

T2主幹路 貫通九龍西東

The East-West Kowloon Connection Trunk Road T2

■ The rapidly progressing Kai Tak Development (KTD) is the driving force behind the regeneration of neighbouring areas and the ambitious plan to energize Kowloon East to become a new Central Business District. Connectivity, as the key consideration of Hong Kong's next generation transport links, is going to help KTD achieve the goals.

The new Kai Tak Cruise Terminal is already bringing in visitors from overseas. A proposed environmentally friendly linkage system will connect Kai Tak with its surroundings, while the Shatin to Central Link will provide the area with exceptional rail links. The final piece of the transport puzzle within KTD is the strategic Route 6, which will run from east to west via Kai Tak to dramatically reduce driving time between West Kowloon and Tseung Kwan O from 30 minutes to about 12 minutes.



■ 現正全速開展的啟德發展計劃，不單為毗鄰地區重新注入活力姿采，更是銳意打造九龍東成為另一核心商業區的動力泉源。連繫貫通將是香港新一代運輸系統的主要關鍵，協助啟德發展計劃實現這目標。

新落成的啟德郵輪碼頭已陸續招徠海外旅客，擬議的環保連接系統將令啟德和其周邊地區連接互通，沙田至中環線亦將為啟德發展區提供進一步的鐵路連繫，而由東至西途經啟德發展區的策略性六號幹線將是啟德發展計劃內整個運輸系統的最後一塊拼圖，使往來西九龍與將軍澳的行程時間，可由30分鐘大大縮短至約12分鐘。

East meets west

Route 6 is a major strategic trunk road stretching approximately 12.5km across the south of Kowloon. It is made up of three sections: to the west lies the Central Kowloon Route, joining the Yau Ma Tei Interchange of the West Kowloon Highway to the KTD; in the east, the Tseung Kwan O - Lam Tin Tunnel will carry traffic to and from the expanding Tseung Kwan O new town. Linking these two sections is the Trunk Road T2, an important trunk road running through the heart of KTD.

In addition to forming the key central section of Route 6 to reduce travel times across southern Kowloon, Trunk Road T2 will bring positive benefit in relieving traffic congestion on the existing main east-west road networks, including Kwun Tong Bypass, Kwun Tong Road, Kai Fuk Road, and their associated slip roads. Trunk Road T2 will also support the on-going development of Tseung Kwan O and Kai Tak, and the "Energizing Kowloon East" initiative, by handling the increase in traffic they are likely to generate.

Planned to perform

Under the South East Kowloon Development Comprehensive Feasibility Study commissioned in 1999, it was initially proposed to build Trunk Road T2 in the reclaimed area of Kai Tak. However, plans for the road evolved in response to public consultations and, in particular, the January 2004 Court of Final Appeal judgment that the presumption against reclamation could only be rebutted by an overriding public need. This ruling and the public's clear aspiration to protect Hong Kong's precious harbour led to the Kai Tak Planning Review, commissioned in July 2004, with "zero reclamation" as the planning basis.

The new proposed Trunk Road T2 alignment was finalised through an extensive three-stage public consultation process

that took into account a wide array of views and restrictions. These included the existing and planned developments and road networks, as well as the need to avoid any permanent reclamation and minimise the impact on the harbourfront and the environment. It was then incorporated into the Kai Tak Outline Zoning Plan, which was approved in 2007.

Alignment

The proposed 3km long Trunk Road T2 will be a dual 2-lane trunk road with about 2.7km in the form of tunnel. One of the highlights of this project is the approximately 2.1km long submarine tunnel proposed to be built by using the tunnel boring machine (TBM) method under the Kwun Tong Typhoon Shelter and the adjacent harbour area. The remaining sections of the road on land will comprise a cut-and-cover tunnel, an at-grade road and a depressed road at the South Apron area of the KTD. There will be a combined administration building with Tseung Kwan O - Lam Tin Tunnel, as well as two ventilation buildings, one at each end of Trunk Road T2 in the east and west.

