

# TUNNEL REFERENCES



Manufacturer:  
NESTAAN NV  
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[www.nestaan.be](http://www.nestaan.be)

Limpet TM is a trademark of Thermica Ltd



PERIOD : 2024



PRODUCT : SLV EXT (External)



CONTRACTOR : Hinrich



FIELD OF EXPERTISE : Structural fireproofing of tunnels



ABOUT THIS PROJECT

### Description :

Structural fire engineering and protection of the new Hung Hom station (that is linked to all East Rail Line stations) and the associated tunnels. This new tunnel plays a significant role in the local rail network with the new Tuen Ma Line platforms.

A transformation of this key interchange station in Hong Kong's MTR network was a must to accommodate its expansion plan and enhance the city's connectivity.

Client= MTR Corporation Ltd. Fire engineering company= WSP.com

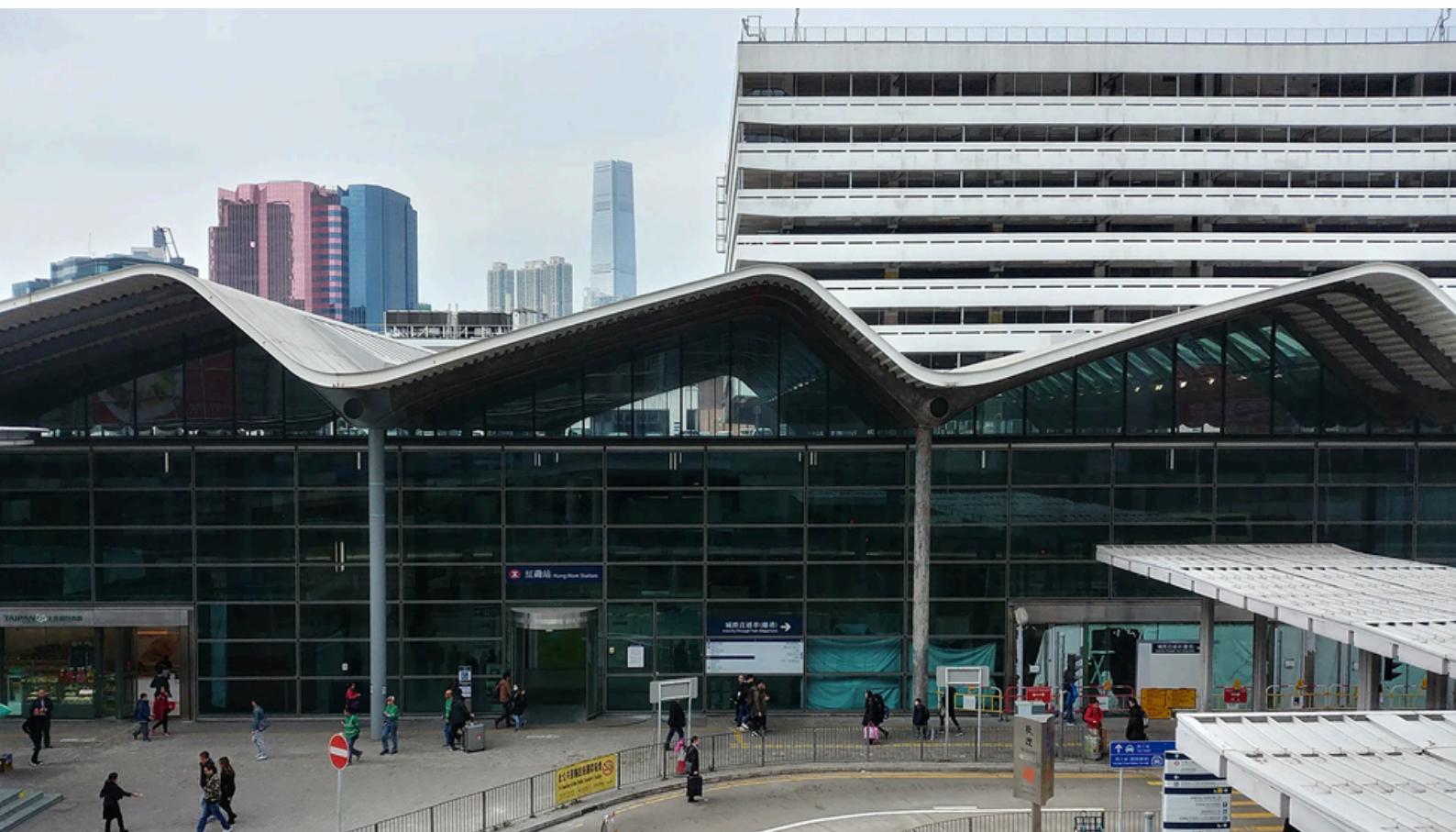
### PFP Assignment :

Making the tunnel structures fireproof to prevent the heating of structural members, and the spread of fire and smoke.

### **PFP Challenge:**

The necessity during all preparations, but also on site of ongoing discipline, of flexible, tailor-made planning, of specialized expertise, and innovative tunelling solutions.

To maintain full operations of the existing railway lines while modification works take place.





PERIOD : 2024



PRODUCT : SLV EXT (External)



CONTRACTOR : GTA Group



FIELD OF EXPERTISE : Structural fireproofing of tunnels



ABOUT THIS PROJECT

#### Description :

The Cointe tunnel is an important tunnel in Liège. The tunnel is part of the A602/E25 and is 1.6 kilometers long.

