



Better Turf for Better Golf

TURF MANAGEMENT

from the USGA Green Section

QUARTER FOR WATER

An irrigation system for the Pawtucket Country Club of Pawtucket, Rhode Island was acquired over a four year period from 1956 to 1959. The system was planned and constructed in stages. This enabled the golf course crew to do much of the work and it eased the burden of financing.

The Green Committee, under the chairmanship of Mr. A. A. "Pete" Bonvicin, showed unusual resourcefulness in its planning and the club adopted an unusual financing method expressed in the slogan "Quarter for Water."

The story of the development of the irrigation system at Pawtucket Country Club is best told by the reproduction of a series of reports from the Green Committee to the membership.

Summer — 1957

To the Members of the Pawtucket Country Club:

In view of the substantial amount of money involved as supplied in large part by the playing members, along with the demonstrated interest of a great portion of the membership in the project, your Green Committee hereby presents a detailed report on progress made to date on the watering system, along with certain recommendations relative thereto.

After the decision of your Board of Governors late last summer to make available to your committee the proceeds of a \$50.00 assessment made against the playing membership for the purpose of irrigating certain greens, tees and fairways of your course, your committee acted to implement the Board's action in the following manner:

Land Rights Acquisition

Negotiations began with the State of Rhode Island, which owns the property

where the pumphouse is located, to secure a lease of the necessary property, since it had been previously determined that it was not for sale. A survey of the required land area was made, proper maps thereof were drawn, and a legal description was compiled, all without cost to the club. The end result of the negotiations is that a ten-year lease on the property with a ten-year renewal option was obtained at the nominal fee of one dollar per year. The lease is the longest obtainable from the State pursuant to applicable law.

Planning and Designing

Simultaneously with the above, a study of the engineering problems connected with the project was commenced. Two aerial photos of the club's land were obtained, scaled 100 feet to the inch, at a cost of \$6.10 each from the United States Department of Agriculture. Since no maps of the course were existent and since a scale map of the land is a necessity in planning such a project, this move proved a real moneysaver. The least ex-

pensive alternative would have been to have had an aerial photomap made by the Fairchild Aerial Survey Company, whose proposal therefor amounted to \$1400. Inquiries concerning a map made by conventional land survey methods disclosed that its cost would have been in the vicinity of \$3000. A tracing was made of the important features of the golf course from the aerial photo. Contour lines at ten-foot intervals were drawn onto the tracing, using a U. S. Geodetic Survey Map as a reference. Blueprint reproductions of the completed tracing provided maps to make the necessary engineering determinations.

Engineering Problems

Among the engineering problems encountered were the following:

(a) The proper location of the pumphouse, of course, preceded all other considerations. It was at first believed that it should be located below the practice putting green near the water's edge, but engineering as well as aesthetic reasons dictated otherwise. It was finally decided to locate it near the central short axis of the course to cut the distance that the water had to be transmitted in any direction to the barest minimum. This allowed smaller pumps and pipes to be employed than would have otherwise been the case, resulting not only in lower initial costs, but in lowered operational and maintenance costs. It also provides the most efficient operation.

(b) The general design of the piping system was the next consideration. Several alternate layouts were considered. For reasons of economy of operation and the ability to transmit large volumes of water it was decided to adopt a plan calling for the installation of a main line from the pumphouse to the 16th fairway, running across the 1st, 9th, 8th and 6th fairways, with sub-mains extending from the main to form loops generally extending just inside the perimeter of the course, each of which sub-mains would join the main in two places, near the pumphouse and also near its extremity on the 16th fairway. This plan allows water from the pumps to be supplied into each of the two loops from two points in the main.

(c) The proper size of pipe lines to convey desired amounts of water to the

designated points of use on the course became the next problem. In this determination it appeared best to solve the most difficult problem first and work therefrom back to the pumphouse. In our case, this point proved to be the third fairway and green area. Not only was the substantial distance from the pumphouse a problem, but the extreme difference in elevation was a major factor, the high point on the third fairway being approximately 70 feet higher than the pond water level. Since a one pound pressure loss occurs as the result of each 2.3 feet of elevation encountered, it is obvious that a 30 pound pressure drop is present in this area as the result of the elevation difference factor alone. Your system is designed to produce a certain gallonage of water on the third fairway and green at a certain pressure, taking into account losses in pressure and volume occurring as the result of the difference in elevation between the pumps and the points of use and the losses caused by friction in the pipes, fittings and appurtenances. The required gallonage and pressure necessary to efficiently water the elevated areas were then applied to the remainder of the course and were found to fit the needs extremely well. An 8" main with 6" sub-mains were determined to be of the proper size for our installation.

