FEATURE ARTICLE

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# Where Did My Water Go?

*Good, old-fashioned water is the one natural resource most taken for granted, even though it is our most precious resource. However, many people may someday ask the question: "Where did my water go?" This could be a homeowner who opens the tap for a drink of water, and the water trickles out (frozen pipes? water main break?). The same homeowner may ask this question when noticing his or her wilting flowers. There are many other scenarios where suddenly, we discover that our water is gone, but perhaps none is more traumatic than that of the local golf course superintendent. The typical turf grass professional relies on his or her precious irrigation supply for keeping the grass green and healthy, whether for private club members or daily fee golfers.*

Arid, drought-like summers seem to occur every few years or so. Another potentially dry summer has begun in the Midwest. If you've started to question your water supply, what should you do?

With the typical Midwest golf course irrigation system, the lack of a sufficient water supply is usually due to one of the following:

- The irrigation supply lake is not being adequately replenished due to the lack of natural run-off or rain. Without an irrigation well, you spend most of your day trying to "contact" Mother Nature. Since Mother Nature fails to answer around here some summers, you may be out of luck!
- You do have a pond recharge well; however, the well has stopped producing water due to mechanical failure of the pump.
- Your well production is reduced and recharge of the pond takes longer than normal. This can be a well pump mechanical problem developing and/or a need for well treatment.

The latter two scenarios are very similar in that they are maintenance issues. In either case, the pump will probably need to be pulled for repair in conjunction with the possibility of needing some type of well treatment. Obviously, our typical Midwest Golf Course Superintendent will attempt to avoid these occurrences during the hot, high-demand summer months by regularly monitoring the operation of the well and pump and by tending to periodic, preventative-maintenance repairs during the off season. For the sake of article space, we'll make the assumption that experienced MAGCS Superintendents will be able to make normal preventative maintenance happen, leaving the focus on the first scenario: *a missing Mother Nature and no well on the grounds.*

In northern Illinois, the most recent occurrence of a "drought-like" year was in 2005. The lack of rain, high temperatures, etc., are still etched in everyone's mind, so there's no reason to relive that part of the past. But our past experiences and the lessons learned by others can be very helpful. We will highlight three recent projects in the hope of allowing others to avoid similar situations. To protect the innocent, the courses will remain anonymous and will be referred to as "Golf Course A," "Golf Course B," and "Golf Course C."

Golf Course A was constructed in an area where natural runoff was plentiful and built with many acres of lakes. There was no initial need for the drilling of a water well to replenish the irrigation pool supply. For the first several years, this was sound reasoning. However, a dry summer occurred in the mid-1990s, causing a depletion of the irrigation-pool water supply. Informal

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discussions took place as to the drilling of a well to replenish the supply, but before the supply had dropped to a critical level, heavy rains fell, and the subject of a well dropped on the priority list. But another dry year occurred in the late 1990s, and discussions about drilling a new "sand and gravel" well became more serious.

The sand and gravel aquifer is commonly called the "glacial drift" and consists of unconsolidated materials that were left behind when the glaciers rolled through the area. In the case of Golf Course A, the local municipality had successful sand and gravel wells in close proximity to the course. Those wells produced in excess of the desired 300 GPM (gallons per minute). A five-inch, nominal-size test hole was drilled to bedrock, which was found to be much shallower than estimated, 38 feet below ground surface. However, it was felt that a 10' screened interval at the bottom of the drift could produce the desired 300 GPM. But, once again, timely rains occurred, and the project was tabled until the fateful 2005 irrigation season.

In 2005, the lack of a water supply became so critical that arrangements were made with the local municipality to run a hose off a nearby fire hydrant to fill the irrigation pool. As you can imagine, the costs were exorbitant for a very small quantity of water, but when there were no other options, this process had to be undertaken. The lack of rain water continued right on through the season, at which time the management of Golf Course A decided it was time to drill a well to replenish the irrigation pool. (The Greens Superintendent had managed to survive that far, but just barely!)

