An construction update of the Express Rail West Kowloon Terminus Part 1

A visual record/summary
prepared by Raymond Wong
as part of his study of the
ERL project since 2011

Presentation prepared in March 2016

Brief Introduction

The 26-km long Hong Kong Section of the Guangzhou-Shenzhen-Hong Kong Express Rail Link (Express Rail Link, or XRL) runs from West Kowloon in Hong Kong to the boundary of Hong Kong and Shenzhen. The Express Rail Link will connect with the 16,000-km National High-speed Railway Network and will enhance Hong Kong's role as the southern gateway to the Mainland.

Construction of the Express Rail Link commenced in January 2010, with completion targeted for 2018.

The rail consists only with a Terminus located at the north of the West Kowloon Cultural District and will be linked to Austin Station and Kowloon Station by footbridges and subways. There will be no intermediate station in the Hong Kong Section before it reaches Shenzhen.

Proposed Alignment and Method of Construction

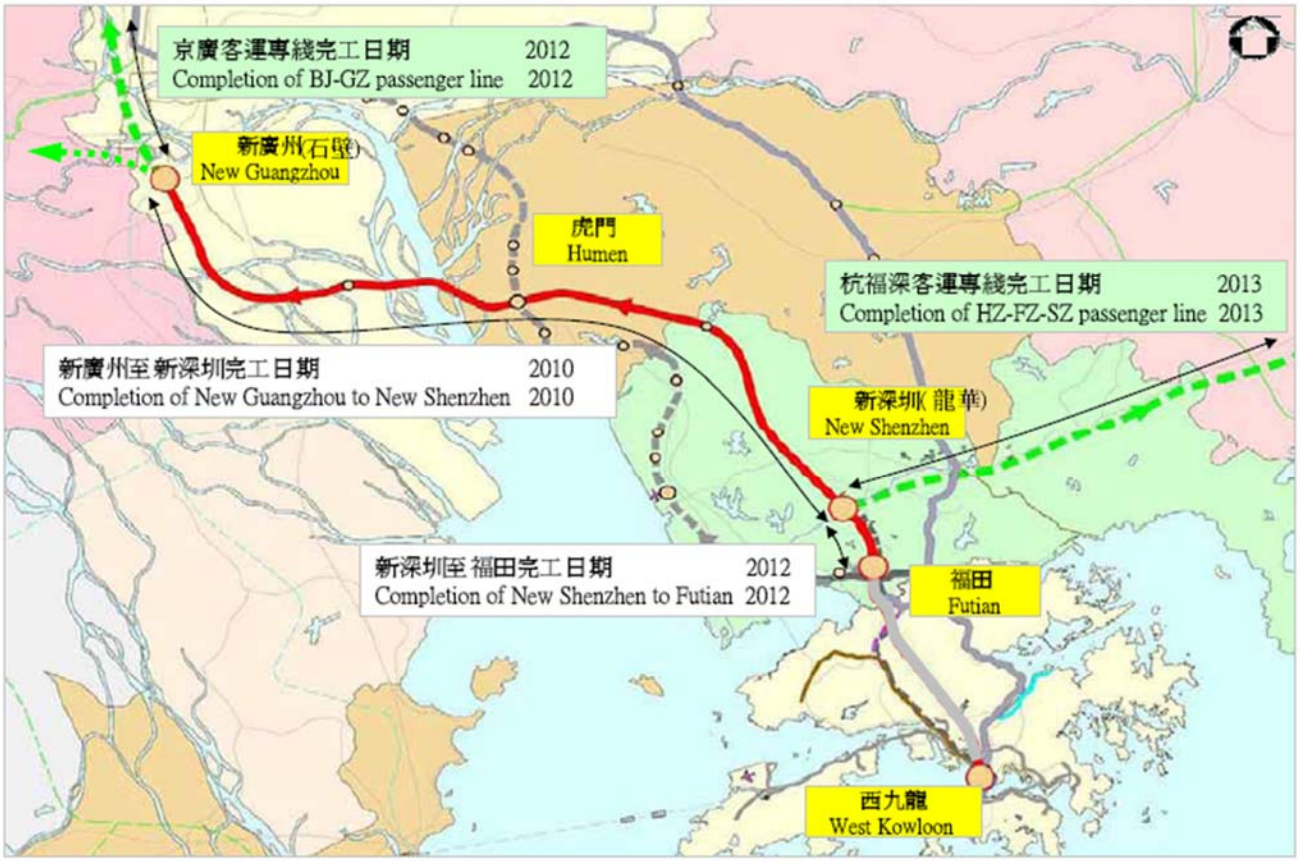
The XRL will start from WKT and pass beneath Jordan Road by cut and cover tunnel construction and pass underneath Hoi Wang Road largely by tunnel boring machine (TBM) to a construction shaft located adjacent to Sham Mong Road.

The tunnel will continue northwards and pass beneath Nam Cheong, Lai Chi Kok, Kwai Chung, Shing Mun Country Park, Tai Mo Shan Country Park towards Shek Kong. This section will be constructed using tunnel boring machines (TBM) in soft ground and drill and blast techniques in rock strata. Ventilation buildings/shafts and emergency access points will be provided at Shing Mun, Kwai Chung and Nam Cheong. An adit will be constructed to connect the ventilation building in Kwai Chung with the main tunnel.

An emergency rescue station will be constructed by cut and cover method at Shek Kong. The tunnel will proceed northwards and pass beneath the Lam Tsuen Country Park towards Ngau Tam Mei. The section between Tai Mo Shan and Lam Tsuen Country Park will be constructed using TBM techniques, while the sections beneath Tai Mo Shan and Lam Tsuen Country Park will be constructed using drill and blast techniques. Ventilation buildings and emergency access points will be located at Pat Heung, Tai Kong Po and Ngau Tam Mei. An adit will be constructed to connect the ventilation building in Pat Heung with the main tunnel.

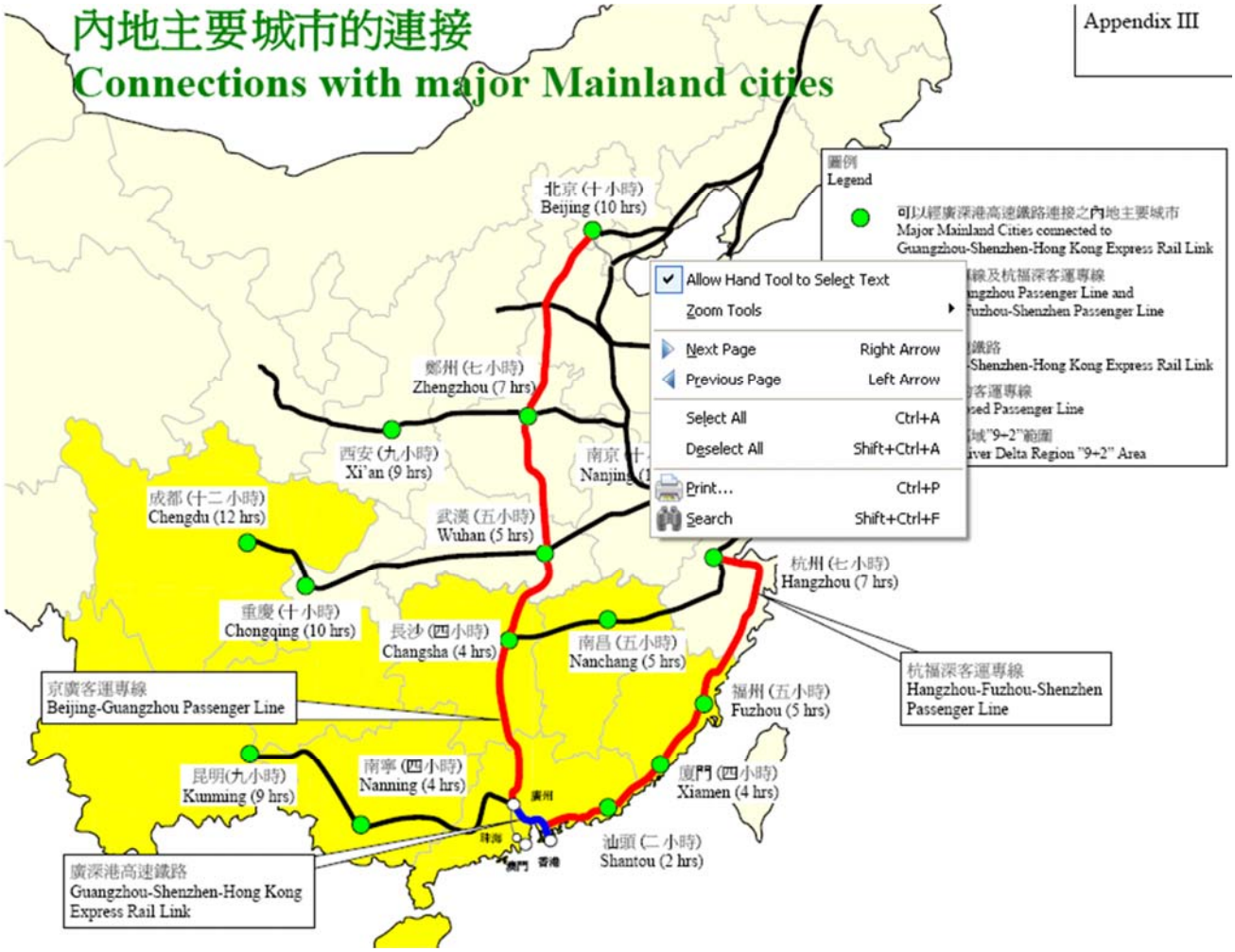
North of Ngau Tam Mei, the alignment will pass deeply beneath San Tin and Mai Po wetlands to connect to the Mainland reception/access shaft located north of the Shenzhen River. For the cross-boundary section, TBMs will be used for tunnel construction beneath the wetlands. A ventilation building will be constructed at Mai Po

高鐵工程進度(內地段)
Express Rail Link Work Progress (Mainland Section)

