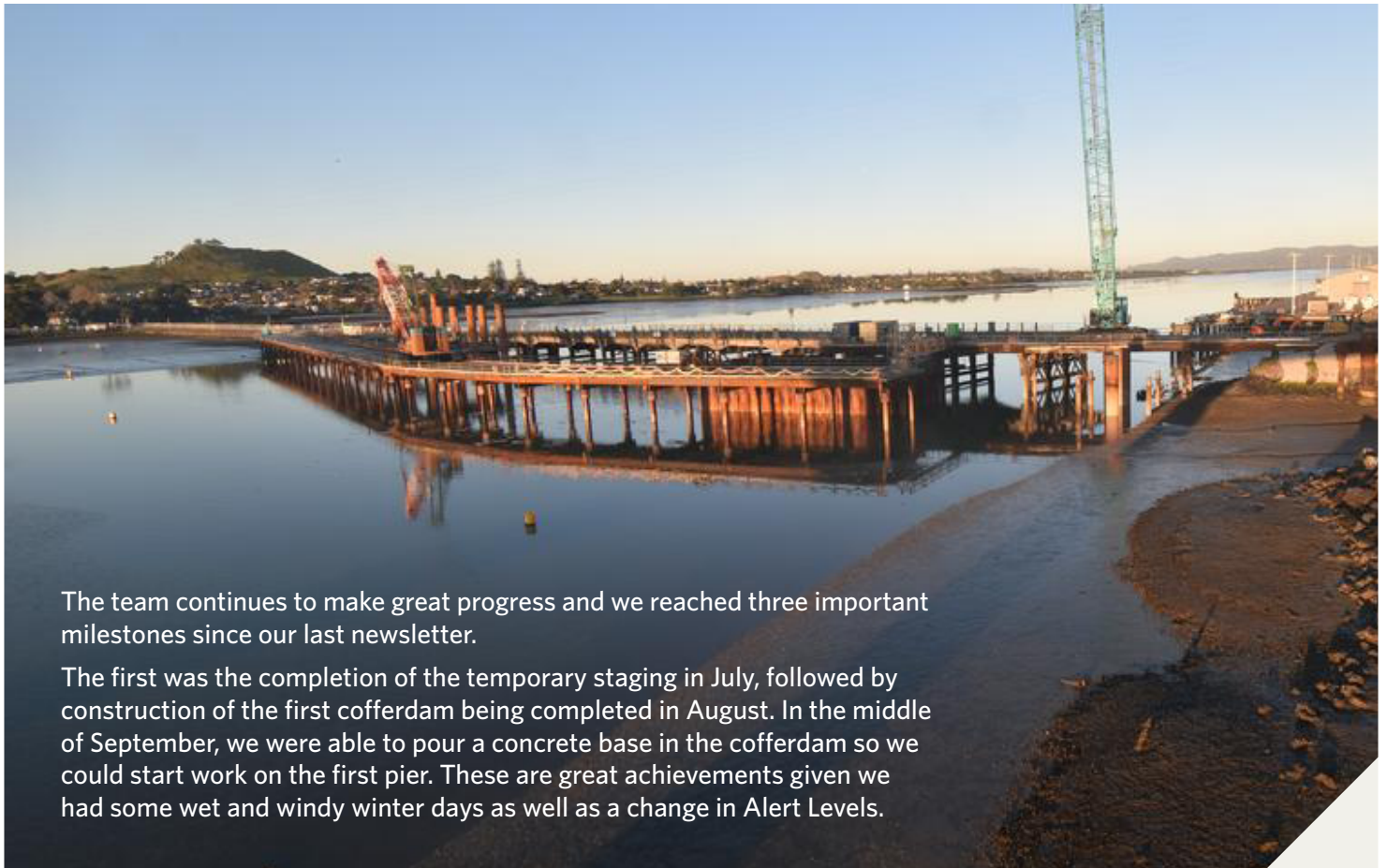


# OLD MĀNGERE BRIDGE REPLACEMENT PROJECT



The team continues to make great progress and we reached three important milestones since our last newsletter.

