



ITA TUNNELLING
AWARDS 2018



香港寶嘉
Dragages
Hong Kong

A member of the Bouygues Construction group



Contract No. CV/2012/08
Liantang / Heung Yuen Wai Boundary Control Point Site Formation
and Infrastructure Works – Contract 2



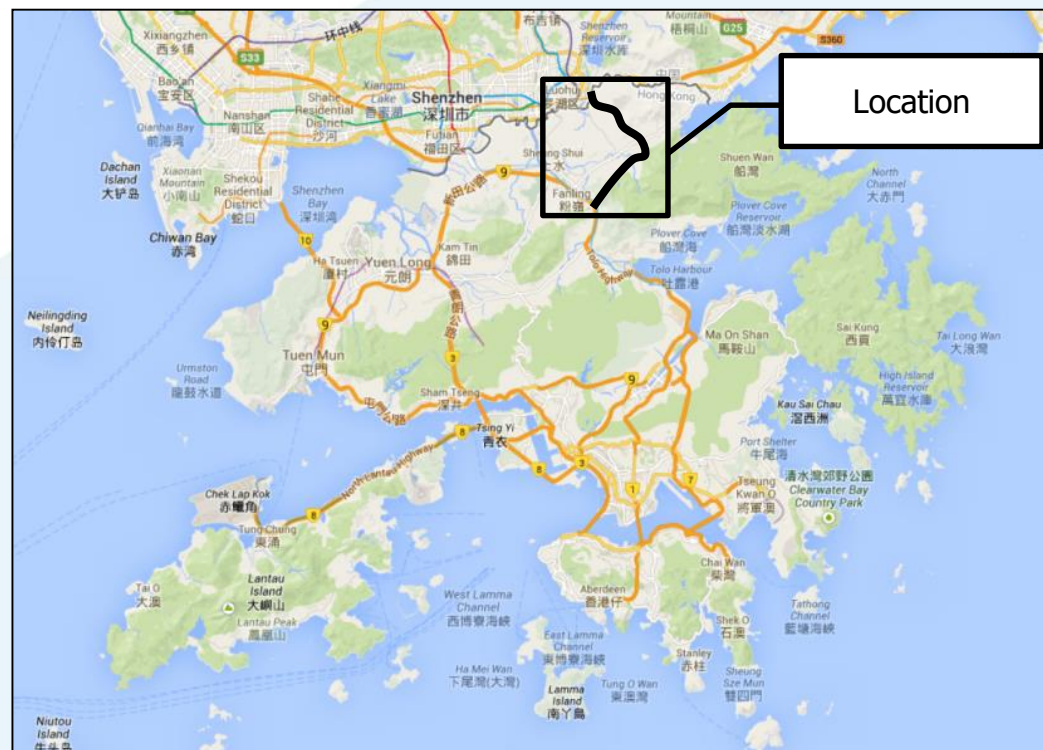
Chuzhou-Nanjing 7th November 2018



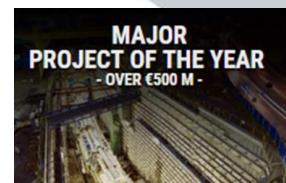
Project Location



- Name - Liantang / Heung Yuen Wai Boundary Control Point and Site Formation and Infrastructure Works
- Seventh land crossing into Main Land China
- Project is 11km long with 5.7km of tunnel, 4.3km viaduct and 1km at grade



