



Key achievements

- Long-term automated and manual monitoring scheme in remote location under harsh site conditions
- Effective installation despite complex ground conditions and mobilisation

The Project

A new wind farm being constructed on Shetland consisting of 103 wind turbines, producing enough power for 475,000 homes. Excess power not needed by local infrastructure can be supplied to the mainland via a new high-voltage cable being laid to connect Shetland to the UK power grid.

The Challenge

In order to provide access to the wind farm during and after construction a new dual carriageway was needed. Due to the ground conditions on the site, it was necessary to measure ground movement and pore pressure in the peat during the construction of the road.

Mobilising engineers and equipment to site on the remote island was a difficult task. Site conditions were also challenging with bitter cold, heavy winds, snowfall and short daylight hours to install the instrumentation in less than a week.

The Solution

A system of 10 Vibrating Wire Piezometers and 24 settlement plates was designed for installation along the course of the dual carriageway. The data from the piezometers is collected automatically and sent via wireless nodes to a shared gateway where it is sent and uploaded to the QuickView monitoring platform. The instrumentation and data collection ran autonomously for 3 years using solar power with a back-up battery. The gateway could be remotely accessed to change data frequency and track battery voltages. Settlement plate measurements were taken manually by site operatives.

Strong cooperation with the main contractor helped overcome many of the issues related to adverse weather and site-conditions. Detailed planning of logistics and works meant the instrumentation could be installed and tested within one week despite strict time constraints and the remoteness of the site.

Application

Geotechnical Monitoring

Technique

Automated Monitoring

Market

Infrastructure

Project Duration

3 Years

Instrumentation

Piezometers
Settlement Plates

Keller companies

GEO-Instruments

