

**For discussion  
on 18 January 2019**

**Legislative Council Panel on Transport**

**Free-flow Tolling System for Tseung Kwan O – Lam Tin Tunnel and  
other Government Tolled-Tunnels and Roads**

**PURPOSE**

This paper seeks Members' views on the funding application for upgrading **823TH** "Tseung Kwan O – Lam Tin Tunnel - Remaining Works" to Category A to construct a free-flow tolling system ("FFTS") for collection of tolls at Tseung Kwan O – Lam Tin Tunnel ("TKO-LTT"). Members' views are also sought on the Government's plan to roll out FFTS at other government tolled-tunnels and roads after the implementation at TKO-LTT.

**PROJECT SCOPE AND NATURE**

2. The scope of works of **823TH** which we propose to upgrade to Category A comprises –
  - (a) the construction of FFTS of TKO-LTT; and
  - (b) associated works for FFTS of TKO-LTT, including utilities works, electrical and mechanical works, communication enhancement works and other related ancillary works.

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

## JUSTIFICATION

### TKO-LTT

#### *FFTS*

3. As shown in the map at Annex A, TKO-LTT will be an alternative route to the Tseung Kwan O Tunnel for coping with the traffic demand arising from developments in Tseung Kwan O (“TKO”) and Kwun Tong districts. The construction of TKO-LTT is anticipated to be completed in late 2021. Due to geographical restrictions, there is no provision of toll plaza in TKO-LTT. As we previously briefed this Panel and the Public Works Sub-Committee (“PWSC”) of Legislative Council (“LegCo”) in 2016, the Government would study the feasibility of electronic toll collection for TKO-LTT and further consult LegCo.

4. The Civil Engineering and Development Department (“CEDD”) commissioned a consultancy study in 2017 on the feasibility of using FFTS at TKO-LTT and carried out field trials. FFTS is a technology-based solution to enable collection of tunnel tolls without requiring a vehicle to stop at a toll booth. The study and field trials were substantially completed in mid-2018, recommending a FFTS at TKO-LTT with both Radio Frequency Identification (“RFID”) (which requires affixing an RFID chip to the vehicle, i.e. the installation of in-vehicle units (“IVUs”)), and Automatic Number Plate Recognition (“ANPR”). A privacy impact assessment for the field trial was also conducted in consultation with the Office of the Privacy Commissioner for Personal Data (“PCPD”).

5. With the implementation of FFTS, the use of TKO-LTT by a vehicle will be detected by the field equipment of FFTS by –

- (i) reading an IVU affixed to a vehicle; or
- (ii) through recognition of the vehicle registration mark on a vehicle number plate through ANPR.

For (i), the detection requires electronic communication based on a radio frequency associated with an IVU. For (ii), the detection requires cameras to capture photo and video images of vehicles. After the detection, the data of a

vehicle using TKO-LTT would be sent to the backend system of FFTS and matched against the record of the Transport Department (“TD”)’s VALID<sup>1</sup> system.

6. 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<sup>2</sup> with TD; and
- (b) Payment in arrears (only for an interim period (see paragraphs 9 and 17 below)): For detected vehicles not affixed with IVUs with pre-registered payment accounts or when automatic payment is not successful<sup>3</sup>, the registered owner of a vehicle or his / her authorised agent may make toll payments manually through designated channels<sup>4</sup> within a grace period (say, seven calendar days).

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

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<sup>1</sup> The VALID system refers to Vehicles and Drivers Licensing Integrated Data system owned and operated by TD. It provides services relating to the registration and licensing of vehicles and drivers, and also supports the operational requirements of other relevant government departments under various application subsystems.

<sup>2</sup> For example, bank accounts, debit cards, credit cards and stored value facility accounts.

<sup>3</sup> 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 owners who use automatic payment will be notified of unsuccessful payments. To enable timely notification of outstanding payments by SMS (regardless of using automatic payment or payment in arrears), we propose to require vehicle owners to provide a mobile phone number when they renew / apply for vehicle licences.

<sup>4</sup> For example, online payment through website and mobile application. The registered owner or his / her authorised agent may also choose to open an account with TD, albeit without automatic payment function, for reviewing of journeys and toll payment records as well as receiving toll payment notifications.