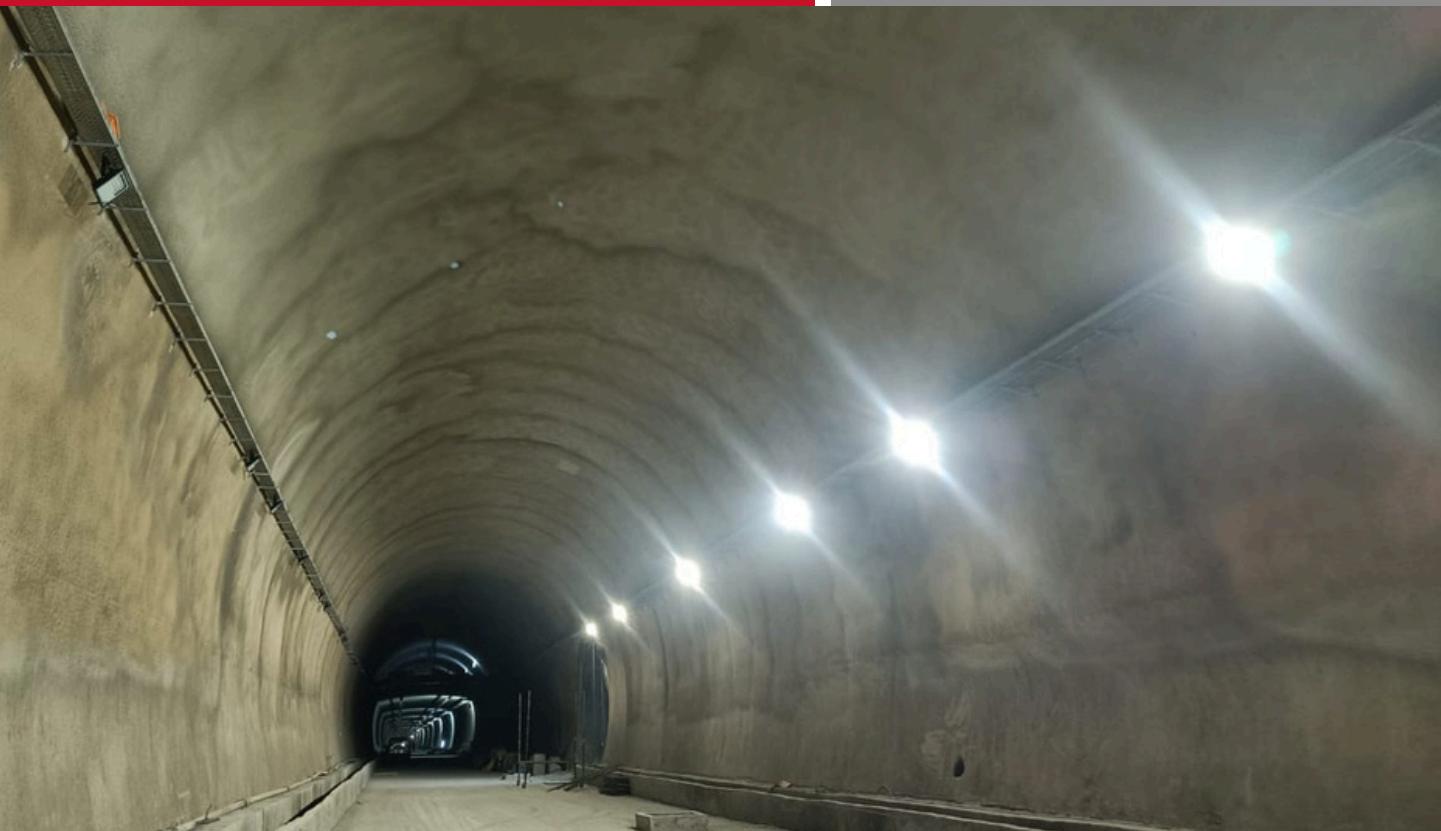
#### PFP Assignment :

Making the tunnel structures fireproof to prevent the heating of structural members, and the spread of fire and smoke.

#### PFP Challenge:

The necessity of ongoing discipline, flexible solutions, tailor-made planning, specialized expertise and innovative tunnelling. This during the preparations, but most of all on site during the tunnel works.





PERIOD : 2021-2023

PRODUCT : SLV EXT (External) &  
SLV INT LOW-GWP

CONTRACTOR : APCO &amp; Soprema India

FIELD OF EXPERTISE : Leveraging advanced  
engineering, operations and  
innovative materials in  
structural fire protection of  
tunnels

## ABOUT THIS PROJECT

### Description :

This road tunnel between places Gagangair and Sonamarg in Ganderbal district of the Union Territory of Jammu & Kashmir.

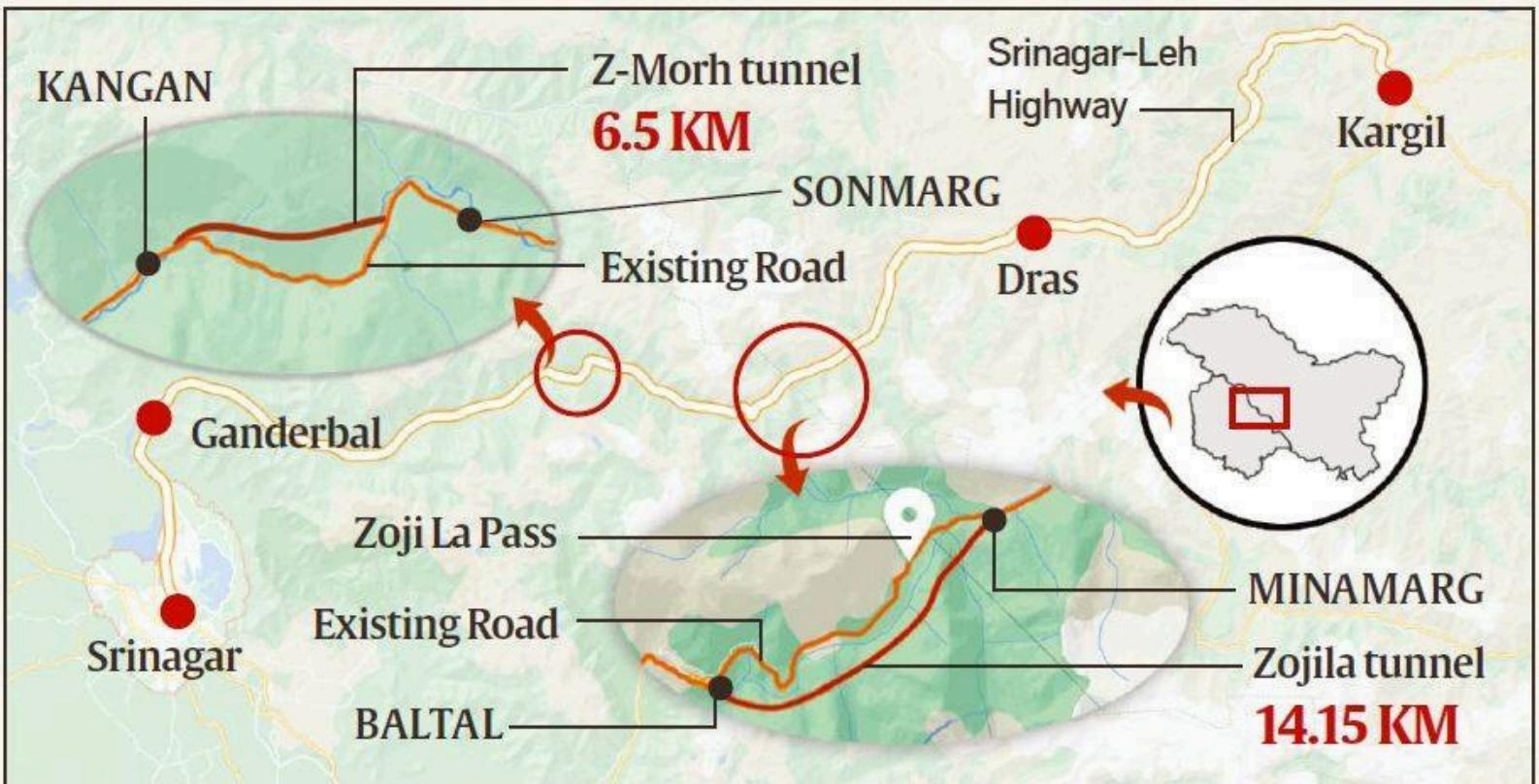
The tunnel replaces a Z shaped road, hence the alphabet Z.

### PFP Assignment:

Respect 100% the committed hours of fire resistance in case of fire in the tunnel.

