

Hamilton Section



PART OF THE WAIKATO EXPRESSWAY



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A coating of iron ochre sludge is visible on rocks at Ruakura.

Design change heads off sludge

A thick red sludge has invaded the underground pipes and channels that drain the new expressway at Ruakura – and it's not going away.

The sludge is iron ochre – a bi-product of iron-oxidising bacteria living in the water that drains from the embankments on either side of the expressway.

This sludge is so persistent and so difficult to control that the project has been forced to redesign 850m of expressway where it travels below ground level at Ruakura. The new design includes an additional 400mm layer of drainage rock that will direct water under the road to rock-lined swales on either side of the expressway. This special layer will continue to drain the highway even if the underground drains become completely blocked.

Project Manager Matt Fairweather says research carried out into iron ochre showed it was difficult to control and virtually impossible to eradicate.

“We tried jetting the pipes but it quickly re-established and blocked them again. This was a problem we couldn't foresee but it risked partially or completely blocking our drains. Ultimately a lack of drainage would cause

the road pavement above to fail.”

The project is confident the new design will ensure adequate drainage, but the delay has slowed road pavement construction at Ruakura.

The full extent of the redesign has affected every layer of the road. The base layer of compacted sand was trimmed back and the remaining sand mixed with cement and water to form a hard pan. Then the 400mm drainage layer was added, with a layer of finer rock on top. Two layers of Hi-Lab rock pavement will now be constructed on top to provide a solid base for the final surface layers. These Hi-Lab layers are thicker than usual because of the drainage layer underneath.

Construction of the Hi-Lab layers will begin in June 2021.



An extra layer of rock is laid at Ruakura to provide additional drainage.

Electron harvest provides energy

Iron-oxidising bacteria take in water containing dissolved iron, then harvest electrons from the iron atoms. They excrete iron oxide which forms iron ochre – a red-brown sludge.

The harvested electrons provide energy for reproduction and other life-sustaining processes in the life of these single-celled organisms.

A variety of species and sub-species of bacteria carry out this process. It requires oxygen, so these bacteria live and reproduce where iron-rich water flows out of the ground and is exposed to oxygen in the air.

Project Update: What's happening now?

Road pavement

Road pavement is now largely complete on the main four-lane alignment.

At Ruakura, an extra drainage layer is being added before pavement can be constructed.

At Powells Road, the underpass structure is complete, and pavement construction is about to begin.



Expressway connections

Northern Interchange:

Street lights are being installed at the tie-in to the Ngaruawahia section. Road pavement construction continues.

Resolution Interchange:

Construction of the road that will link the interchange with Resolution Drive is progressing well.

Greenhill Interchange:

Kerbing and shared paths are now complete. The final asphalt surface is being laid.

Ruakura Interchange:

The interchange is one layer of asphalt from completion. Trucks are using this connection to haul asphalt north and south to supply paving teams.

Southern Interchange:

Street lights are being installed. Asphalt is being laid. A raised roundabout is under construction at Cherry Lane to link local roads with the East West Link Bridge. The tie-ins from SH1 to the Cambridge Road Bridge (the on-ramp south) are under construction.



Final surfacing

Progressing north to south, final asphalt surfacing is now in place from Lake Road to Puketaha Road (approximately 9km out of a total 22km).

Asphalt is also being laid at the Southern Interchange – on the main four-lane alignment, the on-ramps and off-ramps, and links to local roads.



Barriers

24km of flexible barrier sleeves have been installed, out of a total 72km. These sleeves will hold the barrier standards, which will support the wire ropes

1.7km of concrete barriers have been installed, out of a total 7km

2km of W-section steel barriers have been installed, out of a total 12km.



Bridges and structures

All major bridges are complete.

The Powells Road underpass structure has just been completed. This is the final major structure on the project. The road embankments are now in place either side of the underpass to allow road pavement to be built on top.



New links for driving, cycling and walking

Rock is being trucked in, and waste material trucked out. The waka sculpture on the Resolution Drive/Borman Road roundabout is visible in the background.



In the north, Resolution Drive is being extended to link with the expressway at the Resolution Interchange. This will be a key link to Wairere Drive and the city's northern-eastern suburbs.

Traffic will be able to travel north or south on the expressway from the interchange, or exit here from the north and south.

Construction of this connection is under way near the Resolution Drive/Borman Road roundabout – the roundabout featuring the 'waka' sculpture.

Over the April school holidays, Borman Road was closed at the roundabout to allow a 4m-deep drain to be installed under the road to connect the new road with the city stormwater system.

Road construction is progressing along the full length of the extension.

Construction of a walking/cycling underpass has just begun. This extension of Resolution Drive will feature a network of shared paths for walkers and cyclists, extending back to the city and over the expressway to Horsham Downs.

In the south, a new link road crossing the expressway at Tamahere will provide easy access to and from the city. It will also connect the Tamahere communities on either side of SH1.

This is part of the Southern Interchange.

A raised roundabout is now being built to connect local roads to the bridge over the expressway. This will provide access to and from the city for motorists in Cherry Lane, Bollard Road and the Tamahere Eventide



Work continues on local road connections at the Southern Interchange.

Underpass will open to traffic soon



This aerial view of the underpass in March shows the finished structure and the concrete settlement slabs on either side. These slabs help tie in the concrete structure with the expressway on either side.

Traffic is expected to be travelling through the Powells Road Underpass in July this year.

The underpass structure is complete. The road approaches to the underpass are about to be constructed, along with barriers and a concrete footpath.

Up above, the new embankments that will carry the expressway over Powells Road are being allowed to settle before the road pavement for the expressway is built on top. This will be one of the last sections of expressway to be sealed and finished.

retirement village. A new network of 3m-wide shared paths will be linked with existing paths for cycling and walking.

The foundation for the raised roundabout and ramps is now in place. Underground drains and services are being installed. Construction of the concrete kerbs, the roundabout and the road pavement is about to begin.

Across the remainder of the Southern Interchange, road pavement is being laid, chip sealed then covered in asphalt – the final smooth expressway surface. Street lights are also being installed.



Any questions?



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