8. To enable toll payment by FFTS at TKO-LTT upon its commissioning in late 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 at licencing offices in the third quarter of 2020. An IVU will normally be a self-adhesive sticker tag affixed on the windscreen of a vehicle<sup>5</sup> (as shown in **Annex B**). The IVU will store two pieces of unencrypted digital data, namely Tag ID<sup>6</sup> and Vehicle ID<sup>7</sup>. Field equipment of FFTS and other IVU applications will read data on the IVU to identify the vehicle. Both Tag ID and Vehicle ID will not be bundled with any personal particulars which could identify the vehicle owner. A preliminary privacy impact assessment on the overall design of IVU indicated that no personal data privacy issue of data in IVUs and field equipment is envisaged, and TD is further working to mitigate personal data privacy risks for the backend system of FFTS in consultation with PCPD. Illustrations showing the workflow of detection and payment for vehicles with and without IVUs are at **Annex C**.

9. 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 owner on a cost-recovery basis except otherwise agreed by the Commissioner for Transport (“the Commissioner”). TD plans to mandate toll payment by IVU detection with automatic payment (i.e. paragraph 6(a) above) upon the implementation of FFTS at all government tolled-tunnels (see paragraph 17 below). Apart from payment of tunnel toll by FFTS, the IVU will also facilitate the collection of real-time traffic data for traffic management and big data analysis, and serve other possible functions such as payment of parking fees by remote means as part of the smart mobility initiatives.

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<sup>5</sup> For a very small portion of vehicles, the material of the whole windscreen contains a metal oxide which may affect the detection by FFTS field equipment. For these vehicles, the IVU will be affixed to the headlamp.

<sup>6</sup> Tag ID is a unique serial number of RFID tag, which is imprinted by the manufacturer *at factory*.

<sup>7</sup> 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 vehicle registration mark (i.e. licence plate number).

10. TD will engage a toll service provider (“TSP”) through open tender for handling the toll collection by FFTS, toll recovery, as well as providing account management and customer services. To cater for the growing diversity in automatic payment means, the number and forms of payment means that may be provided by the TSP will be one of the tender assessment criteria<sup>8</sup>.

### ***Proposed Toll Level***

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

12. Having regard to the function of TKO-LTT as an alternative route to TKO Tunnel, and being part of Route 6<sup>9</sup> which will be an essential highway infrastructure to support new developments in the western and eastern part of Kowloon, we propose that TKO-LTT should charge the same toll level as TKO Tunnel (i.e. a flat toll of \$3 for all types of vehicles) upon its commissioning.

13. Similar to the existing arrangements of manual toll payment, certain types of vehicles would be exempted from tolling, such as vehicles used by a disabled person. Such exemption will be effected in the backend system of FFTS.

14. We note the various suggestions from stakeholders on the toll level of TKO-LTT, including that the tunnel should be toll-free or charge toll levels higher / lower than TKO Tunnel. After considering the traffic impact, we do not recommend either suggestion. Making TKO-LTT toll-free will attract excessive traffic to its connecting roads, thereby defeating its purpose of providing an east-west express link in Kowloon as part of Route 6. On the

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<sup>8</sup> To cater for emerging e-payment technology, TD will explore the feasibility to include a contract provision to require the TSP to propose and provide additional payment means for automatic payment upon request by TD.

<sup>9</sup> Route 6 comprises the Central Kowloon Route (“CKR”), Trunk Road T2 and Cha Kwo Ling Tunnel, and TKO-LTT. The construction of CKR started in end-2017 for completion in 2025. Subject to funding approval by the Legislative Council Finance Committee 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.

other hand, if TKO-LTT charges a toll different from TKO Tunnel, it will not be conducive to effective traffic diversion from TKO Tunnel.

15. To make efficient use of limited road space and tunnels, the Government proposes to adopt the concepts of “congestion charging” and “efficiency first” in future upward and downward adjustment of 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 undertake a study to comprehensively review the hierarchy and level of tolls of all government toll-tunnels and 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 lower tolls while requiring vehicle types with low carrying capacity (e.g. private cars) to pay higher tolls. The toll levels of TKO-LTT will be covered in this study; subject to the findings of the study in due course, the toll levels of TKO-LTT may be adjusted, together with those of other tunnels in the longer run.

