

CASE STUDY

GULL WING BRIDGE Lowestoft

Deep Soil Mixing Ltd recently carried out soil mixing solutions for client Farrans, to stabilise the site ground and ensure the successful completion of the new Gull Wing Bridge in Lowestoft.

Farrans secured the contract from Suffolk County Council, and Deep Soil Mixing Ltd helped Farrans deliver on this innovative construction project.

The Gull Wing Bridge has been designed to reduce traffic around Lowestoft and forms the third crossing of Lake Lothing. Deep Soil Mixing Ltd was responsible for improving the strength, condition and stability of the soil on the northern approach to the new Gull Wing Bridge, to ensure its load bearing quality was sufficient for the construction of the bridge.

The Solution

The existing site soil needed to be strengthened and stabilised before construction could begin – and this was achieved with the native soils on the northern approach through a combination of mass mixing and the installation of Soil Mixed Columns (SMCs).

In addition to improving the load bearing quality and condition of the soil on the northern approach to the new Gull Wing Bridge, soil mixing solutions are environmentally friendly as none of the ground needs to be excavated or removed from site, reducing the carbon footprint of the project and saving on time and costs. It also aids Health and Safety as there are less vehicle movements on site.



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SOIL MIXING STABILISATION ENABLES CONSTRUCTION

The ground was mass mixed to depths of 2 metres and Soil Mixed Columns were installed to depths of 7 metres. The mix of mass mixing and soil mixed columns provided the necessary support to the northern approach embankment and enabled the bridge to be built once the soil mixing phase had been completed.

The soil mixing part of the project took approximately 14 months to complete and was finished in Spring 2023.

The Project

The work involved carrying out mass mixing and installing soil mixed columns to strengthen the properties of the site soil and increase its load bearing capabilities.

The Stabilised Transfer Mattress (STM) and Soil Mixed Columns were installed using Deep Soil Mixing Ltd's double rotary mixing head that rotates in two directions to provide homogeneous mixed ground. The ALLU mixing bucket was attached to the excavator with an MB900 arm, which enabled greater accuracy of mixing to improve efficiency and cut costs for Farrans compared to using the industry standard of a single auger mixing head.

Advantages of Soil Mixing

- Reduces construction programme and therefore cost
- Improves sustainability - No need to excavate and cart away so reducing landfill
- Zero vibration during construction and the equipment does not exert any lateral pressure when mixing we can work as close as 200mm from the building/foundations.
- Wide range of soils can be treated compared to other solutions
- Soil can be used as construction material
- No need to bring costly and bulky materials on site
- Environmental – Reduction of Carbon Footprint
- Effective on different soils, including soft soils, flood plains, contaminated land, peat, silts and alluvium etc.
- Increases bearing pressure, controls settlement and reduces permeability
- Reduces vehicle movement and improves safety
- Increased soil stability, strength and quality
- Multiple uses of strengthened soil, including construction of roads, support for embankments and bridges and foundations, and to replace piling methods if needed

As part of the soil mixing solution, Deep Soil Mixing Ltd created bridge abutments to improve the load bearing pressure of the ground and resolve any contamination in the ground.

The process involved raising the embankment soils by approximately 5.5 metres above the existing ground and using this soil heap to mix a 5-metre mattress above ground level. Columns were installed within 50mm of Anglian Water assets, which meant ensuring a 1 metre gap between the teeth of the rotary mixing head. The rotary was then reduced to 900mm in diameter before the ground was mass mixed to within 1 metre of the crown of the assets.

The Soil Mixed Columns were installed through the Soil Mixed Mattress, ensuring the binding of the columns into the platform turned it into the Transfer Mattress between the Soil Mixed Column layout. This innovative solution was a first in the UK and enabled testing to be carried out to prove there was no punching of the Soil Mixed Columns.

FIND OUT MORE

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