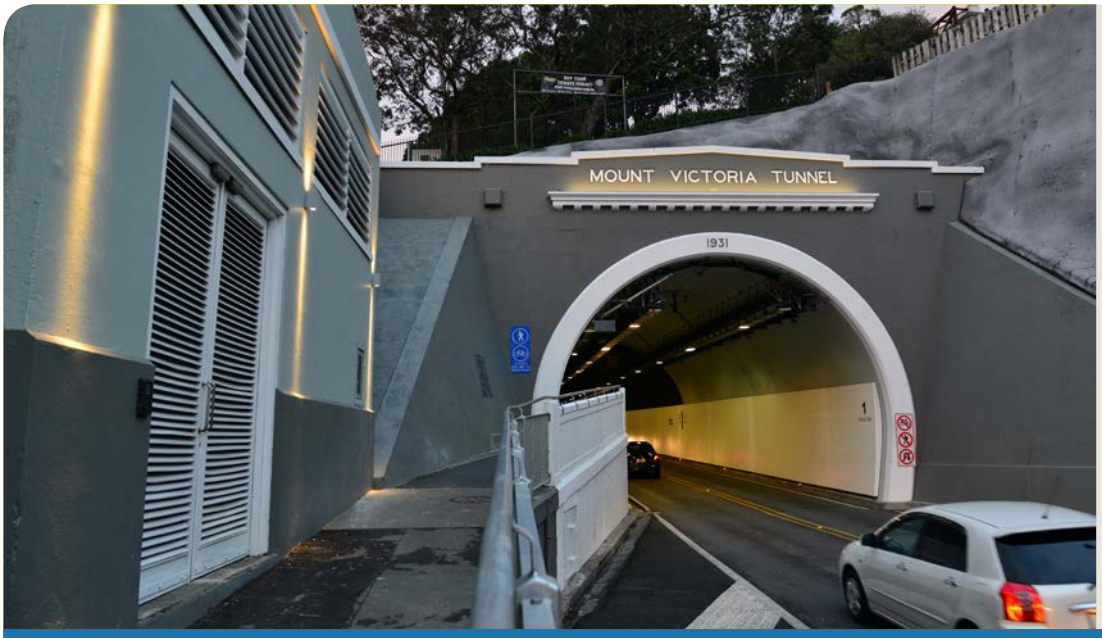

UPDATE 6
PROJECT COMPLETION
June 2016

85-year-old tunnel transformed

An extensive upgrade of the 85-year-old Mt Victoria Tunnel in Wellington that started in April 2015 has been completed 14 months later on 24 June 2016.

The State Highway 1 tunnel, which was carved through rock in 1930 and 1931, has been transformed to include 21st Century safety technologies. The tunnel was closed overnight from Sundays to Thursdays 9.00pm-6.00am on 295 occasions to allow the safety upgrade to take place. The tunnel is now open 24 hours every day, apart from scheduled maintenance closures.

To enable many of the new safety features, a huge amount of electronic communication, mechanical and electrical engineering has been undertaken, the most obvious spin-off being the rebroadcast of 18 FM frequencies so tunnel users can continue listening to their favourite radio station.

Mt Victoria Tunnel is a vital link in the Wellington region's transport network and is part of the highway route from Wellington Airport to the rest of the North Island as well as connecting the eastern suburbs to the central city.

A fresh-looking drive-through

Conditions for driving through the tunnel have been improved with 1000 light-reflecting white panels beside the carriageway, a new paint palette and glowing 'cat's eye' markers along the sides and centreline. The fibrous cement panels are fire-resistant, adding to the tunnel's safety profile.

The cat's eyes (delineators) are electronically programmed to pulse and strobe in sequence toward the exits in an emergency, guiding people safely out. The system installed in Mt Victoria Tunnel is a world-first use of delineators to this extent.

The tunnel has been repainted inside and out with a new colour scheme that features Mt Victoria Robin's Egg Blue on the portals and elevated path wall, soft white and black (ceiling).

Cat's eye markers (above and below) define the sides and centre of the route and are electronically programmed to pulse and strobe in sequence toward the exits to guide people out in an emergency.

Efficient LED lighting

The tunnel is equipped with an efficient LED (light emitting diode) lighting system which dims or brightens depending on the outside light levels at the portals to make the transition easy on drivers' eyes.

The lights gradually dim toward the centre of the tunnel as drivers' eyes adjust. This system not only optimises the lighting levels in the tunnel but is also energy efficient.

Two sensors on fabricated steel columns sited 55 metres from each portal measure the intensity of light at the portals and feed that information into the automatic lighting control system. Mt Victoria Tunnel is the first state highway tunnel operated by NZ Transport Agency to use LED lighting for safer driving.

The 'intelligent' LED lighting system responds to outside light levels to provide safer driving conditions.

