

# Investigation and Treatment of Mine Workings Beneath Reinstated Opencast at Blindwells, Tranent.

## Project Profile

**Client:** Hargreaves Services plc

**Designer:** Forkers Scotland Ltd

**Supervisor:** Waterman I&E Ltd

**Value:** £1m



A large part of the 128 ha site has been opencasted for coal, finally being reinstated in the mid 1990's and now zoned for up to 1600 housing units. This 'design & construct' mine workings treatment contract was undertaken to locate and treat shallow mine workings that remained within the highwall and within the footprint of the original opencast coal mine on a 9 ha part of the site proposed for residential development (phases 1 to 4). This drawing below summarises the work that was required, probe-holes were drilled along the high wall (green areas) at 30m intervals to determine the spatial distribution and condition of the coal seams. Rotary percussive open-hole techniques were used and holes were drilled to a depth of rock head plus 25m to target the 'Parrott Rough' coal seam.

Within the footprint of the mine (red & grey areas) rotary percussive investigation boreholes were drilled on a 24m grid to confirm the thickness of overburden and the depth, thickness and condition of the shallow coal seams assumed in the initial design. Once design parameters had been confirmed, the areas requiring treatment were drilled and grouted on a 5m domino grid. Secondary and tertiary treatment holes were instructed based on primary hole grout takes.

Grout batching and pumping was undertaken from a strategically located compound within the development area using 50m<sup>3</sup>/hr continuous grout mixer with grout pumped directly to the treatment areas. Container bunkering was provided for PFA and sand storage with 50t horizontal silo for cement and 4 large water storage tanks to supply grout mixing requirements.

- 1,400 boreholes drilled (36,623m of drilling), average depth 26.67m, max 40m
- Holes were drilled with 101mm OD rotary percussive steel casing drilled and sealed into rockhead followed by drilling a 75mm open hole allowing insertion of a 50mm MDPE grout tremie.
- 6 rigs on site to complete the drilling work
- Air flush drilling was used to ensure no water saturation of the opencast backfill
- 3,400t of grout mixed and placed (8:4:1 PFA: SAND:OPC)
- A number of grout test holes were carried out to validate the treatment works
- Continuous monitoring of injected grout quantity and pressure was carried out together with full quality control and testing of mixed grout.
- Factual report produced on completion.