(d) After the required gallonage of water had been determined along with the pressure losses, it became possible to select the proper pumping equipment to do the job. A wide variety of pumps is available, but it was deemed best to select two centrifugal pumps each having a rated capacity of 480 gallons per minute at 125 pounds pressure, so installed that either one or both may be operative as conditions warrant. Provisions were made for automatic operation of the pumping facilities.

(e) Next came the job of designing the pumping station facilities. This included the suction sump, piping, pump placement, the pressure tank installation, control equipment, electrical work, the pumphouse, etc. This proved to be one of the simpler tasks involved in the entire system.

(f) Since the available funds were obviously insufficient to irrigate the entire course, an exhaustive investigation

of costs was undertaken to determine how extensive the initial system could be within the limits imposed by available monies. Comparative studies of the various types of pipe and fittings were compiled and pumping facility costs were compared also. Quality, permanence, ease of installation, maintenance factors and operational desirability, along with costs, were among the factors considered.

As a result of the study, it was decided to use Transite pipe in the 4, 6 and 8 inch sizes and a semi-rigid plastic pipe manufactured by the Republic Steel Company of "Kralastic," a U.S. Rubber product, in the sizes smaller than 4". Transite is the cheapest available pipe in the required larger sizes, but it is not manufactured in sizes smaller than 4 inches. It is made of a combination of Portland cement and asbestos fibre and has proved highly successful in water works installations over a long period of time. It does not rust, corrode or tuberculate, has a low friction co-efficient, and possesses an extremely long life. The plastic pipe is a relatively new development. It also has an extremely smooth interior, is non-rusting, cannot corrode and theoretically, in our installation, should provide a long-lived installation. Size for size, it is competitive in price with steel pipe, which was deemed less satisfactory for our job because of its tendency to rust and corrode. Both types are relatively easy to install.

It was finally estimated that the 1st, 9th, 18th and 10th fairways and greens could be watered and the total pumping facilities for the entire course installed with the available funds.

Construction

After the detailed plans had been prepared in consideration of the foregoing conclusions, the materials were ordered and construction began. The great bulk of the labor involved was performed by our maintenance crew who used our own equipment exclusively. The paid skilled labor required was furnished by a club member. Both did excellent work. Unfortunately, the materials were received too late last autumn to totally complete the installation at once. Operations were suspended late in December on account of excessive cold and snow. The trenches, open in part throughout the winter,

eroded and widened considerably more than had been anticipated, causing additional expenditure for loam for refilling and subsequently somewhat less satisfactory playing conditions than should have been the case. Work on the pipe system re-commenced in the early spring and continued until virtual completion of the planned portions had occurred. The pumphouse was erected last autumn and throughout the winter and spring equipment was installed, piping was completed and the electrical work finished. About June 10 the Blackstone Valley Gas and Electric Company completed its cable installation and the system was tested. Certain bugs appeared as is normal in any large installation. They were eradicated as time elapsed and it now appears that the system is operating smoothly and efficiently, dispersing approximately 1,000 gallons of water per minute onto parched areas of our course.

Finances

Happily, the estimates previously made concerning the extent of work that could be accomplished with the available funds appears to have been reasonably accurate, as the following balance sheet demonstrates:

BALANCE SHEET

INCOME	
Assessments, Including \$50.00 from	
Each New Member	\$14,640.00
Tournament Committee	3,000.00
Total	\$17,640.00
Less Payments to Internal Revenue	
(20% Tax on Assessments)	2,280.00
	\$15,360.00
Less Bank Service Charge68
Available for Use	\$15,359.32
EXPENDITURES	
Pipe System in Fairways	
Transite Pipe	\$ 4,250.79
Sprinkler Heads, Couplers and Valves	882.60
Cast Iron Fittings for Transite	386.82
Plastic Pipe, Copper Pipe, Fittings, Hangers, Etc.	3,828.09
Skilled Labor (Other than Normal Maintenance Crew)	802.70
	\$10,151.00*
Pump House, Suction Sump, Etc.	
2—480 GPM Pumps	\$ 989.40
2—40 Hp. Motors for Pumps	750.00
Steel Shed	445.00
Concrete for Shed Floor	38.22
3'x6' Gal. Tank and Stand	318.24
Bolts	1.35
2—3'x6' Steel Screens	100.00
Pipe, Fittings, Etc.	1,061.43
Skilled Labor	368.75
	\$ 4,072.39**

* To the total for the pipe system in the fairways must be added the cost of five cubic yards of concrete used in stabilizing the risers from the main lines. This will be approximately \$60.00.

