Gibraltar Rock, Tynemouth

Emergency Repairs to an Unstable Retaining Wall at Gibraltar Rock

King Edwards Bay is a small sandy beach enclosed by grassy banks and sheltered by cliffs, located at the foot of Tynemouth Priory and Castle – a historic site run by English Heritage. It is one of the most recognisable landmarks in the North of England. The cliff face had been remediated poorly in the 1980's and was in imminent danger of collapse, threatening local pubs and restaurants on the beach and the cliff. Aarsleff Ground Engineering were one of 8 contractors contacted by North Tyneside Council to provide a geotechnical solution to the failed cliff face.

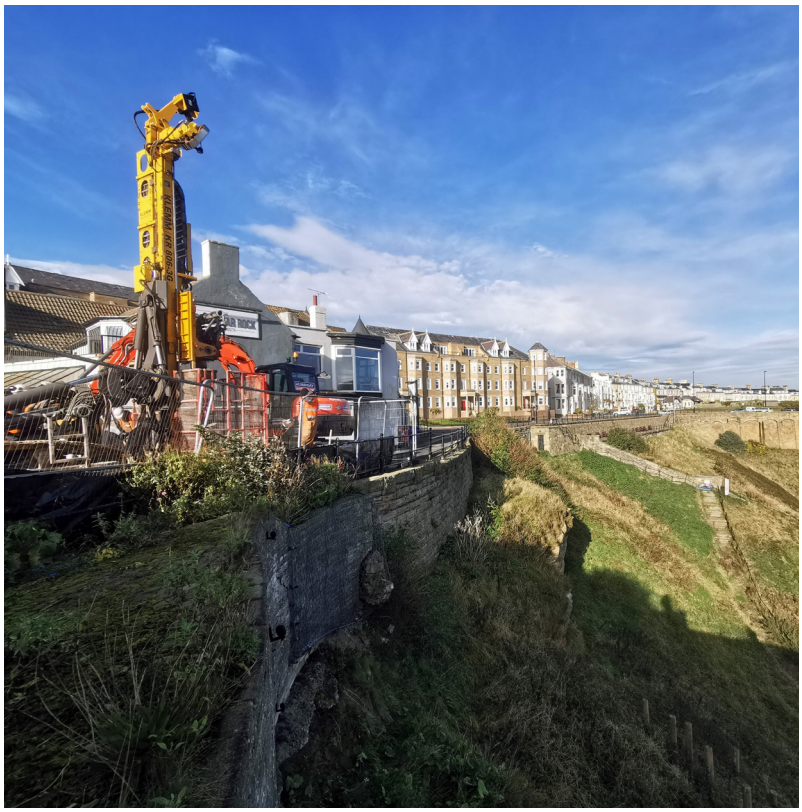
Acting as the main contractor, as well as scheme designer and self-delivering most geotechnical aspects of the work, Aarsleff provided a two staged solution to develop a scheme design that would provide a 120-year design life in remediating the failed slope. Stage 1 included the ground investigation works including trial pits to determine the nature of the cliff failure and to provide a cost-effective solution.

Stage 2 required the installation of a contiguous piled wall, 10m in depth and 300mm in diameter, secured with a capping beam. Aarsleff then provided a scaffold platform on the cliff face, for demolishing 3m of the failed cliff face. Aarsleff demolished the cliff face until they reached competent sandstone. They then installed 3m long rock bolts to secure back to the cliff, a gabion basket wall within the voided area and shotcrete to the new face of the wall.

Due to the emergency nature of the works, the scope of the final product was not known at tender stage, such as knowing the final dig level of the demolition. However, through detailed design work and early engagement with supply chain partners, as well as the local council, Aarsleff were the only contractor to provide a scheme design that was cost effective and managed the risks on the project, and therefore were successful in being awarded the scheme.

The main challenges of the piling work were operating in a tight environment, very close to an unstable cliff, with little space available at the pile locations. This was further complicated working close to local businesses and English Heritage site. Aarsleff's technical knowledge and diverse drilling capabilities allowed them to overcome unforeseen ground conditions such as harder bands of sandstone.

Another challenge of the works was demolishing the failed slope safely in a controlled manner, whilst reducing the commercial impact on local stakeholders. This was achieved through early detailed engagement of subcontractors to manage risks at tender stage, coming up with appropriate scaffold solutions and demolition sequences to protect the local businesses on the beach below.