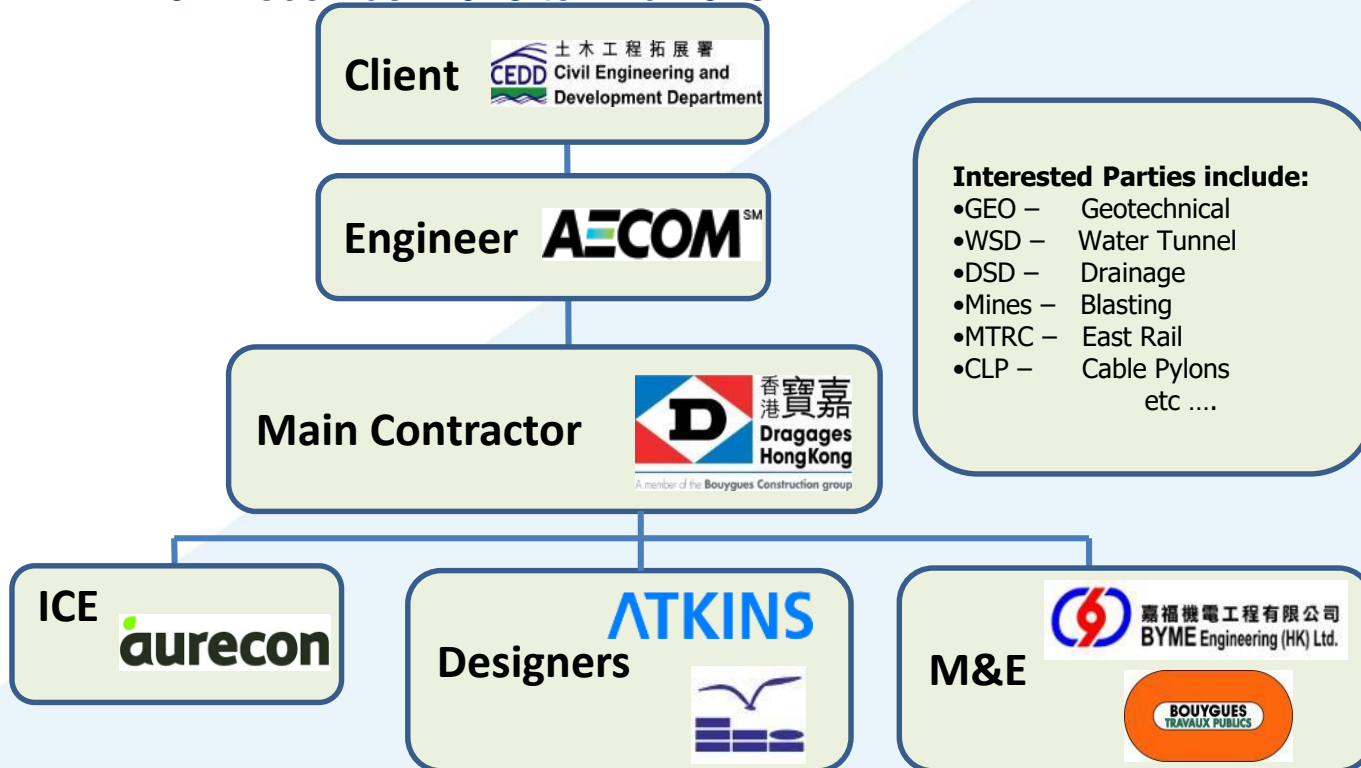
Contract 2 Overview

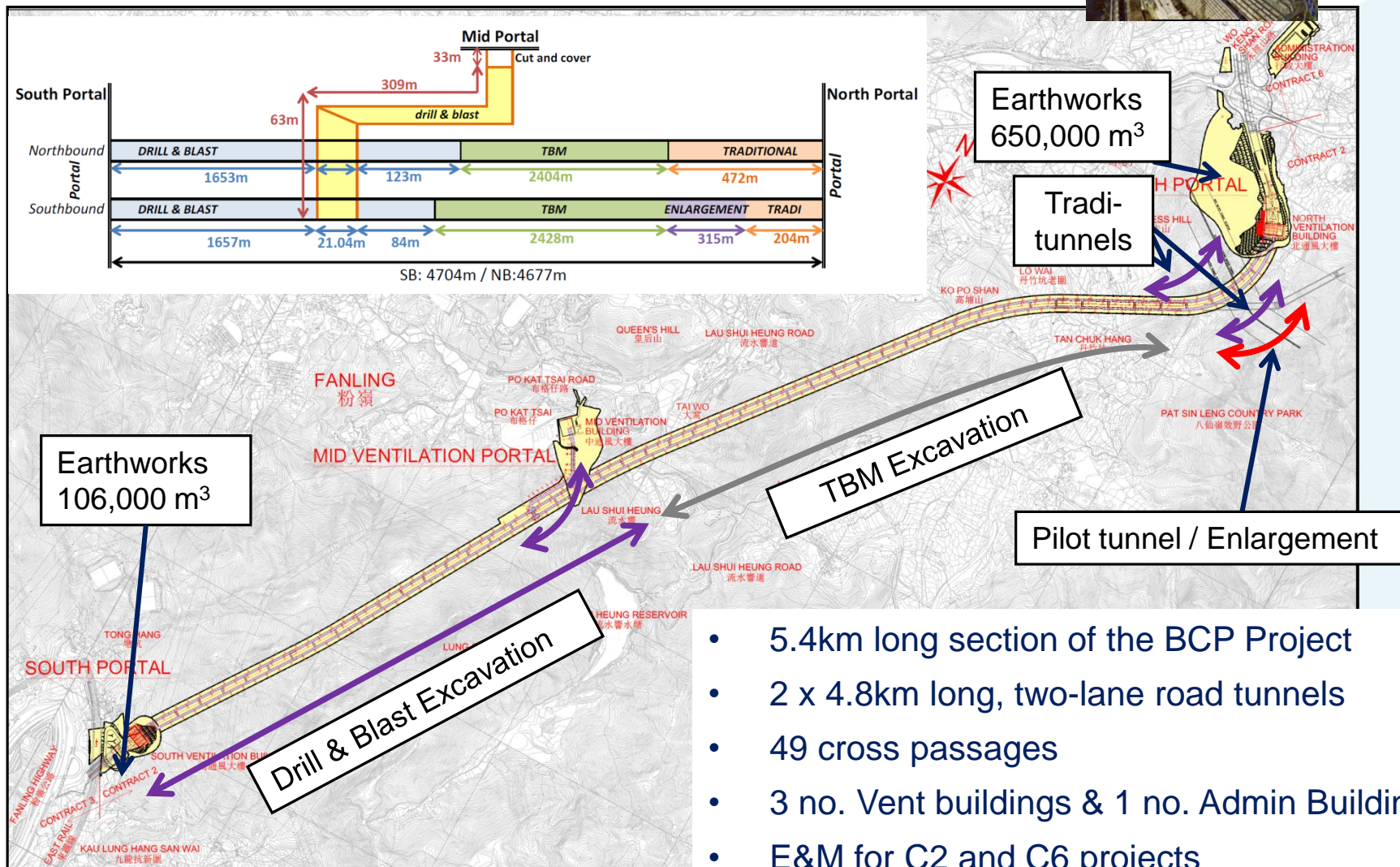
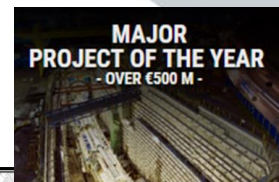


Project Name - Liantang / Heung Yuen Wai Boundary Control Point and Site Formation and Infrastructure Works - Contract 2

Contract Sum: HKD 10,313,888,888 (incl. Prov. Sum)

