

A review of Hong Kong's Highway Construction since 1990s

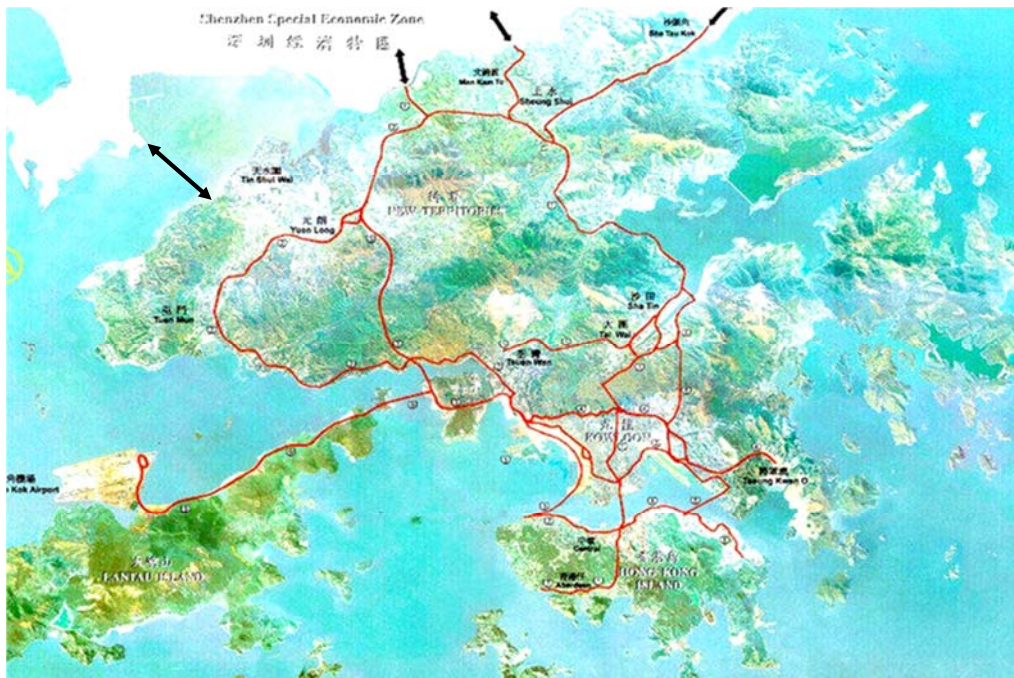
Speaker: Raymond Wong
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 Organizing Institution: Engineers Australia HK Chapter
 Date of talk: 23 September 2015

Title of talk

Highlight of the construction features of representing Highway Project since 1990s. The talk will mainly cover:

- highway projects forming part of the Airport Core Projects
- Hung Hom Bypass
- Route 3 and Route 8
- Deep Bay Links and the HK-Shenzhen Western Corridor
- Widening and improvement of the Castle Peak Road
- Central-Wanchai Bypass (in brief)
- Other environmental and construction operation concerns

Major Highway Systems (Highway Strategic Network)



Highway Routes (2003)



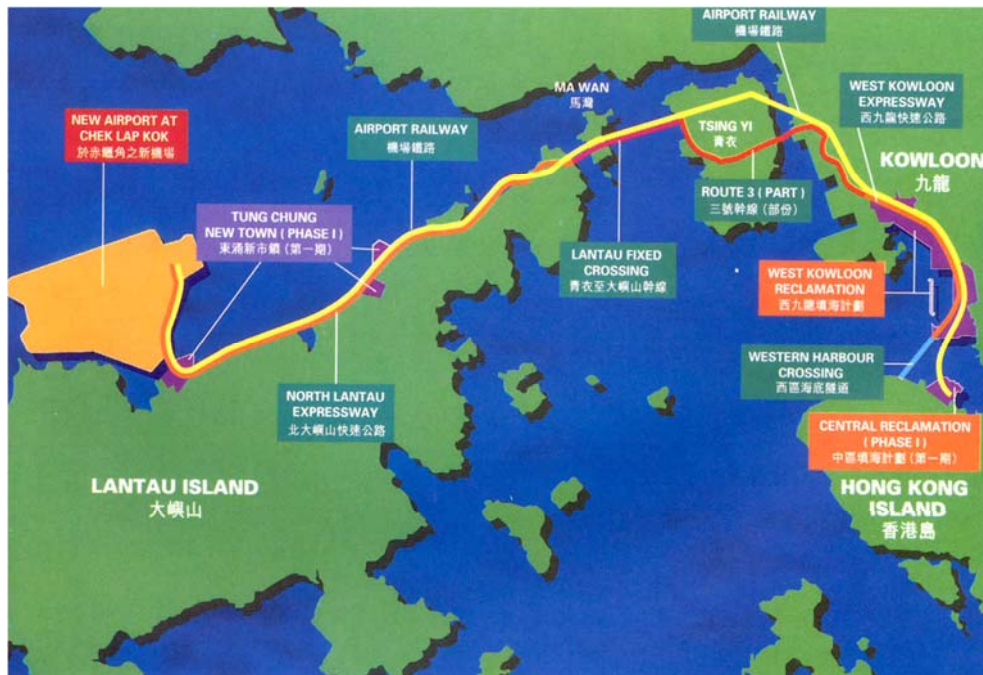
Highway Routes (2014)



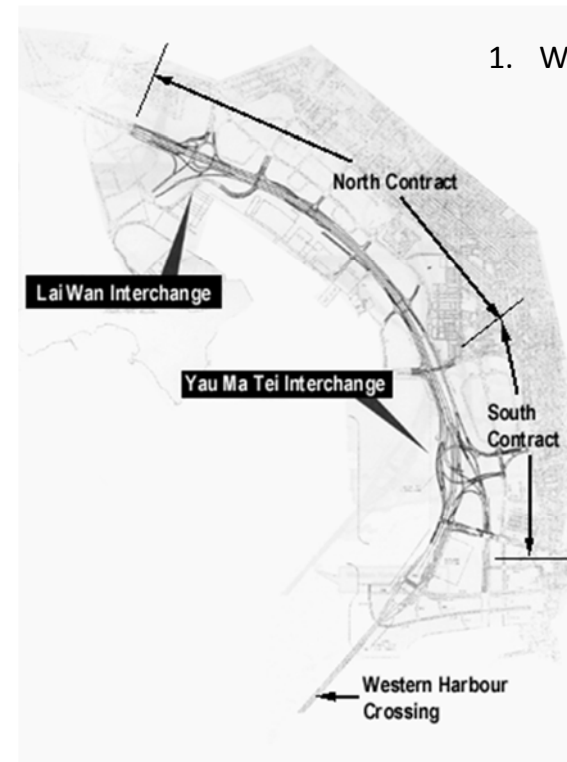
Highway projects forming the Airport Core Projects (1992 - 1997) include:

1. West Kowloon Expressway
2. Route 3, Kwai Tsing Section
3. Lantau Fixed Link
4. North Lantau Expressway

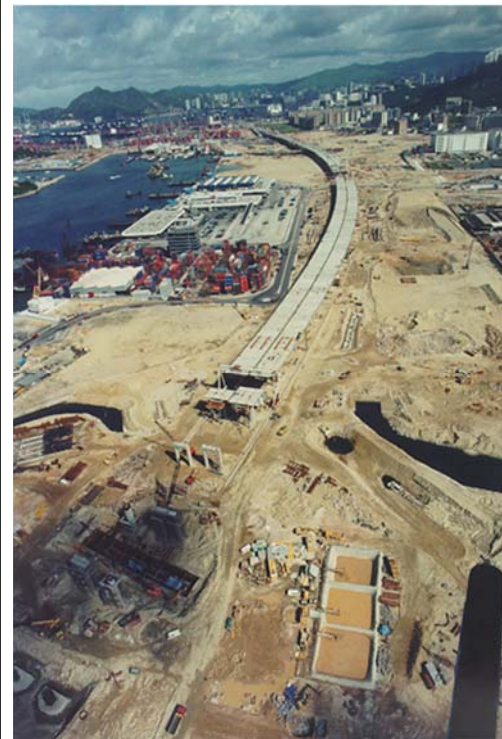
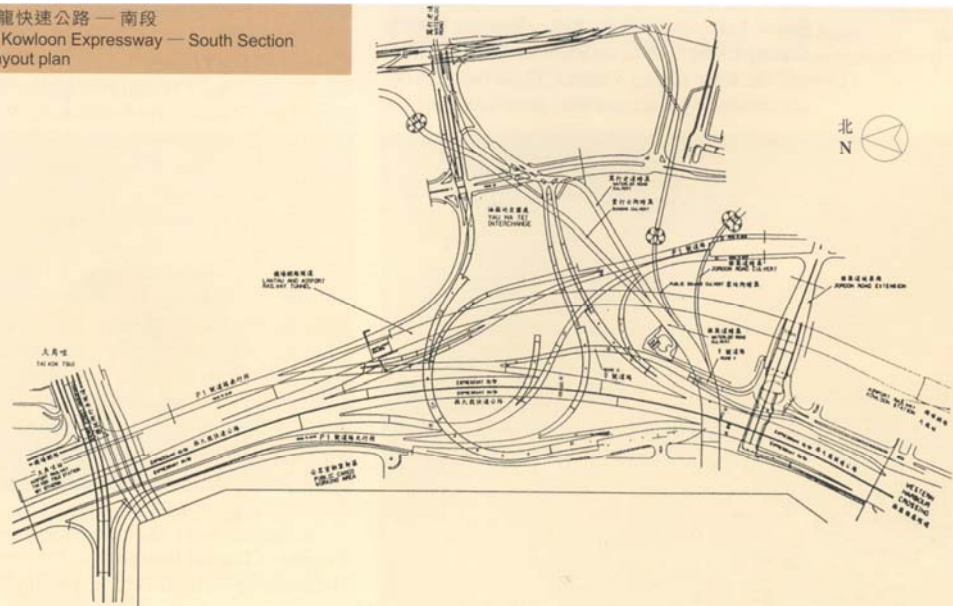
Location of Airport Core Projects



1. West Kowloon Expressway



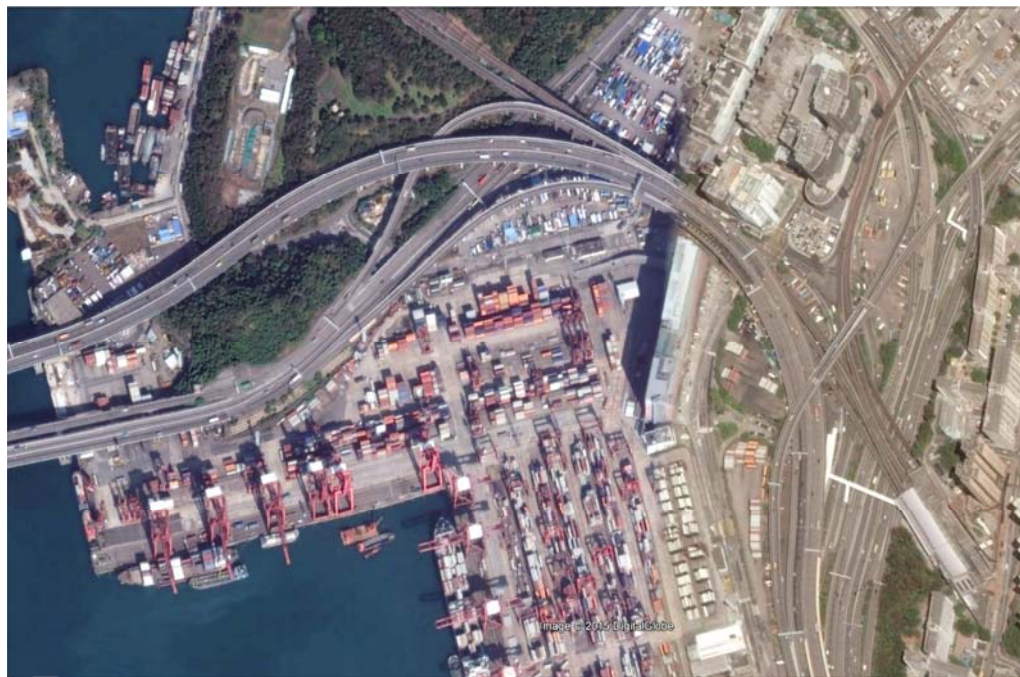
西九龍快速公路 — 南段
West Kowloon Expressway — South Section
site layout plan







