GeoDrilling International

Geoquip aids Malawi water programme

Charles Stafford explain how Geoquip Water Solutions is helping to aid rural communities in Malawi gain access to clean drinking water by providing cameras and water treatment solutions.

Charles Stafford and Ministry chemist Johannes Murowa work together on the Climate Justice Fund project in Malawi (Credit: Jamie Rattray)

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Many rural communities in Malawi now have better access to clean, safe water thanks to an ongoing programme led by the University of Strathclyde and funded by the Scottish government.

Comments

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Charles Stafford

The **Climate Justice Fund*** project, headed by Professor Bob Kalin, sees university students working on the ground with the Malawi government and in-country partners, including the Malawi Ministry of Irrigation, Agriculture, and Water Development.

The focus is on checking, testing and maintaining vital boreholes and wells which supply water in rural areas, as well as providing training and sharing expertise with local water experts.

Providing key equipment to support the university's team is Geoquip Water Solutions, which recently supplied an ultra-light Laval SC-500 compact camera system with an SC-166 water well camera, together with its BoreSaver Ultra C water treatment solution.

Charles Stafford, who is working towards his MSc Hydrogeology (2018-2019), is one of a group of students who have just returned from Malawi after working first-hand on the project during May and July.

ellbore forensics

ur remit was to carry out a wellbore ensics programme," says Stafford. e undertook a variety of tests to sess the functionality of the Afridev lls and pumps and identify if there re problems with contamination or structions such as bricks or other bris, which sometimes happens if a ll has been vandalised or damaged.

"Using a camera is the best way of verifying that a well is clear, it means we can check the pump and the casing and the wellbore itself and make sure it is all working properly.

"Given the conditions and the fact we that all our daily equipment was in the back of our vehicle, it was important to that the camera was portable, small and easy to manoeuvre and this one was ideal for the job."

Working with local in-country partners, Stafford and his colleagues were also able to show how the equipment worked so that it could continue to be used locally after the Strathclyde team had returned home.

In certain parts of Malawi high levels of iron are found in the groundwater and, with Stafford's dissertation focusing on identifying where iron contamination occurs and how it can be treated; he was keen to try out potential solutions to improve the performance of borehole equipment.

"We already knew from our partners that they had found high readings of dissolved iron in the water and, in anticipation of that, we brought Geoquip's BoreSaver treatment solution with us," continues Stafford.

"We were working closely with the Malawi Ministry of Irrigation, Agriculture, and Water Development and there were a few raised eyebrows when we said we were putting an oxalic acid solution into the drinking water.

"BoreSaver treatments had never been used before in Malawi, but once we showed them Geoquip's literature and usage guidelines and explained the process, they were happy to sign it off and were impressed with the end results."

Having identified suitable sites that suffered badly with iron slime and iron precipitate, the downhole camera was once again sent down to survey the damage and the pump and rising main were lifted out of the borehole to be checked.

Stafford explains: "Through the camera, we could see globes of orange mess floating about and the casing was covered in such a thick orange residue that we couldn't even see the slots in the casing.

"Usually we use the slots to help monitor the depth, but the water was so murky we couldn't see anything."

The extent of the slime on the rising main after it was removed as part of the wellbore forensics programme (Credit: Jamie Rattray)

A low dose (two per cent) of BoreSaver was applied and, on the advice of the Geoquip team, a combination of downhole brushes, a home-made surging tool and hydraulic displacement were used to ensure the treatment solution was easily mixed.

The results were, says Stafford, both impressive and almost instant: "It worked really well, we did a follow-up camera survey and pumping test two hours later and most of the casing looked brand new.

"The water was clear, there was no orange mass, we could identify and document where the slots were and we achieved about a 10 per cent increase in pumping efficiency. We believe that well was at least 17 years old and, given that it hadn't been maintained or treated before, we like to think that we have given it at least another 17 years of providing clean, safe water for the local communities."

Progression on the rising main from a clean pipe at the top, to black precipitates and the orange Fe-oxide precipitates and slime (Credit: Jamie Rattray)

He believes that in areas where the contamination is even worse, still higher percentage increases could be achieved.

Having left both the camera and the remaining BoreSaver with local partners, Stafford says there will be at least enough solution to treat another five wells and he continues to liaise with the local Ministry team to encourage them to monitor the treated well.

Mike Deed, MD of Geoquip, said: "We were very pleased to be able to work with Stafford and the wider university team on such a worthwhile project.

"Having access to clean drinking water is something most of us take for granted, so to see and hear about the benefits now being achieved to help local people in Malawi is very gratifying."

Focusing in on the right camera for the right job

When it came to advising the team on which camera was best suited to its needs in Malawi, Geoquip knew immediately that the SC-500 from Laval Underground Surveys would fit the bill.

As Stafford identified the fact the camera system is ultra-light, portable and compact, meaning it is ideal for aid programmes and other projects where manoeuvrability, a competitive price and small size are important.

It is fitted with an SC-166 water well camera designed for water wells, boreholes, and vertical shafts as small as 2in (5cm) to 10in (25cm) in diameter - another reason why it works well in areas where shallow wells are often the norm. It has a 9in touch screen monitor with built-in recording and playback weighs just 4.1kg and is pressure tested and waterproof to 750psi.

Where inspections in deeper boreholes are required, Geoquip recommends the Laval R-Cam 1000 XLT downhole camera. Still completely portable, it boasts a self-contained video inspection system that can inspect boreholes up to 300m (1,000ft) deep or with the R-Cam 1300, 400m.

Five adjustable light settings mean operators can increase or decrease the lighting as necessary and it offers real-time inspection footage on site. It has a state-of-the-art solid-state DVR that records survey footage to a 16GB internal storage and/or expandable USB flash drive, built-in microphone recorder and mini Bluetooth keyboard remote.

Aimed at smaller operators, it is cost-effective while delivering all the features of a fully professional system.

Completing the line-up is Laval's range of Deep Well Winch Camera System which, as the name suggests, extends the capability of the R-Cam 1000, the R-Cam 1300 and the SC-350 / 500 systems to enable them to reach further and deeper.

Perfect for upgrading existing R-Cam systems, the DW-1500 reaches depths of 450m (1,500ft) and the DW-2000 reaches depths of 600m (2,000ft).

The winches are powered by a 90 VDC electric gearbox equipped with a variable speed motor controller and Kevlar-reinforced lightweight coaxial cable to lower or raise the camera in the well.

The cameras also come with a range of add-ons, including flight cases, lighting accessories, portable winches, power adaptors and tripods.

**The Climate Justice fund was launched in 2012 to help tackle the effects of climate change in the poorest, most vulnerable countries in the world*