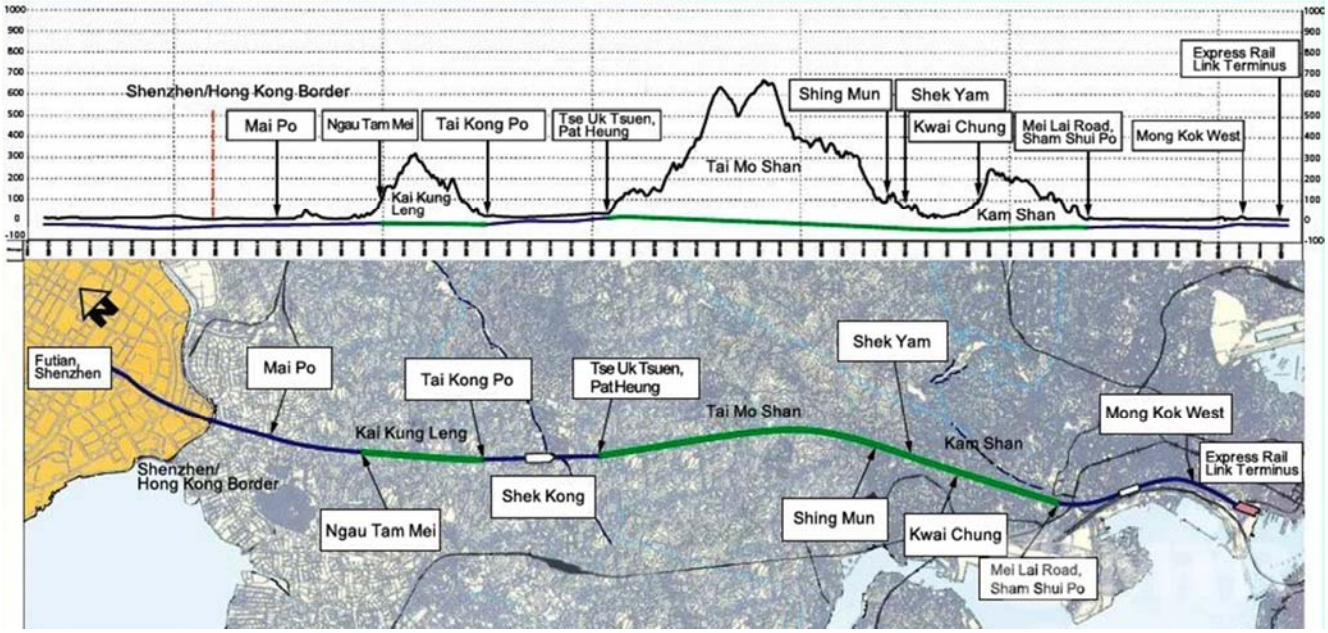


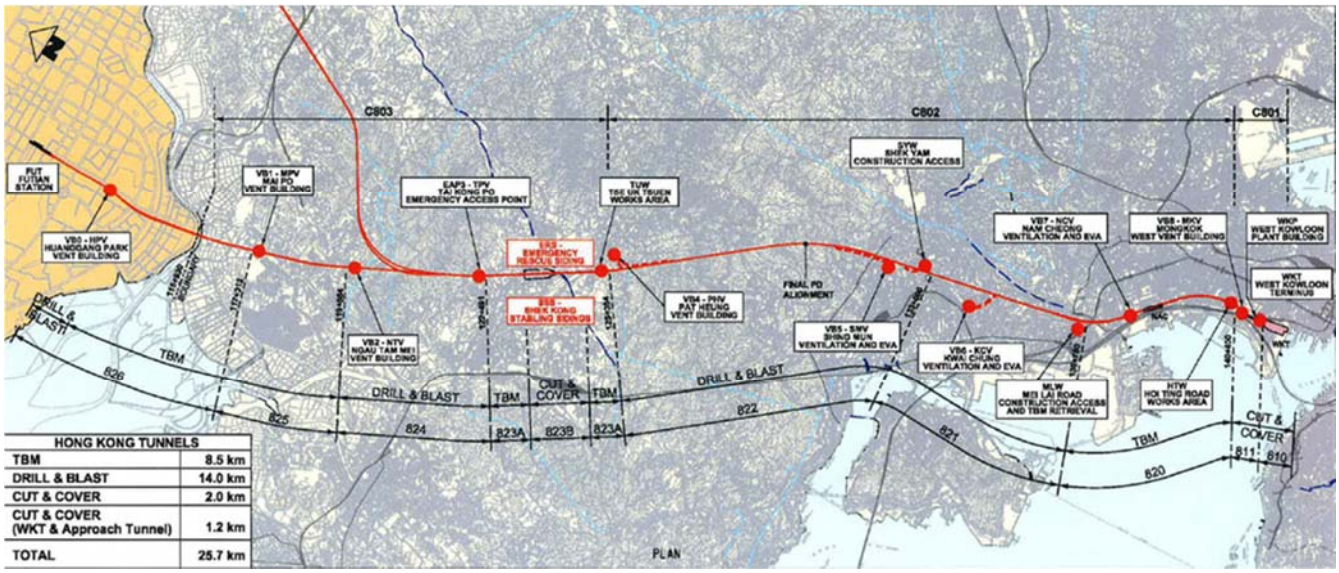
Appendix III

內地主要城市的連接
Connections with major Mainland cities



Alignment of the Express Rail within Hong Kong section





HONG KONG TUNNELS	
TBM	8.5 km
DRILL & BLAST	14.0 km
CUT & COVER	2.0 km
CUT & COVER (WKT & Approach Tunnel)	1.2 km
TOTAL	25.7 km

This presentation tries to provide an visual update of the work status for the Terminus construction including the associated works up to February 2016.

Highlights of some of the features and working difficulties involved in the construction of the Terminus and its associated facilities

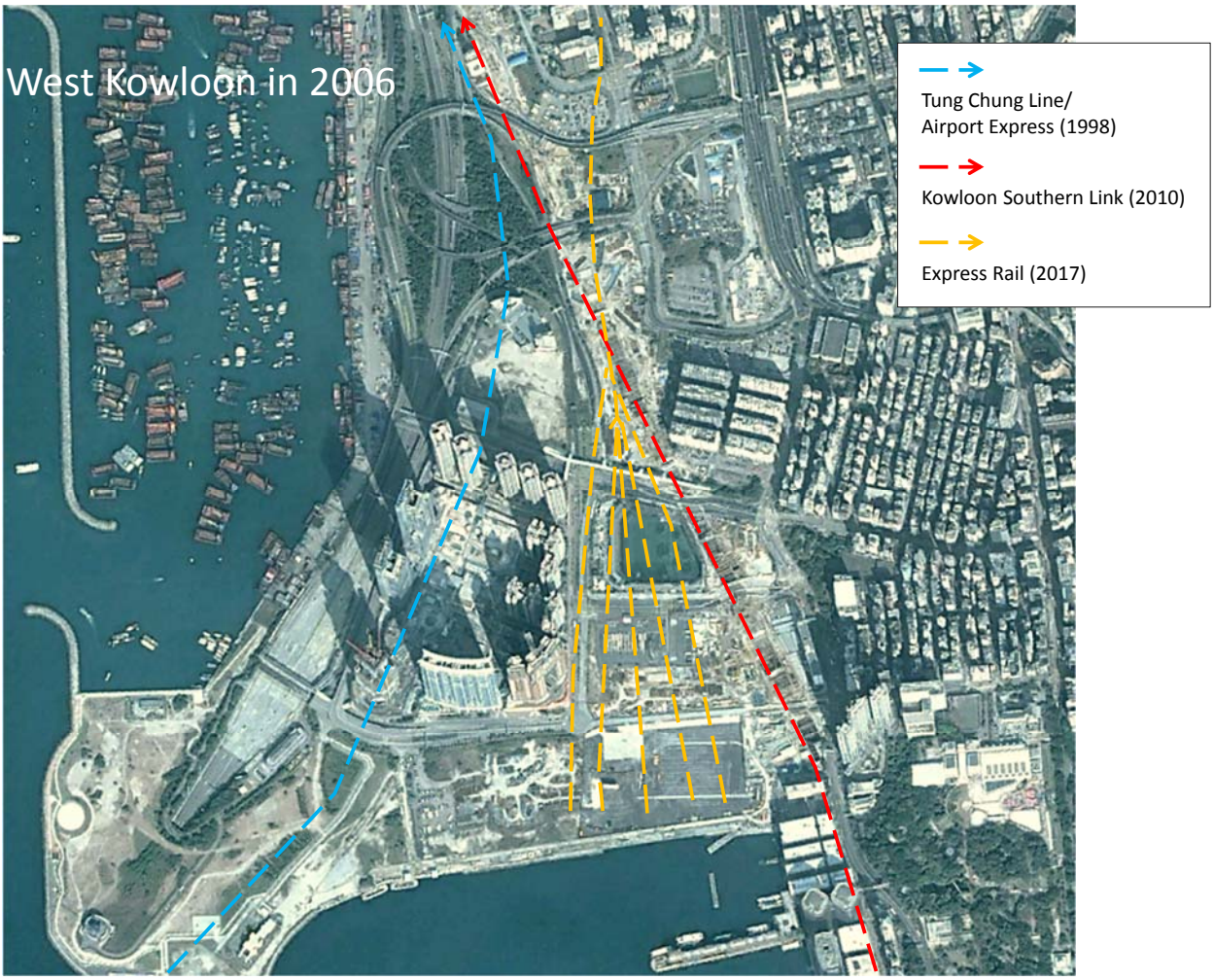
1. The area of the involved sites is extremely large (overall about 30 hectares).
2. Complicated phases of traffic diversion required both for vehicular and pedestrian.
3. Involving deep and large volume of excavation to accommodate the station facilities.
4. Working in close proximity to two existing mass transit system, that is, the Kowloon Southern Link and the Tung Chung/Airport Express Lines.
5. Working in narrow strip of available land especially at the north end of the Terminus where the KSL/TC-Airport Express Lines and the Express Rail meet.

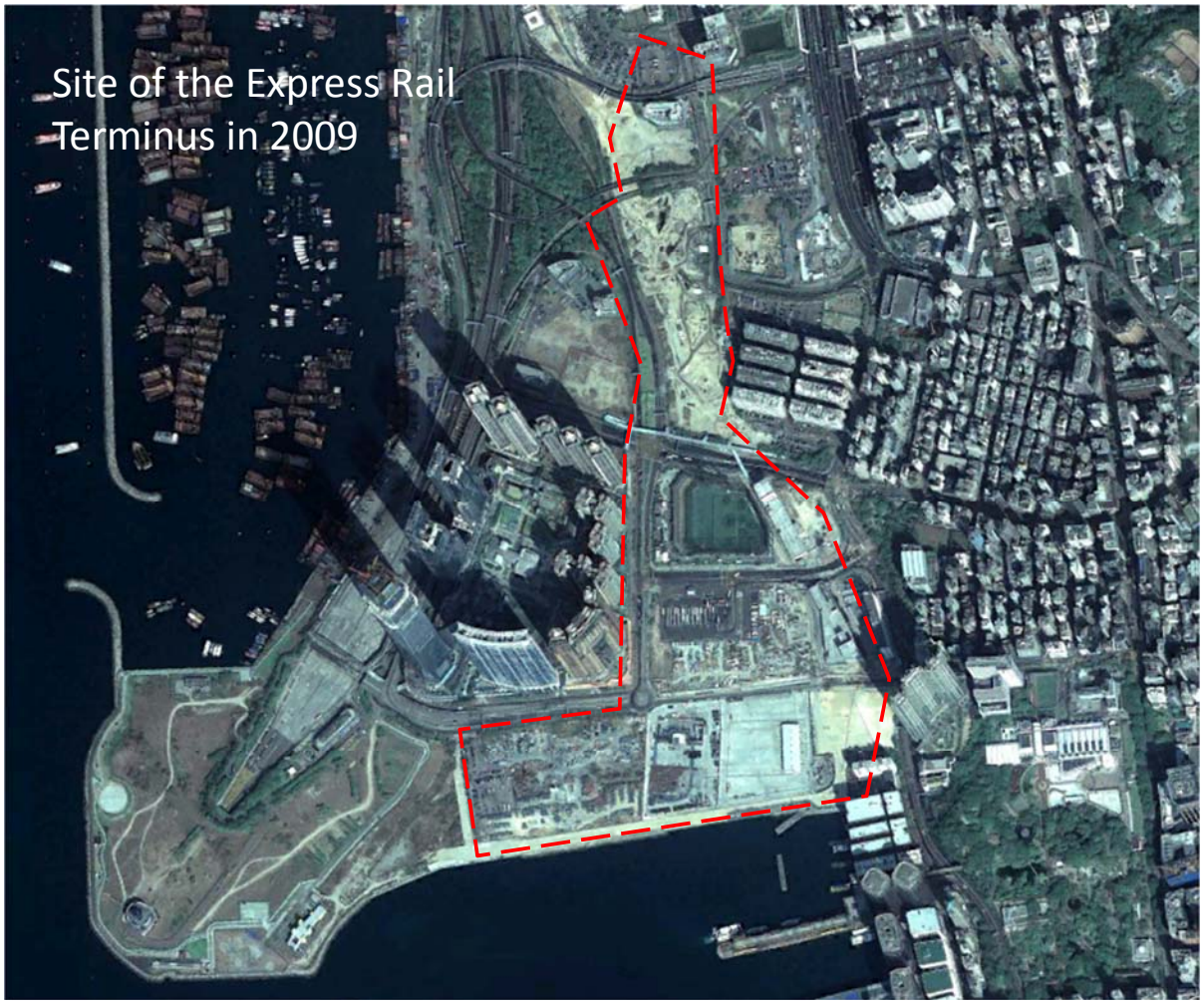
Highlights of some of the features and working difficulties (continued)

