GOLF COURSE CONFERENCE AND TRADE SHOW

The 62nd International Golf Course Conference and Trade Show is slated for February 5-12, 1991, in Las Vegas, NV. Sponsored by the Golf Course Superintendents Association of America (GCSAA), the event will include nearly 50 educational sessions and seminars, a 2-1/2-day trade show, a gala banquet featuring singer Neil Sedaka, the association's annual meeting and election of officers, and the GCSAA Golf Championship.

Topics from turfgrass disease control to environmental regulations will be covered in 41 one- and two-day seminars during the first four days of the conference. Six concurrent sessions are slated for Saturday, February 9. The GCSAA's continuing education program recently earned official accreditation from the Accrediting Council for Continuing Education, which is recognized by the U.S. Secretary of Education as the official accrediting agency for noncollegiate continuing education.

Mark H. McCormack, sports marketing entrepreneur and best-selling author of the book, "What They Don't Teach You At Harvard Business School," will be the keynote speaker for the opening session on Friday, February 8. The session will he held at the Riviera Hotel, which will serve as headquarters for the event.

More than 500 exhibitors and distributors of golf and turf industry products, supplies, and services are expected to exhibit at the trade show, which will run February 10-12 at the Las Vegas Convention Center.

The formal closing banquet, where Sedaka will perform, will be held on February 12. The presentation of the Old Tom Morris Award, the GCSAA's top honor, will highlight the evening. The award will be presented to William C. Campbell, the only American ever to have served both as president of the United States Golf Association and as captain of the Royal And Ancient Golf Club of St. Andrews, Scotland.

INTERNATIONAL GOLF BOOM IN FULL SWING

The American golf course of the 1990s is in record demand throughout the world, according to Dan Maples, president of the American Society of Golf Course Architects (ASGCA).

"Obviously, the Pacific Rim has been a fertile market for American-style golf courses for the past decade, but today our members are receiving inquiries from every continent," Maples said.

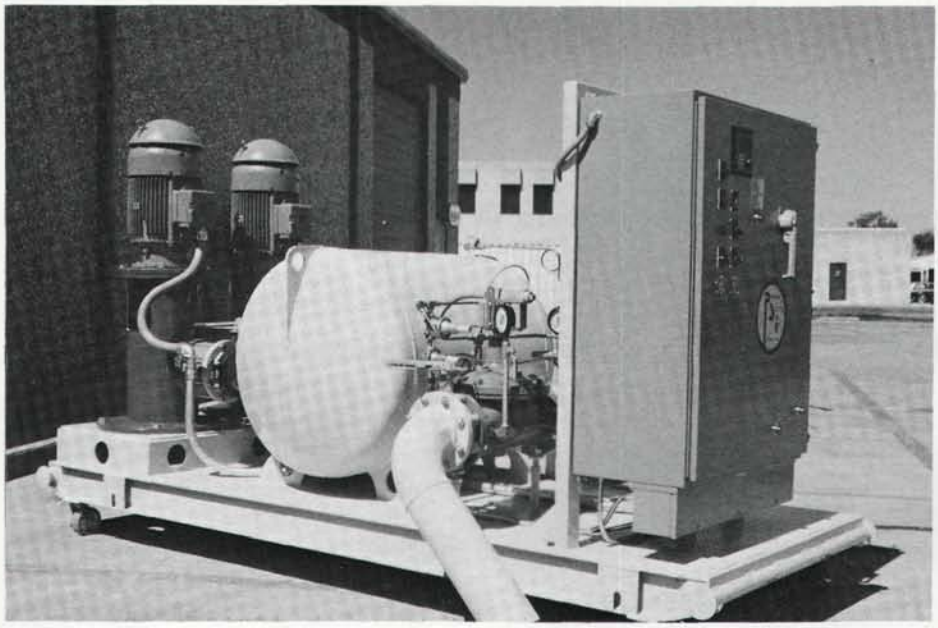
He pointed out that Europe is in the midst of a golf boom similar to the one in North America during the past five years. He added that Europe has even greater potential now that its eastern countries are interested in attracting tourists and business people with hard currency.

Among the "hot" development areas for courses are Spain and Germany. However, there has also been significant activity in areas not commonly associated with golf, such as the Scandinavian countries.

