

# INNOVATION, SUSTAINABILITY + DIGITAL IN PRACTICE

ISDIP

## ISDIP052 Utilisation of Recycled Water in Low Carbon Concrete.

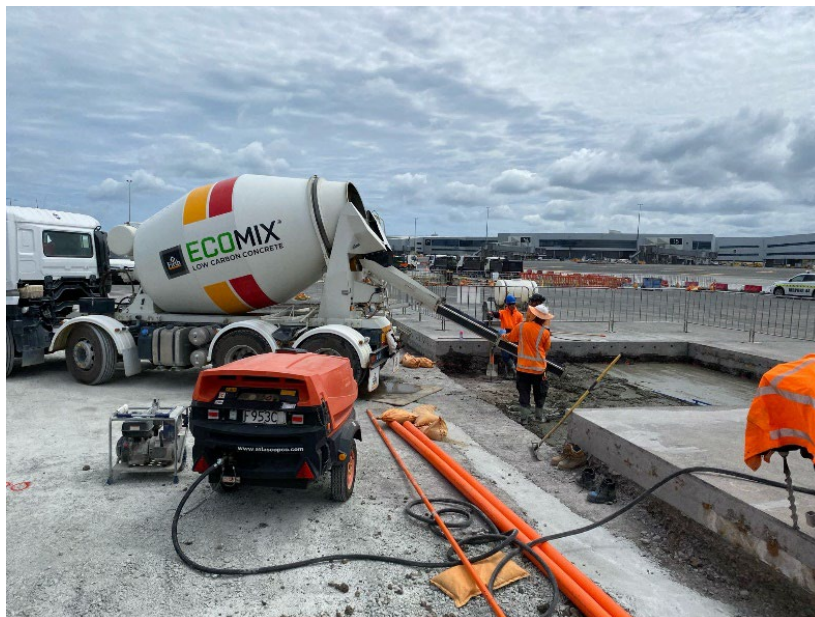
Date	March 2024
Business Unit	Brian Perry Civil
Project & Region	Foam Tank – Northern Region
ISC Themes	<ul style="list-style-type: none"><li>• Innovation</li><li>• Emissions, Pollution and Waste</li><li>• Water</li></ul>

### 1 What Happened?

Brian Perry Civil (BPC) is providing main contractor services for the Hangar 4 Foam Tank Project. This building project has a Green Star requirement that encourages sustainable thinking with our supply chain. As a large portion of our carbon footprint is linked to concrete usage, we are looking for ways to reduce the Global Warming Potential (GWP) of the concrete that we use.

### 2 What Are We Doing Differently?

BPC and Firth began workshopping how we could further reduce the GWP of the concrete. The workshopping identified emissions could be reduced using recycled water instead of potable water for most of the available mixes. The amount of recycled water used in the concrete mix can be adjusted to suit. Firth's 'Green Star' low carbon rules require that a minimum of 50% recycled water is used for the mix to qualify as a low carbon concrete mix.



#### Recycled water low carbon concrete mix.

The Firth team began producing concrete using recycled water for BPC to trial. This was sourced by Firth from washing of the batching machines, delivery trucks and equipment at the plant and rainwater that is collected

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on these areas. The collected water is filtered at the plant, but still has a high PH and is considered hazardous if it was disposed of inappropriately. The recycling is therefore saving potable water as well as finding a destination for contaminated water.

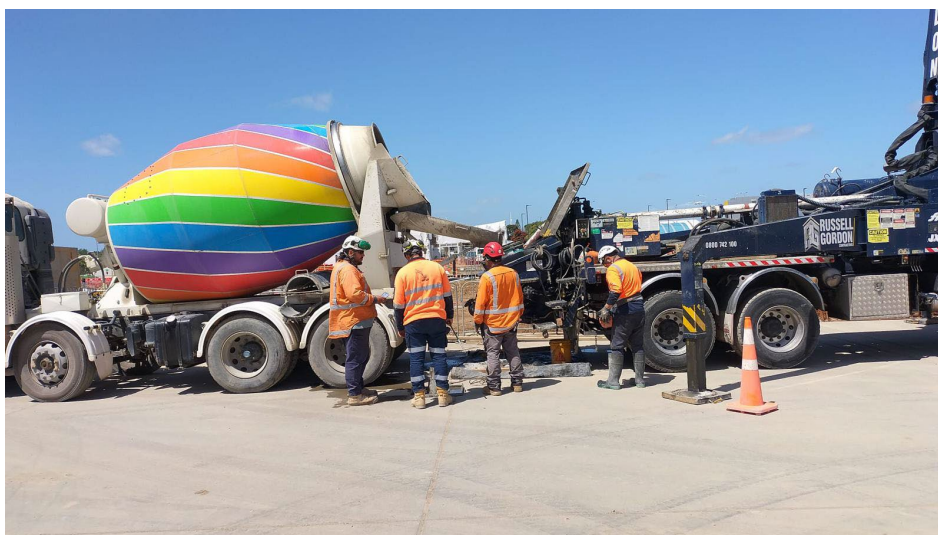
The performance results from the concrete are not affected by using recycled water, however the additional suspended solids in the water act as nucleation points for the crystal to grow. This means the concrete sets faster than it normally would, depending on the percentage of recycled water used. The construction team therefore needs to factor this workability change into their construction approach.

An initial trial programme was established, with a focus on how fast the concrete would cure. These were conducted in areas where the concrete finish wasn't critical. With initial results being successful, the BPC team is now using it for most of our pours on the Foam Tank project.

Savings to date: Firth estimate they have saved 20m<sup>3</sup> to 25m<sup>3</sup> of potable water to date, and the project has further potential to save another 10 – 15 m<sup>3</sup>. (Generally 1m<sup>3</sup> of concrete uses 120 – 140 litres of water. When ordering 50% recycled water there is a saving of 60-70 litres of potable water per m<sup>3</sup> of concrete).

As noted above – as well as offsetting the use of potable water, the contaminated water is not required to be treated or disposed of.

This change is a great example of how collaboration and aligned sustainability targets can create a mindset of seeking and driving change. The reduction in potable water use is an important carbon reducing strategy, and with the supplier and contractor working together, these types of opportunities can be introduced.



**Firth and BPC Trialing Low Carbon Concrete**



When a large enough volume of concrete is used, Firth can provide a specific Global Warming Potential (GWP) value for the concrete mix being used. This allows the impact this change has had on our emissions profile to

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be calculated.

An important tool in our sustainability decision making are Environmental Product Declarations (EPDs). These documents quantify the environmental impact of the products we purchase, and the majority of Fletcher Building products have invested in EPD's to assist their customers. Firth's EPD covers their full national production capability, and ranges from mixes from 17.5MPa, right up to 50MPa. The EPDs also contain step-by-step guides that assist selection of to achieve the most eco-friendly mix to suit the required application.

<https://www.firth.co.nz/concrete/low-carbon-concrete/epd-ecomix-concrete/>

Going forward, the BPC team is continuing with further trials and a mindset to reduce carbon, achieve great results for our client and share these learnings for the benefit of the wider industry.

## 3 More Information