Water

Delivering great tasting, clean and safe water to meet customer need

NI Water scientist undertaking water quality tests

Strategic areas of focus

Improve at source — Enough water for all — Tasty, clean and safe — Drive down leakage — Always on

Sustainable development goals

Strategic threats/opportunities

ST1 ST2 ST3 ST4 ST7 ST8 SO4

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Strategic performance indicators

Water	Unit of measurement	Target 2019/20	Actual 2019/20	Pass/ Fail	Target 2020/21
Water quality compliance*	%	99.79	99.90	Pass	99.79
Reduction in leakage	Ml/d (Million litres/day)	155	161	Fail	153
Reduction in supply interruptions in excess of: • 6 hours • 12 hours • 24 hours	%	 0.808 0.153 0.009	 0.697 0.085 0.003	Pass	 0.792 0.146 0.009

*Calendar year target

Strategic areas of focus

Improve at source

Peatlands provide a range of eco-system services. They provide a natural form of water purification, protect against floods and help reduce greenhouse gas emissions by storing more carbon than the world's forests. Unfortunately over the years large areas of peatlands have been destroyed to make way for farming and construction. When peatlands are damaged the eco-system services they provide are lost and cause many tiny particles to run off the land into the river colouring the water which is expensive for us to treat.

We are committed to restoring peatlands and harnessing nature's natural water filter instead of building more carbon intensive treatment works. In 2019/20 we completed the restoration of the largest expanse of intact blanket bog in Northern Ireland, the Garron Bog. This has improved the quality and reliability of the water received at NI Water's Dungonnell treatment works, which is supplied by the Garron catchment. Drains were deliberately blocked to recreate bog to filter rain water and reduce the amount of chemicals NI Water needs to use, to clean the water. The success of the work undertaken at Dungonnell means it will serve as a demonstration site for best practice and as a model for future bog restoration projects in Northern Ireland and beyond.

In 2020/21 we are investing €4.9m to improve the Erne and Derg cross border river catchments that are a source of our drinking water, piloting changes in land management techniques such as fencing to exclude livestock and replacing boom spraying of the herbicide MCPA for rush control, with weed wipers, which helps to reduce the amount of herbicide running off into our rivers and streams. It is hoped these initiatives will help restore nature and improve the water quality before it reaches our works.

Restoration of the Garron Plateau Blanket Bog in Dungonnell Catchment, County Antrim

Garron Bog: https://www.youtube.com/watch?v=l1O62AfRjto

Derg: https://www.youtube.com/watch?v=SGzwvfBx9s4

Enough water for all

Our changing climate is bringing more frequent and severe weather events such as heavy rainfall, heatwaves and extreme cold. These events can affect the quality and quantity of our water sources, placing pressure on our water treatment works. For example heavy rainfall can cause discolouration of the water making it more difficult to treat and lead to the growth of algae, which can affect the taste and odour. Higher temperatures can accelerate the growth of harmful bacteria.

One way we mitigate the risks associated with climate change is through temporary storage of drinking water in large storage tanks known as service reservoirs. These reservoirs allow us to keep customers in supply during planned maintenance and unplanned events at our water treatment works.

We started a project in 2019/20 to inform capital investment to further strengthen water storage levels. The project has involved the development of a bespoke model, which allows us to predict areas that need increased water storage for customer resilience.

During 2019/20, we invested £5m in a new service reservoir at Lough Fea. This reservoir has the capacity to hold 12 million litres of drinking water for supply to our customers in Pomeroy and Cookstown, County Tyrone.

Over 2020/21, we are investing £10m in additional drinking water storage for Enniskillen in County Fermanagh and £14m at Drumaroad water treatment works in County Down.

The new Lough Fea service reservoir, County Tyrone

Tasty, clean and safe

Delivery of great tasting, clean and safe drinking water is central to what we do. It underpins the public health and economy of Northern Ireland. The fresh water we use to produce our high quality drinking water is predominantly taken from Lough Neagh, local rivers and a range of upland sources, all of which are rich in natural organic matter.

To make it suitable for drinking, we treat the fresh water to remove anything that could be harmful, including using disinfectant such as chlorine to kill bacteria. When chlorine reacts with the organic matter it can generate harmful by-products known as trihalomethanes, which can also cause the drinking water to have an unpleasant smell or taste. One way to reduce this unpleasant smell or taste is to use less chlorine in our treatment processes by improving the quality of the fresh water reaching our treatment plants.

In 2019/20 we introduced a new treatment plant to enhance the new bore hole on Rathlin Island, the only inhabited offshore island in Northern Ireland. The bore hole has been the only source of drinking water on Rathlin for the last 15 years. The new treatment process removes organic matter leaving no opportunity for trihalomethanes to form, improving the taste and quality of the water and protecting this vital water source for Rathlin.

In 2020/21 we are trialling a number of pilot studies at Derg water treatment works, County Tyrone, to remove heavy metals, suspended solids (turbidity) and pesticides including using a form of volcanic crushed rock and recycled brown and green glass to filter the water.

New treatment plant at Rathlin Island, off the coast of County Antrim

Strategic areas of focus

Drive down leakage

Every day we lose around a quarter or 161 million litres of water from our infrastructure. This loss is a combination of leakage through our pipes, which is caused by natural wear and tear, damage from severe weather, leakage on the customer supply pipe, illegal usage or unknown usage. Reducing leakage is a top priority for NI Water, but with a network of around 27,000km of underground water pipes (long enough to circle more than half way around planet earth) located predominately in rural and remote areas, it can be a complex and costly job finding the leaks.

