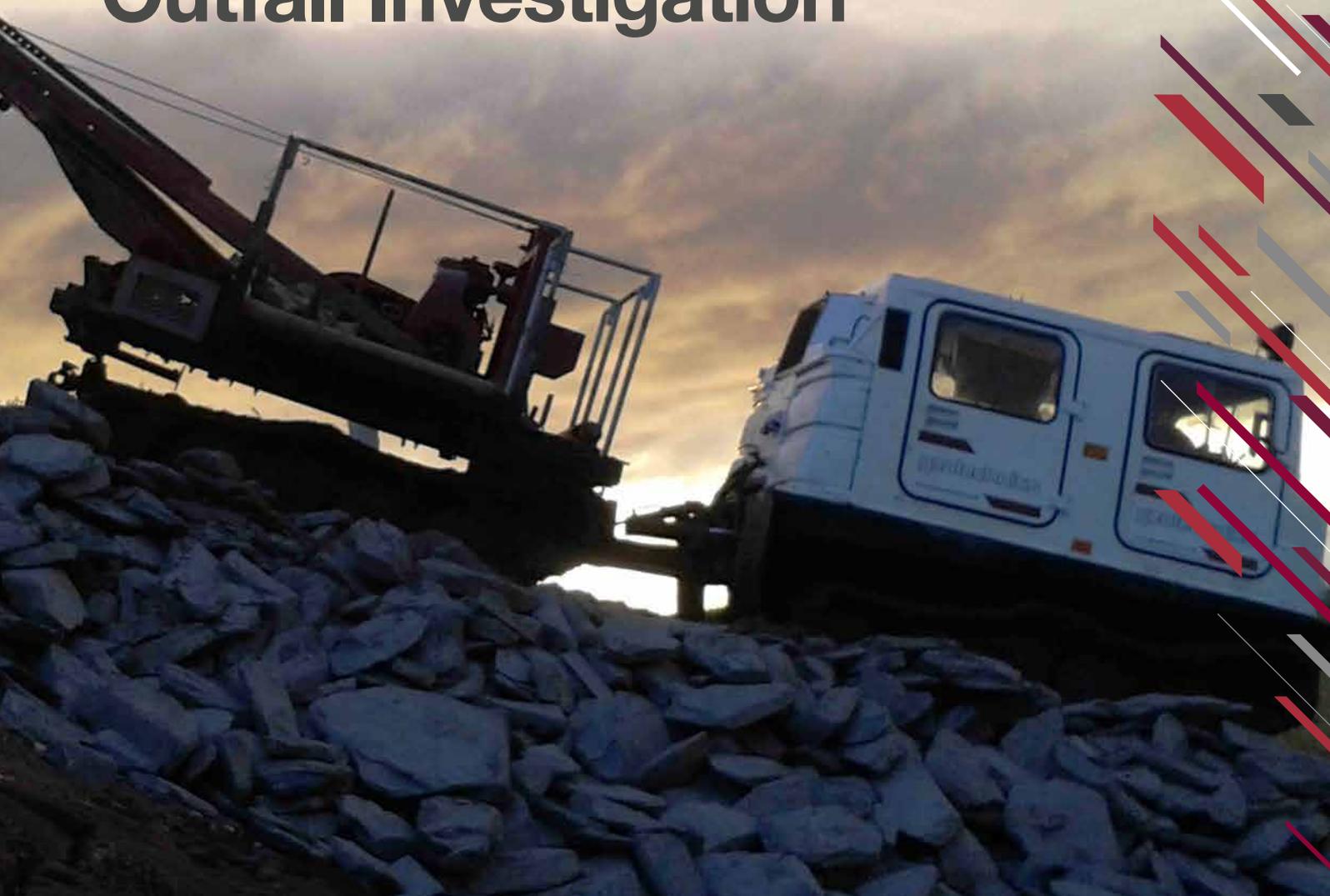


Case Study

Barrow – Long Sewer Outfall Investigation



Key facts:

Project Name

Ground Investigation for Long
Sea Sewer Outfall, Barrow

Client

United Utilities

Date

May 2013

Plans for a new United Utilities sewer outfall structure in Barrow-in-Furness, some 1400m across an inter-tidal area opened up an opportunity for Geotechnics to showcase the potential of their versatile, capable and environmentally sensitive Hagglund Hybrid Cable Percussion rig.