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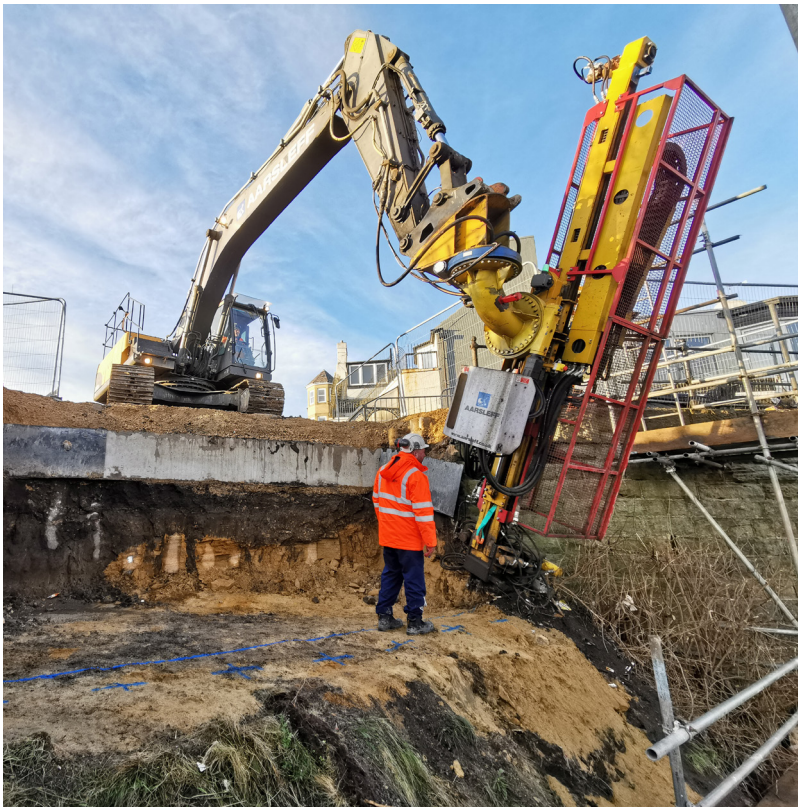
Aarsleff and their supply chain have delivered an excellent quality product, securing the cliff face for the full 120-year design life of the scheme. They have managed to remove a failed slope safely and replaced it with a piled wall and gabion basket design. The new cliff face is also more aesthetically pleasing than before, with 25m2 of the wall being shotcreted, carved and dyed to match the existing Victorian era wall. Aarsleff were the only geotechnical contractor that grasped the complexity and potential solution that was within budget, safeguarded the cliff and improved the aesthetic of one of the North East's most iconic landscapes.

The works at Gibraltar Rock was the first time Aarsleff worked with North Tyneside Council and is one of the largest projects they have undertaken as principle contractor. The project has been extremely successful, with close cooperation that has continued from tendering stage to project completion. Aarsleff's design principle, of using a contiguous piled wall to help support the failing slope during demolition, as well as utilising close cooperation with their supply chain partners from an early preconstruction phase, is now considered by North Tyneside Council as the textbook response to any future issues with slope instability.

Aarsleff Ground Engineering have highlighted the value their company, their partners and design experience, as well as CDM responsibilities, can offer during wider emergency works in areas such as mine working collapses and slope instabilities.



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Scope of Works:

19 300mm mini piles
Contiguous piled wall
Gabion basket wall
3m rock bolts
Shotcrete

Contractor:

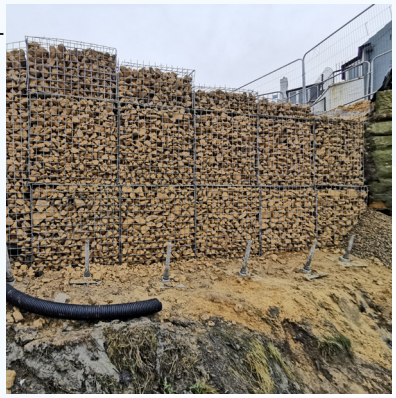
North Tyneside Council
and Capita

Construction period:

October 2019 - January 2020

Equipment:

Klemm 806
Volvo Excavator



Contact

Aarsleff Ground
Engineering
enquiries@aarsleff.co.uk
Tel 01636 611140

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