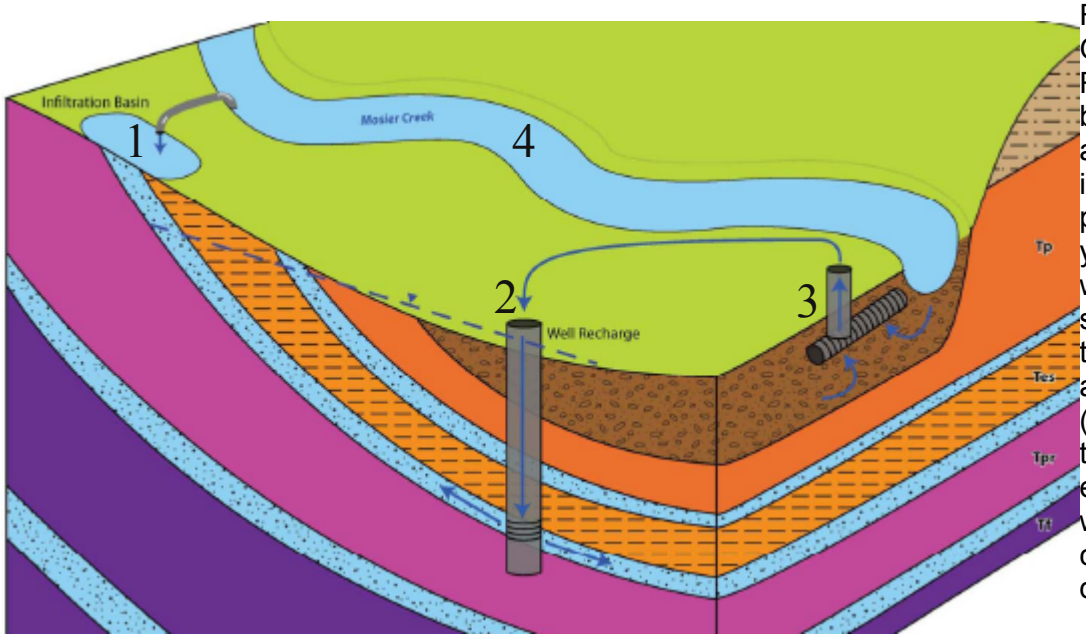
Mosier Watershed Council April Meeting – Kris(ten) McNall

This month, GSI Water Solutions came back to Mosier to give us their final presentation about Aquifer Recharge. (First we had to debate what GSI stands for; and the answer is: These days, Nothing. Although this sort of detail is relatively trivial, it does raise the issue of the best way to bring new participants in Mosier's Watershed Council up to speed on ongoing topics.) There was a lot more information than is practical to repeat in this writeup, so I'm going to discuss the main concepts and, what everybody wants to know, how much would this all cost?



First, here's a picture from GSI reviewing how Aquifer Recharge works: either you build a lake (1) on top of the aquifer and let the water soak in, or you build a well (2) and pump water into the aquifer. If you use the well method, the water has meet cleanliness standards. The cheapest way to do that is to use the ground as a natural filtration system (3). The alternative is to use a treatment plant, which is very expensive. In all cases, the water for Aquifer Recharge comes from Mosier Creek (4) during the rainy season.

This picture is also useful for seeing how wells interconnect aquifers and cause ***commingling***, a term all Watershed Council attendees soon learn. Note that our sample well goes through 2 aquifers. If the well is not sealed, water can flow between these aquifers. The goal of an Aquifer Recharge project would be to put water into the Priest Rapids aquifer (the second one down). Thus, the injection well would need to be sealed as it passes through the Pomona aquifer (the first one down). GSI told us that they thought it was a good idea to drill a new well for any recharge project, both because we don't really have an appropriate well available, and because that way the well can be specifically designed for pumping water in, rather than out.