** Not included in the total for the pump house is the cost of 900 feet of 3—wire neoprene jacketed, steel-armored electric cable which extends from the electric pole below the caddie shack beneath the water to the pump house. The cost of this cable is \$1,557.55 to the Blackstone Valley Gas & Electric Company. They will bill the club \$50.00 monthly on their electric bill until this amount has been paid. This expenditure was not included in the original estimates. It came about as the result of the decision to abandon the plan of the utility company to transmit the power to the pumping station free to the club via an electric pole line along and adjacent to the first fairway. It was decided to purchase the underwater cable at the utility's cost rather than accept their offer of the pole line because of the poles' unsightliness and their potential interference with play. The utility did, however, furnish everything involved except the cable itself including the poles, wire, transformer station, transformers and labor.

Also not included in the total is the cost of the interior electric wiring, etc., in the pump house, the bill for which has not yet been received. It is estimated that it will amount to approximately \$1,100. The final cost of the pumping facilities, if the above two items are included, as is proper, will total approximately \$6,800.

It must be borne in mind in the assessing of costs that much labor for construction, both on the pumping station and on the fairways, was furnished by our normal maintenance crew. No attempt has been made to place a value on this labor or upon work performed by the equipment used, which consisted principally of our own dump truck and tractor backhoe. In addition, no costs have been allotted for loam and seed for the trenches.

Recommendations

Your committee feels that a good beginning on a permanent installation of great value to our club has taken place. The results of even a short period of its use demonstrate that value to all.

Your committee strongly recommends that the system eventually be extended until the entire course is watered. The recommendation is made because:

(1) In no other way, in view of the topography and geological conditions involved, can satisfactory playing surfaces be provided and maintained. Dr. DeFrance of the University of Rhode Island, a nationally recognized authority in the field of agronomy, recently stated in an article in the PROVIDENCE SUNDAY JOURNAL that the Pawtucket golf course posed a particularly difficult problem in turf maintenance in dry seasons because of the existing soil conditions. He said that our top soil was infertile, composed as it was of glacial till, and that the condition is further aggravated by the fact that it is deposited on a gravel subsurface. Our recent excavations have confirmed these allegations. In addition, the topsoil is in most cases deposited in a very thin layer, sometimes no more than three inches in depth. It can be seen that the whole pic-

COMING EVENTS

- February 14-15
Virginia's First Turfgrass Conference
Jefferson Hotel
Richmond, Va.
- February 20-23
Penn State University Turfgrass Conference
University Park, Pa.
- February 23-23-24
Minnesota Golf Course Superintendents Turf
Conference
Minneapolis, Minn.
- February 27-28
Southern Turfgrass Conference
Peabody Hotel
Memphis, Tenn.
- February 27-March 2
Cornell Turfgrass Conference
Cornell University
Ithaca, N. Y.
- March 6-8
Midwest Regional Turf Conference
Memorial Center, Purdue University
Lafayette, Ind.
- March 9-10
Massachusetts Turfgrass Conference
University of Massachusetts
Amherst, Mass.
- March 14-16
Iowa Turfgrass Conference
Student Union Building
Iowa State University
Ames, Iowa
- March 27-29
Wisconsin Turfgrass Conference
University of Wisconsin
Madison, Wisconsin

ture is one which allows normal moisture to drain away so rapidly that the burning out of our course occurs quickly in hot weather, as we so well know. The answer to the problem is to supply water frequently and in large amounts to overcome the natural conditions over which no control can be exercised.

A Money Saver

(2) The watering of the complete course will prove a money-saving venture. It is very difficult to estimate how much it now costs to provide what little water can be supplied to our tees, greens and approaches via our old system. In addition to the cost of the water itself, by no means an inconsiderable item, the labor costs involved are very high. Consider, if you will, only one small area of the course, admittedly the worst from a watering viewpoint, the 3rd, 14th and 15th greens. The pressure in our present old pipe system is so low in these areas because of rust, corrosion and inadequate sizing that even the small sprinklers are unable to rotate satisfactorily. As a result it takes almost the whole of one man's time just to hand-water these three greens. That alone costs us somewhere in the vicinity of \$50.00 weekly. Even so, the water penetration on these greens is only in the vicinity of one inch, a dangerously inadequate amount for proper greens maintenance. Add to the above the cost of daily watering of the other portions of the course by manual means and you can begin to perceive the extent of the present watering problem from a cost viewpoint. That alone wouldn't be totally prohibitive, but when it is added to the fact that it is impossible, with the present inadequate system, to do even a partially workmanlike job of maintenance because of lack of water and water transmission facilities, it becomes pound-foolish not to extend the new system to its design limits. In addition, it appears that the pond water may contain much organic matter that may be beneficial when applied to turf. This could have an important bearing on future fertilization costs which currently run in the \$1500-\$2000 yearly category. Laboratory tests of the water are now in process to determine its constituents.