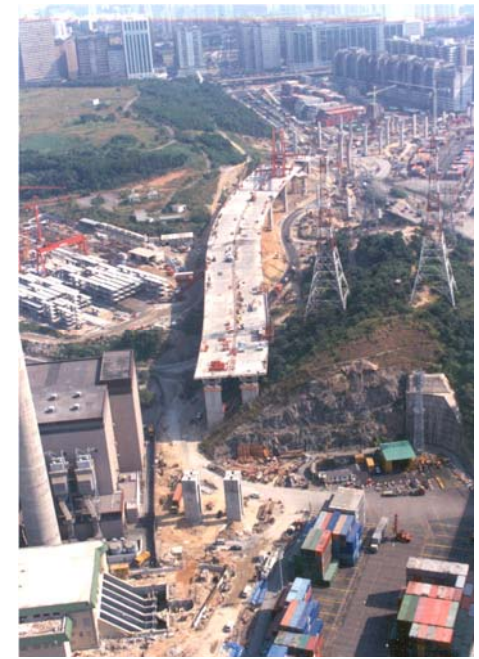
2. Route 3, Tsing Kwai Section



Route 3, Tsing
Kwai Section at
Kwai Chung



Approach section of Route 3 heading to the Rambler Channel



Launching Gantry used in the Route 3 Kwai Chung section



This section of Route 3 is mainly composing of 4-lane 2-way elevated roadway, averaged 35m span and 15m above ground





3. Lantau Fixed Link



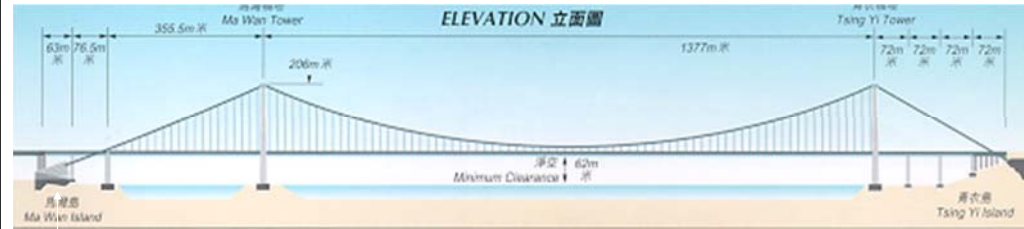
The 1377m span Tsing Ma Bridge



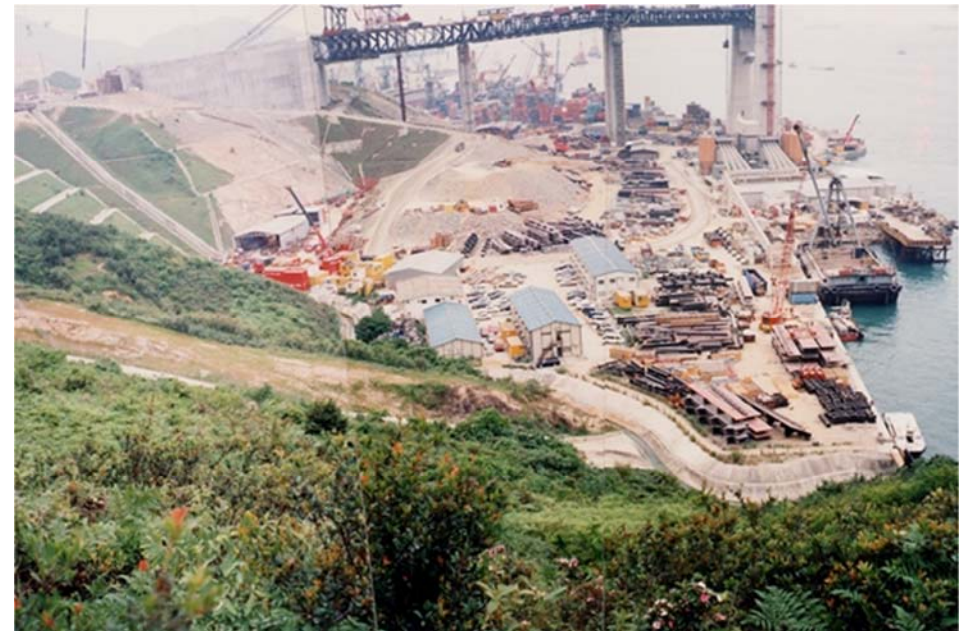
The Tsing Ma Bridge

Ma Wan side

Tsing Yi side



Water Channel between Tsing Yi and Ma Wan as in 1995



The preparation site on Tsing Yi side to support the construction of Tsing Ma Bridge

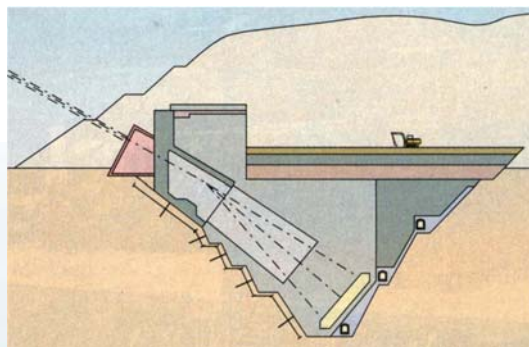


The forming of the cable anchor of Tsing Ma Bridge on Ma Wan side

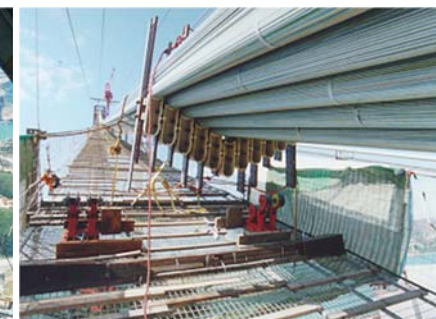
(this is a gravity anchor weighting about 300,000 tons to resist the pull from the suspension cable)



The forming of the cable anchor of Tsing Ma Bridge on Tsing Yi side



Spinning of the suspension cable using steel thread (33000 thread each of 3mm diameter forming a 1.1m cable)





Forming the deck of the approach section of Tsing Ma Bridge on Ma Wan side using erection and hoisting approach



Forming the deck of the approach section of Tsing Ma Bridge on Tsing Yi side



Completing the deck of Tsing Ma Bridge (abutting section at Tsing Yi side) by erecting of the steel truss at spot



Hoisting and erecting of the modulated bridge deck for the Tsing Ma Bridge





Hoisting and erecting the modulated bridge deck onto the suspension cable

Exterior and interior view inside the bridge deck



The Ma Wan Viaduct – the linking section between the Tsing Ma and Kap Shui Mun Bridge



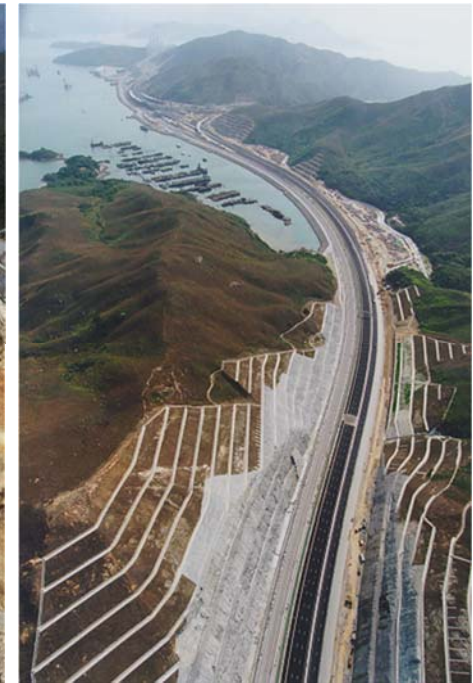




4. North Lantau Expressway



Original Coastline of
North Lantau (section
between Yam O and Tai
Ho)



North Lantau Expressway –
formation of the Yam O
Section



Slip Road to Penny
Bay (Disney Land) at
Yam O



Tai Ho Section and the Depot Facilities of Tung Chung Line



Toll Plaza of the Expressway at Kap Shui Mun entrance





Constructing the linking bridge between Tung Chung and Chek lap Kok (the Airport Railway) using Incremental Launching method



Tung Chung taking shape as in 1997

Hung Hom Bypass (1996 - 1999)









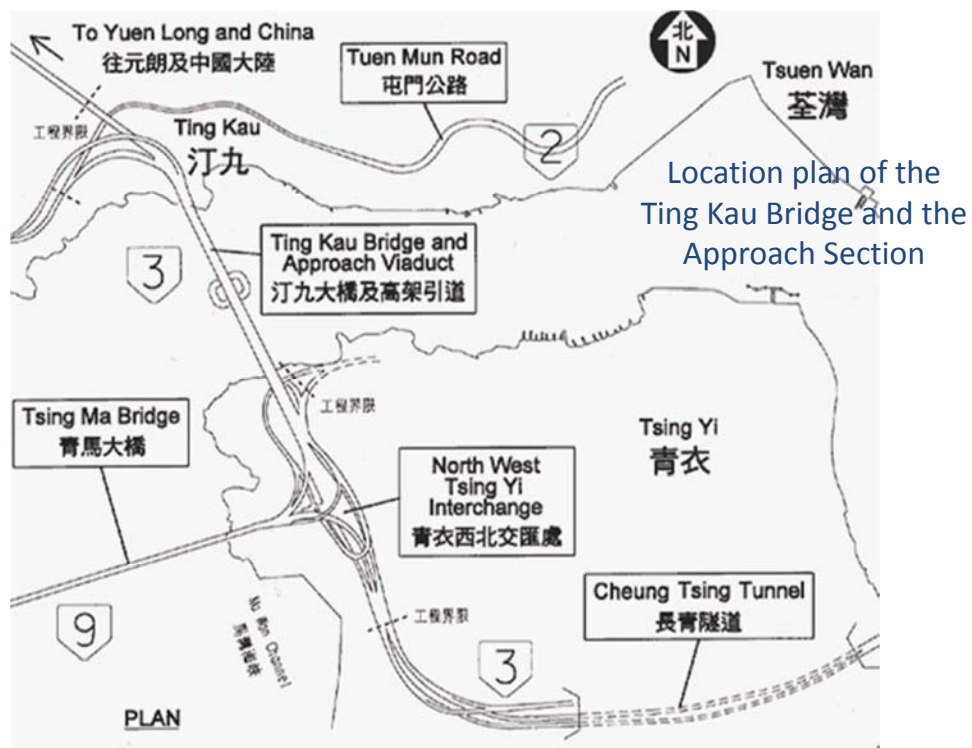


Route 3, Country Park Section. (1998 – 2002)

The project included:

- Ting Kau Bridge and the approach carriageway
- Tai Lam Tunnel
- Au Tau Interchange





