Irrigation and drainage go hand and hand

As demand for water increases so does its cost. But of greater consequence to those who manage sports fields is the real possibility that irrigation water use in the foreseeable future is going to be seriously curtailed.

In managing sports turf it seems to be that we either have too much water around in which case we need to undertake drainage, or too little, in which case we need to irrigate. The two are interdependent on one another and can no longer be treated as separate entities.

It's unwise to compromise in the design of irrigation and drainage schemes to save a little money initially. You should be looking upon both as major capital investments, which can

Shelton System 25 installing secondary drainage in soccer stadium.

earn a good return over a number of years. Time and time again one sees serious shortcomings in practice as a result of compromises made at the installation stage.

Consider the situation of excess soil water on your fields. Modern drainage systems can move up to one inch of rain in one hour. Main drains are usually sited off the main playing area and the lateral drains are spaced at 5, 7 or 10 yard intervals depending on the design criteria. The high-speed wheel trenching machines cut with precision, conveying the excavated soil into trailers running alongside leaving a clean surface finish.

Superimposed over these piped drains there needs to be a secondary drainage system to speed the passage of water to the pipes. Two alternatives have been used in Europe: the Shelton Gravel Band Drainage and Shelton System 25. Both install gravel bands 1 inch wide and down to a maximum depth of 13 inches, and 16 inches respectively, spaced at 16-32 inches apart.

Gravel band drainage is a trenchless system. The operation has to be carried out when soil is moist and this prevents summer work unless irrigation is available. Disruption is minimal and the area can be brought back into play immediately. Because of the close spacing of the bands soil shrinkage is less of a problem and significant settlement in the bands rarely occurs.

The Shelton System 25 is designed to dig trenches with minimum disturbance to the playing surface. To this end it has a conveyor carrying the excavated soil to a trailer running alongside. Simultaneously, a vibrating hopper on the rear of the machine places a permeable fill in the trench in a one-pass operation.

Often in the past the drainage water was allowed to go to waste, which can be a case of money down the drain when one realizes that 1 inch of rain falling upon an acre is in excess of 22,000 gallons. Today the scheme designer should be planning for its storage in order that it can be used for irrigation in drier times. Run-off from paved areas and buildings can be considerable, and where possible, should be conserved also. However rain water from car parking areas may be polluted and need treatment before being used for irrigation purposes.

Increasingly reclaimed water is being used for irrigation. It is essential to get such water analysed on a number of occasions and over a

Above: Gravel Band Drainer installing 1-inch wide bands in Gateshead Stadium, England.

Three-ton Gravel Band Drainer installing gravel to surface. Aggregate can also be set down in the trench.

period of time before making a decision as to whether it is safe to use.

Reclaimed water from sewage treatment plants serving mainly residential areas may be treated at the plant to remove high levels of phosphates. However, from our experience, lapses can occur and irrigated sportsturf can soon be receiving more phosphates than is good for the plants.

One needs to take great care in using reclaimed water from industrial areas for one hitch at the treatment beds can do untold damage on the sports field.

Reed beds for foul-water treatment are increasing in popularity for some domestic and semi-domestic situations. Reports suggest these work extremely well but it would be wise to get analytical reports before proceeding.

For too long installers of land drainage and installers of irrigation have worked apart. As a result one sometimes blames the other when pipes and control cables are seriously damaged. The lack of joint planning leads to a chaotic network of underground services. Substantial sums of money could be saved initially and in the ongoing situation, with forethought and cooperation.

The use of a high speed wheel trencher for installing irrigation pipes up to four inch diameter minimally impacts established playing surfaces. It also can be easier to ensure that the design depth is achieved and the location of the pipes can be permanently marked by adding sand in the backfilling operation.

Whether to install irrigation pipes below the drainage pipes or vice-versa is a matter of personal preference for the pros and cons of each appear to balance out one another.

In other ways, too, drainage and irrigation of sports fields go hand in hand. The Shelton gravel-banding technique described above was developed as a drainage technique but it is also capable of dramatically saving irrigation water. In hot weather when irrigation is applied daily the top 3-4 inches of the soil absorbs this moisture and much is evaporated. The grass roots are mainly in this zone. If water is withheld the plant is quickly put under strain. With a gravel band drainage system in place the irrigation water passes through the gravel bands to lower depths often 10-12 inches.

Considerably less water is lost to evaporation. The pattern of applying irrigation water in these circumstances needs to be changed. Best results are obtained by two or three short periods of irrigation as opposed to one long one. If the land drains begin running then too much water has been applied. Gravel banding looks set to be equally important to the irrigator as it is to the drainer.

Turf managers everywhere are looking for cost savings. Architects, too, need to consider the on-going management and maintenance of new facilities once they are built. Closely integrating the drainage and irrigation aspects leads to greater efficiency and effectiveness. ■

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