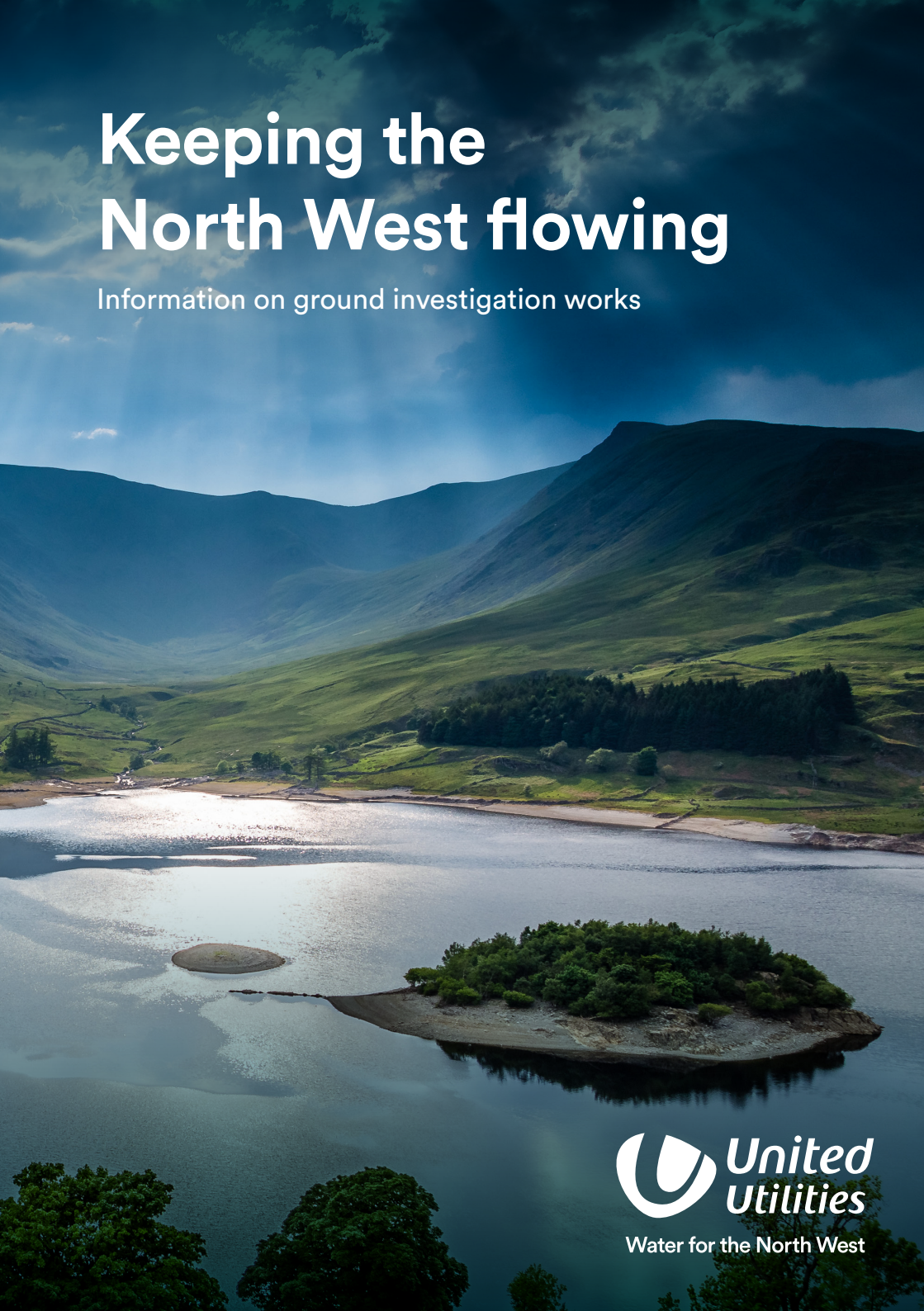
Keeping the North West flowing

Information on ground investigation works



United Utilities

Water for the North West

Contents

What are we doing?

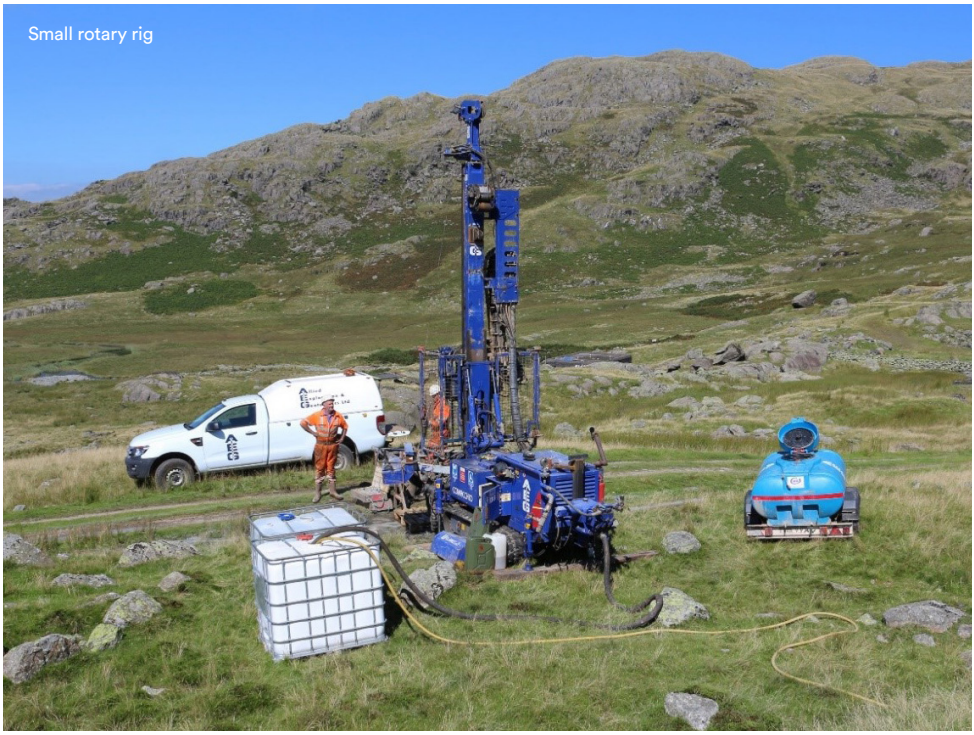
The Haweswater Aqueduct (HA) was built by Manchester Corporation between 1933 and 1955, to transport water by gravity from the Lake District through Cumbria, Lancashire and down to Greater Manchester to support the growing population in all these areas.

