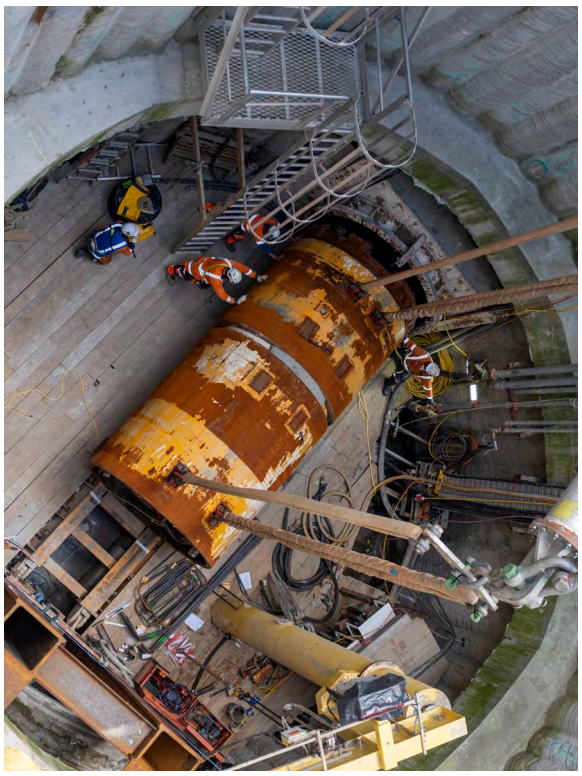
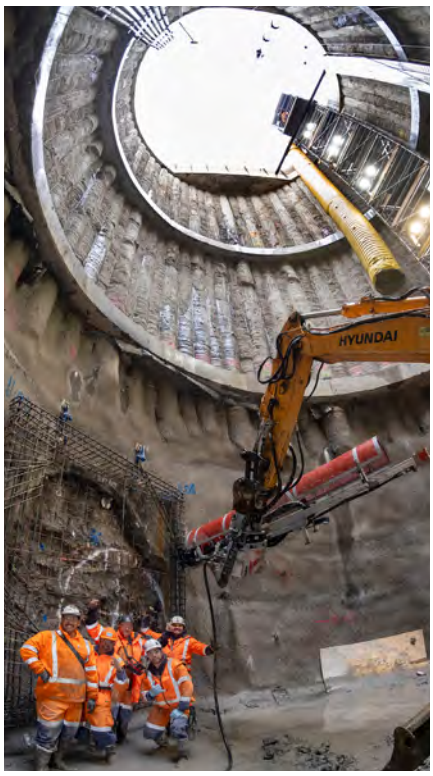
Building the

CENTRAL INTERCEPTOR

Project newsletter - issue 10
April 2024



Lowering the mTBM at Miranda



Shaft drilling at Dundale

In this issue:

Project update:

We farewell Domenica as we close our first sites

Our micro-TBM, Domenica, has performed great feats: boring two sewer links (at depths for 12m-70m), 4300m of tunnel in five drives, and laying some 14,000 x 3m pipes, she is being farewelled by our project team. She came out of the ground at Norgrove Ave, for the last time, and will now go to our Māngere main site for a decision on her future.

We've also completed our construction work at two Link Sewer C sites, Dundale Ave and Miranda Reserve. We excavated a 26m-deep shaft at Dundale Ave, an important launch site for Domenica. By completing a 1187m drive from Miranda Reserve to Dundale Ave, the longest on the project, we were able to avoid opening a shaft site in the middle of nearby Whitney St. This saved considerable disruption to the local community.

At Miranda Reserve, we excavated our 14.6m-deep shaft on the existing playground space. The equipment was removed and shipped to a school in Vanuatu. This gift was appreciated by the local village as it has encouraged more students to attend school. A new playspace was created nearby on Miranda Street after consulting with the local community and this is being very well used. Auckland Council is managing the construction of a new playground in the Reserve.

We will fully reinstate both sites with new plantings in the winter.

Project build **2019** to late-**2026**

longest wastewater tunnel in NZ

high enough to fit a giraffe

wide enough to fit four rhinos side by side

A round-up of our construction sites

Main tunnel sites

Main tunnel: We continue to make very pleasing progress, with the TBM now through Haverstock Rd and on her way to Lyon Ave.

Māngere Pump Station: On the pump station building and shaft, work in progress includes installation of the switchboards, busducts, HVAC electricals, high voltage cable ducting and drywell fitout. Landscaping along the rising main has commenced. Temporary works for Emergency Pressure Release crossing under the Western Interceptor have begun. On the confluence chamber, Western Interceptor (WI) and diversion chamber settlement monitoring is ongoing with the confluence chamber base under construction.

