Crescent Link Trunk Main

installation of new 450mm trunk main to provide an effective and sustainable supply to a population of 17,500 (and increasing) across Derry City

by Gary McFadden, Gary Farrell, Odhran O'Boyle & Mark Devlin

NI Water

Located south/south-east of the River Foyle in Derry, Co. Londonderry, a new trunk main was installed from Tamnymore Service Reservoir (SR) along the Strabane Old Road, Trench Road, Irish Street, Bann Drive, Dennet Gardens and Dungiven Road. During periods of high water usage, the existing Crescent Link Trunk Main failed to meet demand, causing low pressure and loss of supply in certain areas of the local network. NI Water is committed to improving the resilience of the water supply infrastructure across Northern Ireland and as part of their IF105 Integrated Partnerships Framework, identified the need to carry out works to replace 3.3km of the existing 10" diameter spun iron trunk main in the Waterside area of Derry/Londonderry to provide an effective and sustainable water supply to a growing population.

Installation of 450mm pipe in Dennet Gardens - Courtesy of Farrans

Backfilling on Strabane Old Road - Courtesy of Farrans

Project scope

The project included the following scope:

- 3km of new 450mm HPPE (SDR17) trunk main from Tamnymore Service Reservoir to Dungiven Road, Derry.
- 0.3km of new 280mm HPPE (SDR17) trunk main on Trench Road.
- 70m of new 125mm HPPE (SDR17) distribution main on Trench Road.
- Installation of new a 250mm electromagnetic flow meter at Tamnymore Service Reservoir.
- Installation of a new 250mm electromagnetic flow meter, PRV and strainer at Sheskin Gardens.
- Abandoning existing 10" spun iron main from Corrody North BPT to Altnaglevin roundabout.

Early Contractor Involvement (ECI), detailed design & engineering challenges

Farrans/Glanua Joint Venture was engaged in early 2021 under an NEC4 Option 'E' contract to carry out site investigation works to enable detailed design. This provided the opportunity to liaise with the necessary specialist contractors and gain their experience, knowledge and input into developing detailed design and construction methodologies.

Construction

The proposed route for the new trunk main was along the Strabane Old Road; a dense urban area often used as an alternative route to the existing A5, for commuters coming in and out of the city. Traffic surveys recently completed identified that 7000 vehicles per day (VPD) were using the road.

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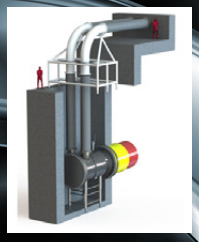

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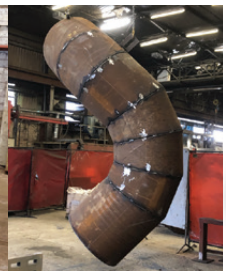
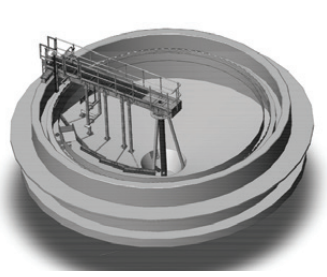

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Meter strainer and PRV construction - Courtesy of Farrans

PE pipe butt welding adjacent to Dungiven Road - Courtesy of Farrans


Planer in operation in Dennet Gardens - Courtesy of Farrans

Planer in operation in Dennet Gardens - Courtesy of Farrans

As a result, early engagement and liaison between DFI Roads, Translink, Farrans Construction and the Traffic Management Contractor were required. A collaborative approach among all stakeholders ensured effective traffic management measures were implemented to protect the safety of road users directly affected by the works and those passing by, minimising disruption as best as possible while the works progressed.

The works were carried out under local road closures and lane closures. Due to the size of the pipe, existing services and rock, all the pipe was installed via open-cut methodology.

A 1m wide asphalt planer was utilised to remove the asphalt layer in the pipe track. This greatly saved time in comparison to the traditional method of an excavator and breaker.

Due to a limited working area, 12m lengths of 450mm diameter PE pipe were delivered from compound to the works area as required via a Hiab. The pipe was then butt-welded and pulled into the trench using rollers and pipe trolleys.

Crescent Link Trunk Main was chosen to trial Control Point's Bluebox Quality Assurance System (Joint Assist). Joint Assist is a mobile application that records and uploads data for electrofusion joint assemblies, enabling real-time inspection, compliance and comprehensive asset management. In addition to Farrans' own quality procedures, Control Point's Bluebox provided NI Water with third party quality assurance.