匯通西東

六號幹線是一條跨越九龍南部的策略性主幹道，全長約12.5公里，由三個路段組成：西面的中九龍幹線，連接西九龍公路的油麻地交匯處與啟德發展區；東面的將軍澳—藍田隧道，為將軍澳新市鎮的持續發展提供便捷的交通往來；而負責連接此兩段走廊的重要通路，正是穿越啟德發展區心臟地帶的T2主幹路。

作為六號幹線關鍵的中段部分，T2主幹路除了可以縮短南九龍地區的行程時間，更可舒緩現有主要東西行道路網絡的交通繁忙情況，包括觀塘繞道、觀塘道、

啟德道及其連接支路。將軍澳、啟德和「起動九龍東」計劃的持續發展，勢將令交通負荷日益加重，T2主幹路將有效疏導車流。

規劃周詳 力臻完善

根據在1999年進行的東南九龍發展綜合可行性研究，T2主幹路最初擬議在啟德發展區的填海範圍內建造。但經過多次的公眾諮詢，特別是在2004年1月終審法院裁決了只有「凌駕性公眾需要」方能建議進行填海後，我們考慮到公眾殷切期望能保護珍貴的維港資源，在2004年7月，以「零填海」作為規劃起點，進行了啟德規劃檢討，幹路的規劃亦隨之作出修訂。

經過三個階段的廣泛公眾諮詢程序，充分考慮到各方面的意見和限制後，全新的擬議T2主幹路走線獲得落實。考慮的範疇包括現有和已規劃的發展和道路網、避免永久填海，以及盡量減少對海濱和環境的影響。擬議T2主幹路的走線已納入《啟德分區計劃大綱圖》，並在2007年獲得核准。

走線

擬議的T2主幹路是一條長約3公里的雙程雙線主幹路，當中約2.7公里以隧道

形式建造。這個工程項目的其中一個亮點，是以擬議隧道鑽挖機方法興建位於觀塘避風塘和毗連海港海底下長約2.1公里的海底隧道。主幹路的其餘路段將由位於啟德發展區南停機坪區的一條明挖回填隧道、一條地面和一條低於地面的道路組成。工程項目亦包括建造一座T2主幹路與將軍澳—藍田隧道共用的行政大樓，以及在走線的東西兩端分別興建一座通風大樓。

六號幹線行車時間 Route 6 Driving Time



隧道鑽挖機運作原理

隧道鑽挖機是一台用作挖掘隧道的機器，其圓筒形金屬機身的前端裝有一個大型鑽頭，可以挖掘通過多種不同的土壤和岩層，而支撐設備則置於後方，用作運送泥土和即時組裝隧道壁（隧道襯砌）。相比其他建造技術，隧道鑽挖機方法可顯著減少對周遭地面所造成的滋擾。

建造隧道的工序包括挖掘開挖隧道入口豎井和回收豎井，以及在開挖隧道入口豎井內裝嵌隧道鑽挖機，然後開始鑽挖隧道並同時組裝永久的隧道壁。當隧道鑽挖機抵達回收豎井，代表鑽挖隧道工程已經完成，可以將隧道鑽挖機分拆，然後運走。

Tunnel boring machine operating mechanism

TBMs are used to excavate tunnels through a variety of soil and rock strata. They consist of a shield, and trailing support mechanisms to remove the excavated material and install lining of the new tunnel instantly. The TBMs are used as an alternative tunnelling technique with the advantage that they limit disturbance to the surrounding ground.