In October 2013 and again in October 2016 we were able to shut off the HA for a short period of time to carry out some inspections. These inspections revealed areas of concern regarding potential risks to both water quality and supply to our customers.

We took action straight away to begin minimising these risks, however, there is still a lot more work to do to ensure the long term future resilience of providing wholesome drinking water to our customers for generations to come. To reduce these risks even further, we need to carry out some site investigations to determine the best course of action.

What are site investigations?

Site investigations (SI) can include ecology surveys, ground investigation, topographic mapping surveys and archaeology surveys. Ground investigation (GI) is one of the techniques Engineers use to gather information about a location to help with planning, design and construction. GI is aimed at understanding the strength and other properties of the ground and this brochure will give you information on the GI surveys that we may carry out as part of this project. Ecology surveys are covered in a separate brochure.



Small rotary rig

Why do we need Ground Investigation?

Ground Investigation works are needed to study the soils, rocks and groundwater below the surface so that any construction works or maintenance can be done safely. It also ensures that the aqueduct is strong enough to cope with the pressures of the soils, rocks and groundwater for its working life.

We will use a variety of methods to investigate the ground beneath our feet. These are detailed in the next few pages.

Cable percussion borehole rig

Types of ground investigation techniques we may use

Pits and trenches

We dig pits and trenches to investigate soil conditions, to take samples and to search for other buried pipes and cables. A pit is typically 1 metre wide, 4 metres long and between 1 and 4 metres deep, for more detailed testing, the working area can be up to 20 metres by 20 metres to allow for soils to be moved around and stored, and we may need to visit the site more than once. This type of investigation can be noisy and will disturb the surface, we will reinstate the area afterwards.

Rotary core borehole

We use a rotating vertical drill that is mounted onto the back of a truck or tracked vehicle. It will drill a small borehole into the ground to investigate the solid rock below ground level. A diesel engine or generator will be used to power the drill. The boreholes range from 20 to 80 metres deep, however there will be points where we need to investigate under the aqueduct level taking the borehole up to 350 metres deep. This can take up to around a 45 by 45 metre working area depending on the depth required. We may use other specialist equipment to lower into the borehole to test the properties of the ground. This rig may be in place from a few days to around six weeks.

Cable percussion borehole

To do this we use a large mobile A-frame borehole rig to drill a small borehole between 5 and 40 metres into the ground to allow us to investigate and sample the soils that sit on the bedrock. We will use a pick-up truck style vehicle to bring the rig to site and a diesel engine will be used to power it. It will be in place for up to a week and there will be 2 people working the rig temporarily using an area of around 10 by 20 metres. On occasion we may also bring a rotary core rig to the site to continue the hole deeper into the bedrock.

Rotary core borehole rig

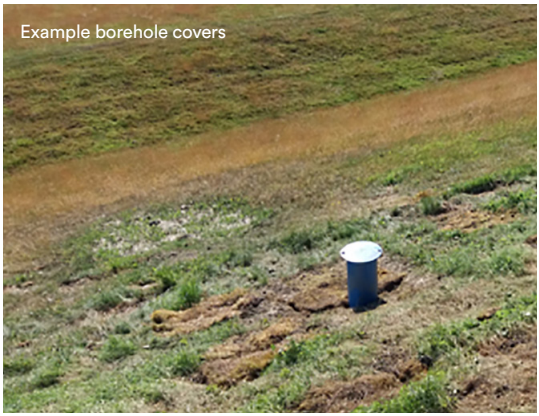
Surface testing techniques

This is a non-intrusive way of recording small electrical currents and tiny changes in gravity or vibrations. We don't need to dig, we would use a small vehicle to lay out cables along the route needing investigation. This may take anything from a few minutes to several days.


Surface testing vehicle

What happens once we've finished these investigations?

Using surface testing techniques the area will look no different once we've left it. When a borehole is finished, we will either fill it in and reinstate the ground, or a cover may be put in place. If we need to keep monitoring equipment in the ground, we will use a either a small cover at ground level, or a small steel tube up to 1 metre above ground level. This will allow us to record data that will be sent to us electronically or allow a person to visit the site to take readings, this will take less than 30 minutes. Once the monitoring is complete, the cover or steel tube will be removed and the ground will be reinstated, this will take less than 30 minutes and may be two to four times a year over several years. A small solar panel may also be required which is typically the size of a PC.


Example borehole covers

All of the information gathered from the investigations will be used to make a model of the ground so that the best route for the aqueduct can be found. The ground investigation is necessary to ensure that we minimise the risks to workers during construction and provide the best value to our customers.

To find out more information see our website
unitedutilities.com/harp

Still got a question? Call us on 0345 672 3723, quoting project number 80061155. We'll be happy to help.

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