Tign Kau Bridge is a cable-stay bridge in 3 spans

Overall view of the Ting Kau Bridge at her opening in 1998



Construction of the bridge towers





Tai Lam Tunnel Ting Kau
and Kam Tin portal



Tai Lam Tunnel portal
on Ting Kau side

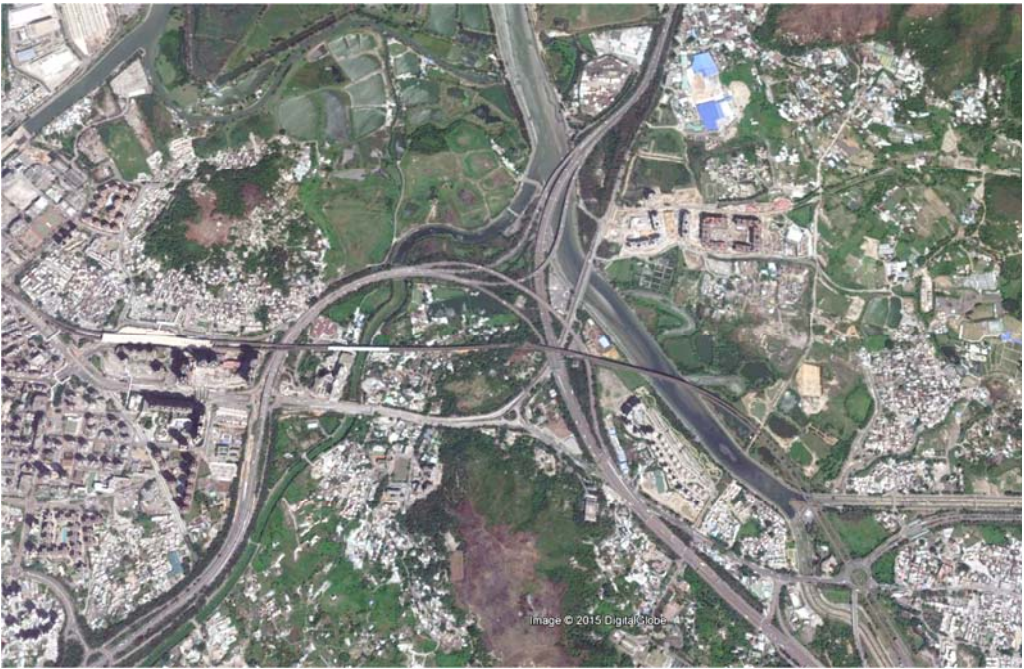




Route 3, Country Park Section - Works at Kam Tin area

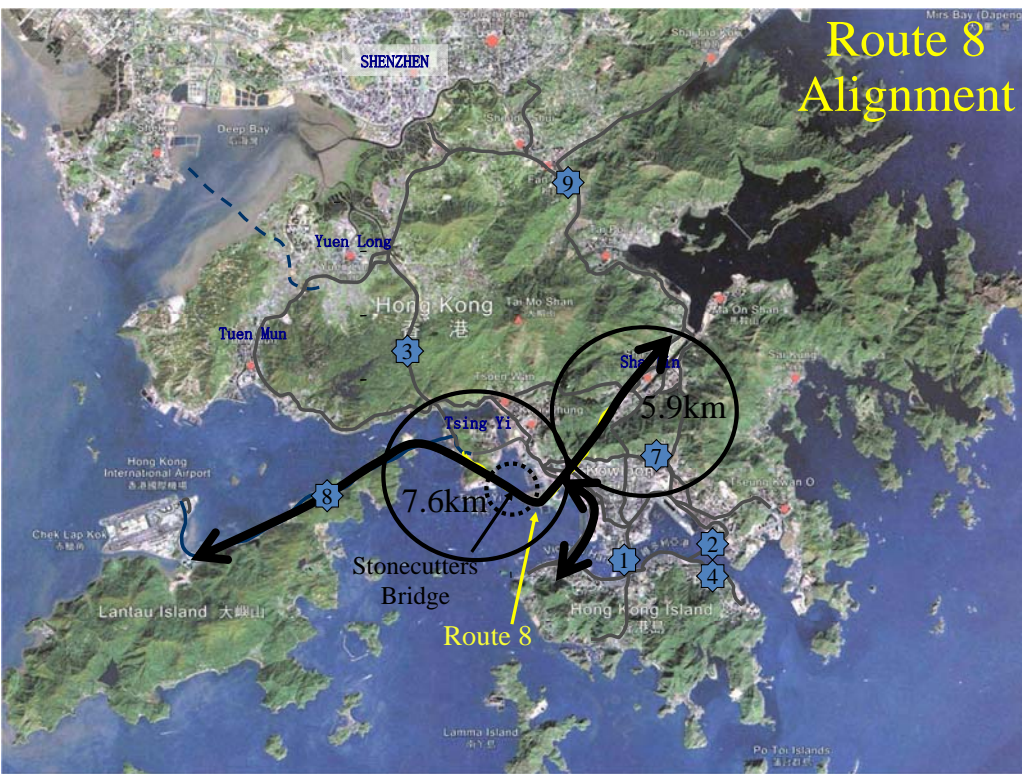


Route 3 – Country Park Section at Au Tau Interchange

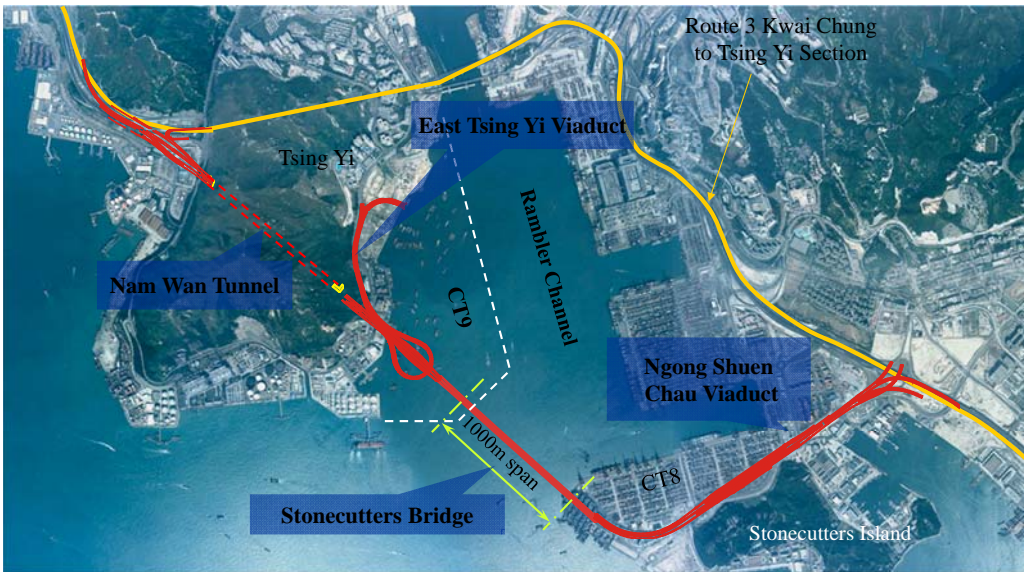


Route 8 (2003 – 2009). The project included:

- Ting Kau Bridge and the approach carriageway
- Tai Lam Tunnel
- Au Tau Interchange

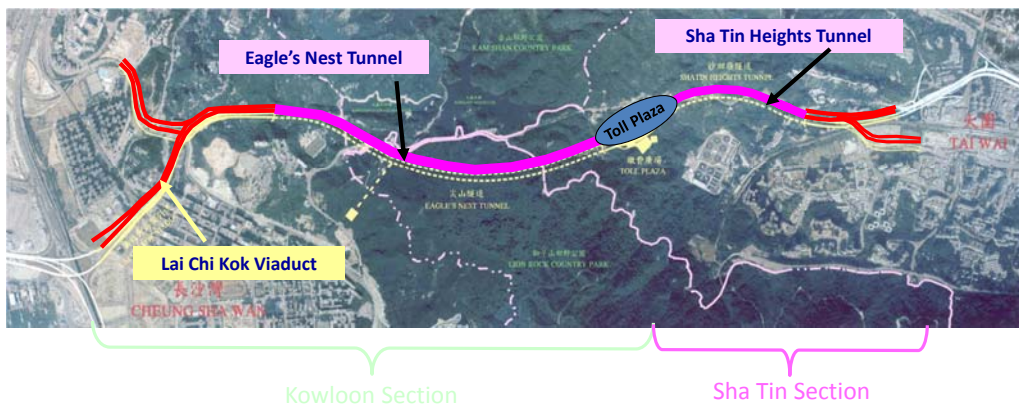


Route 8 between Tsing Yi and Cheung Sha Wan – Major Elements of Works

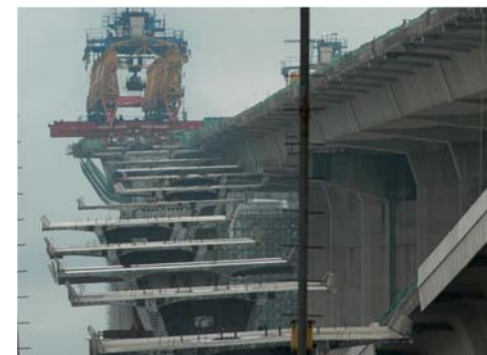


Route 8 between Cheung Sha Wan and Sha Tin

Major Elements of Works



Interchange at Cheung Sha Wan and Ngong Shuen Chau crossing WKH heading to the Stonecutters Bridge











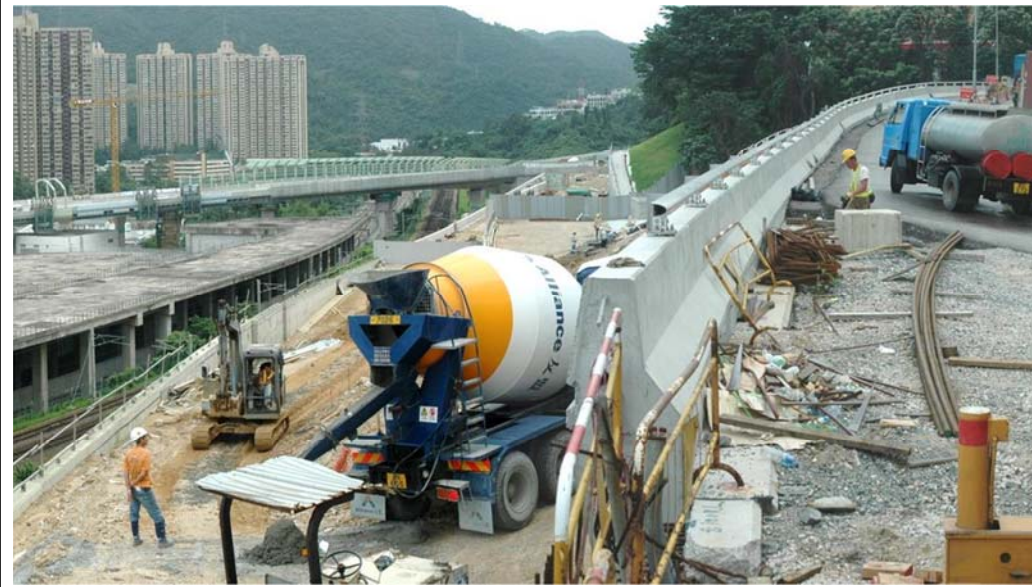


Joining Route 8 to the existing road system in Tai Wai



Cutting of large volume of slope to give way for the passing of a series of carriageway in Tai Wai, Shatin

