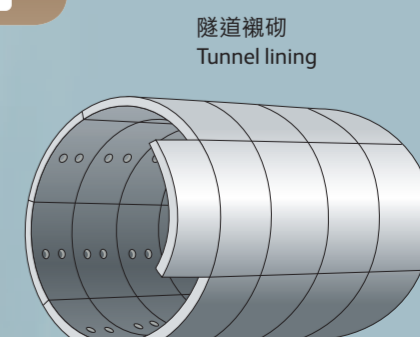
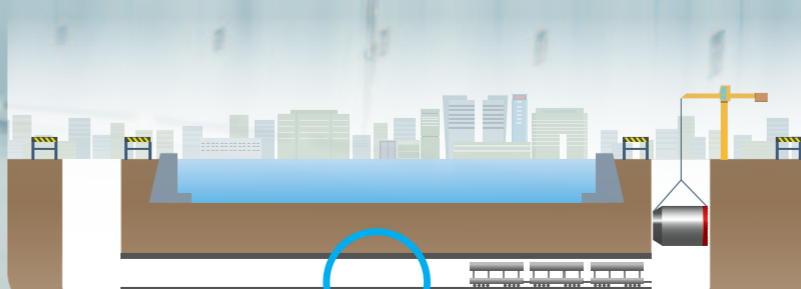
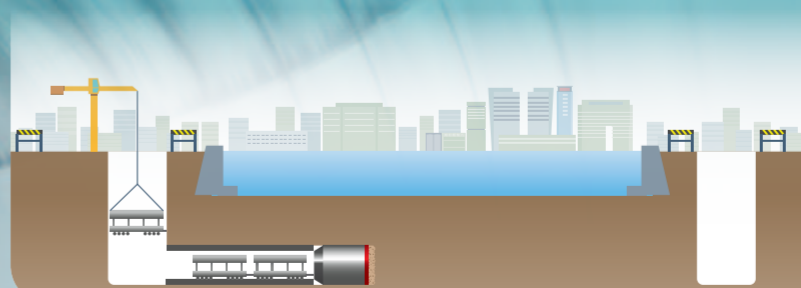
The tunnelling operation consists of excavation of launching and retrieval shafts, the assembly of the TBM in the launching shaft, where it can then bore the tunnel and simultaneously install a permanent lining. Once the TBM arrives at the retrieval shaft, the tunnel is completed and the TBM will be dismantled and removed for transportation.

4 鑽挖機抵達回收豎井後，進行分拆，然後運走。The TBM arrives in retrieval shaft to be dismantled and removed for transportation

1 挖掘開挖隧道入口豎井和回收豎井。Excavate launching shaft and retrieval shaft

2 在開挖隧道入口豎井進行隧道鑽挖機裝嵌。Assemble the TBM at launching shaft

3 在海底鑽挖隧道。Excavate the tunnel



T2主幹路 設計與建造

設計

整個工程項目在設計和建造上都以盡量減少T2主幹路及其配套設施對視覺和環境的影響為目標，特別是避免破壞維港的優美景觀。T2主幹路大部分路段的設計都以地下或海底隧道形式建造，讓走線上的地面和水域可以釋出作其他更寶貴的用途，以及減少對現有海域的影響。T2主幹路隧道的東西兩端出口設置於內陸，遠離海濱。通風大樓和行政大樓均為低層建築物設計，配合園境綠化環境，以減少對景觀的影響。

東面通風大樓將與隧道東端出口融為一體，

設於將軍澳—藍田隧道的擬建藍田交匯處內，遠離茶果嶺村，以減低對鄰近居民的影響。西面通風大樓則設置於觀塘繞道附近，通風設施和大部分機房將設置於地面以下，務求減少對景觀的影響。