### **FFTS at Other Government-tolled Tunnels and Roads**

16. As stated in the Hong Kong Smart City Blueprint, the Government will develop the use of IVUs for allowing tunnel toll payment without stopping at toll booths as one of the key smart mobility initiatives. FFTS allows vehicles to pay tolls more efficiently, avoiding disruption to traffic flow arising from the need to stop at toll booths for manual toll payment. In addition, with the implementation of FFTS, the existing toll booths at toll plazas could be removed, potentially freeing up some space for other transport related purposes, such as improvement of existing bus stops.

17. To ensure the smooth transition from toll booth-based toll collection to FFTS, and so that road users can adapt to the change of traffic management schemes of the tunnels upon transition, TD plans to roll out FFTS in phases at other government-tolled tunnels and roads<sup>10</sup>, with an indicative timing of completing the changes within about two to three years after the

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<sup>10</sup> Covering Cross-Harbour Tunnel, Eastern Harbour Crossing, Lion Rock Tunnel, TKO Tunnel, Shing Mun Tunnels, Aberdeen Tunnel and Tate’s Cairn Tunnel and Eagle’s Nest and Sha Tin Heights Tunnels, Lantau Link, and Tuen Mun-Chek Lap Kok Link Subsea Tunnel. As for Western Harbour Crossing and Tai Lam Tunnel, both of which are Build-Operate-Transfer tunnels, TD plans to implement FFTS upon the Government’s take-over of ownership respectively in August 2023 and May 2025.

commissioning of TKO-LTT<sup>11</sup>. TD will, in collaboration with relevant departments, start preparatory work in 2019, including detailed design of the temporary and permanent traffic management schemes, associated civil, electrical and mechanical works such as removal of toll booths, modification of road layout, as well as installation of overhead gantries, field equipment, roadside cabinets and cable ducts.

18. As toll collectors will not be required after the complete implementation of FFTS, TD will set out in the renewed management, operation and maintenance contract requiring the tunnel operators to arrange re-deployment of the toll collectors by providing re-training for them to take up other tunnel posts, such as Traffic Officer; as well as to plan in advance for natural attrition. TD also plans to make provisions in the tender documents of the TSP contract requiring the TSP to make offer to the toll collectors of existing Government tunnels to take up FFTS related duty, e.g. image reviewing and toll recovery services.

### **Legislative Backing**

19. To provide legislative backing for implementing FFTS at TKO-LTT and other government tolled-tunnels and roads, we plan to introduce legislative amendments into LegCo within 2019. The legislative amendments will enable toll collection by FFTS when the relevant equipment is in place, and provide for the necessary implementation details and procedures for FFTS. Since vehicles do not need to stop for toll payment by FFTS, if a vehicle fails to pay toll, there is practical difficulty to identify the driver. To discourage toll evasion and reduce the administrative cost to recover unpaid tolls, certain measures are also proposed –

- (a) the person who is responsible for paying tolls by FFTS for using government tolled-tunnels and roads will be specified as the registered owner of a vehicle<sup>12</sup> ;

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<sup>11</sup> The service provided by Autotoll Limited will be running in parallel at individual tunnels before the implementation of FFTS at that particular government tolled-tunnels and roads. TD will maintain liaison with Autotoll Limited and operators of government tolled-tunnels and road for the transitional arrangement of discontinuation of existing Autotoll service.

<sup>12</sup> Currently under the Road Tunnels (Government) Regulations (Cap. 368A), the driver of a vehicle is required to pay toll at the toll booth for using a government tolled-tunnel.

- (b) similar to requirements currently prescribed in Tsing Ma Control Area (General) Regulation (Cap. 498B) and Tsing Sha Control Area (General) Regulation (Cap. 594A), a surcharge will be imposed on a cost-recovery basis if toll payment is not settled within the grace period (say, seven days);
- (c) for convicted toll evasion cases, subject to consultation with the Judiciary, the magistrate will be provided with the power to make an order directing the Commissioner to refuse the renewal or transfer of licence of a vehicle until the outstanding tolls and surcharges are paid;
- (d) similar to offences currently prescribed in Cap. 498B and Cap. 594A<sup>13</sup>, it will be an offence if a person willfully prevents the use of a government tolled-tunnel or road by a vehicle being detected by FFTS field equipment (such as by interfering with, damaging, or altering an IVU or tempering with FFTS equipment and related systems); and
- (e) to mandate toll payment by IVU with automatic payment upon all government tolled-tunnels and roads have been installed with FFTS.