"The society and individual members are receiving many inquiries from developing countries that recognize the drawing power of golf courses designed by recognized American architects," said Maples.

He added that there will be more public/private partnerships internationally to develop golf courses. "Hotels and resorts are recognizing what their North American counterparts learned years ago–a championship golf course can generate profitable convention and meeting business," he said.

Selection and Protection of Pump Stations



Prefabricated vertical turbine pump station by Pumping Systems, Inc.

The Middle East crisis has reminded us how dependent we are on people and things beyond our control. It has made us realize how rising energy costs threaten our budgets at work and at home. Finally, it motivates us to take steps to regain at least some control over complex technologies that affect our livelihood.

For the golf course superintendent and managers of other large turf areas, the irrigation system is one of the most complicated mechanisms required to do their job. They are highly dependent upon reliable and consistent delivery of water to turf and other living plants. Without irrigation, maintenance of golf courses and athletic facilities would be impossible.

At the heart of all large irrigation systems is the pump station. Like oil, we too frequently take for granted that it will always be there when needed and understate our dependence on it. Instead our attention has been directed more toward innovations in irrigation controls, advancements in sprinkler heads, and even weather stations. In the attempt to keep golf courses up-to-date and competitive in both design and maintenance, we have favored the accessories over the basic hardware that makes irrigation possible.

Rising energy prices may bring superintendents back to the basics as the cost of inefficient pump stations is magnified in the coming months. Electricity wasted to run pumps below their peak efficiency will add up quickly to cost golf courses thousands of dollars. Many superintendents will get a jolt when they open their electric bills.

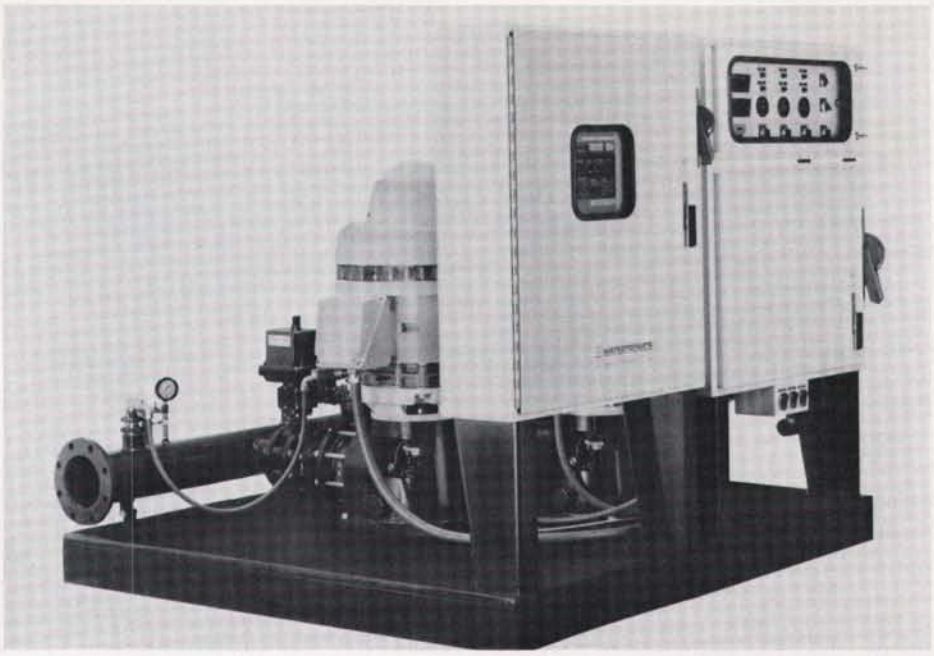
At the same time, the golf industry has been hit by a shortage of potable water for irrigation. More and more irrigation systems are operating with lower quality water that threatens the performance of pump stations and many other components. Put it all together and you get the message that this winter is a good time to reevaluate your entire irrigation system – starting with the pump station.

"Pump station efficiency depends upon many things beside the pump," states Carroll Childers, president of Carroll Childers Co. in Houston, TX. "Ninety percent of what people put on pump stations is there to compensate for flaws in the design of other parts of the irrigation system." Widely fluctuating flow rates in irrigation schedules, inconsistencies in water supply and quality at the source, inadequate consideration of elevation changes in design, and any changes made in heads or zones after installation all affect the demand placed on the pumps.