The first was the completion of the temporary staging in July, followed by construction of the first cofferdam being completed in August. In the middle of September, we were able to pour a concrete base in the cofferdam so we could start work on the first pier. These are great achievements given we had some wet and windy winter days as well as a change in Alert Levels.

## CELEBRATING A MILESTONE WITH OUR MANA WHENUA PARTNERS

Construction of the project moved into a new phase at the end of July with work starting on the first cofferdam.

Te Ākitai Waiohū, Ngāti Whanaunga and Ngāti Tamaoho lead a blessing for this milestone which was attended by the project team. The karakia was held before dawn to bless the structure, honour ancestors and the history of the harbour as well as request their protection for the safety of workers.

A cofferdam is a watertight box made from joined-up steel plates or 'sheet piles' driven up to 20m below the seabed and rising above the water level at high tide. When the water is pumped out, the team can work within the harbour in a dry and safe space. Cofferdams also protect the surrounding environment from the effects of construction.



L-R: Martin Te Moni Ngāti Whanaunga, Ronnie Salunga Waka Kotahi, Kathleen Wilson Te Ākitai Waiohū, Stephen Collett Waka Kotahi, Hero Potini Ngāti Tamaoho and David Wilson - Takaanini Te Ākitai Waiohū



# Onsite Update

Construction of the first cofferdam structure was completed in early August.

To make the cofferdam watertight, specialist construction divers had to seal the sheet piles underwater. They will continue to check on the structure to manage any minor leaks which may appear due to the high amount of pressure from the water in the harbour which surrounds the cofferdam.

Approximately 1.4 million litres of sea water was pumped out so that we could start work inside the structure. After removing the water, a digger was lowered into the cofferdam by crane to dig down through 2.5m of mud until we reached the seabed. A concrete floor was poured which will be the foundation of construction of the first pier.

In total, nine cofferdams (two large and seven smaller ones) will be constructed in order to build the new bridge's concrete piers in the harbour. From inside the cofferdams, the team will build the concrete and steel pier structures that will support the bridge deck and the arch.

The image at the bottom right shows our team working inside and gives an idea of the size and scale of the cofferdam.

Two more temporary platforms were completed in July and five smaller "finger" staging platforms were also finished in August. The temporary platforms reach out at a 90-degree angle from the main construction platform. They are used for storing materials and machinery so that the main platform is kept clear for work to be safely carried out.



