

5.29 Marsh Lake - Firehall Water Supply System

The Marsh Lake Firehall is currently serviced by a water supply system that delivers water from a 28 m deep well. The water from the well flows from a holding tank by gravity to an overhead truck fill for water delivery to local residents and also feeds into a pressurized domestic system servicing the Firehall (Tetra Tech 2006). There is also an exterior public water station where local residents retrieve water. In addition, water is fed to two water-holding tanks used to fill the fire truck (Tetra Tech 2006). Tetra Tech understands that a new water treatment system is in the planning stages to be installed in 2017. The Marsh Lake Firehall water supply system 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.

5.29.1 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 – YG CS (the client) has been consulted and provided review comments for the data compilation.

5.29.2 Hydrogeology

The groundwater flow direction in the vicinity of the Marsh Lake Firehall is inferred to be southwesterly towards Marsh Lake (Tetra Tech 2006). The driller's log indicates that well-graded granular sediments were the predominant materials encountered during the drilling of the Firehall well, and the well appears to have been terminated within a reasonably productive overburden aquifer. The well log indicates that the well is likely to be completed within an unconfined sand and gravel aquifer. Due to the absence of finer-grained sediments overlying the aquifer, the vulnerability of the aquifer to surficial contamination is considered to be high.

5.29.3 Well Summary

The log for Well 1334 is included in the GIS map and database portion of this report. The following table summarizes the completion characteristics of the well.

Table 5-73: Marsh Lake Firehall, Well 1334 Summary		
Well Construction Parameters	Details	Source
Date of construction	The well was constructed by Fredalena Enterprises in June 1992	Well log
Total well depth	28.0 m bgs	
Casing	6" (152 mm) OD Steel Well Casing	
Casing depth	26.8 m bgs	

Table 5-73: Marsh Lake Firehall, Well 1334 Summary

Well Construction Parameters	Details	Source
Well screen	1.2 m 25 slot (0.64 mm) well screen from 26.8 m bgs to 28.0 m bgs	
Static water level	Approximately 19.5 m bgs (June 1992)	
Sanitary seal	No record of sanitary seal installation	Well log and Tetra Tech 2006
Wellhead completion	The wellhead is located approximately 1.7 m below grade inside a 1.2 m diameter steel culvert with a wooden box enclosure at surface. The well is equipped with heat trace for freeze protection	Tetra Tech 2006
Wellhead stickup	1.8 m bgs (measured on May 9, 2005)	
Well rated capacity	3.2 L/s (42 IGPM) (estimated by the driller)	Well log
Well GUDI status	Potentially GUDI	Based on well construction
Well Construction Comments:	Well was not constructed to meet Canadian Groundwater Association Well Construction Guidelines.	

5.29.4 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 key observations and comments noted during Tetra Tech's 2005/2006 chemical water quality review and groundwater sampling on the well are summarized as follows (Tetra Tech 2006):

- The water quality results indicated that the water from the well was a calcium-bicarbonate type water with a pH of approximately 8.22 on the date sampled;
- The water was considered very hard, with a hardness of 163 mg/L on the date sampled;
- The water quality results indicated that the water from the well meets the GCDWQ for all the parameters analyzed;
- The reported concentrations of THM and HAA were below the laboratory detection limits; 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.

5.29.5 Water Treatment and Distribution

Table 5-74: Marsh Lake Firehall Water Treatment and Distribution Details

Item	Details	Source
Owner/Operator	Government of Yukon	
Water source	Groundwater	Tetra Tech 2006
Number of wells serving the system	Marsh Lake Firehall well (Well 1334)	
Treatment type	Chlorination	
Water Users	Firefighting and domestic water fill point	
Delivery method	Piped (to the building)	
Age of system/last known update	A new water treatment plant is planned for 2017	

5.29.6 Source Water Protection Planning

There is no source water protection planning in place for the Marsh Lake Firehall water system. The vulnerability of the aquifer in which this well is completed is considered to be high, and a SWPP would provide a valuable tool for identifying, monitoring and managing risks to the wells and aquifer. Source water protection planning here could be incorporated with planning for the Marsh Lake Community Centre and private water supplies where applicable to create a comprehensive Marsh Lake Community SWPP.

Tetra Tech was not able to find and records indicating that a GUDI assessment has been completed for the system.

During the 2005 SPDWSA, Tetra Tech identified an above ground fuel storage tank located approximately 27 m from the well (Tetra Tech 2006). In addition, there had been a spill reported on November 22, 1987 (Tetra Tech 2006). The spill has been recorded in the EC Spill Report Information Database as Spill # 8717. There had reportedly been a transport truck that had lost control and crashed approximately 500 m south of the Lakeview Marina turnoff on the Alaska Highway. Due to frozen condition and lack of surface drainage area, environmental damage was reportedly minimal (Tetra Tech 2006). Since the reported spill location is at least 1 km away from Marsh Lake Firehall, this spill was not considered to be a potential concern to the water quality at the Firehall (Tetra Tech 2006).

5.29.7 Water Supply Information Data Gaps

This summary has been reviewed by YG PMD and Tetra Tech is awaiting review comments from YG CS, Tetra Tech identified the following data gaps:

- Tetra Tech recommended that a GUDI assessment be completed for the system, the well be retrofitted with a sanitary surface seal and that a water softening system be installed should manganese staining prove problematic;
- There is no source water protection planning in place to protect this groundwater resource. As the aquifer is unconfined and considered vulnerable to surface sources of contamination, the implementation of a SWPP would be valuable to reduce the risk of contamination of the aquifer. A SWPP developed here could be incorporated with the Marsh Lake Community Centre well SWPP to create an integrated plan.