



# CASE STUDY AYKLEY HEADS, DURHAM



## GROUND IMPROVEMENT

### CLIENT

Durham County Council

### MAIN CONTRACTOR

Durham County Council

### SCOPE OF WORKS

Controlled Modulus  
Rigid Inclusions

### ACHIEVEMENTS

Completed on time  
Completed on budget

## Project Brief

Roger Bullivant were approached by the technical team at Durham County Council to assist with a foundation solution for a new office building on Plot C at Aykley Heads, Durham.

The development formed part of a wider scheme to develop the Aykley Heads area as part of the council's plan to relocate its current HQ. The area is already home to a number of businesses and the re-development aims to attract thousands of high quality jobs, worth up to £400 million to the county's economy.

### Durham County Council, Construction Manager said:

"I found Roger Bullivant as a contractor to be very professional throughout, from pre-construction to the works being completed on site. I would have no hesitation in using them again on any future projects."



ROGER BULLIVANT LIMITED

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# GROUND IMPROVEMENT



## Key Issues/Requirements

- Roger Bullivant were requested to provide guidance and a solution for the use of Controlled Modulus Rigid Inclusions (CMRI) to provide adequate bearing for 20kPa and 200kPa bearing pressures for the internal slab and steel portal frame structure.
- Ground conditions generally comprised of loose to medium dense sands overlying medium dense to dense sands. CMRIs was proposed adopting a 300mm/600mm column to 8m depths beneath strip and pad locations and a 5m depth for the slab areas.
- The basic principle behind the CMRI process is to offer settlement reduction through the installation of concrete inclusions below a load transfer platform to distribute the load imposed by the slab. The inclusions act as a reinforcing element within the soil profile and relies on the interaction between the load transfer mat, soil and inclusion to support the structure.
- A finite element design was undertaken to evaluate the predicted settlements for the applied loads. The proposed 5m and 8m CMRIs with a 400mm deep load transfer platform formed the final design.

## Solution

- RB installed 227 Nr. 300mm/600mm CMRIs to depths of 8m underneath all pad and strip foundation locations and 175 Nr. 300mm/600mm CMRIs to depth of 5m for the area underneath the slab.
- CMRIs were validated by carrying out a series of plate load tests and a zone test to ensure that the recorded settlements were in accordance with the design calculations.
- Despite encountering one area on site which contained some obstructed ground which required some additional pre-boring work, RB completed the ground improvement works on budget and within the scheduled programme time.
- The benefits of the CMRI technique allow for a thinner ground bearing slab, vibration free installation, minimal spoil removal, easier trimming of the columns.