Cofferdam for future pier 2 being dewatered



On the temporary staging facing the finger staging for future pier 3

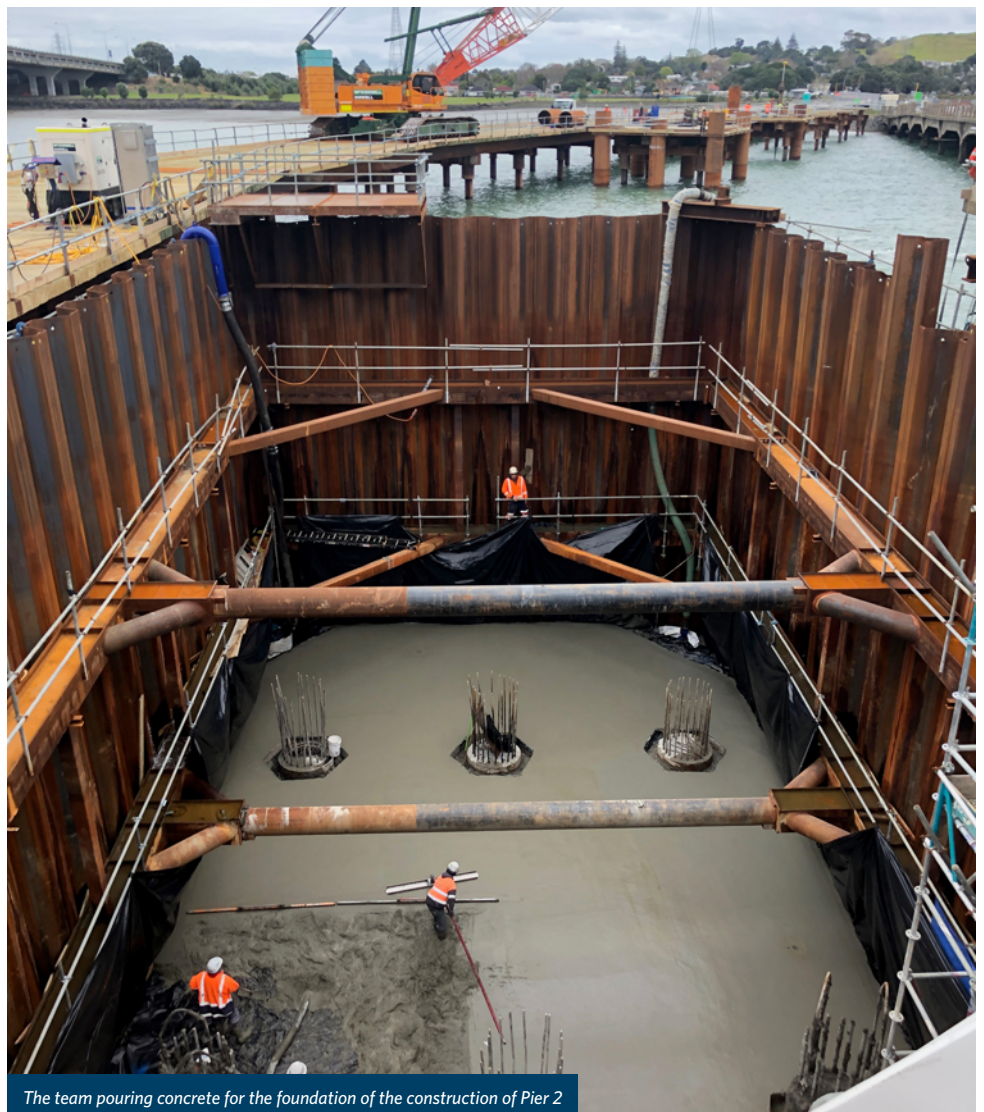
There is a piling rig on the main staging platform and this piece of equipment is used to install permanent piles deep beneath the sea floor that will eventually support the bridge piers. A pile is a hollow steel tube 1.2 m in diameter that is driven into the ground. The seabed material is then drilled out before a steel cage is lowered inside and it is filled with concrete to act as the foundation for the structures above. Currently, 20 of the 29 piles we need

have been placed in to the seabed and nine have had the mud drilled out and replaced with structural concrete.

One of the ways we are trying to reduce the impact of the lockdown during Alert Level 4 (earlier in the year) is by bringing in a third crane on site to provide additional lifting resources. This will mean we can work in more locations in the project area than previously planned.



Sheet piling underway to build the cofferdam for future pier 2 - during high tide



The team pouring concrete for the foundation of the construction of Pier 2



# How do we check the conditions of the seabed?

Before we can begin drilling piles into the ground, we have to carry out a test which is called “proof drilling”. This enables the team to confirm that the ground conditions at that location are suitable for the design requirements needed for the piles, so support is guaranteed.

The team drills down to about 35 metres using a specialised rig which is smaller than the one which would be used to install the piles themselves. The rig is positioned on the finger staging as shown on the picture to the right and it removes core samples of soil and rock. It can be thought of a bit like when an apple corer is used. Approximately one metre long samples of material are then taken so that we can see what the earth is like at different depths underground.

It takes around a day to carry out each proof drill and some of the samples which we have taken, date back to 5 million years ago! The ground is sampled at various locations deep underground to ensure it is strong enough to support the loading of the new bridge.



