

## Ballina Bypass - Pacific Highway

Emigrant Creek South, NSW

Read how Keller's approach to very soft soils provided a cost effective treatment for our client.



### The project

A new bridge over Emigrant Creek South, part of the Ballina Bypass, Pacific Highway upgrade, required approach embankments to be built over very soft soils needed a foundation to limit settlement and ensure stability.

## The challenge

The Richmond River floodplain south of Ballina has deep, soft soils, which are vulnerable to large and variable settlement. These needed to be stabilised and strengthened, to allow construction of the embankments and to reduce differential settlement at the transition between the embankments and the bridge structure.

## The solution

Dry Soil Mixed columns provided a ground improvement solution that met the settlement criteria specified by the client whilst being cost-effective. Keller installed a total of 35,000lm of columns in an interlocking grid beneath the embankment footprints and side slopes. A significant advantage of the solution was that it allowed construction of the embankments soon after treatment was complete, minimising delays to the programme. Treatment was verified using pull-out tests, coring and UCS tests on recovered samples. Results showed that both strength and modulus of the soil mixed columns met the design criteria.

## Project facts

### Owner(s)

Ballina Bypass Alliance

### Keller business unit(s)

Keller Australia

### Main contractor(s)

RMS

### Solutions

Bearing capacity / settlement control

### Markets

Infrastructure

### Techniques

Dry soil mixing