Of the four sprinklers shown, the one at the right is an automatic tee sprinkler. The others are automatic sprinklers for the adjacent green.

How Much Water and Where Is Leading Irrigation Query

By WENDELL P. MILLER

(PART FOUR)

The main point in planning fairway irrigation is for the club to know that it is right, that everything it does is right, that the installation is permanent unless the life of the property is limited, and that their operating costs can be kept at a minimum. Clubs which are not operated on the "penny-wise-pound-foolish" basis will find it advisable to have a careful investigation made of their entire situation and careful estimates of the cost of the various types of construction. With this information at hand, prepared by competent authorities in which the club has confidence, the club will be able to decide intelligently exactly what course to pursue.

How Much Water?

There is a wide variation in the water requirements of different clubs—even for the same purposes. Different clubs enjoy polo fields, grass tennis courts, large and small gardens, landscaping, dormitories, cottages, guest rooms, pools, ponds and stables in endless combinations. The clubs seldom keep accurate records (if any) of the water consumption. The figures we have available would mean little to any particular club because of the wide variation in area, soil, topography and climate, hence the writer would not like to be quoted as saying that fairway irrigation, for instance, requires this or that number of gallons per day. However, examples throw considerable light on the subject.

The Clubhouse

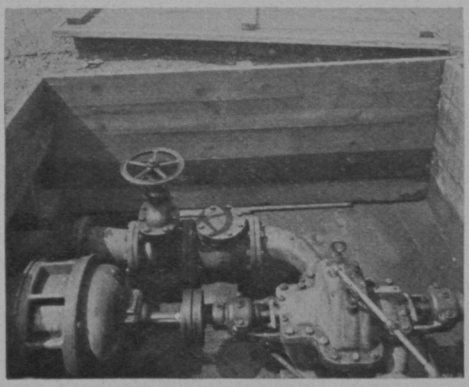
By actual meterage, the Wakonda clubhouse at Des Moines, Iowa, not including the outdoor swimming pool, used 13,500 gallons of water per day in May and 25,600 gallons per day in June. This is a big and busy clubhouse. Midlothian clubhouse and six "cottages" are using approximately 30,000 gallons per day this season.

North Shore clubhouse at Glenview, Ill., was figured at 18,000 gallons daily, with a peak of 22,000 gallons. We are told that Olympia Fields uses up to 100,000 gallons daily. Divide this by four to get an average size club and you have a peak of 25,000 gallons. There you have it—for an 18 hole course private clubhouse, 13,500 to 30,000 gallons per day, not including swimming pools, stables, etc.

Tees and Greens

Knollwood Club (New York) has been

going along on only 10,000 gallons per day for tees and greens, and doing nicely, too. Ten thousand gallons are all they can get. And this makes me question the wisdom of such large use of water on tees and greens. Outside of this extreme case we find the clubs using from 18,000 gallons



Interior of Eden pumphouse, ideal for large turfed area. Note deep well pump in foreground, discharging through sump opening into large pond. Roof has hatch over turbine pump for driller's convenience.

per day on the tightest soils to 60,000 gallons per day on Long Island and Jersey sands. Most clubs use from 20,000 to 30,000 gallons per day for their tees and greens.

Fairways

And now the big question: How much for the fairways? The variation on the fairway consumption, measured in gallons, is large, due to the extraordinary requirements of sandy soils. Pomonok C. C. used 163,000 gallons per day during June and July for tees, greens and fairways, a net total of about 140,000 gallons for the fairways (7 days per week). We figured Riverside (Chicago) to need a maximum of 200,000 gallons per day in this year's drouth for all purposes except clubhouse. The highest 18 hole requirement we have encountered to date indicates a possible maximum use of 240,000 gallons per day for 18 fairways. We know of several clubs using well under 150,000 gallons per day for 18 fairways. The limits, therefore, appear to be 125,000 gallons and 250,000 gallons for standard 18 hole courses.