Deep Bay Link and
HK-Shenzhen Western Corridor





HK-Shenzhen Western
Corridor

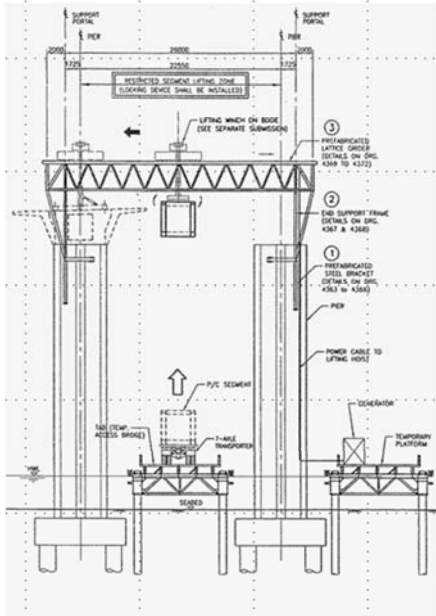








Piehead Segment Placement Gantry



Pierhead segments in shallow water region are lifted by the gantry's winch system

Delivery of Segment



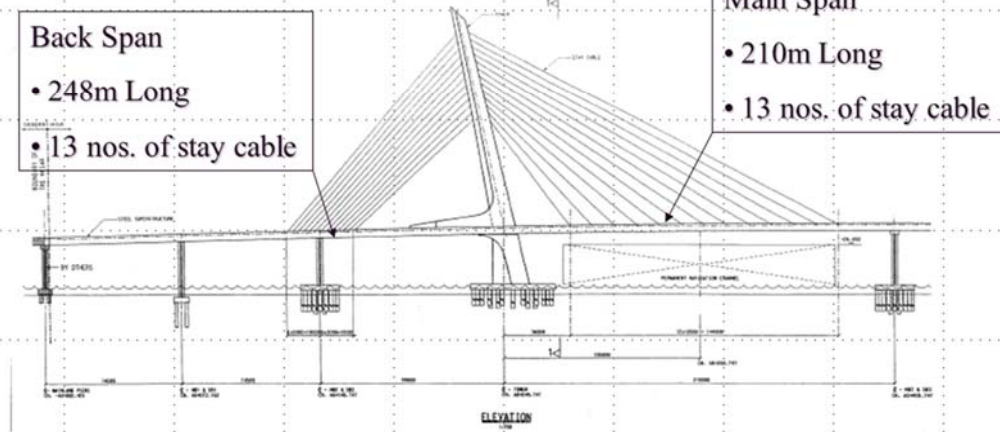
Cable-Stayed Bridge Section

Back Span

- 248m Long
- 13 nos. of stay cable

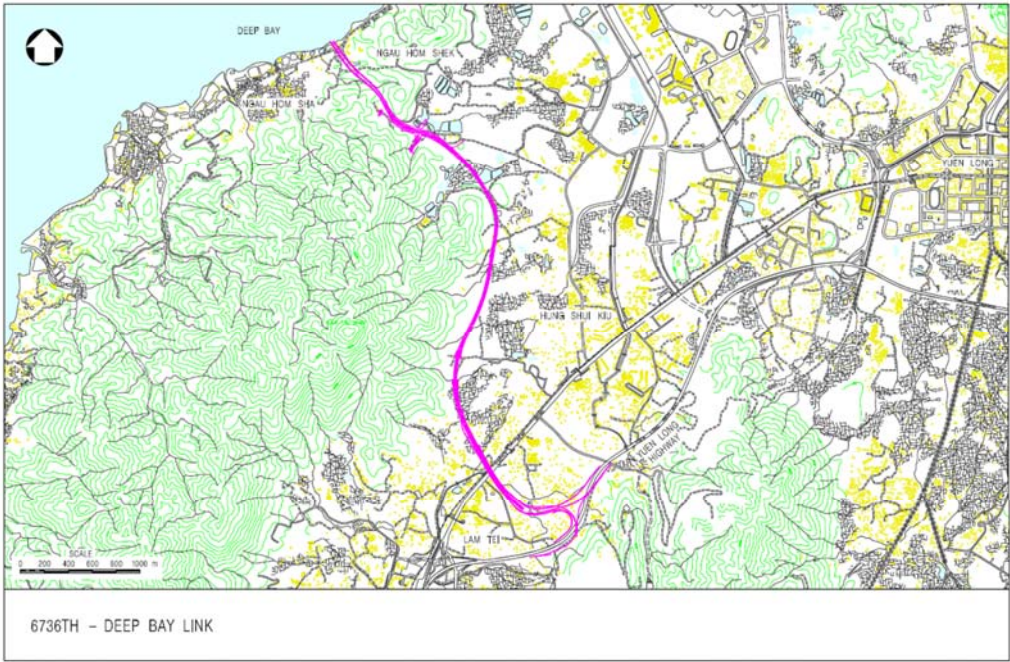
Main Span

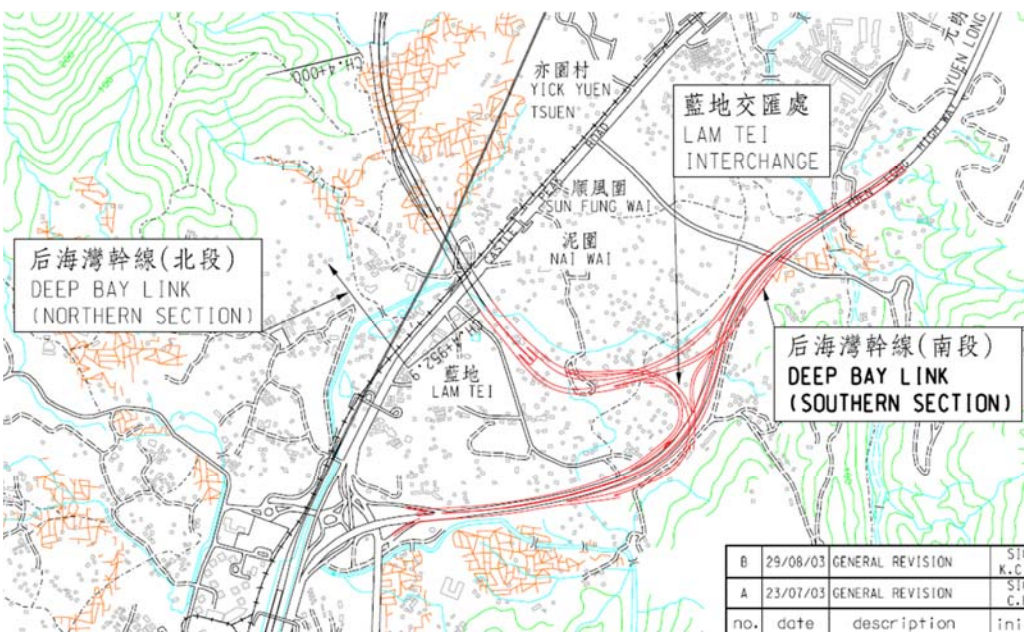
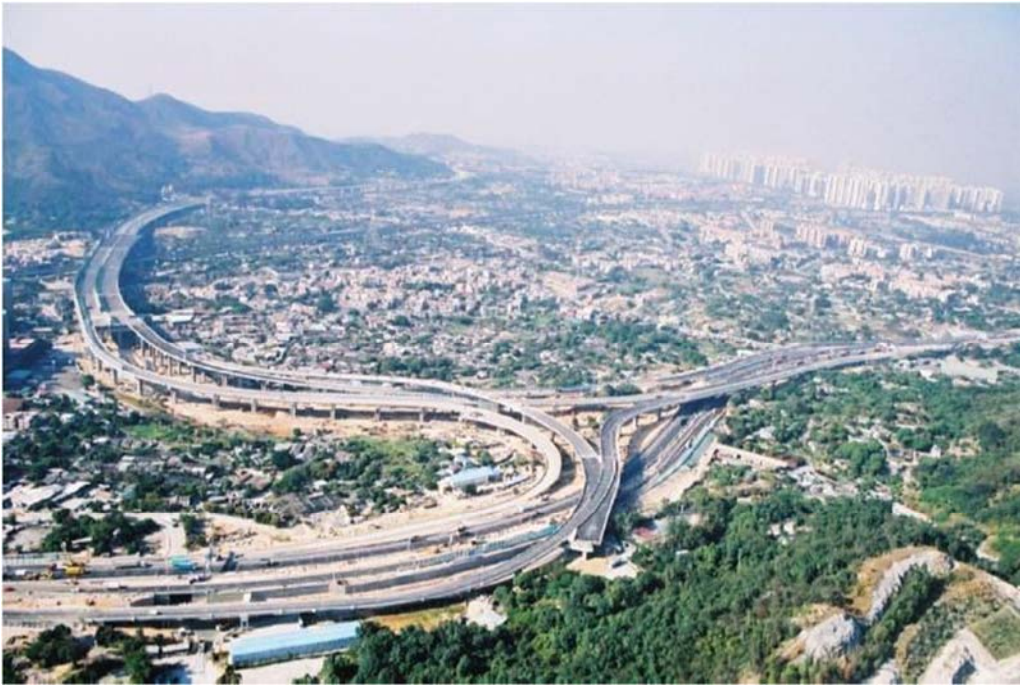
- 210m Long
- 13 nos. of stay cable





Deep Bay Link
(north and south section)















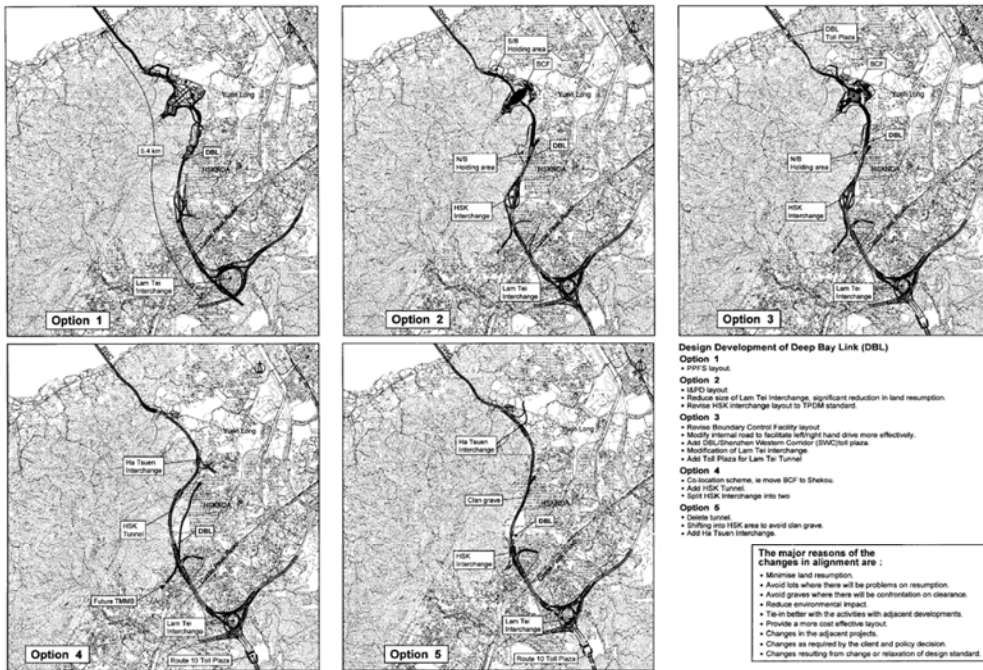
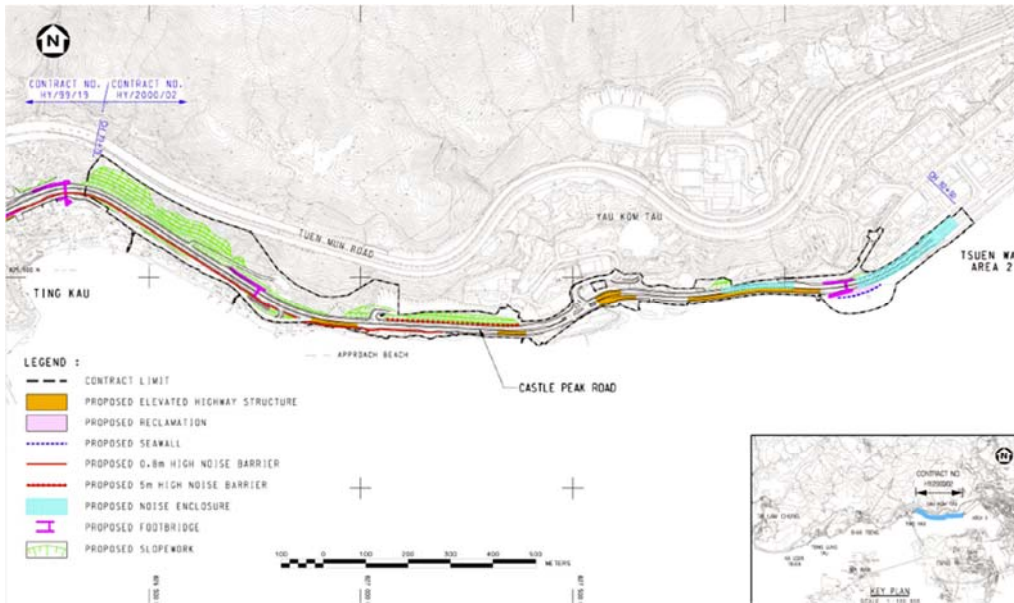


