

# Rural Wastewater Investment Programme

## £10m wastewater programme delivering environmental benefits across rural Northern Ireland

by  
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In 2008 Northern Ireland Water (NI Water) embarked on its 'Rural Wastewater Investment Programme' (RWwIP), an extensive two-year project aimed at upgrading a series of small wastewater treatment works across rural Northern Ireland. The main objective of the programme is to improve the quality of discharge to minor watercourses and bring about significant environmental benefits for local communities. Although a complex and logistically-challenging contract, within its first year alone, NI Water and its contract team have successfully embarked on implementing new infrastructure at over 40 sites province wide.



Top photos: Before (left) and after (right) shots of Ballymaguigan WwTW in Co Antrim. Bottom photos: Before (left) and after (right) shots of Farmacaffley WwTW in Co Armagh - typical sites being upgraded as part of the Rural Wastewater Investment Programme

### Background

Approximately 600,000 people, around one third of Northern Ireland's total population, live in rural Northern Ireland. Much of the wastewater infrastructure servicing these rural areas – which predates the establishment of both Northern Ireland Water and its predecessor Water Service – was designed to service only a handful of properties. In many cases the treatment facilities consist of open concrete tanks dating back to the 1960s which over the years have become increasingly ineffective; struggling to cope with the demands of rural population growth and rising discharge standards.

### The project

The £10m Rural Wastewater Investment Programme represents a package of work being undertaken by Northern Ireland Water to refurbish wastewater treatment facilities in hamlets and villages across Northern Ireland where the population falls below 250 people.

The aim of the scheme is simple – to upgrade as many of the old works as possible to meet standards set by the Northern Ireland Environment Agency (NIEA) within the £5m-a-year budget.

The Rural Wastewater Investment Programme will offer long-term benefits for local communities. Not only is each area being serviced by the most up-to-date treatment solutions available, but the sites – many of which have become dilapidated over the years – are being totally refurbished and will no longer resemble the eye sores of the past.

This major investment is also delivering significant environmental improvements within the locality of each works. The sophisticated processes installed are ensuring stringent NIEA discharge standards are met, leaving adjacent watercourses free from wastewater pollution and the air clean of foul odours.



A small, 10 PE unit, which was installed in the side garden of a householder's property

Courtesy of Northern Ireland Water

### The approach

The NEC Option B project is being undertaken by a consortium of Northern Ireland-based companies who have the extensive design, civil engineering, M&E and process expertise along with invaluable local supply links and geographical knowledge required to successfully execute the scheme.

A team of four civils subcontractors work under the main joint venture contractors, Williams Industrial Services and BSG Civil Engineering to cover the whole of Northern Ireland. These key elements of the supply chain bring with them even further local knowledge and enabled the main JV contractors to hit the ground running with construction in November 2008, only four months after award of contract.

### Design

In a bid to get the project moving as quickly as possible and more importantly, maintain significant momentum, NI Water and its Consultants, Belfast-based McAdam Design, stipulated a standardised design for all the wastewater treatment solutions. With support from wastewater treatment specialist KEE, the JV put forward a Rotating Biological Contactor (RBC) solution, with units differing only in terms of size to suit the varying populations. All of the new RBCs are designed to allow for a minimum of 10% residential growth in each area.

In a bid to determine realistic standards required for such a variety of small works (5 – 250 PE), the NI Water project team meet regularly with the NIEA to discuss the programme of work and examine the



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watercourses affected by each scheme. This proactive approach ensures that the design solution for each new works is optimised to obtain the consent standards stipulated by the regulator.

## Challenges

The project is not without its challenges: logistically the WwTWs span an area of over 13,500 sq km and operationally, the small footprint works must remain fully functional whilst the new equipment is being installed. The latter is by no means an easy task as in many cases the land surrounding the NI Water-owned infrastructure is insufficient in size to accommodate the new RBC and supporting electrical equipment. To compound the situation, at many sites new 3-phase power supplies are required to operate the RBCs, which have the potential to delay commissioning.

## Project management

Over 100 sites were initially identified as needing urgent refurbishment work and although each of the sites is relatively small, there is still a tremendous amount of planning, co-ordination and communication required to undertake the job in the most efficient way possible.

In terms of getting projects to site quickly and fulfilling budget spend for Year 1, the RWwIP team devised a special 'traffic-light' system to identify which of the 100 WwTWs posed the least complications. This involved gathering information on NIEA consent standards, land ownership details, population figures, existing power supplies, access issues etc and determining the most appropriate treatment solution for each site. Once the relevant data is analysed, any 'good-to-go' sites are labelled green and passed to the JV to allow them to begin site investigation work. Sites with only minor issues are coloured amber and those with more serious problems are marked red. The team meet every two weeks to discuss progress, address any problems and re-evaluate issues so that amber sites are constantly turning green - ensuring fluidity of work for contractor and guaranteeing contract spend for NI Water.