Duration: 20th December 2013 to End 2018

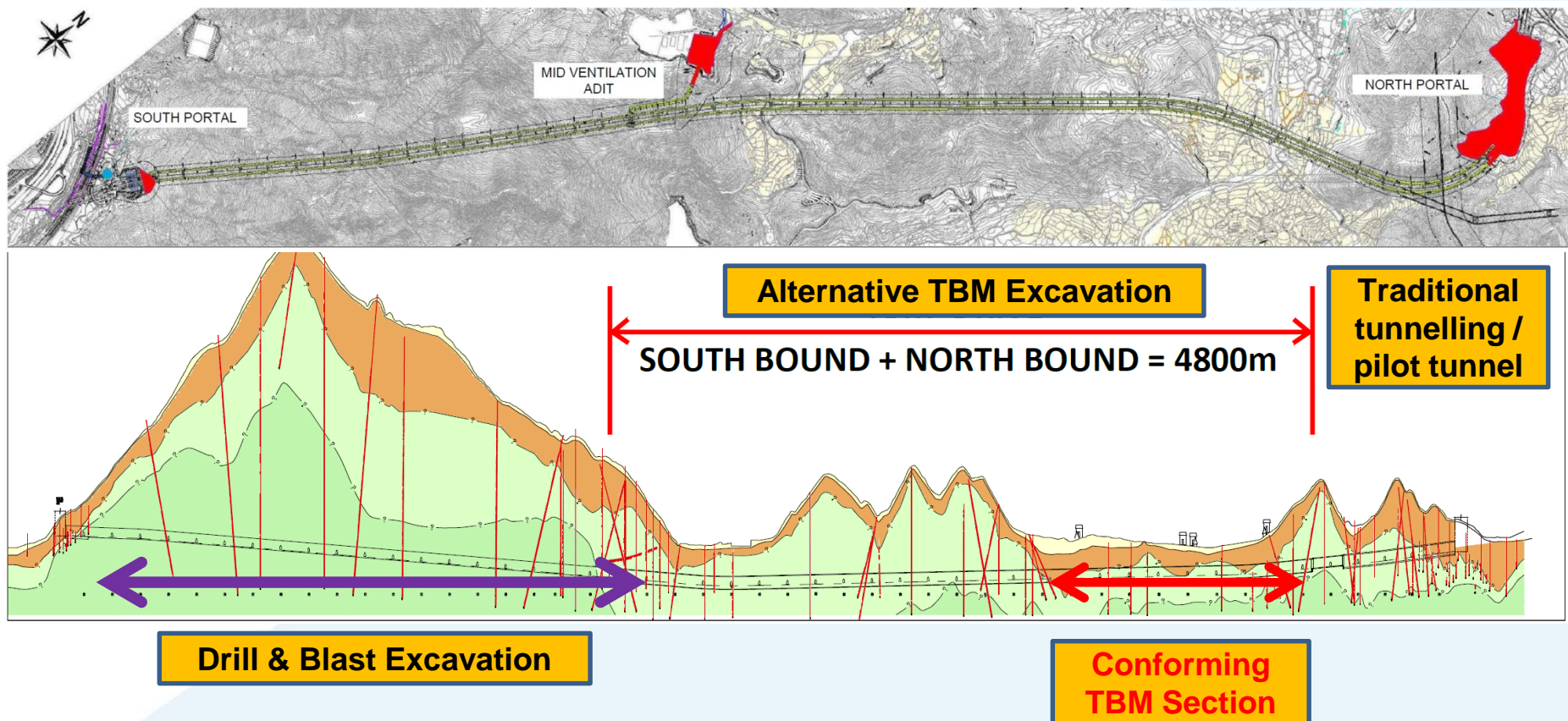




- 5.4km long section of the BCP Project
- 2 x 4.8km long, two-lane road tunnels
- 49 cross passages
- 3 no. Vent buildings & 1 no. Admin Building
- E&M for C2 and C6 projects



- Geological Setting – Volcanic Ash Tuff rock influenced by two regional faults
- Rock varies in strength from very strong rock to completely decomposed with sections of faulted ground and low ground cover





ITA TUNNELLING
AWARDS 2018

South Portal Aerial



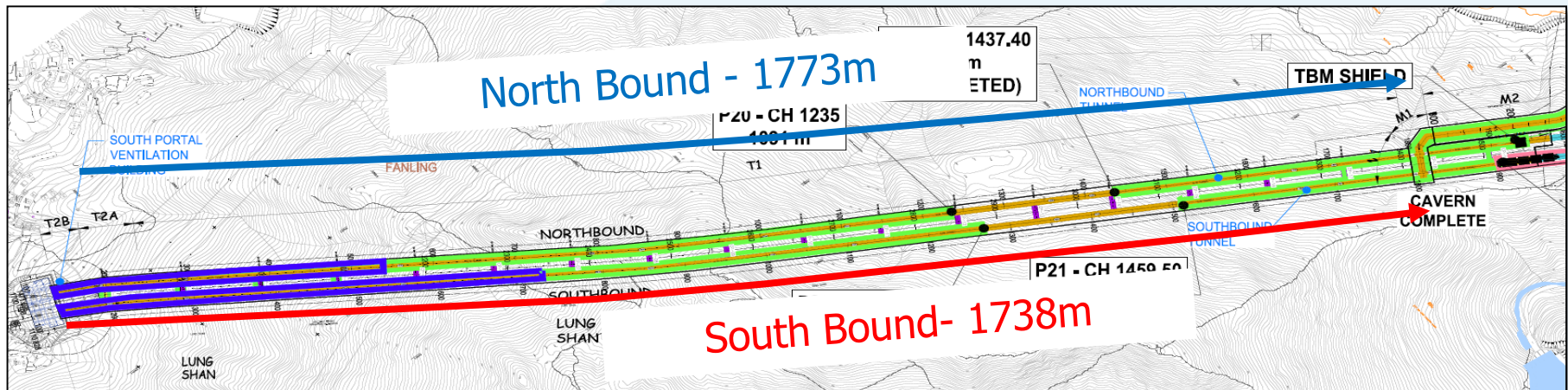
December 2017

South Tunnels – Drill and Blast Excavation

- Drained rock tunnel span – 14.15m / 130m² face (typical)
- Temporary support dowels (typ.4m) and FR shotcrete (typ.50 – 70mm)
- 3511m of tunnelling (two tunnels)
- 18 Cross Passages
- Pre-excavation grouting required;
 - ~26 no. primary and secondary holes (25 to 36m long)
 - Grouting duration between 2 to 6 shifts to complete

□ Production statistics:

