CASE STUDY
M1 WIDENING J25-J28 SECTION 1&3

Project: The widening of the M1 to 4 lanes between J25 & J28, northbound & southbound
Van Elle Involvement: Various geotechnical techniques have been used throughout including; restricted access piling - both load bearing piles for new gantry bases and retaining walls; ground anchors to retaining walls; and soil nails for stabilising the embankments.
Location: M1 J25-J28 (Nottinghamshire/Derbyshire)
Client: MVM (Morgan Est, VINCI Construction Grand Projects and Sir Robert McAlpine) on behalf of the Highways Agency

Due to our expertise and because MVM had been completely satisfied with our works on section 2 they felt confident to use Van Elle as the sole geotechnical contractor for the piling within this next phase and the central reservation work. Skills and capabilities were shared across the Van Elle team to offer a fully integrated and comprehensive package for the client.


Van Elle installing anchors to the piled retaining walls using new innovative rigs.

Design and Planning:

We had to factor in some major working restrictions.

- Three carriageways were to remain open in both directions between 6am and 8pm
- Multiple trades were to work on site at the same time
- Disturbance to residents had to be kept to a minimum

The two overriding issues were health and safety in such a high risk environment and cost efficiency for such a large, public project.

Restricted Access Piling
Piled retaining walls were needed either side of the bridge abutments to carry the additional loads, however, ground conditions varied on site and we were able to form the piles in either CFA configuration or rotary bored method using temporary casings or even rotary percussive drilling up to 600mm in diameter. This meant that downtime due to ground conditions was minimised.

The pile design went hand in hand with the choice of rig. Both rigs chosen to operate on the M1 were compact, manoeuvrable machines, specifically chosen for their reduced size, height and weights.

Ground Anchors
Our in-house team designed the ground anchors. Because of our experience of similar ground conditions we could use higher, more realistic values for the design, which resulted in the most economical option for the client, as the ground anchors were designed using shorter fixed lengths. To ensure this geotechnical solution was safe as well as cost efficient we carried out proving tests to ensure the anchors could carry three times the loads required. This involved 9 No. on site tests before installation.

Soil Nails
We had to customise the mast height of our rigs before going on site because of the tight working restrictions.


Van Elle installing soil nails to stabilise the embankments.

The programme was based on a four row soil nail matrix installed in two parts. I) drilling and installing the soil nails, II) installing the mesh. The break in between allowed for the drainage contractors to work on site. Working with multiple trades in tight sequence meant finding new ways of managing the project to programme.

Construction:

Restricted Access Piling
300 No. 600mm diameter CFA piles were used in the construction of the retaining walls, combined with the ground anchors. 92 No. CFA and rotary percussive load bearing piles were installed for the gantries.


Van Elle installing pile cages on the M1.

The restricted access piling was scheduled for 10 weeks with two rigs and the programme was completed on time. This was no mean feat as there were discrepancies between the SI and the on-site ground conditions. To realise the design our team had to use their skills and experience to amend the piling programme and swap the reinforcement cages due to the depths of rock found on site.

Ground Anchors
256 No. ground anchors were installed to varying depth. Rock had to be identified on site, recorded and then we had to overdrill into the rock to suit the bond – essentially customising ground anchors as required by the site conditions.

The original depth was 25m, but sometimes ground anchors were installed to 16m. Because of these shorter depths and our ability to customise the ground anchors we saved time on installation.

Soil Nails
6,000lm of soil nails were installed on site, between 3m-8m depths.

The ground conditions varied from clay to rock, but we were able to react on site - changing from augered drilling to Down The Hole Hammer techniques.

The soil nails were also tested by our own SI team and we managed to beat the programme every day of installation.

'The M1 project has, and continues to have, many challenges to overcome and through their team approach with a proactive and positive attitude Van Elle continue to respond to these by achieving solutions in a timely manner.'
Chris Illsley, Section Manager, MVM

This central reservation work is ongoing.