## **Publicity**

20. To enhance motorists' awareness of FFTS and ensure that they are familiar with the payment arrangements, the Government will conduct briefing sessions for stakeholder groups<sup>14</sup> in 2019, and launch publicity campaigns in 2020 and 2021 before issuing IVUs to vehicle owners and the commissioning of TKO-LTT respectively.

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<sup>13</sup> A person who alters, interferes with or erases the coded data of an electronic toll pass (i.e. an Autotoll tag), damages an electronic toll pass or attempts to use an altered or damaged electronic toll pass for toll payment commits an offence and is liable on conviction to a fine at level 2 and to imprisonment for six months.

<sup>14</sup> For example, transport trade groups, Sai Kung District Council and Kwun Tong District Council.



## FINANCIAL AND OTHER IMPLICATIONS

21. The estimated capital cost of the proposed works under **823TH** (i.e. paragraph 2 above), which we propose to upgrade to Category A, will be about \$330.2 million in money-of-the-day (“MOD”) prices.

22. Based on the development and experience of **823TH**, the estimated capital cost of implementing FFTS at other government tolled-tunnels and roads is \$945.98 million. The cost mainly covers the provision and installation of FFTS field equipment and facilities<sup>15</sup>, development and modification of the backend software system, essential modification of existing toll plazas and the procurement of IVU tags and readers. The provision required will be reflected in the Estimates of the relevant financial years.

23. The implications on the environment, heritage, land acquisition and traffic for **823TH** are set out in **Annex D**.

## PUBLIC CONSULTATION

24. At the meeting of this Panel on 23 March 2016 and the PWSC meeting on 21 May 2016 for the funding application of **872TH** 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, and the factors which would be taken into account in determining the toll levels of TKO-LTT. The Kwun Tong District Council and Sai Kung District Council were also briefed on the possible use of electronic toll collection for TKO-LTT in 2012 and 2015 respectively.

## BACKGROUND

25. The Government upgraded **823TH** to Category B in April 2007. On 10 May 2013, the 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” an approved project estimate of \$196.0 million in MOD prices for carrying out the detailed design and site investigation for the

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<sup>15</sup> Unlike TKO-LTT, at some government tolled-tunnels, toll gantries do not need to be installed as the field equipment may be installed on existing tunnel infrastructure.

TKO-LTT and associated works. The detailed design and site investigation works have been substantially completed. On 17 June 2016, the 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.

26. The TKO-LTT project comprises the construction of an approximately 3.8-kilometre-long dual two-lane carriageway connecting Po Shun Road of TKO and the Cross Bay Link (which is under construction) in the east; with the proposed Trunk Road T2 and Cha Kwo Ling Tunnel at Lam Tin Interchange and Eastern Harbour Crossing in the west. TKO-LTT will be an alternative route to the TKO Tunnel for coping with the traffic demand arising from developments in TKO and Kwun Tong districts.

27. The Government published the Hong Kong Smart City Blueprint in December 2017, outlining strategies and initiatives to develop Hong Kong into a smart city. Smart mobility is one of the six major areas in the Hong Kong Smart City Blueprint.

## **WAY FORWARD**

28. We plan to submit the proposal for upgrading the proposed works of **823TH** detailed in paragraph 2 to Category A to the PWSC for their support, and to seeking funding approval from the FC, with a view to starting the construction in end 2019. We also target to introduce legislative amendments into LegCo within 2019 to provide legislative backing for implementing FFTS at TKO-LTT and other government tolled-tunnels and roads.

