HYDRAPULSE™ is a gate device that controls the flow of effluent to minimise the effect of Fat, Oil & Grease (FOG), silt and other deposits. It maintains sewer cleanliness passively and thus reduces maintenance costs whilst offering additional environmental and customer benefits.

HYDRAPULSE™ is installed in sewer manholes where the network is subject to blockages due to FOG, sags in the line, or where solids are deposited due to low flow. The head of fluid that builds upstream of the gate, together with its unique design, provides an instantaneous snap opening and closing that ensures a flushing wave of wastewater with maximum volume and velocity to flush and cleanse the downstream sewer effectively.

In addition, on the upstream side of HYDRAPULSE™, constant changes in the effluent level help prevent FOG adhering to the sewer walls, therefore creating an upstream cleansing effect.

The design is resistant to jamming or blocking due to rags or similar materials, and is inherently ‘fail safe’ during storm conditions.

HYDRAPULSE™ is easy to install and eliminates the need for costly periodic water jetting of problem sewers, odours due to low flow sewage and blockages due to FOG and sags in the line. It reduces maintenance cost and restores asset performance cost-effectively.

**Cost Benefits:**
Reduces operational cost through elimination of interventions to clean sewers.

**Environmental Impacts:**
Reduces use of jetting/cleaning trucks. A reduction in operational carbon and in water used and wasted to clean sewers.

**Customer Benefits:**
Reduces sewer flooding and pollution incidents due to sewer blockages, whilst reducing the impact to the community from the opening of manholes in streets for jetting and cleaning purposes. Improved reliability of wastewater services.
With the gate in the closed position, effluent level builds until a sufficient head pressure of fluid opens the gate.

An instantaneous snap opening and closing that ensures a flushing wave of wastewater with maximum volume and velocity to flush and cleanse the downstream sewer effectively.

HYDRAPULSE™ is installed in sewer manholes where the network is subject to blockages due to FOG, sags in the line, or where solids are deposited due to low flow.

Multiple gates recommended in high FOG and silt areas to keep the energy of the flush wave high and keep the FOG mobilised.

HYDRAPULSE™ Upstream Effect - Constant changes in the effluent level help prevent FOG adhering to the sewer walls, therefore creating an upstream cleansing effect.

HYDRAPULSE™ design provides an overflow (fail-safe) route for effluent during heavy rainfall.
Case Study 1
Extended Lifetime Testing HYDRAPULSE™

Background:

As part of the commercialisation phase within our Product Lifecycle Management Process (PLMP) all products must undergo specific extended lifetime testing in worst case environments to ensure the integrity of the product in use.

A gate was tested within two accelerated lifecycle environments including:

a.) A screen testing channel at a sewer treatment works. Flowrates in the channel allowed us to conduct accelerated lifecycle testing due to the controllable flow rates we could put through the gate.

We were able to perform excessive rag tests on the gate during trial.

The test also allowed us to trial our remote telemetry system which was attached to the gate and recorded each open and close event.

b.) Water powered test jig. The intention is to test the components of the gate, including the seal to destruction.

Figure 1. HYDRAPULSE™ in operation during extended lifetime testing
Case Study 1
Extended Lifetime Testing HYDRAPULSE™

Results:

a.) Test Sewer - The gate was tested over a period of 4 months, and it flushed 22,000 times. At 8 flushes per day, this equates to 7.5 years of operation.

During rag testing the gates anti snag features performed as expected. On subsequent flushes rags were flushed downstream of the gate.

On removal of the gate we performed detailed inspection of a number of aspects of the gate. Valuable feedback was gained, and fed back into the design process. The gate surpassed all expectations during this trial.

The telemetry system identified open and close events so remote monitoring of the gate could be achieved as planned.

b.) Water powered test jig - The test was concluded at 200,000 flushes without any loss of seal performance. This equates to over 60 years of operation at 8 flushes per day...
Case Study 2
HYDRAPULSE™ 300 Sewer Installation

Background:

Installation of a HYDRAPULSE™ 300 Flusher Gate into a 375mm sewer.

HYDRAPULSE™ location chosen to have maximum effect in order to:

- Reduce frequency of planned cleansing operations
- Prevent blockages from occurring immediately downstream.

An ultrasonic depth measurement probe was installed at this site which interfaced with the asset owners SCADA system allowing them to monitor the gate remotely.

First installation of a 10 gate trial, the remaining gates will be installed throughout the sewer network in locations that require the most frequent jetting operations.

2 different sizes of HYDRAPULSE™ will be trialled, 200mm and 300mm. Other sized gates are available on request.
Case Study 2
HYDRAPULSE™ 300 Sewer Installation

Results:

HYDRAPULSE™ 300 is flushing as expected.

Ultrasonic measurement device is recording the level change after each flush, therefore providing a flush frequency value over time.

As this is a combined sewer rainfall events lead to an increase in flush frequency as can be seen in the telemetry trace.

Downstream flush wave has been observed at subsequent manholes, showing the cleansing energy and scouring effect being transferred down the sewer conduit.

Figure 7. Image of ultrasound system above HYDRAPULSE™

Figure 8. Telemetry trace showing HYDRAPULSE™ working over time
Summary

Having worked closely with Northumbrian Water, we have developed a cleaning system that we believe will help address the issues caused by FOG and sediment in challenging sewer networks. Our Flusher Gate product, tradename, HYDRAPULSE™ has undergone extensive testing to date including accelerated lifetime testing as well as a growing number of installations within live networks, with more installations planned going forward. Northumbrian Water have been pivotal in the development of the HYDRAPULSE™ flusher gate and are a great example of how collaboration can aid in the introduction of new design thinking from other sectors.

We see HYDRAPULSE™ as a potentially widely used tool throughout the water and other sectors, not only domestically but also internationally. With HYDRAPULSE™ Flusher Gate now commercially available, our team is on hand to discuss potential options for installations and trials throughout the UK and abroad.
Mike Madine, Head of Wastewater Networks and Developer Services - Northumbrian Water

“We have now installed 7 gates of a 10 gate HYDRAPULSE™ trial. Prior to the trial, HYDRAPULSE™ gates were subjected to highly accelerated lifetime testing at Northumbrian Water’s test facility in Chester-le-Street without failure of either the mechanical or seal components, so we know that it is a robust system that is suitable for long-term deployment. The HYDRAPULSE™ gates are installed in combined sewer networks and the first HYDRAPULSE™ has now been deployed since May 2016. The HYDRAPULSE™ system’s overflow feature has been tested on many occasions and the gates have not presented a blockage risk. The installed HYDRAPULSE™ gates are working as intended, mobilising sediment and FOG deposits down our sewer networks. Our aim with these installations is to stop routine jetting operations over the sections of our sewer network where the HYDRAPULSE™ gates are installed, reducing operational costs and improving efficiency.”