

5.30 Marsh Lake - Community Centre Water Supply System

Government of Yukon owns and operates the Marsh Lake Community Centre public drinking water system at Marsh Lake, Yukon. The water supply at the Marsh Lake Community Centre is sourced from a moderately deep drilled well that supplies water to the facility (Tetra Tech 2006). The system serves potable water to the users of the community centre 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 water for human consumption.

5.30.1 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 YG PMD regarding all water systems they operate and/or maintain. YG PMD has provided review comments and data for the compilation.

5.30.2 Hydrogeology

The groundwater flow direction in the vicinity of the Marsh Lake Community Centre is likely westerly towards Marsh Lake; however, there is inadequate hydrogeological information to confirm the estimate at this time (Tetra Tech 2006). Predominantly well-graded granular sediments were encountered during the well drilling, and the Marsh Lake Community Centre well appears to have been terminated within a reasonably productive unconfined overburden aquifer (Tetra Tech 2006). The well log reports a low permeability till layer from 3 m to 5 m below grade. This till unit, if continuous across the site would offer some protection to the aquifer by hindering the vertical migration of potential surface contaminants (Tetra Tech 2006).

5.30.3 Well Summary

The well log for the well serving the Marsh Lake Community Centre water system is included in the GIS map and database portion of this project. The following table summarizes the completion characteristics of the well.

Well Construction Parameters	Details	Source
Date of construction	Well was completed by Hollow Point Exploration in June 2006	Well log
Total well depth	33.1 m bgs	
Casing	6.6" (168 mm) ID Steel Well Casing	
Casing depth	30.8 m bgs	
Well screen	2.3 m 30 slot (0.76 mm) stainless steel well screen from 30.8 m to 33.1 m bgs	
Static water level	12.2 m bgs (May 2006); 7.1 m bgs (July 18, 2006)	Well log and Tetra Tech 2006
Sanitary seal	No record that a bentonite sanitary seal has been installed	Tetra Tech 2006

Table 5-75: Marsh Lake Community Centre Well Summary

Well Construction Parameters	Details	Source
Wellhead completion	The wellhead is equipped with a pitless unit and also heat trace for freeze protection. The wellhead is located in an insulated wooden enclosure.	
Wellhead stickup	Approximately 0.55 m ags	
Well rated capacity	Approximately 1.9 L/s (25 IGPM) (estimated by the driller)	Well log
Well GUDI status	Potentially GUDI	Tetra Tech 2013
Well Construction Comments:	Based on the lack of a surface seal, the well was not constructed to meet the Canadian Groundwater Association Well Construction Guidelines.	

5.30.4 Source Water Quality

In 2006, 2007 and 2012, Tetra Tech sampled the raw water from the Marsh Lake Community Centre water system. In addition to the results of the groundwater samples collected by Tetra Tech, Tetra Tech also reviewed the water quality results of the samples collected between November 2007 and October 2011 as part of the field review of the system in 2013 (Tetra Tech 2013). Following summarizes Tetra Tech’s observations and comments on the groundwater quality of the Marsh Lake Community Centre well (Tetra Tech 2006 and 2013):

- The water quality indicated that the raw groundwater source was calcium-bicarbonate type with a pH of 7.8 to 8.2 and was classified as very hard water with a measured hardness of 346 mg/L to 371 mg/L as CaCO₃;
- Four raw samples were collected between July 2006 and October 2012 and the total manganese concentrations of the raw water samples collected between this period ranged between 0.053 mg/L and 0.161 mg/L and all exceeded the GCDWQG AO of 0.05 mg/L;
- The water quality results of the raw samples indicated that all other health-based and aesthetic objectives were met for the parameters analyzed when sampled in 2006, 2007; however, the total iron concentration (1.93 mg/L) from the raw water sample collected on October 16, 2012 exceeded the CDWQG AO of 0.3 mg/L;
- No septic indicator parameters were found to be elevated above inferred background levels, indicating that the well water supply was not likely being impacted by anthropogenic sources of contamination on the dates sampled;
- Laboratory analytical results for the treated sample collected from the kitchen sink on October 16, 2012 indicated that the filtration system was effective in reducing iron and manganese concentrations associated with suspended solids. The total iron and manganese concentrations in the treated sample were 0.033 mg/L and <0.001 mg/L, respectively; and
- The treated water sample had a hardness of 2 mg/L when sampled in October 2012.

5.30.5 Water Treatment and Distribution

Table 5-76: Marsh Lake Community Centre Water Treatment and Distribution Details		
Item	Details	Source
Owner/Operator	Government of Yukon	
Water source	Groundwater	
Treatment type	Filtration (20 micron and 5 micron stages) and water softener (Model ECR 3500R30, rated for 11 gallons per minute). UV System. A RO system was installed on one of the kitchen sinks for drinking water use	Tetra Tech 2013
Number of connections	Typically 5 to 30 people, but can be up to 150 people during part of the day when meals are served, and up to 300 people for full day events	
Delivery method	Piped directly from the well to the Community Centre building	
Age of system/last known update	Tetra Tech recommended upgrades to the water treatment system including installation of a UV disinfection system with a redundant unit, installation of a second filter system, replacement of the filtration with 10 micron and 1 micron absolute cartridge	

5.30.6 Source Water Protection Planning

No SWPP has been completed for the Marsh Lake Community Centre public drinking water system. Although the near-surface low permeability till layer encountered at the Community Centre well will provide some protection to the aquifer, and the well is considered to be non-GUDI, several potential contaminant sources were observed to be located within 30 m of the wellhead during the 2005 SPDWSA work (Tetra Tech 2006). Given the water is used for consumption by the users of the community centre, implementation of a source water protection plan is still considered important to ensure safe drinking water. Source water protection planning here could be incorporated with planning for the Marsh Lake Firehall and private water supplies where applicable to create a comprehensive Marsh Lake Community SWPP.

5.30.7 Water Supply Information Data Gaps

Tetra Tech has obtained review comments from YG PMD regarding the current status of this system and to our knowledge this summary is complete and accurate to March 2017. The following data gaps have been identified:

- There is no source water protection planning in place for this water supply system.