- Avg. 15m/wk / Best 32m/wk



Mid Ventilation Junction



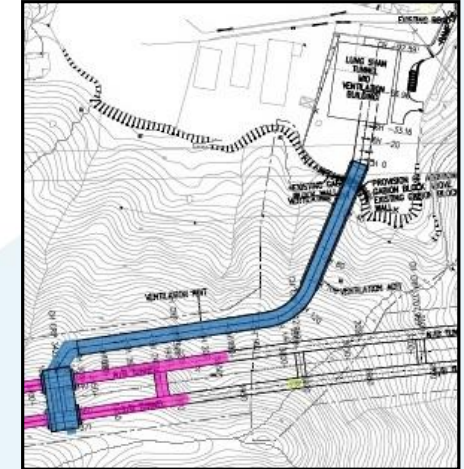
- Permanent – ventilation structure
- Temporary – used to turn the TBM around for the second drive
- Cavern span 21.7m / height 23.5m / length 50.6m





ITA TUNNELLING
AWARDS 2018

Mid Ventilation Junction – NB-N (Break-in)

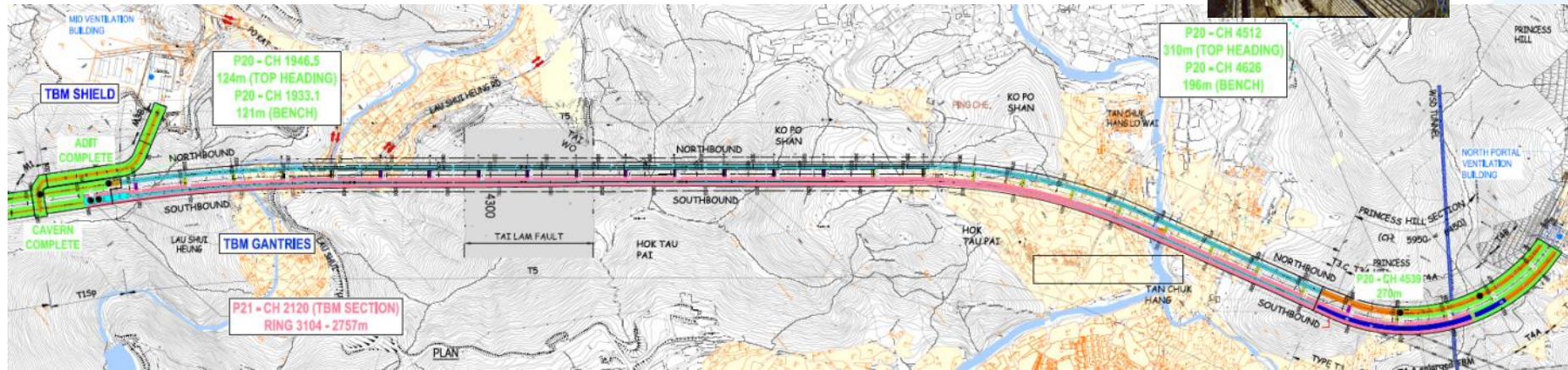


- Span 17.8m
- Height 18.3m



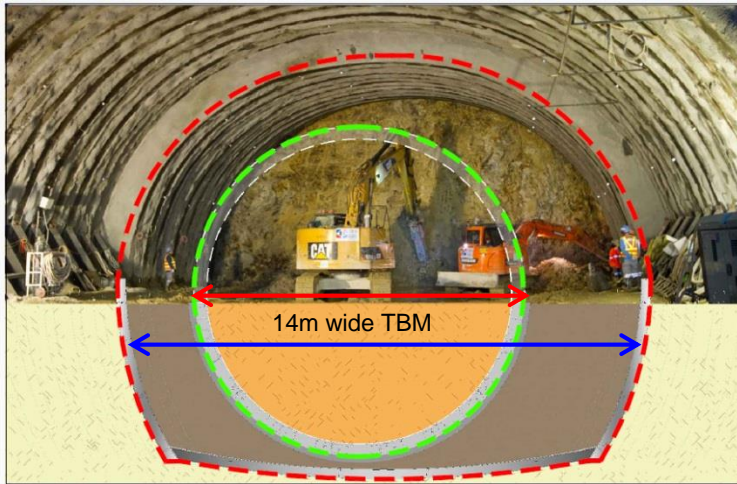


Princess Hill Wide Span Section

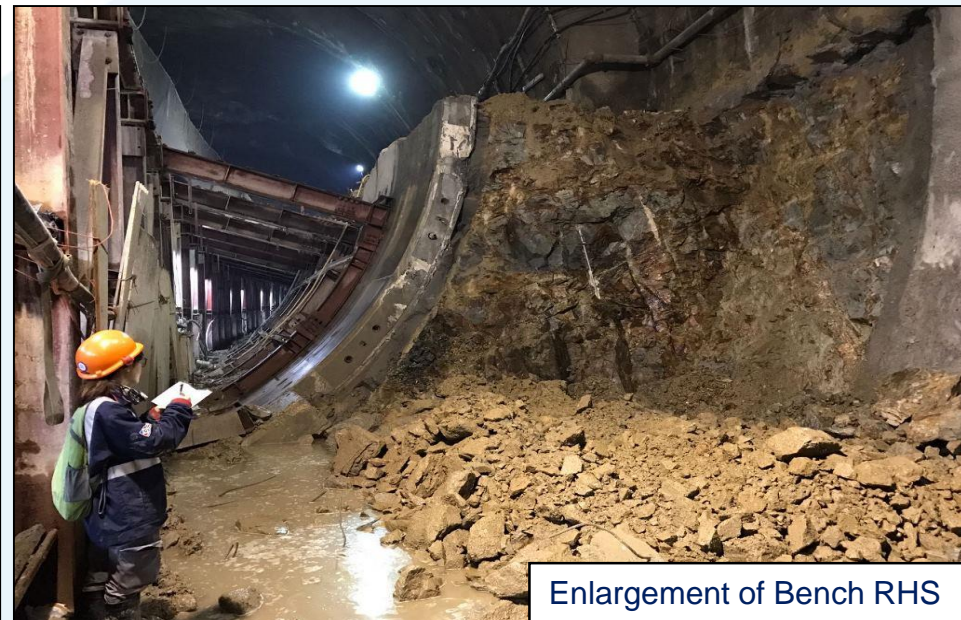
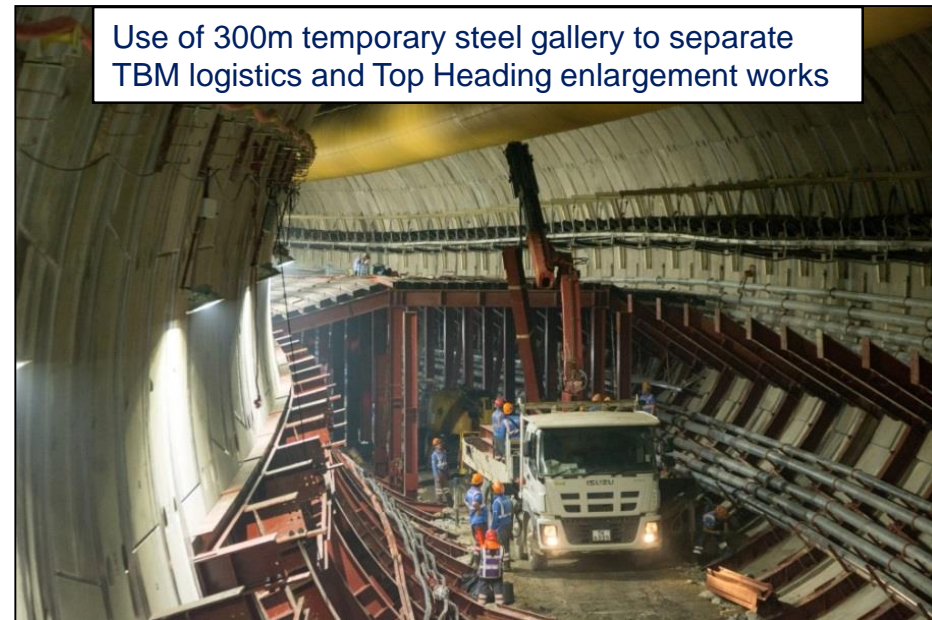


- Northern (~500m) wide span (17.8m I.D. span) tunnels to comply with sight line requirements (110m @ 80km/hr) in tight curve under Princess Hill
- To achieve Project Programme:
 - South bound tunnel excavated full span until TBM assembled and ready to launch
 - Pilot tunnel formed by TBM through remaining section of wide span tunnel section and later enlarged to required span in “Hidden Programme Time”
 - North Bound tunnel excavated full span to end of wide span tunnel and TBM dismantling chamber formed

TBM Pilot Tunnel Enlargement



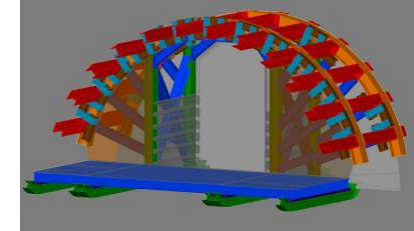
Use of 300m temporary steel gallery to separate TBM logistics and Top Heading enlargement works