**Transport and Housing Bureau**  
**Transport Department**  
**Civil Engineering and Development Department**  
**January 2019**

圖例：  
LEGEND：

--- 工程範圍  
SITE BOUNDARY

將軍澳隧道  
TSEUNG KWAN O  
TUNNEL

將軍澳市中心  
TSEUNG KWAN O  
TOWN CENTRE

藍田  
LAM TIN

將軍澳 - 藍田隧道 (建造中)  
TSEUNG KWAN O - LAM TIN TUNNEL  
(UNDER CONSTRUCTION)

TRUNK ROAD T2 AND  
CHA KWO LING TUNNEL  
(UNDER PLANNING)

T2主幹道及茶果嶺隧道  
(規劃中)

東區海底隧道  
EASTERN HARBOUR  
CROSSING

擬建不停車繳費系統龍門架  
(設計待定)  
PROPOSED FREE-FLOW TOLLING  
SYSTEM GANTRY LOCATION  
(SUBJECT TO DESIGN)

跨灣連接路 (建造中)  
CROSS BAY LINK  
(UNDER CONSTRUCTION)

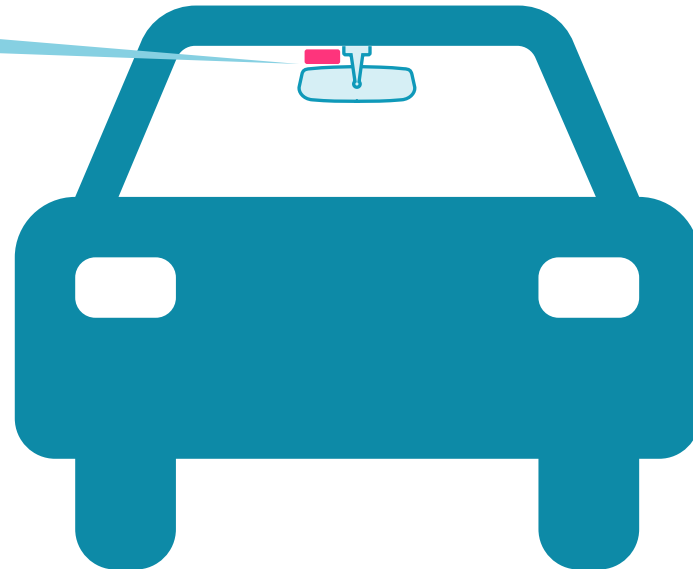
圖則名稱 drawing title

工務計劃第823TH號 - 將軍澳 - 藍田隧道  
將軍澳 - 藍田隧道餘下工程 - 不停車繳費系統分布圖

PWP ITEM NO. 823TH - TSEUNG KWAN O - LAM TIN TUNNEL  
LAYOUT PLAN OF TSEUNG KWAN O - LAM TIN TUNNEL REMAINING WORKS FOR FREE-FLOW TOLLING SYSTEM

# *In-Vehicle Unit*

The self-adhesive IVU sticker tag is affixed on the windscreen next to the rear view mirror