"A pump is most efficient at one point on its curve,"Childers points out. The curve he is talking about is a graph of the energy consumed by the pump motor at different rpm. Running the pump constantly at peak rpm uses the least amount of electricity per gallon of water. If it pumps 500 gallons per minute (gpm) at peak rpm, then the demand for water by the irrigation zones should be designed at 500 gpm to achieve maximum efficiency. Since golf course irrigation systems generally require from 800 to 2,500 gpm, a series of pumps are linked together to meet demand.

While a conventional pump running at a fixed speed has one point of maximum efficiency, a pump designed to run at different speeds has many curves and many different efficiency points, says Gordon Ammon of Watertronics in Elm Grove, WI. This is the purpose of a variable frequency drive (VFD). It allows the pump to run at peak efficiency at any flow. VFD only draws as much energy as necessary to supply the demanded flow. It also replaces the hydraulic valve which requires an eight to ten psi pressure drop. Therefore, less energy is required to produce the same flow of water at the same pressure at the sprinkler.

The extra cost of controls for VFD is offset by energy savings when water demand fluctuates. VFD protects the pumps



Watertronics pump station.

from working harder than required to meet demand.

Ammon adds that VFD also helps protect pipe and other components from damage by severe pulsing when demand fluctuates from one zone to another. He believes that the growing use of effluent water for irrigation increases the chance for malfunction of hydraulically-actuated pressure regulating valves.

Watertronics offers an electrically-actuated pressure regulating valve for its prefabricated stations. "The working components of our valve are not exposed to water," says Ammon. "Our valves have a maximum full flow pressure drop of less than one psi. This low friction loss translates to less required work by the pump stations. We use a flow sensor and pressure transducer that measure rates of change in increments of time. This information is fed back into a controller, which in turn adjusts the valve to prevent pulsing."

Hydraulically-activated pressure reducing valves are most common, according to Doug Verhuel with Pumping Systems, Inc., of Dallas. TX. "Variable frequency drive accomplishes essentially the same thing by controlling pressure and flow," he states. "A properly designed pump station includes a downstream relief valve to keep pressure from reaching damaging levels."

"It's like insurance," Childers explains. "How much do you need? Backup protection costs money and increases the complexity of the station. The way to save money is by designing the pump station to fit the irrigation system in the first place. If you make changes in the irrigation system, then you also need to consider adjustments in the pump station."

However, a superintendent or irrigation manager may not be totally aware of some changes that affect the performance of his irrigation system and pumping station. One principal culprit is water quality. Debris, particulate matter, or algae carried into the system with the water can plug screens, valves, or heads rapidly.

In addition to wear on pump components, foreign material can reduce or block the flow of water during delivery. When flow drops below design levels, the efficiency of the pumps is reduced. Witnessing plant stress and not being aware of blockage, the superintendent instructs his irrigation manager to lengthen cycle times. This compounds inefficiency at the pump station.

"Most superintendents have so many other fires to put out that they don't realize there is a problem with their pump station until something breaks," says Bob Whalen, sales manager of Western Pumping Systems in Chandler, AZ. "The pump station is an alien device with a bunch of control panels, valves, and relays. Frequently, a problem isn't obvious until the power bill arrives. I know of a case where a stuck valve kept two pumps running for part of a month. The power bill was $6,000 higher than expected!"

To assist the superintendent and irrigation manager, the company created a device that records energy, pressure, and flow. This data can be fed into a personal computer with a program that calculates pump efficiency. Called the Data Logger, the troubleshooting device informs the superintendent when the pump is not running properly. "The Data Logger software is written for the superintendent," says Whalen. "It explains, in terms he can understand, what problems exist and what adjustments are necessary."

Poor-quality water is a problem facing a growing number of golf course superintendents. Fortunately there are ways to filter water both upstream and downstream of the pump station. Upstream filters protect the pump from abrasive materials. Downstream filters remove finer particles and organic matter that can plug valves, screens, and drip emitters.

The ideal situation would be to filter water before it enters the pumps. However, there are practical limitations to upstream filtration. Any device that restricts water from entering a pump can cause severe damage due to cavitation.