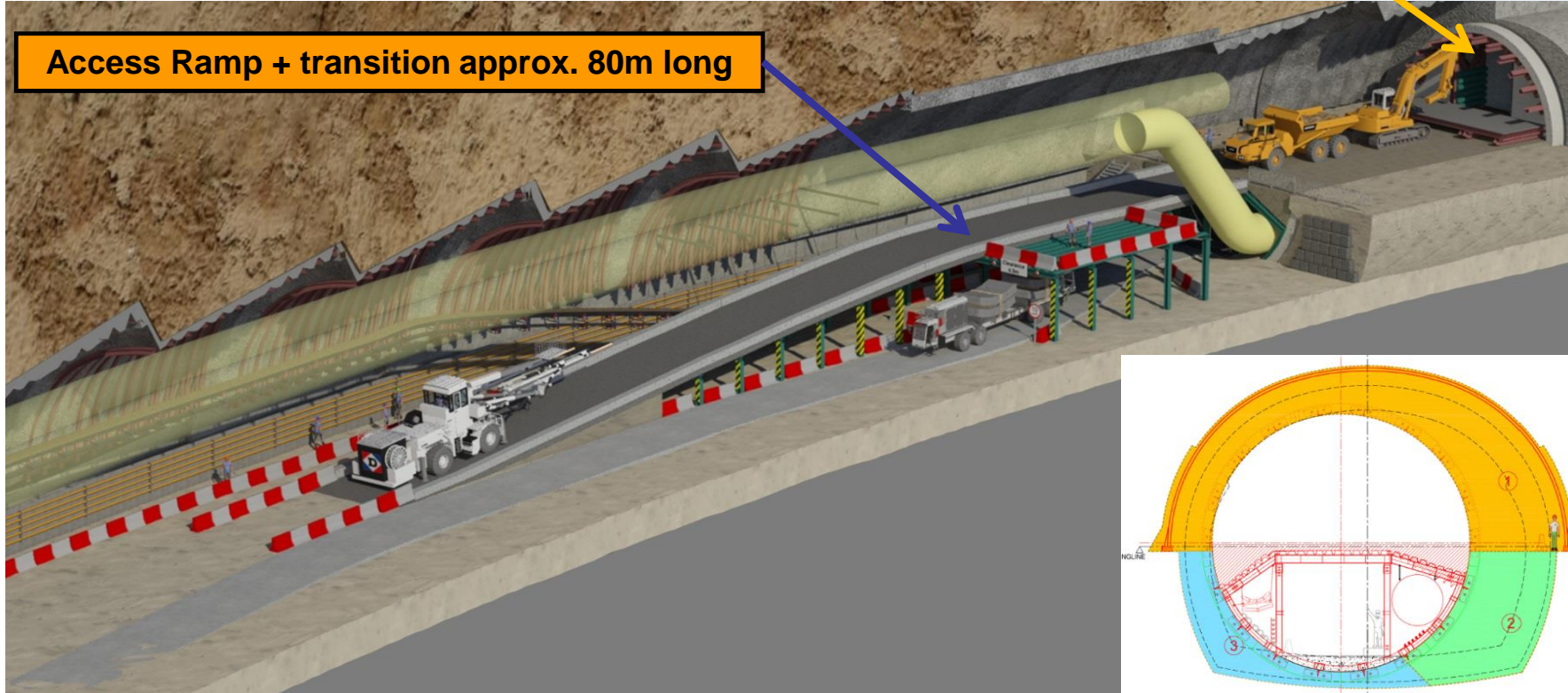


TBM Pilot Tunnel Enlargement – Heading

- Access ramp to heading work front
- Separated TBM logistics through Technical Gallery
- Safe upper working area
- Impact gantry – control falling debris onto technical gallery



