



6.2 POTABLE WATER TRANSGRESSIONS

1. PURPOSE

For the Committee to be informed of the actions taken following the recent potable water transgressions.

2. SIGNIFICANCE

The matters for decision in this report are not considered to be of significance under the Significance and Engagement Policy.

3. BACKGROUND

3.1 Carterton's supply and treatment

The Carterton drinking water supply is classified under the Drinking-Water Standards for New Zealand, as a minor sized urban community supply providing water to the urban population.

Water is provided from two sources, the Kaipaitangata Stream, eight kilometres west of the Carterton township and the Frederick Street bores in Carterton.

Water from the Kaipaitangata Stream is treated at the Kaipaitangata Water Treatment Plant and stored in two reservoirs, a concrete storage reservoir (513m³) and a timber storage reservoir (960m³). The water supply comes into the urban network down a water supply trunk main from the WTP storage tanks to the urban reticulation network via Brooklyn Road where it tees into the reticulation at Lincoln Road.

At the top end of the trunk main, five properties are connected into the water supply and therefore the Kapi WTP must remain in operation to supply these properties. When the Fredrick Street WTP is in operation a Bermad Valve closes (keeping the Kaipaitangata watermain separated from the Fredrick Street water supply).

Water from the Fredrick Street bores is treated at the Fredrick Street Water Treatment Plant and stored into two timber tanks. The water supply is then connected into the reticulation network at Lincoln Road.

3.2 Escherichia coli

Escherichia coli (E. coli) was identified in 1885 by the German paediatrician, Theodor Escherich. E. coli is widely distributed in the intestine of humans and warm-blooded animals and is the predominant anaerobe in the bowel and part of

the essential intestinal flora that maintains the physiology of the healthy host, including humans.

Most E. coli bacteria are harmless however, some strains can cause illness. The presence of E. coli in a drinking water sample usually indicates recent faecal contamination. That means there is a greater risk there are bugs that can cause illness being present in the water e.g. campylobacter, giardia, cryptosporidium.

E. coli O157:H7 is the most frequently isolated serotype from those becoming ill.

When a drinking water sample is reported as “E. coli present,” it does not mean that O157:H7 is present. However, it does indicate recent faecal contamination. Boiling or disinfecting contaminated drinking water destroys all forms of E. coli, whether or not they can cause illness in humans.

4. EVENTS

On Tuesday the 9th March 2021, a testing point in the network failed to meet the E-coli Maximum Allowable Variation (MAV) limit of <1 MPN per 100ml in accordance with the Drinking-Water Standards for New Zealand 2005 (Revised 2018). The result was 2 MPN per 100ml.

In response to the failed test a text alert was sent to the Council. The Ministry of Health was also included in the text alert notifications and contact was made with them soon after the alert at approximately 3pm. It was agreed to undertake another sample at the testing point and that afternoon the sample was delivered directly to the testing laboratory in Seaview, Eurofins ELS Limited. The re-testing in response to a transgression in a drinking-water supply distribution zone is in accordance with the Drinking-Water Standards for New Zealand.

The subsequent re-test result was processed, and the Council was notified on Wednesday afternoon as meeting the MAV limit of <1 MPN per 100ml.

On Friday the 12th March 2021, two testing points in the network failed to meet the E-coli MAV limit with the retest process being repeated and daily sampling commenced along with a boiled water notice being issued.

A total of eight E-coli detections were found all within the network as shown below in table 1.

| Date Notified | Location | Reading |
|---------------|----------------------------|-------------|
| 9th March | Fisher Place | 2 MPN/100mL |
| 12th March | Park Road | 3 MPN/100mL |
| | Kent Street | 1 MPN/100mL |
| 17th March | Hilton Road | 1 MPN/100mL |
| | Brooklyn Road (bottom end) | 6 MPN/100mL |
| 18th March | Brooklyn Road (top end) | 5 MPN/100mL |
| 28th March | Brooklyn Road Underpass | 2 MPN/100mL |
| 1st April | Fisher Place | 1MPN/100mL |

Table 1: dates, locations, and recorded levels of E. coli readings

A map of Council testing sites is attached (**Attachment 1**).

During March CDC was using a mix of both the Frederick Street water treatment plant (2nd – 12th March as well as 23rd March - ongoing) and the Kaipaitangata Water Treatment Plant (13th – 22nd March). At no time during this period was there a recording of E. coli from either of the plants.