Obviously, *Aquifer Recharge for Mosier* has **Issues**. The biggest issue is that the USGS study showed that Aquifer Recharge would have limited value if we don't fix the commingling wells. Another issue is finding land for a lake, aka an "infiltration basin." GSI expects that the geologically best place is near Mosier Creek both upstream and downstream of Digger Road, because there's water from the creek, and the aquifer is believed to be penetrable by water from the surface. However, that area has challenges, not the least of which is that it's privately owned. Furthermore, much more geological research would be required to be confident that water would indeed recharge the Priest Rapids Aquifer. Thus, GSI concluded that there is a high uncertainty of whether the right combination of conditions is present for surface recharge and recommended well recharge would be the preferred option.

However, well recharge is Even More Expensive than Surface Recharge, especially if we have to filter the water rather than just letting the ground do the filtration. Here is a Summary of Guestimated Costs:

Surface Recharge: **$520,000 - $710,000 + $10,000-$20,000**/year Operations & Maintenance (O&M)
Well Recharge without separate water filtration plant: $**980,000 - $1,350,000 + $35,000 - $70,000** O&M
Well Recarge with filtration plant: **$3,500,000 - $3,800,000 + $65,000 - $100,000** O&M

These costs are estimates. They may change when GSI sends us their final report, but they should be close enough for us to see that It's A Lot Of Money.

GSI then reminded us that there would be little point doing any Aquifer Recharge without repairing those darn commingling wells. This fact enabled them to spend some time researching well inspection and repair techniques and costs.

It appears to me that Wells are like _____. No two are the same, and they all have their quirks. Thus, each well repair would be a unique situation. However, the overall goal would remain the same: ensure that a well only allows water flow from a single aquifer. GSI considered one standard technology when doing their costing estimates, Full Casing and Sealing. This technology was chosen because it conforms to Oregon rules, and because it is considered to be reliable. Although the Oregon Water Resources Department (OWRD) has indicated that they would be willing to consider variances for repairs, they are very concerned about getting it done right.

The normal rules require 2" of seal for a well. A well usually needs a minimum diameter of 4" inside to run things like the water pump down the hole. Thus, the minimum diameter for an existing well to be eligible for repair is typically 8", unless OWRD grants a variance. An alternative to attempting to case and seal an existing well would be to decommission the well and then replace it. Decommissioning a well requires perforating any existing seal, and then pumping the whole well full of grout. An easily penetrated aquifer can swallow a lot of grout and make this task easier said than done.

Here are GSI's estimates on well repair costs:
Well Repair: **$32,000 - $49,000**
Well Decommissioning: **$14,000 - $20,000**; New Well: **$37,000 - $52,000**; Total: **$51,000** - **$72,000**
New Pump System (may be needed for either repair or new well) : **$5,000 - $16,000**

Obviously, well repair is also Very Expensive. GSI also talked about technologies for determining which wells are commingling, and how much. The idea would be to find the Really Bad Wells and fix them first. Unfortunately, assessing commingling wells can also be expensive. There are some relatively inexpensive approaches such as putting temperature probes down wells which can work if the pump isn't in the way, but they only tell whether the well is commingling or not. How much water is flowing through the well remains a mystery. There are also some quantitative methods for assessing how much a well is commingling, but those methods are expensive. Basically, a quantitative survey of well commingling costs around **$10,000**/well. See the GSI slides (info below) for more details. GSI expects that a volume discount could be had, but once again, we're talking about A Lot Of Money. However, if it turned out that a few wells were causing a large percentage of the commingling, it could be worth the investment of surveying wells.

Phew. Believe it or not, this article really is only a summary of what was discussed. If you want to learn more, we are going to start posting Watershed Council information on the **MosierCommunity.com** web site under the Issues tab. We will post the GSI slides as well as slides from the USGS presentation.

The next meeting has not yet been announced, but as always all are welcome. We will try to post notices in various places and on MosierCommunity.com, or you can contact Kate Conley to get on our mailing list: *kate dot merrick at or dot nacdnet dot net*. If you haven't attended a Mosier Watershed Council meeting, please take a look at the USGS and GSI slides before the meeting. We will be working on an informational presentation for new members, but these slides should help you to understand the outstanding challenges so that you'll be ready to help work on current issues.