### PFP Challenge:

The ongoing needs of flexible, tailor-made planning, specialized expertise, and ad hoc solutions due to the harsh weather and working conditions on the construction site in the far, cold north of India.





PERIOD : 2021-2023



PRODUCT : SLV EXT (External)



CONTRACTOR : AFCONS & Soprema India



FIELD OF EXPERTISE : Structural fireproofing of tunnels



### ABOUT THIS PROJECT

#### Description :

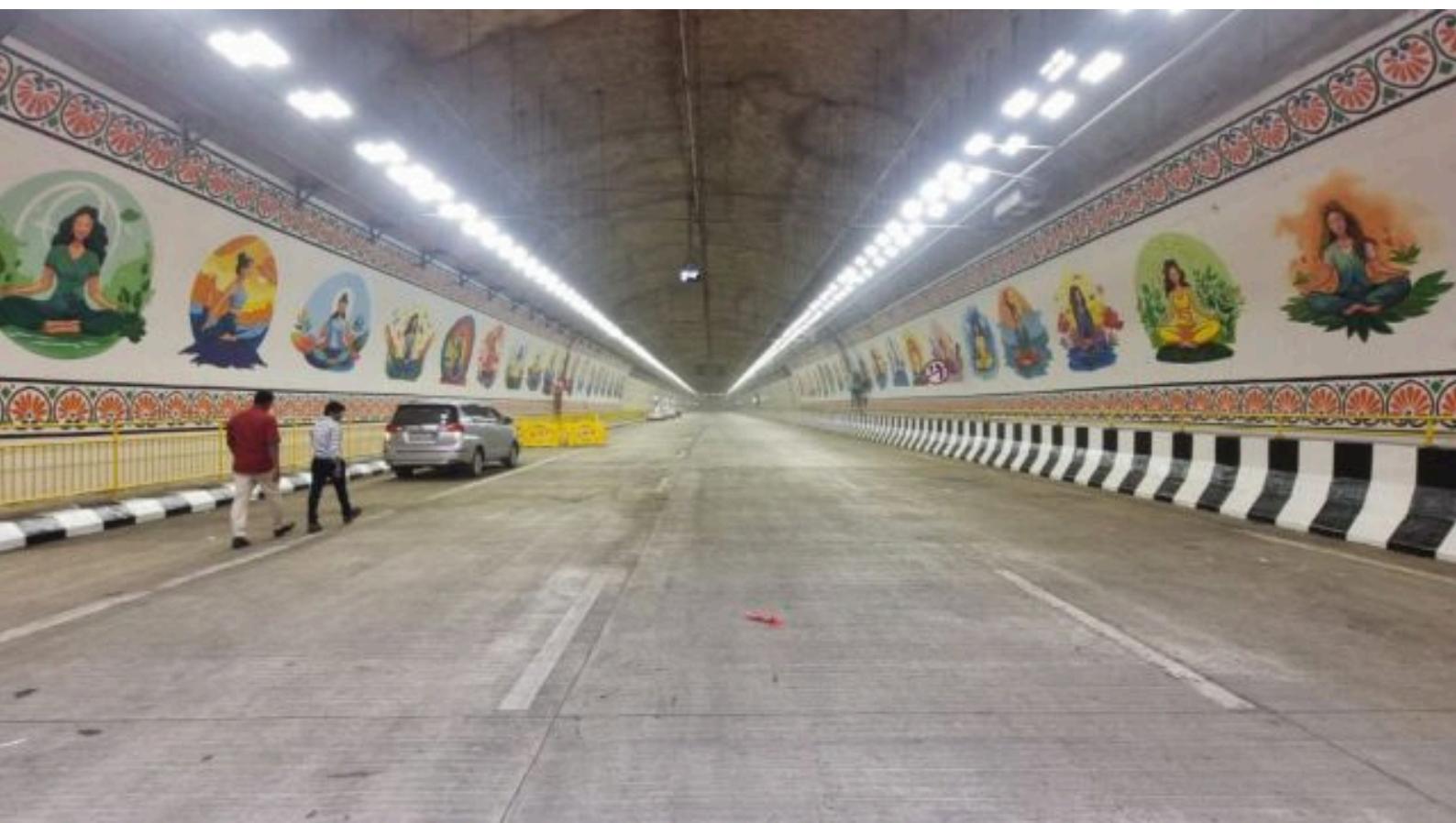
Connecting Igatpuri and Kasara, it is one of the longest and widest tunnels in India. The twin tunnels, part of the 700-km Mumbai-Nagpur expressway, will reduce travel through Kasara Ghat to five minutes from 35 minutes. The twin tunnels measure 8 km in length and 17.5 m in width. It was a massive achievement that connectivity had been achieved ahead of schedule despite lockdown due to the Covid-19 pandemic.

#### PFP Assignment:

To respect 100% the committed hours of structural fire resistance in case of fire in the tunnel.

### **PFP Challenge:**

The necessity of ongoing discipline, flexible solutions, tailor-made planning, specialized expertise and innovative tunnelling. This during the preparations, but most of all on site during the tunnel works.







PERIOD : 2016-2022



PRODUCT : SLV EXT (External)



CONTRACTOR : Leighton-China State Joint Venture with Hinrich is as applicator.



FIELD OF EXPERTISE : PFP of tunnels & underground infrastructures



#### ABOUT THIS PROJECT

#### Tseung Kwan O-Lam Tin Tunnel (TKO-LTT)

##### Assignment:

Apply passive fire protection to both concrete and steel substrates of this 2,2 km long tunnel

##### Challenge:

To adapt permanently new plannings due to Covid19 lockdowns with disturbed staff planning on site and caused major lacks in the (inter)national supply chain. After months of stagnation the works can continue thanks to extremely keen planning and engineering, using the latest systems technology, offering a top quality passive fire protection in extremely close collaboration with Hinrich, one of the most experienced and dedicated application contracting companies around the world.

## Objective

Tseung Kwan O Lam Tin Tunnel is being developed to alleviate traffic congestion during peak hours at the existing Tseung Kwan O Tunnel and to meet the traffic demand from the anticipated population increase in the Tseung Kwan O district.



## Description

**The Tseung Kwan O- Lam Tin Tunnel (TKO-LTT) project** -located in Hong Kong- involves the construction of a 4.2km-long two-lane dual carriageway in Hong Kong, which will integrate a 2.2km- long tunnel.

Together with the proposed Trunk Road T2 and Central Kowloon Route, it will form the Route 6 which **will provide an east-west express link** between West Kowloon and TKO areas. It will meet the TKO external traffic demand .

The works include construction of the main tunnel of the TKO-LT Tunnel, construction of tunnel portal facilities , ventilation and fire protection building at TKO, construction of slip roads, branch tunnels, viaducts, Lam Tin Interchange and environmental protection.

Originally expected to open in 2021, its opening has been delayed to 2022 due to the worldwide outbreak of COVID-19.