5. LIFT AND RE-SET OF THE BOILED WATER NOTICE

The first boiled water notice was issued on the afternoon of Friday 12th March, on the advice of Regional Public Health. The Drinking-Water Standards require a water provider to have three clear days of testing prior to lifting a boiled water notice. Council staff were aware of the disruption that a notice causes and also of the low-level nature of the E. coli readings.

On Thursday 25th March the intention to lift the boiled water notice was communicated to Regional Public Health, provided the Friday's test results were clear. The results were not due back from the laboratory until Saturday 27th. The results were late in being provided and were not emailed until late Saturday night when a decision was made to make the announcement of the lift Sunday morning, which was followed.

An alert from Eurofins lab was received on the afternoon of Sunday 28th March as a result of Saturday's testing identifying an E. coli reading of 2 MPN/100mL and the boiled water notice was re-instated. The notice was finally lifted on 16 April 2021 after discussions with our Drinking Water Assessor and Regional Public Health. This followed 15 days of clear results.

6. PUBLIC INFORMATION

When the boiled water notice was first issued, at 3pm on Friday 12th March, a media statement was immediately sent to local radio and national news media outlets. A set of frequently asked questions was developed and posted on the CDC website and social media channels (CDC and Information Centre) along with a copy of the media statement.

The electronic notice board at Carrington Park carried the notice and local hospitality businesses were contacted via email and in person visits were undertaken with poster drop off, a physical copy of the media statement and FAQs.

Emails were sent to Age Concern Wairarapa, Digital Seniors, Wairarapa Community Networks, Neighbourhood Support, all Carterton schools and preschools, the District Health Board, neighbouring Councils, Wellington Region Emergency Management Office and Regional Public Health.

New World agreed to place posters with a QR code that linked to our website and FAQs. The automatic question and answer function via Facebook messenger was updated to allow instant answers to questions regarding the boiled water notice.

Wellington Region Emergency Management Office advised Council that we could not make use of the text message alert system in place for emergencies as we did not meet the threshold of imminent life endangerment.

Fulton Hogan and Higgins were both approached to hire the trailer based electronic notice boards. None were available so two large print signs were placed at each end of town.

Emails weren't sent to urban ratepayers for the first boil water notice as potential privacy issues were raised but were sent from 15th March onwards. An initial subscription base of just over 100 people increased to 400 on CDC's newsletter and these were also emailed with any communications and FAQs.

Articles were published in the April Crier, April Midweek and April quarterly newsletter which goes out with rates accounts to request email addresses so we can notify people directly if further circumstances require us to do so.

With the second boil water notice, a large rubber bladder was gratefully accepted on loan from Upper Hutt City Council.

7. ACTIONS UNDERTAKEN TO ADDRESS TRANSGRESSION

On the evening of Friday 12th March, following the second positive E. coli reading from Park Road and Kent Street, CDC was contacted by Wellington Water's Chief Advisor Potable Water, Network Development and Delivery, Laurence Edwards and CEO of Lutra, Jason Colton, offering advice and guidance. This offer was gratefully received, and a zoom conference call was organised for the following afternoon to discuss the situation and potential steps to be taken.

Following the conference call both Wellington Water and Lutra agreed to conduct an onsite high-level review of the Frederick Street plant. Following this visit adjustments to the start-up procedure for the Frederick Street plant were made to alter the sequence of valve opening and closing while flushing water to waste while the UV reactors warmed up. Improvements to the plant were also suggested by Lutra and all work that could be done immediately was undertaken.

Service agents were requested to inspect the UV reactors and chlorine dosing pumps at the Kaipaitangata. The chlorine dosing pump was inspected at Frederick Street and a new chlorine analyser installed and verified as it was coming due for replacement. The UV control cabinet was replaced at Kaipaitangata while the servicing was taking place.

Supervisory Control and Data Acquisition (SCADA) is a system of software and hardware elements that allows the monitoring and processing of real-time data that interact with devices such as sensors, valves, pumps, and motors. The SCADA data for both water treatment plants was reviewed by Lutra and Wellington Water for any obvious errors in either plants workings.

Sampling of the treatment plants, as well as the reticulation system, moved from the normal weekly tests to daily. The sample points used for testing increased from 9 to 18. Sampling from Saturday 13th March was doubled to make a mirrored sample run to two different testing laboratories. One set of tests were sent to Eurofins in Petone and the other to Central Environmental Labs in Palmerston North. This was to rule out any potential false positive responses.

On Monday 15th March flushing throughout the network was undertaken, one of the Frederick Street reservoirs was drained, inspected, and cleaned with a super

chlorinated spray mix. The existing mesh anti-vermin grates were replaced with stainless steel. On the Tuesday the other reservoir was drained, inspected, and cleaned with a super chlorinated spray mix. Both tanks were tested for ground leaks. All known backflows on the reticulation network and in the commercial sector were retested.

