For discussion **PWSC(2019-20)18**
on 19 June 2019

ITEM FOR PUBLIC WORKS SUBCOMMITTEE OF FINANCE COMMITTEE

HEAD 707 – NEW TOWNS AND URBAN AREA DEVELOPMENT
Transport – Roads
823TH – Tseung Kwan O – Lam Tin Tunnel – remaining works

Members are invited to recommend to the Finance Committee the upgrading of the remaining part of **823TH** to Category A at an estimated cost of $330.2 million in money-of-the-day prices.

PROBLEM

We need to construct a free-flow tolling system (FFTS) for collecting tunnel tolls for the Tseung Kwan O – Lam Tin Tunnel (TKO-LTT) as there is no toll plaza.

PROPOSAL

2. The Director of Civil Engineering and Development (DCED) proposes, with the support of the Secretary for Transport and Housing, to upgrade the remaining part of **823TH** (the proposed works) to Category A at an estimated cost of $330.2 million in money-of-the-day (MOD) prices to construct an FFTS at TKO-LTT for collection of the tunnel tolls.

PROJECT SCOPE AND NATURE

3. The scope of works of the remaining part of **823TH** which we propose to upgrade to Category A comprises -

(a) the construction of an FFTS at TKO-LTT; and

/(b) …..

(b) associated works for the FFTS at TKO-LTT, including utilities works, electrical and mechanical works, enhancement of communication systems and other related ancillary works[1].

The layout plan of the proposed works is at Enclosure 1.

4. Subject to funding approval of the Finance Committee (FC), we plan to commence the construction works in end 2019 for completion in end 2021.

JUSTIFICATION

5. TKO-LTT will be an alternative route to the Tseung Kwan O (TKO) Tunnel (as shown in Enclosure 1) for coping with the traffic demand arising from the developments in TKO and Kwun Tong districts. The construction of TKO-LTT is anticipated to be completed in end 2021. Due to geographical restrictions, there is no toll plaza at TKO-LTT. As we briefed the Public Works Subcommittee (PWSC) of the Legislative Council (LegCo) in 2016, the Government would study the feasibility of electronic toll collection for TKO-LTT and further consult LegCo.

6. The Civil Engineering and Development Department engaged consultants in 2017 to study the feasibility of using FFTS at TKO-LTT and carried out field trials. FFTS is a technology-based solution to enable the collection of tunnel tolls without requiring a vehicle to stop at toll booths. The study and field trials were substantially completed in mid-2018. The consultants recommended the adoption of both Radio Frequency Identification (RFID) (which requires affixing a RFID chip to the vehicle, i.e. the installation of an in-vehicle unit (IVU)) and Automatic Number Plate Recognition (ANPR) for the FFTS at TKO-LTT.

7. With the implementation of FFTS, the use of TKO-LTT by a vehicle will be detected by -

(a) reading the IVU affixed to the vehicle; or

/(b) …..

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1 The proposed works of the remaining part of **823TH** include the development, design and construction of toll gantries and field equipment located within TKO-LTT to capture data of vehicles passing through the tunnel area, the development of computer systems for data storage, account management and toll clearing, and the provision of ancillary works for the implementation of FFTS at TKO-LTT.

(b) recognising the vehicle registration mark on the vehicle number plate through ANPR.

For (a) above, the detection requires electronic communication based on a radio frequency associated with the IVU. For (b) above, the detection requires cameras to capture photo and video images of vehicles. After the detection, the data of a vehicle using TKO-LTT will be sent to the backend system of FFTS[2] and matched against the records of the Vehicles and Drivers Licensing Integrated Data (VALID)[3] system of the Transport Department (TD).

8. TD plans to collect tolls from vehicles using TKO-LTT through the following two methods -

(a) automatic payment: The registered owner of a vehicle or his / her authorised agent may pay tolls upon using TKO-LTT through direct debit from a pre-registered payment account[4] with TD; and

(b) payment in arrears (only for an interim period): For detected vehicles using the tunnel but are not affixed with IVUs with pre-registered payment accounts or when automatic payment is not successful[5], the registered owner of a vehicle or his / her authorised agent may make toll payments manually through designated channels[6] within a grace period.

