

# St Judes Way (Rainworth) Flooding Alleviation

sewer enlargement in the centre of Rainworth to alleviate foul and surface water sewer flooding of private properties

by David Hutchinson

The hydraulic incapacity of the foul and surface water sewers around St Judes Way, Rainworth, Mansfield, resulted in the frequent flooding of homes, gardens and highways during periods of heavy rainfall. In June 2014, Severn Trent Water (STW) commenced a £0.95m project to remove 13 properties from the STW FLOODS register and reduce highway flooding in the St Judes Way area of the village. The project team was committed to achieving a long term solution whilst minimising the impact on the local community.



Open cut works through the main junction in the centre of Rainworth village - Courtesy of NMCNomenca

## Planning the works

A number of solutions were considered to resolve the flooding issues. Excess foul water could not be passed downstream and so is now stored in a large diameter pipe close to the flooding properties using a HydroSlide flow control device. The storage was designed to allow it to be located within a grass verge area off St Judes Way, preventing the need to close the cul-de-sac and improving the safety for operatives maintaining the storage in future.

Surface water ultimately discharges to a watercourse in the centre of Rainworth, and it was determined that the best long term solution would be to pass the excess surface water downstream rather than restricting the flow and using storage due to the volume required. This would provide the least embodied carbon, least maintenance solution; however, it required the construction of almost 1km of new sewer pipe in one of the main roads out of the village.

Discussions were held between STW, NMCNomenca and Nottinghamshire County Council Highways early in the planning phase of the scheme, and were carried through until commencement on site, to allow the works to be undertaken with the minimal possible disruption.

## Minimising disruption

The location of the required new sewers in Southwell Road, a main road running through Rainworth between Mansfield and Newark, meant that the traffic disruption associated with the scheme was potentially very significant. The most critical section was where the work crossed two major junctions in the town centre. The programme of works was planned around completing this most disruptive section in the 6-week school summer holidays in order to keep the amount of traffic affected to a minimum.

The staggered junctions in the centre posed an interesting challenge for managing the traffic during the works, with no suitable diversion being available for the Warsop Lane junction, coupled with the fact that this junction had the most congested services.

These services meant that open cut construction would be very slow and would need to cross immediately across the face of the junction. In order to achieve this four way signals would have been required with long travel times, which was predicted to result in considerable traffic queues even in school holidays and was therefore rejected.



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The decision was taken to employ a trenchless construction technique below the Warsop Lane junction to allow it to remain fully open during the works. This would be done with Kirklington Road closed, which has a convenient diversion via the ring road and good links to nearby housing estates, allowing Southwell Road to be put on two way lights which would keep traffic flowing through the village more easily.

The drilling was further complicated by the fact that two pits could not be opened simultaneously whilst still keeping traffic flowing. Because of this restriction, and with the ground conditions on site being dense sands, the use of pipe jacking was selected over guided auger boring.

A 70m continuous run of 1,200mm diameter concrete jacking pipes was installed from one side of the Warsop Lane junction to the other by sub-contractor Active Tunnelling Ltd. The work had to be carried out from a small working area in one lane of Southwell Road leading to cramped working conditions to allow a lane of traffic to pass under lights. The tunnel was launched from the drive pit and upon reaching the desired length the drive equipment was removed, and the drive pit fully reinstated including new manhole chamber.

Once the traffic management was clear of the drive pit, the next phase could begin with the closure of Southwell Road to allow the reception pit to be dug and the TBM machine retrieved. Despite the challenging sequence and working conditions the programme of work for this section of work was completed on schedule, just a few days longer than the school holidays.

#### Customer communications

Customer care has been essential to keep the community and businesses informed about the planned work. Prior to the start of construction a letter drop was done to a large area of Rainworth, and a public exhibition held at Rainworth Village Hall providing essential information to concerned residents, advising where and when works are taking place. The exhibition was a very popular event with over 70 individuals or households attending throughout the afternoon.

It provided an invaluable opportunity for the public to meet the design and site team, to ask questions and to raise any concerns about the works. It not only allowed the team to take a number of actions away to improve the experience of the local residents during the work, but also brought other network issues to light that could be passed on to Seven Trent's operational department.

#### Sharing the load

Nottinghamshire County Council carried out work in Rainworth in late 2013 to improve the highway drain capacity in Kirklington Road. Part of this work involved the replacement of the existing highway drain outfall into Rainworth Water, at a similar location to the new outfall required for the proposed second surface water sewer in Southwell Road.

Discussions were held between STW, NMCNomenca and Nottinghamshire County Council and a collaborative approach was agreed to minimise both the visual impact at the watercourse and the duration of the respective construction works on site. This allowed a single outfall structure to be constructed to serve both the upsized highway drain system and the new STW surface water sewer, instead of two separate structures. The headwall was constructed by Nottinghamshire County Council during their work, with handrailing, access gates and bank protection works being completed later by NMCNomenca.

*The editor and publishers would like to thank David Hutchinson, Design Lead with NMCNomenca, for providing the above article for publication.*



*Extensive liaison with Nottinghamshire County Council highways aimed to minimise disruption to traffic - Courtesy of NMCNomenca*



*The use of pipe jacking beneath the Warsop Lane junction kept this major link to Blidworth open - Courtesy of NMCNomenca*



*Only one outfall was required following collaboration between Severn Trent and Nottinghamshire Council - Courtesy of NMCNomenca*