Figure 1.4
Deep Bay Link Options Considered in this Project





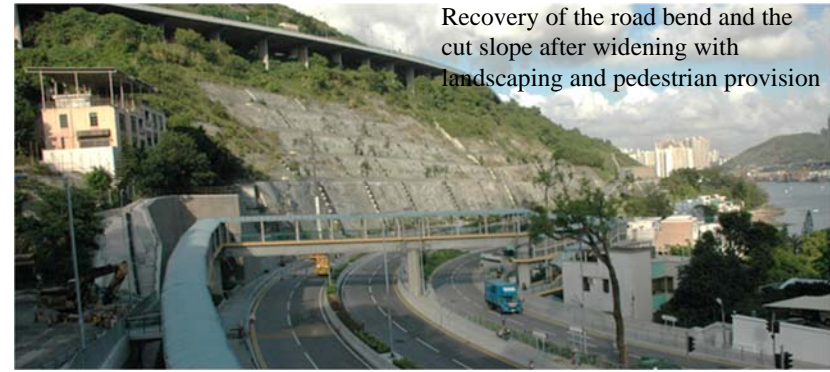
Widening of Castle Peak Road



Section between Tsuen Wan and Ting Kau



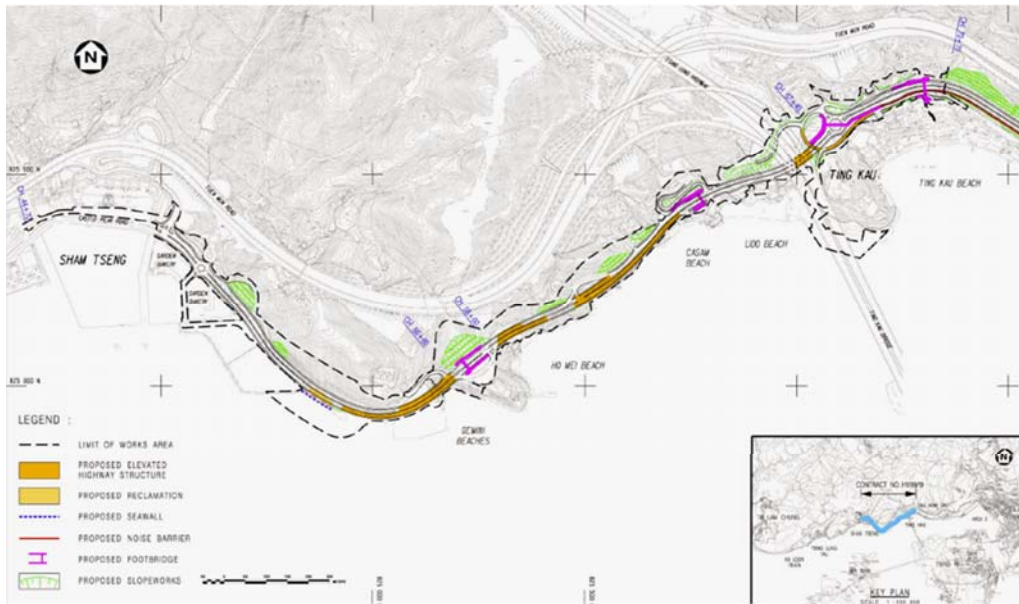
Large-scale slope-cutting along the east bank of the original Castle Peak Road formed a major component in this portion of contract



Recovery of the road bend and the cut slope after widening with landscaping and pedestrian provision



Final stage of the extension work near Yau Kam Tau



Section between Sham Tseng and Ting Kau



Slope-cutting and bank-filling formed part of the widening design on this portion of extension contract



Using earth reinforced wall to obtain extra space the road widening



Widening of the road bank by land-filling and retained by earth-reinforced wall





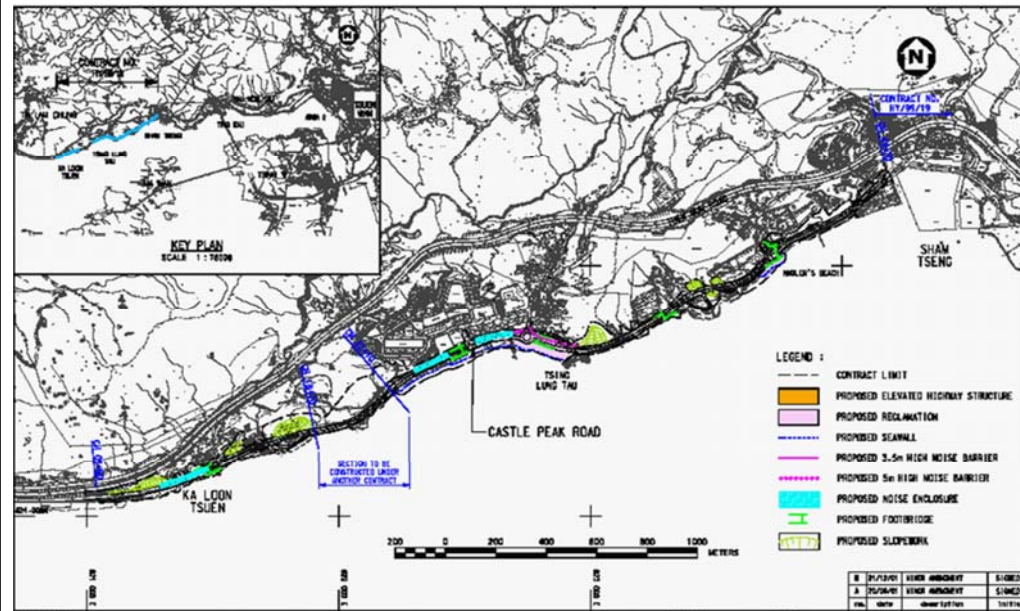
Straightening of a road bend by rock cutting near Lido Bay



Strengthening of the road bend by a new arch bridge section under the Ting Kau Bridge



Traffic diversion at section under the Ting Kau Bridge with the new and old road alignment at the interfacing point



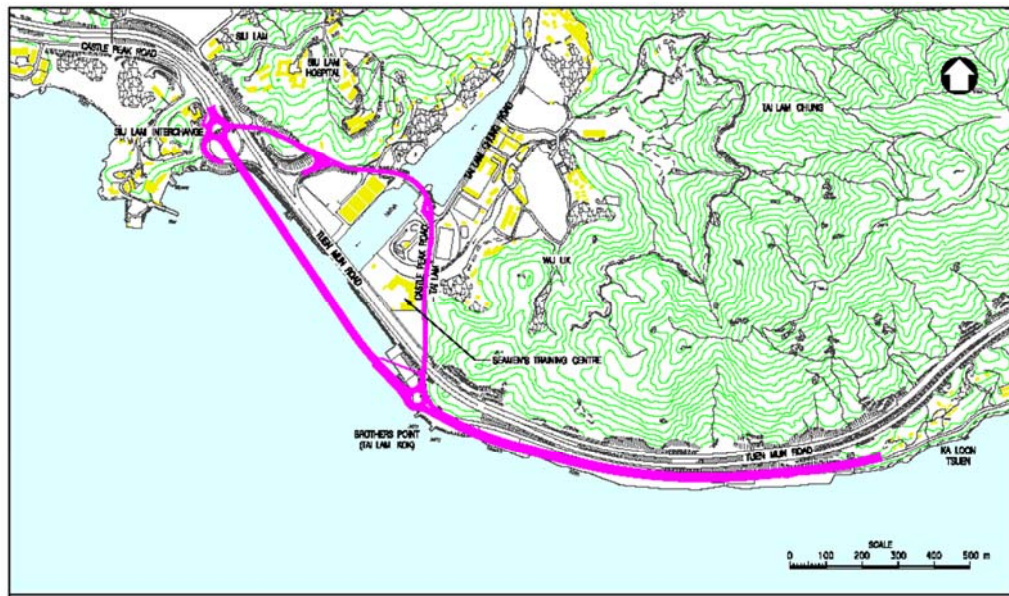
Section between Sham Tseng and Siu Lam

Widening of the road section by filling up and side supported using various types of retaining structures



Viewing the beautiful Tau Kau Bridge and the new roadway of CP Road near Shum Tseng





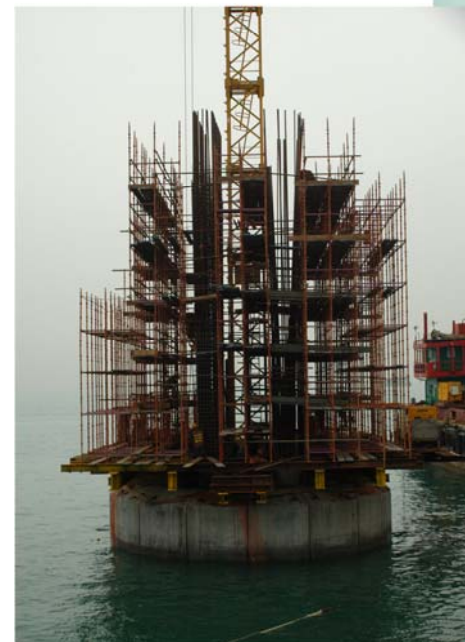
Siu Lam Section



Dredging and Reclamation work near Tai Lam Kok



Marine works to form bored piles for a section of 800m viaduct over the sea outside Siu Lam



Forming the pier for the viaduct



The new bridge crossing Sui Lam Bay



Other Associated Works





Noise barrier enclosure



Footbridge



Storm water out-fall



Drainage and
storm water
discharge



Construction works as seen during
the road improvement process





The newly completed Castle Peak Road as seen from a high position



New Coastline
near Tsing Lung
Tau after the
road
improvement



New look of the
CP Road after the
road
improvement and
environmental
upgrading



New look of the CP Road after the road improvement and environmental upgrading



Highway projects using Launching Gantry

Kwun Tong Bypass (1 machine, 1990-91)

Route 3 – Kwai Chung Section (3 machines, 1995-6)

1 for beam launching, 1 underslung type for airport railway and 1 for Ramble Channel viaduct

Route 3 – Country Park Section at Au Tau (1 machine, 1998)

Hung Hom Bypass (1 machine, 1997-98)

Tsing Yi North Coastal Road (1 machine, 2000-01)

Ma On Shan T7 (1 machine, 2002-03)