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2 The backend system of FFTS of TKO-LTT will be extended by phases for connecting to the FFTS of other government tolled tunnels and roads.

3 Owned and operated by TD, the VALID system provides services relating to the registration and licensing of vehicles and drivers, and supports the operational requirements of other relevant government departments under various application subsystems.

4 For example, bank accounts, debit cards, credit cards and stored value facility accounts.

5 Failure of automatic payment through pre-registered payment accounts may be due to rejection from financial institutions, malfunction of IVUs or other technical or operational reasons. Registered vehicle owners who use automatic payment will be notified of unsuccessful payments. To enable notification to the registered vehicle owners of outstanding payments by Short Message Service in a timely manner (regardless of whether unsuccessful automatic payment or payment in arrears is involved), we plan to require vehicle owners to provide a mobile phone number when they renew / apply for vehicle licences.

6 For example, online payment through website and mobile application. The registered vehicle owner or his / her authorised agent may also choose to open an account with TD, albeit without automatic payment function, for reviewing journeys and toll payment records as well as receiving toll payment notifications.

9. To enable toll payment by FFTS at TKO-LTT upon its commissioning in end 2021, and having considered that vehicle owners are required to renew vehicle licences either every four or twelve months, TD plans to commence issuing IVUs to registered vehicle owners in the third quarter of 2020. The first issue of IVUs to registered vehicle owners will be free of charge. Subsequent re-issuance, including replacement, of IVUs will be at the cost of the vehicle owners on a cost-recovery basis except otherwise agreed by the Commissioner for Transport. The IVU will store two pieces of digital data, namely Tag ID[7] and processed Vehicle ID[8]. Field equipment of FFTS will read data on the IVU to identify the vehicle[9]. Illustrations showing the workflow of detection of vehicles with and without IVUs and their payment methods are at Enclosure 2.

10. The consultants engaged by the Government have conducted privacy impact assessments successively on the workflow of the frontend system (including the field equipment), backend system and the planned operations of the toll service provider of FFTS. No insurmountable personal data privacy concerns pertaining to the systems and workflow are envisaged after consultation with the Office of the Privacy Commissioner for Personal Data (PCPD). The proposed works will comply with the Personal Data (Privacy) Ordinance (Cap. 486) (PDPO) and the codes of practice and guidelines issued by PCPD to mitigate personal data privacy risk. After completion of the works, TD will conduct regular audits to ensure that the handling of personal data under FFTS will continue to comply with PDPO and the codes of practice and guidelines issued by PCPD.

11. According to the existing policy, tolls of government tolled tunnels and roads are determined in accordance with the "cost-recovery" and "user-pays" principles. The Government will take into account a host of factors, including traffic management, costs (including the capital ones) of provision of the relevant tunnels and roads, the toll levels of alternative routes, public affordability and acceptability, etc.

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7 The Tag ID is a unique serial number of a RFID tag, which is imprinted by manufacturer ***at factory***.

8 The Vehicle ID is a unique identification number of a vehicle assigned by TD, which is currently shown on the paper vehicle licence. The Vehicle ID is ***not*** equivalent to the vehicle registration mark (i.e. licence plate number). The Vehicle ID on the IVU will be processed in an appropriate manner to enhance protection of the data.

9 As part of the smart mobility initiatives, the IVU will facilitate the collection of real-time traffic data for traffic management and big data analysis, and may serve other functions such as payment of parking fees by remote means, apart from payment of tunnel tolls by FFTS.

12. TKO-LTT will be an alternative route to TKO Tunnel, and form part of Route 6[10] which will be an essential highway infrastructure to support new developments in the western and eastern parts of Kowloon. Having regard to the above-mentioned factors, we propose that the toll level of TKO-LTT be pitched at the same level as TKO Tunnel (i.e. a flat toll of $3 for all types of vehicles) upon its commissioning.