PS23, Hillsborough: Diversion chamber construction is progressing very well, with 90% of our concrete poured. Hoskins Ave pipeline works are now completed, bar one last small set of works, and the biofilter on the footpath upgraded.

Keith Hay Park: On the main site, we've constructed the external walls and backfilled two chambers. On branch 9B, the installation of pre-cast concrete manholes is making good progress. We've commenced excavation of a fifth manhole (MH-2A) at Frost Road, which will facilitate the connection of the newly constructed Branch 9B to the existing network. At the other end of the park, we've installed sheet piles and excavated inside the sheet piles in all seven of our manhole locations and have completed four of seven pipe-jacking drives. The fifth pipe drive is underway beneath the Arundel St car park.

May Road: This site is now our tunnelling HQ, having launched the TBM in late 2023. We have erected two noise reduction sheds and commenced work on the air treatment facility (ATF) – see article below.

Walmsley Park: We have constructed the walls of the diversion chamber and future connection chamber. We have also built connections to the drop shaft to enable flows from the existing network into the main tunnel. We have also installed sheet piles ahead of excavating and laying a key airduct between the shaft and the new above-ground plant room.

Haverstock Road: As well as celebrating Hiwa-i-te-Rangi's breakthrough into the main shaft, at 50m down, we're pleased with progress on the permanent shaft lining, with 13 of 18 concrete pours completed to date. On the overflow chambers, we've built the base slabs and started work on construction of the manhole walls.

Lyon Avenue: The permanent shaft lining has been completed. Works on the shaft benching have commenced and construction of two chambers will be begin soon. We have many months of work ahead inside the shaft to install the cascades and dividing walls.

Western Springs: We are currently building the permanent reinforced concrete lining of the shaft. The lining will be completed in nine concrete pours, with seven still to do. Construction of the two connection sewers is ongoing.

Tawariki St, Grey Lynn: Shaft excavation to 28m is now finished and work on the two diversion chambers is progressing well.

Link Sewer C

Haycock Avenue: The major works of constructing the manhole chamber in the roadway is proceeding well, with the road closed until mid-year. We will reinstate the site after that.

Dundale Avenue: Construction work has been completed and the area returned to grass. Replacement tree planting will take place in the winter.

Miranda Reserve on Blockhouse Bay Rd: Construction work has been completed. Council will shortly begin planning for a new playground on part of the reinstated reserve.

PS25 in Miranda Reserve: On the shaft, welding of the liner for the high-density polyethylene (HDPE) pipe is ongoing. All three chambers have been built and are awaiting installation of gates and cover slabs. Vent Vent stack works have also commenced.

Link Sewer B

Mt Albert War Memorial Reserve: The main tunnel does not run through the shaft here, but 23m to the east. To connect Link Sewer B to the tunnel, we are hand-digging a small tunnel (known as an 'adit'). We are starting to plan for work on new chambers that will be used to divert the local sewer networks to the shaft and then into the Central Interceptor.

Norgrove Reserve: We have recently completed a major stormwater manhole (SWMH01) and pipelaying for the connection sewers is progressing well.

Rawalpindi Reserve: Domenica, our mTBM, has commenced her final 300m drive from Rawalpindi Reserve and will break into the Norgrove shaft in April 2023. The overflow chamber walls have been constructed and we are making connections to existing sewers.

What happens to the air in the tunnel?

With all the facts and figures about how much wastewater the CI tunnel can hold, we don't often mention that it also fills up with air.

As more wastewater flows into the tunnel, it pushes out the polluted air in the tunnel. This volume of air also needs to be planned for and managed. To enable us to do so, we are building two air treatment facilities (ATFs) along the tunnel. These are at May Rd, Mt Roskill and at the Māngere pump station, with resource consent to construct a future ATF at Western Springs.

These ATFs will play a crucial role in maintaining public health and environmental quality. Properly treated sewer air contributes to cleaner air quality and reduces the risk of nuisance odours.

ATFs helps minimise the spread of pathogens and mitigate odorous gases coming out of the tunnel. They use advanced technologies to capture, treat and remove harmful gases such as hydrogen sulphide (H_2S) and ammonia (NH_3). Air scrubbers neutralise these compounds through biological and chemical screens, limiting their release into the atmosphere.

As CI runs under some of the densest housing areas of Auckland it is important to treat this air so we can all enjoy our city's open spaces.