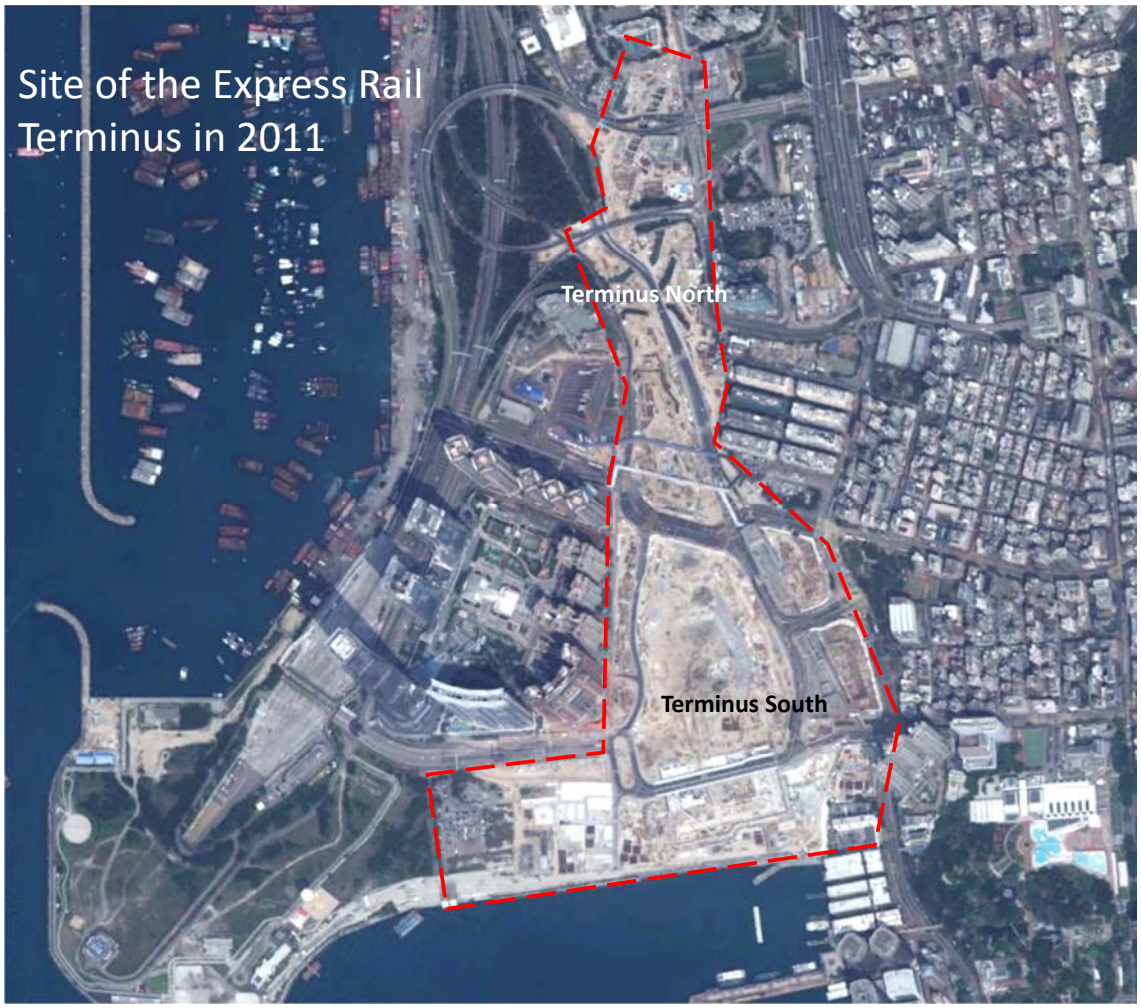
6. Working under limited headroom, these include:
   - Under slip-roads of the West Kowloon Interchange
   - Under temporary carriageway as substitutions for Jordon Road and Austin Road
7. Interrupting by large amount of underground services and nearby facilities during the excavation, these include:
   - A series of large section storm water culvert
   - Other underground facilities including drains, water supply, gases and electric cable etc.
   - A series of pedestrian footbridge including its diversion and reconnection in phases to fit the ground works.
8. Usual difficulties for top-down construction in particular to plan for large sections in complicated junctioning phases.

The project overview


West Kowloon
in 1999


West Kowloon in 2006
Tung Chung Line/
Airport Express (1998)
Kowloon Southern Link (2010)
Express Rail (2017)


Site of the Express Rail Terminus in 2009


Site of the Express Rail Terminus in 2011
Terminus North
Terminus South

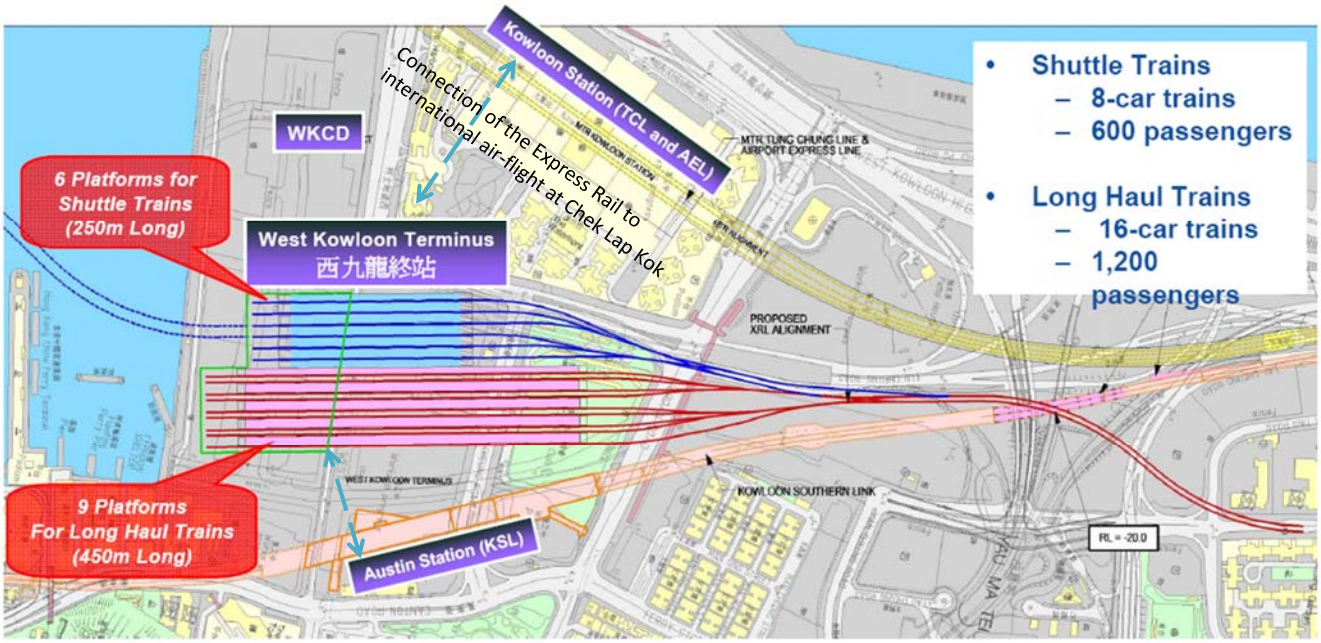
Aerial view of the Express Rail Terminal at West Kowloon in 2011

Aerial view of the Express Rail Terminal at West Kowloon in 2012

Aerial view of the Express Rail Terminal at West Kowloon in late 2014

Aerial view of the Express Rail Terminal at West Kowloon in late 2015

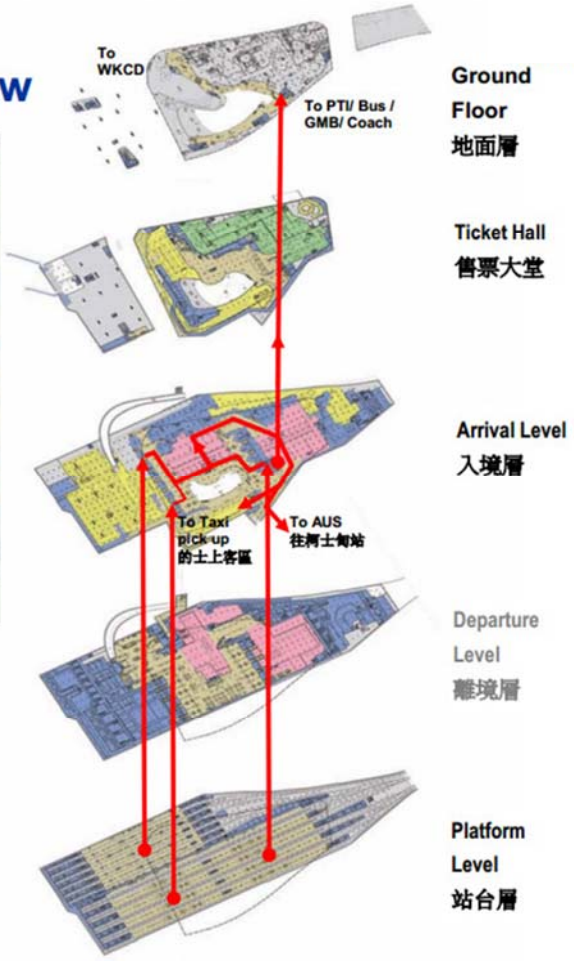
Layout of the Terminus showing the rail platforms



Express Rail Terminal at West Kowloon (showing platform layout)

Construction of the tunnel (cut-and-cover) ⟶
for the previous Kowloon Southern Link
connecting East Rail to the West Rail

抵港及離港人流路線圖
Station Arrival & Departure Flow



- PLATFORM AREA
- CIQ HALL & OFFICES
- BACK OF HOUSE
- PROPERTY CARPARK
- STATION CARPARK
- ARRIVAL PEDESTRIAN FLOW
- DEPARTURE PEDESTRIAN FLOW

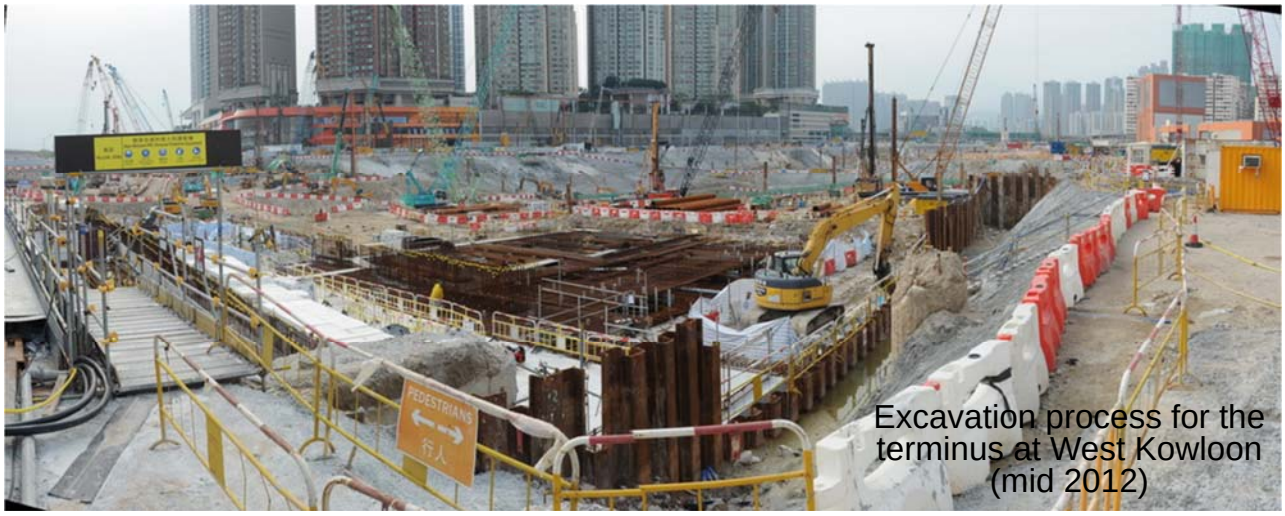
The Terminus site as seen in late 2010

The Terminus site as seen in late 2010

Express Rail Terminal Site at West Kowloon (November 2011)

The terminus site (south) as seen in mid 2012

The terminus site (north) as seen in mid 2012



Excavation process for the terminus at West Kowloon (mid 2012)

April 2012

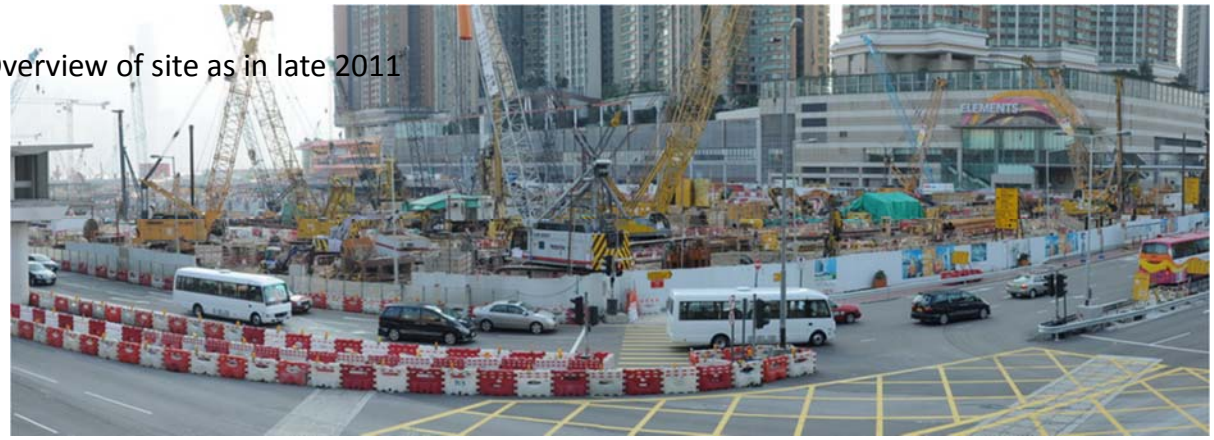
August 2012

Excavation process for the terminus at West Kowloon

Project progress highlight,
West Kowloon Terminus Station South

(Mainly for Contract 810A)