13. In the long run, to optimise the use of limited road space and tunnel capacity, the Government proposes to adopt the concept of "congestion charging" and the principle of "efficiency first" in determining the future toll levels of different types of vehicles so as to allocate more effectively the limited road space at tolled tunnels. To this end, TD will soon embark on a consultancy study on "congestion charging" in mid-2019 to examine the hierarchy and levels of tolls of all government tolled tunnels (including the Western Harbour Crossing and Tai Lam Tunnel which will be taken over by the Government upon franchise expiry in August 2023 and May 2025 respectively) as well as the Tsing Ma and Tsing Sha Control Areas, with a view to enabling efficient people carriers (e.g. franchised buses) and vehicles that support economic activities (e.g. goods vehicles) to enjoy concessionary tolls, while imposing higher tolls on vehicle types with low carrying capacity (e.g. private cars). The study will also examine the scope for charging different tolls during different time periods under FFTS.

FINANCIAL IMPLICATIONS

14. We estimate the capital cost of the proposed works to be $330.2 million in MOD prices, broken down as follows -

		$ million (in MOD prices)
(a)	Tolling Gantry	16.8

/$ million .....

10 Route 6 comprises the Central Kowloon Route (CKR), Trunk Road T2, Cha Kwo Ling Tunnel and TKO-LTT. CKR is under construction for completion in 2025. Subject to funding approval by the FC, the construction of Trunk Road T2 and Cha Kwo Ling Tunnel is targeted to commence in the second half of 2019 for completion in 2025 in tandem with CKR.

			$ million (in MOD prices)
(b)	Development of Frontend System		80.7
	(i) field equipment	54.4	
	(ii) computer system at the administration building	26.3	
(c)	Development of Backend System		147.8
	(i) computer system	82.1	
	(ii) supporting facilities	65.7	
(d)	Ancillary works		16.7
(e)	Consultants' fees for		6.2
	(i) contract administration	3.3	
	(ii) management of resident site staff (RSS)	2.9	
(f)	Remuneration of RSS		28.8
(g)	Electrical and Mechanical Services Trading Fund (EMSTF)[11]		3.2
(h)	Contingencies		30.0
	Total		330.2

15. We propose to engage consultants to undertake contract administration and site supervision of the proposed works. A breakdown of the estimates for the consultants' fees and RSS costs by man-months is at Enclosure 3.

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11 Upon its establishment from 1 August 1996 under the Trading Funds Ordinance (Cap. 430), the EMSTF charges government departments for design and technical consultancy services for E&M installations. The services rendered for this project include checking consultants' submissions on all E&M installation and providing technical advice on all E&M works and their impact on the project.

16. Subject to funding approval, we plan to phase the expenditure as follows -

Year	$ million (MOD)
2019 – 20	3.4
2020 – 21	54.5
2021 – 22	145.0
2022 – 23	65.5
2023 – 24	36.1
2024 – 25	25.7
	330.2

17. We have derived the MOD estimates on the basis of the Government's latest set of assumptions on the trend rate of change in the prices of public sector building and construction output for the period from 2019 to 2025.

18. We estimate the annual recurrent expenditure arising from the proposed works to be $46.8 million.

PUBLIC CONSULTATION

19. The Kwun Tong District Council and Sai Kung District Council were briefed on the possible use of electronic toll collection for TKO-LTT in 2012 and 2015 respectively. At the meeting of the Panel on Transport held on 23 March 2016 and the PWSC meeting held on 21 May 2016 for the funding application of part of **823TH** for the construction of the main tunnel and associated works for TKO-LTT, Members noted that the Government would consider electronic toll collection for TKO-LTT.

20. We consulted the Panel on Transport on the funding application for the proposed works on 18 January 2019. Members in general supported the proposed works, while requested elaboration on the protection of personal data collected through FFTS. Subsequently, we have provided written responses in this regard to the Panel. Paragraph 10 above has incorporated such elaboration.

