

Dark Cavern/Mud Hole Infilling

Client	Dudley Metropolitan Borough Council
Date	June 1999 to March 2000
Value	£3.6m (Funded by English Partnerships Land Stabilisation Programme)

Work involved bulk infilling, grouting and underground work to stabilise redundant limestone mine workings in the Castle Hill area of Dudley with elements of contractor design.

The Castle Hill area is a Site of Importance of Nature Conservation. A significant element of work was also required in areas occupied by Dudley Zoo and Dudley Canal Trust. Both areas presented significant access problems and environmental considerations for the work which included;

- 95 no. high tolerance infill and grout holes up to 60m deep, hole diameters up to 375mm.
- Bulk infill with 212,000 tonnes (dry weight) PFA paste to both dry and flooded galleries.
- Design and construct an area of temporary infill (for possible future removal) within the Dark Cavern Gallery. The temporary infill material used was sand, retained by granular barriers constructed at each end of the temporary infill area.
- Both barrier material and temporary infill material were injected through a grid of large diameter boreholes drilled from the surface. The 30,000 tonnes of barrier and temporary infill materials were transported to injection positions using a four section, 300m long conveyor system, set along existing paths, in order to minimise the environmental impact of transporting this quantity of material in this sensitive location by vehicle.
- Construct contractor designed underground in-situ concrete barriers to isolate the workings from an existing operational canal system, utilising the canal to access the works with concrete pumped from a surface access point.
- In addition, filling to a flooded gallery (40,000m³) was sequenced with a water treatment contract established to remove contamination from the mine water before discharging to sewer.

Extensive temporary infrastructure was established for the PFA storage and mixing plant area which included weighbridge, wheel wash, container surrounded compound, with mist spray facilities. Up to 2,500 tonnes per day of bulk PFA was received on a daily basis.



Dark Cavern/Mud Hole Infilling (contd)

Infill paste and grout mixed using computer controlled, continuous mixing plant and pumped using up to three high output concrete pumps, pumping up to 1400m to injection points. 3 No. 125mm dia. steel concrete pumping mains were used.

Access to the drilling work in Dudley Zoo was severely restricted due to animal enclosures and, in this location holes were drilled using a mini-rig.

Continuous liaison was carried out prior to and during the contract with the Client, English Nature, Dudley Metropolitan Borough Council Environment and Leisure Services Department, Dudley Canal Trust, Dudley Zoo and other specialists, e.g. Dr. Robert Stebbings Consultancy for monitoring and exclusion of bats, resulting in agreed sequence of work, drill hole and pipeline positioning, access routes and conveyor routes to ensure minimal disturbance to existing flora, paths and tracks, avoid badger sets and limit the intrusive impact to Dudley Zoo.

