

Secugrid®, Combigrid® - Haul Road & Compounds for Onshore Wind Farm - UK

Base course reinforcement

- **Project name**
Benbrack Wind Farm Access Track, Castle Douglas, UK
- **Client**
Red Rock Power Ltd, UK
- **Designer/Consultant**
Tony Gee Engineering, UK
- **Contractor/Installer**
Jones Bros Civil Engineering UK
- **Product**
Secugrid® 30/30 Q1
Combigrid® 40/40 Q1 GRK 4 C





70,000 homes, 15 wind turbines and Naue

A new 15-turbine onshore wind farm is under construction in Dumfries and Galloway, Scotland. Located between Dalmellington and Carsphairn, it's estimated that the 67MW Benbrack Wind Farm will provide sufficient electricity to power 70,000 homes when full commercial operation is achieved in the summer of 2024.

Civil engineering work for the project, including the development of a temporary construction compound, substation compound and access tracks to each turbine site was contracted to Jones Bros Civil Engineering UK.

In addition, Jones Bros were tasked with the construction of an unpaved haul road, from the site access point off the A713, just south of Eriff, across rough grassland which is underlain with widespread areas of peat. The haul road construction needed to be robust and resilient to withstand heavy plant movements during pre-construction, as well as enabling delivery of the 15 wind turbines.

The wind farm layout and construction methodology have been designed to minimise the disturbance of deep peat areas, but some peat excavation was required during construction of the haul road and hardstanding areas. However, failure to protect peat during construction can lead to peat erosion and degradation, as well as the possibility of peatslides; with the potential for consequent environmental impacts both on-site and off-site.

Although peat depth surveys had indicated that the peat underlying the planned haul road route is generally less than 1.5m in thickness, it was agreed that floating road construction should be employed wherever peat soils greater than 1.0m in depth are encountered. Furthermore, in areas where excavation is unavoidable, effective peat storage must be implemented, and vegetation restoration will be required post-construction.

10 km of haul road and access tracks - "Floating use" of Naue geogrids

Neil Ralston, Naue's sales manager in Scotland, commented: "As one of the UK's leading civil engineering contractors, with a wealth of experience in the renewables sector and past experience of using our geosynthetic products, Jones Bros were confident that the strengths and benefits of Naue's Combigridd® and Secugrid® products would make them ideal for the task at Benbrack." In total, Jones Bros will be constructing around 10 km of haul road and access tracks; with approximately 20% of the route expected to require floating road construction using Naue's stabilisation and reinforcement products.

Naue has references from countless similar projects around the world, and the engineering design department at Naue GmbH & Co. KG provided Jonathan Maitland, Jones Bros' project manager at Benbrack, with a preliminary design for a reinforced base course to increase the bearing capacity of the existing soft subgrade. The design calculations were based on the precept that the haul road would need to be robust enough to accommodate a minimum of 100,000 axle passes, at 18 tonnes per axle. With layers of Naue Combigridd® and Secugrid® installed to stabilise and reinforce a well-graded 0/75mm granular fill material, typical CBR values will be increased from 0.5% to 20%.

At Benbrack, Naue are supplying a combined total of 12.5 kilometres of Naue Secugrid® 30/30 Q1 and Combigridd® 40/40 Q1 GRK 4 C, on 4.75m wide rolls. Where floating road construction is required, the geogrids are being installed as a double-layered system to give an overall reinforced construction depth of 880mm; with Combigridd® being laid direct to the subgrade, and a Secugrid® layer sandwiched midway between 2 layers of aggregate.

For construction of the 5,000m² temporary site compound and 9,000m² substation compound, the separation and reinforcement properties of Naue Combigridd® 40/40 Q1 GRK 4 C are being employed beneath a 500mm layer of aggregate. In addition, on undisturbed land adjacent to the temporary compound, excavated material is being laid onto a layer of Combigridd® until it's needed for reinstatement of the compound area once construction of the wind farm is completed.

Naue manufactures a wide range of uniaxial and biaxial Naue Secugrid® products from stretched, monolithic polyester or polypropylene, flat or profiled bars, with welded junctions. Secugrid® geogrids are robust and exhibit high stiffness and low creep; the ideal solution for applications requiring high tensile strength over extended periods.

Naue Combigridd® comprises a laid geogrid, made of stretched, monolithic flat bars with welded junctions, plus a mechanically-bonded and calendared filter geotextile which is welded within the geogrid structure. Combigridd® is used between soft subgrade and sub-base course layers to improve bearing capacity, and to prevent migration of material from one layer to the other.

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