ENVIRONMENTAL IMPLICATIONS

21. The project is not a designated project under the Environmental Impact Assessment Ordinance (Cap. 499) and will not cause any long-term adverse environmental impact.

22. We will require the contractors to control the short-term noise, dust and site run-off nuisances during construction within established standards and guidelines through the implementation of pollution control measures in the relevant contracts. These measures include the use of silencers, mufflers, acoustic lining or shields for noisy construction activities, frequent cleaning and watering of the site, and the provision of wheel-washing facilities. We have included the cost for the implementation of pollution control measures in the project estimate.

23. At the planning and design stages, we considered measures for the proposed works and construction sequences to reduce the generation of construction waste where possible. In addition, we will require the contractors to reuse inert construction waste on site or in other suitable construction sites as far as possible, in order to minimise the disposal of inert construction waste to public fill reception facilities (PFRF)[12]. We will encourage the contractors to maximise the use of recycled and recyclable inert construction waste, and the use of non-timber formwork to further reduce the generation of construction waste.

24. At the construction stage, we will require the contractors to submit for approval a plan setting out the waste management measures, which will include appropriate mitigation means to avoid, reduce, reuse and recycle inert construction waste. We will ensure that the day-to-day operations on site comply with the approved plan. We will require the contractors to separate the inert portion from the non-inert construction waste on site for disposal at appropriate facilities. We will control the disposal of inert construction waste and non-inert construction waste to PFRF and landfills respectively through a trip-ticket system.

/25. …..

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12 PFRF are specified in Schedule 4 to the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N). Disposal of inert construction waste in PFRF requires a licence issued by DCED.

25. We estimate that the project will generate in total about two tonnes of construction waste. Of these, we will deliver one tonne (50%) of inert construction waste to PFRF for subsequent reuse. We will dispose of the remaining one tonne (50%) of non-inert construction waste at landfills. The total cost for disposal of construction waste at PFRF and landfill sites is estimated to be $271 for this project (based on the charge rate of $71 per tonne for disposal at PFRF and $200 per tonne at landfills as stipulated in the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N)).

HERITAGE IMPLICATIONS

26. The proposed works will not affect any heritage sites, i.e. all declared monuments, proposed monuments, graded historic sites / buildings, sites of archaeological interest and government historic sites identified by the Antiquities and Monuments Office.