Project management is enhanced by the use of a dedicated project Sharepoint site – a centrally-located information network to which each member of the team has remote access. This acts as an integral information and communications tool onto which every team member uploads relevant data i.e. land ownership maps; design layouts; progress reports; approved drawings; construction programme, electricity connection details; commissioning data, health & safety audits etc. Tasks are recorded after each bi-weekly meeting and are completed/reviewed in the two weeks following.

## Land liaison

A crucial part of ensuring that the RWwIP runs to programme is communicating effectively with the many landowners affected by the scheme. In this respect a dedicated project communications manager has been appointed to the scheme. Equipped with detailed site layout maps, the communications manager meets with landowners well in advance of any works taking place to discuss what will be involved and to talk through any problems or concerns they may have.

To minimise land purchases – which are expensive and time consuming – the team design the new RBCs to fit within the existing NI Water land ownership where possible. If this isn't feasible, a land swap will be pursued with the owner, leaving buying land as the last route taken. On some of the schemes completed to date, buying



*Some of the RWwIP project team with local councillors at the new RBC works at Ballymaguigan WwTW* Courtesy of Northern Ireland Water

additional land was unfortunately necessary. However, early and sustained communications with landowners has meant that an agreement for early entry for construction to take place (prior to any legal issues being finalised) has been achieved. This has allowed the project to maintain its momentum and most importantly has kept the supply chain working effectively.

Letter drops with specific project leaflets are circulated within the vicinity of each new site to ensure that all residents within the village are aware of when and why the work is taking place.

## Greener solutions

At some of the remoter sites, and as an alternative to the RBC solution, NI Water and its project team, working with Rural Generation Ltd, are pursuing the use of willow plantations as competent treatment processes. Three sites are currently being investigated with landowner negotiations at an advanced stage. Although much more lengthy to implement, the willow plantations act as very effective and robust bio-filters, converting the useful nutrients in the wastewater effluent into wood which is then harvested for fuel.

Controlled irrigation of the effluent onto this non-food crop has the advantage of fertilising the crop to increase fuel yields for the farmer. There is no outflow to surface or groundwater from the system, making it an ideal way to completely recycle effluents in a sustainable and secure manner.

## Achievements

With so many factors and unknowns about each particular site to be considered, the Rural Wastewater Investment Programme had the potential to encounter problems from the outset. However by investing in effective team development and communications strategies and bringing on board all stakeholders throughout the process, NI Water has been able to execute this project in a robust and efficient manner.

In the first year alone, NI Water's Engineering Procurement division have not only designed, tendered and awarded this scheme, but they have also ensured the commissioning of over 25 projects province wide to meet the required consent standards.

**Note: The Editor & Publisher thank Keith Taggart, Project Manager with Northern Ireland Water, for preparing the above article. ■**

## Partnering with KEE leads to a successful upgrade solution in Northern Ireland.

During the latter part of 2008 KEE Process Limited (KEE), Williams Industrial Services Limited and BSG Civil Engineering Limited successfully secured a contract with Northern Ireland Water (NIW) to upgrade their Minor Wastewater Treatment Works.

NIW had identified a large number of existing wastewater treatment sites throughout Northern Ireland that were in need of upgrading to ensure future population growth and that future tighter discharge consent standards would be accommodated.

The KEE team produced a cost-effective design covering sites with a population equivalent range from 20pe to 300pe. KEE designed a process plant solution to meet the NIW specification requirements that involved a combination of Rotating Biological Contactors (RBC's) from its large portfolio of RBC products.

With the project up and running, NIW's requirement was for delivery and installation of a number of sites simultaneously. This required a rapid and controlled 'ramping up' of the RBC production rate within the KEE production facility at Aston Clinton, Buckinghamshire. Two production cells were tasked

with producing the RBC product variants that were selected for the project and maintained a rate that has resulted in all RBC units being delivered on or ahead of time.

KEE despatched a team of Site Engineers to work continuously in Northern Ireland. As each RBC unit was then fully installed and the electrical supply was made available on-site, the KEE Site Engineers then commissioned the units

To date, 36 KEE RBC units have been delivered into Northern Ireland for the Minor Wastewater Treatment Works upgrade project. From the initial effluent sample results taken at the operational sites, all are more than meeting the specification requirements. On successful completion of an effluent sampling regime each site is then handed over to NIW. At this stage, KEE have been further tasked with performing the Servicing and Maintenance on the RBC units, effectively completing the 'circle' on the whole project cycle.

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