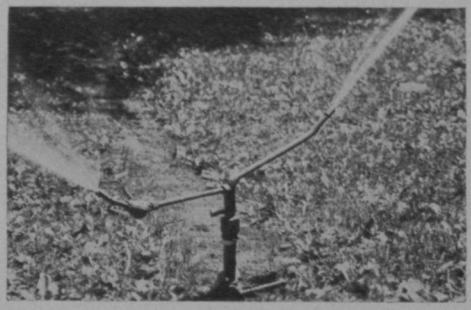
Add to these limits tee, green, general area and clubhouse requirements, we find the average daily seasonal requirement of 18 hole private clubs to range from 150,000 gallons to 300,000 gallons.

Importance of Water

If there be any panacea for the finance and house committees, it is a liberal supply of water for the fairways. On a recent visit to South Bend, Mr. H. W. Eldredge, chairman of the green-committee of the country club, said that he was certain that club officials generally do not appreciate the value of a liberal supply of water, and particularly at his club where they are over half surrounded by lakes and have 12 holes which are on marsh land and are automatically irrigated from below. Actual results show plenty of water boosts the guest fees and clubhouse revenues as an offset to the cost of irrigation operations. Clubs with fine surface water supplies are lucky because selectors of golf sites seldom worry about where water is coming from. Yet water is the blood and the pumping plant the heart of irrigation.

Consideration of Water Supply

Green chairmen and other officials are often surprised at the importance we give to the water supply. What good is a system for distributing the water unless you have plenty of water at suitable pressure? Golfers, especially club officers, think of a



Concealed sprinkler type popular on golf courses. Mowers pass freely over concealed sprinklers not in use.

water system in terms of piping and sprinklers. They do not generally consider that first comes the water—rivers, lakes, city mains, wells, or what have you?—and then the pumps, power for the pumps with suitable control apparatus, then the pipes and the outlets and sprinklers. Further, they do not consider that underlying everything is the greenkeeper and his operations. Unless you give the greenkeeper a good water supply, a good pumping plant, and a complete system de-

signed to facilitate the greenkeeper's work at every point, your irrigation operations will prove costly indeed.

Sources of Water

There are only three possible sources of water for a turfed area, other than rain and the irrigation ditches of the far west, as follows:

(1) Surface water.
(2) Subsurface water.
(3) Municipal or water company mains.

Surface Water

First in importance are natural lakes and ponds which, spring or river fed, maintain a fair level throughout the year. Second are the flowing streams, ditches and self flowing wells of Florida and elsewhere.

Subsurface Waters

These consist of well waters, springs which can be pumped, and collected drainage waters. Of these, only wells are of common occurrence in turfed area irrigation. Wells are to be used only where there is no other alternative at anywhere near the same cost of operation. The well situation is peculiar to each locality and a satisfactory solution of the well problem can be secured only by men who specialize in this work. Beware of the well driller who is merely a well driller. Unless you bargain for a well of guaranteed capacity or else employ competent advice, you may buy something that will disappoint you and prove a costly investment.

Wendell P. Miller

A well for fairway irrigation of 18 holes, including all other purposes, should have a minimum capacity of 200 gallons per minute, or more, under continuous pumping.

The design, drilling and "development" of wells is so broad a subject and so highly specialized in nature that we cannot discuss the subject at any length.

Test Wells

Where shallow wells are practicable and in loose ground, it is a wise procedure to sink a test well first; then you know what to expect from the finished well and just what the conditions are.

Wells vary in depth from a few feet to 2,500 feet or more; in cost from several hundred dollars to $20,000, occasionally more. The controlling conditions, and hence the cost and depth, vary so widely from one locality to the next, even occasionally from one property to the next, that it is useless to give any figures on the actual cost of developed wells.

Depreciation plays an important part in the cost of well water. Wells give out or accidental happenings put them out of commission. Small initial wells prove inadequate for fairway watering. More engineering skill and intelligence is required for dealing with well problems than any other part of the water system.

It is possible to contract for a guaranteed well but it is cheaper to employ an irrigation engineer and drill by contract. The results of this method are generally very satisfactory. If you buy a guaranteed well, be sure you get an adequate performance surety bond from the contractor and also be sure that the contract is iron-clad.