LAND ACQUISITION

27. The proposed works do not require acquisition and clearance of private land.

BACKGROUND INFORMATION

28. We upgraded **823TH** to Category B in April 2007.

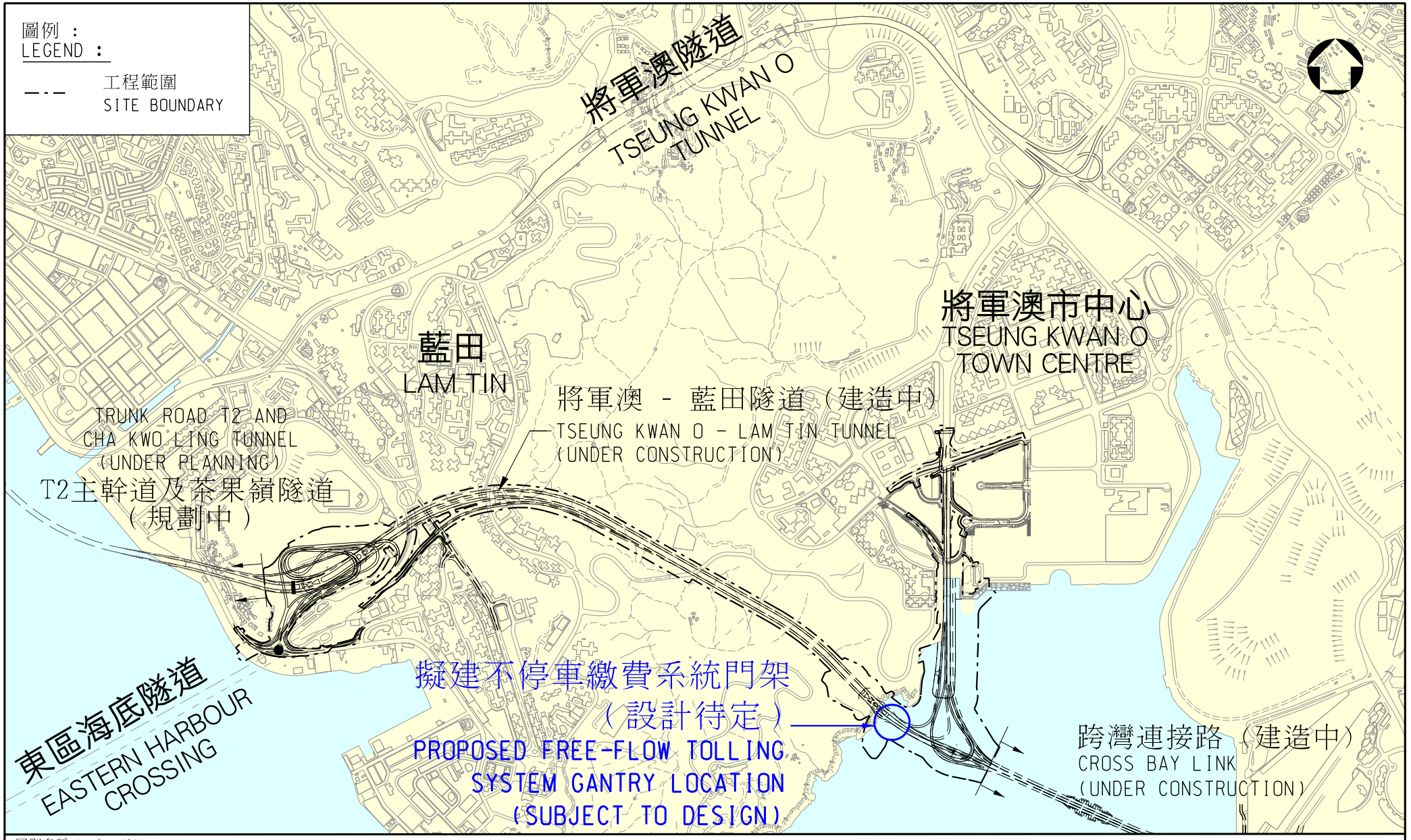
29. In January 2009, FC approved the upgrading of part of **823TH** to Category A to become **827TH** "Tseung Kwan O – Lam Tin Tunnel – investigation and preliminary design" at an approved project estimate of $198.9 million in MOD prices for engaging consultants to undertake the preliminary design of the TKO-LTT and the associated site investigation works. The preliminary design was completed in 2013.

30. In May 2013, FC approved the upgrading of part of **823TH** to Category A to become **862TH** "Tseung Kwan O – Lam Tin Tunnel – detailed design and site investigation" at an approved project estimate of $196.0 million in MOD prices for carrying out the detailed design and associated site investigation for TKO-LTT. The detailed design and site investigation works have been substantially completed.

31. In June 2016, FC approved the upgrading of part of **823TH** to Category A to become **872TH** "Tseung Kwan O – Lam Tin Tunnel – main tunnel and associated works" at an approved project estimate of $15,093.5 million in MOD prices.

32. We estimate that the proposed works will create about 60 jobs (45 for labourers and 15 for professional or technical staff) providing a total employment of 1 200 man-months.