The Geologists proof drilling the seabed prior the piling



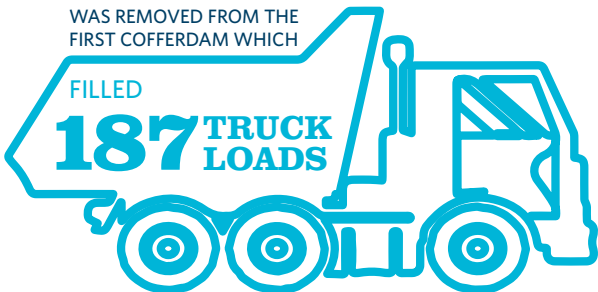
Geologists and climate scientists use this same proof drilling method to sample ice and rock hundreds of metres deep into the earth. Each different layer tells a story of what the earth was like at that time in history depending on whether it is igneous, sedimentary or metamorphic. These are the three types of rock which are all formed in different ways.

**1100m<sup>3</sup> OF MUD**

WAS REMOVED FROM THE FIRST COFFERDAM WHICH

FILLED

**187 TRUCK LOADS**



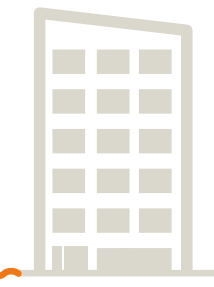
**1.4 MILLION LITRES OF WATER**

HAS BEEN PUMPED FROM THE FIRST COFFERDAM WHICH COULD FILL JUST OVER

**4.2 MILLION CANS OF DRINK**



STEEL FOUNDATION PILES ARE DRIVEN **20 METRES**



BELOW THE SEABED WHICH IS THE SAME HEIGHT AS A

**FIVE STOREY APARTMENT BUILDING**

During COVID-19, it is the priority of Waka Kotahi NZ Transport Agency and our construction partner McConnell Dowell to ensure the health and safety of the community and our people. At time of going to print, Auckland is in Alert Level 2 and the initiatives in place during this time include physical distancing, health checks for our team and maintaining hygiene and cleaning protocols within the work site.

# MEET THE PROJECT TEAM



**Aimee Pene**  
Site Engineer

**What is your role and responsibility in this project?**

I'm one of three Site Engineers on the Old Māngere Bridge Replacement

Project. I have been a Site Engineer for about four years after a Mechanical Engineering degree. I decided to study Engineering because I had an amazing calculus teacher at school who had a doctorate in engineering,

and she was very inspiring. It made me want to learn about engineering.

My primary job on this project is to work with the teams involved in fabricating and installing the new structural steel bridge components. I was also part of the team who completed the construction of the temporary staging which is important as it's needed for us to start building the replacement bridge.

**What do you enjoy about working on this project?**

There is so much I enjoy about this project. I've been on the team from the start and no

two days are the same as there are so many different elements of construction. I can go from planning, coordinating and facilitating construction work on site to raising technical queries or attending meetings, I really enjoy the variety. I'm lucky to be able to come to work in such a spectacular location but it can be pretty wet and windy in the Manukau Harbour too! It's also great to work with such a lovely team, they're awesome.

**What is the outcome you'd like to see at the end of construction?**

I'm looking forward to seeing the new bridge open to the public for everyone to enjoy.

## SAVE THE DATE

### Project information day

Come along to meet the project team and learn more about the Old Māngere Bridge Replacement project. You can enjoy a site visit, learn about the new bridge and construction updates as well as enjoy a sausage sizzle!

We look forward to seeing you on the day.

**Date:** Saturday 31 October,  
9.30am to 1pm

**Location:** Waterfront Reserve  
on the corner of Waterfront  
Road and Coronation Road,  
Māngere Bridge



For more information on the project or to sign up to newsletter updates, please scan the QR code or visit [www.nzta.govt.nz/omb](http://www.nzta.govt.nz/omb)

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