Overview of site as in late 2011



Overview of site as in August 2012

Overview of site as in December 2012

Overview of site as in March 2013

Overview of site as in May 2013

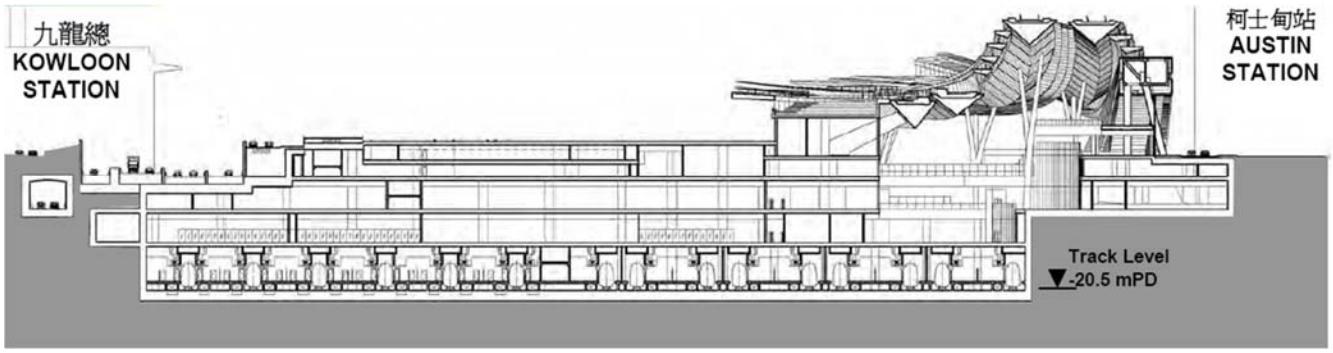
Overview of the southern tip of site as in May 2013

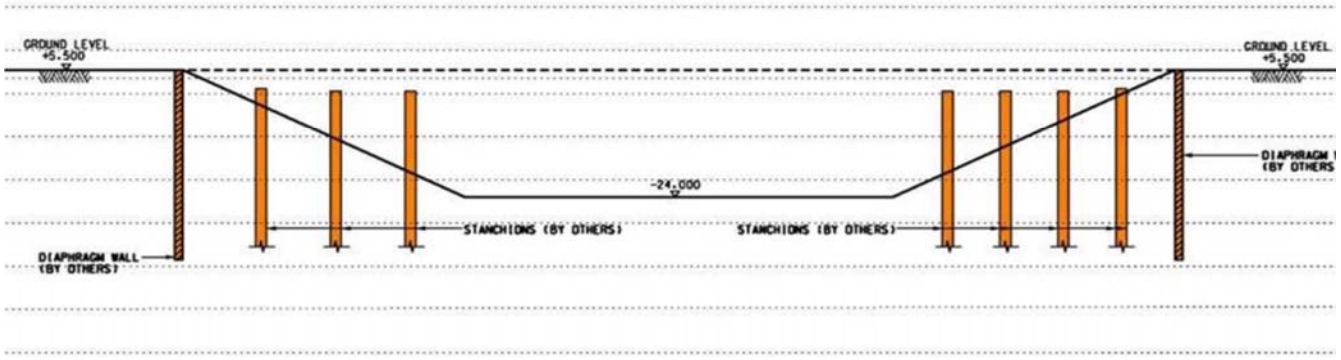
Overview of the southern tip of site as in August 2013

Overview of site as in August 2013

Overview of site as in November 2013

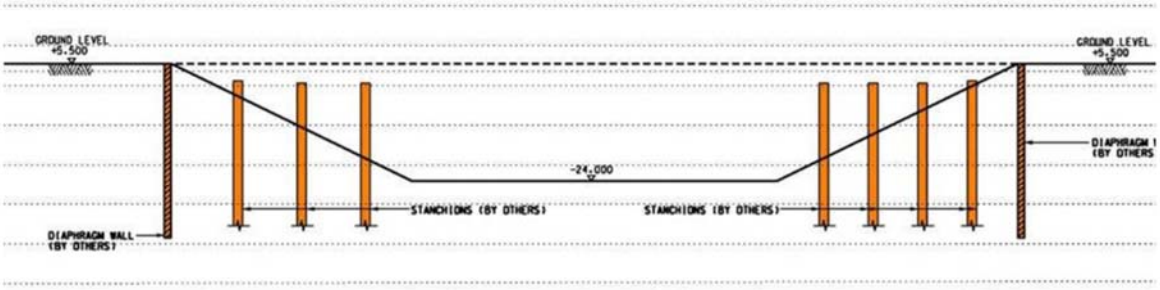
Overview of the southern tip of site as in December 2013



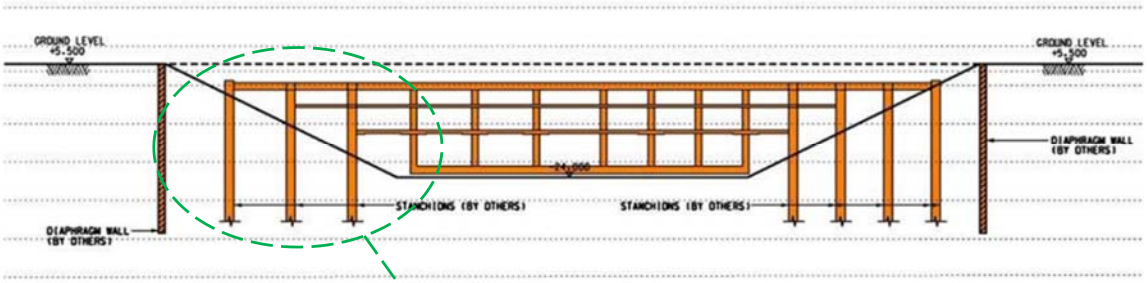


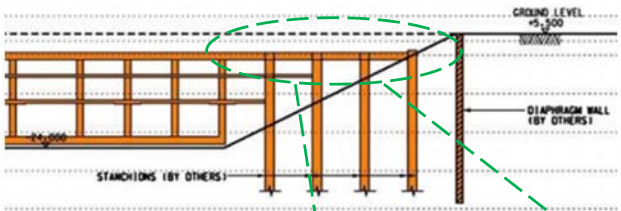
Section showing the underground space of the Terminus

Excavation proposal and the actual work set-up
for the south portion of Terminus

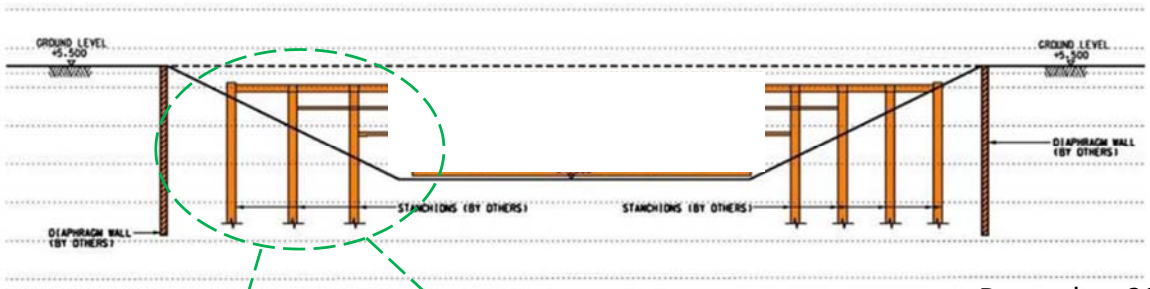


Progress in December 2012



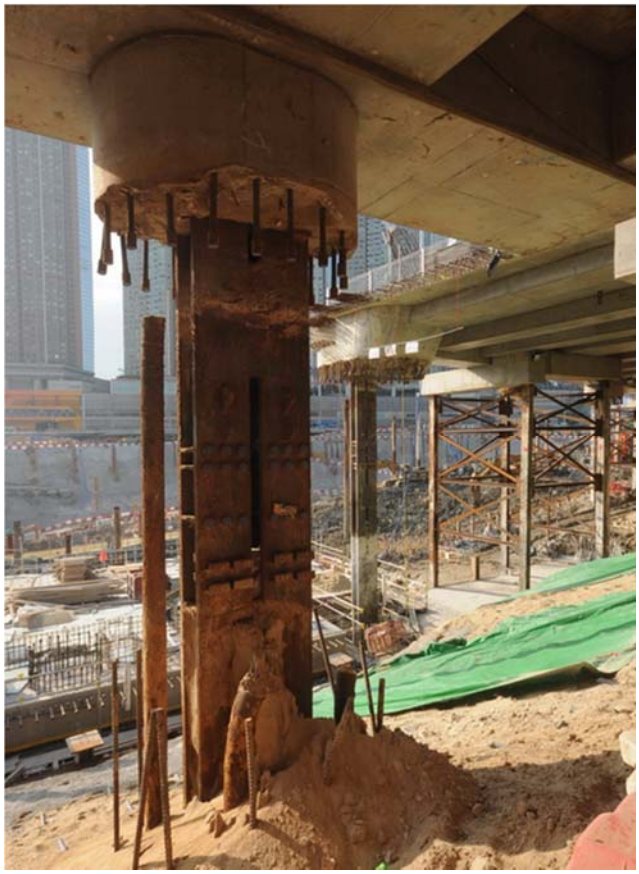


Casting of the first slab before top-down



December 2012

Steel stanchion supporting the upper slabs

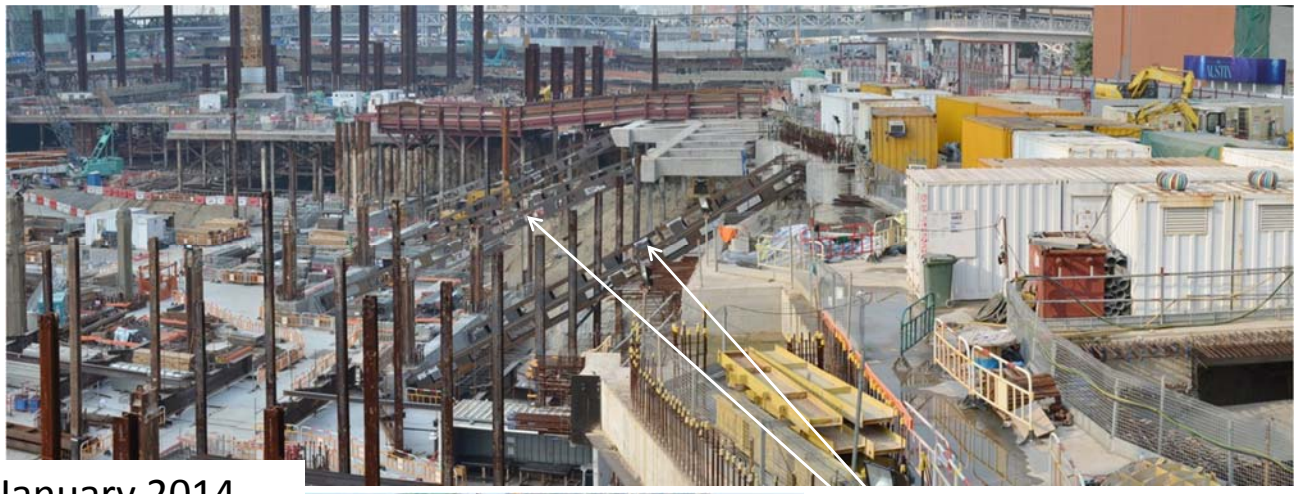


Steel stanchion supporting the upper slabs

December 2013

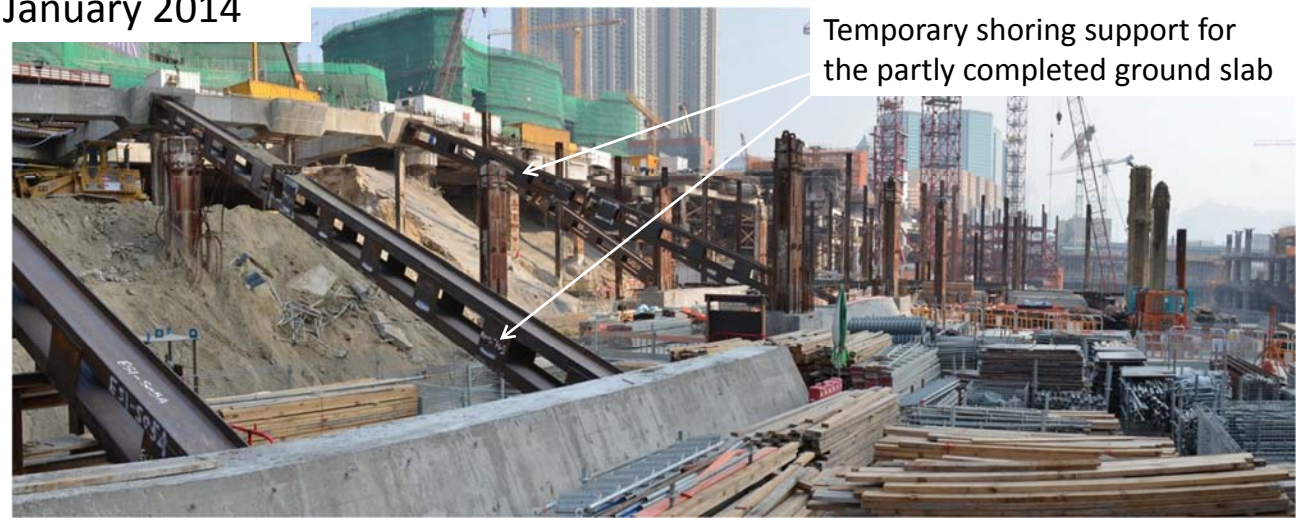
Commencing the erection of the falsework in the form of a gigantic structural steel frame to supporting the construction of the terminus canopy truss roof