"A major point of concern is whether to put the filters before the pumps or after," points out Isaac Orlans, president of Amiad USA in Van Nuys, CA. "If there is any type of malfunction with a filter system [upstream], the pump can be badly damaged for lack of water. On the other hand, if the filter is installed after the pump and it malfunctions, the irrigation system might suffer for a few hours. But no loss of a major capital investment like pumps will happen. From our experience, if the intake has been built and located properly, there is only need for very coarse filtration before the pumping station."

To avoid damage to pumps, most manufacturers suggest filtration only for debris or coarse particles ahead of the pump. Fixed screen filters are common. The draw-

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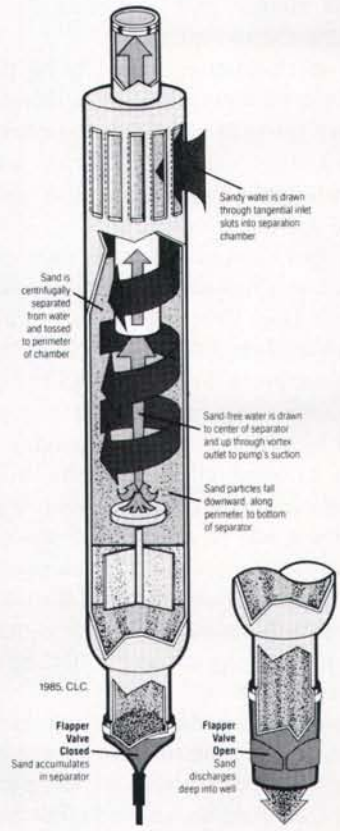
back with fixed screen filters in cases of debris-laden water, such as lakes and moving streams or rivers, is they may require periodic cleaning. The intake and screen are generally submerged to avoid surface debris and algae. Cleaning or changing the screen may not be a simple task.

The intake and screen should be large enough so that fish can swim away from the suction, advises Childers. Excessive suction also encourages rapid buildup of debris on the screen.

When a river or stream is the water source, it is difficult to locate the intake in a place free of debris. In such cases, self-cleaning intake filters are recommended. The Plum Creek filter by Claude Laval Corp., of Fresno, CA, uses jets of water to backwash a cylindrical screen as it rotates. The jets should be positioned in the same direction as the current of the river.

Like most filters, the self-cleaning screen sacrifices a small amount of flow to do its job, explains Randy Delenikos, marketing manager for the company. "A small percentage of the flow runs back to the jets to clean the screen. It may take 30 gallons out of 900 gpm. Units range in capacity from 100 to 4,800 gpm. The screens range in size from ten to 30 mesh."



Pump Protection Separator by Lakos.

Plum Creek filter uses jets of water to backwash intake screen.

If the water source is a well, there may be a chance of sand in the water. "A properly drilled well should not produce sand," Childers remarks. "If it does, then you need to realize that bigger problems may be coming. As the sand is removed at the base of the well, a cavity is created that could eventually collapse."

One method of protecting the pump from sand is to run the water into a reservoir first. Sand will settle out before the water enters the intake. Childers cautions that a wet pit is not designed to remove particulate matter like sand.

A second option has been developed by Lakos, a division of Claude Laval Corp. The Pump Protection Separator removes coarse sand by centrifugal force. The separator, placed in the well hole, redeposits the sand back into the well. For the separator to work effectively, the water must be maintained at a certain velocity. Delenikos says the separator does not affect flow, but does create a loss in pressure of five to ten psi.

The big challenge today is making effluent suitable for landscape and turf irrigation. This water has been partially treated by municipal agencies or private institutions to remove solids and begin the process of bacterial decomposition of suspended material. When received by the golf course, this water still contains fine organic material.

The effluent is placed in a reservoir until needed for irrigation. If the effluent is stored for any length of time, further decomposition of suspended material can be accomplished by equipping the reservoir with aeration devices. This can also reduce problems with odor and algae in the top few feet of water.

"The user should realize that effluent water conditions vary throughout the year," explains Ken Phillips, president of Yardney Water Management Systems in Riverside, CA. This variation is caused by changes in sunlight, temperature, and seasonal differences in water discharged by sewage treatment plants.