- Project type
- Length
- Developer
- Consulting engineer /construction supervisor
- Approved project estimate:

dual two-lane carriageway  
overall: 4.2km, Tunnel: 2.2km  
Civil Engineering and Development Department (CEDD)

AECOM Asia Co. Ltd.

about \$15.1 billion

## Websites

<http://www.tko-ltt.hk>

<https://www.cedd.gov.hk/eng/our-projects/major-projects/index-id-65.html>;

STUDY: <https://contractdispute.com.hk/case-studies/lam-tin-to-tseung-kwan-o-tunnel/>;

## Videos

<https://www.youtube.com/watch?v=A1k6oDRi03U>;

<https://www.youtube.com/watch?v=yUkOAlMq0lg>;

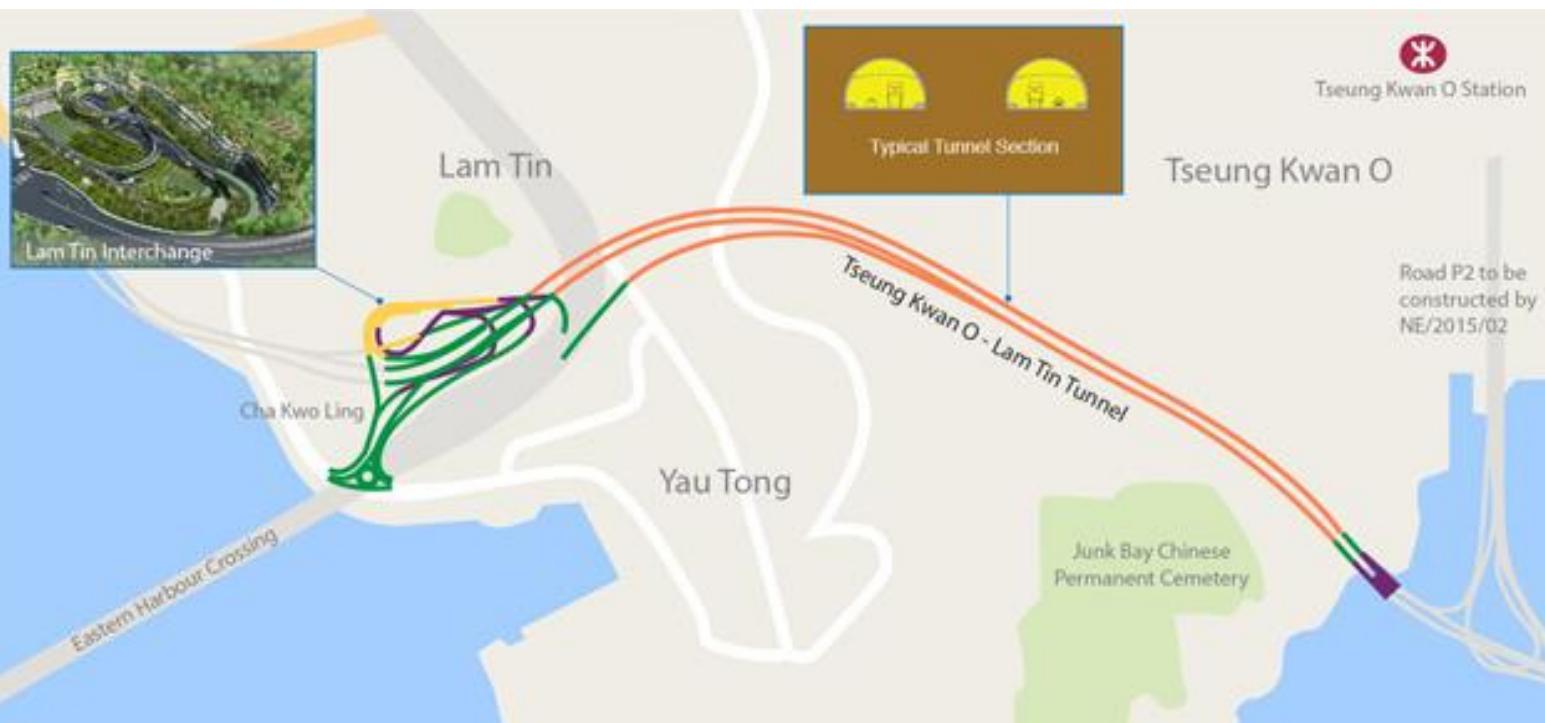
### Its crucial importance

Upon the gradual completion of new residential housing developments, the population of Tseung Kwan O District will be increased. This will aggravate the traffic load of Tseung Kwan O District. We therefore need to construct the Tseung Kwan O Lam Tin Tunnel to meet the traffic demand arising from the anticipated population increase.

The TKO-LTT project will also improve the traffic conditions within Kwun Tong District and relieve the extra traffic load to be brought about by the future development of the district. After completion of the project, part of the existing traffic between Tseung Kwan O and Eastern Harbour Crossing can use the TKO-LTT Tunnel without routing through Tseung Kwan O Road and Lei Yue Mun Road etc. of the Kwun Tong District.

Tseung Kwan O Lam Tin Tunnel Main Tunnel and Associated Works mainly comprises the construction of a 2.2 km long dual two-lane main tunnel connecting Kwun Tong and Tseung Kwan O, and a branch tunnel connecting the main tunnel from Tseung Kwan O to Eastern Harbour Crossing.

The tunnel, along with the Central Kowloon Route and Trunk Road T2, will form part of the city's Route 6 — becoming an east-west express link between the West Kowloon and TKO areas. **The completion of Route 6 is anticipated to reduce the travel time between West Kowloon and TKO from 30 minutes to 12 minutes.**





**Topick**  
hket.com



## Construction details

At TKO, the project activities will primarily involve the construction of the tunnel and its associated portal facilities, a ventilation building, slip roads, branch tunnels, viaducts, the TKO interchange, and approximately 3ha of reclamation.

Other ancillary works forming part of the project include the construction of associated buildings, integration of a [traffic control and surveillance](#) system (TCSS), landscaping, and environmental protection and mitigation works.

The tunnel is being constructed using either the mechanical method or the conventional drill and blast method, depending on geological conditions and site constraints.

Approximately 4.17 million cubic metres of inert materials and 83,000m<sup>3</sup> of non-inert materials are expected to be generated during the construction phase. Of the inert materials, 814,600m<sup>3</sup> will be reused for reclamation purposes, while 19,360m<sup>3</sup> of sediment is expected to be generated and reused as filling material.







**PERIOD :** 2020



**PRODUCT :** SLV EXT (External)



**CONTRACTOR :** TBT Sweden  
& Besix/Jan De Nul/Engie



**FIELD OF EXPERTISE :** PFP of tunnels  
& underground infrastructures



### ABOUT THIS PROJECT

#### **Assignment :**

Crucial part of the indepth renovation of Belgium's longest tunnel (2x2,6 km): the application of our PFP sprayed mortar to all crucial and complicated parts of the tunnel.

#### **Challenge :**

With 60,000 vehicles a day travelling along four lanes, the tunnel is a major traffic artery of the capital city centre and the Brussels Region. The tunnel built in 1987, presented a high degree of general degradation, and needed to meet current compliance requirements, mainly in the area of fire safety.

