



Water supply for the Avalanche Creek Campground

Water for the campground at Avalanche Creek is supplied from a developed spring about ¼ mile east of the campground. The springbox is no longer secure from surface contamination and the water source is classified as “groundwater under the direct influence of surface water” (GWUDISW) by Montana DEQ. This classification requires treatment and monitoring as if it was from a surface water source. Alternatives to surface water treatment include repairing the collection system at the spring and the transmission line to the campground, or constructing a well at the campground.

Hydrogeology

There are no records of previous well drilling at Avalanche Creek campground or the immediate area. The nearest known well is at the ranger station at the north end of Lake McDonald; too far distant to make inferences regarding the hydrogeologic conditions at the campground.

The geologic maps show the valleys at the campground (both Avalanche Creek and McDonald Creek) to be filled with glacial till. Glacial till is the unsorted sediment deposited directly by a glacier. Till may include clay, silt, sand, gravel, and boulders. In some of the older texts, it was often referred to as boulder clay; as a descriptor of boulders imbedded in a matrix of finer-grained sediments.

Generally, till is a poor aquifer. Clay and silt particles tend to fill the pore spaces between sand and gravel, leaving no space for groundwater to flow through the sediments. There may be environments where the geologic processes associated with deposition of the till resulted in lower proportions of silt and clay, resulting in more permeable sediments. The geologic maps of Glacier National Park (Whipple, 1992 and Carrara, 1990) describe the till as bouldery rubble with minor amounts of sand, silt, and clay. If there are only minor amounts of silt and clay, then the till may be a permeable aquifer. In addition to not knowing the makeup of till at Avalanche Creek, we have no information regarding how thick it might be.

The valleys of McDonald Creek and Avalanche Creek are steep and contain high-energy streams that carry large loads of sediment from the surrounding mountains and rework the glacial sediments underlying the valleys. Post-glacial streamflow processes may have reworked the glacial sediments, removing some of the fine-grained sediments. Alluvial sediments deposited by the streams provide additional permeable material that could yield water to a well.

The bedrock underlying the area is Grinnell Formation; consisting of argillite and quartzite. Argillite is a sedimentary rock formed by compaction of silt and mud. The Grinnell Formation is unlikely to contain groundwater.

Potential test well site

The geology and geomorphology in the vicinity of the campground suggests that there is at least a reasonable chance of successfully constructing a well in the area. In particular, we should look for a site that is at the intersection of the two valleys. One potential site for a test well is at the ranger station at the entrance to the campground (as shown on Figure 1). This location is more than 250 feet from both creeks, so a well would be less likely to be classified as GWUDISW, especially if the screened interval is more than 50 feet deep. The location is near the midline of the McDonald Creek valley, where the sediments should be thickest. There might also be delta-type sedimentary deposits in this locale from sediments carried by Avalanche Creek that have been dropped as the creek entered the main valley of McDonald Creek.

