

TOURLE STREET BRIDGE UPGRADE

FREYSSIMIX JET GROUT CUT-OFF BARRIER



Client: RTA
Consultant: SMEC

Contractor: Daracon Group
Specialist Contractor: Menard Bachy Pty Ltd

THE PROJECT

The Daracon Group were engaged by the RTA to construct a replacement for the existing Tourle Street Bridge in Newcastle, NSW. The bridge connects the Newcastle side of the Hunter River to Kooragang Island to the north.

As part of the new abutment foundation works, driven precast piles were to be installed to support the bridge take off. The fill materials through which these piles were to be driven were contaminated with tars and heavy hydrocarbons below the groundwater level. It was anticipated that the installation method for the piles may disturb the contaminated soils and hence may result in migration of contaminants into the Hunter River, thus causing a serious environmental incident.

It was recommended that a groundwater barrier (i.e. cutoff wall) be constructed prior to the pile installation process and hence provide a permanent barrier to contain any contaminants disturbed during the piling process.

MENARD BACHY'S ROLE

To meet the clients requirements and as an alternative to the suggested 'Slurry Wall' solution, Menard Bachy proposed to install a contiguous Jet Grouted wall running parallel to the river bank in front of the southern abutment. At roughly 25m in length this solution was deemed to be technically and commercially more suitable than the slurry wall option.

The main benefit of this solution was the minimal disturbance to the in-situ contaminated and un-contaminated soils during the construction process. Two rows of contiguous jet grouted piles were installed adjacent to each other, thus forming a continuous barrier in the desired location. The columns were installed several metres below existing ground level, a cutoff was formed in a layer of natural clay and the columns finished at the same RL as the mean high water level. This allowed both tidal waters and natural ground water flow into the river to pass over the wall and hence not artificially raise groundwater levels in the local area. Whilst doing this the barrier also provided the desired cutoff to prevent the flow of contaminants into the river from the contaminated soils below the water table.

The grout mix for the works included a small percentage of bentonite to guarantee the target permeability of 1×10^{-8} m/s and a low strength in the order of 1-2mpa. Production quality control and off site laboratory testing confirmed that these targets were met.

The Jet Grouting method allowed for flexibility in construction around an area of services, specifically in grouting around a high pressure mains pipe carrying water across the existing bridge. It also allowed for flexibility in the design as the wall had to be realigned and added to in length once works were underway.

The works were carried out on schedule and to the satisfaction of the main contractor and the client.