"As we enter the emerging era of diminished water resources, the use of sewage effluent for irrigation will be of increasingly significant concern to all communities and regions, whether they are located in arid areas of the country or not," Phillips continues. The nature of the effluent must be taken into consideration to select the proper type of filtration, especially if the irrigation system includes drip or low-flow zones.

Filtration for suspended organic matter usually takes place downstream of the pump station. Coarse intake screens are not intended to remove fine particles, just large debris. Fine organic material is not considered a threat to the pumps. The concern is that suspended organic material may build up on intake screens and eventually reduce flow. If the flow can't keep the wet pit full, then a low-level detector will shut the pumps down to prevent damage.

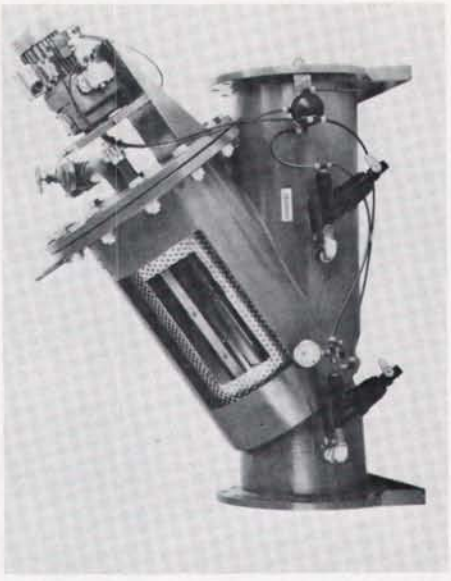
Even when potable water is obtained from municipal treatment plants, the pressure in the main may fluctuate according to the demand from other users. If the pressure and/or flow drop below the designed demand of the irrigation system during operation, a booster pump may not

perform efficiently, since it is operating below design capacity.

Some variable frequency drive pump stations can detect drops in pressure or flow upstream. By reacting to signals from flow sensors or pressure gauges, the motors can protect themselves by ramping down to compensate for inadequate supply.

As long as the pumps are protected from coarse debris and abrasive particles, receive the correct amount of water through intakes, and are maintained regularly, they have a relatively long life and will provide a reliable supply of water to the irrigation system. Pump manufacturers recommend service at intervals based upon their use. A desert golf course should have its pump station checked two or more times a year. A single service call in the fall or spring may be adequate for courses in wetter regions of the nation.

The development of the prefabricated pump station has increased the reliability of pump stations and improved repair service to golf courses. Prior to the '70s, pump stations were custom-designed from parts of various manufacturers. If there was a problem, the manufacturer or distributor of the malfunctioning part had to be notified for service. Today, manufacturers of prefabricated pump stations assume responsibility for servicing all components.



Automatic self cleaning screen filter by Amiad.

Superintendents should obtain clear instructions on preventative maintenance from their service technician. Periodic lubrication, cleaning, and visual inspection help build a better understanding of the equipment and reduce the risk of problems which could lead to down time.

Pumps are designed to leak slightly around the shaft for cooling purposes. The amount of leakage is controlled by a packing gland around the shaft. This packing may need to be tightened or replaced periodically by a qualified technician. The golf course irrigation specialist should keep an eye on the amount of leaking water and make sure that drains for this water remain open.

Electric motors for pumps are air cooled. Anything that restricts air circulation around motors can cause them to run hotter and perhaps shorten their life. Screens over air passages should be kept free and clear of debris at all times.

Bearings on motors should be lubricated as needed. The oil in oil-lubricated bearings should be changed at least twice a year, or more often if the oil turns black. The grease lubricating certain bearings should be removed and replaced with fresh grease on a similar schedule.

Finally, the strainer on the control valve should be cleaned regularly. Ask your service technician to demonstrate the best way to clean the strainer.

Basic familiarity with the components

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may be useful if a breakdown occurs and the service technician can't get to your course the same day. You might be able to solve some problems over the phone.

Today, computers and computerized controls enable the superintendent or service technician to access performance data related to pump efficiency. This technology permits the technician to diagnose pump problems through a phone modem. By using the data to pinpoint problem components, the technician can identify and obtain repair parts before arriving at the course.