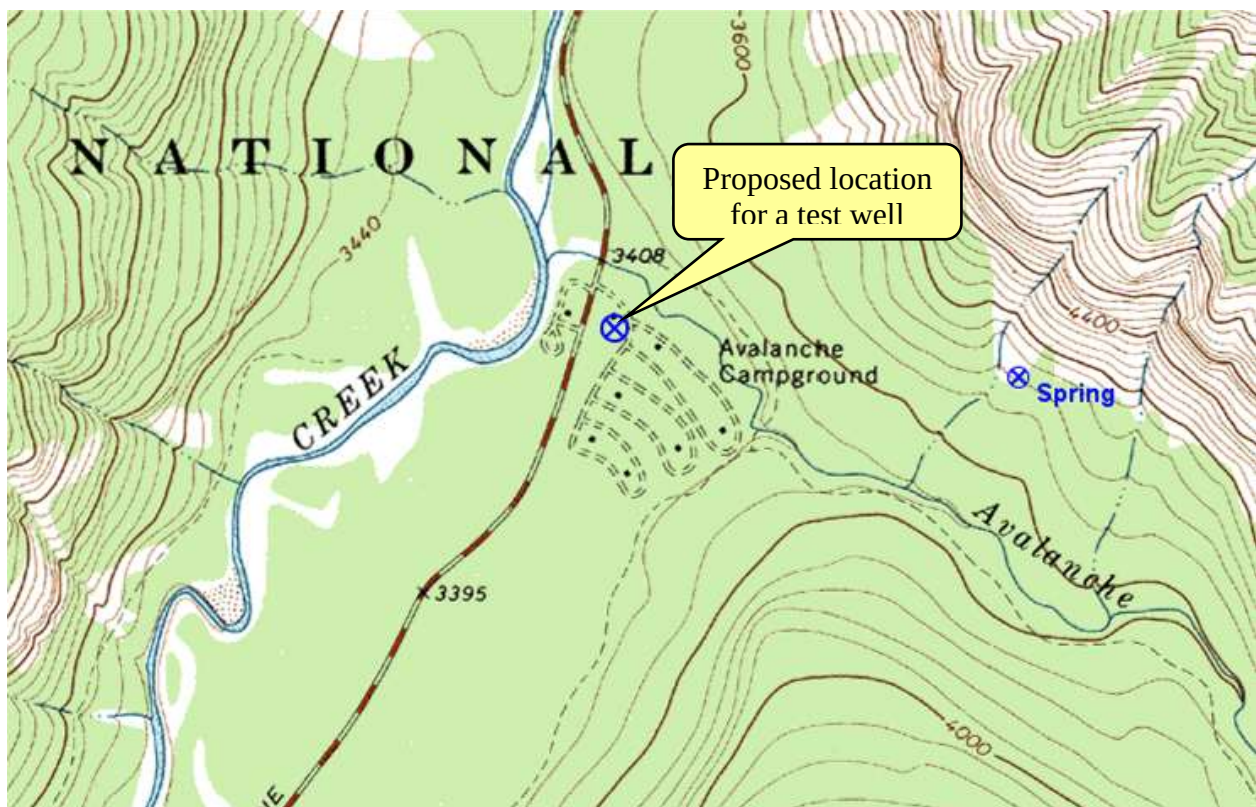


Figure 1. Proposed location for a test well at Avalanche Creek.

There should be a clear plan of how to provide electricity for a submersible pump in a well prior to constructing a test well. There's no point in drilling and testing if there won't be an acceptable method to provide power to operate the pump.

If a test well is constructed, it should only be drilled until bedrock is encountered. There's no point in drilling into the bedrock formation as it almost certainly will be nearly impermeable and therefore not a source of water. Bedrock will probably be encountered within 100 feet of ground surface, and quite likely less than that.

If at all possible, the test well should be constructed with the screened interval more than 50 feet below ground surface. The screened interval depth of greater than 50 feet, in combination with being more than 250 feet from a stream, should result in the well being designated a groundwater source by Montana DEQ. Thus avoiding the GWUDISW testing and monitoring requirements.

If the screened interval of the well is less than 50 feet below ground surface, additional testing may be required to determine whether the well will be classified as groundwater or "under the influence of surface water".

Alternatives

The alternatives for a water source for the campground are;

1. Continue to use the existing springbox and transmission line. This water would be classified as coming from a surface water source. Water treatment and monitoring would need to be upgraded to comply with Montana regulations.
2. Repair, replace, or rehab the collection system at the spring and transmission line between the spring and campground to bring it up to standards for classification as a groundwater source by MT-DEQ. Staff from MT-DEQ should be engaged to insure that the reconstructed collection system will meet Montana standards.
3. Construct a well at the campground. This option would require drilling a test well to determine whether groundwater is available at the campground. If groundwater is available, then a power supply would need to be developed for the submersible pump in the well. Additional testing might be required to determine whether the well would be classified as a groundwater source or groundwater under the direct influence of surface water.

References

Carrara, P.E., 1990, Surficial geologic map of Glacier National Park, Montana: U.S. Geological Survey, Miscellaneous Investigations Series Map I-1508-D, scale 1:100000.

Whipple, J.W., 1992, Geologic map of Glacier National Park, Montana: U.S. Geological Survey, Miscellaneous Investigations Series Map I-1508-F, scale 1:100000.