

Temuka water event (asbestos)

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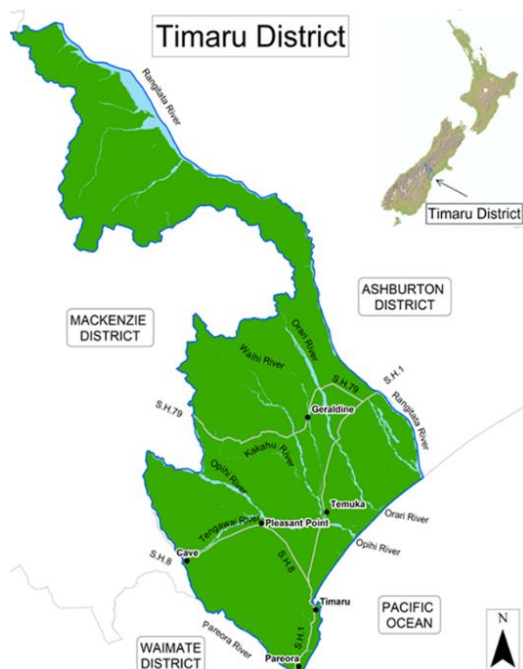
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ABSTRACT: At 4.45 pm on the 5th of December 2017 advice was received that the Temuka Water Supply contained 'enormous amounts of asbestos fibres'. This advice was received following the analysis of water samples that were causing washing machines and shower heads to block with 'fluffy like' material. Medical advice was urgently obtained which confirmed that when ingested asbestos fibres were not a health hazard but when inhaled they could cause health issues such as lung cancer. A comprehensive media plan was put in place while a strategy was urgently developed to overcome the immediate problem and determine a long term solution. A filtration plant was assembled and commissioned by the 20th of December 2017 and on the 12th of January 2018 an extraordinary meeting of the Timaru District Council approved the replacement of 9 km of 300 mm Asbestos Cement trunk water main with a budget of \$3.5 million. By the 26th of March 2018 the 450mm HDPE replacement pipeline had been installed and made operational. The pipeline components and the physical work were generally procured via competitive processes and at the peak of construction 15 excavators were involved across six work fronts. The presentation describes the timelines, communication techniques, procurement methods, construction details and the outcome of this urgent work.

KEYWORDS: asbestos, watermain, replacement.

1 Introduction

Timaru District Council had to call on all its resources to ensure the continuation of its water supply after a catastrophic issue with the main trunk water main supplying Temuka.



2 Background

In late November 2017, there was a spike in the number of water customers in the South Canterbury town of Temuka complaining of low water pressure. Inspection of tap filters showed that a 'fluffy' white substance was blocking internal plumbing fixtures in many houses and on filters at the property shut off tap. Samples were sent for laboratory testing.

Our initial fears that this was asbestos were confirmed by further testing including type and concentration levels.

An internal task force was set up on the first day of the issue with three main aims: identifying where the contamination was coming from, finding a short term solution to the issue, and dealing with public health and communication initiatives.

We had been given confirmation by the Medical Officer of Public Health that there were no health risks of drinking water containing even high levels of asbestos, but from a consumer perspective this was unacceptable, so this situation needed to be resolved with real haste.

As a short term move, we brought in water tankers to a central point in town to enable people who had concerns, to access an alternative source of drinking water.

As the issue was being found throughout the network serving a population of 4000, the most likely source was identified as being 9km of asbestos cement pipe in the 12km trunk water main, which runs from the bore water source at the Orari River to the edge of Temuka. This 300mm diameter main was installed in 1964 and was the sole source of water for the township.

A pipe sample showed that the invert of the pipe was for some unknown reason eroding and delaminating along its entire length. The effect was the deposition of a significant amount of asbestos into the water. The delamination was also causing the pipe to lose its structural integrity, giving the whole pipe the texture of 'wet weetbix'.

The 9km of pipe would need replacing, and quickly!

2.1 Interim Solution

While the main issue was being worked on, a second team was also working on a short term solution to remove the asbestos from the water coming into town. Staff knew of a temporary filtration plant that had been commissioned as a backup following the Christchurch earthquakes and after some consultation, thought it would be suitable for re-use.

By the 17th of December, 3 weeks after the discovery, the filtration plant had been sourced and was installed inline at the end of the water main. This worked to remove the bulk of the asbestos in the system, and was a major step in restoring public confidence going into Christmas.

The filtration system resulted in lower water pressure for the town, so we needed the help of the community to respond to the level 5 water restrictions we imposed.

2.2 Final Solution

In parallel to this, we had a team working on the design and specifications for the new 9km pipeline. A pre-tender meeting was also held with local contractors to ensure they knew this job was coming, what it would involve and for them to be prepared. At this briefing there was agreement that the approach to the project was acceptable to all.