Barrow WwTW is situated to the east of the main dock area of Barrow-in-Furness and was constructed in 1996 to treat flows from Barrow, Dalton, Walney Island, Lindal and West Barrow. The outfall however, has been in existence since the late 19th century, the difficult excavation works having originally been carried out by hand as an open cut channel to carry sewage and industrial effluent flows through from the newly reclaimed land behind the sea wall. To assist in the excavation, a railway was reportedly constructed across the sands and mudflats alongside the trench. During high tides, the engines were kept on nearby Headin Haw island which was formerly occupied by a gunpowder magazine associated with the iron ore industry in the area. A cast iron pipe was later installed in the outfall channel and buried, with a brick built headwall at its discharge point.

The mudflats south of Barrow Docks are subject to a number of designations including a special area of conservation (SAC) and a special protection area (SPA) due to the habitat it provides for numerous species of fauna and flora. Following a recent review of these designations it was identified that the existing outfall is adversely affecting the eel grass which is a protected feature of the area. In order to minimise their impact on these protected habitats, United Utilities undertook a programme of studies and optioneering exercises to identify a suitable position to which the outfall could be relocated.

It was soon realised that any construction would be challenging due to soft ground, rapid tides, ecological issues and interaction with existing activities and stakeholders in the area.

Geotechnics was engaged under the United Utilities site investigation framework to provide geotechnical and geo-environmental information relating to the site. This would enable United Utilities Engineering to provide sufficient information relating to ground conditions to allow subsequent tenderers to accurately assess the requirements and constraints of the scheme and to price it accordingly.

The difficult access and obvious risks associated with working in a potentially dangerous area were coupled with working in a protected environment that is classified as a Special Area of Conservation (SAC), Special Protection Area (SPA), a Site of Special Scientific Interest (SSSI) and a Ramsar (Wading birds).

Prior to intrusive works United Utilities Water plc commissioned bathymetric and land magnetometer surveys to provide information on the topography of the proposed pipeline route across the foreshore and ensure the safe passage of works through an area understood to have been heavily bombed during WWII.

Favourable tides in May 2013 were chosen to carry out the works. Prior to mobilisation method statements detailing stringent environmental

controls were required to satisfy both the Marine Management Organisation and Natural England that the protection of the area would not be compromised.

Geotechnics' Hagglund Hybrid Cable Percussion rig was designed and built to work in environmentally sensitive areas that reduce the damage to the ground to a bare minimum. Access to the foreshore was not possible via an existing ramp due to this being protected species rich grassland.

As an alternative Geotechnics proposed the design and construction of two ramps along the proposed sea defence wall that would enable safe access to and from the tidal area on a daily basis. Natural England requested that these ramps be made of local derived stone and that these be removed and reinstated after the works.



Geotechnics carried out sixteen boreholes over the length of the pipeline route with the Hybrid Hagglund Cable Percussion Rig with boreholes taken to depths

varying between 7.00m and 12.05m below ground level. In addition, fifteen Static Cone Penetration Tests were completed to depths varying between 2.86m and 11.45m

below ground level by Lankelma Ltd. Careful monitoring of the tides ensured safe working practices.



The static cone penetration tests were undertaken using an 18 tonne CPT track-mounted rig (UK8) equipped with a 20 tonne capacity hydraulic ram set. A piezo and magnetic combination

cone was used at all locations to provide UXO (Unexploded Ordnance) clearance, cone tip resistance, friction sleeve resistance and dynamic pore water pressure.



The wealth of experience exhibited by Geotechnics and United Utilities' staff teamed with approved specialist contractors resulted in another high quality professional investigation in a demanding and potentially dangerous environment.



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