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Bacteria has a massive impact on borehole pipework

Why the clock is ticking on borehole maintenance

Is your sustainable water source operating at full efficiency?

Throughout the drier months, when rainfall is in short supply, greenkeepers face an ongoing battle to keep greens watered and courses in tip-top condition.

Most golf clubs and greenkeepers will aspire to having their own water supplies — an option that in the long term is much less expensive than utilising mains water.

Increasingly, on-site boreholes are the preferred option. Although initial financial outlay may be considered costly, return on investment is likely to be achieved in a relatively short space of time, depending on the amount of water required.

Most importantly, boreholes usually remain unaffected by hosepipe bans, water company supply problems and price hikes as they provide reliable water supplies from a known underground source. In other words, they put the user in control.

In return, boreholes require a certain amount of maintenance to ensure the water keeps flowing and the best time for this to take place is in the off season, when water shortages may be the last thing on your mind.

"Time is of the essence," said Mike Deed, from specialist suppliers Geoquip Water Solutions. "Many courses will look to start irrigating in earnest from the end of March or early April and that means essential checks and maintenance need to be happening sooner rather than later.

"Much as you would give your car a winter service, boreholes need similar attention — they might be underground but this is not a 'fit and forget' scenario. If you look after your borehole, it will keep supplying your water for years to come. If you ignore the warning signs, you could find your water dries up at the time you need it most."

One of the most common problems — apart from mechanical failure — is bacteria. This thrives in a borehole when slimy biofilm and residue is allowed to build up unhindered, usually because »

A water sample being taken for use in a Biological Activity Reaction Test (BART) kit to identify bacteria

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of a lack of regular cleaning. Once bacteria takes hold, it can cause increasing problems.

These problems will often only become apparent once water quality or quantity is affected, but there are often early visual clues if you know what to look for.

"I always say follow the symptoms," continued Mike. "If you are seeing orange-brown, rusty stains appear on the grass after watering, that is the first indication your borehole needs cleaning.

"Sometimes people will think that's just part and parcel of using borehole water but it isn't — it's a sign something isn't right. Similarly, if your borehole breaks down when you don't expect it to and the yield and pressure are dropping, ask yourself why.

"Consider what the signs are telling you. It may be possible to determine if it is just the water source (the borehole) that has been affected or if it is a wider problem that is affecting all the pipelines and sprinklers as well.

"If you can do that, either on your own or with the help of experts, then you should be able to deal with the heart of the problem more quickly, for example by undertaking a thorough clean of the pump and motor. If, through that prompt action, the yield returns to normal, then you have stopped it contaminating all the pipelines and reduced the overall impact.

"Early detection is key and the sooner you take action, the less invasive the problem will be."

Bacteria

The most common type of bacteria found in a borehole is iron-related bacteria (IRB) and the rich red colour of much of the soil found across the UK is a good indicator of the presence of high iron content in the ground — and therefore the groundwater.

Left unchecked, the bacteria will form a thick ochreous sludge, which quickly blocks borehole pump, pipes, motors and other equipment.

Although some soil types are more susceptible to the build-up of IRB, it doesn't mean that other areas escape scot-free. Even in areas where there are low iron levels in the groundwater, IRB can still be prevalent.

Some ground conditions mean boreholes will be more prone to struggling with bacteria growth than others, but if the environment is right and the bacteria has the food and nutrition it needs, it can still propagate very quickly. Take the West Country which, despite being largely sandstone and hard granite, can still attract build-ups of IRB. Similarly, in chalk downland areas in the south of the UK, where chalk soil is generally lower in iron, you wouldn't expect to have problems. Geoquip's experts, however, say they have encountered plenty of IRB growth and sludgy water in boreholes situated in chalk wells.

Other types of bacteria can also impact on borehole performance, including slime-forming bacteria, sulfate-reducing bacteria, manganese or calcium carbonate. Bacteria aside, a further threat, especially in areas with sandy or loamy soils, is that of fine layers of soil particles getting into a borehole.

Typically, this will happen if there has been a crack in a borehole casing, which then allows the particles to settle into the bottom of the borehole, gradually building up layer-by-layer until the pumping mechanism and motor become less effective and pipes become blocked.

A downhole camera inspection, carried out by an expert, will be the only way to identify this type of issue and agree a course of action.

Planning ahead

Whether problems have already been spotted or not, a borehole maintenance programme should be a regular part of the calendar year.

While some checks can be managed in-house, other operations — such as removal of the pump and motor and the need to ensure correct disposal of cleaning products and liquids used to flush the systems through — must be carried out with appropriate advice and support from borehole experts.

Every borehole installation is different and therefore it is important for greenkeepers to work out a practical strategy, ideally in hand with experts who know exactly what they are doing. A plan must suit the immediate need and consider the disposal options available at the location.

