

A465 Heads of the Valleys, Wales



Running across the Heads of the South Wales valleys, the A465 trunk road provides a fast east-west connection between Pembroke Dock, Fishguard and Swansea, to the Midlands and beyond. Its route takes it through some of the UK's most beautiful scenery, with varied landscapes and geology. The existing road, constructed in the 1960s, is being realigned and upgraded to provide a faster continuous dual carriageway to stimulate further economic activities in the South Wales Valleys Region.

Main contractor Future Valleys (FVC), on behalf of main client Welsh Assembly Government, appointed Bauer Technologies, to undertake piling work for the project. Bauer arrived on site late October 2021 and was sub-contracted to install a total of 109no. piles, with diameters including 900mm, 1180mm, and 1350mm, which equated to 1973 linear metres and 2495m³ concrete. All works conducted were done so from restricted, narrow platforms, which were

constructed in such a way that traffic on the A465 was not interrupted. All platforms were drawn up in a 3D environment, to ensure that the works could be carried out by the large machinery, paying particular attention to public safety, due to the machinery working on narrow platforms alongside/above the trunk road.

The varied geology across the project brought a number of challenges and, whilst works were programmed in line with tender stage information, on site it soon became apparent that the final design consisted of much deeper and larger piles, in ground conditions that consisted of notably strong Quartzitic Twrch Sandstone and grit stone, with a uniaxial compressive strength in excess of 200MPa.

The underlying Pembroke limestone was especially strong, containing karst features and caves at the interface with the sandstone, some 8m below ground level. Ground difficulties were overcome by utilising Bullflex™ fabric

pile liners (supplied by Bauer), which contained the concrete in the karst and cave features. To drill the piles, Bauer Technologies brought specialist rock drilling tools to site, which consisted of Rock Augers, Core Barrels, Cross Cutters and to help with the extraordinarily strong rock, Roller Core Barrels were used to speed up the process and reduce wear on the traditional rock tooling.