A side benefit with the delay in the decision to drill the well, was that the local municipality had drilled another new well nearby. Instead of a sand and gravel well, the new well was drilled into the Silurian dolomite or limestone formation. The production from a limestone well is highly unpredictable, but surprisingly, the new city well produced over 700 GPM (1,000,000 gallons of water per 24 hour pumping period). Golf Course A then opted to take a chance and drill a similar limestone well. After the final design and contract process, a successful, 700 GPM limestone well was drilled and put into operation by July 4, 2006. Golf Course A will still need to perform periodic maintenance and continuously monitor their new water well, but their supply problems are now solved.

Golf Course B faced similar circumstances in 2005 with significant depletion of their irrigation pond. The main difference was that Golf Course B already had limestone wells to replenish the pond supply. However, the location of Golf Course B was such that the limestone aquifer was very marginal, and in dry summers even more marginal, due to the lack of recharge through the glacial drift. The water supply shortage also forced Golf Course B to throttle their new, larger irrigation system – a double whammy! With the marginal, shallow aquifers in their area, management at Golf Course B decided it was time to move ahead with the drilling of a deep, sandstone well.

In northern Illinois, there are two principal, "deep" sandstone formations. One is the upper St. Peter sandstone with depths ranging from 900 to 1,000 feet, while the lower formation is the Galesville sandstone with depths approaching 1,300 to 1,500 feet below ground level. In most areas, the St. Peter sandstone is capable of a sustained 150-200 GPM production, while the Galesville sandstone can produce upwards of 500-700 GPM with a properly designed well. Since Golf Course B was already dealing with 100-200 GPM marginal wells, the decision was made to drill to the Galesville sandstone. After six months of planning and construction, Golf Course B put their new sandstone well into operation, also around the 4th of July, 2006, with production in the range of 500-550 GPM. Golf Course B had resolved their worries, which also allowed them to make better use of their new irrigation system.

Now for Golf Course C, where they were dealing with a different situation, even though there was already an existing sand and gravel well that had provided a sufficient water supply for 30+ years. As this well was starting to show signs of its age, the water quality had also worsened, due to presumed road salt infiltration through the glacial drift. Since he had already been tracking the problem for a few years, the Superintendent at Golf Course C informed management of his pending problem. But it seems that when **quality** is the problem rather than **quantity**, it is much more difficult to shake the needed funds loose from the budget. (The drilling of a deep, Galesville Sandstone well was needed to produce the higher quality **and** quantity.) But let's just say, "hypothetically," that your on-site golf dome was about to be demolished, rather than renovated. Thus, significant, budgeted funding is not needed, and suddenly, the major funding for a new deep well is available. Well,...(no pun intended), Golf Course C had this very situation occur. Since he had already laid the groundwork for the new well, the Superintendent seized the opportunity, and the deep well project moved ahead rather quickly. After five months of planning and construction, Golf Course C started their new 550 GPM deep sandstone well just before the current irrigation season.

There are, no doubt, many other very interesting stories to relate. But, the bottom line is that it is never too early to analyze your current needs, estimate your future needs, and investigate what you would need to do to upgrade your present water supply. You may need some help, and there are a variety of ways to receive assistance. Your local well-drilling firm should be very helpful with information about other wells in your vicinity. You can also check with state agencies, such as the Illinois State Water Survey and the State Geological Survey. Irrigation consultants may be able to lend a hand as well. But don't delay in analyzing your current situation and planning ahead so that you don't end up asking yourself, "Where Did My Water Go?" **-OC**

