



The problems which are inherent in designing a large, complex system were compounded by water restrictions, the desert environment and the unusual landscaping of the course.

Gainey Ranch Golf Course

A DESERT SCULPTURE

When most people think of a desert, the images that come to mind are of hot, dry and essentially lifeless places. Some may conceive of a desert as a flat, endless expanse of tumbleweeds and cactus, while others may picture continually shifting dunes in a vast sea of sand.

One look at Gainey Ranch Golf Course in Scottsdale, AZ, is all it takes to realize how the desert image can be transformed into a state-of-the art golf course by a talented team of developers, irrigation specialists and architects. It's nothing short of remarkable.

In creating Gainey Ranch Golf Course out of the desert, the builders were faced with the enormous task of reshaping an undistinguished piece of property into 220 acres of greens, tees, fairways, roughs and bunkers, all strategically located with meticulous care. Before the site was ready to receive the first plant material, three million cubic yards of earth were moved, and the elevation of portions of the site changed by as much as 40 feet.

The challenge of building such a golf

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Water recirculates constantly over waterfalls between the five lakes on the Lakes course.

course would have been challenging in any environment. In the arid climate and poor soil of the Arizona desert, construction of the Gainey Ranch Golf Course constitutes a gargantuan feat.

Throughout the project's development, the land planners, golf course architects, contractors, irrigation designer and management personnel benefitted from the sure, steady and competent direction of Markland Properties of nearby Phoenix. For more than four years of development and two years of operation, Markland Properties has displayed unwavering dedication to quality.

The 27-hole course was designed by Benz and Poellot, Inc., of Saratoga, CA, and constructed by Siemens Environmental Developers, Inc., of Fresno, CA. One of the reasons why the Gainey Ranch Golf Course is so unique is that each of the facility's three separate nines offer a totally originally landscape effect. By varying their 18-hole games among any two of the three nines, golfers find the course challenging game after game. Each hole is designed to stimulate the golfer's strategic thinking by using both new and traditional design concepts. Options are designed into each hole for golfers of all skill levels.

Each of the nines has been painstakingly molded and sculpted to achieve a desired effect. The Arroyo nine is contoured along the banks of a wash (arroyo) running through the ranch. The once ordinary gully has been molded into naturally meandering fairways with traps that the golfer can't ignore.

Approximately 1,500 trees were planted on the Arroyo Course. This was an extremely delicate task since temperatures soared to 110 degrees during construction. The bulk of the trees came from California nurseries, but a few had to be shipped all the way from Illinois. Holding time was kept to a minimum and trees were often planted the day they arrived.

The Dunes nine wraps around a series of spectacular sand dunes complemented by carefully selected plants adapted to arid climates. Hubbs Bros. Seed Co., a specialist in native Sonora desert plants and seeds, landscaped this particular nine.

Specimen native trees were excavated and boxed on the construction site and relocated to the Dunes. Mark Rathert, the architect's representative, worked closely with Jim Hubbs selecting and locating the desert plants, seeds and trees for the course.

Finally, the Lake nine is dotted with water-scapes for a classic resort-type golf course. Players find themselves aiming their shots in and around beautiful lakes, ponds, rolling hills, graceful trees and other fine landscape features. The Gardens Landscaping Co. of Phoenix landscaped the Lake Course. Concrete Finishing Inc., constructed the exposed aggregate cart paths under the careful direction of Benz and Poellot.

A variety of residential dwellings are nestled in and around the three nines, offering the owners excellent views of the



More than 1,500 trees were planted on the Arroyo nine. This proved to be one of the more difficult tasks of the entire project because of extremely hot weather.

paradise-like setting and the convenience of walking to play their favorite sport.

"What stands out about this project is the amount of time that was spent shaping and sculpting the land to achieve the desired effects," explained Nick Siemens, president of Siemens Environmental Developers, Inc. "The owners and architects insisted that every inch of the course portray just the right feeling and playability. They refused to settle for anything less than perfection."

