

With our variable climate one of the greatest challenges facing every golf club is efficient and environmentally-sound water management. Good drainage on a course is vital during wetter periods and sound irrigation systems make their mark during drier spells. Can more be done to create harmony and greater stability between the two? Nigel Wyatt suggests how.

DECENT DRAINAGE



Collecting water from your golf course in the rainy times, for use in the drier times, is an extremely sound proposition for most clubs. If a drought does set in serious and expensive damage can occur very quickly. Grass roots are unable to obtain sufficient water to make up for transpiration losses and the grass becomes stressed.

Circulating water which you have collected provides an insurance policy - it is there when you need to protect the fine playing surface of your course. It is by collecting water and transporting this vital liquid in sufficient quantities from A to B around the course, plus the timing of when this happens, that will ensure the sward will flourish. There is no doubt today's members are highly critical of playing conditions and expect them to be as good as, if not better, than those next door. Clubs cannot afford to neglect this.

Basically the scheme involves collecting ground water and surface water run-off, channelling this into a piped drainage system and feeding that into a storage reservoir in the ground - which need or need not be lined.

Tightening water controls by the Environment Agency and new regulations which examine borehole extraction help to make an on-course water storage system a highly viable proposition. Water licences, issued on a five year basis, will mean those applying will have to show they are making responsible use of this valuable resource - otherwise their abstraction licence could be revoked. New water laws, currently going through parliament, will make water recycling even more beneficial. The Environment Agency recommends greenkeepers water efficiently by:



Developing a water system maintenance programme. A routine inspection should be organised for all plumbing fixtures, appliances, pressure regulators, water lines, valves and pumps for leaks. Arrange replacement immediately when leaks are detected.

Training staff to work on increasing levels of awareness of water efficiency.

Eliminating irrigation on areas such as the rough.

Watering at night or early in the morning to reduce evaporation losses.

Utilising drought-resistant turfgrasses that require less irrigation and maintenance.

Inspecting sprinkler nozzles to ensure they are not clogging, are operating properly and distributing the water uniformly.

Employing mulches wherever possible.

Recycling water for other purposes wherever possible.

Upgrading, replacing or computerising your irrigation system.



Any ground water abstraction will require consultation with, and ultimately licensing from, the Environment Agency.

For general information and technical advice contact the Environment Agency, National Water Demand Management Centre on 01903 832073.

It is not inconceivable that ground water/surface water collection systems could provide an adequate amount of water to operate an irrigation system throughout the summer. If not, it could provide an economic supplement to the existing supply.

The benefit of this approach is twofold - an economic supply of water for irrigation and, of course, the benefit of drier fairways in the winter months.

Primary drainage

Planning is the first all important stage of any drainage scheme.

Use a reputable contractor to assist with planning design and costing of the works. Obtain a number of quotations, normally three. Contact the Land Drainage Contractors Association Sports Turf Division.

Their members are individually vetted on their ability to carry out such works. Ask the chosen contractor for references of a similar project and take them up.

Alternatively engage the services of a Consultant. You will be given unbiased advice and design, at a cost. Charges are generally between 5% and 15% of the contract cost.

The level of drainage required is dependent on the course structure. Courses built on naturally free-draining soils are likely to require only a basic drainage system. Heavier soils

will require much more work and expenditure to give satisfactory drainage.

For best results, systems should be installed when the ground and weather conditions are reasonably dry and firm.

A piped drainage system forms the basis of the construction and consists of a main drain installed at a depth of 600-900mm at the edge of a fairway within the semi-rough. Pipes are typically 100-200mm diameter and are laid within trenches on a formed trench bed.

The pipe is then surrounded and the trench filled to within 150mm of the surface with an approved, clean stone which is generally blinded with grit.

The trench is then filled level with an approved coarse sand. It is important to ensure no migration of fines through the gravel. A capping mix of rootzone is then commonly used to dress the trenchlines. This provides a medium in which grass seed can grow, helping to ensure quick establishment.

Golf clubs are keen to ensure works are completed as quickly as feasible to protect their revenue streams.

Lateral drains typically 60-100mm diameter connect into the main at 5-10m spacings in a grid formation. They should be laid within trenches excavated cleanly to a minimum depth of 450-750mm and backfilled in the same manner as the main drains.

Lateral drains should always cross the natural slope of the land so they can intercept ground water moving naturally through the soil profile. If ground levels demand it, the main drain may be installed within a fairway with lateral drains connecting

into the main in a herringbone formation.

Natural settlement is likely to occur over the trenchlines and continued work may be necessary in order to maintain the correct surface levels.

There is no doubt that installing a piped drainage system for the transportation of soil water can dramatically improve conditions - either on very wet sites with heavy soils or where there is a high water table in more permeable soils.

Timing of works

Drainage works are likely to affect at least one fairway - which will need to be closed during the installation of the system. For this reason it is common for a Golf Club's calendar of events to dictate when works can be carried out.

Clubs need to be fully aware installing drainage systems in the winter months is a risky business and works may have to be delayed. This could result in the benefits of the works being lost for a further year.

Installing land drainage systems within a new or established golf course requires a combination of the correct experience coupled with the correct installation equipment. Much of the machinery is specialised and developed specifically for its purpose by the contractor and machinery manufacturer over a number of years.

Working in fine turf situations means trenching machinery, whether tracked continuous chain or tractor mounted continuous wheel should be fit for excavating on the course.

To prevent contamination of the playing surface, trenchers often include soil loading conveyors so excavated soil is put directly onto dumpers. All wheeled equipment,

including soil removing dumpers and gravel fill discharge trailers, should be fitted with low ground pressure tyres fit to use on turf.

