



Australian Government

BUILDING OUR FUTURE



Transport for NSW

Soft soils fact sheet

Woolgoolga to Ballina Pacific Highway upgrade

The Australian and NSW governments are jointly funding the Woolgoolga to Ballina Pacific Highway upgrade. Transport for NSW, Pacific Complete and its contractor partners are working together to deliver the project.

The upgrade runs through a number of soft soil locations within the Clarence and Richmond River floodplains. Soft soils are often found in floodplain areas where there is a high water content in the ground.

Soft soils add complexities to road design and construction because they compress easily and are susceptible to movement. As such, we expect a degree of post-construction settlement* to continue over time. This means ongoing monitoring and planned intervention work will be required.

*Post-construction settlement refers to the vertical movement of the ground during the operation of the road.

Monitoring

Now the road has opened, we have implemented a programme of monitoring and inspection to manage and respond to post-construction settlement. This includes:

- installing geotechnical monitoring points
- carrying out surveys to monitor settlement
- regular inspections for ride quality.

Planned intervention

Because the upgrade is located in areas of significant soft soil, we have identified a number of planned intervention activities. Planned interventions may involve:

- resealing pavement cracks
- topping up existing asphalt layers
- jacking up bridge approaches.



What type of soft soil treatments were used on the Woolgoolga to Ballina upgrade?

Soft soil treatments are used to stabilise the underlying soil before the road is built. This is done to reduce the expected amount of settlement once the road is open.

A number of our soft soil sites were topped up with preload and surplus fill material to compress the soil and squeeze out the water prior to construction starting.

This settlement process took from six months to three years to complete in some locations. Once the settlement had reached the required level, we removed any surplus fill material and started building the new road.

In addition to fill material, we used a combination of wick drains and concrete injected columns to remove water and further stabilise the ground.

Fast facts



27 kilometres
of soft soil



More than
2 million
metres of wicks



More than 20
local
catchments



2 major
flood
plains



Over 1000
bore holes
drilled during
geotechnical
investigation



3509
concrete
injected
columns

Wick drains

Wick drains can help reduce settlement periods from years to months. They are inserted vertically into the ground and are used in conjunction with fill material to squeeze the water out like a sponge.

Wick drains have a plastic core and are surrounded by a geotextile fabric which prevents soil getting in. They are driven deep into the ground in large numbers with about 20 centimetres of the top of the wick exposed at the surface.

As more fill material is placed, the increased weight pushes the water out of the soft soils, through the wicks and out through the drainage channel.

Concrete injected columns

Concrete Injected Columns (CIC) were used in road embankments and bridge approaches to strengthen the underlying ground.

CIC are constructed by drilling through the soft soils and deep into the hard ground foundation with an auger. The auger has a hollow stem which pumps concrete into the excavated hole as it is extracted from the ground. As the concrete hardens it forms a column. When grouped together, CIC add additional strength and support to the road pavement and traffic load above.




North of the Clarence River, Harwood

Fun fact: We used these “Christmas trees” to measure the level of soft soil settlement over time. Did you ever see them on your travels?

Contact us

If you have any questions or would like more information, please contact the project team:

 1800 778 900

 pacific.highway@rms.nsw.gov.au

 pacifichighway.nsw.gov.au



This document contains important information about road projects in your area. If you require the services of an interpreter, please contact the Translating and Interpreting Service on 131 450 and ask them to call the project team on 1800 778 900. The interpreter will then assist you with translation.

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