Eurofins laboratory General Manager, Rob Deacon, undertook a review of sampling techniques used by CDC staff and advised on improvements that could be made. These were immediately introduced with refresher training for all sampling staff to be undertaken the following week. It was also recommended that sampling points used were dedicated and secure. A design was offered (see Figure 1 below) and an order was placed for manufacture.

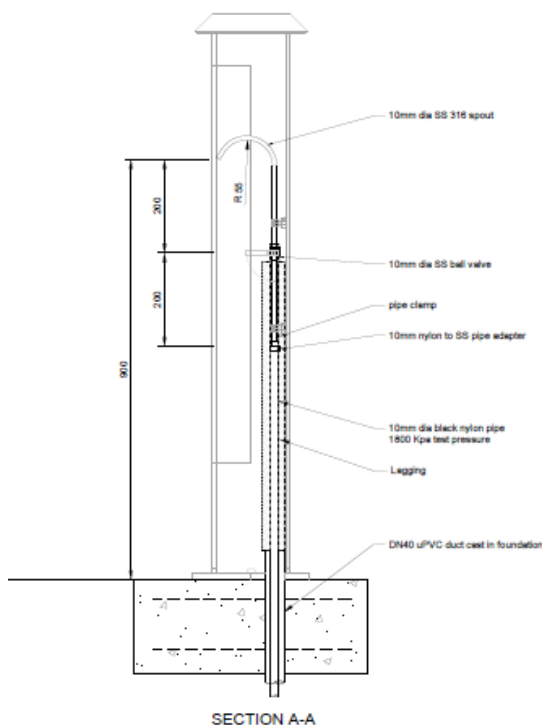


Figure 1: Schematic of dedicated and secure potable water sampling points

Disappointingly, CDC’s existing flushing plan had not been updated for some time. This was identified in the first week of the response, corrected and flushing again undertaken. The previous flushing plan had not been altered to reflect the growth in town and old flushing points needed to be moved and new ones added to encompass all dead ends. The number of flushing points moved from 44 to 66. Flushing times were derived from the pipe size and calculated to move three times the amount of water through the pipe. When an extensive flush was undertaken the reservoirs at the Kaipaitangata were nearly drained requiring the development of a three-level flushing plan based on the water treatment plant in use at the time and free chlorine measurements taken prior, and during, flushing.

Late on Thursday 18th March 2021 Council identified a potential point of contamination to the drinking water supply. Approximately 200m from the

Kaipaitangata treatment plant, along the water trunk mains leading into town there is a disused scour valve. At some point in the past 2 decades a culvert that crossed under the road was installed. Also created was a sump that incorporated the scour valve outlet (Figure 2). Critically, the scour valve outlet was at a level below both the culvert inlet and outlet creating a pool in which the disused scour valve outlet sat (Figure 3). The pressure at this high end of the Kaipaitangata main trunk line is surprisingly light at approx. 20psi and with a potential of a failure of the scour valve allowing for the ponded and stagnant water to enter the main trunk line.



Figure 2: The foreground shows the culvert sump with the outlet of the culvert seen in the picture.



Figure 3: A view of the culvert (top left) and the scour valve visible at the base of the trench.

On the morning of Friday 19th March, the sump was dug out and piping installed (Figure 4) to remove any discharge and eliminate any contamination potential with headworks being completed in the following week. Extensive reticulation flushing was undertaken commencing the afternoon of Friday 19th March and completed on Saturday 20th.



Figure 4: Pipe extension attached to both the culvert and replaced scour valve outlet.

While the scour valve points to a likely source of contamination staff continued to seek out any potential source of contamination and to make improvements wherever they could be identified.

A scour valve on Lincoln Road was found to not have been installed as required from a recent development and was recognised as leaving a potential 70m of pipe work without a flushing point.

The line has been flushed and the scour valve is being installed immediately.

An air valve along Brooklyn Road was dismantled, inspected, super chlorinated and returned. The concrete reservoir at the Kaipaitangata was drained, inspected, and cleaned with a super chlorinated mix.

All smart meter data was examined and a new reading was conducted to identify any potential backflow issues. Some negative numbers on the readings were physically checked and found to be replacement meters on some previous faulty meters. The new meters started at a zero count and were less than the old meters and showed up as potentially allowing for backflow, but this was eliminated as a potential source.

On 1 April 2021 a further low-level E. coli reading was reported at Fisher Place.

