

# Terefil® Used to Fill and Decommission Ageing Wastewater Infrastructure in New Zealand Parkland



INDUSTRY	Infrastructure
STRUCTURE	Decommissioned wastewater transmission lines
PROBLEM	Fill abandoned pipes
LOCATION	Auckland, New Zealand
DURATION / YEAR	5 days / January 2018
TECHNOLOGY	Terefil®
BUSINESS UNIT	Mainmark New Zealand

Above: (Left) The end of the ageing infrastructure was accessed from the new network. (Right) The network to be decommissioned ran through a popular public parkland that was difficult for vehicles or machinery to access.

## Summary

A new sewer main was being installed to replace ageing infrastructure in Auckland, New Zealand. The old infrastructure consisted of a concrete wastewater transmission network (pipes), with the main sewer running alongside and under a stream in a parkland that is frequented by the local community.

There were concerns that ground settlement or degradation could cause the ageing pipe networks to collapse, or allow for groundwater to penetrate, leading to the creation of sinkholes (tomos), a common issue in Auckland, and pose a risk to members of the public.

The asset owner needed an environmentally conscious solution to decommission the old sewer pipes, while protecting public safety and avoiding the risk of contamination during works.

The old pipes were located in an area of the parkland that is extremely difficult for vehicles and large machinery to access. Re-routing or digging out the redundant pipes was deemed unfeasible due to the difficulty of bringing heavy machinery to the area as well as the disruption the machinery would cause to the public visiting the parkland. Major excavation works could also potentially compromise the ageing structures, and increase the risk of pollution should the pipes leak into the parkland's natural environment.

Mainmark was appointed by the asset owner to decommission the old pipe infrastructure by pumping Terefil®, an environmentally inert fill solution, into the existing pipes. The Mainmark team successfully completed the complex project in 5 days over an 8-day period, without any need to excavate the site.

## Terefil® Used to Fill and Decommission Ageing Wastewater Infrastructure in New Zealand Parkland continued

### Objectives

The primary objective of this project was to safely fill the existing sewer system situated beneath an area of public parkland that had limited access.

As it was not possible to bring vehicles or machinery close to the pipes' location, a meticulously planned approach was required that would allow technicians to deliver the solution through a limited number of locations where site access was possible.

It was vital to prevent damage to the existing infrastructure, to minimise risk of seepage contaminating the surrounding waterway or parkland, while at the same time delivering the solution without disrupting public access to the park.

### Solution

Mainmark's Terefil was the ideal solution to achieve project outcomes while working around the challenges of restricted site access. Terefil is a cementitious grout that is both strong and lightweight, reducing the imposed load on the surrounding soils when compared to other fill methods. This reduces the chance of future damage-causing settlement such as collapse of the structure, or sinkhole formation from groundwater penetration.

As the main sewer ran alongside and under a stream in the parkland area, there were limited locations where the Terefil could be pumped into the pipes. In order to navigate this restriction, it was determined that the Terefil solution could be pumped over long distances from a number of carefully considered sections of the sewer.

Mainmark installed 24 end forms into the pipes via existing manholes, to seal off and isolate the redundant pipeline. Terefil was then pumped from the existing manholes into the interconnected abandoned pipelines. From these access points, both the main pipe and the larger network of lateral pipes that branched off the main sewer were successfully filled.

Terefil cementitious grout filled the wastewater network which included 174m of 300mm diameter pipe (13m<sup>3</sup>), 630m of 600mm diameter pipe (179m<sup>3</sup>), and 60m of 225mm diameter pipe (3m<sup>3</sup>). A total of 132m<sup>3</sup> of Terefil solution was mixed and pumped into the abandoned pipes. The expansion factor of the Terefil grout meant that less ready-mix agitator trucks were required on site, further lessening interruption to the community.

Once pumping was complete, Mainmark then filled the existing manholes via gravity feed, 300m below existing ground level. Several of the manholes that did not have vehicular access were filled from the bottom up whilst pumping grout through the main line.

Being both highly flowable and environmentally inert, with low shrinkage and zero bleed, Terefil was deemed safe for the natural environment, providing peace of mind for the asset owner. The remediation project was completed in just 5 days, with public access to the park maintained throughout the works.



Access to pumping locations was limited so Mainmark planned carefully to avoid significant disruption to the public parkland.