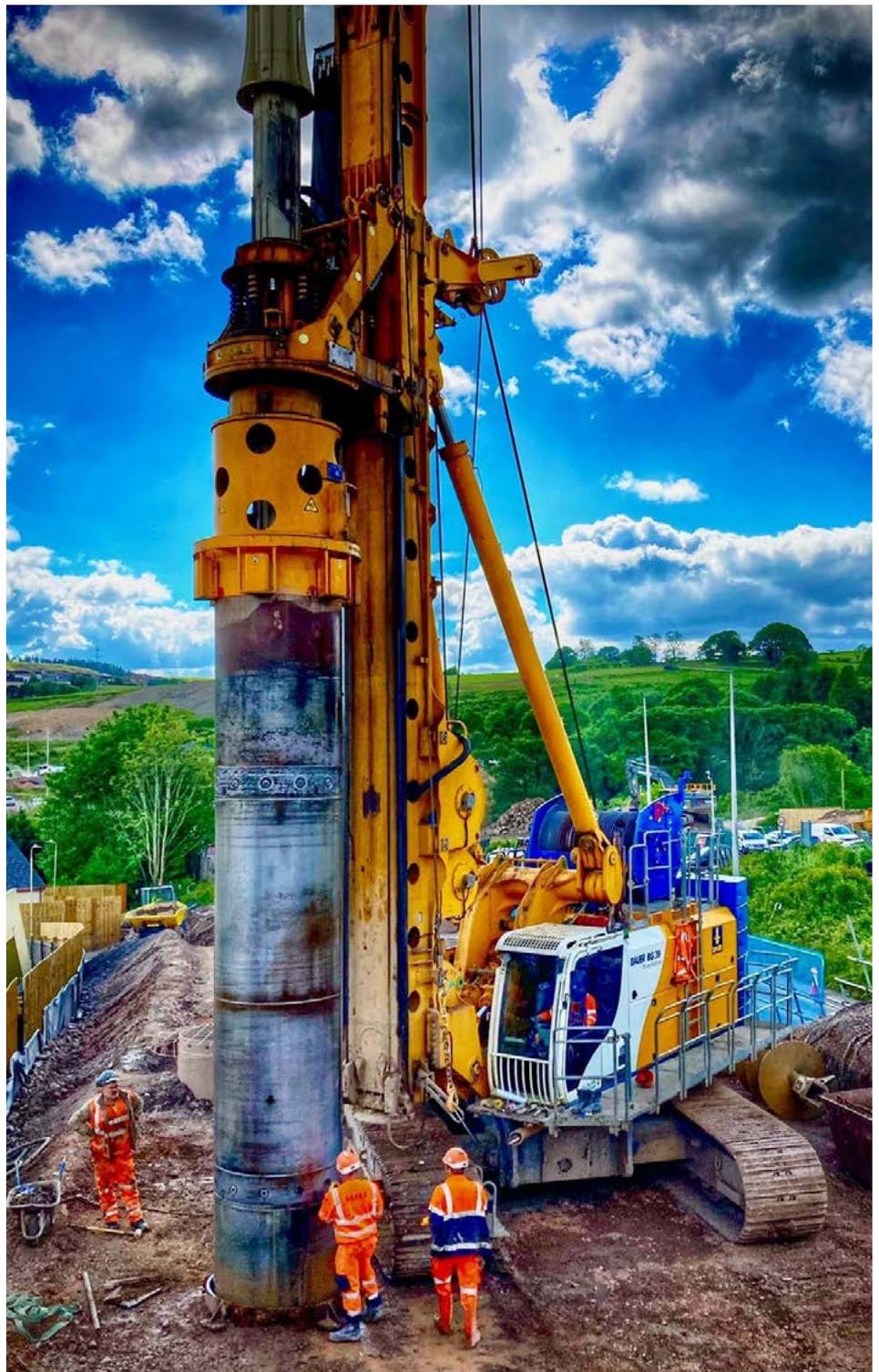
Due to the restricted nature of the site, the Roller Core Barrel drilling tool - a mechanical system that does not require additional resources, such as large compressors or air receivers etc - was the perfect tool for the job and, though it is a slower process than a Down the Hole Hammer (DTHH) system, it is calculated to be 4.5x more carbon efficient, which is an important element of the project. The southeast retaining wall consisted of 30no. piles, but all were drilled with short casing, as the rock was so high. Production rates consisted of 2/3 piles per week.

After completion of the southeast retaining wall, Bauer Technologies moved on to the installation of 21no. 1180mm piles in the southwest retaining wall. These piles required 12m of casing, then sockets drilled into the underlying Quartzitic Twrch Sandstone. Following this section of wall, Bauer proceeded to install 21no. 1350mm piles, which required 15–16m of 1500mm casing, drilled into the sandstone. Works progressed at 2no. piles per week.

The bearing piles for the Taf Fawr Mainline bridge allowed Bauer to speed up the installation of the 900mm piles into the underlying sandstone, as the sandstone in this area was much more fractured, making drilling much quicker.

To close the south wall, piles had to be installed through the existing bridge approaches of the High Street Bridge, these piles featured heavily reinforced cages, installed deep into the underlying Pembroke limestone, and whilst Bauer had completed previously the southwest retaining wall, what made this platform unique was its size, being just big enough in one direction to rig up a BG39. The service crane had to be used by tracking it on and off the platform and using the north side of the High Street Bridge for overnight parking.

Despite the incredibly challenging geology and the scale and complexity of the project, Bauer's team completed works on time, to budget and to the satisfaction of the main contractor.



Principal Contractor:

Future Valleys (FCC)

Piling Contractor:

BAUER Technologies Limited

Contract Period:

October 2021 to September 2022

Bauer's Scope of Works:

- Southeast retaining wall: 30no. 900mm Piles; 444 LM, 384m³
- Southwest retaining wall: 42no. 1180mm and 1350mm piles, 761 LM, 1153m³

- Taf Fawr Mainline Bearing Piles: 24no. 900mm Piles, 470 LM, 365m³
- High Street South Retaining Wall: 13no. 1350mm Piles, 298 LM, 592m³

Equipment Used:

- Bauer BG39 Piling Rig