## Size Comparison



RFID IVU Tag

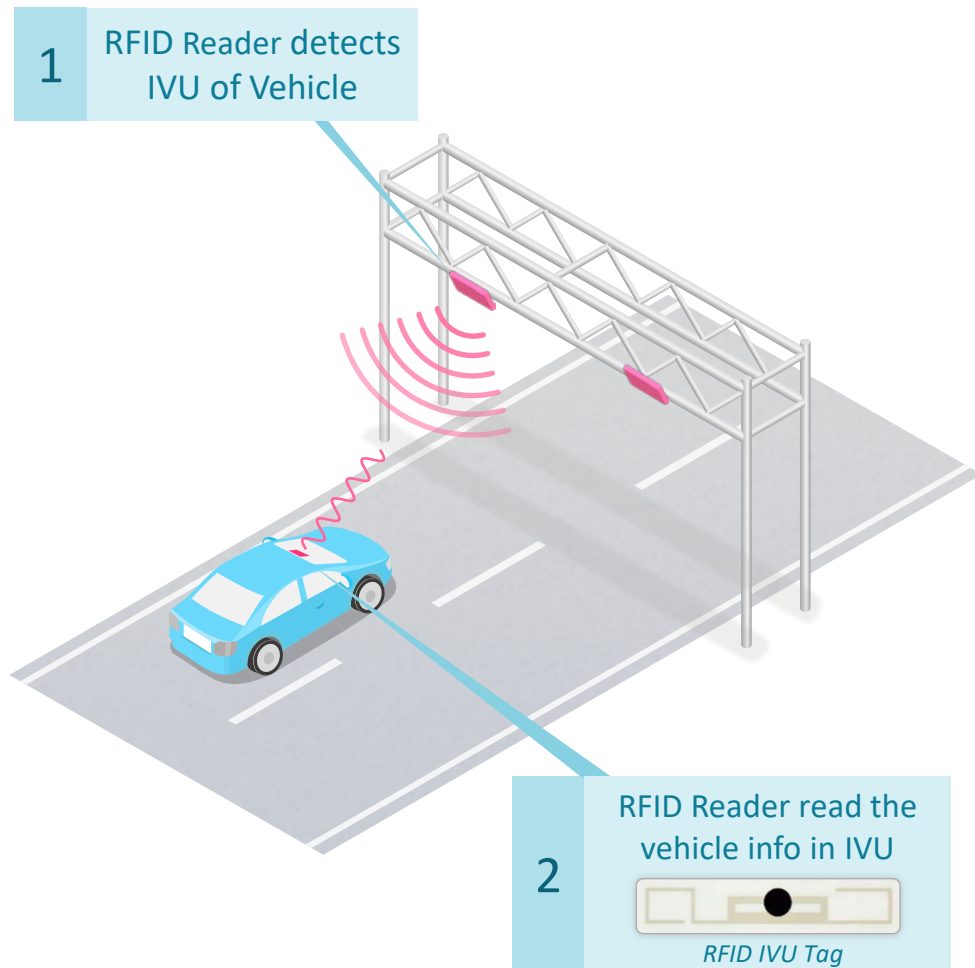


Credit Card

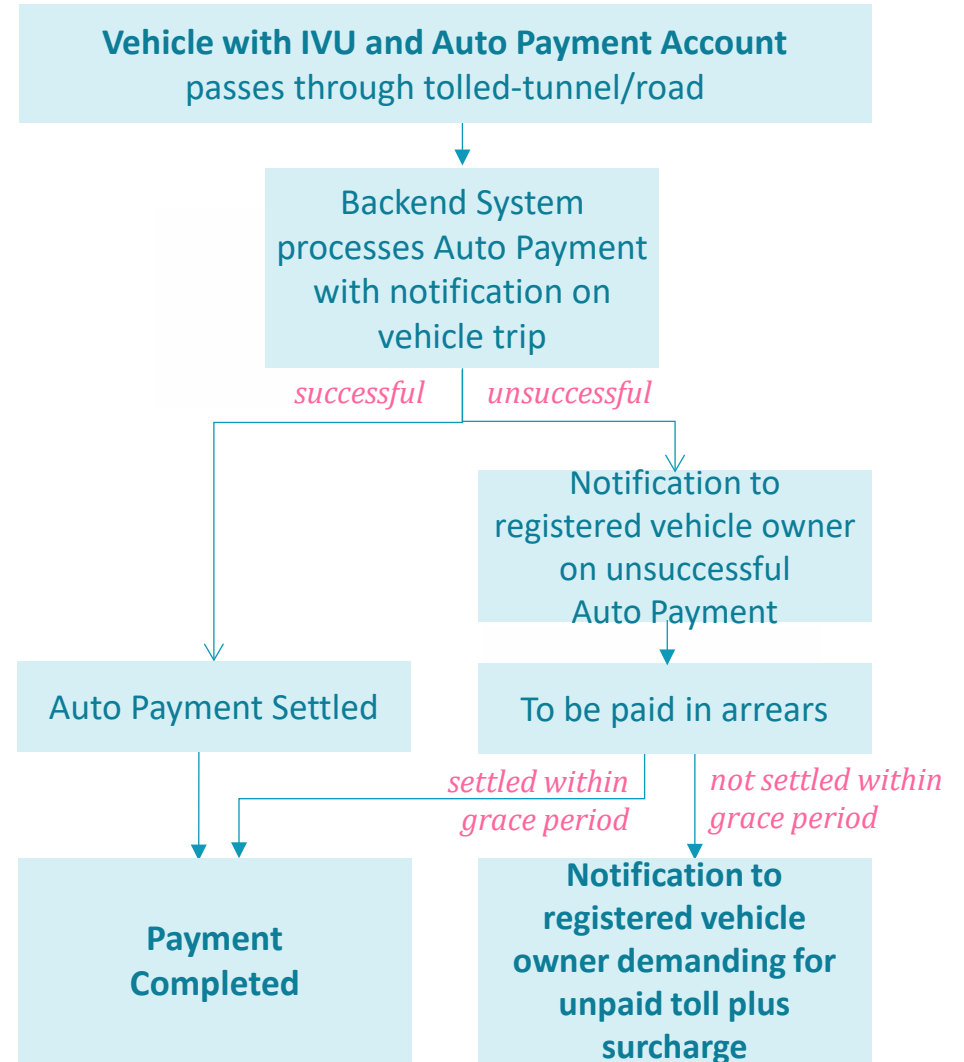
# Free-Flow Tolling System

## Vehicle with IVU

### Vehicle