At the Lincoln road end of the main trunk line there are several valves to stop water entering onto the reticulation system from the Kaipaitangata when the Frederick Street bores are in use. Two valves had been closed to prevent this happening. Both the pressure reducing Bermad valve and butterfly valve were inspected to ascertain if there were any water passing from the main trunk line into the reticulation system. The Bermad valve position indicator was replaced but there was no physical water movement found between the main trunk line and the reticulation system.

Leak Detection Services were engaged to seek out any leaks in the network that may present an avenue for possible contamination. Leak Detection Services use audio detection techniques to identify constant water flow, and combined with a pressure drop, a potential source of contaminant egress. These services are regularly employed by CDC to survey the reticulation system and were last on site in January 2021. Any audio identification of an underground leak can mask any others that may be in the area and it was for this reason Leak Detection Services were asked to return. The reticulation system had not had any reduction in pressure across the entire time period making leak egress a low possibility of contamination.

CDC were notified of a leak on the corner of Lincoln/Victoria which was immediately repaired.

Some of the contamination readings and timings of those readings coincided with sub-division water connections. It is possible that during connections when water mains are turned off (and therefore no pressure drop detected) and new lines connected contaminants could enter the system if the new lines had not properly been treated. When one of these connections was transferred to Council ownership and Council undertook a precautionary flush of the line, particulate matter was

identified in the water. Contractors are now only permitted to connect to the Council water mains if they have pre-approval to do so.

8. FREDERICK STREET PLANT UPGRADE

Council are mid-way through a planned upgrade of the Frederick Street treatment plant. The timing of the upgrades has been constricted due to the requirements of having to rely on supply through the Kaipaitangata treatment plant while working on the Frederick Street plant.

The Kaipaitangata is a surface take that we cannot use if flows are below 83 litres per second and will also shut down with high turbidity readings. The window for work to be undertaken on the Frederick Street plant needs to fit within the window of water availability, i.e. outside summer months and weather forecasting. Heavy rain will increase the turbidity of the water and trigger an automatic shutdown of the UVs. We are reluctant to rely on weather event forecasting for any more than 3 or 4 days in advance therefore work on the Frederick Street plant needs to be staged so that each tranche of work must be in a 3 to 4-day window.

Furthermore, the availability of supplies is currently not easily sourced. All parts and potential parts (should other items be identified during a particular tranche of work) must be on-hand prior to work commencing.

The upgrade of the Frederick Street plant was identified by CDC as a suitable funding mechanism for the Three Waters funding received by Council in November 2020. Council had received \$300,000 plus its own planned capex expenditure to undertake the work.

This work is a high priority and will be accelerated as much as possible within the limitations described. The upgrades include the installation of a new power supply, new cabinets and wiring for SCADA. New variable speed drives for the reticulation pumps, automatic switch overs to generator during a power outage, new chlorine dosing pumps and SCADA control. All plant, equipment, and controls have been incorporated into new schematics.

9. FURTHER STEPS

New sampling storage procedures have already been put in place requiring the purchase of a dedicated sample fridge and separate area to hold sampling equipment.

A database for collation and centralisation of sampling data has been obtained to aid in trend identification and will hold all Council testing data.

Epro NZ has been contracted to undertake CDC's Drinking Water Safety Plan in line with new Drinking water Standards as outlined by Taumata Arowai. The Drinking water standards are still in draft form and the plan will be submitted at the end of the year when more certainty of the requirements are known.

CDC has reduced to twice weekly testing as advised by the Drinking Water Assessor, coupled with real time monitoring and recording for free chlorine levels with daily flushing.

Lutra have been tasked to provide a detailed review of the Kaipaitangata plant to ascertain what, if any, upgrade requirements may be necessary in the future.

10. CONSIDERATIONS

10.1 Climate change

There are no climate change considerations for this report.

10.2 Tāngata whenua

There are no impacts specific to Tāngata whenua in this report.

10.3 Financial impact

The costs associated with the E. coli response were not budgeted for and are yet to be collated for unbudgeted expenditure considerations.

10.4 Community Engagement requirements

This report summaries high-level responsive work already undertaken and there is no consultation required.

10.5 Risks

There are no risks with this report.

11. RECOMMENDATION

That the Committee:

1. **Receives** the report.
2. **Notes** the events in relation to elevated E-coli in the Carterton drinking water supply.
3. **Notes** the responses to the E-coli, and **agrees** the responses were appropriate for the circumstances.

Notes the Frederick Street treatment plant upgrade and the further steps being taken will enable the Council to meet the Drinking Water Standards.

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Attachments: 1. Testing Sites Map