In consideration of the conditions involved, it is impossible to give too much credit to Les Kennedy and Bill Barney

and their crew for providing us with our greens, generally conceded to be equal, if not superior, to any in the State.

Your committee has reviewed the problem from a cold, practical point of view and recommends that sufficient funds be made available this year to extend the present system to include the course's most critical areas, the 2nd, 3rd, 4th and 15th fairways, tees and greens and the 14th green. This extension will cost approximately \$7,000 for materials. No addition to the pumping facilities will be necessary, for the present installation is designed to handle the load for the entire course. Labor can, for almost the entire job, be furnished by our normal maintenance crew. These funds should be committed on or about September 1 in order to allow for time for receipt of materials. Construction could begin about October 1.

Conclusion

In view of the foregoing, your Green Committee will, in the immediate future, submit a plan for approval to the Board of Governors whereby it is hoped to raise the needed money for the above-recommended project. The cooperation of the membership will be urgently needed. You are earnestly requested to lend your aid when asked to the end that we might in the relatively near future have the best course in the State insofar as playing surfaces are concerned.

GREEN COMMITTEE

"Pete" Bonvicin, Chairman
Bob Hird. Lou McCaughey
Aime Smith Ned Barlow
Len Jenard Art Rose

AUGUST — 1957

For the purpose of raising funds to extend the new watering system, the Board of Governors of the Pawtucket Country Club did, in regular meeting on July 31, 1957, vote to impose a charge of twenty-five cents (.25), pursuant to rules formulated by the Green Committee, upon each player using the golf course facilities.

The Board feels that the funds resulting from this charge, when added to those monies annually accumulated by the Tournament Committee, will provide sufficient means to develop the watering system in progressive phases which will allow its completion in or be-

fore the autumn of 1959. It further believes that no assessment or other fund raising activities will be necessary to complete the improvement if all players faithfully pay their QUARTER FOR WATER each day they play golf.

The regulations applicable to the Board's action follow:

(a) Each player shall, each and every day the player uses the course, prior to starting play sign a roster in the pro shop and immediately pay the attendant the sum of twenty-five cents (.25). Please note that this is a charge for the day, not for each time golf is played during the day.

(b) QUARTER FOR WATER applies regardless of the number of holes to be played and regardless of the tee off point.

(c) QUARTER FOR WATER does not apply to normal practice play conducted from and in the designated practice areas.

(d) QUARTER FOR WATER applies to all players, without exception, whether members or guests.

(e) QUARTER FOR WATER has absolutely nothing to do with caddie fees.

(f) QUARTER FOR WATER must be paid in cash; no charging can be allowed because of the bookkeeping difficulties involved.

(g) Since this is an action of the Board of Governors, it follows that appropriate enforcement thereof will occur.

These regulations shall be effective at 12:01 A. M. Sunday, August 10, 1957.

GREEN COMMITTEE

"Pete" Bonvicin, Chairman

Progress Reports

WATERING SYSTEM — 1957

The second year's watering system extension provided facilities to totally irrigate the following areas: 2nd fairway and green, 3rd tee, fairway and green, 4th tee, fairway and green, 5th tee, fairway and green, 15th tee, fairway and green, 16th tee, 14th green, 40% of 14th fairway, 8th green, and 9th tee.

Construction began during the last week in September and proceeded until mid-December. The second, third and fourth fairways provided certain difficult construction problems, principally due to the very unfavorable soil conditions en-

countered. The second proved to be filled with large boulders, while the others had such an extreme soil compaction that the maximum effort of the trenches was needed almost continuously. This caused not only difficult pipe-laying conditions, since proper pitch must be maintained, but excessive equipment repair costs as well. Most trenches were back-filled and loamed, but small lengths remain to be accomplished next spring.

The total cost for fairway watering installation has amounted to \$20,362.06. The cost of the pumping station must be added, which is approximately \$6,800. Thus, the entire system has cost us \$27,162.06 at the present stage of development. No allowance has been made in these figures for the labor of the maintenance crew or loam or seed for repairing the trenches. These costs may amount to some \$2,500 to \$3,000 per mile of pipe installed.

