Cannock Wood Abstraction Borehole

Client Name:

Coal Authority

Overview:

Levels of mine water were rising at a dangerous rate, threatening drinking water aquifers in the South Staffs region of Cannock Chase. Urgent action was therefore required on behalf of the client, requiring a large diameter borehole to penetrate the shallow seam mine workings at 161mtr below ground level. This would enable heavy duty pumping equipment to be installed, allowing the mine to be dewatered. allowing the mine to be dewatered. Water pumped from the borehole was then to be pumped through specially constructed reed beds to remove contaminants and from here it would be clean enough to run freely to nearby water courses thus removing the threat to South Staffs drinking water aquifers while at the same time enhancing the environment.

Drilcorp were commissioned to drill a borehole to a depth of 161mtr. The borehole was to be lined to a depth of approximately 145mtr with 914mm (36") steel casing. The borehole would then be drilled on at 800mm (30") into the shallow seam workings. A 500mm (20") stainless steel screen would be drop-set to cover the open hole section and into the 30" casing. Consequently, the well could be flow tested before installation of the pumping equipment to ensure everything was in functioning order.

Description of Works:

To alleviate the problem **Drilcorp** were commissioned to drill a large diameter dewatering borehole which would enable the installation of giant submersible pumps to rapidly lower the water table in the disused coal mine and negate the threat to the drinking water aquifers.

The project was challenging on several aspects:

The location of the drill site was a mile from the nearest metalled road across old mine heaps which turned to mud after even the slightest rainfall. Heavy plant and mobile cranes would be needed for the works. An aluminium roadway was laid out over the full distance and the problem was solved.

The stratum to be drilled to reach the target mine was riddled with old worked coal seams and the associated collapsed ground. There were also several layers of soft collapsing marls with large ironstone nodules. In order to assure that we would hit the target and to determine the strata that would be encountered on the main production borehole, a 300mm (12") pilot hole was drilled. This proved successful and the design of the main borehole was formulated as follows:

GL – 21mtr	Drill at 1500mm (60") and install a 1070mm (42") conductor casing.
21mtr – 145mtr	Drill using reverse circulation at 400mm (16") then ream to 635mm (25") then ream to 890mm (35") and finally ream to 1066mm (41.5"). A 914mm (36") mild steel casing was then installed and the annulus grouted.
145mtr – 161mtr	Was drilled at 890mm (35") into the mine workings. A 450mm (18") stainless steel casing and screen was then drop-set covering the base of the previous casing and into the mine workings. Falling head tests consisting of the rapid injection of 40m3 loads of water proved that the mine workings were clear and water could enter the borehole freely.

The client immediately installed giant pumps and started pumping. The water levels rapidly dropped and the threat to the drinking water aquifer was removed.

The operation was a huge success.