Eden Brows Landslip Repair Settle-Carlisle Railway Stabilisation Solution in Cumbria

North of Armathwaite, Cumbria



TYPE OF PROJECT	YEAR OF CONSTRUCTION	CLIENT	CONTRACTOR	DESIGNER
Soil Nailing	**2016**	**Network Rail**	**Story Contracting**	**Aecom**

PROD. RELATED
GeoMats ()

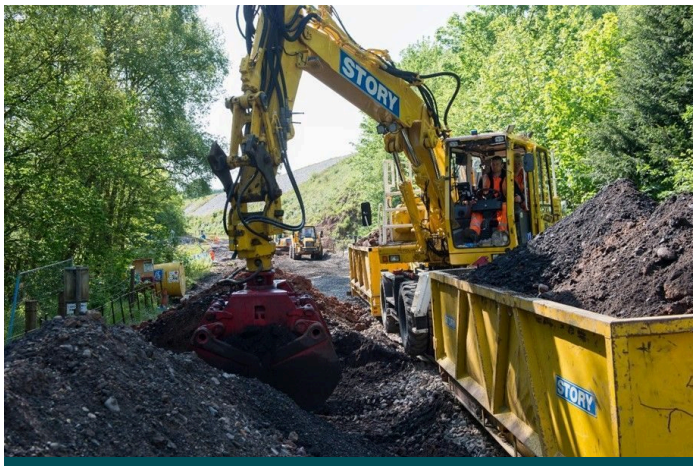
Challenge

Severe flooding in Cumbria during the winter of 2015–2016, particularly following Storm Desmond, triggered a major landslip at Eden Brows near Armathwaite. Around 500,000 tonnes of earth collapsed, forcing the closure of the historic Settle–Carlisle railway line in February 2016. This critical section of railway infrastructure is located approximately 200 metres from the River Eden and sits 70 metres above it, making it highly susceptible to slope instability and geotechnical failure.

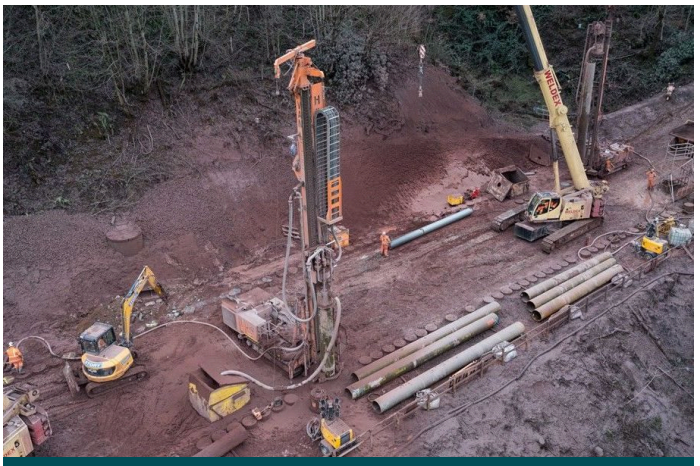
The extreme weather conditions reactivated a historic landslide, causing significant ground movement at a depth of approx 15 metres from the riverbank up to the railway embankment. This resulted in substantial deformation of the rail embankment and track alignment, with the ground shifting dramatically beneath the Up line. The landslip posed a serious risk to rail safety and threatened the long-term future of one of the UK's most iconic railway routes.

The Settle–Carlisle line, opened in 1876, is not only a major tourist attraction known for its scenic landscapes but also a vital freight corridor and transport link for local communities across Northern England. The closure of the line had significant economic, social, and logistical impacts, making rapid and effective remediation essential.

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Story Contracting has removed 16,000 tonnes of soil from



During construction in 2016

Solution

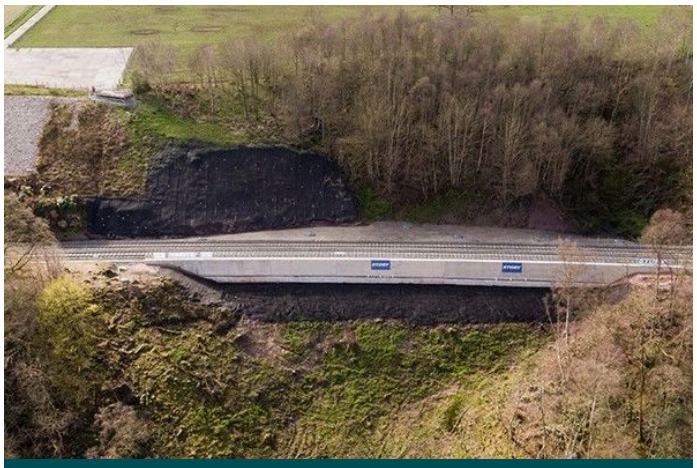
Following the landslip, ground levels beneath the railway dropped by up to 2.5 metres, requiring a £23 million emergency repair programme led by Network Rail. The project was widely regarded as one of the most complex railway geotechnical engineering challenges in the UK.

Engineers developed an innovative slope stabilisation and ground reinforcement solution designed to ensure long-term railway resilience, even in the event of future landslides. The approach involved installing two rows of large-diameter steel piles, filled with reinforced concrete, deep into the stable bedrock of the Eden Gorge. These piles, ranging from 20 to 30 metres in length, effectively anchored the railway structure beyond the active slip zone.

A total of 226 steel piles were installed to create a robust foundation system, supporting a newly constructed reinforced concrete track slab. This design allows the railway to remain stable and operational even if ground movement occurs again, effectively decoupling the track from slope instability.

To further enhance slope stability and provide erosion control, Maccaferri MacMat® R was installed as part of a soil nailing system. This erosion protection solution stabilises the slope surface, reduces weathering effects, and prevents shallow failures, contributing to the overall durability of the repair.

The Settle–Carlisle railway line was successfully reopened in March 2017, restoring passenger and freight services. This landmark landslide remediation project not only reinstated a critical UK rail route but also delivered a long-term, resilient engineering solution for slope stabilisation and infrastructure protection.



View of the site after the repair works



Works almost completed with 480m of new track installed



Vegetation is growing over the MacMat® R



The much loved section of the Settle-Carlisle railway re-

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