R8, Stonecutter viaduct (2 machines, 2003-05)

R8, Cheung Sha Wan Viaduct (1 machine, 2005)

R8, Shatin Height (1 machine, 2005)

T3/R8 at Tai Wai (1 machine, 2004-05)

Deep Bay Link north and south section (4 machines, 2003-05)

HK Shenzhen Western Corridor (1 machine, 2004-05)

Central-Wanchai Bypass (1 machine, 2012-14)





Other projects



Tsing Yi South Bridge (1994 – 1996)



Tsing Yi South Bridge (1994 – 1996)



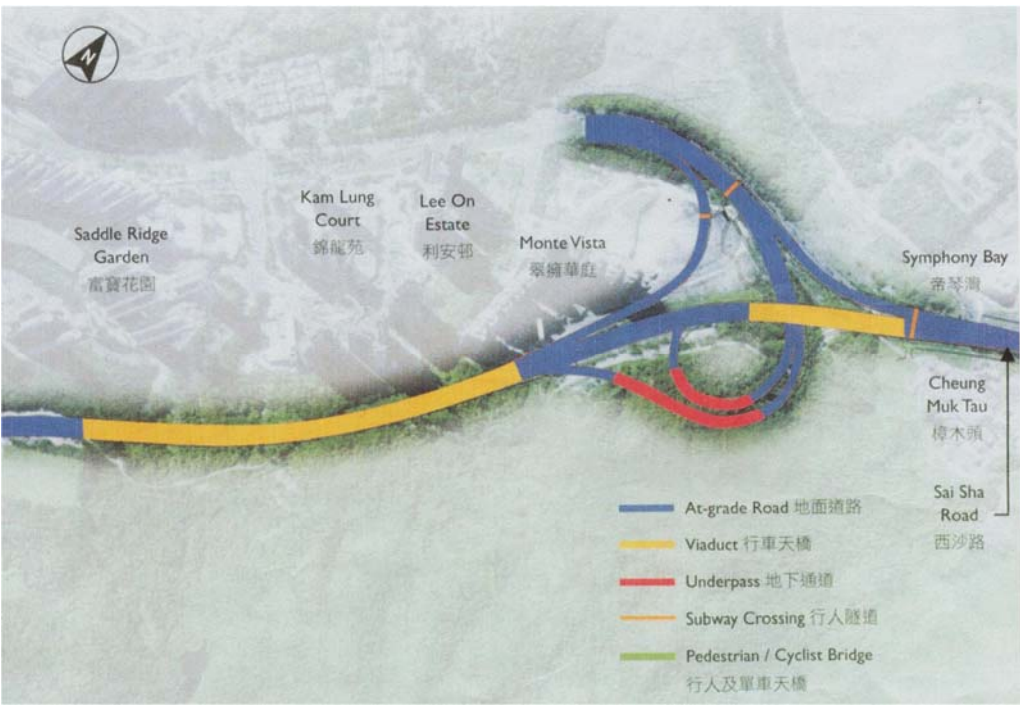
Tsing Yi North Coastal Roadway (2000 - 2002)



Tsing Yi North Coastal Roadway



Salisbury Road Underpass (2002 – 2004)



T7, Ma On Shan Bypass



Route 5, Tsuen Kam Interchange



Junction of Tuen Mun Highway, Tsuen Wan Bypass and Castle Park Road



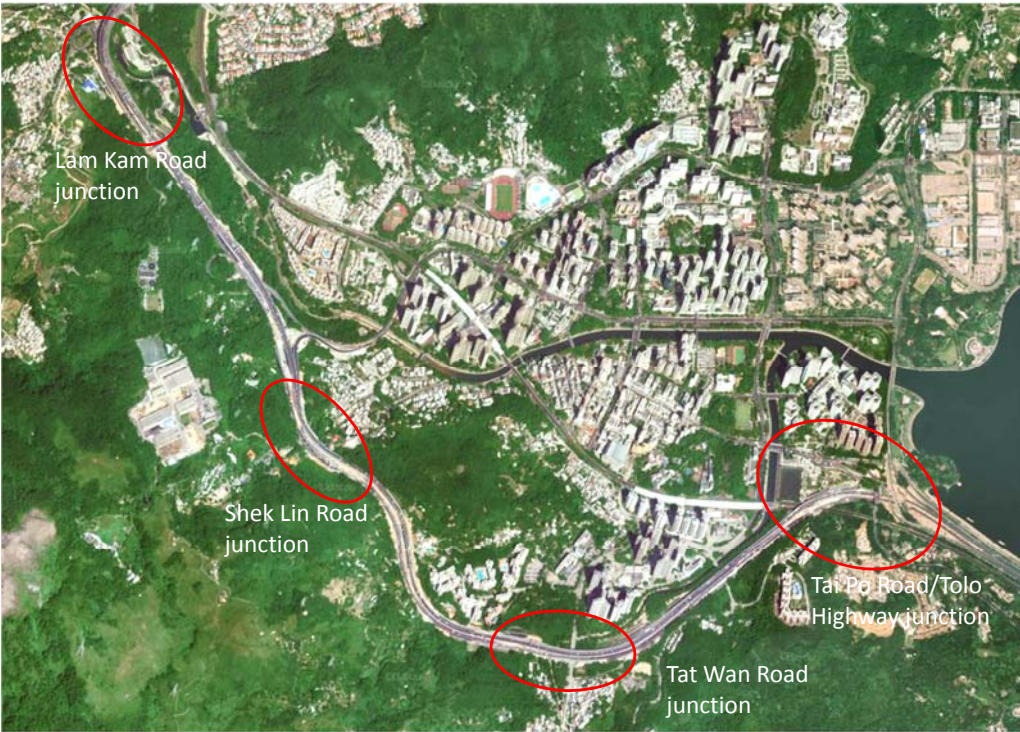






Widening of Tolo Highway/Fanling Highway







Some difficult works as part of the treatments for storm water discharge or slope stabilization





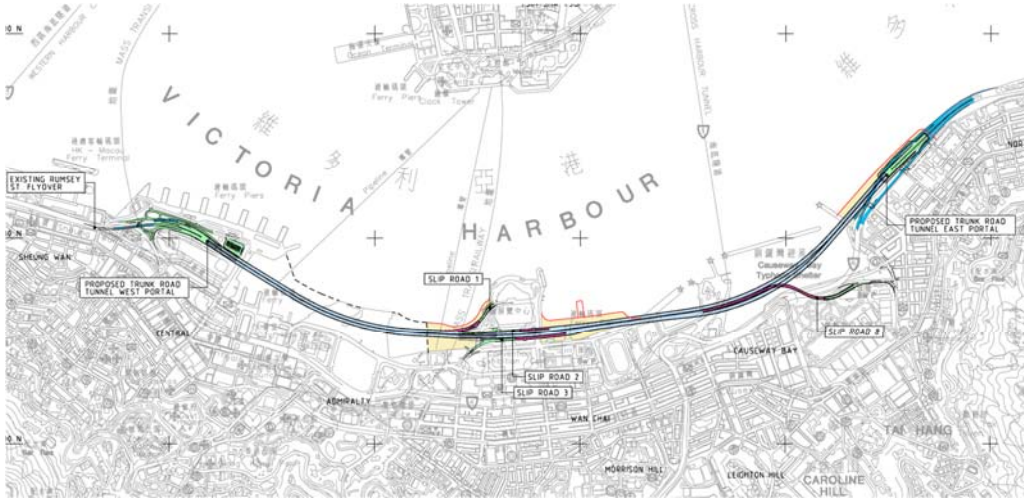
A connecting slip road leading to the Choi Wan site formation



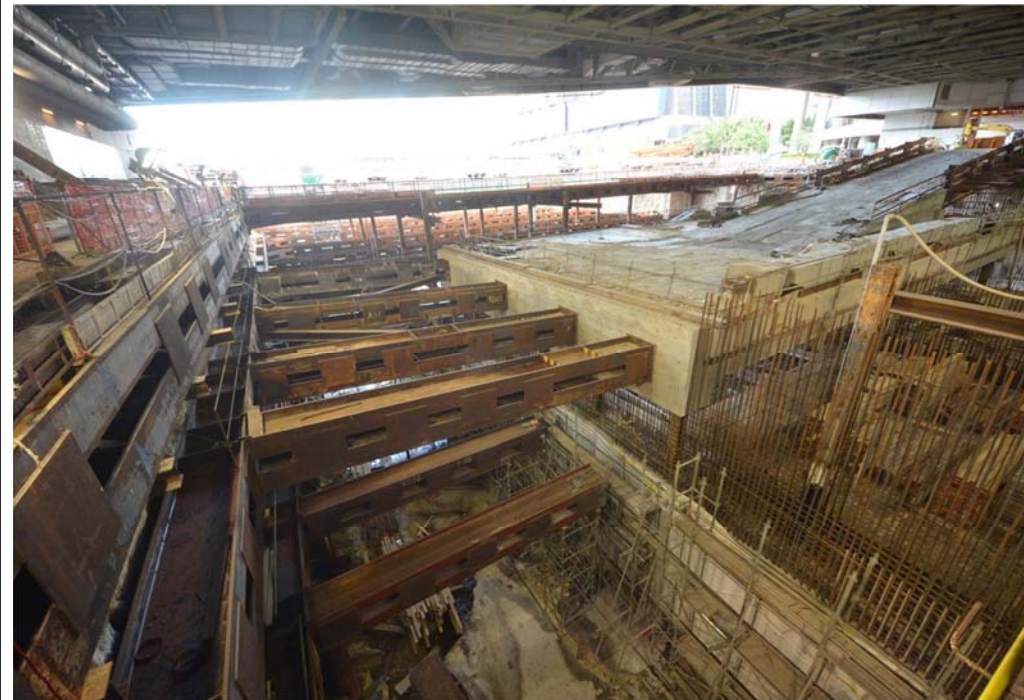
Nanpu Bridge and the approach bridge, Shanghai

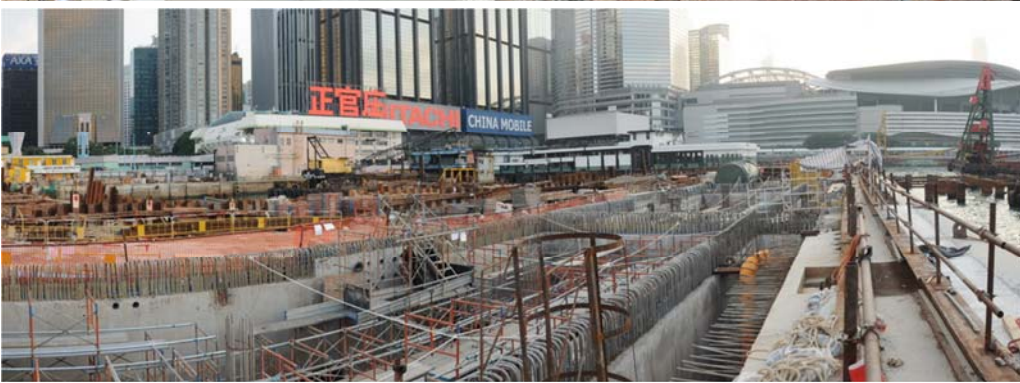
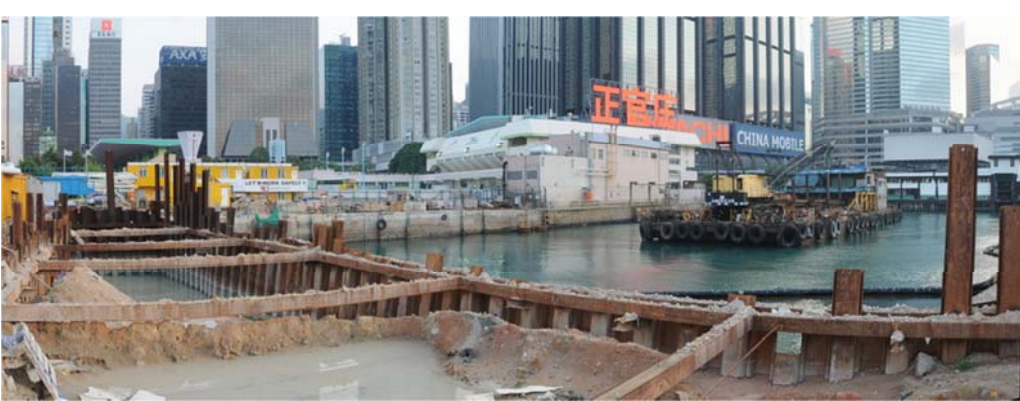