Before starting work, asbestos had to be removed in an 18,000 m<sup>2</sup> containment zone. The specific tunnel equipment also needed replacing, including 800 km of cables, ventilation, communication & surveillance equipment, and lighting. The interior aesthetics have been totally redesigned.)

The contract covers maintenance operations for 25 years (2021 – 2046), which committed all suppliers and contractors to set the quality standards very high-end.

Renovation work started in 2018 and is carried out exclusively at night, from 10 p.m. to 6 a.m. The July and August school holidays are an exception with the tunnel completely closed. This presented a real and daily logistical challenge. The work will end in 2021.

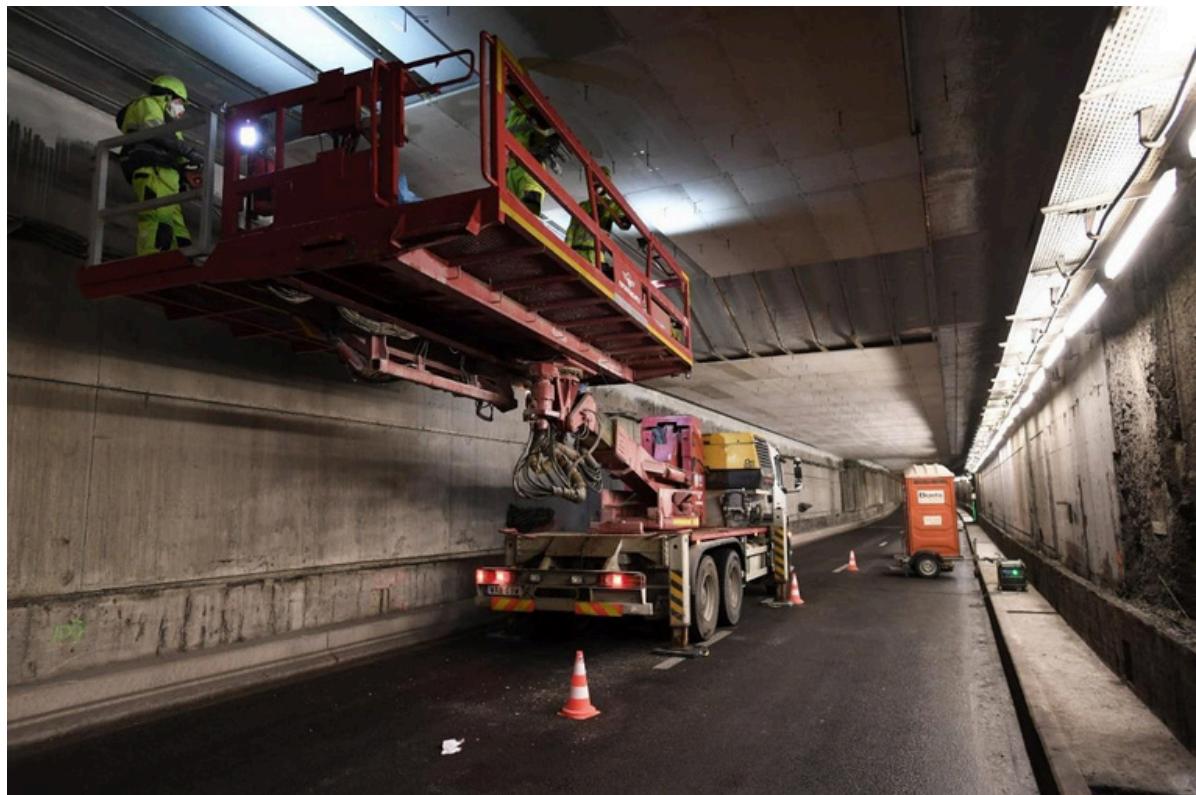


Reference: TBT



Reference: TBT







PERIOD : 2019 (project 2018-2020)



PRODUCT : SLV EXT (External)



CONTRACTOR : Täby Brandskydds Technik (TBT) , on behalf of Züblin-Boskalis



FIELD OF EXPERTISE : PFP of tunnels & underground infrastructures



ABOUT THIS PROJECT

### Assignment:

Passive fire protection of a submerged tunnel's curved top edges to full RWS:2008 standard.

### Challenge:

Design-engineering in which the use of different fireproofing materials is married and needs to offer an over all RWS:2008 protection to the concrete substrate of prefabricated concrete tunnel elements, sunk in place under the Göteborg harbor basin.

# The Marieholm Connection (detailed description)

## Situation

The Marieholm Connection consists of the Partihall Intersection, Marieholm Tunnel and South Marieholm Bridge. The tunnel and the railway bridge across the Göta Älv improve communications between the Port of Gothenburg and the industries of Hisingen.

The Port of Gothenburg is the largest port in the Nordic region, with approximately 11,000 vessels calling at the port every year. Gothenburg is one of the fastest growing regions in Northern Europe. The city urgently needs new river crossings since the current crossings are vulnerable and overloaded. In addition, the amount of rail freight is steadily increasing.

The Gothenburg region has more than half a million inhabitants in its urban area and approximately one million in Greater Gothenburg. 70 per cent of the Scandinavia's total industrial capacity is located within a 500-kilometre radius.

## The Marieholm Tunnel

The Marieholm Tunnel in Gothenburg is a road tunnel with three lanes per direction and a central gallery. The 306 m long immersed tunnel section crosses the Gota älv river. An important boundary condition to take into consideration during the execution was not to negatively affect the sensitive ecosystem of the river. The tunnel has a planned service life of 120 years.

The tunnel is constructed as an immersed tunnel with cut & cover tunnel and open ramp sections at both ends. For this, three tunnel sections each more than 100 m long are produced in a dry dock, then brought into their final position and lowered to the riverbed. The dry dock directly extends from the course of the tunnel. After completion of the three tunnel segments, the tunnel access section is realized in this dry dock using the cut-and-cover construction method.