A properly operating pump station is still subject to problems occurring downstream. Valves and heads are carefully selected and programmed to fit specific hydraulic conditions. A leaking valve or clogged nozzle changes these conditions. Filters prevent contamination and assure system performance. They also protect the pump station by guarding it against unplanned changes in water flow.

Filters also affect the hydraulic balance of an irrigation system. If they are added or changed, adjustments in pump output may be necessary. The type of filter(s) you need is based upon the impurity in the water, the maximum pressure and volume required by the system, and the space available.

"No single type of filter will eliminate all impurities," says Efraim Donitz, president of Efco, Inc., North Hollywood, CA. "There are three basic types: screen filters, sand separators, and media filters. A combination of filters may be required to protect irrigation systems on golf courses, especially in cases where effluent is used.

"Before choosing filters, first determine the type of impurity(ies) in the water and the quantity of that impurity," adds Donitz. "Then you need to determine the flow requirement of the irrigation system so that you'll know what capacity of filter you need."

Downstream sand separator at a sports complex removes sand and grit. Photo courtesy: Lakos.

Screen filters remove particles that are bigger than the size of the mesh of the screen. Pressure loss increases as the size of the openings in the screen decreases. By knowing the size of the nozzles in the irrigation system, you can select a mesh that prevents blockage with the least amount of pressure loss. Drip emitters require the finest mesh screens. When possible, isolate drip zones and filter this water separately.

The advent of automatic self-cleaning screen filters coincided with the need for filtration on golf courses, says Orlans. He claims that self-cleaning screen filters today greatly reduce the need for media filters on golf courses. "High-tech screen filters can do the job cheaper than media filters, take up considerably less space, and cause a smaller pressure loss," he states.

Media filters made a name for themselves in agriculture as an efficient way to remove organic material from high volumes of water. Suspended solids are deposited throughout the media (normally sand) in these filters. By reversing the flow of water through the filter, the solids are washed out of the sand. Little maintenance is required for media filters.

Sand separators remove particles that are heavier than water. They are important when water comes from wells, rivers, or streams containing sand or silt. Water from municipal sources may also contain particulate matter following construction or repair of water lines.

"A large amount of scarce, expensive labor goes into cleaning sprinklers," Donitz reveals. "Much of this labor can be eliminated by using proper filtration on the water in the first place."

The concern over sprinkler performance has grown as more golf courses retrofit their systems with valve-in-head and lower-pressure sprinklers. By seeking greater control over distribution of irrigation water, superintendents have increased the complexity of their systems. As a result, finding the right balance of pressure and flow from the pump station is more difficult. Rising energy prices and use of effluent

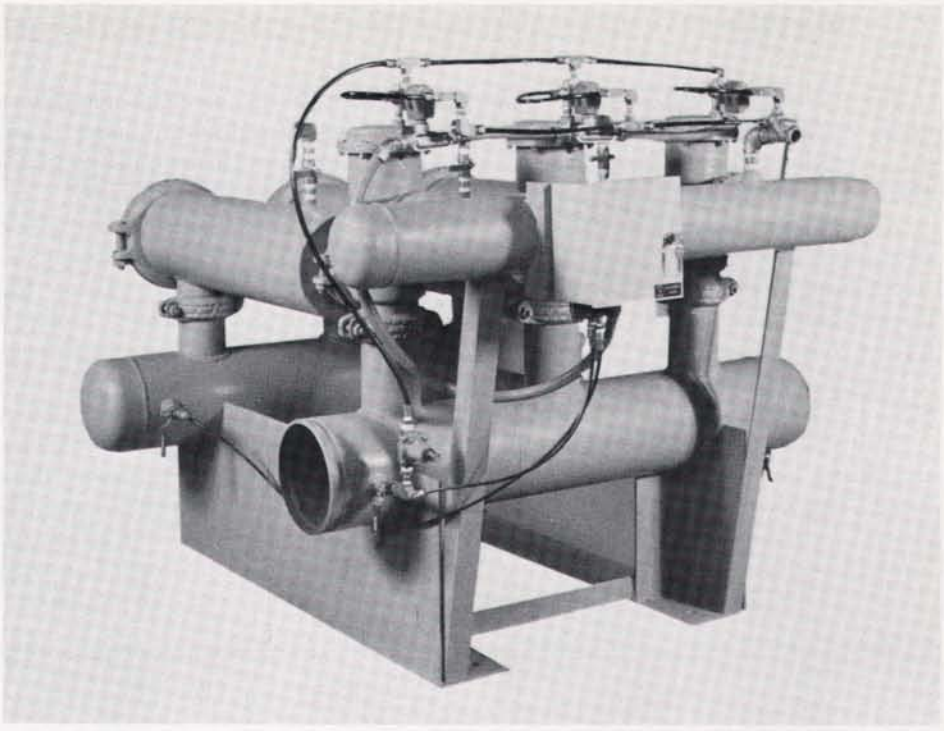
Sand media filter by Lakos on Utah golf course.

water compound the problem.