One example of this is when borehole pipes have been flushed through with a cleaning product to help remove the slime and dissolve the residue that feeds the bacteria growth lying at the bottom of the pipes. Once it has done its job, »

Badly-blocked borehole casings at the Renaissance Club reduced the flow of water

Top tips

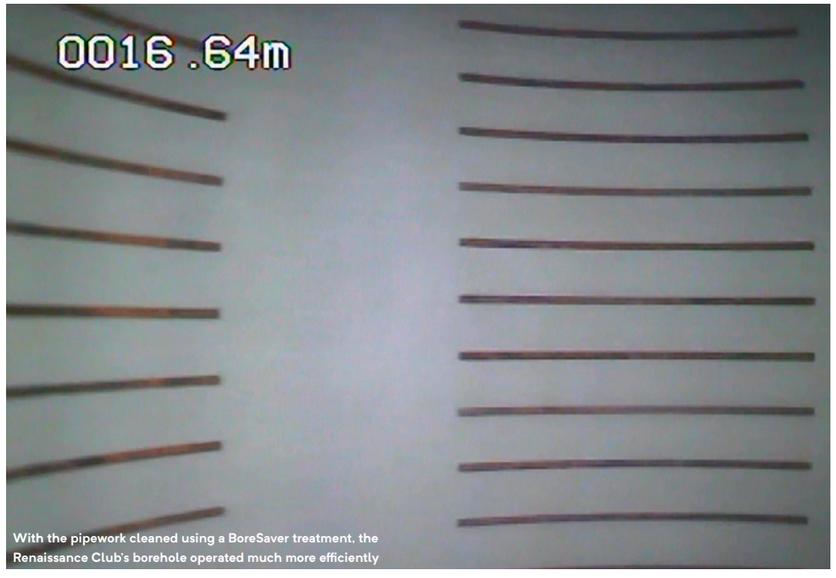
1. Do a visual check of all borehole systems and equipment. Look for signs of leakage and changes around the well that may impact performance. Make sure pipes have already been drained down to avoid burst pipes and leakages.
2. Switch the borehole on, check the pump and booster system and flush water through the pipelines to make sure they are clear. Check that all relevant valves, meters, mechanisms, electrical components and monitoring systems are in good working order.
3. Check yield and pressure against previous readings to see if these have changed.
4. Carry out a downhole survey to check for any damage, such as a blockage or debris falling into the borehole.
5. Remove the sprinklers and pop-ups, give them a thorough clean, then replace with new or reconditioned units as necessary.
6. Implement a cleaning programme to keep bacteria at bay.
7. Plan your maintenance schedule in advance to avoid last-minute problems.

correct containment of that water is essential, as the acidic treatment water needs to be neutralised and the pH corrected before it can be disposed of. Flushing the water straight into rivers or lakes or into the drainage could be detrimental for the environment, as some golf courses have found out to their cost. Therefore, an essential part of the process is for the wastewater to be treated and neutralised, turning it into supernatant clear 'grey' water — which is completely harmless — ready to be disposed onto any nearby rough ground, where it will simply soak away.

This is where expert knowledge and advice comes into its own and the Geoquip team has put together a list of helpful hints and tips for greenkeepers keen to start checking boreholes ahead of the new season, shown on the left of this page.

Continue the conversation:

Geoquip Water Solutions are on Twitter at @geoquip



With the pipework cleaned using a BoreSaver treatment, the Renaissance Club's borehole operated much more efficiently

GEOQUIP | The "magic" treatment solution for borehole bacteria

If your golf course borehole is struggling with reduced yield or pressure, this could be due to a build-up of bacteria.

Taking a water sample with a Biological Activity Reaction Test (BART) kit will not only confirm if bacteria is present, but will also identify the particular type, allowing the most effective treatment to be applied.

Geoquip Water Solutions recommends the BoreSaver range of borehole cleaning and well rehabilitation solutions.

Specially designed to dissolve the residue where bacteria breeds, the biodegradeable treatments contain a marker that gives an instant all clear to demonstrate any remaining chemical residue has been removed.

BoreSaver treatments will completely remove bacteria deposits and slime from boreholes, wells, pumps and equipment, while testing at six-monthly intervals will help ensure equipment stays contamination free.

At Scotland's The Renaissance Club 18-hole golf course, Head Superintendent Paul Seago discovered the value of BoreSaver after a downhole camera survey revealed casings on the course's main borehole were badly blocked by iron-related bacteria.


The Renaissance Club

Once the pumping equipment had been removed, Treewaters Control Systems carried out a brushing and cleaning programme before treating the borehole with BoreSaver Ultra C PRO. These methods resulted in water flow increasing to 24-25 cubic metres of water an hour — over double pre-clean levels.

Paul said: "The borehole is at the heart of our irrigation system but because it is below ground no-one sees it. When those first images came back from the downhole camera, it made sense because we could identify the problems we were experiencing.

"Once the BoreSaver had worked its magic and we saw the post-treatment camera images, the difference was like night and day."

For more information, visit www.geoquipwatersolutions.com

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