WATERING SYSTEM—1958

Extension of the watering system took place last autumn to provide facilities for watering the following: 14th tee and 60% of the 14th fairway; 13th fairway and green; 16th fairway and green, 6th tee, fairway and green; 7th tee, fairway and green; 17th tee, fairway and green; 11th tee, fairway and green; 18th tee; 12th tee; nursery between 17th fairway and 7th green; and rough area in vicinity of 18th tee.

The following remains to be accomplished to fully complete the system: 12th fairway and green; 8th tee and fairway; the 2nd, 10th and 3rd tees, and a small portion of the 9th fairway.

Work on this year's extension began in the third week of September and continued until the first week in December. With the knowledge acquired during the past two years, the crew laid the pipes faster and better than ever before, even allowing for the horrible soil conditions encountered in a great many instances. The exceedingly early winter, bringing the coldest December weather in 41 years, caused a cessation of work much earlier than had originally been planned. For example, a year ago the men worked until January 5 on the watering system. This year we were forced to quit the first week of December. I am confident that all trenches would have been backfilled

and loamed if we had had a season comparable to that of a year ago. As it is, we will be forced to put up with the trenches for a longer period in the spring than had been planned.

To date a total of 18,338 feet or 3.47 miles of pipe has been installed. It is estimated that the installation of an additional 3,500 feet of pipe will complete the system. If funds are available, it is planned to do this work during the autumn of this year.

The three-year construction cost for fairway watering has totaled \$30,473.30. In addition, the pumping station cost approximately \$6,800. The entire system, then, at the present stage of development, has cost us \$37,273.30. This sum can be broken down as follows:

Material and Equipment	\$35,728.30
Skilled Labor	1,171.45
Contracts	
(a) Steel Pumphouse	445.00
(b) Electric Installation	1,100.00

No allowance has been made in these figures for the labor of the maintenance crew, the use of club-owned equipment, or loam and seed for filling the trenches. It is believed that the system can be completed, using the above basis of cost computation, for approximately \$6,000. It can be seen from the foregoing that if completed this fall, our membership will, without undue strain, have financed and very nearly paid for a capital improvement worth a minimum of \$60,000 at current construction prices.

The work on the system and the \$8,000 loan made last fall has been paid for out of receipts from the following sources:

Quarter for Water	\$ 3,783.48
Tournament Committee	2,195.85
Donation	25.00
Watering Assessments	150.00
Initiation Fees	1,200.00
Loan from Bank	5,000.00
Loan from Country Club	4,650.00
Total	\$17,004.33

WATERING SYSTEM — 1959

Virtual completion of the watering system took place last autumn when facilities for watering the following were installed: the 8th tee and fairway, 12th fairway and green, 13th tee, 2nd tee, 10th tee, and small portions of the 9th and 10th fairways. This practically completes the system, for only a small amount of pipe remains to be laid from the middle of the 18th fairway to the 8th tee and on

the 10th fairway going up the first small hill. Work on this year's extension program began in October and was completed early in December. Rainy weather causing wet ground conditions necessitating mechanical pumping slowed the installation to some degree, but our crew surmounted the difficulties very well. This year for the first time we are able to backfill all trenches and to place the loam therein. All that remains to be done will be a little shaping up in the spring and then seeding can occur.

The four-year construction material cost for fairway watering has totaled \$35,905.34. In addition, the pumping station cost approximately \$6,800. The entire system, then, at the present stage of development, has cost us \$42,705.34. This sum can be broken down as follows:

Material and Equipment	\$39,983.89
Skilled Labor	1,171.45
Contracts	
(a) Steel Pumphouse	445.00
(b) Electric Installation	1,100.00

No allowance has been made in these figures for the labor of the maintenance crew, the use of club owned equipment, or loam and seed for filling and grassing the trenches. These items amount to a considerable sum.

It can be seen from the foregoing that our club now has, in a virtually completed stage, a watering system worth between \$60,000 and \$70,000. It is very nearly totally paid for. I am proud to have had a part in this undertaking, which I consider to be the finest system of its kind in the State. We have the water supply, pumping equipment and distribution lines to enable us to use more water on a larger area of course than any comparable installation in the State and this, of course, is the criterion by which any such system can be judged. The costs for this year's extension and the \$5,000 loan made in the fall of 1958 were paid for out of receipts from the following sources:

Quarter for Water	\$ 4,078.00
Tournament Committee Net Profits	3,174.21
Watering Assessments	50.00
Initiation Fees	2,050.00
Additional Loan from Bank	5,000.00
Total	\$14,352.21

It can readily be seen that "Quarter for Water" and Tournament Committee receipts play a large part in financing our great progress. Accordingly, we urge the fullest possible participation in both by the entire membership.