All these changes impact the performance of the pump station. Peak efficiency can be maintained by adjusting the station to match changes in the irrigation components, or by controlling the demand of the irrigation system to fit the pump station. Pump station manufacturers have increased flexibility from their end by adding sophisticated controls. Recently, manufacturers of irrigation controllers have responded with equally sophisticated flow management programs.

Both Rain Bird's MAXI IV and Toro's Network 8000 have been enhanced with optional computer software that adjusts irrigation programs to smooth out the demand on pump stations. Data on the flow requirements of each station is used to arrange start times to manage water use throughout the irrigation schedule. By eliminating large fluctuations in demand, the pumps can cycle up and down efficiently.

Simpler controller functions, such as water budgeting, can also reduce run times as well as wear and tear on pump stations. Various moisture sensing devices can be linked with field stations or controllers to accomplish the same thing. Overwatering wastes electricity as well as water.



Screen filter with automatic backwash cycle by SyncroFlo, Inc.

An irrigation system requires water, energy, and labor to function. The cost of each of these is steadily increasing. Events like the crisis in the Middle East further aggravate our budget problems. To reduce its exposure to changes in the marketplace, the golf course industry must do all it can to control irrigation costs...starting at the pump station.

WATER CONSERVATION GROUP BRINGS OPPOSING FACTIONS TOGETHER

The Golf Course Water Conservation Group (GCWCG) in San Diego, CA, has successfully held discussions among developers, governmental agencies, and environmental forces regarding the water efficiency and ecological compatibility of golf courses. By bringing together groups that are usually on opposite sides concerning the construction of new golf courses, GCWCG was able to exclude greens from Stage 4 water rationing laws in San Diego.

"It's a win/win situation for existing and future golf courses in San Diego County," said John Moore of Hydro-Scape Products, who is vice president of GCWCG. "We have been able to bring together build-

Water District staff to share information about how golf courses are operated and the methods they use for water conservation."

Results from water audits performed on more than 70 San Diego area golf courses have been helpful in the discussions. The audits are available free of charge to all golf courses wanting to assess their water usage.

Margurite Engles, program director of Large Water Audit Programs in San Diego, reported, "Generally, we've found them [golf courses] to be over 80-percent efficient in their water usage." She added that they achieve this high rating partly because

employ full-time irrigation managers. Although many golf courses still use potable water for irrigation, the majority use runoff, effluent, recycled, or well water.

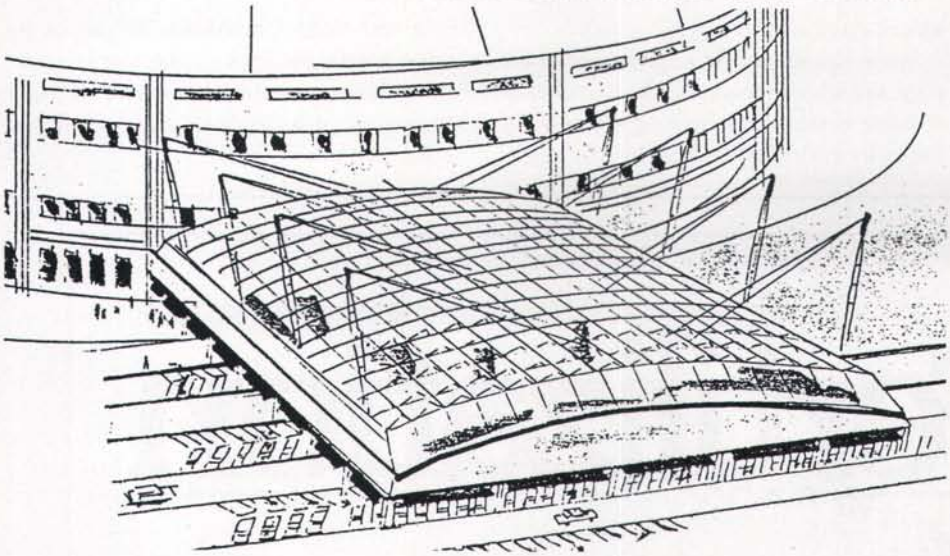
Moore said that GCWCG also arranged discussions between developers and environmental groups, including the Sierra Club. The talks revealed that both parties were trying to accomplish the same thing for the land. The group is planning future meetings with the Audubon Society and the Native Plant Society.