Project background:

Important link sewers connect CI to the greater Watercare network

While the bulk of our budget and resources are focused on the main tunnel, we have two other major CI projects, important in their own right. Watercare is also building two new link sewers as part of the Central Interceptor scheme. An interceptor is a large diameter transmission sewer that transfers flows in the pipes in your street to the treatment plant. The link sewers are smaller than our main tunnel but are still relatively large wastewater pipes.

Link Sewer C is a 2.1m internal diameter wastewater pipe that duplicates sections of the Western Interceptor (an 80-year-old main sewer under western Auckland). The new link sewer runs from Miranda Reserve in Avondale to May Rd, Mt Roskill, for approximately 3.5km. Each 3m-long pipe that comprises the tunnel is constructed with reinforced concrete. It has a polyethylene liner on the inside that reduces corrosion from the sewage that it conveys.

Domenica being readied for her first drive

To build the tunnel, Domenica, our micro-tunnel boring machine, drove through sandstone deep underground (approximately 30 meters below the surface). Once completed, seven similarly deep shafts will help transfer wastewater flows from the surface into the tunnel.

Link Sewer C has been designed to supplement the Western Interceptor, which is the main arterial sewer serving West Auckland,

Pipes from Hynds ready for laying

Domenica breaks through at Haycock Ave

as far north as Kumeu. With the new Link Sewer C in place, more housing development will be enabled under Auckland Council's Unitary Plan, with reduced risk of wastewater overflows into the environment. This will bolster not only the areas immediately surrounding the new pipeline, but also most of West Auckland.

Link Sewer B runs 1.2km deep underground through the suburb of Mt Albert, connecting to the main CI tunnel at Rocket Park on New North Rd. It is a similar type of pipe as C, made of concrete with a polyethylene lining, but has an internal diameter of 2.4m.

Mt Albert and surrounding suburbs, along with Meola Creek, suffer more sewer overflows in wet weather than most of Auckland. There

Welding work in the link sewer

will be a significant environmental improvement for open spaces and beaches from capturing these overflows. The new sewer will also help cater for housing growth in areas surrounding Mt Albert, such as Unitec and Pt Chevalier.

This sewer will take some of the existing waterflow out of the century-old Ōrākei Main Sewer, an interceptor-sized pipe which runs from Mt Albert through the CBD to Ōrākei. Here the Eastern Interceptor picks up the flow, taking it through the eastern isthmus and under Manukau Harbour to our Māngere wastewater treatment plant. With the new Link Sewer B taking most of the wastewater flow out of the Ōrākei Main Sewer, Watercare can undertake essential maintenance on the latter.

In summary, these two link sewers extend the area of the city benefitting from the CI scheme and help provide for future growth, improve operational resilience and create a better environment for the people of Auckland.

(By Stephen Grace, CI Lead Engineer, Link Sewers)

The Central Interceptor is much more than a tunnel

Wonderful marae experience

Te Ahiwaru Trust and Makaura Marae in Māngere are close neighbours of ours. The trust was established in 2004 by the Makaurau Marae Executive Committee and represents the direct descendants of the Ihumātao peninsula. The CI project passes directly through key landmarks that hold great significance for Te Ahiwaru.

We wanted our CI team to understand the connection we have with Te Ahiwaru especially as so many staff had never been to a marae. Recently, some 40 of us joined a morning marae induction, which began with a pōwhiri including karanga, mihimihi and a hākari.

After the pōwhiri, the staff members learned basic marae protocols, followed by a tour to the whenua and awa. Here they learned the history and pūrakau (myths) of the surrounding landmarks. The visit ended with a morning tea and the chance to ask more questions of our hosts.

The trust invites visitors to tour the marae and surrounding land and gardens with guided hikoi, filled with historic and contemporary kōrero. There are also creative workshops (e.g. poi-making), storytelling and tree-planting and traditional gardening experiences to enjoy. Find out more here: https://www.teihuomataoho.com/tours-workshops

Watercare has an existing relationship with Te Ahiwaru Trust through mana whenua relations and the Te Whare Manaaki laundry service. (See newsletter #7, August 2022)

Sustainability and environment:

Rare moss species found by CI staff

On a fine and crisp Tuesday morning in March, project staff moved in to save a nationally vulnerable moss species, Fissidens berteroi. This special moss was found last year by our environmental team in Meola Creek, next to our construction site at Rawalpindi Reserve.

CI will soon begin work on an outfall in the creek, where we found the moss. To prevent any negative impact from these works, the team hand-carried all the moss-covered rocks, daisy-chain, to a safer location upstream.

The moss is even more threatened than the brown kiwi, for example, so it is important we did everything we could to protect it. Some of the moss has also gone to the Botanical Gardens to help ensure its survival as a species.

GAJV Social Outcomes Manager, Sandra Edwards, is very pleased with this rare find