Terminus underground structure along the Wui Man Road (匯民路) constructed in top-down approach



January 2014

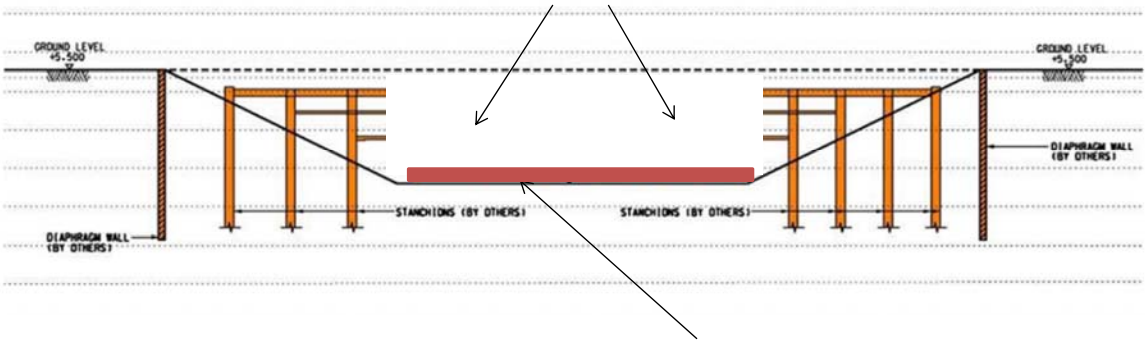
Temporary shoring support for the partly completed ground slab




KATO

Construction of the central portion
of the terminus structure

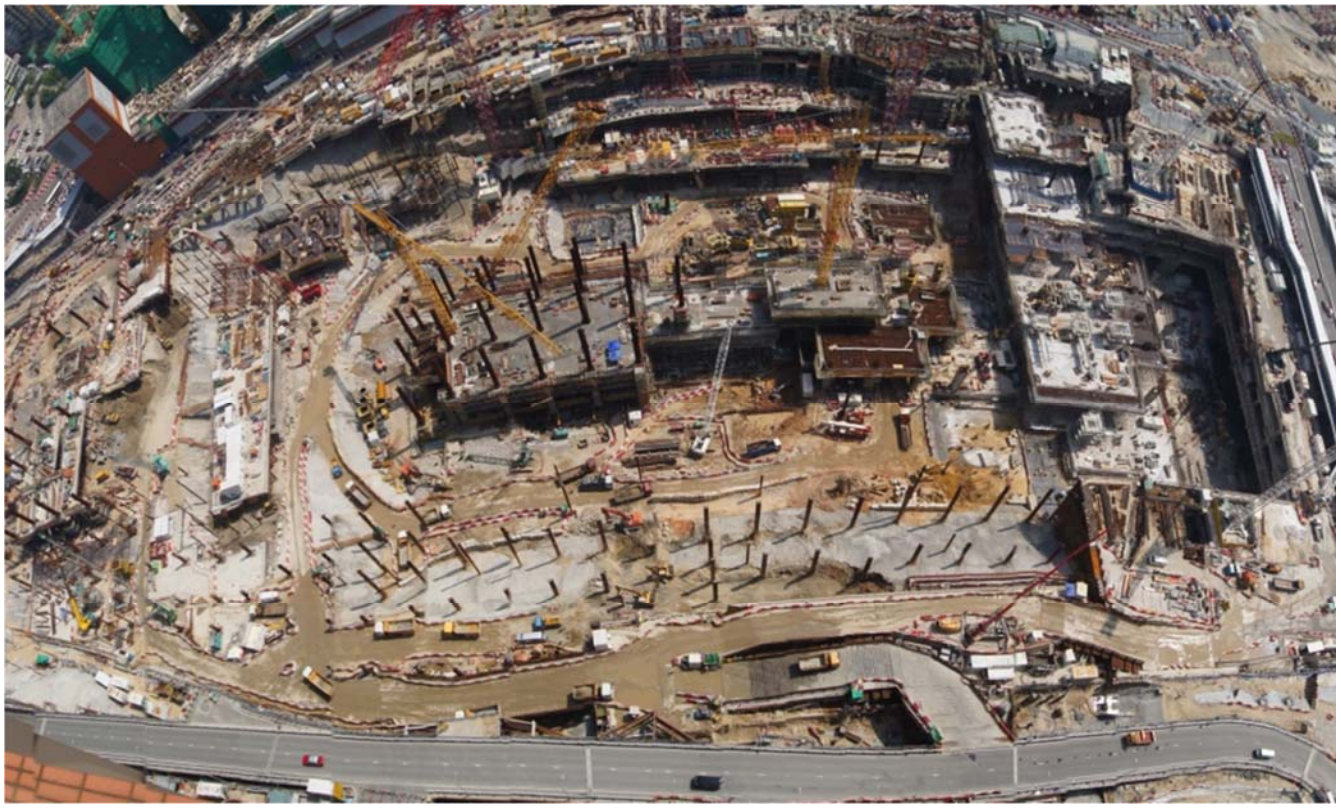
Central core constructed
at a slightly deferred stage



The raft slab for the
central core structure

Construction of the central portion of the terminus structure

Early 2012

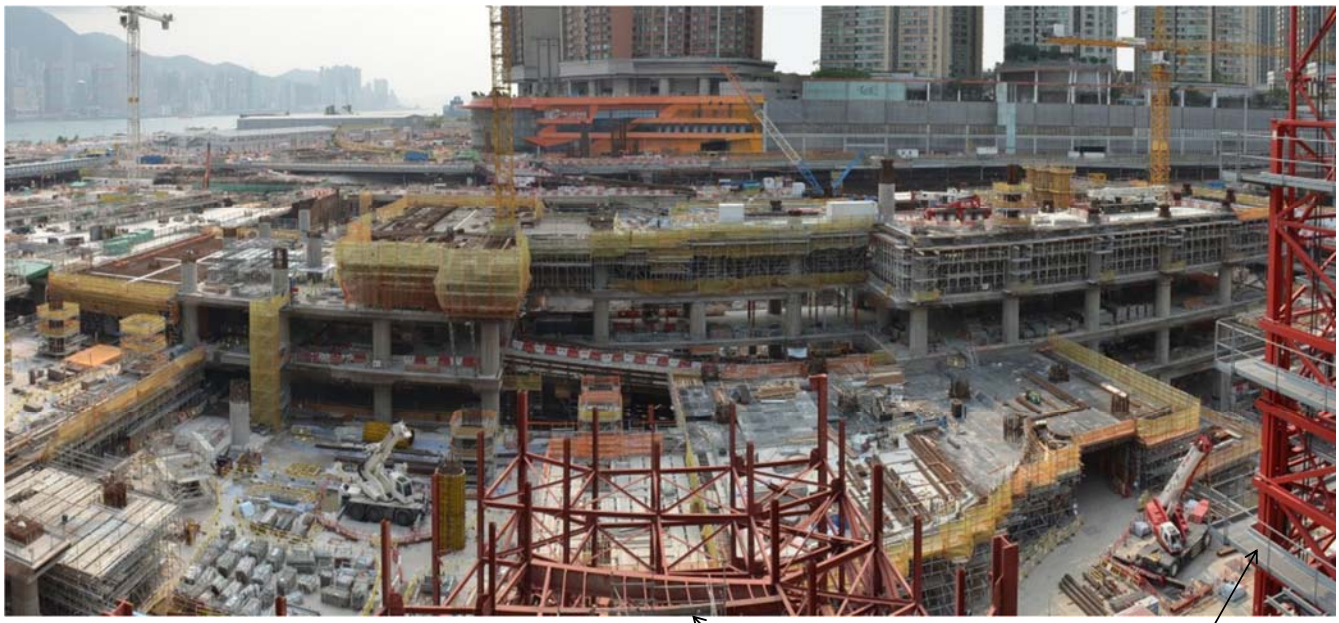


Early 2013

Overview of the central core as in June 2012

Overview of the central core
as in late 2013

Overview of the central core as in April 2014



Falsework to support the erection of steel truss for the future canopy structure

Overview of the central core as in April 2014

Overview of the site as in October 2014

Overview of the central core and the adjacent apron structure as in October 2014

Overview of the central core and the adjacent apron structure as in March 2015

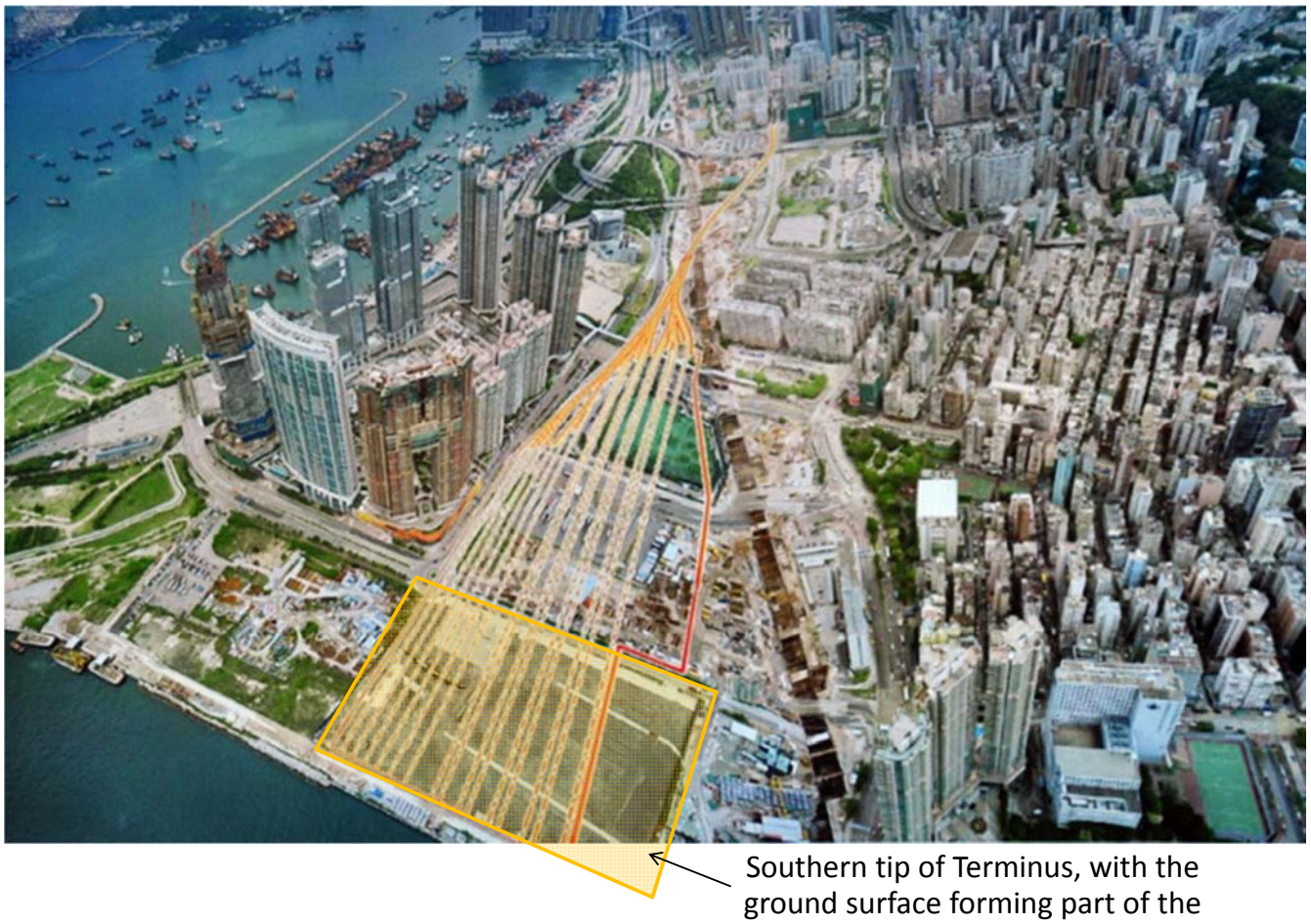
Overview of the central core and the adjacent apron structure as in March 2015

