Scheme: **Yeoman Hey IR**

Problem: **Ground Water Ingress into Draw off Tunnel and Shaft**

Solution: **Injection Leak Sealing**

Client: **United Utilities Water**

The draw off tunnel at Yeoman Hey had a long history of significant ground water ingress, complicated by accumulations of ochre sludge within the tunnel. As part of the reservoir safety programme, United Utilities commissioned Ram Services Limited to undertake an investigation to confirm the tunnel construction details, and to establish the extent to which ground water travel occurred within or behind the brick lining.

Following this investigation, which found that the lining was solidly constructed and in good condition, an approach to stemming the water ingress was developed, based on the assertion that water ingress through the tunnel lining occurred locally (and severely in places), rather than along the full extent of the lining.

A variety of low viscosity polyurethane aqua reactive resin grouts were supplied for the work, which commenced at the base of the draw off tower, and then extended down the tunnel to the most severe leak around 30m downstream.

In addition to the ingress through the brickwork tunnel arch lining, further occurrences of water ingress through the sandstone invert lining were stemmed using similar techniques.

On completion of the work three weeks later, the severe ingress through the brickwork and sandstone lining had been stemmed completely, although more minor ingress through the base of the tunnel walls persisted.

Following a period of monitoring, United Utilities confirmed that the scheme objectives had been met, and no further work was required.

Contract duration: **Three weeks** **Contract value:** **£9,985.00**