Soil Toil and Water Washing

REHABBING NEFARIOUS SOIL AND WATER

Editor's note: Golfdom is partnering with the American Society of Irrigation Consultants (ASIC) to publish a quarterly column on irrigation success stories in the golf industry on behalf of its members.

Last year, Dave Davis earned the task of adding a new 18-hole golf course irrigation system to an existing 18-hole golf course in Southern California. Each golf course has its own water source. The existing course is situated on one landfill; the new course is located on a separate landfill and some old, worn farmland. The landfill portion of the new course is elevated 90 feet to 100 feet above the old farmland portion.

Dave Davis

The veteran irrigation designer would battle intense environmental regulation and monitoring, poor quality soil (for obvious reasons), poor quality water (for the same obvious reasons), developing a new water conveyance system for considerably greater output, multiple stages of water filtering, variable elevation, wind, and dynamic water pressure.

Davis, the proprietor of David D. Davis and Associates in Crestline, Calif., and an irrigation consultant who specializes in hydraulics, was up to the task. The project would require everything from intense water studies and master planning to the complete design of a new irrigation system.

The site

An existing municipal golf course was doubling in size and would be bordered by high-end tract housing and a diversion channel. The 18-hole addition would require 100-plus acres of irrigation; about half being 90 feet to 100 feet higher than the rest of the course — and its water sources.

Because of the coastal orientation and elevation differences, wind levels on the upper holes are completely different from those on the lower. Intense agency monitoring and oversite meant that sprinkler specification had to be precise, with no over-spacing of sprinklers (a 70-foot sprinkler radius on 65-foot spacing), a design technique used to compensate for wind, etc.

Soil specifications required that more than a million cubic yards of new soil be brought in to adequately cover the landfill portions of the new course. Unfortunately, the imported soil came from a coastal source loaded with salts.

Initially, water studies were conducted to determine the project's overall need (volume), and quality of existing well water. According to Davis, the well water was high in mineral content, making it tough to sustain turfgrass. The initial irrigation system used both well water for primary irrigation and potable water for leaching the greens.

The solution

To address the differences in elevation, Davis divided the courses hydraulically into two parts: a high-pressure zone that covers about 65 percent of the course requiring 1,500 gallons per minute (GPM) at about 145 pounds per square inch to operate; and a 2,500-GPM, low-pressure zone that operates at about 120 psi. These zones would be required to accomplish a full irrigation set in six to eight hours.

The challenging site conditions and environmental sensitivity required a continual educating of policymakers. Davis had to develop and sell a middle ground of policy that considered irrigation timing and scheduling needs but was consistent with environmental and political goals.

Water and soil quality

Pouring poor-quality water over it would only exacerbate already-compromised soil quality. Davis designed a fresh-water system for the greens to leach excess minerals and salts through the root zone, and he incorporated a fertigation system for a customized cocktail of deficient elements.

The new lake water sources are ozonated to maintain lake health and minimize algae growth. A sulfur burner was added to help stabilize water pH. A series of automatic, self-flushing, fine-screen filters grabs debris before water leaves the pump station. A stainless-steel screen helps eliminate large debris at the intake tube. Another ozone injector was placed on the discharge side of the pump station and downstream of filters and fertigation system. This ozone is intended to assist water infiltration of the soils.

"Electronic treatment of the water to help control bicarbonates was probably the most unique design element of this project," Davis asserts. "Fortunately, the superintendent and golf course architect are really topnotch, and we were able to work together to design the system to meet everyone's needs while fulfilling myriad site requirements." ■