construction Guidelines.	

Table 5-37: Tantalus School, Well 6511-B Summary

Well Construction Parameters	Details	Source
Date of construction	April 2005	
Total well depth	Unknown	
Casing	Unknown	
Casing depth	Unknown	
Well screen	Unknown	p.c. Nick Barnett 2017
Static water level	Unknown	
Sanitary seal	Sanitary seal installed	
Wellhead completion	Pitless adaptor	
Wellhead stickup	Unknown	
Well rated capacity	Unknown	
Well GUDI status	Unknown	Unknown
Well Construction Comments:	Unknown	

5.15.4 Source Water Quality

As part of the SPDWSA review conducted in 2005, Tetra Tech reviewed available groundwater chemistry data and collected an additional sample to test for identified parameters of concern. The new well is completed relatively near the existing well, and the wells likely obtain water from the same aquifer. The observations made in 2005 are summarized below:

- The groundwater source was calcium-magnesium-sulphate type water and was considered very hard with a measured hardness of 208 mg/L (as CaCO₃);
- The water met all GCDWQ health-based and aesthetic objectives for the parameters tested;
- EPH and PAH were below the laboratory detection limits, indicating that the well had not been impacted by hydrocarbons; and
- Review of chloride, nitrate and nitrite showed all three to be low and within the normal background ranges, suggesting that the aquifer was not under the influence of anthropogenic surface sources of nutrients or anions such as septic wastes at the time of sampling.

5.15.5 Water Treatment and Distribution

Item	Details	Source
Owner/Operator	Government of Yukon	
Water source	Groundwater	
Wells serving the system	Tantalus School well	
Treatment type	Sediment filtration and chlorine injection disinfection**	Tetra Tech 2006 p.c. Nick Barnett 2017
Water users	Tantalus School	
Delivery method	Piped from well to School	
Age of system/last known update	New school in 2008	

**Note: Tetra Tech understands this system may be equipped with UV disinfection in the near future.

5.15.6 Source Water Protection Planning

There is no SWPP in place for Tantalus School Well 6511-A or 6511-B, and Tetra Tech was not able to obtain any record of GUDI assessment completed for Well 6511-A or 6511-B. Given the unconfined, vulnerable nature of the aquifer, a SWPP would provide a valuable tool for identifying, monitoring and managing risks to the wells and aquifer. The planning for this site should be incorporated into with planning for the Carmacks Village centre to create a comprehensive SWPP.

Potential sources of contamination in the vicinity of well 6511-A that were identified as part of the 2005 SPDWSA site review included:

- Sewer lines from the Carmacks community sewer system are likely within 30 m of the well;
- An AST located 1 m from the wellhead; and
- Well 6511-B should be located with respect to potential sources of contamination, but Tetra Tech was not able to confirm this.

5.15.7 Water Supply Information Data Gaps

Tetra Tech has obtained review comments from YG PMD regarding the current status of this system; however, they were not able to provide details on the water system or the new water well. The following data gaps have been identified:

- There is no source water protection planning for this groundwater resource. Source water protection planning here could be incorporated with planning for other locations in the central Carmacks Village to create a comprehensive Carmacks SWPP; and
- The new school built in 2008 and is connected to a new water well completed in 2005, but well details were not provided.