"Golf courses are very pure environments," said Moore. "They provide a wildlife habitat, sanctuary for migratory waterfowl, clean and cool air, abundant plant life, and water sources. Golf courses use very few pesticides. Those are mainly fungicides and fertilizers, which do not find their way into the groundwater."

Encouraged by the spirit of cooperation, the water conservation group predicted that golf course construction will continue in San Diego. "We all want the same things for the environment," said Moore. "We just weren't aware of it."

Additional information on GCWCG and dates of its meetings are available from Moore at Hydro-Scape Products, (619) 560-6611.

GREENWAY OFFERS SOLUTION FOR INDOOR GRASS



Modular units of natural turf are located in a greenhouse-like structure during non-active periods.

The Greenway Group in Horsham, PA, believes it has solved the riddle of having natural turf playing surfaces indoors. Thomas Ripley, group coordinator of the company, recently announced the development of the Integrated Turf Management (ITM) System. Ripley claims ITM provides the first transportable turfgrass system for use indoors or on top of artificial surfaces.

Dr. Henry Indyk, former turf specialist at Rutgers University in New Brunswick, NJ, joined Greenway to help a development team complete the design of the system. The company also utilized staff from its sod, nursery, consulting, and distribution groups for the project.

The patent pending system incorporates a lightweight growing medium, modular transport units, and a greenhouse-like structure to give sports complexes the ability to interchange surfaces according to events. "The ability to convert fields back and forth between systems will benefit the athletes as well as the game," states Ripley.

The transportable, self-contained units of natural turf permit an indoor facility to replace wear areas, change turf varieties, offer field configurations for different sports, or cover artificial surfaces in a matter of hours. They are relocated to a controlled environment for maintenance during non-active periods.

ATHLETIC FIELD SPORTSTURF SEMINAR

The Ohio State University (OSU) Athletic Fields/Sportsturf Seminar will be held on January 29-31, 1991, at the Parke Hotel in Columbus, OH. The program will provide basic information on the maintenance of athletic fields and sportsturf facilities.

Emphasis will be on principles of agronomy, soils, entomology, and plant pathology. Specific topics include soil management, construction systems, cultural practices, weed control, turfgrass insects, soil mixes, turfgrass selection, fertilization, and turfgrass diseases.

The seminar is designed for athletic field and sportsturf managers, supervisors, and support workers involved in the maintenance of turfgrass facilities. Attendees will qualify for recertification credits from the Ohio Department of Agriculture for Licensed Pesticide Applicators and Ohio Parks and Recreation Association members will qualify for continuing education credits.

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University of Cincinnati's soccer field.

Tall Fescues Meet The Challenge

The pressure is mounting on golf courses and other large recreational turf areas to reduce the amount of chemicals and water used to maintain turf. At the same time, superintendents and groundskeepers face unprecedented use of their facilities. Satisfying environmental concerns while still managing stress on turfgrass is perhaps the greatest challenge of this decade.

Turf managers in the transition zone have been experimenting for years with ways to reduce the maintenance and water requirements of their turfgrasses. The climate of the region does not lend itself either to most warm- or cool-season turfgrasses. Both struggle to remain healthy during the hot, humid summers or freezing winters.

The turf managers have found, however, that one specie of turfgrass stands out under moderate maintenance and irrigation. It is tall fescue. By using improved turf-type tall fescues where practical, both superintendents and sports turf managers have successfully reduced their consumption of chemicals and water.

Dense stand of tall fescue and Kentucky bluegrass on soccer field.