Leakage detection technology has a key role to play in detecting leakage quickly and with minimal interruption to our customers. In 2019/20 we tested a number of initiatives to detect leakage including, listening devices known as acoustic loggers, which can reduce the time taken to detect leaks, record potential leakage previously undetectable using current tools and improve the accuracy of the location of the leak. Acoustic loggers pinpoint leaks by measuring the noise of escaping water that follows a leak or burst, and then sending an alert together with details of its location, allowing us to focus effort in that area. The rapid detection and pinpointing of leaks means that the job is carried out faster and more precisely, meaning less digging, less water lost, less cost and less disruption for our customers.

We have improved monitoring of domestic consumption habits with the installation of 'fast-logging' at various sites throughout our network providing us with the ability to analyse water usage on a minute-by-minute basis. Over the last number of years we have noted a change in consumption habits during the night, which is the period of time that leakage is assessed. This refinement in understanding consumption patterns will enable us to more accurately calculate the level of leakage.

Despite the implementation of the new technology to improve leakage detection we did not meet our leakage target of 155 million litres per day for 2019/20, against an actual level of leakage of 161 million litres per day. We have struggled with leakage over PC15. Our PC21 Business Plan sets out how we can achieve the sustainable economic level of leakage of 150 million litres per day, which is the point at which the cost of fixing a leak outweighs the benefit. To succeed we need to find more and more innovative ways to track down leaks and save water. In 2020/21 we are trialling the use of satellite technologies, which use various wavelengths of the visible and invisible light spectrum to locate leaks.

Leakage detection in Omagh, County Tyrone

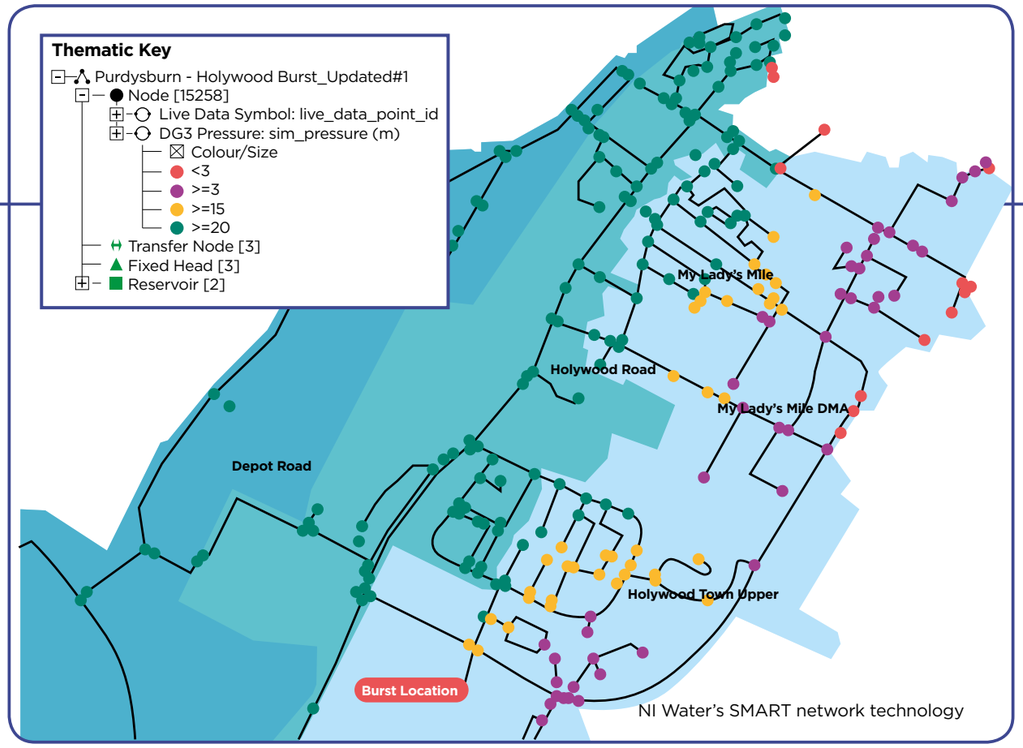
Always on

Things can go wrong when managing 27,000km of water mains. This can result in interruptions to customers' supply or customers experiencing low water pressure. Every minute counts when it comes to fixing water supply problems so we are looking at a range of areas to fix problems before customers are affected. This will help us to reduce the minutes lost per property by 50% to 25 lost minutes per property over PC21.

One area we have been looking at over 2019/20 is valves. Research has suggested that a proportion of supply interruptions can be traced back to work on valves, which create surges in water pressure. To ensure work on the underground pipe network does not disrupt the water supply, we have upskilled colleagues, contractors and engaged with external stakeholders who operate our water hydrants including Northern Ireland Fire and Rescue Service (NIFRS), DWI and local councils to keep our network CALM. Other approaches adopted over 2019/20 include the use of temporary over-land pipes and water tankers.

We are also learning the lessons from previous interruptions. A review of a supply interruption at Tullywhisker in County Tyrone has led to the introduction of SMART network modelling to more accurately predict the impact of work undertaken on our network.

In 2020/21 we will develop our SMART network to provide information in real time and help predict interruptions to supply and identify leaks. This SMART technology will provide early event warnings, reduce costs by fixing problems before they escalate and improve the customer experience.



NI Water's SMART network technology