

Timber Crib Retaining Wall

Oakwell House

CLIENT

South Yorkshire Pensions Trust

CONSULTANT

GeoGrow

Requirement

Oakwell House, a commercial property in Barnsley owned by South Yorkshire Pensions Trust, is bordered by a Permacrib timber crib retaining wall holding back a landscaped bank behind the car park. The wall is built from interlocking, preservative-treated timber headers and stretchers infilled with free-draining granular fill on a mass concrete foundation – a well-established gravity wall system, but one reliant on the condition of its timber.

Over time, the horizontal stretchers forming the wall's front face deteriorated. As the timber broke down, the wall deformed and lost containment, with granular backfill spilling out through the failing facing. Localised steel straps and plates had already been fixed near the corner to slow the deterioration, but movement was serious enough that South Yorkshire Pensions Trust barriered off the affected section on safety grounds. With demolition and full reconstruction impractical for a live car park, the brief was to stabilise the existing structure quickly and safely, avoiding the cost and disruption of rebuilding from scratch.

Testing

A geotechnical stability assessment of the wall was carried out to establish the scale of works required. With no site-specific ground investigation available, published British Geological Survey records were used to build the ground model: weathered sandstone gravel beneath the wall, and well-graded granular fill both in the crib infill and behind it. The assessment confirmed the visible distress already evident on site: a deep-seated failure mechanism beneath the foundation returned an adequacy factor of just 0.96 – below the level required for adequate long-term stability.

To set a reliable design resistance, on-site suitability testing of Vulcan Earth Anchors was carried out on 10 July 2026. Two AS90 anchors, driven approximately 2.5m through the wall at 30° below horizontal, were tested to 25kN, while four AS30 anchors, driven to lengths of 4.2m–5.8m, were tested to 15kN. In every case, testing was halted early – not by ground failure, but by cracking in the fragile timber facing. This confirmed the timber, not anchor pull-out capacity, as the governing constraint, setting a conservative design resistance of 15kN per anchor. All anchors achieved the required load capacities.

Solution

Based on the testing and calculations, Anchor Systems specified 43 No. AS-30 Vulcan Earth Anchors, each a 16mm galvanized threaded steel tendon on a 300mm x 300mm x 8mm bearing plate, driven perpendicular to the wall at 14° below horizontal. Anchors were arranged across five rows at approximately 1.10m centres, with tendon lengths of 2.0m–3.0m tying back into stable ground beyond the retained soil wedge. A Deltax® G80/2 steel wire mesh facing was fixed ahead of installation to retain infill through the gaps left by the deteriorating stretchers.

The driven method of Vulcan Earth Anchors made this a practical retrofit: anchors were installed using a 5-tonne excavator and MEWP, with no grouting or curing time needed, so each could be installed, tensioned and tested in a single visit. The full scheme of 43 anchors was completed in two weeks, every anchor proof-loaded to 15kN and locked off at 10kN, restoring the wall to its required long-term stability. For South Yorkshire Pensions Trust, the result was a fast, low-disruption repair that reopened the car park safely – demonstrating how Vulcan Earth Anchors can rescue an existing timber crib retaining wall without costly reconstruction.