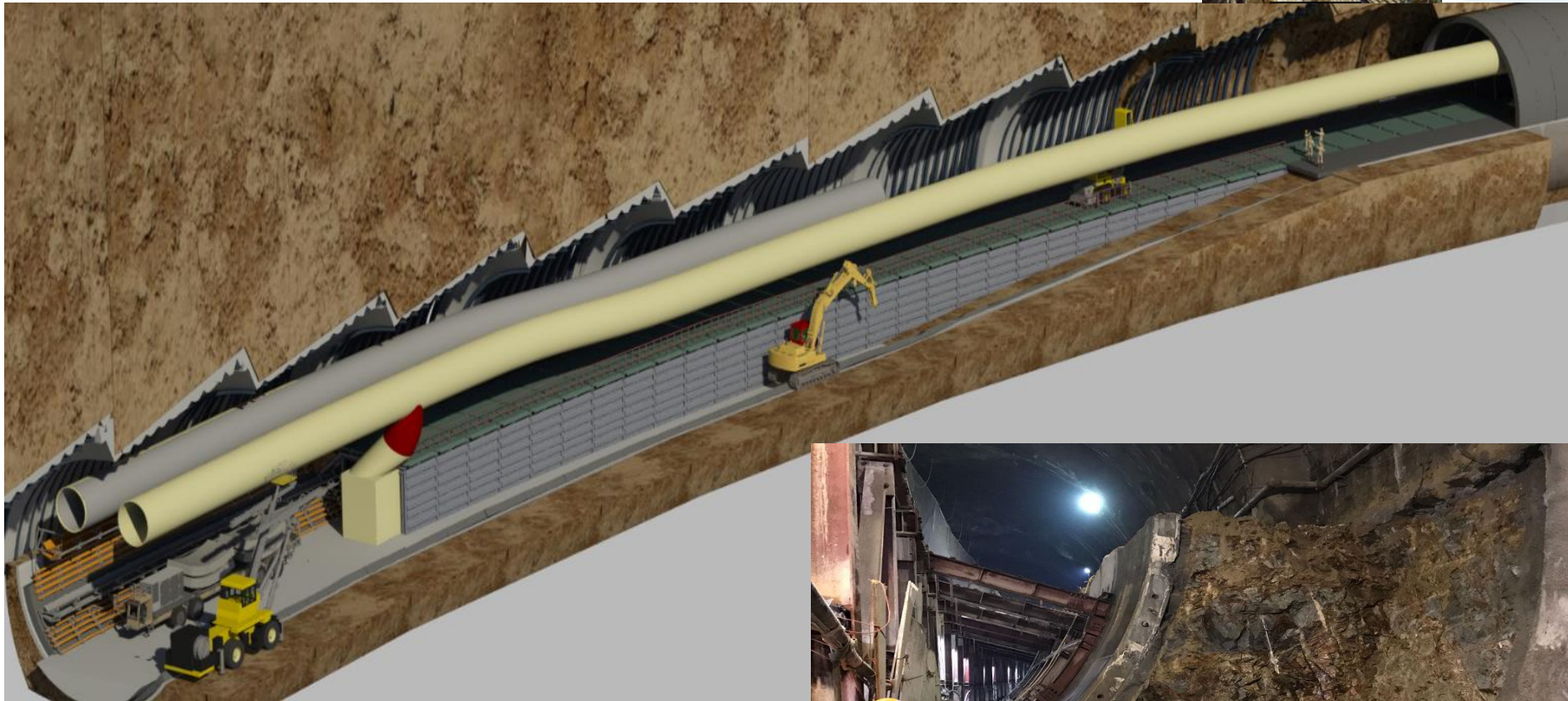
Impact Gantry



Access Ramp + transition approx. 80m long



TBM Pilot Tunnel Enlargement – Bench

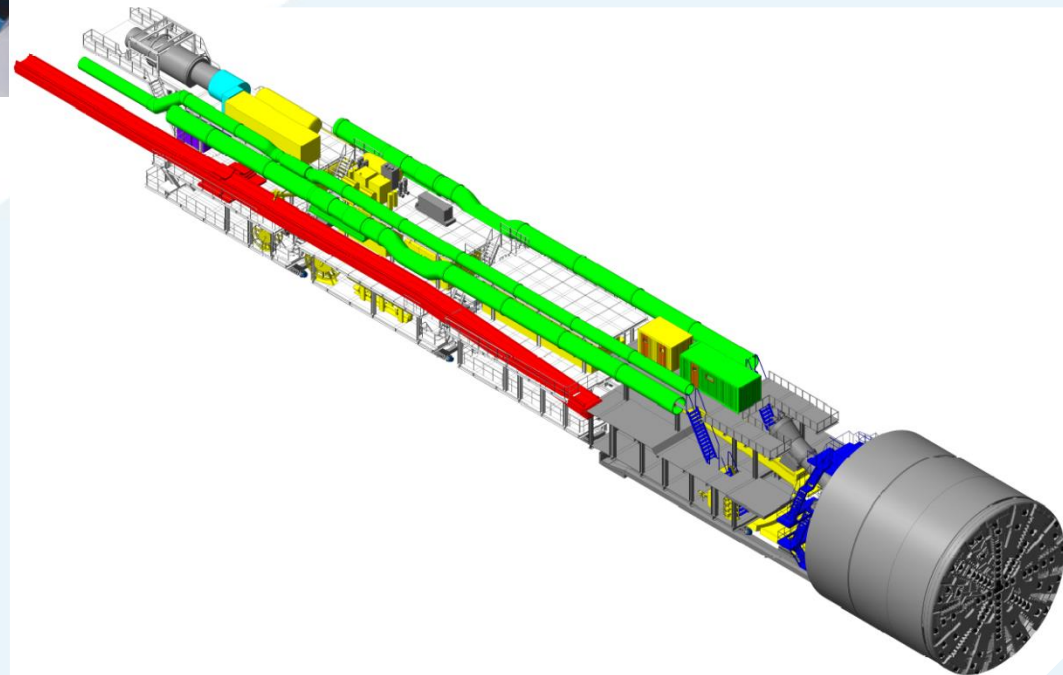


- Bench excavation commences after heading complete and TBM logistics re-located
- Enlargement completed 26th of August 2017





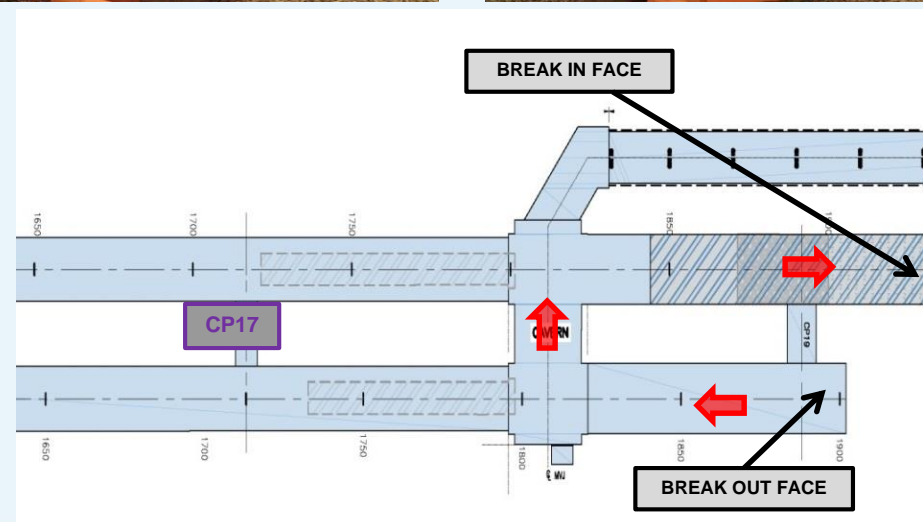
- 14.1m dia. Earth Pressure Balance (EPB) TBM - Supplier NHI / NFM
- Shield 13.36 long, 4 back-up gantries
- Total installed power - 7700 KW
- 77 disc cutter and 568 tools
- Main Innovations - Telemac & Mobydic





TBM Transfer Underground

- Overall programme improvement by turning the TBM underground rather than dismantling and relaunching from the north
- Proven methods from POMT
- February to April 2017 (10 weeks)



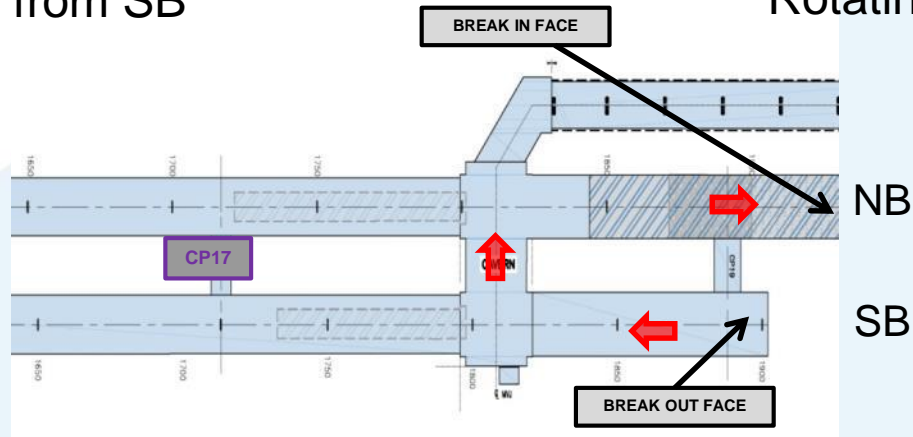