An Extraordinary Council meeting was held on the 12th of January 2018 where Council signed off the \$3.5m proposal for immediate implementation. The proposal included the concept of Council being the project managers and that there would be several work fronts on foot at any one time.

We set ourselves the deadline of Easter, being the 30th of March 2018.

2.3 Construction

The installation was set up as several different contracts, four for construction, one for pipe supply and one for pipe welding. We also had a staff member working separately to obtain land entry approvals, permissions, and resource consenting.

The formulation of a workable project plan was critical to installation success. The pipe supplier in the North Island prioritised the manufacture and supply of the pipes, being 450mm HDPE. The pipes arrived ahead of

schedule, ready to be welded on-site into larger strings that the contractors then placed into the trenches when dug.

The delivery of this job to meet time and quality standards required us to work at a high level of trust and collaboration with multiple contractors, who were in turn all working in parallel.

2.4 Critical Path

A project critical path was developed and monitored at weekly project control group meetings. Given the urgency of the work, it was usual to have 4 to 6 key project elements on the initial path at all times.

Initially it was concept design, followed by approvals and then construction deliverables.

The work was 2 weeks ahead of the critical path until Cyclone Gita arrived on the 20th of February 2018. This swamped the work sites and resulted in at least 10 days of non-productive work time.

2.5 Risk

A risk plan was formulated for the project which identified a number of risks that would normally be allocated to the head contractor when there is such an entity, however, the urgency of the work and the project delivery method chosen meant that the Principal, being Timaru District Council, owned many of the project risks. As an example, the ground water risk was owned by the Timaru District Council and when Cyclone Gita arrived, it resulted in additional costs being incurred. These costs were associated with ground de-watering and pipeline cleaning.

The concept of the Principal owning the risk associated with the project was a very useful experience for our own staff. The understanding of risk, the cost of risk both in addition to work and time delays, have both added value to the understanding of construction risk.

The job, which included multiple road, railway and creek crossings, was ready for final commissioning on the morning of the 29th of March 2018, 119 days after the initial discovery. The old AC water main, and its filtration plant were taken out of commission that day.

There was no particular fanfare at the time, but the job was completed on time, meeting

all standards for procurement and quality and at a reasonable cost to ratepayers.



Crossing existing 300mm AC pipe

3 Collaborative approach

Delivering a project of this size at this speed could not have been achieved without a high level of collaboration and trust with the community, our suppliers and contractors.

3.1 General public/Medical Officer of Health

Residents of Temuka were extremely concerned about having high levels of asbestos in their water supply. As far as we knew, it was one of the first major communities in New Zealand that had suffered this issue, and we did not have a lot of prior knowledge to work on.

In the initial days of the crisis we had to collaborate closely with Community and Public Health and particularly the Medical Officer of Health to ensure that we could provide real assurance to people that the water was still safe to use as normal.

The Medical Officer of Health was unequivocal in the advice that there has been extensive global research into communities with asbestos in their drinking water, along with numerous animal studies, and they have not demonstrated any health effects of ingesting asbestos.

We had an incredible amount of media interest in the short term, every single media agency was in touch with us regarding the issue in the first few days and there was a

massive amount of discussion on social media.

This, plus the fact we had a short term solution underway, gave us the confidence to front foot the issue in the media, have robust and honest conversations with the community both in person and particularly on social media.

The media interest died down quite quickly, even at a local level, but social media required careful and active management to ensure that the public did not lose trust in the project and our ability to manage it.

Having set the level of open, honest communication meant the community were a lot more understanding when we had water outages during the process and treated necessary actions, such as water conservation, seriously.

Once the project had been signed off by Council, we dropped an information leaflet to every residence in the town outlining what had been done to date, what the next steps were and committing to the end of March for the permanent fix.

A variable message board was also set up in Temuka so visitors could be made aware of the issue. Social media was actively managed knowing that leaving an information vacuum would lead to scaremongering by keyboard warriors.

To mark the near end of project, and to thank everyone for their patience and assistance, we held a community fun day at the Temuka swimming pool, which was well attended.

3.2 Contractors

Despite being a relatively small community we have a reasonable number of well-equipped and highly skilled contractors, and we knew that for this project to be delivered to a tight timeframe it would be critical to collaborate across all fronts.

Early on in the piece, when we had confirmed that the replacement was going ahead, we held a meeting for all approved contractors to outline the plan and the timeframe and what we needed from them.

The contractors showed an amazing level of local spirit and went above and beyond to ensure that everything from the tender process, to the job itself went to plan. During the works, there were five separate

contractors all working to deliver the same aim.

At the peak of construction, 15 excavators were involved across 6 work fronts.

