



Drainage to the rear of a retaining wall



Client: Carluke Station Park & Ride
Project: Station access ramp, Carluke
Contractor: George Leslie Ltd
Product(s): TERRAM™ Drainage Geocomposite 1BZ

As part of their plans to improve transportation links in the region, South Lanarkshire Council, in collaboration with Strathclyde Partnership for Transport, funded the development of a £2million Park & Ride facility at Carluke Station, providing South Lanarkshire commuters with an additional 329 spaces, including parking for disabled.

The 0.8 hectare Park & Ride facility is situated on the west side of Carluke Station and due to the elevated position of the station in relation to the park & ride area, it was necessary to build appropriate pedestrian links, including a DDA compliant pedestrian access ramp. A key element of the design was the provision of an engineered drainage system behind the retaining walls.

Inadequate drainage can result in a build up of groundwater behind a retaining wall and this 'trapped' water exerts hydrostatic pressure which can affect the structural integrity of the wall. Following thorough investigation into various drainage methods, civil engineers from South Lanarkshire Council's Roads and Transportation Services determined that a geocomposite fin drain would be the most effective solution.

These are formed by bonding geotextile filters and impermeable membranes to the sides of a drainage net. The geotextiles filter pore water and prevent the ingress of fine soil particles which could block the core. The membranes are used to prevent the passage of water and gases.

These composite drains are frequently used to replace traditional granular layers as they are much easier to install, particularly on vertical faces, have a proven record of performance, and avoid the need to use primary aggregates.

For Carluke's Park & Ride facility, South Lanarkshire Council specified TERRAM 1BZ which has a geotextile filter bonded to one side of a geonet core and an membrane bonded to the other side - a cut-off drain.

Commenting on the project, Gordon MacKay, Head of South Lanarkshire Council's Roads and Transportation Services said:

"We needed to ensure that the drainage system would be sustainable, providing the retaining walls with maximum protection from hydrostatic pressure throughout the life of the access ramp. The ease and speed of construction of TERRAM's 1BZ geocomposite over conventional drainage materials made it the most practical solution for this particular project".

At Carluke, TERRAM 1BZ was fixed to the access ramp's retaining structure prior to the introduction of the backfill material. The TERRAM 1BZ was positioned so that it would act as a vertical channel, directing excess groundwater into a perforated drainage pipe at the base of the walls which would be carried to the nearest main drainage system.



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The impermeable LDPE component of the 1BZ drainage composite waterproofs the wall whilst the high flow rate and filtration provided by the geotextile filter and the polymer core ensures that the water drains away rapidly, maintaining soil stability and alleviating hydrostatic pressure.

Civil engineering contractor, George Leslie Ltd was appointed by South Lanarkshire Council to construct the access ramp and associated retaining walls, connecting the park & ride facility to the station.



"The flexibility and easy handling of the TERRAM 1BZ drainage composite made installation very simple and problem free", said Scott Rowan, George Leslie's Site Agent for the Carluke construction project.



TERRAM drainage composites are designed for a wide range of applications where drainage is required:

- Roads
- Landscaping and roof gardens
- Retaining walls
- Buried Structures
- Tunnels