Crescent Link Trunk Main: Supply chain - key participants

The construction contract was awarded under NEC4 Option 'C' Target Cost Contract to Farrans/Glanua JV. Construction began in May 2022 and took place over a 12-month period at a total cost of £2.5m.

- **Delivery contractor**: Farrans/Glanua JV
- **Design/project management**: WSP UK Ltd
- **Civil design**: Jacobs Design
- **Main contractor (Civils)**: Farrans Construction
- **M&E works**: Ensica Ltd
- **Traffic Management**: McVeigh Contracts Ltd
- **Surveyors**: Geodynamics
- **HDPE pipe & fittings**: APP Fusion Group
- **Quarry products & reinstatement**:
  - Northstone Materials Ltd
  - MP Coleman
  - P Woods & Son Ltd

Dungiven Road Crossing

The Dungiven Road is categorised as type 1 road with recent traffic surveys recording approximately 1500 VPD using the road. As a result, the works were carried out at night (7pm to 6am) to minimise disruption.

Lengths of 600mm twin wall pipe were installed in the road via open-cut methodology and completed in sections. This allowed time for the road to be backfilled, temporarily reinstated at the end of each shift and opened in time for the morning traffic.

Once all the twin wall pipe was installed, a 450mm string of pipe was welded and successfully sliplined through the twin wall pipe with only one joint/bend required. Once all works were completed in the road, a planer was used to remove the temporary asphalt and allow the permanent reinstatement to be completed.

Following testing (Type 2 pressure test), commissioning works were undertaken in preparation for connections to the existing network.

Seven new connections were made to the existing network which allowed for the existing 10" spun iron main to be abandoned.

Utilising existing kiosk and telemetry units, new electromagnetic flow meters and pressure transducers were fitted as part of a new PRV, meter and strainer arrangements at Tamnymore SR and Dennett Gardens to allow NI Operations to monitor flows and pressures over the telemetry network.

Public relations & social engagement

Farrans' PR manager, Sarah Heffernan, worked closely with NI Water Comms to implement a proactive engagement strategy to ensure all key stakeholders were informed of the work in a timely manner. Letter drops took place in advance of each section of pipelaying to advise the residents and businesses of the planned works and variable message boards were erected along the route. Business-specific signage was installed around each works area and press releases issued to inform the wider public. Communication with other stakeholders, including elected representatives, landowners, roads and transport authorities was maintained throughout the scheme.

NI Water's 24-hour dedicated customer care 'Waterline' number, was issued on all correspondence to the public and displayed on all signage which ensured that any queries about the work were dealt with quickly and effectively.

To minimise the impact to the public while working on the Dungiven Road, works were carried out at night with increased working hours in order to complete the pipelaying in the shortest possible timescale. Additionally, roads were temporarily reopened around holiday periods to minimise disruption.

Whilst working through the most congested and built-up area of the project (Strabane Old Road), Farrans' in-house Stakeholder and Social Value Team along with NI Water engaged with the local primary school. The site team visited the school delivering a site safety talk, ensuring the pupils understood the dangers that construction sites can bring and how to stay safe around the works.

Following this, the site team facilitated two site visits where the pupils were brought onto the live construction site to see works and the watermain being laid. They were given a presentation by the site engineer covering a variety of topics on all things engineering, the water cycle, how water gets from source to tap and why works were being carried out in their area. There was great engagement from the pupils during the visits and pupils went back to their classroom with an engineering superhero colouring competition to help remember everything they had learnt on their site visit.

Seeing first-hand the construction works and learning why the work needed to be undertaken hopefully helped the pupils to think further about STEM subjects and the different career options available to them in the future.

Project summary

Testing and commissioning of the new 450mm trunk main began in March 2023, with the final connection to the network completed in April 2024. The new Crescent Link Trunk Main will provide a sustainable supply in of wholesome drinking water to the Waterside area in Derry/Londonderry, bolstering Northern Ireland Water's existing infrastructure and reinforcing supply to approximately 17,500 customers.

The editor and publishers would like to thank Gary McFadden, Senior Project Manager with NI Water, Gary Farrell, Project Manager with WSP UK Ltd, Odhran O'Boyle, Contracts Manager, and Mark Devlin, Site Agent, both with Farrans Glanua JV for providing the above article for publication.

(left to right) (i) Pipe trench excavated around services (ii) placement of pipe bedding (iii) plpe bedding and marker tape and (iv) 450mm PE pipe installation
Courtesy of Farrans