

Case Study

Tenax HM4, StrataGrid SGI 120, Landlok 450, Duodrain GMG412

Elan Valley Aqueduct Rehabilitation Programme

Reinforced Soil Wall & Working Platform

Bleddfa Powys



Location:

Pen-Y-Bryn
Bleddfa
LD7 1PA



Client:

Severn Trent Water

SEVERN
TRENT
WATER

Contractor:

BNM Alliance

Consultant / Engineer:

GHD Livigunn

Merchant:

Burdens

Geosynthetics Limited
Fleming Road
Harrowbrook Industrial Estate
Hinckley
LE10 3DU

T: 01455 617 139
sales@geosyn.co.uk
www.geosyn.co.uk

The Elan Valley Aqueduct (EVA) Rehabilitation Programme was established to facilitate the off line replacement of the existing aqueduct in three separate locations.

The replacements were deemed necessary to ensure the ongoing lifespan of the EVA, which has carried water supply from Mid Wales to Birmingham and the surrounding area for over 100 years.

The nature of the upgrade was to install a replacement tunnel using a 150 tonnes Tunnel Boring Machine (TBM). The new conduit in Bleddfa is 1.8km long and 3.0m in diameter. Geosynthetics were approached to assist with the design of a reinforced soil wall to host a working platform required to support the heavy construction traffic and a 1000 tonne crane which would be used to extract the TBM from the shaft.



Due to the location of the EVA the reinforced soil wall needed to be built into the side of the hillside. To minimise the footprint of the structure and reduce the amount of fill material required the structure was designed to stand at a slope angle of 85 degrees. Site won soils were tested and it was determined that the properties were suitable for use within a reinforced soil structure, following a specific and strict testing regime during the installation. The topography and requirements of the site dictated that the structure would stand at a maximum height of 14 metres and be 160 metres in length. The final proposal consisted of 43 layers of primary reinforcement with Stratagrid SGI120 and SGI60 wrap-around in the face including Landlok TRM450 and a heavy Rivel mesh to achieve 85deg. The design of the reinforced soil wall was done in accordance with BS8006:2010 and Eurocode 7 (BS EN 1997-1).





One of the main objectives was to achieve a cut-and-fill balance and the reinforced soil solution ensured the structure could be built using on-site won soils thus avoiding the importation of granular material. The structure was designed to accommodate the Rivel facing system which ensures a consistent slope angle and quick installation. The structure was completed in an 8 week period despite being subject to some particularly inclement weather conditions. Throughout the construction phase Geosynthetics were available for on site support to ensure the suitability of fill materials were within tolerance.



“The reinforced earth solution enabled the project to make savings by utilising site won soils and provide a working platform for our tunnelling operations inline with the programme. This would not have been possible without the assistance from Geosynthetics Limited.”

Chris O’Conner - Site Agent



**INVESTORS
IN PEOPLE**

Bronze

CERTIFICATE NO. 11161 ISO 9001:2008

CERTIFICATE NO. 11161 ISO 14001:2004