



# SIKA AT WORK

## JOHNSTONE'S HILL TWIN TUNNEL NEW ZEALAND

CONCRETE  
WATERPROOFING  
SEALING & BONDING

BUILDING TRUST





# JOHNSTONE'S HILL TWIN TUNNEL NEW ZEALAND

Contractor: Northern Gateway Alliance  
Client: New Zealand Transport Authority



Breaking through to the otherside of Johnstone's Hill

SIKA WAS INVOLVED IN THE JOHNSTONE'S HILL TWIN TUNNEL PROJECT FROM THE BEGINNING. THE PROJECT WAS PART OF THE FOUR LANE MOTORWAY EXTENSION THAT BY-PASSES OREWA NORTH OF AUCKLAND. THE PURPOSE OF THE BY-PASS WAS TO IMPROVE TRANSPORT INFRASTRUCTURE AND SUPPORT THE ECONOMIC AND SOCIAL WELL-BEING OF THE AREAS TO THE NORTH. CONSTRUCTION OF THE TUNNELS STARTED IN JANUARY 2006 AND THE PROJECT WAS COMPLETED MID 2009.

The tunnels run a total length of 640m and the tunnel design includes two cross-passages, lighting, ventilation and fire protection. The tunnels were constructed through a steep ridgeline clad with native forest. The decision to construct the tunnels option resulted in significant safety, aesthetic and environmental benefits.

The motorway had several engineering challenges including the site's location within a steep mountainous area high in ecological value. The initial tunnel support was to be sprayed concrete incorporating steel fibres, and the shotcrete mix had to meet the specified compressive and flexural strength tests. The batching plant was approximately 30 minutes away from the tunnel site, and it was the preference of the Tunnel Engineer that the mix was not to be dosed with admixture on site.

Sika offered the following solutions for the concrete application to the tunnel:

- Sika ViscoCrete SC305 - retarding superplasticiser
- Sigunite L53-AF - accelerating sprayed concrete at the nozzle during application
- SikaTard-930 - set stabilising admixture, which controls cement hydration allowing the concrete to be sprayed 12-18 hours after batching.
- Sika also supplied a Sika Aliva PM500 Robot Sprayed Concrete machine for the shotcrete application.





*The Sika Aliva  
PM500 in action*

*The Sika Aliva PM500  
robotic arm sprays the  
shotcrete containing Sika  
ViscoCrete SC305 retarding  
superplasticiser, and Sigunite  
L53-AF accelerator for  
sprayed concrete*





Once the tunnel was excavated and shotcrete applied, Sika once again stepped in with a solution for waterproofing.



Sika has supplied 25,000m<sup>2</sup> of Sikaplan FPO (Flexible Polyolefin) waterproofing membrane.

This membrane was applied by Sydney based Bluey Construction Products.



*Sikaplan FPO being applied over felt protection material*

The membrane was installed over a felt protection material, directly to the excavated tunnel wall or to the shotcrete (where used).



*Application of the Sikaplan FPO in the tunnel*









*The concrete tunnel lining was then poured against the Sikaplan membrane. The concrete contained Sika ViscoCrete 5-500 a superplasticiser for an ultra smooth finish.*

Sika Products used in the Northern Gateway Johnstone's Hill Twin Tunnel Project:

#### **GROUTING**

Sika Grout-212, -215  
Sika Grout-212 HP  
Sika Grout GP  
Sikadur-31  
Sikadur-41  
Sikadur-42

#### **CONCRETE REPAIRS**

MonoTop Primer  
MonoTop Structural Mortar  
MonoTop High Build Mortar  
MonoTop Micro Concrete  
Renderoc LA 55  
Renderoc FC  
Nitoprime Zinchrich  
Nitokit LV  
Nitokit TH

#### **ARCHITEXTURES**

Sika Blockbase

#### **WATERPROOFING**

SikaProof Torch-on 3P & 4P Mineral  
Sikaplan FPO

#### **JOINT SEALANTS**

Silaflex MS  
Sika Firerate  
Sika Firerate PU  
Plastiseal  
Sika Boom  
Sikaflex Construction  
Sikaflex-11FC  
Sikaflex Tank

#### **ADMIXTURES**

Sika ViscoCrete 5-500  
Sika ViscoCrete SC-305  
Formol  
Rugasol MH & Rugasol MH extra  
SikaFilm  
Separol WB-230  
Sigunit L53-AF  
SikaTard-930





Northern Gateway Toll Road Begins

TUNNEL



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## WHO WE ARE

Sika AG, Switzerland, is a globally active specialty chemicals company. Sika supplies the building and construction industry as well as manufacturing industries (automotive, bus, truck, rail, solar and wind power plants, façades). Sika is a leader in processing materials used in sealing, bonding, damping, reinforcing and protecting loadbearing structures. Sika's product lines feature highquality concrete admixtures, specialty mortars, sealants and adhesives, damping and reinforcing materials, structural strengthening systems, industrial flooring as well as roofing and waterproofing systems.

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