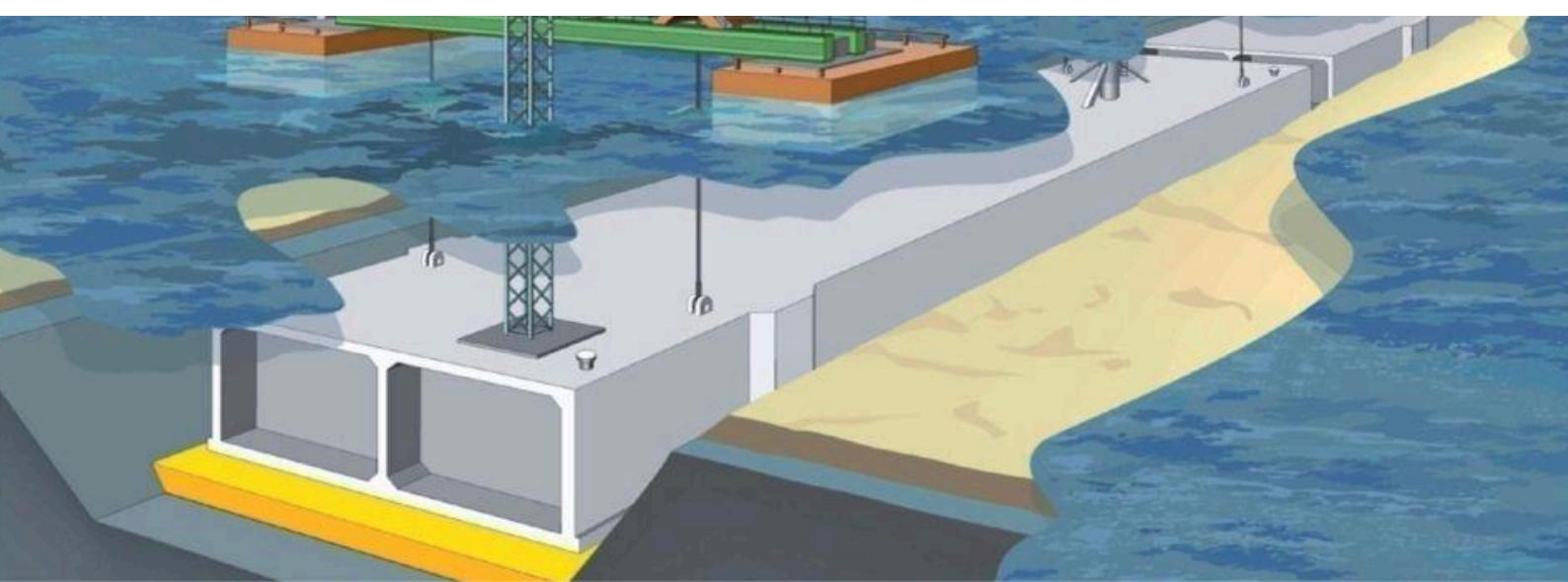
The Marieholm Tunnel will be an additional crossing over the Göta Älv which will relieve pressure on the congested Tingsta Tunnel. All major motorways within Gothenburg will use the new Marieholm Tunnel thus reducing disruption on local roads.

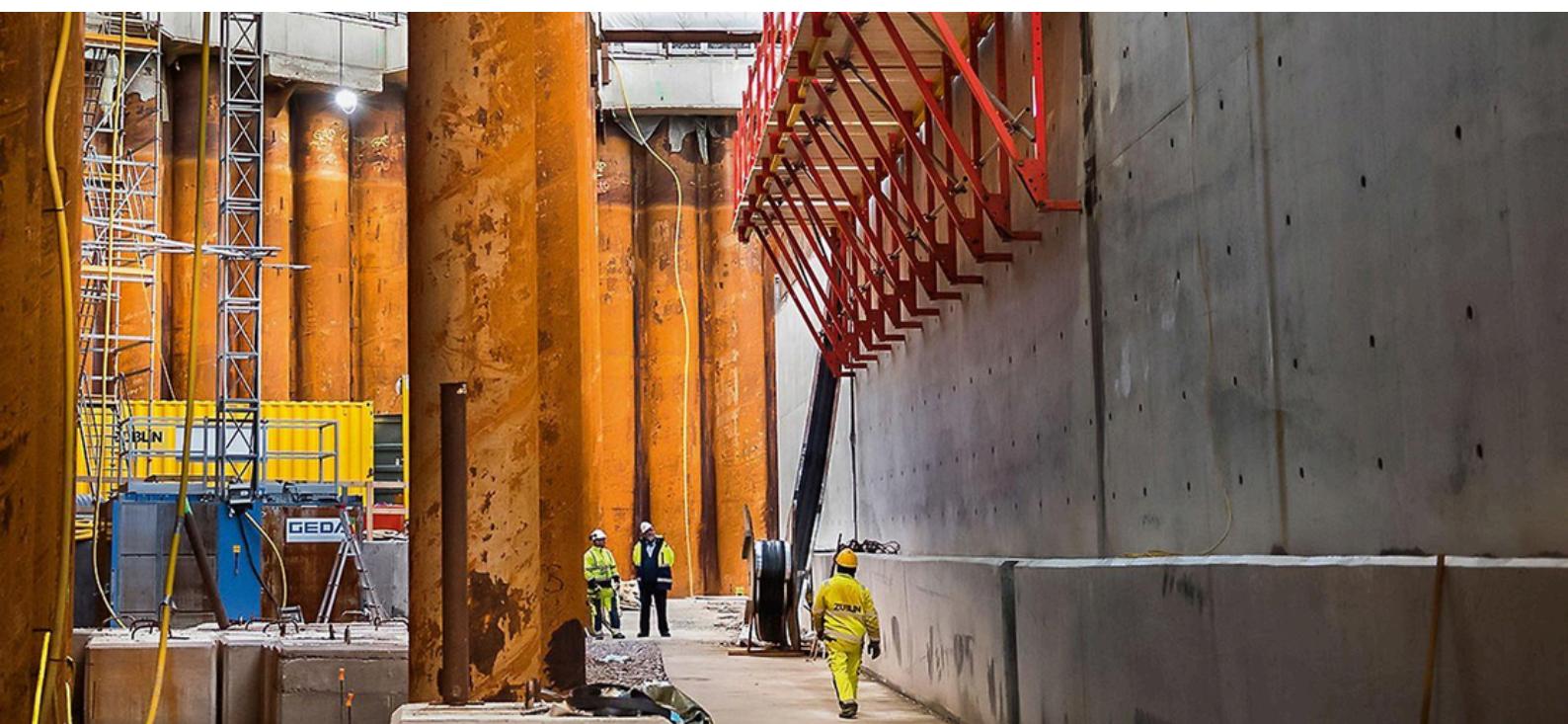
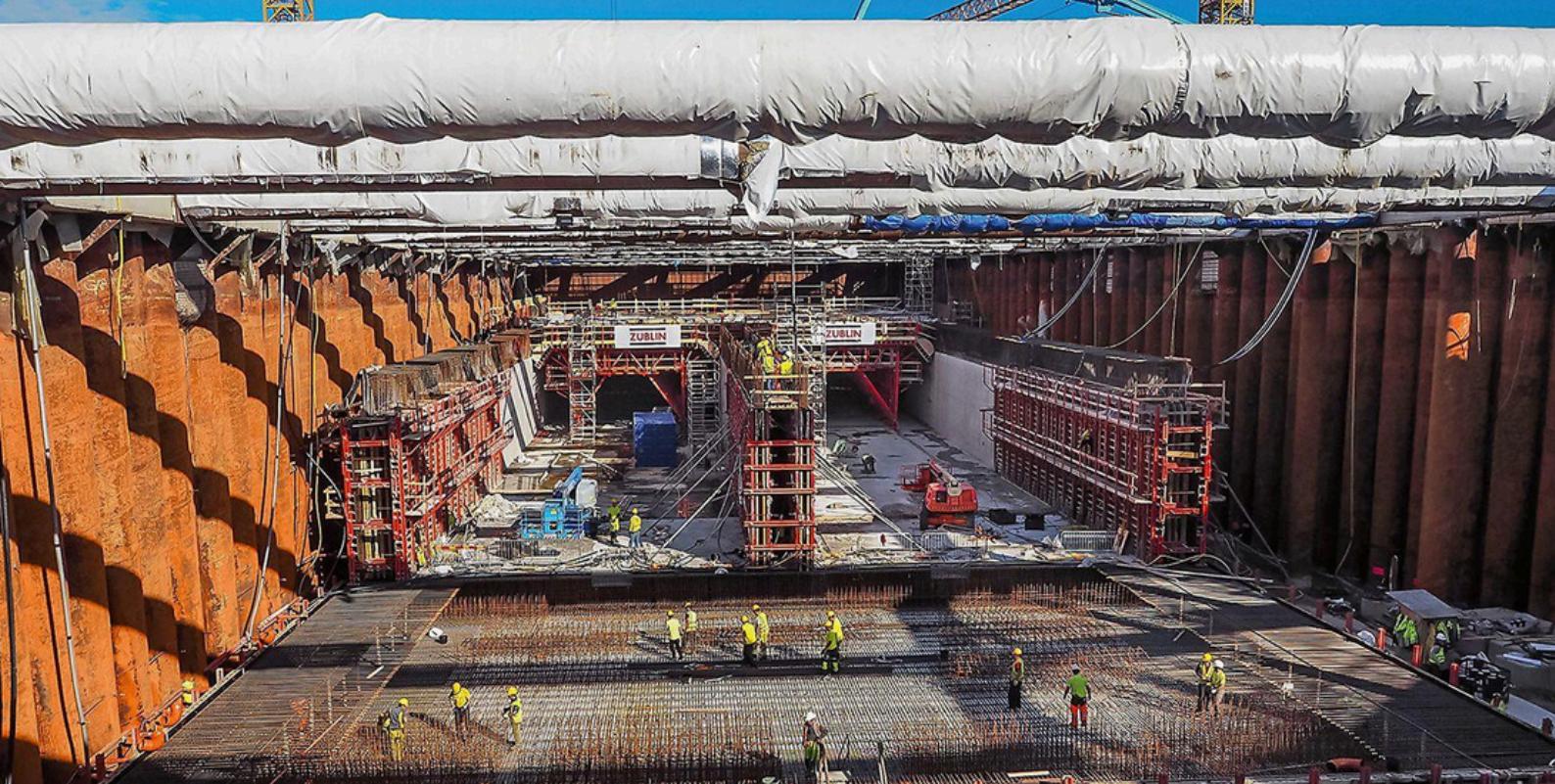
We are currently building the Marieholm Tunnel. The tunnel is expected to be opened in the end of 2020.