Detection



### Toll Payment

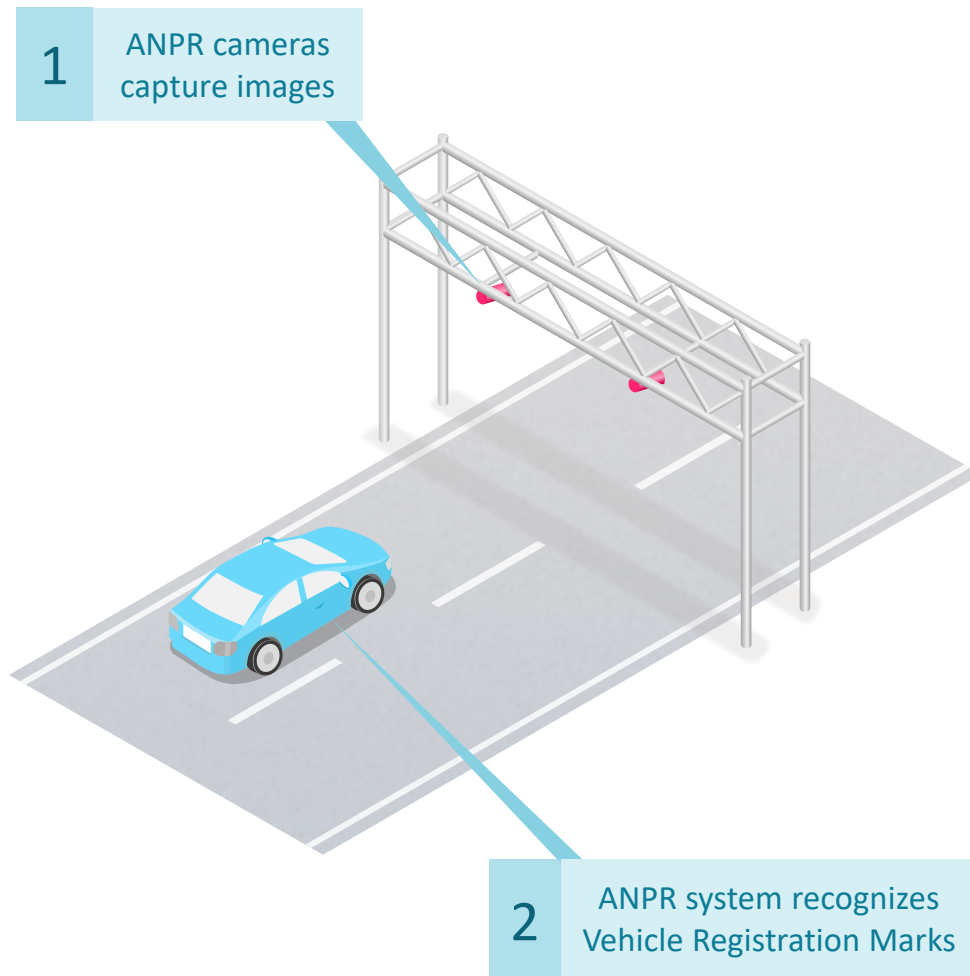


\*All pictures shown are for illustration purpose only. Actual arrangement of gantry and field equipment may vary.