Mid Ventilation Junction – TBM U-Turn



Rotating from SB



Rotating to NB



Mid Ventilation Junction – TBM U-Turn

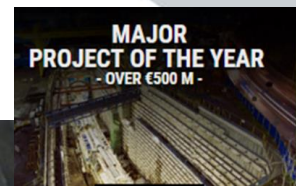


Shield being jacked into NB-N
(screw retracted or maintenance)



ITA TUNNELLING
AWARDS 2018

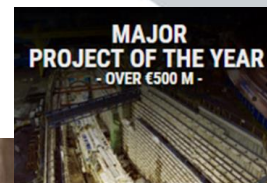
Mid Ventilation Junction – TBM U-Turn





ITA TUNNELLING
AWARDS 2018

Key Technical Breakthroughs



Breakthrough of Mid-vent southbound tunnel by TBM on 1 Mar 2017



Breakthrough of South Portal northbound tunnel by D&B on 24 Jul 2017



Breakthrough of South Portal southbound tunnel by D&B on 15 Aug 2017



Breakthrough of Princess Hill northbound tunnel by TBM on 27 Apr 2018

Current Work Status



- **Tunnelling Works:**

- Excavation and Temporary Support: 100% completed
- Permanent Lining: 100% completed
- Internal Structures: 95% completed