Dale Siemens, the company's vice president, illustrated the attention to detail on the part of the owners and designers by relating the story of how the sand trap near the number five green of the Arroyo nine finally came to be shaped.

Markland and the architect visited the site one day because they weren't comfortable with the trap. They spent an hour walking back and forth, sizing up the area. At one point the architect grabbed a rake and said, "Let me finish this thing the way I think it should be done."

"Never, in the more than 100 golf course contracts we've been involved in, have we seen such meticulous direction," Siemens continued. "I think some real artistry went into the Gainey Ranch."

As the course was being constructed, a number of professional golfers, including Tom Weiskopf and Hale Irwin occasionally toured the facilities and gave their opinions of its playability.

Natural galleries were constructed around each of the 27 holes and the holes were arranged to allow for the easy movement of large numbers of spectators. These pathways are so well blended into the landscape they go unnoticed by golfers who play amid thousands of fine jacarandas, crepe myrtles, eucalyptus, and native desert plants. The plants also serve as windbreaks, provide spectacular color to a previously gray

desert and separate the holes.

However, achieving the primary goal of providing the best possible quality of play consisted of more than shaping the earth. It was determined from the outset that good management would have to be an integral part of the golf course's development, including the most advanced irrigation system available.

As a result, Markland Properties took the unusual step of hiring their first golf course superintendent, Don Lokey, before construction even began. Lokey had input into the development of the facility and followed each phase of construction from beginning to end.

Construction of the golf course was scheduled to begin in January, 1983, but was delayed several weeks by heavy rains. As the work slowly gained momentum, Siemens found that they were using a crew of 85 to 100 men, depending upon the stage of development.

To make their operations more efficient, the company began making innovations in its own work procedures. Nine two-way radios were purchased specifically for the Gainey Ranch job, and they quickly became invaluable tools.

"The radios were an absolute godsend to us," Nick Siemens commented. "We had runners almost constantly on the road. If a man in the field needed something, he could contact the runner and the part would arrive promptly. The radios greatly improved our field capabilities."

If there is one reason that the Gainey Ranch Golf Course is exceptional, it is that Markland demanded that the designs of the golf course architect and the irrigation designer be fulfilled by the contractors. The construction crews were constantly observed by the Markland Properties inspection team, the architect and the irrigation designer. Rather than creating resentment on the part

of the contractor, the high level of scrutiny caused the crews to strive for an ever higher quality of work.

"The inspection teams really helped us to police our own quality control," Dale Siemens explained. "From Markland's point of view it was a very smart thing to do."

Precise design and careful installation are also the keys to the Gainey Ranch Golf Course's irrigation system. Bob Oltman Associates of Chandler, AZ, was assigned the tremendous task of meeting the water needs of the three vastly different nines while conserving water as much as possible. "This was the first project I'd ever designed in which you couldn't take it for granted that we'd have an unlimited supply of water," Oltman reflects.

The decision was made not to rely on deep wells or city mains for irrigation water. Instead, the developers took the extraordinary step of building a three-stage water reclamation plant for the city of Scottsdale directly on the site. Effluent generated by residences and businesses of Scottsdale is treated to supply all of the water for the course. Oltman had to determine how much water would be available from the output of the treatment plant as well as on-site storage capacity before he could design the first section.

Implementing conservation measures was a huge job by itself, but Oltman also had to match the system to the unusual landscape effects of the course. Each of the course's three nines are distinguished by considerably different plant materials, some of which are located in very unique planting conditions. In addition, the site contains many unusual contours or oddly-shaped features which challenged conventional irrigation design.

In order to effectively irrigate under these exceptional conditions, the irrigation systems for each of the three nines had to be broken into four or more subsystems. The subsystems, which all feed off the same main, not only help the golf course superintendent attain greater water conservation, but they also afford him a greater degree of control over irrigation.