Central-Wanchai Bypass

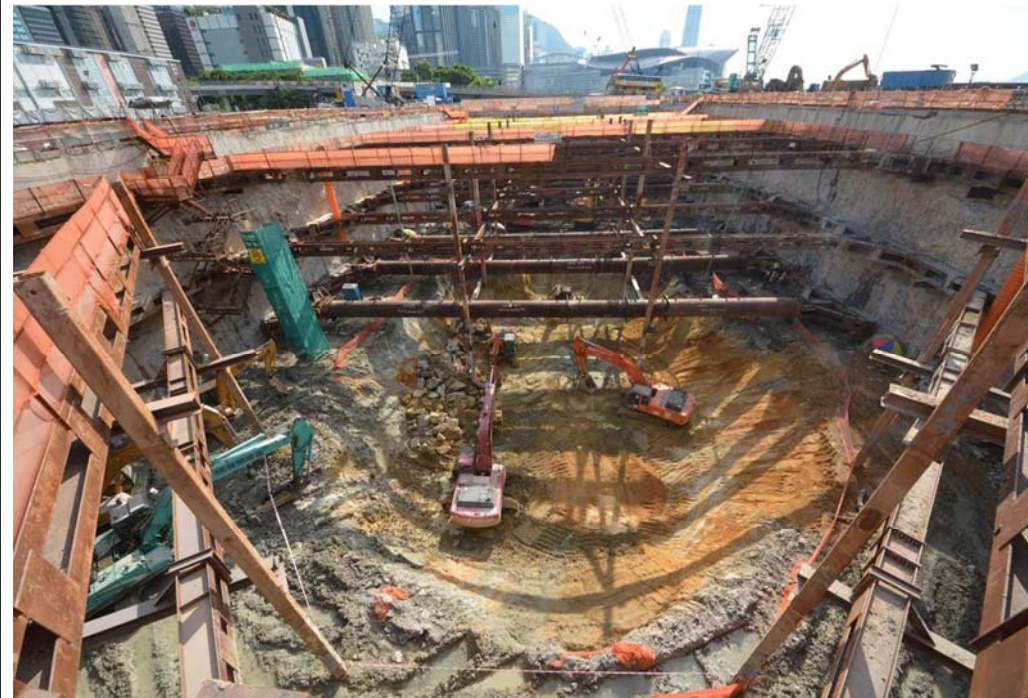
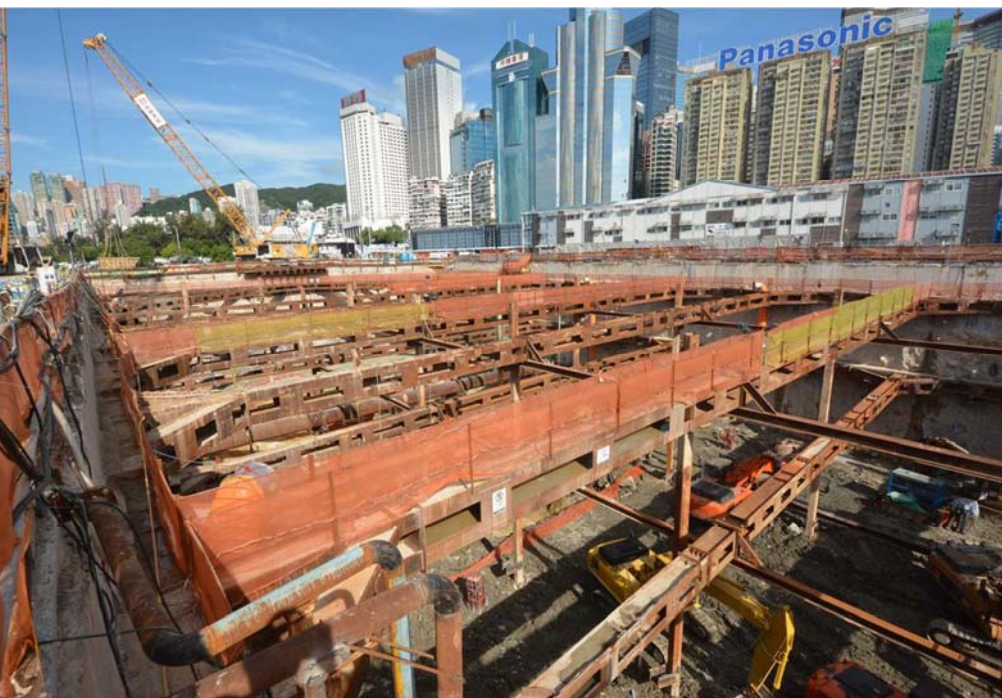
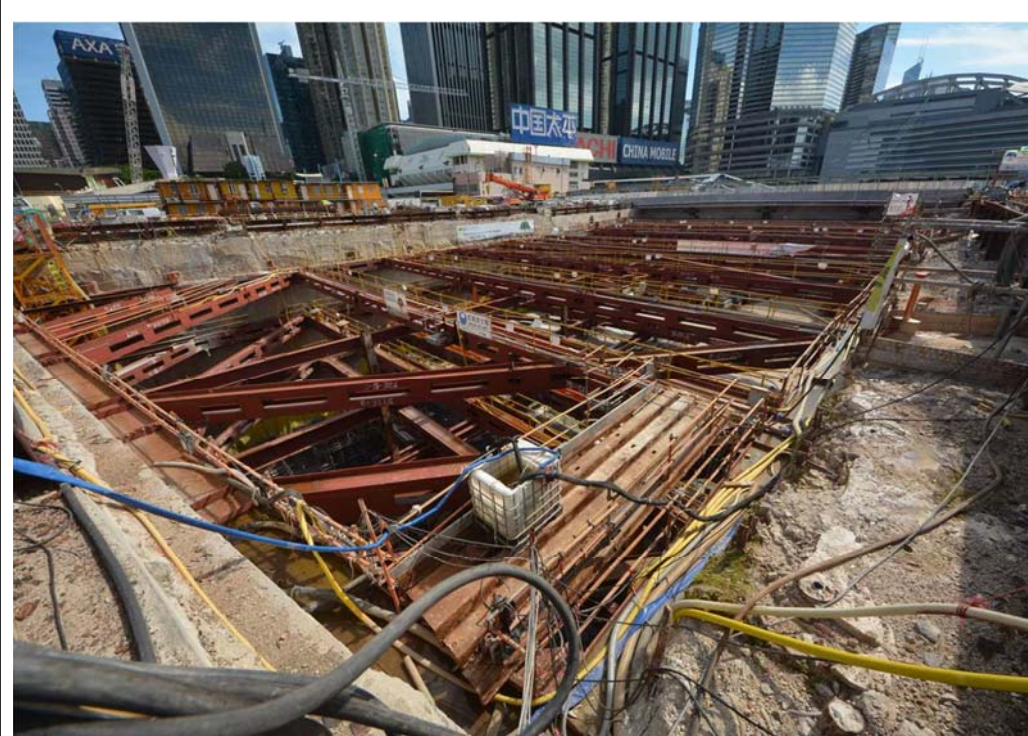


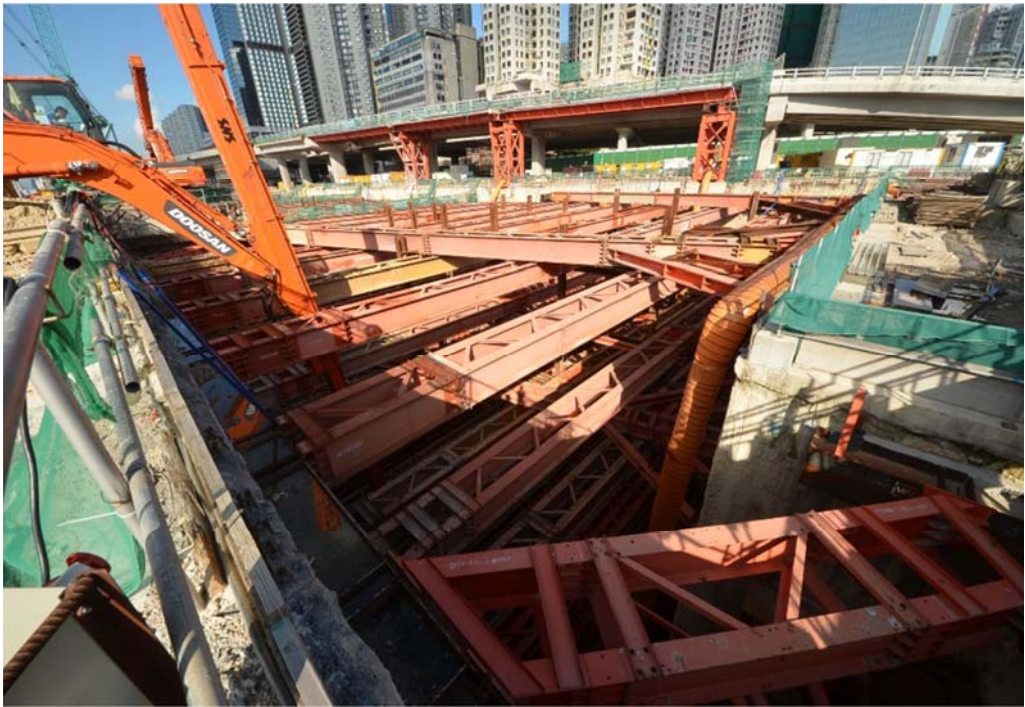
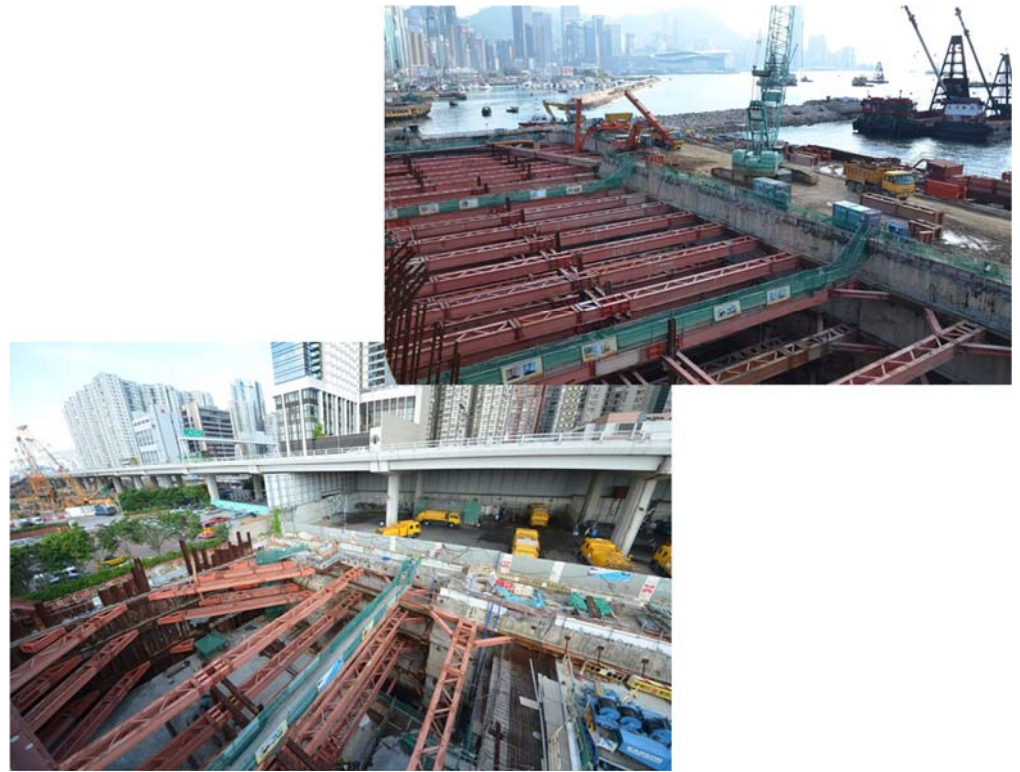