Overview of the central core and the adjacent apron structure as in March 2015

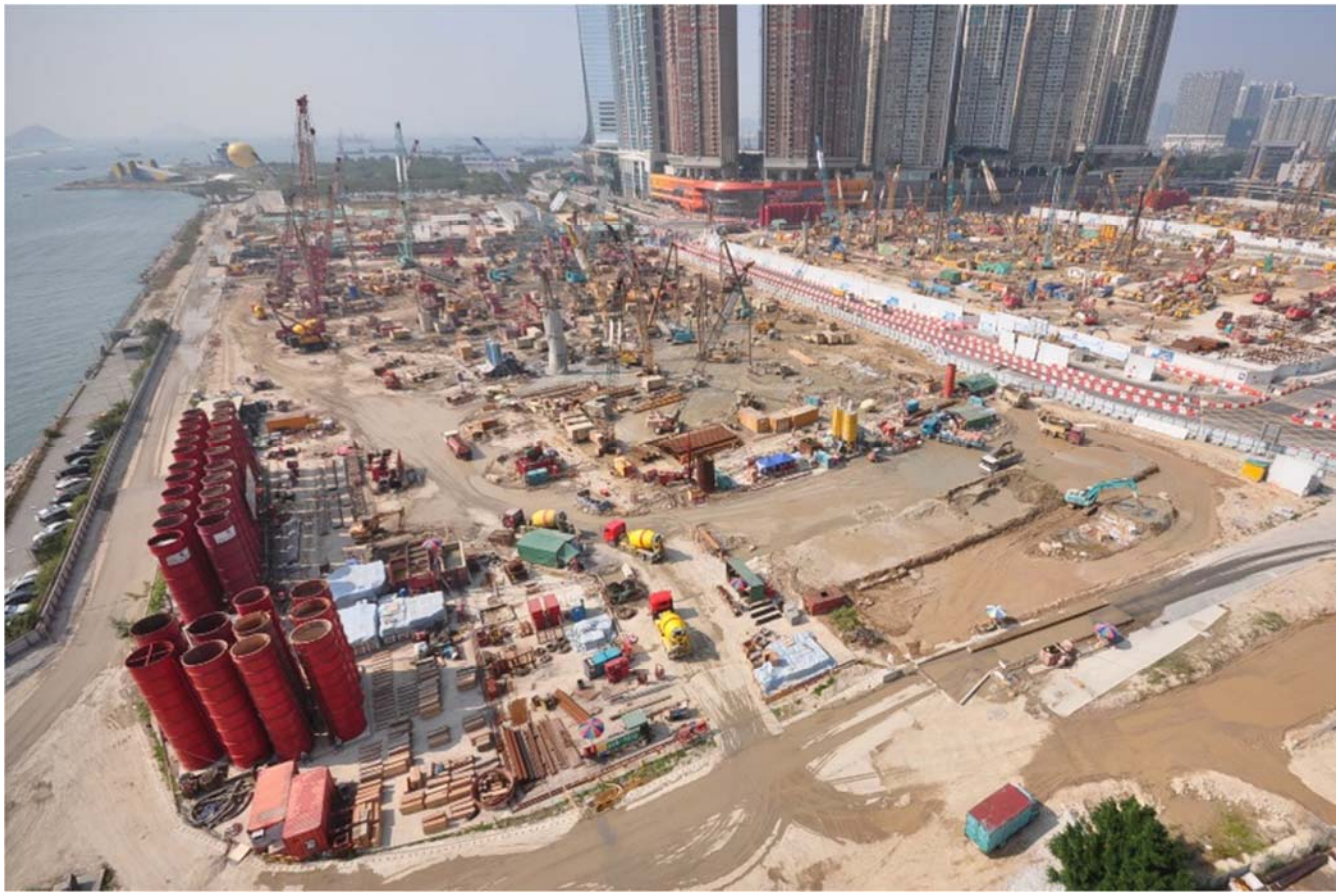
Complicated construction layout as seen in mid 2015

Overview of the terminus structure as in March 2015

Highlight on the Southern tip of the Terminus



Southern tip of Terminus, with the ground surface forming part of the future West Kowloon Cultural District



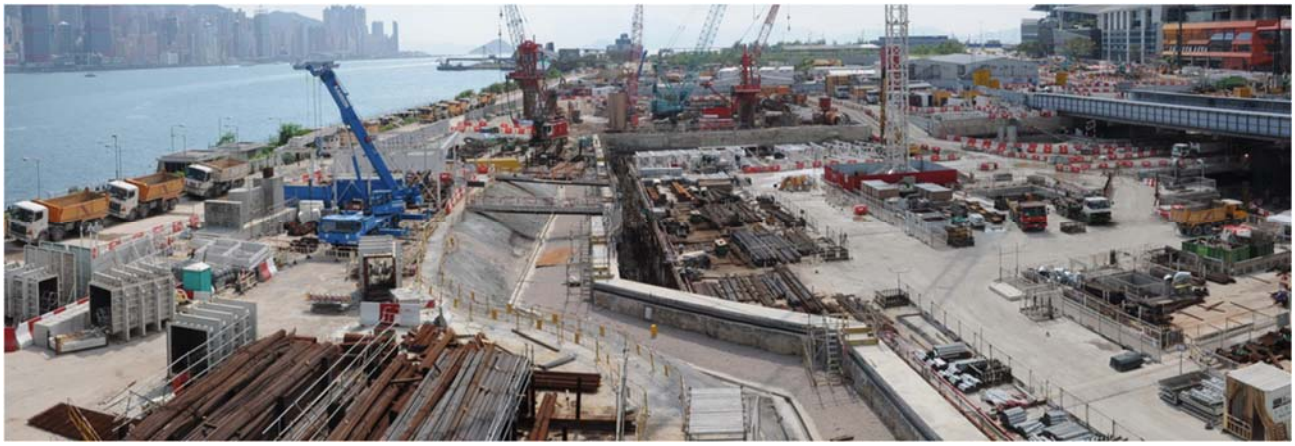
Terminus south as seen in mid 2010

Terminus south as seen in October 2011

Terminus south as seen in mid 2014
(station platform underneath constructed using top-down)

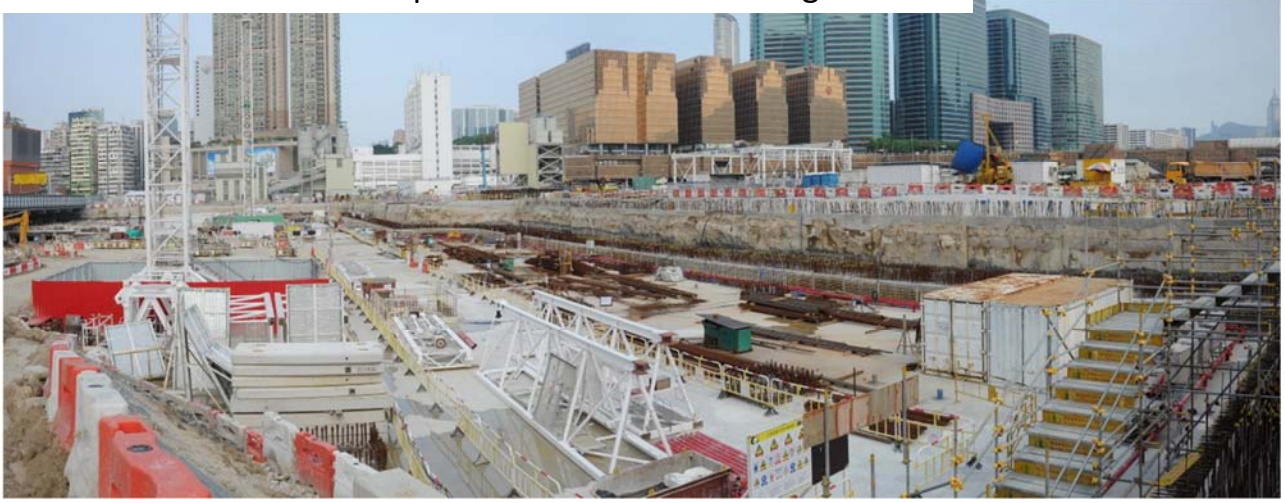
Terminus south as seen in mid 2015

Casting the ground slab supported by steel stanchion before the construction of the underground station structure using top-down

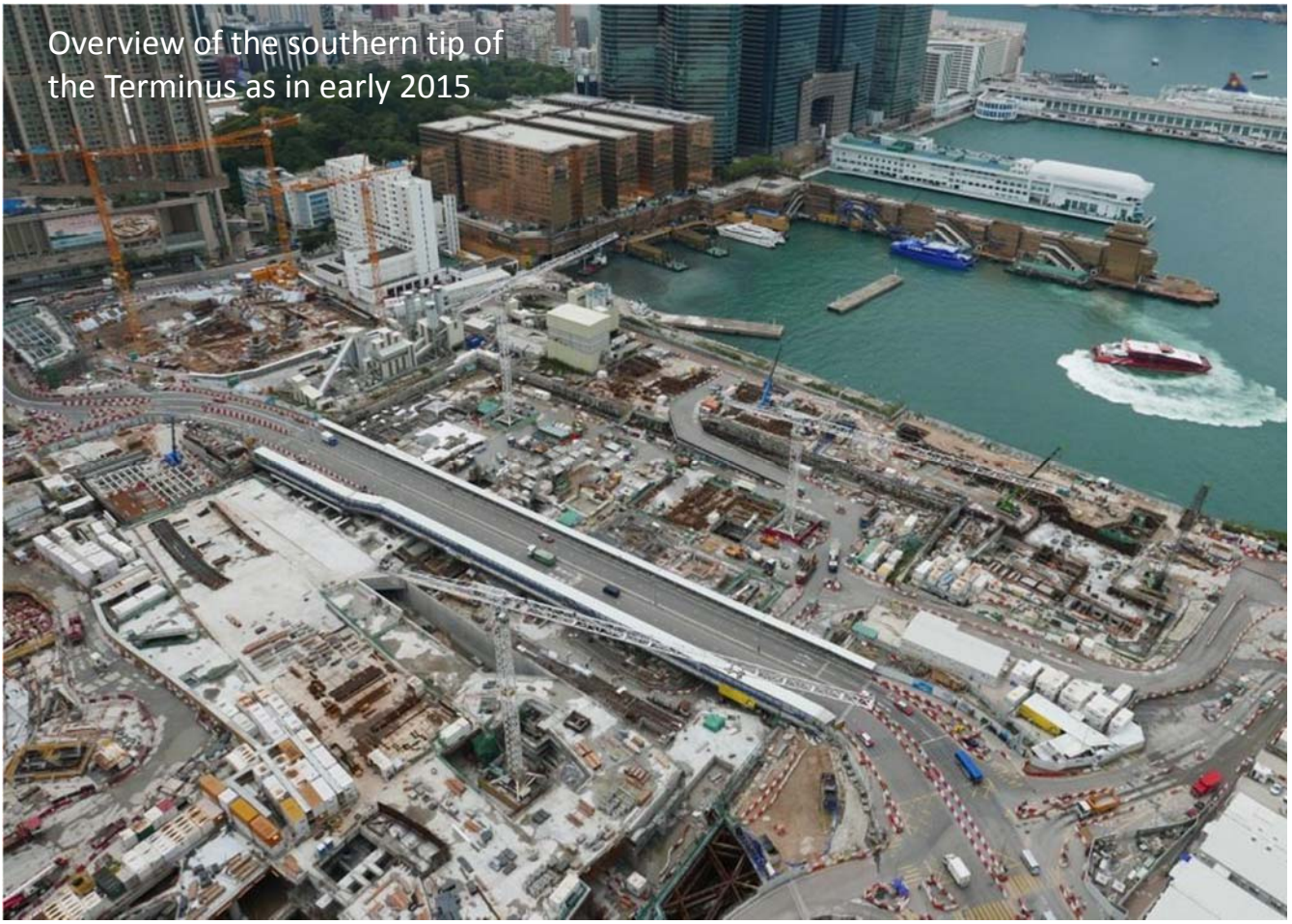


Overview of the southern tip of the Terminus as in August 2012

Overview of the southern tip of the Terminus as in August 2012



Overview of the southern tip of the Terminus as in early 2014


Overview of the southern tip of
the Terminus as in early 2015


Substituting Austin Road formed
by temporary carriageway


Ground slab being cast
supported by stanchion

Underground structure at the terminus south was basically constructed using top-down approach. These photos show the supporting detail of the ground slab on steel stanchions

Top-down arrangement for the construction of the terminus south (mainly for concourse and train platform)