On the Dunes nine, for example, separate subsystems carry water to turf areas, to drip systems for all trees, a second drip system for shrubs growing in the dunes and a spray system for other types of shrubs growing out of the same dunes. In addition, the Dunes nine has a quick-coupler system located along the banks of a small wash meandering through the course. Although its installation required the same effort as the automatic systems, the quick-coupler will be used only occasionally for tasks such as establishing plants after hydroseeding and after winter overseeding.

For the Arroyo nine, the division of the irrigation system is similar. It also includes a quick-coupler system for periodic use. The Lakes nine does not have a quick-coupler system, but does have the same submain division for turf and drip systems.

By constructing the Gainey Ranch's irri-



The Arroyo nine was sculpted out of a wash running through the ranch.

gation system with subsystems, overwatering has been virtually eliminated. The trees situated in turf areas, for example, will receive less water through their emitter system than trees in non-turf areas since a portion of their water need is met by the turf system.

Oltman acknowledged that constructing an irrigation system in this manner was more expensive, it also contributes greatly to overall system efficiency and future water savings. He gives much credit to the site's owners. It wasn't a case of "Hang the cost, let's do it," he commented. "The decisions were made based on good sound judgement and knowledge of what the money was going to accomplish. They knew what they were after, and were willing to pay for it."

Oltman did not have to devise shortcuts to solve budget restraints. As a result he was able to select and space the spray heads with a great deal of precision. For example, he used part-circle heads to avoid overwatering and to control undesirable plant growth. "By using part-circle sprinklers along the perimeter of the Dunes nine, we carefully restricted where the grass could grow," he explained. "If we were using full circles we'd be throwing water onto the sand dunes. We'd be wasting water, and the superintendent would have a weed problem."

The unusual undulations of the course greatly contributes to its popularity with gol-

fers and attracts homebuyers, but the rolling terrain also posed a number of difficulties for Oltman. The problems of valving, spacing and especially control had to be carefully considered.

"What makes the difference is the control system itself," Oltman points out. The Rain Bird Maxi III system (upgraded from the original Maxi II) provides the capacity to manage the large irrigation system, the pumping system, the water level in the lakes and the amount of water drawn from the treatment plant. Water management consultant Ken Christley works with superintendent George Corthouts to gain maximum benefit from the computerized irrigation controller's capacity.

The numbers behind the system are staggering in themselves. On a 220-acre site, the design includes over a million feet of underground wire, almost 650,000 feet of PVC pipe, 139,000 fittings, thousands of sprinkler heads, 741 electric valves, and 124 field controllers.

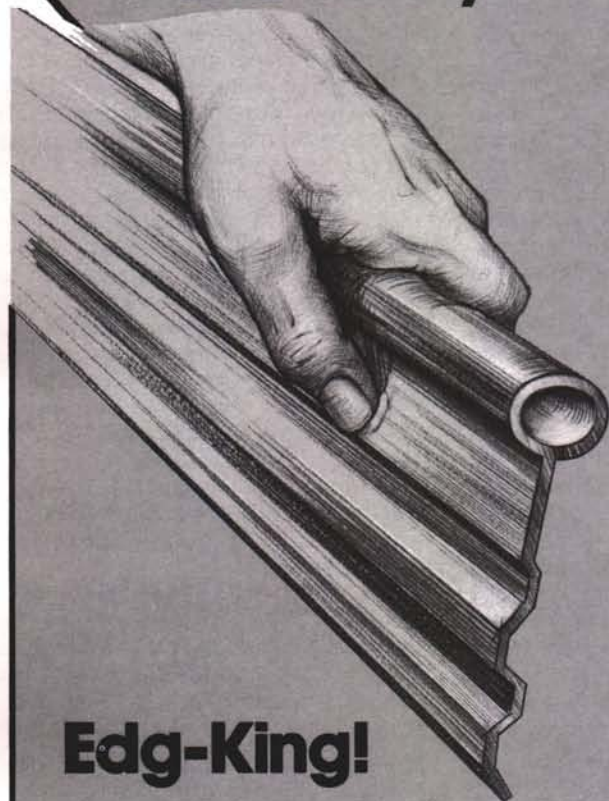
The numbers for the pump station are also staggering. The pump, one of the largest ever designed for golf course irrigation, has the ability to supply the system with 4,000 gallons of water per minute. Moreover, it is complemented by a number of smaller pumps to recirculate lake water in the six lakes on the Lake Course.