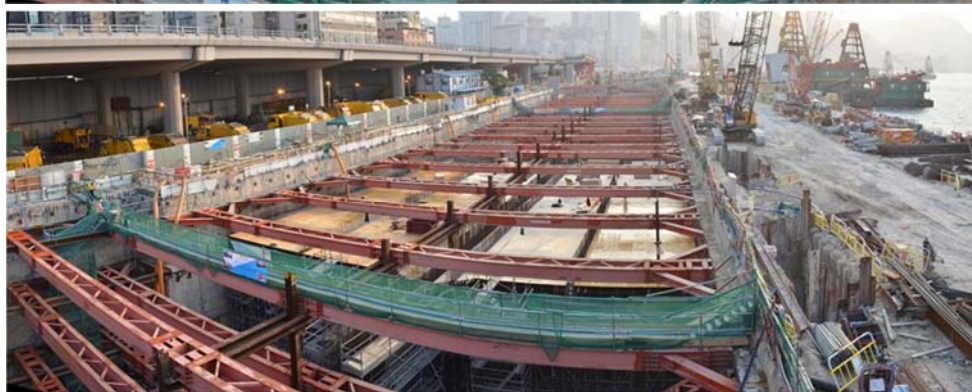
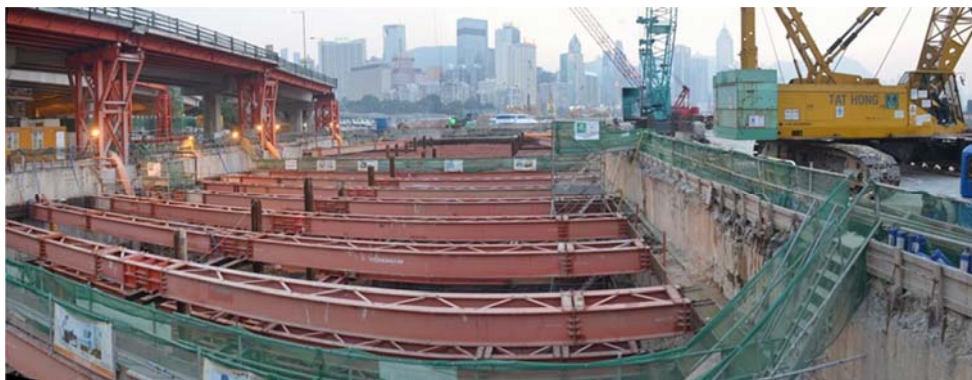


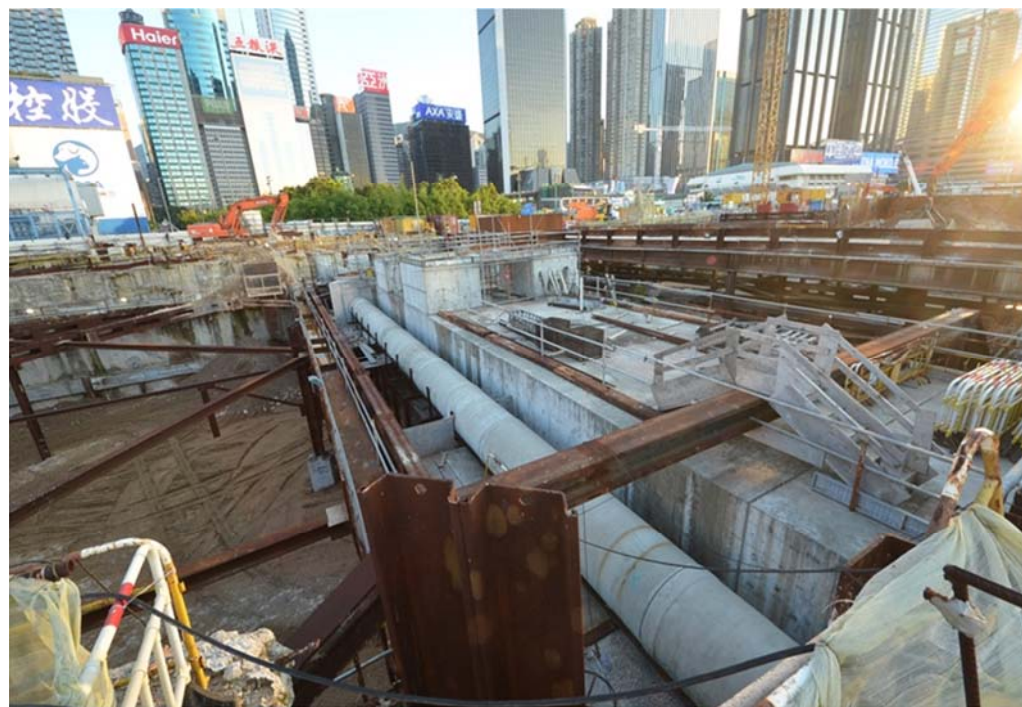


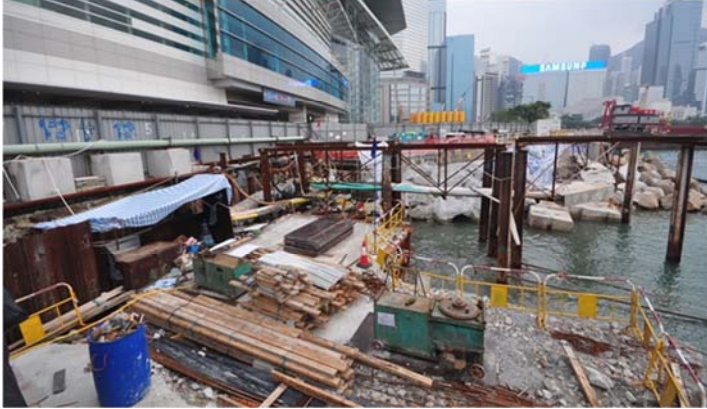










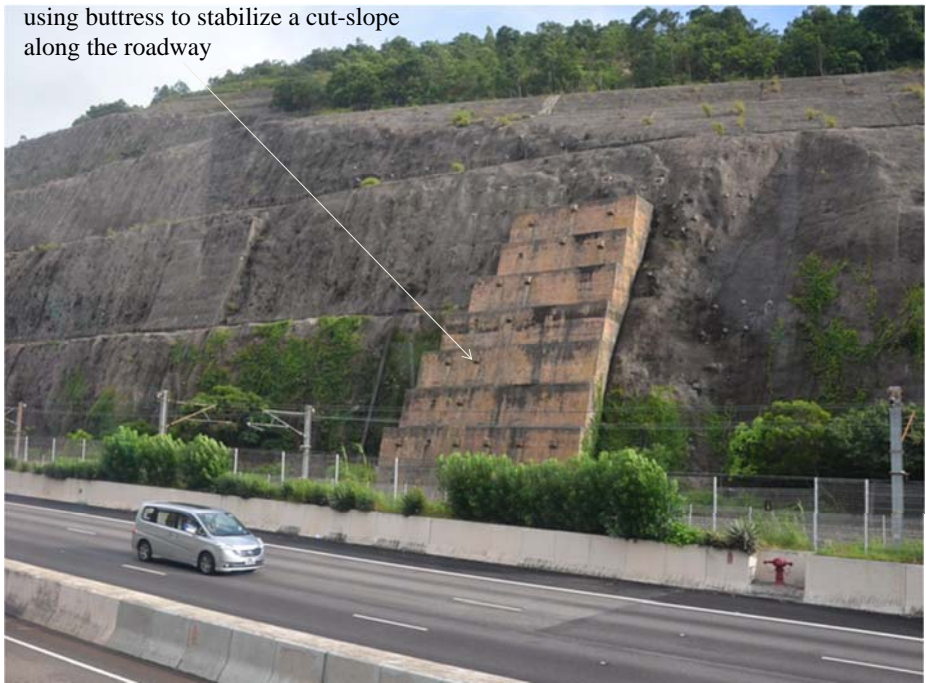


Other environmental or safety concerns
in road design/construction

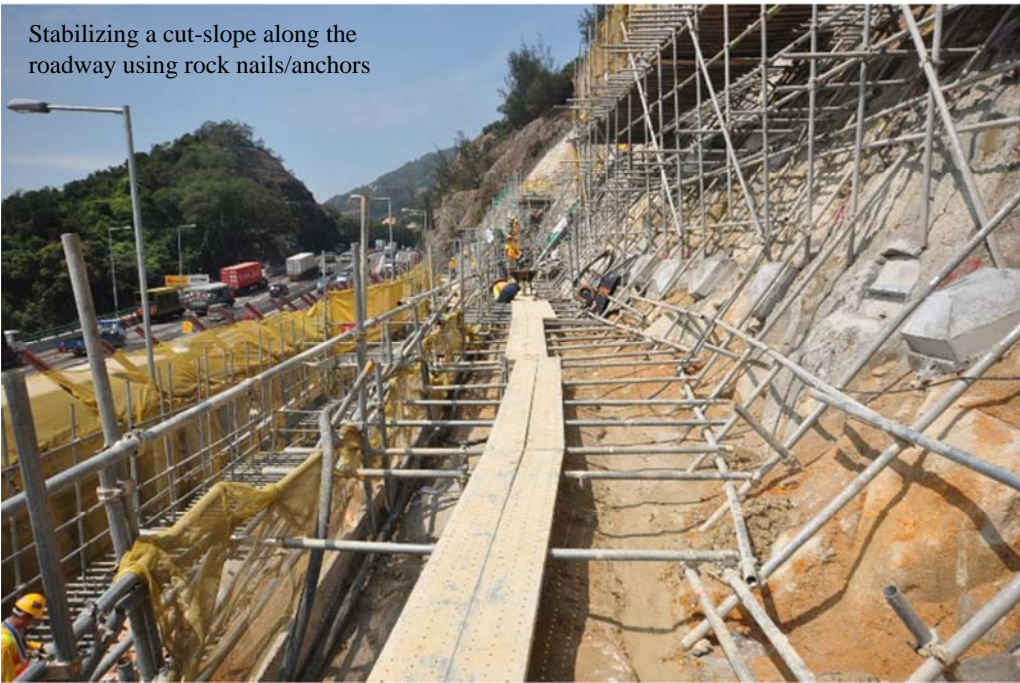




using buttress to stabilize a cut-slope
along the roadway



Stabilizing a cut-slope along the
roadway using rock nails/anchors





Examples of some provisions to keep a slope safe from possible falling of loose materials by the use of catch-fence



Providing access to servicing roadway for the carrying out of works



Providing access to servicing roadway for the carrying out of works



End of Presentation