Wells Versus City Water

In many irrigation projects we encounter the time worn problem—wells versus city water. The solution to the problem lies, of course, in the net cost of water and in the certainty of the well supplies. Investments in wells are accompanied by risks that when the cost of city water approaches within a few cents of the cost of well water we generally decide in favor of the city water, provided that suitable guarantees of adequate capacity can be obtained.

For example, a well-known Long Island club was considering a well, to cost $13,000, as the source of water for their irrigation project; in fact, the well people had them sold. Investigation disclosed an ample supply of city water at their gate, with a pressure of 40 pounds, and a ten cent rate (per thousand gallons). In this case the decision was easily in favor of city water.

In Des Moines we recently encountered

a prominent club which was giving some consideration to wells. Here wells are cheap, shallow, low in cost and rather certain. However, a survey disclosed an eight inch city main on one side of the property and a 12 inch main on the other side, with a 16 inch main to one corner. The water rate is ten cents, and even nine or eight cents in a year like 1930 (because of the necessarily large consumption). Here again there was no choice. Ordinarily driven wells cannot compete against cheap city water.

In the case of several clubs on Chicago's north shore, well water is cheaper than village water, even though the wells may be over 2,000 feet deep.

A club in Tennessee which is now planning fairway irrigation has at best 17 cent city water available. In order to obtain this supply the club must invest in one mile of main, adding perhaps three cents per thousand gallons for interest and amortization. Add to this another three cents for pressure pumping and the city water will cost 23 cents put into the golf course mains. It is probable that a well will prove desirable in this case.

It is quite evident that the clubs with free water are in enviable position with respect to fairway irrigation, and that while well water can be obtained in most cases at a total cost well under ten cents (including interest and depreciation on the well) per thousand gallons, nevertheless, when city water under good pressure is available at ten cents, or thereabouts, it is good policy to use the more certain city supply.

Clubs that are dependent on wells seldom need worry because no city or free surface water is available. We have yet to encounter the first case where fairway irrigation is impossible or too costly to operate for the average seasoned club of 18 holes and 300 members. The difficulty lies in the large plant investment for the water supply and irrigation system and not in the operating cost. Clubs taking on irrigation for the fairways find that the extra operating cost is largely offset by increases in guest fees and in the patronage of all departments. We repeat, if there be any panacea for the troubles of a golf club it is fairway irrigation; and irrigation may be provided as nicely through subsurface waters as otherwise. It should be pointed out that much more care, patience, and competent assistance are required in going into a well project than in a city water or free surface water project.

Municipal Water

Municipal water is very satisfactory if the quantity rate is low enough and the supply ample in times of drouth. When lawn sprinkling is in season, municipal water supplies frequently run short or the pressure falls very low. Sometimes this shortage can be overcome by collecting the water in a reservoir. In any event, possible shortage must be thoroughly investigated before you can place complete dependence in the municipal water supply.

Usually city water must be "boosted" by pressure pumps. City pressures, particularly in the summertime, are inadequate for golf course irrigation. Irrigating with direct city pressure is a very costly operation. Often in the dry season the city water pressure drops to a point where, because of friction in small size pipes in original tee and green system, the water completely fails. We have encountered several extreme cases along this line this season.

Deep Well Pumps Versus Pressure Pumping

Deep well pumps carry plenty of load without requiring them to operate against the head required for irrigation. Further, few well and well pump installations have sufficient capacity to provide irrigation water at the rate it is used for fairway watering. Hence, intermediate storage is required, followed by pressure pumping. Well pumps providing pressure suitable for fairway irrigation do not prove satisfactory in the long run.

Automatic Pressure Control

It is desirable to have the pumping plant under automatic (electric) control. Under this plan the proper pressure is automatically maintained; the pumps, both well and pressure, automatically start and stop. Pumps which are not under automatic control are wasters of power and cause trouble in the water pipes because of the sudden increases in pressure when the pumps are turned on.

Every complete pumping plant for irrigation purposes includes a large steel pressure tank connected to the water main very close to the pressure pump. These tanks should have a capacity of not less than 3,000 gallons (5 by 20 feet) to 4,000 gallon size (6 by 20 feet)—the larger the better. The pressure tank is maintained two-thirds full of water and one-third full of air in height. The purpose of the tank is to provide a pressure reservoir.