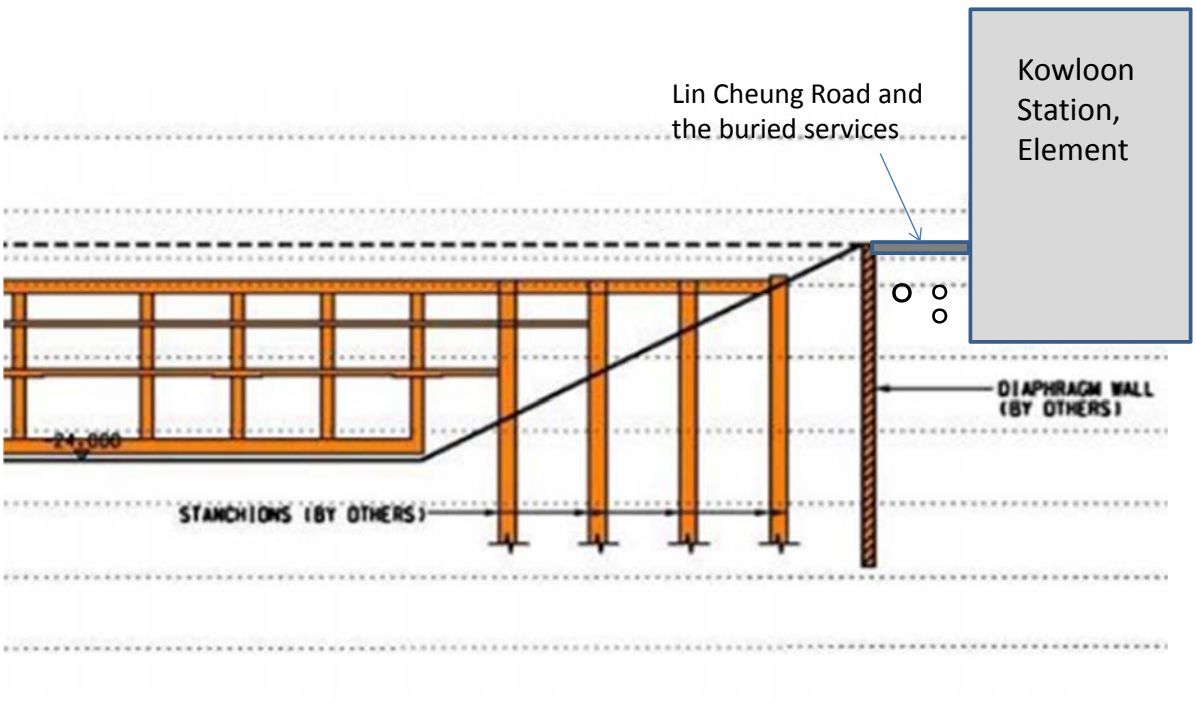
Typical work layout and arrangement for top-down construction

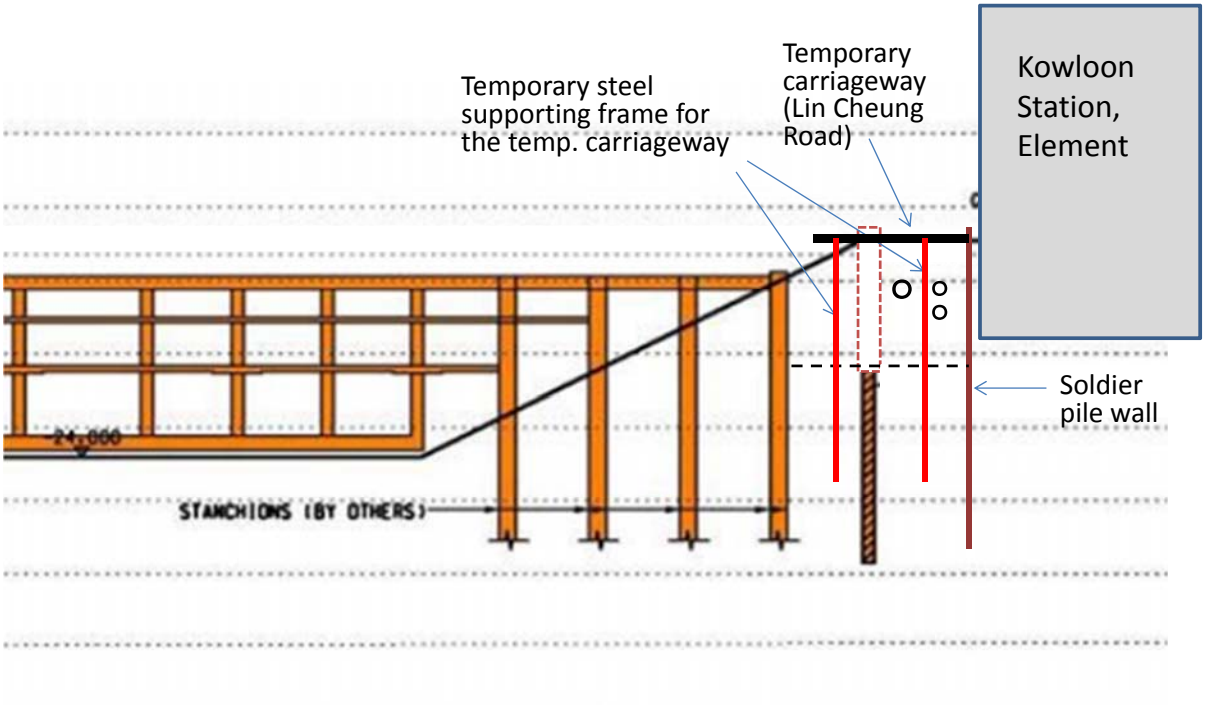
Typical work layout and excavation arrangement using top-down method

Highlight on the Construction of the terminus structure along Kowloon Station (previous Lin Cheung Road)

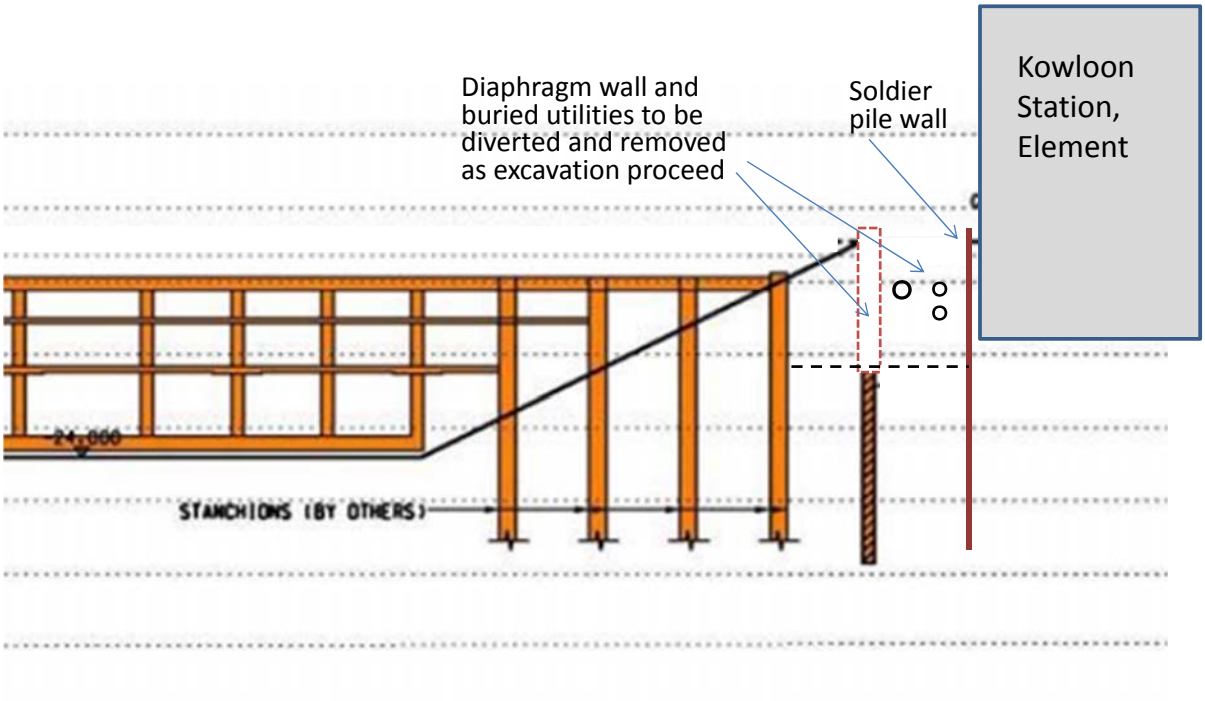
Work along this area is very difficult due to several reasons, including:

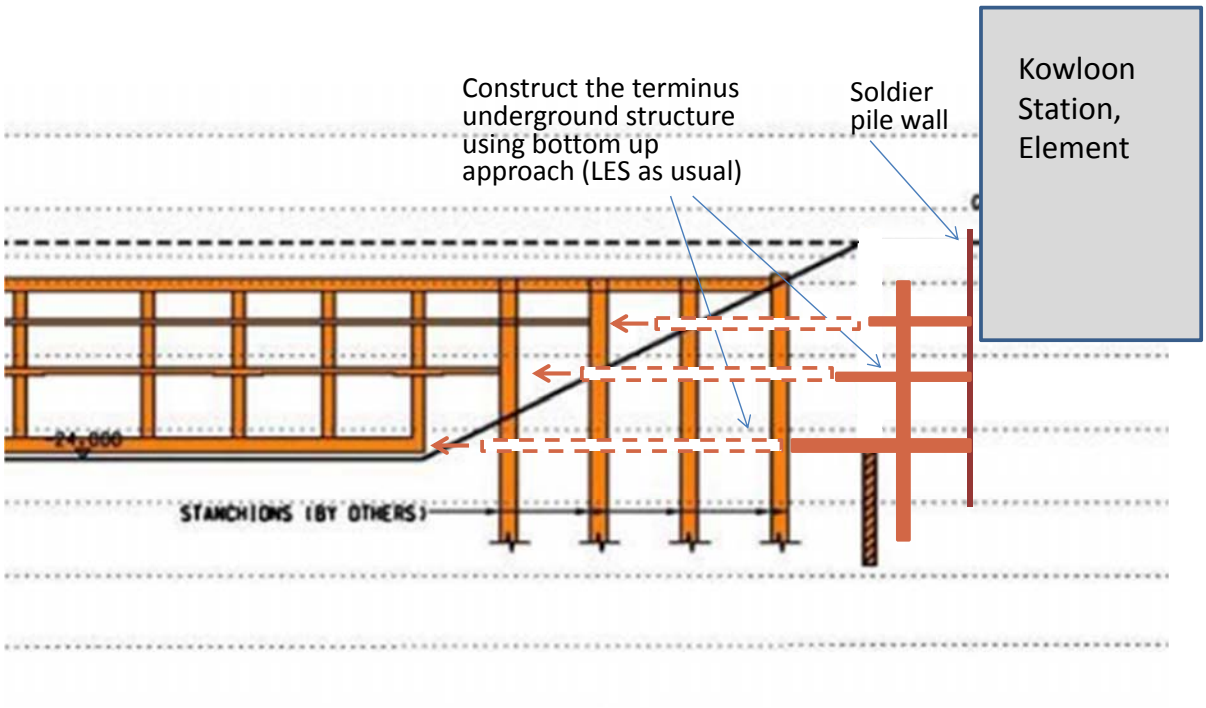
1. Some major utilities were located underground along previous Lin Cheung Road.
2. Construction using top-down manner along this area adjacent to the underground structure of the Kowloon Station needs extra stabilization during the excavation process