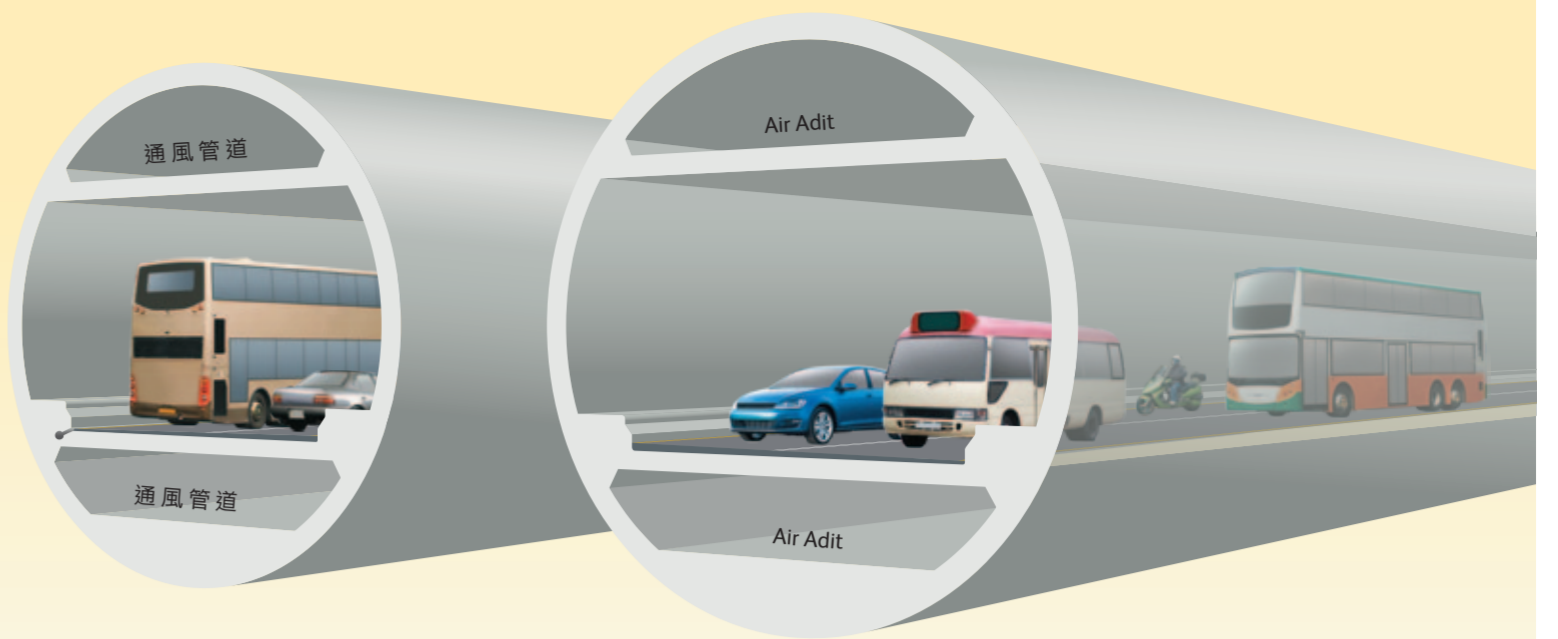
取道地下

T2主幹路其中一段位於海底的隧道，經過詳細考慮後，建議將以隧道鑽挖機方法取代原來計劃的沉管隧道方式建造。隧道鑽挖機方法的優點良多，不但可以避免臨時填海和大型疏浚工程，亦可減少對觀塘避風塘使用者造成不便。相比之下，沉管隧道方式則需要大規模疏浚海床和填海、拆卸並重置現有的

防波堤，以及把一條海底排水管出口進行臨時改造。對環境而言，使用隧道鑽挖機方法可降低對水質的影響，亦大大減少建造隧道時產生的泥土。

T2主幹路的工程計劃進展順利，現正進行詳細設計和第二期段的工程勘測。相關的環境影響評估報告已於2013年7月24日至8月22日向公眾展示，期間沒有收到任何意見，並於2013年9月19日，根據《環境影響評估條例》獲核准。視乎準備工作及完成法定程序的進度，我們的目標是盡量配合六號幹線的其他路段，在相近時間啟用T2主幹路。□

海底隧道剖面圖
Submarine tunnel
cross section



Design and Build of Trunk Road T2

Design

Many other aspects of the project's design and construction have been inspired by the goal of minimising both the visual and environmental impact of Trunk Road T2 and its ancillary facilities, especially with respect to the iconic Victoria Harbour. With most parts of Trunk Road T2 designed in the form of tunnel underground or under the sea, the land and water above will be free for other more valuable uses and impacts to the existing sea areas can be reduced. Each end of the Trunk Road T2 tunnel –

the western and eastern portals – will be located inland and away from the harbour. The ventilation and administrative buildings have been designed as low rise buildings and are landscaped to minimise visual impact.

The eastern ventilation building will be integrated with the eastern tunnel portal and sited within the proposed Lam Tin Interchange under the Tseung Kwan O – Lam Tin Tunnel, which is well away from the residents of Cha Kwo Ling Village; while the western ventilation

building, next to the Kwun Tong Bypass, will have lowered ventilation fans and the majority of the plant rooms will be below ground level to minimize visual impact.