- **Building Works:**
100% completed



- **External Works:**
90% completed



2018-10-2 14:57



- Total number of hours worked on this project: 16,256,030 man-hours (as of 30 Sep 2018)
- Cumulative accident frequency rate is 0.036 per 100,000 man-hours worked since project commencement.
- It is over 10 times, well below the target set by the Development Bureau, Hong Kong Government SAR of 0.6.
- Although a challenging schedule and work load, there is no reportable accident since January 2017. Accident frequency rate is hence ZERO recently.
- “Civil Engineering and Development Department (CEDD) Innovation Award for Site Safety 2016 – Merit Prize”
- “Certificate of Merit Award” in Temporary Works Excellence Award 2017
- “Lighthouse Club’s International Design for Safety Competition” in 2017
- “Recognising Excellence in Safety” in the “Safe Project Team Award 2017”
- “Site Safety Practitioner Award 2017”



Environment Protection



- Energy savings of various operations – such as conveyor belts, electric plants, Tunnel Boring Machine cooling system, etc. Total reduction of over 5,900 tonnes of CO₂ emission on site



Electric Plants

40 units of Electric Plants

SAVINGS

- over 10,000 L fuel

REDUCTIONS

- 30 tonnes of CO₂ emission



TBM Conveyor Belts

TBM Conveyor Belts and 70 tonnes Dumper for Spoil Transportation

SAVINGS

- over 70,000 L fuel

REDUCTIONS

- 33,600 and 59,900 delivery trips
- 200 tonnes of CO₂ emission



Twin-TBM Cooling System

Minimised Electricity Consumption

e.g. twin-TBM cooling system, ventilation speed control, time switches for air conditioning, LED tunnel lights

SAVINGS

- over 8,132,000 kWh

- 2016 Hong Kong Awards for Environmental Excellence (HKAEE) – “Certificate of Merit”
- Hong Kong Green Organization and “Energy-wi\$e Certificate” in 2018

- Workshops, lobbying activities with locals, parties for work achievement which encourage communication, show appreciation towards people, welcome new members and thank people for their contributions



- Public Consultation - mail drop to the neighborhood at least one month before blasting



來函編號:

本函編號: LTH/Inhabitant/L/02140/CL

Date: 22 October 2014

Dragages Hong Kong Limited

Site Office : Junction of Sha Tau Kok Road and Wo Keng Shan Road, Fanling
Mailing Address : P.O. Box No. 541 Fanling Post Office, Hong Kong
Head Office : 3/F, Island Place Tower, 519 King's Road, North Point, Hong Kong
Tel 電話 : +852 2171 3000 Fax 傳真 : +852 2171 3299

香港興業建築有限公司
工地辦事處：粉嶺沙頭角公路及米徑山路交界
郵寄地址：粉嶺郵政局郵箱541號
總行字樓：香港北角英皇大道510號匯豐大廈3樓

www.drapagestik.com

E0221 Temporary Structure Located at Lot No. 612 D085 (O3)
E0225 Building Located at Lot No.612 D085 (O1)
E0226 Temporary Structure Located at Lot No.612 D085 (D2)
E0227 Temporary Structure Located at Lot No.612 D085 (D2)
E0230 Temporary Structure Located at Lot No.612 D085 (D2)

流水響村 612 地段 DD.85

致：張潤聰先生

Notice

CV 2012/08 Liantang/ Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure Works Contract 2 – Tunnel Works at Lau Shui Heung and Po Kat Tsai towards Tai Po

To facilitate the construction of the Lung Shan Tunnel, the Contractor will commence tunnel works at Lau Shui Heung and Po Kat Tsai towards Tai Po from mid-December 2014. The blasting works will be carried out once a day between 2 p.m. and 6 p.m. (except Sundays and Public Holidays). The blasting works will last for about 6 months.

Evacuation of the workers from the blasting work site will be carried out about 15 minutes before each blast. Siren will be activated continuously about 5 minutes before the blasting work. Our delegated staff will assist and direct, if necessary, nearby pedestrians away from the working area about 2 – 3 minutes before the blasting.

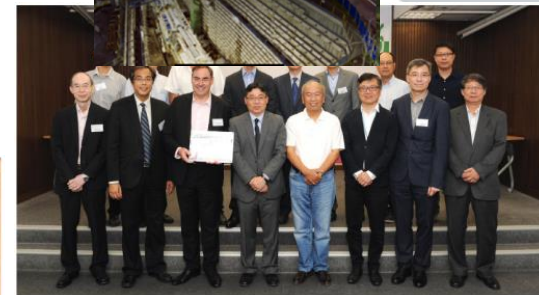
Once the blasting is completed, the siren will stop and our delegated staff will inform members of the public nearby. The pedestrian flow will then resume normal. Signage displaying the daily blasting schedule will be posted outside the works area.

We will closely monitor the works so as to minimize disturbance to the community. Please accept our apology for the inconvenience caused. Should you have any queries, please call the Project Hotline at 6032 7831.



- “Civil Engineering and Development Department (CEDD) Innovation Award for Site Safety 2016 – Merit Prize”
- 2016 Hong Kong Awards for Environmental Excellence (HKAEE) – “Certificate of Merit”
- ITA Tunnelling and Underground Space Awards 2017 – Safety Initiative of the Year – Telemach Cutterhead Disc Robotic Changing System
- “Global Tunnelling Team of the Year” in Tunnelling Awards 2017 by New Civil Engineer (NCE)
- “Certificate of Merit Award” in Temporary Works Excellence Award 2017
- “Lighthouse Club’s International Design for Safety Competition” in 2017
- “Recognising Excellence in Safety” in the “Safe Project Team Award 2017”
- “Site Safety Practitioner Award 2017”
- Hong Kong Green Organization and “Energy-wi\$e Certificate” in 2018

MAJOR
PROJECT OF THE YEAR
- OVER €500 M -





ITA TUNNELLING
AWARDS 2018



Thank You