Transport and Housing Bureau
June 2019



圖則名稱 drawing title

工務計劃第823TH號 - 將軍澳 - 藍田隧道 - 餘下工程
擬建工程分布圖

PWP ITEM NO. 823TH - TSEUNG KWAN O - LAM TIN TUNNEL - REMAINING WORKS
LAYOUT PLAN OF THE PROPOSED WORKS

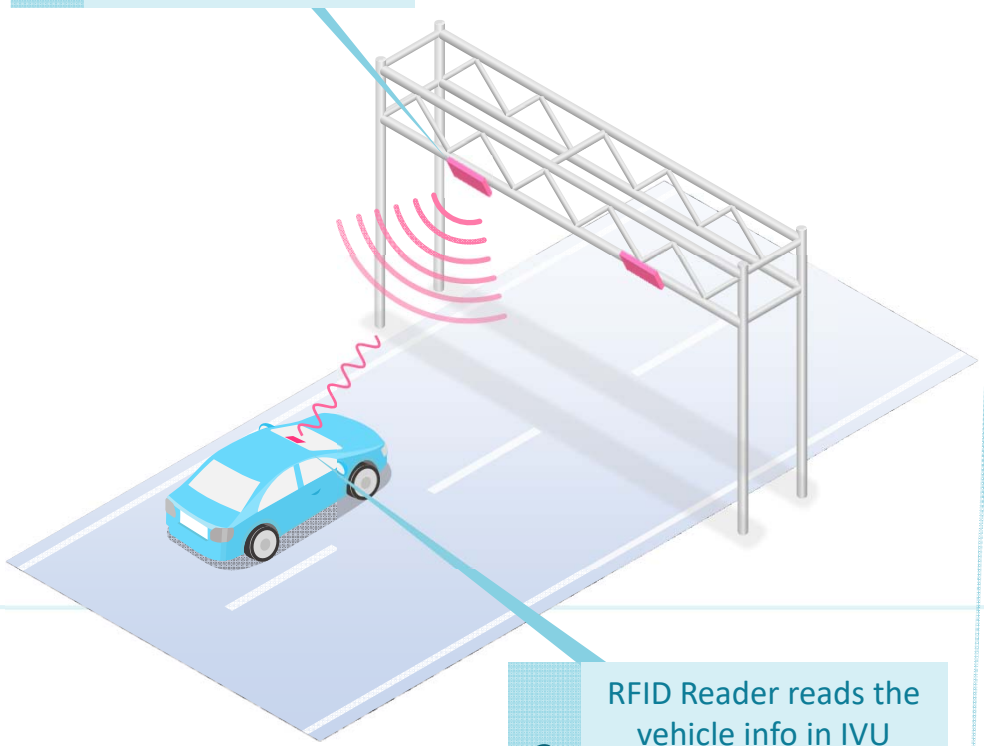
附件一 Enclosure 1

Free-Flow Tolling System

Vehicle with IVU

Vehicle Detection

1 RFID Reader detects IVU of Vehicle



2 RFID Reader reads the vehicle info in IVU

RFID IVU Tag

Toll Payment

Vehicle with IVU and Auto Payment Account passes through tolled-tunnel/road

Backend System processes Auto Payment with notification on vehicle trip

successful | *unsuccessful#*

Auto Payment Settled

Notification to registered vehicle owner on unsuccessful Auto Payment

To be paid in arrears

settled within grace period

not settled within grace period

Payment Completed

Notification to registered vehicle owner demanding for unpaid toll plus surcharge

Enclosure 2 (Sheet 1 of 2)

*All pictures shown are for illustration purpose only. Actual arrangement of gantry and field equipment may vary.

