

5.46 Teslin - Village of Teslin Water Supply System

The Village of Teslin (VoT) is located at km 1244 on the Alaska Highway and is situated on the shores of Teslin Lake where Nisutlin Bay meets the main body of the lake. Teslin has a population of approximately 263 residents (Yukon Bureau of Statistics 2016). Water is sourced from a groundwater supply well, and is treated for iron, manganese and arsenic, and is disinfected through chlorination and then delivered by trucked distribution. A new water treatment plant was completed in 2013, and the treatment plant and water well TW10-02 were put into use in summer 2013. The VoT community water supply is owned and managed by VoT, but Tetra Tech understands that Yukon Government Community Services (YG-CS) is currently involved in the management of the system as upgrades are under way. The VoT community water supply system is classified as a Large Public Drinking Water Supply System under the Yukon Drinking Water Regulations – Guidelines for Part I – Large Public Drinking Water Systems (YG 2007) and is also regulated under the Yukon Drinking Water Regulations - Guidelines for Part II - Bulk Delivery of Drinking Water (YG 2007).

5.46.1 Data Compilation Methodology

Tetra Tech approached stakeholders including governing and regulatory bodies as well as water system operators and owners to let them know the project was in progress and to request their assistance in compiling the most complete and accurate data set possible. Many of the stakeholder groups contacted were able to provide data and received the project positively. Through the process of compiling the data, Tetra Tech has had communication with the following entities in regard to the Teslin Community Water Supply System:

- Village of Teslin – VoT was contacted and directed for the original data compilation and has provided review comments on this data summary.
- YG Community Services (the client) – YG CS provided for systems where the operator and other proponents contacted were not able to find the documents.
- YG Environmental Health Services – YG EHS was contacted and assisted with the provision of data for Teslin.

We have made an effort to present the most up-to-date information available to us at the time of this project and included the source and year for all information presented in this report and the GIS database.

The data summary was compiled as data was received. The ArcGIS database was created by importing CAD and GIS data into the mapping program to create a map layer showing the location of water infrastructure and capture or buffer zones. Metadata was added to the database using an attachment and attributes tool.

5.46.2 Hydrogeology

The Village of Teslin (VoT) is located on the shores of Teslin Lake. Surficial geology mapped in the vicinity of VoT is mapped as lodgment and ablation till with a silty to sandy matrix. The thickness of the till is likely controlled by the bedrock contact and the depth to bedrock somewhat irregular. Three test wells have been completed in the vicinity of the new community water supply well. Bedrock was encountered in only one of these wells at a depth of 130 m bgs.

Bedrock mapped in the vicinity of VoT consists of a combination of metamorphosed sedimentary and intrusive rocks from the Cache Creek Terrane, Teslin Suite plutonic intrusives and Yukon-Tanana group sedimentary rocks. In the vicinity of the VoT water wells, the bedrock is mapped as altered volcanic rocks. A dry well (TW10-01) drilled to a depth of 182.2 m bgs in the vicinity of Teslin community water supply well TW10-02 encountered bedrock at approximately 130 m bgs. Bedrock encountered in test well TW10-01 consisted of chlorite schist. This confirms the mapping of altered volcanic rocks in this area.

Aquifers underlying VoT are thought to consist of isolated sand and gravel lenses within the till complex. The source aquifer for the new community water supply well, TW10-02, appears to have some limited aerial extent as indicated as follows:

- Test well (TW10-01), 400 m away, did not encounter significant water to a depth of 182.2 m.
- The old community water supply well, about 550 m to the west from the new well TW10-02, encountered water at a depth of 38.4 m. No drawdown was observed in this well during pump testing at TW10-02.
- Two nearby wells, the library well about 120 m to the south and the VoT Maintenance Compound well about 100 m to the south of TW10-02, appear to be completed in the same aquifer. During the pumping test completed for TW10-02, drawdown was observed in the library well and pumping from the Maintenance Compound well was observed to cause additional drawdown in TW10-02.

5.46.3 Summary of Well Completion Details

The VoT community water system is supplied from one groundwater well located in the Village of Teslin Recreation Park. The well log for this well is included in the GIS mapping and database and the well completion details are summarized below.

Table 5-119: VoT TW10-02 Community Water Supply Well			
Well Construction Parameters	Details	Source	
Date of construction	The well was completed by Impact Drilling in June 2010	Tetra Tech 2010 p.c. C. Hunking 2017	
Total well depth	21.79 m bgs		
Casing	8" (203 mm) ID Steel Well Casing		
Casing depth	19 m bgs		
Well screen	<ul style="list-style-type: none"> ▪ 1.1 m of 80-slot (2.03 mm) telescopic Variperms well screen exposed from 19.0 m bgs to 20.1 m bgs ▪ 1.7 m of 20-slot (0.51 mm) stainless steel well screen from 20.1 m bgs to 21.8 m bgs 		
Static water level	5.28 m bgs (May 2010)		
Sanitary seal	Bentonite surface seal to 5.8 m bgs		
Wellhead completion	Pitless adapter		
Wellhead stickup	0.61 m ags		
Well rated capacity	3.47 L/s (45.8 IGPM)		
Well GUDI status	Non-GUDI (based on Phase 1 Initial GUDI Screening)		
Well Construction Comments:	The well was constructed to meet Canadian Groundwater Association Well Construction Guidelines.		

5.46.4 Source Water Quality

Tetra Tech collected one water sample during the completion of the well in June 2010 and reviewed water quality results from January 2017, and the following were noted:

- Other than manganese, arsenic and TDS the water met all GCDWQ health based requirements and aesthetic objectives for the parameters analyzed;
- The concentration of arsenic in the water was 0.0142 mg/L in 2010 and 0.0107 mg/L in 2017, both of which exceed the GCDWQ MAC of 0.01 mg/L;
- The manganese concentration was 0.199 mg/L in 2010 and 0.346 mg/L in 2017, both of which exceed the GCDWQ AO of 0.05 mg/L.
- In 2017 the total dissolved solids (TDS) concentration was 565 mg/l which exceeds the GCDWQ AO of 500 mg/L;
- The water from the well is very hard and can be characterized as magnesium-calcium-bicarbonate type; and,
- The laboratory measured pH of the water was 8.10 in 2010 and 8.22 in 2017.

5.46.5 Water Treatment and Distribution

Table 5-120: VoT Water Treatment and Distribution Details

Item	Details	Source
Owner/Operator	Village of Teslin	Tracey Kinsella, YG-EHS June 2016
Water source	Groundwater	Permit to Operate Application 2013
Wells serving the system	TW10-02	Permit to Operate Application 2013
Treatment type	Chlorination, greensand filtration to remove iron and manganese, granular ferric hydroxide filters to remove arsenic from water, reverse osmosis, chlorination for disinfection	Teslin Control Narrative 2013
Population served	263	Yukon Bureau of Statistics 2016
Delivery method	Trucked bulk delivery	Tracey Kinsella, YG-EHS June 2016
Age of system/last known update	New water treatment system in 2013. New water well constructed in 2010.	Permit to Operate Application 2013, Tetra Tech 2010.

5.46.6 Source Water Protection Planning

We are not aware of any source water protection planning completed for the Teslin community water supply system. Implementing a source water protection plan for the community of Teslin would provide a comprehensive approach to protecting the VoT drinking water supply.