



# Tensar®

**FOUNDATIONS**

The new link road crosses very weak lake deposits on an embankment supported by a TensarTech® Stratum™ cellular foundation mattress system.

## Joined up thinking

Tensar worked with the entire project team to develop an alternative solution for building a link road embankment over very weak ground in Glasgow.

### CLIENT'S CHALLENGE

A new road linking Robroyston railway station with the M80 and a major residential scheme had to cross very weak ground, including large peat pockets, and a solution was needed to reduce differential settlement of the embankment. Piling would have been prohibitively expensive and deep soil mixing time-consuming and complex, with the risk of contaminating nearby watercourses and groundwater.

### TENSAR SOLUTION

Tensar provided an alternative, indemnified design for the 580m long embankment, using its TensarTech Stratum cellular foundation mattress system. The 1.3m thick mattress comprised a TriAx geogrid base with uniaxial geogrid walls, creating cells that were filled with compacted recycled demolition material (equivalent to Type 6F2).

This created a stiff raft foundation, improving stability, increasing bearing capacity and reducing differential settlement. It also acted as a drainage layer.

## Robroyston

Roads and platform  
Link road

📍 Robroyston, UK

### BENEFITS

**£0.5m**

saved compared with a deep soil mixing solution

**1,500m<sup>2</sup>**

of cellular mattress installed by hand, per week

**Reducing**

differential settlement of the embankment

REF TEN404



Up to 300m<sup>2</sup> of Stratum was installed by hand per day, regardless of the weather, with cells filled with compacted, recycled granular fill.

## PROJECT BACKGROUND

Glasgow City Council needed to build a road linking a new railway station with the M80 motorway and a 1,600 home development at Robroyston, Glasgow.

Ground conditions were challenging, with made ground overlying glacial clay containing frequent, large peat pockets. This meant an engineering solution was needed to reduce differential settlement of the road embankment. Soil mixing was originally chosen to treat the ground, after piling was deemed too expensive. However, Glasgow City Council wanted to explore using TensarTech Stratum cellular foundation mattress, having used it successfully on the M74 in the 1990s.

Contractor Luddon Construction asked Tensar to provide an indemnified design for the 580m long embankment. Tensar and geotechnical consultant Geofem designed the cellular mattress to BS8006-1:2010. Finite element analysis was used to predict differential settlement beneath the cellular mattress.

After Luddon Construction had levelled the route, Foster Contracting installed the 1.3m thick mattress, comprising a Tensar TriAx geogrid base and uniaxial geogrid cell walls. The cells were filled with compacted recycled demolition material (equivalent to Type 6F2), reducing the project's carbon footprint, and also acting as a drainage layer.

As Stratum could be built by hand directly on the ground, without pre-consolidation or treatment, construction was faster (and more economical) than piling or soil mixing. Up to 300m<sup>2</sup> of mattress was installed per day, regardless of the weather.

TensarTech Stratum was also more environmentally-friendly than deep soil mixing, as it removed the potential for contaminating local streams and the water table. Additionally, because recycled demolition material was used as fill and all of the geogrid was delivered in five lorry loads, vehicle movements were reduced.

The Stratum system increased bearing capacity and reduced the differential settlement of the embankment. Its success was verified by extensive site monitoring, which showed differential settlements were even less than predicted.

Main contractor:

**Luddon Construction**

Specialist installer:

**Foster Contracting**

Geotechnical consultant:

**Geofem**

Client:

**Glasgow City Council**

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*“Differential settlement will be minimised, significantly reducing road maintenance costs. It was important to maintain hydraulic connectivity through the embankment and Stratum is ideal for this purpose.”*

**Donald Linn**

Glasgow City Council  
Principal Geologist

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