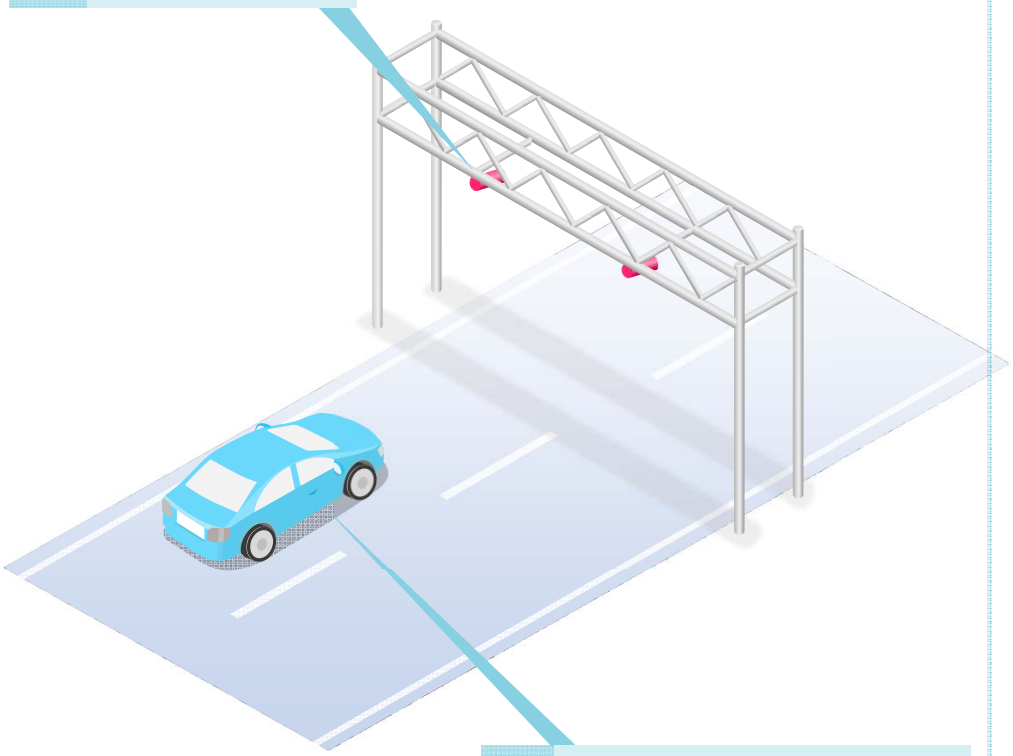
including vehicle with IVU but without auto payment account.

Free-Flow Tolling System

Vehicle without IVU

Vehicle Detection

1 ANPR cameras capture images



2 ANPR system recognizes Vehicle Registration Marks

Toll Payment

Vehicle without IVU passes through tolled-tunnel/road

↓

Notification to registered vehicle owner on vehicle trip and remind payment

↓

To be paid in arrears

↓

settled within grace period → **Payment Completed**

not settled within grace period → **Notification to registered vehicle owner demanding for unpaid toll plus surcharge**

*All pictures shown are for illustration purpose only. Actual arrangement of gantry and field equipment may vary.

Enclosure 2 (Sheet 2 of 2)

823TH –Tseung Kwan O – Lam Tin Tunnel – remaining works

Breakdown of the estimates for consultants' fees and resident site staff costs (in September 2018 prices)

			Estimated man-months	Average MPS* salary point	Multiplier (Note 1)	Estimated fees ($million)
(a)	Consultants' fees for					
	(i) Contract administration (Note 2)	Professional	–	–	–	2.0
		Technical	–	–	–	0.8
					Sub-total	2.8#
(b)	Resident site staff (RSS) costs (Note 3)	Professional	102	38	1.6	13.4
		Technical	294	14	1.6	13.5
					Sub-total	26.9
	Comprising –					
	(i) Consultants' fees for management of RSS				2.5#	
	(ii) Remuneration of RSS				24.4#	
					Total	**29.7**

* MPS = Master Pay Scale

Notes

1. A multiplier of 1.6 is applied to the average MPS salary point to estimate the cost of RSS supplied by the Consultants. (As at now, MPS salary point 38 = $81,975 per month and MPS salary point 14 = $28,725 per month).

2. The consultants' staff cost for contract administration is calculated in accordance with the existing Consultancy Agreement for design and construction of **823TH**. The construction phase of the assignment will only be executed subject to the Finance Committee's approval for upgrading the remaining part of **823TH** to Category A.

3. The actual man-months and actual costs will only be known after completion of the construction works.

Remarks

The cost figures in this Enclosure are shown in constant prices to correlate with the MPS salary point of the same year. The figures marked with # are shown in money-of-the-day prices in paragraph 14 of the main paper.