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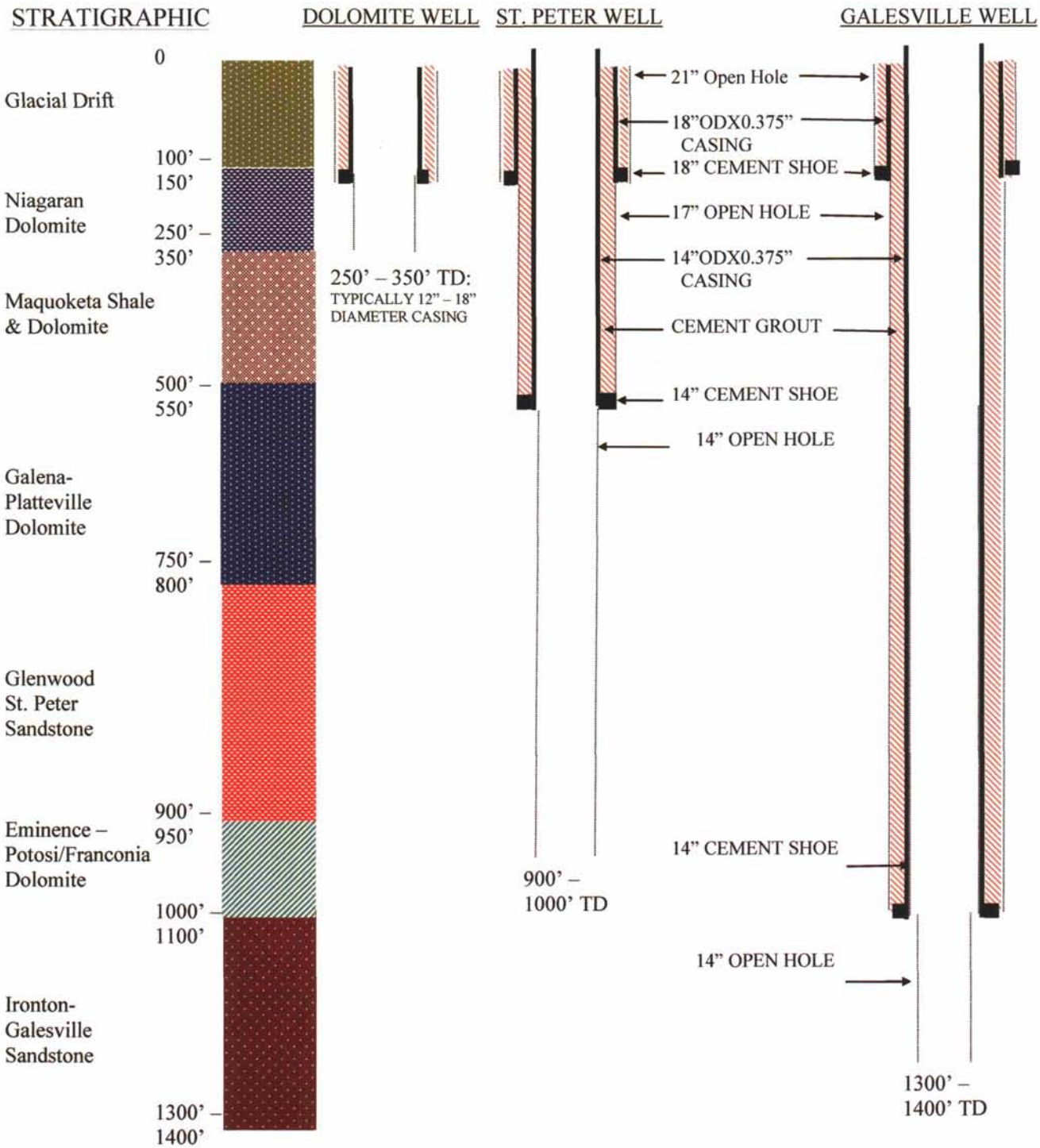
# TYPICAL NORTHEASTERN ILLINOIS IRRIGATION WELL CONSTRUCTIONS




NOTE: NOT TO SCALE. ALL ELEVATIONS ARE TAKEN FROM GROUND LEVEL. GEOLOGICAL DEPTHS WILL VARY BY LOCATION.