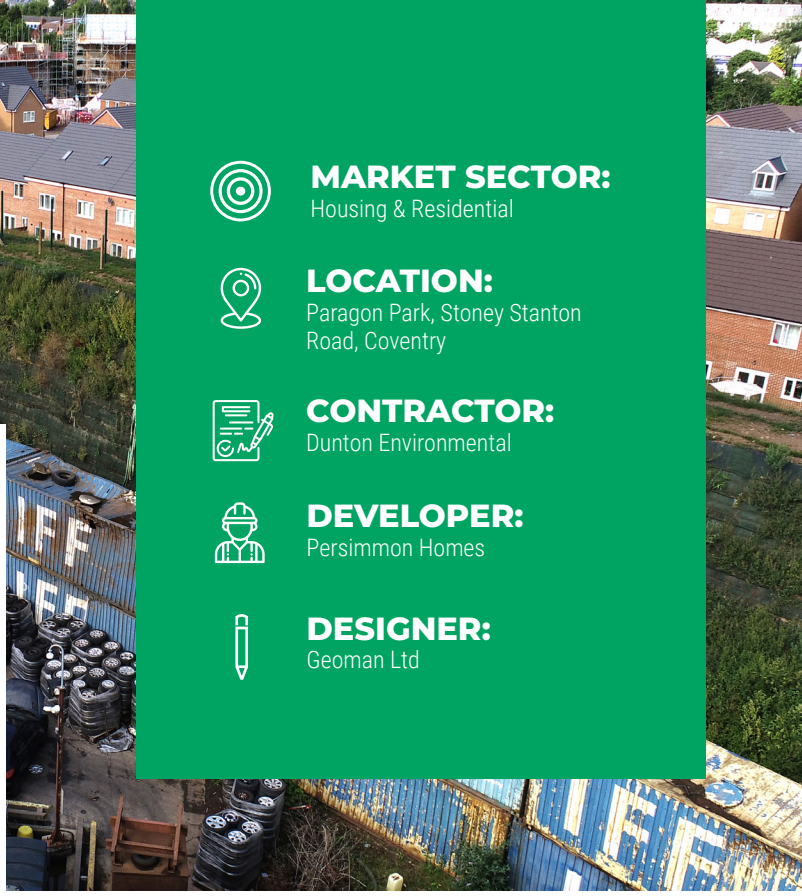
Case

STUDY

STRATAGRID, RIVEL MESH, LANDLOK 450 & EKOTEX
Paragon Park
Visual & Acoustic Bund



MARKET SECTOR:
Housing & Residential

LOCATION:
Paragon Park, Stoney Stanton Road, Coventry

CONTRACTOR:
Dunton Environmental

DEVELOPER:
Persimmon Homes

DESIGNER:
Geoman Ltd

The BACKGROUND

A planning condition to enable Persimmon Homes to develop the site of a former brickworks in Coventry, required the construction of a visual and acoustic bund to screen their new homes from an adjacent metal recycling plant.

Geosynthetics Ltd. were contacted by Ground Remediation and Waste Management specialist, Dunton Environmental, to discuss potential options for the 9.5m high, 450m long bund.

Our Client's REQUIREMENTS

A sustainable solution for an acoustic bund utilising contaminated fill.

Fundamentally important to achieving the sustainability credentials and the commercial viability was that the bund had to be constructed from approximately 80,000m³ of fill imported under licence by Dunton Environmental.

The hydro-carbon and heavy metal contaminated fill, imported from multiple sites, would be, treated and graded on site prior to its re-use in the earth bund.

10,990
LORRY LOADS SAVED VERSUS AN UNREINFORCED SOLUTION

61%
REDUCTION IN LAND REQUIRED VERSUS AN UNREINFORCED SOLUTION

4,527 T (58%)
REDUCTION OF CO^2E VERSUS A TRADITIONAL UNREINFORCED SOLUTION

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Our Value Engineered

SOLUTION

Dunton approached Geosynthetics Ltd, and together we evaluated that a 70-degree geogrid reinforced slope on the bunds external face towards an adjoining scrap metal merchant, and a 1v:2h slope on the internal face best fulfilled the schemes criteria.

Geosynthetics' Engineering Department analysed the bund's geometry, imposed loads and the imported fill's anticipated parameters to carry out stability analysis in accordance with BS8006:2010 and BSEN1997-1:2004 – Eurocode 7 to prepare a Technical Recommendation for the scheme.

Particle Size Distribution and Shear Box tests of the embankment fill were undertaken to finalise the design parameters for the bund, classifying the material as Class 2A/2C.

While the sustainability benefits of re-using a fill that would otherwise go to landfill are self-evident, a calculation of the total CO^2e emissions associated with the materials used for the bund was performed using the National highways carbon tool, taking into consideration the principles of PAS 2080:2016 to quantify, promote and deliver a low carbon solution for the project.

The analysis was done for the product and construction process stages and showed a reduction of 58% of CO^2e versus a conventional solution using a granular Class6I/6J material.

Dunton's biggest challenge was ensuring the material was geotechnically suitable for the geogrid reinforcement. This required the correct treatment process of screening/blending.

To monitor compaction of the imported fill during bund construction a testing regime comprising nuclear density and plate bearing tests was undertaken to ensure that a minimum CBR of 15%, a minimum 95% of standard proctor density, and a maximum moisture content of 10% had been achieved.

In turn, this enabled Geosynthetics to value-engineer the final solution using two different grades of uniaxial geogrid at vertical spacings of 300-600mm, with reinforcing tail lengths varying between 4.7m and 7.1m.

The face of the slope utilised Geosynthetics 'Rivel Mesh' system to ensure the required face geometry was achieved. Landlok 450, a permanent turf reinforcement mat, provided erosion control and promoted vegetation establishment.

Geosynthetics also provided advice on how a 2m high fence could be constructed on top of the 9.5m high bund.

Design Indemnity was provided to Dunton Environmental by specialist geotechnical consultant Geoman Limited who checked then adopted Geosynthetics Limited's calculations and agreed a testing regime to ensure and document that the required compaction of each layer of fill had been achieved.

"After considering several design options to build an acoustic bund 9.5m high, we chose Geosynthetics for their professionally detailed design, to suit the parameters of the site and the category of soil type available.

The procedure has involved Geosynthetics initially from design stage to sales, supply and technical support through the build.

Thanks to all their team, it has been a pleasure."

DEREK WILSON
Contracts Manager

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