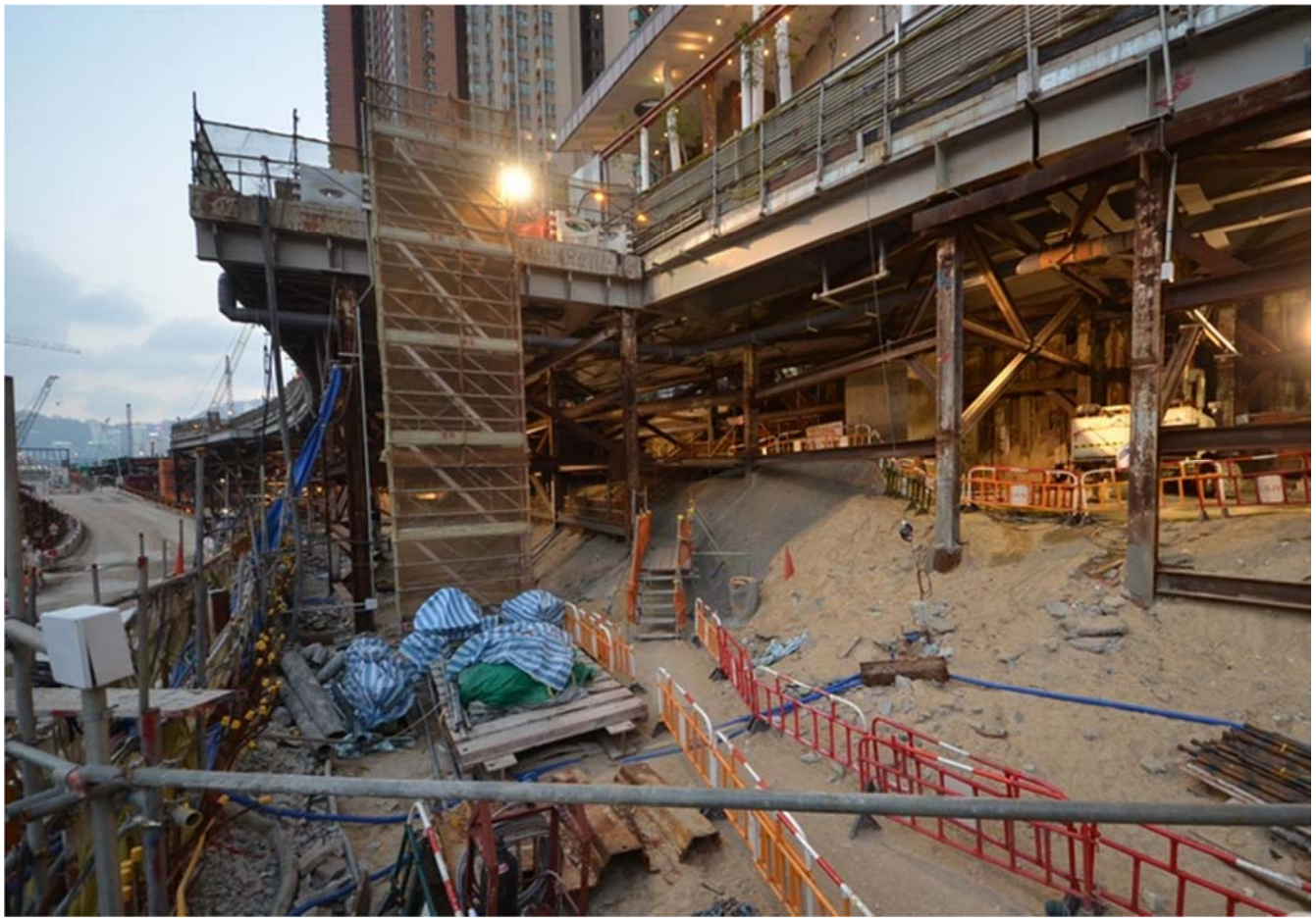
Drawing not to scale

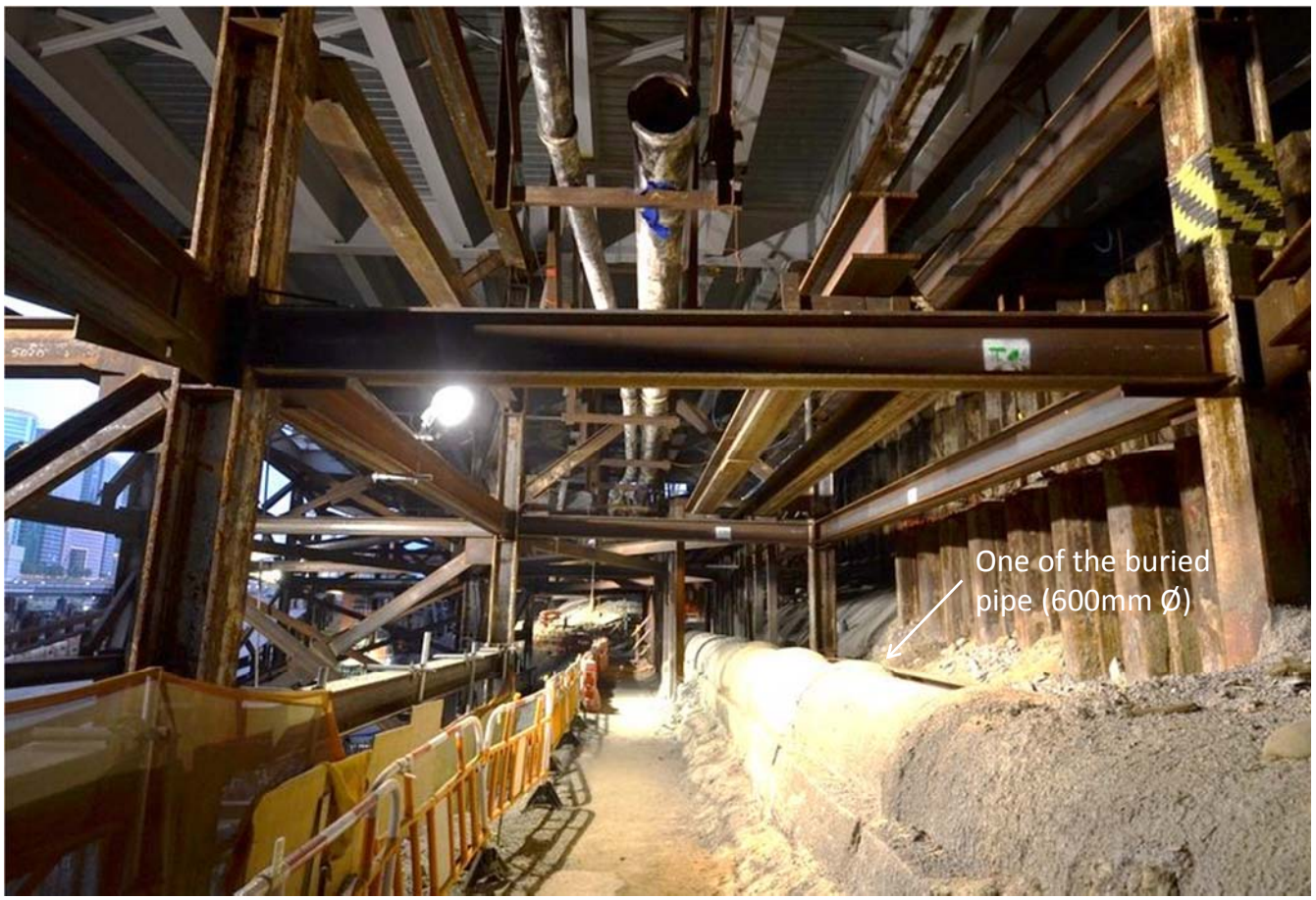




Drawing not to scale

Temporary carriageway
(Lin Cheung Road)

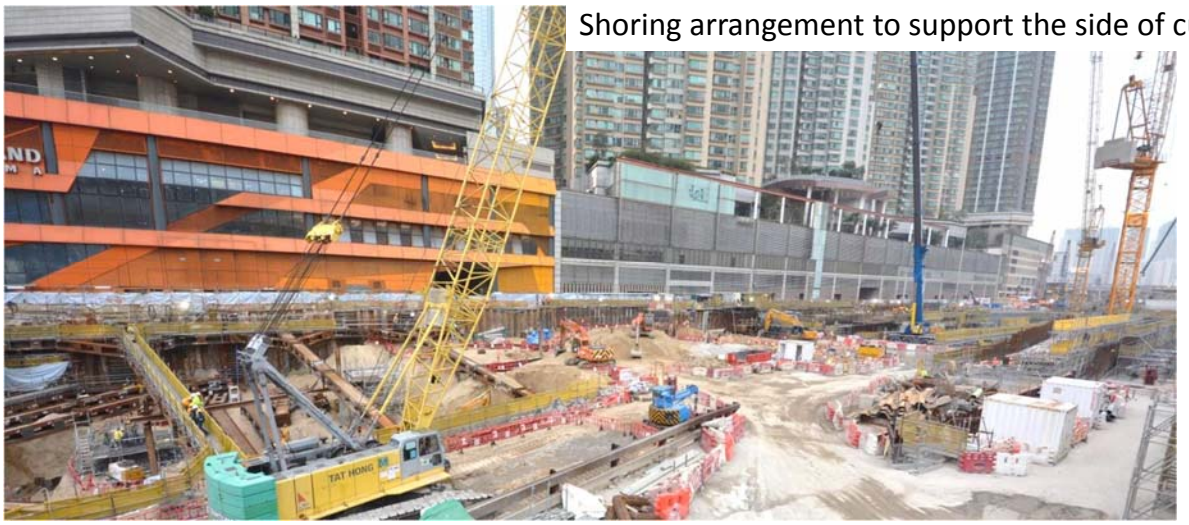




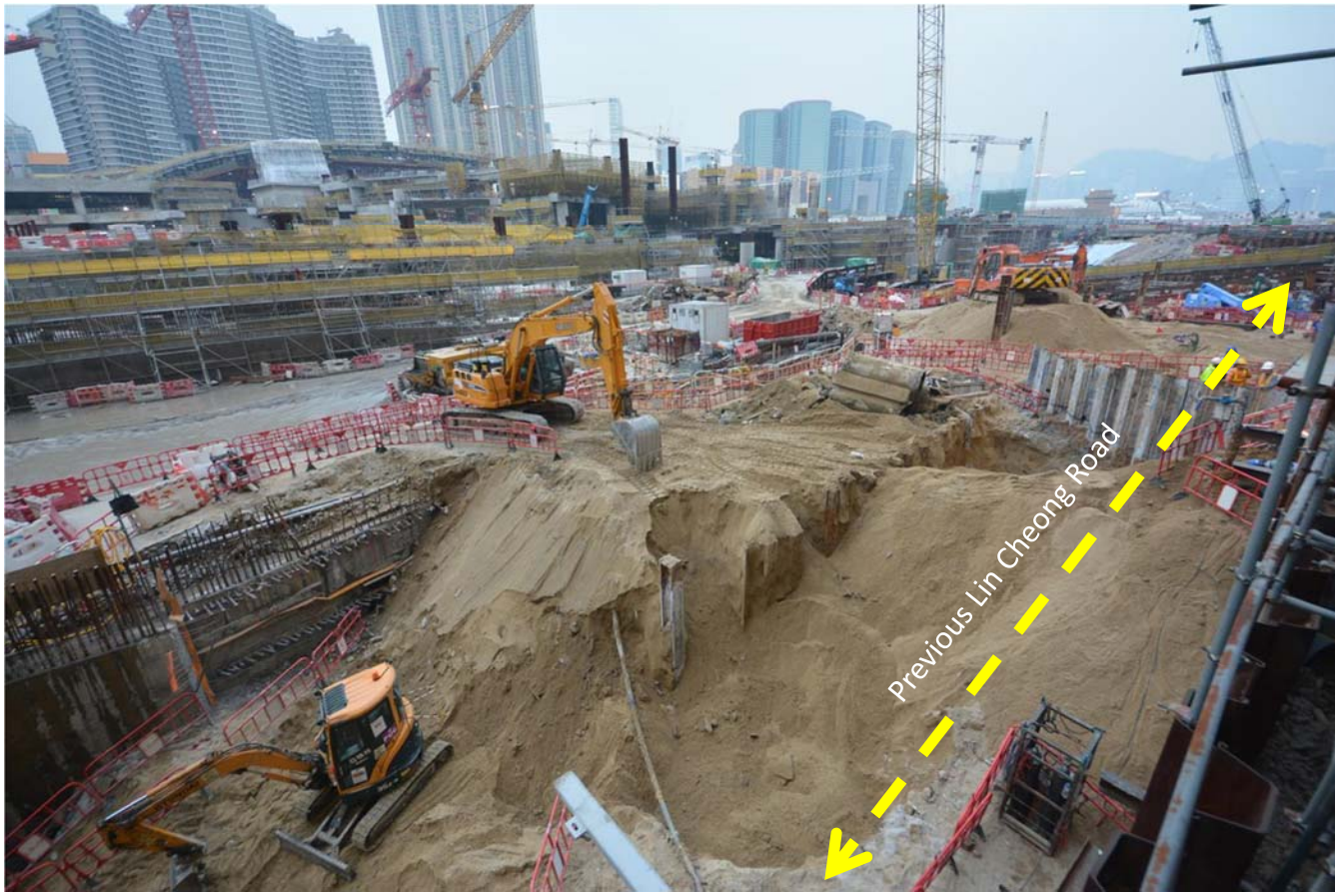
Working situation underneath the temporary carriageway

Temporary roadway will be dismantled after the stabalizing of the side of cut and diversion of the utilities lines located underneath

Shoring arrangement to support the side of cut



Shoring arrangement to support the side of cut



Constructing the terminus side wall close to Kowloon Station


Ground slab and terminus structure connecting to the side of Kowloon Station
Previous Lin Cheung Road

End of Part 1