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In several areas of the course, hydroseeding was performed for erosion control purposes.

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Installation of the irrigation system started in 1983 and stretched out for nearly a year. Over the duration of the installation work, there were repeated changes in the design. This was due to the owner's desire that the landscape come first and the irrigation system be designed to fit the landscape, not the other way around.

With the number of changes that were made, the original irrigation plans differed in some cases from the finished system. Because of a strong desire for a complete and accurate set of "as-builts," a series of aerial photographs were made showing exactly where the pipes were laid prior to installation. These photos, combined with the as-builts, have helped greatly since the course was completed. As each section of the irrigation system was completed, Siemens had to prove its performance to the satisfaction of the owner's inspection teams.

Drainage on the Gainey Ranch Golf Course was particularly important. The Scottsdale area is occasionally subjected to sudden, violent downpours. "For once we've seen an owner tackle the drainage problem properly, right from the start," Nick Siemens said. "We have 12- and 18-inch drainage pipes feeding into catch basins all over the course. There are miles of corrugated and perforated pipe running underneath the ground, all tied together into a unified system. Some of this drainage water is captured and put into the storage lakes.

Again, the owner's inspection team checked each phase. "The owners wouldn't accept a green until we ran a hose at the high point and they could see how much water would flow into the catch basin," Siemens adds. "This is the only project we have ever had to prove immediately that the drainage functioned as intended—I think it's highly commendable."

The ornamental lakes on the Lake course are actually storage facilities. The lakes are kept within a foot of the desired level for aesthetic reasons. A sophisticated network of pumps and pipes recirculates the water at all times. Treated effluent enters the highest lake and flows down over waterfalls to each successive lake. When it reaches the lowest lake the water either enters the irrigation system or is recirculated to the top lake.

The amount of water that is pumped into or out of the lakes varies according to the month of the year. Even with precise planning, the lake levels drop within the one foot limit during the end of July when the irrigation needs exceed the production of the treatment plant. That one foot of drop is the three million extra gallons needed to fill the gap.

The treatment process sometimes leaves the water with a higher than normal salt content, a factor that was considered in the design. The primary concern is the drip emitters. They have to allow certain sized particles, such as 30 mesh, through them. After two years, the drip system is operating as designed.

"One thing we've discovered about the drip system for trees," says Corthouts, "is each plant must have a pit around it for the water from its emitter to collect. Without the pits the water just runs down the surface away from the plant."

Corthouts is trying a number of moisture sensors on the course. "One difficulty with the moisture sensors is the wide range of soils we have on the course. Each type of soil gives a different reading on the sensors. It's still in the experimental stage for us. We rely mainly on close inspection of the course and taking core samples frequently."

There are five irrigation specialists for the Gainey Ranch out of a total landscaping and golf course crew of 55. "That may sound like a lot of people," says Corthouts, "but we have acres of plant beds in addition to the course."

Gainey Ranch has been a private golf course from the beginning. One exception is a limited arrangement with the new Hyatt Regency adjacent to the course. Director of Golf Paul Purtzer wants to keep the course busy while preserving its exclusivity.

Those golfers fortunate to play at Gainey Ranch Golf Course experience a golf course of unusual quality. The team that put it together and maintain it today have proven they can overcome a harsh desert environment, a shortage of water and tremendous complexity to provide golfers with a course that gives new meaning to the term "desert course." ●