## Brief summary

- 50,000 vehicles will use the Marieholm Tunnel every day.
- Each tunnel element will be approximately 100 metres long, approximately 30 metres wide and approximately 10 metres high.
- The largest weighs about 25,000 tonnesThe construction of the Marieholm Tunnel is unique, as worldwide only one such immersed tunnel is completed every year.
- 17 different nationalities are represented in the project.
- The tunnel will have two tunnel tubes, with three lanes in each direction. Each tube has a clear width of 12.9 metres and a headroom of 5.1 metres.

[http://www.cwb-hyd.hk/images/about/ProjectMap\\_EN.jpg](http://www.cwb-hyd.hk/images/about/ProjectMap_EN.jpg)





## CWB Tunnel

Hong Kong



PERIOD : 2015



PRODUCT : SLV EXT (External)



CONTRACTOR : Hinrich



FIELD OF EXPERTISE : PFP of tunnels & underground infrastructures



ABOUT THIS PROJECT

### Assignment:

Fireproofing of all soffits, outer walls and diaphragm walls in High Strength Concrete to full RWS:2008 standard in a multiple discipline, multiple site tunnel structure of ca. 245.000 m2.

### Challenge:

Nine portions, ten sites, different structures, different substrates, all completed well ahead of schedule due to extremely keen planning and engineering, using the latest systems technology, offering a top quality passive fire protection in extremely close collaboration with one of the most experienced and dedicated application contracting companies around the world.

# The Central-Wan Chai Bypass (CWB) tunnel

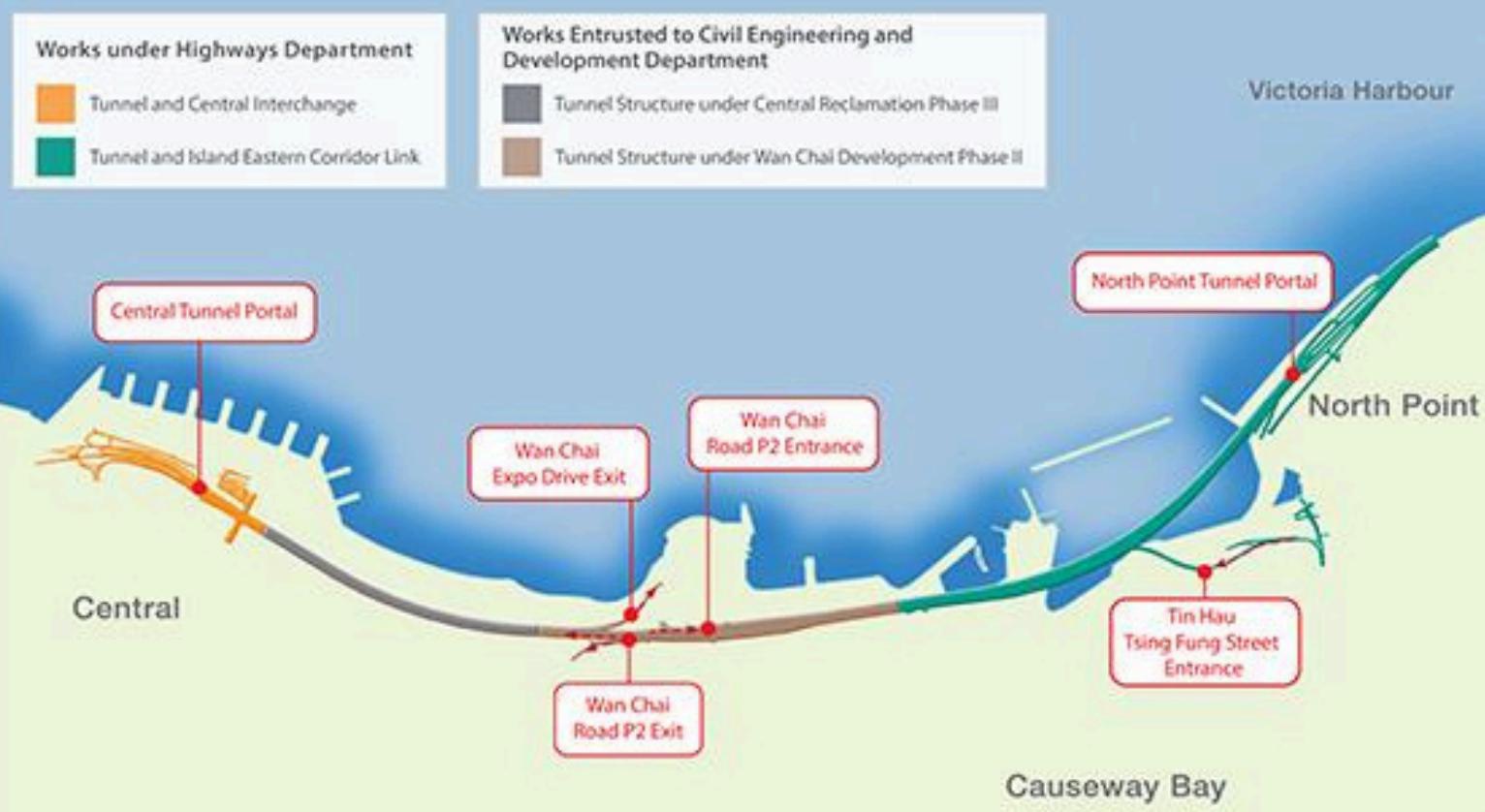
(detailed description)

