

**Project: HS2 Heave Trial**  
**Client: HS2 Limited**  
**Contractor: Eiffage Kier Ferroviaire Bam JV**  
**Date: 2019-2020**  
**Location: Near Daventry, Northants**



As part of our Earthworks Strategic Partnership with Eiffage Kier Ferroviaire Bam (EKFB) on the C2 and C3 sections of HS2 Phase One, Blackwell were appointed in the spring of 2019 to undertake the earthworks for the UK's first "Heave Trial".

#### Description of Earthworks

The Trial saw the excavation of the first alignment cutting on HS2 (Boddington North Cutting) which comprised the excavation of 200,000 cu m of Charmouth Mudstone from a 15m deep cutting which had been seen the pre-installation of 31 vertical geotechnical monitoring points. The earthmoving was planned to ensure that the cutting was excavated without disturbing the highly sensitive monitoring points, which had to be lowered as the cutting was excavated.



Excavated material was hauled along a purpose-built haul road to the deposition site in a meander of the Oxford Canal, where the material was stored in 10m high stockpiles for reuse in the HS2 main works.



#### Earthmoving Around Geotechnical Apparatus

In conjunction with the Contractor, BEL established a temporary works protection regime that saw the monitoring points enveloped by concrete drainage rings that were left in place whilst the surrounding clay was excavated by the primary 50t excavators in progressive 3m lifts. Following the completion of each lift, 20t excavators equipped with proprietary handlers removed the rings and excavated the pinnacle of clay from around the monitoring point, before the monitoring point was lowered by the geotechnical contractor.



In this way, earthmoving continued at an efficient pace with two 50t excavator teams whilst ensuring the integrity of the monitoring points.

#### Technology and Innovation

Blackwell in conjunction with EKFB and Finning undertook a field scale trial of Finning's enhanced telematics technology and Caterpillar's driver fatigue system in 2019. The trials enabled Blackwell to provide Finning with feedback for the continued development of the technology.

#### Environmental Sensitivity

The Heave Trial site is in picturesque Warwickshire countryside and is bounded by the Oxford Canal which is a popular walking and boating amenity. Its situation coupled with it being the first major earthmoving on the HS2 programme, meant that the earthworks had to be undertaken without causing undue impact on the surroundings.

Extensive surface water management measures were installed by BEL to comply with discharge consents and included the establishment of a water treatment plant that operated continuously, without incident, throughout the very wet winter of 2019/20.

#### BEL Resources

Cat 352 primary excavator x2  
 Cat 745 ADT x6  
 Volvo A45 ADT x2  
 Cat D6T dozer x2  
 Cat 320 excavator x 2  
 Cat 16M grader x1  
 Cat CS76 roller x1

and support equipment