Sensors mounted on columns outside the tunnel transmit information on light intensity to the automatic lighting control system.

Thermal imaging camera trial

The tunnel's communications system includes thermal imaging cameras that 'see' through sunstrike at the entrances and through smoke if there is an accident, sending their infrared images to the Wellington Transport Operations Centre (WTOC).

The central tunnel thermal imaging camera (below) can pan, tilt and zoom to 'see' the heat signatures of people and vehicles through smoke. The thermal imaging cameras are being trialled by the Transport Agency in Mt Victoria Tunnel for potential use in other highway tunnels.

This central tunnel thermal imaging camera can pan, tilt and zoom to detect heat signatures of vehicles and people through smoke from an accident.

Ventilation fans upgraded

The fans in the existing ventilation system - two extractors, two fresh air input - have been either replaced or reconditioned.

A reconditioned tunnel extractor fan being installed.

Strengthened cycle and walkway

Seismic strengthening of the cyclist and pedestrian path involved diagonal bracing with steel straps bolted to the path and fixed to anchors bored into the walls.

This bracing system both reinforces the path and ties it firmly into the tunnel wall. New handrails have been installed along the path and the outside ramps.

The asphalted path and overhead illuminated exit signs are marked with distance measurements to show users how much further there is to go. The red panel (right) contains a fire hydrant, one of 13 installed as part of extending the fire safety upgrade started in the 2011-2012 Stage 1 project. The circular camera (below) is one of four PTZ (tilt, pan, zoom) incident cameras specifically focused on the path.

One of 13 fire hydrants installed in the tunnel.

One of the four incident cameras focused on the elevated path through the tunnel.

Walkers through the tunnel can see distance measurements marked on the path and exit signs to show how much further there is to go.

State-of-the-art emergency communications system

The specially designed communications system is programmed into the Wellington Transport Operations Centre (WTOC) computer with 26 potential emergency scenarios requiring a range of responses depending on severity.

The communications system includes a radio rebroadcast system to allow WTOC to interrupt car radios with emergency messages. Loudspeakers in the tunnel broadcast emergency messages to all tunnel users.

A total of 26 cameras (new and updated) are installed through and outside the tunnel for incident detection purposes, with most installed on cable trays that run the length of the tunnel ceiling.

A significant upgrade of the software and systems at WTOC was undertaken. The outcome is a more efficient operation of the tunnel, all channelled through a single telephony headset instead of multiple devices.

The trialling of the technologies in a simulated environment early in the project meant the multi-faceted traffic management system was fine-tuned and finalised before it was installed in the tunnel. This meant a minimum of disruption to the public and traffic operations.

Tunnel communications experts test the tunnel emergency response system at the Wellington Transport Operations Centre.

An outside view

Pictured below right at the Basin Reserve entrance are the exterior portal slopes which have been strengthened and resurfaced with sprayed concrete (shotcrete) at both ends of the tunnel. Of the two fire response boxes at left, the red box is new and contains a fire hydrant booster. A new hydrant pipe runs under the road, over the top of the plant control room, and enters the tunnel through portal ceiling from where it connects to the fire hydrants along the elevated path.

Three plant control rooms have been refurbished inside and the art deco rooms at the Basin and Hataitai end have had their exteriors repaired, repainted and illuminated with new lights. A new, fourth plant room has been installed in upper Paterson St (the local road at right) to assist with the larger quantity of tunnel electrical and electronic controls.

Further back at the Basin Reserve intersection, new automatic barrier arms have been installed to stop traffic in an emergency. New arms are also installed at the Hataitai end, at the Taurima St intersection.

The view from the top at the Basin Reserve end.

Free bus service

The free bus service operated by driver Mark Osborne on behalf ofthe Memorial Park Alliance has carried an average of 90 pedestrians and cyclists a night from one side of Mt Victoria to the other during the tunnel closures. The service was given permission to use the bus tunnel that goes through the hill to make the journey shorter than the earlier detour route through Newtown.

Driver Mark Osborne taking cyclists and pedestrians from one side of Mt Victoria to the other in the free bus service.

Artists brighten barrier arm cabinets

Local artists Kelly Spencer and Bruce Mahalski were contracted to brighten up the barrier arm control cabinets with murals. Two nearby schools, Hataitai Kindergarten and St Mark's Church School, were involved in helping the artists with inspirational ideas for the murals.

Kelly drew on Hataitai Kindergarten children's enthusiasm for the Hataitai taniwha legend, walking through the tunnel and rainbows in her mural in Taurima St. Bruce referenced St Mark's Church School pupil's thoughts and drawings, including the area's namesake Queen Victoria, tunnel-tooting cars and Basin Lagoon/Reserve, plus a little Middle Earth.

Kelly Spencer's mural, inspired by Hataitai Kindergarten children.

Bruce Mahalski's mural, inspired by St Mark's Church School pupils.

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