Secondary drainage

Another important issue is the quick removal of surface water. This often causes puddling because of the impermeability of the subsoil or topsoil. Secondary operations include:

Gravel/sand slitting

Narrow trenches, typically 50-65mm wide are excavated to an average depth of 250mm.

Slits are installed at 1-2m spacings, perpendicular to the primary lateral drains. Trenches are filled with gravel to within 50mm of the surface, and topped off with coarse sand.

Gravel banding

Narrow bands of grit are installed, typically 20mm wide to an average depth of 200mm, at 0.4m spacings, perpendicular to the primary lateral drains.

These secondary systems intercept surface water, conveying it and discharging to the permeable fill within the lateral drains.

Top dressing should form part of an ongoing maintenance programme, especially on very wet sites. This will ensure the continuing effectiveness of the drainage systems.

Water storage

Having designed and installed your land drainage system, it will be necessary to direct all water into a reservoir.

Gravity pipework alone is unlikely to be sufficient to take the water to the right place so it is not inconceivable water will go through pumping systems into a series of reservoirs. The Belfry is a good example of this.

During improvements made to the Brabazon Course, in preparation for the Ryder Cup, water management was a prime concern. There is a requirement to irrigate three golf courses, including greens, green surrounds, approaches, fairways, carry areas and tees. No summer abstraction of water is allowed, so a large quantity of water is required to be stored over the winter.

The irrigation storage reservoir at The Belfry, already one of the largest of its kind in this country, was extended to accommodate the storage of 15 million gallons of water. In addition each feature lake within the Brabazon and PGA National Courses was extended to accommodate more storage.

Low level discharge pipe work was installed within each lake, together with pre-cast concrete pumping chambers and submersible pumps. A network of underground pipes was installed throughout the courses, to enable the movement of water around the site as required.

Designing and planning water storage facilities can be carried out by experienced contractors such as MJ Abbott, who will take into account ecological and aesthetic issues. This makes a dramatic difference. It ensures the functional requirement is met, and that the project enhances the environment.

It is critical to understand the viability of the proposal.

Feature lakes within the golf course need to retain their water levels to be aesthetically pleasing. Therefore the usable amount of water stored within feature lakes should only be the top 200-400mm in depth.

If more is used, when the water level goes down the side of the banks will turn into mud making them unattractive.

Often a preferred option is the construction of a reservoir within an area out of play. Generally therefore there would be a requirement for a pumping system, in accordance with the example given in the Belfry.

Any new lake or reservoir construction is conditional on planning from the local authority. Generally

the most economic solution is the method of cutting and filling. The first operation is the removal of the topsoil over the area of the site. Excavation of the subsoil would then be carried out, either by the use of conventional tracked hydraulic excavators loading into dump trucks, or by the use of a D8 bulldozer and trail box. On a level site it is possible to excavate the centre and place the fill to form banks and surrounds. Ensuring compaction of the fill material within the bank is a key to its success.

Lining lakes

There are two possible options for lining lakes and reservoirs. If the indigenous subsoil is clay, it may be possible to puddle the clay to form an impermeable layer. If the subsoil itself is permeable it will be necessary to install a man-made lining system.

Typically a geotextile underlay is used over the subsoil surface, followed by a polyethylene lining system. The lining system is sandwiched by another layer of geotextile and secured around the perimeter of the reservoir by a key trench. The final operation is to spread a protective layer of topsoil at a minimum depth of 150mm over the geotextile. This acts to protect it and enables growth of indigenous plant species.

We generally allow three million gallons of water storage for a typical 18 hole greens, tees and approaches system. To accommodate full fairway watering systems five to ten million gallons is required.

Water-wise

With increased legislation, it is likely borehole extraction licences will become more difficult to secure. Trying to save water by installing a water storage facility on site is likely to be looked on more favourably by the Environment Agency. Clubs benefit by saving water - and having drier fairways.

Nigel Wyatt is Contracts Director at MJ Abbott who can be contacted on 01722 716361, email: nigel.wyatt@mjabott.co.uk website: www.mjabott.co.uk



The Ecosol Aero-fil System

Providing state-of-the-art aeration and drainage



The Deep Drill 60/18 and Drill 'n' Fill aerators bring dramatic improvements to turfgrass quality, with unrivalled performance:

- Drill, extract and backfill all in one action!
- Improve infiltration, percolation and gas exchange up to 18" deep.
- Inject fresh rootzone, sand, amendment or a customised blend.
- Create permanent drainage ducts through water-holding thatch and black layers.
- Bypass wet, spongy upper areas into freer draining, more structured soil beneath greens, tees and fairways.

All this with NO DISRUPTION TO PLAY! Just ask Flackwell Heath, Glen Gorse, The K-Club, Liphook, Portmarnock, Sleafy Hall, St. Andrews, Sunningdale and Wildernesse.



For contract work, sales or a no obligation chat, call the UK & Europe's sole importers today.

31 Castle Road Hythe Kent CT21 5HB Tel: 01303 267636 or Oxford 01367 870165
www.ecosolve.co.uk email: king@ecosolve.freeserve.co.uk

MJ ABBOTT LIMITED



SPECIALISTS IN:

- Golf course construction and renovation
- Supply and installation of irrigation systems
- Design and installation of land drainage schemes
- Sports ground construction and maintenance
- Design and installation of water supply and distribution systems

Bratch Lane • Dinton • Salisbury • Wiltshire SP3 5EB
Tel: 01722 716361 • Fax: 01722 716828
www.mjabott.co.uk