The contractors all shared the same sense of community good in the work they were doing, and we suspect a degree of professional rivalry spurred the job on as well.



Zone 1

3.3 Suppliers

Tendering and sourcing 9km of HDPE pipe at a months notice was not a small task by any stretch of the imagination, but again collaboration with the supplier ensured that the pipe was on the ground ahead of when our contractors needed it.

A full but short tender process was held for pipe supply, which was won by ASMUS Water in Hamilton. ASMUS stepped up in this case by diverting already fabricated pipes destined for a different job to our project, giving us a huge head start.

The pipes were delivered regularly from Hamilton over five weeks and it was said that there was a part of the pipeline somewhere on State Highway 1 every day.

At no time were contractors ever left waiting for pipes to be delivered. This was incredibly beneficial for the project, as it enabled time to weld the pipe strings and ensure that the highest levels of quality control were adhered to.

3.4 Landowners and Consenting Authorities

As we had to keep the water flowing to Temuka while we built the new main, we had to plot a new parallel route between the source and the town for the replacement pipeline.

One of the biggest areas where we required cooperation was in gaining easements from the three farmers whose paddocks we had to cross. Knowing that any delays in this vital area could quickly sink the project, but that we had to make sure we were providing best value for ratepayers, this was a delicate process.

Thanks to intensive work by our negotiators and ongoing communication during the project, we managed to not only gain the easements for the pipeline, we finished the project with a positive working relationship with the landowners.

While the majority of the pipe was within public land, there were some significant other issues that we had to deal with. This included working with KiwiRail to put the pipe under the Main South Trunk Line and the New Zealand Transport Agency to cross State Highway 1. Both of these were done with no closures to road or rail.

There were also significant underground assets that we had to work around, including a particularly challenging part of the installation where we had to 'thread the needle' by getting the pipe between 3 fibre optic cables and a major trunk sewer.

Most of the work was exempt from requiring consents from a Timaru District Council perspective. The design for spanning a formed creek crossing that formed an important part of the job ensured a Resource Consent from Environment Canterbury was not required. A consent to discharge water used to disinfect the new pipeline was required and we had to work to ensure this got through as quickly as possible so as not to delay the job.

3.5 Elected Members

Despite the fact that the job was deemed necessary from an early point in the project, Council's procurement strategy meant that we could not launch a \$3.5m project without proper scrutiny and authority.

We ensured that Council and the local Community Board was kept well informed about the project at all times and therefore when the Annual Report sign off was being debated there was a full understanding of the variations in order to provide for this project and the consequential delays to other projects.

4 Innovation

The Council was in uncharted territory for much of this project, this meant that we had to take an innovative approach on several fronts to ensure we got it over the line.

4.1 Filtration plant

One of the major positives in the project was the sourcing and installation of the temporary filtration system, which significantly lowered the amount of visible asbestos in the system and probably was the single most effective tool in allaying the fears of the public.

We would have struggled to keep the community on-side for the whole period of the project had we not been able to install this quickly.

The filtration plant had been sitting in Christchurch in-case it was required for an emergency deployment during the major infrastructural repairs following the earthquake. Our Development and Renewals Engineer was aware of the plant and suggested that we may be able to use it as a stop gap measure while the replacement work was underway.

The plant was sourced, modified and installed within 3 weeks of the problem being discovered.



4.2 Contract Management

The installation plan was for Council to provide the pipe, the fittings and to arrange for contractors to weld the pipe, install the pipe and to disinfect and commission the new pipeline.

This method also required Council to accept the risks associated with the work and to coordinate all facets of the materials supply and installation work across multiple work fronts.

This approach was taken in order to achieve the self-imposed timeframes. Direct control of all work activities including the coordination of approvals, suppliers and installers, was an essential element of completing the work prior to Easter.

Inevitably this meant that Council accepted a significant degree of construction risk associated with groundwater and weather. These risks were best managed by those in control and Cyclone Gita did cause two weeks delay in the construction phase. This delay was overcome by accelerating the disinfection and commissioning of the completed pipeline in the following weeks.

The project management concept was not the norm for us but it did ensure that the required community outcome was achieved.

5 Conclusion

The continuity of supply of potable water to the Temuka Community is a fundamental role of the Timaru District Council. The discovery of escalating amounts of asbestos fibres within the water network meant that decisive action was required in order to overcome initial public health perceptions and then to provide a workable solution.

The installation of a temporary filtration plant and the design and installation of a new 9km trunk water main within 119 days ensured that the community received a potable water service, even under particularly complex circumstances.

The 2018 Timaru District Council community survey showed that in Temuka there was absolutely no diminishing of the satisfaction score for the water supply. This result can be sheeted home to both the immediate response and the delivered solution within a relatively short time frame of 119 days.