



Lateral Thinking

Rob Donald makes a case for the installation of drainage at a time when standing water seems like a luxury item!

It is difficult to imagine the need for drainage during the balmy summer months and indeed among reports of the driest winters on record, diminishing aquifers and countrywide hosepipe bans. Despite the logical opinion to the contrary, there is no better time to consider drainage installations than in the middle of a dry summer. Cast your mind back to how your fairways looked last time there was some 'proper' wet weather, try and recall the grumbling golfers, the migrating members and the inactive course staff and then consider the benefits that drainage could offer your club.

The principals of drainage remain constant whatever the season. Drainage is installed with the objective of removing surplus water from a designated area and discharging it to a positive outfall, a collecting area or an area of low value. A drainage installation should have physical properties that enable water to be collected and then conveyed through a network to a point of ultimate discharge. Good drainage of a golf course is now becoming a requisite as the expectations of the modern golfer often require year round access and playability.

Drainage can, of course, be entirely natural, free draining soils (often sandy) allowing rapid permeation into similarly free draining sub-strata; this however is not often the case. Large areas of the United Kingdom are covered with slow draining clay deposits, a legacy from the last ice age. These deposits are often found to extremes, in areas of very high population density, for example the Thames Valley. In this instance drainage does not occur naturally, intervention is required in the form of an installation.

The requirements of a golf course in terms of drainage are not as extreme as the requirement of, say, a winter sports pitch (rugby, football), the golfer is less inclined to tee off at 3pm on a wet Saturday afternoon when the referee is blowing his whistle to commence a football match. The installation however should be constantly functioning, removing excess soil water efficiently.

A golf course drainage system should effectively remove surplus water from the fairway, green, tees and bunkers, allowing the benefit of year round access and, equally as important, the management of turf culture. A golf course that is inadequately drained will limit the sward development:

- Reduction in soil temperature is caused because the water in the soil pores has a higher heat capacity than the air with which it replaces. This results in a reduced sward growth and effectively a shorter growing season.





- The consequential lack of aeration restricts root development, thereby limiting the nutrient uptake and leading to drought susceptibility, which ultimately results in a weak sward prone to disease and physical damage (divotting/rutting).
- Water logged soils interfere with the desirable micro organic life, which in turn may lead to a reduction in the rate of decomposition of organic matter, the result is anaerobic conditions with black layer and thatch.
- The soil structure will suffer when soils are waterlogged, as any mechanical activity will accentuate the liability of compaction and smearing.
- Finally the effectiveness of fertilisers and herbicides is reduced as the nutrient uptake is limited and the potential for leaching is increased.

Drainage design is typically separated into two components;

Primary drainage is the term used to describe the pipework infrastructure on a fairway which typically comprises a main drain with laterals connecting into it at appropriate intervals. The orientation of the main and laterals is determined by the topography of the course, however consideration should be made for the presence of irrigation pipework and the disturbance to the fairway that a main drain and associated lateral junctions would have. Typically therefore, a main drain is run adjacent to the fairway with junction positions within the rough, the laterals being more discreet are installed within the fairway itself.

A green is likely to be drained during construction and would typically have a 'herringbone' system installed, this provides for the efficient collection and removal of drainage water from the green, within the green formation (often a basin).

Bunker drainage will again comprise of pipework running through the lowest areas of the feature and connecting into the fairway drainage. Prevention of sand ingress is paramount to the efficiency and longevity of a bunker drain and the design should adequately address this issue.

Secondary drainage is often described as a bypass system. This refers to the ability of surface water generated through heavy rainfall, to be directed via a surface system into the pipe drainage network, thereby bypassing the topsoil. The systems available are known as sand slitting, gravel banding/grooving and to a certain extent vertidrain and mole ploughing.

These operations when correctly specified, situated and installed can have a marked effect on a primary piped drainage installation and extend it's efficiency.

To conclude, the design and installation of a golf course drainage scheme, whether during construction or within an established facility, requires experience and expertise. Drainage it is fair to say, is not rocket science, however incorrectly installed drainage schemes often result in an inefficient or dysfunctional system with an extensive remediation requirement. Only specialist consultants and contractors should be approached for both design and/or installation phases of any significant project.

Rod Donald is Managing Director of White Horse Contractors Limited: Lodge Hill, Abingdon, Oxon, OX14 2JD. Telephone: 01865 736272 or email: whc@whitehorsecontractors.co.uk



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