The **Central-Wan Chai Bypass** is a 4 km trunk road running between **Sheung Wan** and **Fortress Hill** on **Hong Kong Island**.

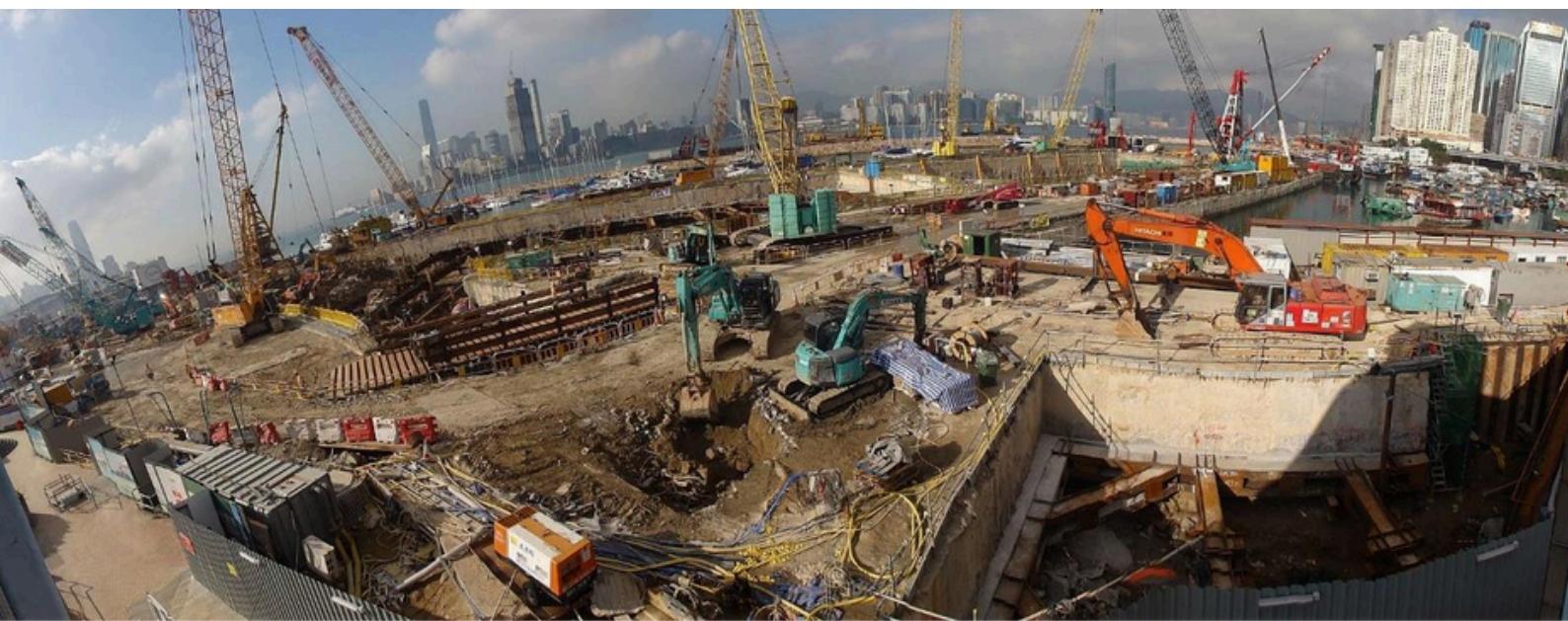
## History

- In 2009 the project, originally estimated to cost HK\$28 billion, was approved by the **Legislative Council** finance committee, following a "decade of objections and legal challenges" from environmentalists and citizens concerned by further **reclamation** of **Victoria Harbour**.
- In 2013 the government bureau blamed unforeseen geotechnical difficulties as well as fluctuating labour and materials costs for the 28 per cent budget increase.
- In 2015 the Director of Highways announced that the Central-Wan Chai Bypass will not open in 2017 as previously anticipated. He blamed a large metal object (probably a sunken ship) that was found on the seabed at the reclamation site in Wan Chai. As a result of the discovery, reclamation works were suspended for some time.<sup>[5]</sup>
- On 20 January 2019 the bypass opened to traffic.

## Central-Wan Chai Bypass and Island Eastern Corridor Link











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## Central - Wan Chai Bypass and Island Eastern Corridor Link

Full opening on 24 February 2019





#### **The benefits of the CWB tunnel & bypass to the public :**

- 1. Speedy Route: 5 minutes from Central to Island Eastern Corridor**
- 2. Lower Noise**
- 3. Better Air Quality**
- 4. Enhanced Water Quality**
- 5. More Greeneries**
- 6. Sustainable City**
- 7. More Jobs**

11 Tunnels on Warsaw Orbital

Poland



PERIOD : 2004-2009



PRODUCT : SLV EXT (External)



CONTRACTOR : various



FIELD OF EXPERTISE : PFP of tunnels & underground infrastructures



ABOUT THIS PROJECT

#### **Assignment:**

Apply passive fireprotection to both steel and concrete substrates, offering the very first RWS:1998 sprayed PFP to public infrastructure in Poland.

#### **Challenge:**

Engineering of the appropriate PFP-systems and armouring components (mesh) for eleven different tunnel projects around the Warsaw Orbital, for pedestrian, cycling, road and railway use to the brand new developed and extremely onerous RWS:1998 standard. Testing and site verification by the local Warsaw based ITB institute under direct guidance of a team of extremely experienced professors and PhD's.

## **Car road tunnels, railroad tunnels, cycle & pedestrian tunnels on Warsaw Orbital (pictures)**





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PERIOD : 2012



PRODUCT : SLV EXT (External)



CONTRACTOR : Brian Mickie



FIELD OF EXPERTISE : PFP of tunnels & underground infrastructures



ABOUT THIS PROJECT

#### **Assignment:**

Apply passive fire protection to both steel and concrete substrates.

#### **Challenge:**

Engineering of the appropriate PFP-systems.

Testing and site verification by Building Control UK.



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