



### Humber Pipeline



#### PROJECT SUMMARY

PROJECT NAME: Humber Gas Pipeline Replacement Project

PROJECT DATE: May 2019

CLIENT: National Grid

CONTRACTOR : PORR, A.Hak & Skanska

INSTRUMENTATION SPECIALIST: Skanska

Picture, left, shows the first people walking through the completed tunnel. (Image: National Grid)



#### OVERVIEW

Over time, the tidal patterns of the River Humber have eroded the riverbed that covers an existing gas pipeline. This pipeline is an important part of the national network delivering gas supplies to millions of customers throughout the UK.

A joint venture between PORR, A.Hak & Skanska was awarded a National Grid contract to design and build a replacement, high-pressure gas pipeline housed within a tunnel underneath the River Humber.

Work commenced in 2017 for completion in 2019 between Goxhill in North Lincolnshire and Paull in the East Riding of Yorkshire. Once complete, it will be the world's longest gas pipeline in a tunnel inserted in a single string.

A section of the TBM tunnel passes under an existing pipeline which required monitoring to ensure the construction work was not affecting the asset.

#### MONITORING

Three sets of surface mount strain gauges were installed on the existing pipeline in three locations. Due to the nature of the project all gauges had to be bonded to the pipeline before protective coatings were applied to ensure long-term anti-corrosion properties were maintained.

Data was collected by the WI-SOS 480 Wireless Sensor Observation System with multi-channel vibrating wire nodes fitted above the sensor locations and a Gateway installed within the site office complex.

The Gateway uploads all data from the VW strain gauges via GPRS to the Geoaxium web portal which can be accessed via the Internet. Skanska engineers monitored the data and set alarm thresholds during tunnelling operations.

The Wi-SOS 480 is a star network based on 800MHz low frequency which has the capability to read nodes over distances up to 10km. Wireless monitoring was perfect for the project due to heavy machinery activity and public highways limiting cable installations at site.

#### PRODUCTS USED

**Surface Mount Strain Gauge VWS-2000, bonded, 150mm**  
To measure strain within the pipeline.

**Wi-SOS 480 vibrating wire nodes 5 channels**  
To log and transmit data.

**VWR1 Vibrating wire readout**  
To set gauges during installation.

**Wi-SOS 480 Gateway**  
Provides remote access and to forward data .

**GeoAxiom Vista**  
Software to visualise data and provide alarms to engineers by text and email.