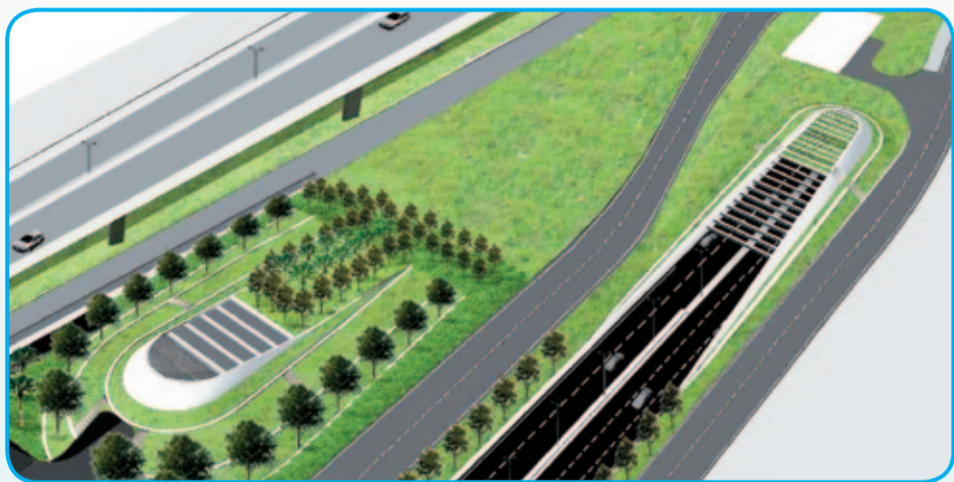
Going underground

After careful consideration, construction of the sub-section of Trunk Road T2 tunnel using TBM method has been recommended over the alternative immersed tube tunnel method originally envisaged. The tunneling approach brings a number of advantages and avoids the need for

temporary reclamation, large-scale dredging, and disruption to users of the Kwun Tong Typhoon Shelter. In contrast, the immersed tube tunnel method would require extensive dredging, temporary reclamation, demolition and replacement of the existing breakwater and the temporary diversion of a submarine drainage pipe. From an environmental perspective, using TBM can reduce impact on water quality, and the amount of spoils generated.

Progress on Trunk Road T2 is well underway. Both the detailed design and the

Stage 2 site investigation works are on-going. The Environmental Impact Assessment Report for Trunk Road T2 was exhibited for public inspection between 24 July and 22 August 2013 and, with no comments received, was approved under the Environmental Impact Assessment Ordinance on 19 September 2013. Subject to satisfactory progress on the preparatory works and completion of statutory procedures, our aim is to commission Trunk Road T2 to tie in with the other sections of Route 6. □



西端通風大樓(左)及隧道西端出口(右)構想圖
Artist's impression of the western ventilation building (left) and western tunnel portal (right)

公共創意活現眼前 Public Creatives in Action

■ 隨著啟德發展計劃「公共創意」的展開，一系列視覺形象特徵已融入發展區內不同的工程項目和公共設施當中，以建立啟德獨特的品牌個性。該等項目和設施包括祥業街啟德消防局、太子道東的污水泵房、連接翠園花園的園景美化高架行人道、承豐道的臨時洗手間和座位，以及跑道公園第一期等。在可見的將來，「活力磁場」會陸續呈現在工業貿易大樓、大樓內的郵政分局、啟福道的泵房和截流設施。

為了展示啟德發展區內未來公共街道設施的可能性，不同設施的樣品設計亦已完成，包括避雨亭、路邊座椅、廢物箱、單車泊放架及信息海報架等。

我們希望把「公共創意」的概念同時融入啟德發展區內的私人發展建築上，並會向不同的專業學會和地產發展商，介紹相關的視覺形象特徵和街道設施樣品設計的初步建議，並初步探討區內私人發展項目中，可實施「公共創意」的地方，務求使啟德成為一個視覺協調且貫徹品牌效應的發展區。□



啟德消防局捲閘圖案
Roller shutter decorative
pattern of Kai Tak Fire Station



臨時洗手間外牆圖案
Temporary toilets
external wall pattern

■ With the launch of "Public Creatives" in the KTD, visual identity elements are being integrated into various projects and public facilities within the KTD to establish a coherent branding identity. These can be seen at the Kai Tak Fire Station at Cheung Yip Street, the sewage pumping station at Prince Edward Road East, a landscaped elevated walkway connecting to Rhythm Garden, temporary toilets and seats at Shing Fung Road, and Runway Park Phase 1. Soon, the "Current of Vitality" will also be on display at Trade and Industry Tower and the Post Office within, and the pumping station and interception facilities at Kai Fuk Road.

