

SHOALHAVEN RIVER CROSSING (NOWRA NSW) SEWER MAIN REPAIR



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ABSTRACT

Nowra is situated 160 kilometres south of Sydney where the Princes Highway crosses the Shoalhaven River (Figure 1). The river supports an oyster industry, and is used for recreational activities.

Wastewater from North Nowra is transported across the 400 metre long Shoalhaven River Bridge via a 300mm AC surcharge main, suspended under the bridge with Gibault joints. Due to hot weather and up to 70mm movement of the bridge deck, a minor leak occurred at the expansion joint and first Gibault joint at the northern abutment. Repair work was carried out at night to avoid peak flows and allow transport of wastewater by tankers. Emergency repairs were affected after contacting EPA, oyster growers, adjacent residents and media. The bridge crossing was drained down twice more to complete permanent repairs.

At no time during any of the repair stages was there any loss of wastewater into the Shoalhaven River.



Figure 1: *Shoalhaven River bridge*

KEY WORDS

Shoalhaven, Nowra, sewer repair, Gibault, barge, expansion joint

1.0 INTRODUCTION

The Shoalhaven River supports an oyster industry, plus it is used for recreational fishing and many and varied recreational water activities. It is a breeding ground for many species of fish and therefore any incident that pollutes the river could have a major effect on public health and those activities.

North Nowra is a suburb of Nowra with a population of 5,445 permanent residents, producing approximately 1.2ML of wastewater /day. This is transported to the Nowra STP across the Shoalhaven River Bridge via a 300mm AC pipeline, which is suspended under the bridge. The 300mm AC pipeline is made up of 3.0 metre lengths of AC pipe connected together by 300mm Gibault joints (86 in total). (Figure 2)



Figure 2: 300mm AC main on right

The North Nowra surcharge main operates by filling and emptying, which is controlled by a pressure sensitive automatic opening & closing valve, located at the Nowra STP. The valve is normally closed and the main fills until it reaches a pressure of 180Kpa, at which time a signal is sent via telemetry for the valve to open. Once opened, it stays open for 30 minutes to allow for the main to empty and scour any sediment etc that may have built up each time the valve closes. This process operates continually unless there is either a power failure or the line pressure reaches 200Kpa which forces the valve to open and stay open until the normal operating conditions return. (Figure 3).



Figure 3: North Nowra surcharge main control valve

2.0 DISCUSSION

2.1 The Temporary Repairs

Shoalhaven Water received word that the pipeline appeared to have a minor leak at the northern abutment. Upon investigation it was found that the first gibault joint past the steel expansion/contraction slip joint was leaking. All the wastewater was contained in a stainless steel 200litre drum and natural bund at the abutment which was reinforced by sand bagging; it was pumped out by an effluent tanker. The leak was stemmed initially by tightening up the gibault joint while further investigations were carried out. (Figure 4)



Figure 4: *Initial leak*

The RTA was contacted in regards to the design specifications for the expansion and contraction of the bridge and Shoalhaven Water was advised that the bridge could move between 60 and 70 millimetres at each abutment depending on the bridge concrete temperature variation.

The conclusion reached was that the first two gibault joints on each of the northern and southern abutments were creeping along the pipes as a result of the gap between the pipes being the points of least resistance, instead of the design expansion and contraction joints.

The northern gibault joint had moved to a point where the rubber sealing ring had reached the gap between the two pipes and the decision was made to effect temporary repairs by removing that joint and replacing it and the first section of AC main with a new style multi fit collar and a section PVC pipe while all the materials for permanent repairs were sourced. (Figure 5).



Figure 5: *Temporary repair*

The bridge crossing was drained down starting at 10pm in the evening and the temporary repairs were completed by 5.00am the following morning in time for the morning peak flows, using a combination of scour points into effluent tankers. Tankers also emptied upstream pumping stations and all Wastewater was transported to the Bomaderry STP for treatment. (Figure 6).



Figure 6: *Effluent tanker*

It was decided to check all the remaining gibault joints for the rest of the length of the main under the bridge before undertaking permanent repairs. This was carried out by the use of a hired barge onto which a mobile elevated work platform was placed.

The barge was then manoeuvred into position and held there while the elevated platform was raised and the position of the gibault joints checked and their bolts also checked for the correct tension settings. There were no visible signs of any of the remaining gibault joints having moved. (Figures 7, 8 & 9).



Figure 7: *Barge & elevated work platform*



Figure 8: *Positioning barge*



2.2 **Figure 9:** *Checking gibault joints*
The Permanent Repairs

The bridge crossing was drained down twice more to complete the permanent repairs.

The permanent repairs consisted of the two existing steel expansion and contraction joints being cut off and in-house fabricated steel table flanges welded onto the steel main where it exited the bridge abutments, to which was bolted a double diaphragm bellow of a suitable pressure rating so as it would flex before any movement of any of the remaining gibault joints. The first sections of AC pipe on each side were discarded and new sections of ductile iron, cement lined (DICL) pipe were fitted in their place with new multifit collars.

Two tee sections and locked scour valves were also added at each repair site, along with a new stop valve and a scour point either side of the stop valve inserted as close to the southern abutment as possible to facilitate any future needs to drain down the bridge crossing for repairs or maintenance. (Figures 10, 11 & 12).



Figure 10: *Welding table flange in place*



Figure 11: *New expansion joint*



Figure 12: *Completed repair*

The temporary and permanent repairs were carried out by Shoalhaven City Council's Mechanical Services Section, assisted by the Northern Wastewater Headworks and Wastewater Distribution Maintenance Sections.

All the remaining gibault joints have been witnessed marked and are being monitored for any signs of movement and creep and to date there been no signs of either, especially the

first two gibault joints after each of the new multifit collars.

5.0 CONCLUSION

The local oyster industry is a key stakeholder in Shoalhaven Water's business. Significant emphasis is placed on ensuring that sewerage problems have minimal impact on their activities.

At no time during any of the repair stages was there any loss of wastewater into the Shoalhaven River.

6.0 ACKNOWLEDGEMENTS

To the Shoalhaven City Council's Mechanical Services Section and the Northern Wastewater Headworks and Wastewater Distribution Maintenance Sections who all carried out the temporary and permanent repairs.