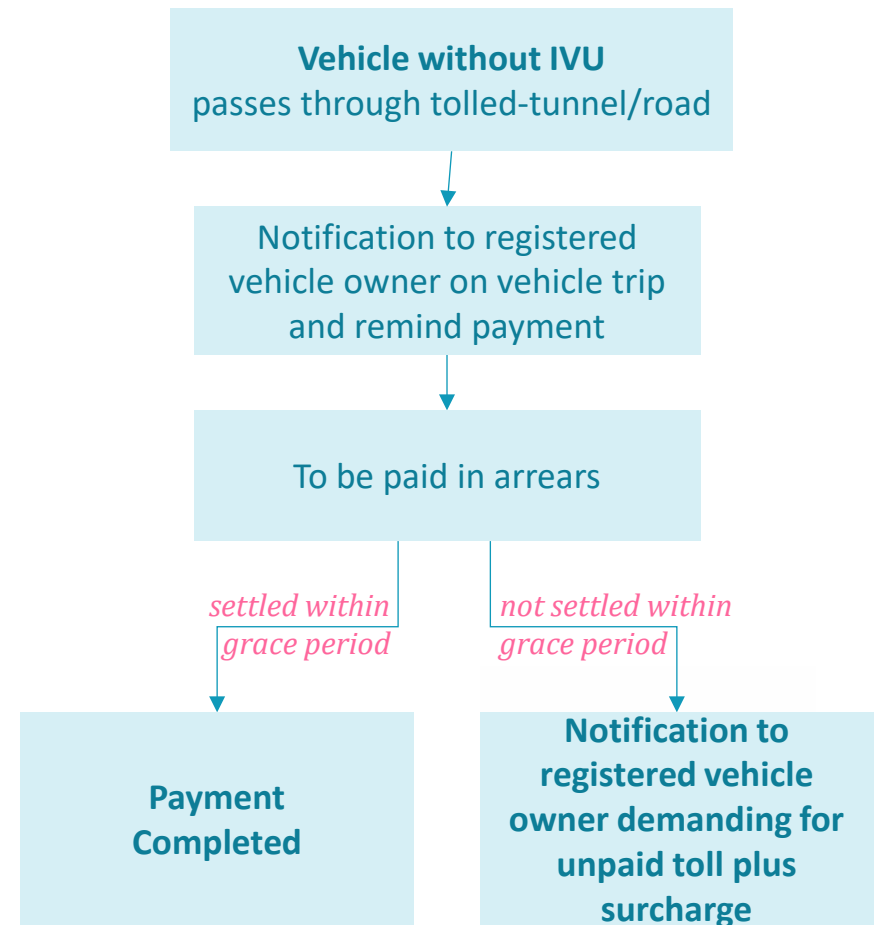
# Free-Flow Tolling System

## Vehicle without IVU

### Vehicle Detection



### Toll Payment



## **IMPLICATIONS ON THE ENVIRONMENT, HERITAGE, LAND ACQUISITION AND TRAFFIC FOR 823TH**

### **Environmental Implications**

The proposed FFTS of TKO-LTT is not a designated project (“DP”) under the Environmental Impact Assessment (“EIA”) Ordinance (Cap. 499) and will not cause any long-term adverse environmental impact. It is the remaining works of TKO-LTT project which is a DP requiring an environmental permit (“EP”) for its construction and operation. The Director of Environmental Protection approved the EIA report of TKO-LTT project in July 2013 and issued an EP in August 2013 under the EIA Ordinance.

2. During construction, Civil Engineering and Development Department (“CEDD”) will control short-term noise, dust and site run-off nuisances to within established standards and guidelines through the implementation of pollution control measures in the relevant contract. These 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.

3. At the planning and design stages, CEDD have considered adopting measures in the proposed works and construction sequences to reduce generation of construction waste where possible. In addition, CEDD will require the contractors to re-use 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<sup>1</sup>. CEDD 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.

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<sup>1</sup> Public fill reception facilities are specified in Schedule 4 of the Waste Disposal (Charges for Disposal of Construction Waste) Regulation (Cap. 354N). Disposal of inert construction waste in public fill reception facilities requires a license issued by the Director of Civil Engineering and Development.

4. At the construction stage, CEDD 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. CEDD will ensure that the day-to-day operations on site comply with the approved plans. CEDD will require the contractors to separate the inert portion from the non-inert construction waste on site for disposal at appropriate facilities. CEDD will control the disposal of inert construction waste and non-inert construction waste to public fill reception facilities and landfills respectively through a trip-ticket system.

### **Heritage Implications**

5. The proposed works will not affect any heritage site, 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**

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

### **Traffic Implication**

7. As disruption to the traffic flow due to the need of stopping the vehicles at toll booths for toll payment will be eliminated, FFTS will benefit the operations of TKO-LTT vis-à-vis other tunnels with toll booths.

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