A number of public street furniture sample designs, such as rain shelters, benches, bins, bicycle racks and information displays, were also created to demonstrate the possibilities for future public furniture at the KTD.

It is hoped the "Public Creatives" concept will also be incorporated into private developments in the KTD. Preliminary proposals for the visual identity design and public street furniture samples will be presented to professional institutes and real estate developers. Suitable locations are being explored for the application of these elements to achieve a visually coherent and consistent branding effect for the KTD. □



九龍拓展處隊員與發展局常任秘書長(工務)及土木工程拓展署署長合照
Group photo of KDevO team with Permanent Secretary for Development (Works) and Director of Civil Engineering and Development



土木工程拓展署署長參與街馬
Director of Civil Engineering and
Development participating in the
Streetathon

跑出活力九龍東 Runners get energetic in Kowloon East

■ 首屆香港街馬10公里@九龍東2014已於3月23日舉行，共吸引約5000名健兒參加，土木工程拓展署亦派出了9支隊伍一同參與。在土木工程拓展署署長帶領下，來自土木工程拓展署包括九龍拓展處的參與隊員與其他參賽者一同由啟德郵輪碼頭起步，途經觀塘海濱長廊、觀塘工業區及九龍灣，再返回啟德郵輪碼頭，完成整項賽事。這條全程10公里的賽道，讓大家可以沿途細味九龍東滄海桑田的變化。香港街馬不但有助推動社區融合，更可以為青年街跑計劃及九龍東社區的慈善機構籌款。在此恭賀土木工程拓展署其中一支隊伍勇奪街馬團隊第十名獎項。□

■ Nearly 5 000 runners, including nine teams from the Civil Engineering and Development Department (CEDD), took part in the first Hong Kong Streetathon 10km@Kowloon East 2014 on 23 March. Led by the Director of Civil Engineering and Development, team members from CEDD including the Kowloon Development Office (KDevO) ran together with other participants from the Kai Tak Cruise Terminal along the Kwun Tong Promenade, through Kwun Tong's industrial district and on to Kowloon Bay before returning to the cruise terminal on a challenging 10km course designed to showcase the changing face of Kowloon East. The streetathon did a great job in promoting the spirit of community integration and raising funds for Youth Street-run Program and other charities in Kowloon East. And congratulations to one of the CEDD teams for winning the 10th place team prize. □



九龍拓展處員工
Staff from KDevO

下期精彩內容

我們將介紹有關環保連接系統項目的最新進展。

Look out for the next issue

We will talk about the updates of environmentally friendly linkage system project.

使用隧道鑽挖機方法有甚麼考慮因素？有否類似在海底岩石情況下使用這種方法的例子？

隧道鑽挖機方法需要高度的專業建造知識和技術，工程人員需仔細考慮土質、隧道長度、直徑，以及其他環境等因素。尤其在類似擬議T2主幹路需在海底岩石和高壓環境下，以隧道鑽挖機方法建造的隧道，世界上規模相若的例子寥寥可數，其中一條是最近開始施工的屯門至赤鱗角連接路，此外還有近年落成的上海崇明南海峽隧道。

What are the considerations of using the TBM method? Had any tunnels built under similar sub-sea ground conditions employed this method?

The TBM method requires a very high level of construction expertise and technology with thorough considerations on the specific geology of the project, tunnel length, diameter, and other environmental factors. Only a few tunnels of comparable size like Trunk Road T2 have been constructed using TBM method around the world under similar submarine ground conditions and high-pressure environment. The Tuen Mun – Chek Lap Kok Link is a similar type of tunnel, which recently started construction in Hong Kong. Chongming Tunnel in Shanghai is another example which was completed in recent years.

有問必答 Frequently Asked Questions

