

**For discussion
on 16 December 2016**

Legislative Council Panel on Transport
Procurement of Bridge Inspection Vehicles
for Tsing Ma Control Area and Tsing Sha Control Area

PURPOSE

This paper consults the Panel on a proposal made by the Highways Department (HyD) to procure one bridge inspection vehicle for Tsing Ma Control Area (TMCA) and one bridge inspection vehicle for Tsing Sha Control Area (TSCA).

BACKGROUND

2. There are currently one bridge inspection vehicle for each of TMCA and TSCA to facilitate the engineering staff to carry out the inspection and maintenance of bridges in the Control Areas. These two bridge inspection vehicles are specifically designed for the bridges in TMCA and TSCA. Each vehicle is equipped with an extendable arm which can be extended or moved over obstructing bridge components (e.g. main cables, suspenders, stay cables or noise barriers, etc.) in order to assist the engineering staff to reach out to the sidings and underside of the bridges to carry out inspection and maintenance. A photo showing a bridge inspection vehicle working on bridge deck is shown at Appendix 1.

3. The present situation of having only one bridge inspection vehicle at each of TMCA and TSCA is insufficient for the handling of major emergency situation occurred at the suspension bridge or cable stayed bridge in which urgent inspection and maintenance is required.

PROPOSAL

4. HyD proposes to procure one bridge inspection vehicle for TMCA and one bridge inspection vehicle for TSCA at an estimated cost of **\$27.56 million**.

JUSTIFICATIONS

5. There are four long span cable-supported bridges, namely, Tsing Ma Bridge, Kap Shui Mun Bridge, Ting Kau Bridge and Stonecutters Bridge in TMCA and TSCA (see Appendix 2). In particular, the Tsing Ma Bridge and Kap Shui Mun Bridge along the Lantau Link are suspension bridge and cable stayed bridge respectively which carry both road and railway traffic. Currently, these two bridges are the only land traffic and railway routes linking the urban areas to Lantau Island and the Airport. In case of emergency event such as major traffic accident or vessel collision causing damage to the bridges, the land transport to and from the airport will be seriously affected and the air traffic may subsequently be delayed as well. Thus, HyD needs to have sufficient bridge inspection vehicles to enable expeditious mobilisation to different locations of the bridges for carrying out detailed inspection by the engineering staff, verifying the condition of the bridge structures and implementing necessary repair works in order to ensure the road traffic can be resumed as soon as possible.

6. HyD proposes to procure one additional bridge inspection vehicle for each of TMCA and TSCA in order to enhance the ability to handle the emergency incidents below:

- (a) In the event of a major traffic accident or vessel collision at the bridge, the bridge may be damaged in different locations or directions of traffic. As there is only one bridge inspection vehicle at each Control Area currently, it is not possible to accommodate the inspection and maintenance works at different locations at the same time. The addition of a bridge inspection vehicle in each Control Area can allow two teams of engineering staff to carry out inspection and maintenance works in different sections of the bridge at the same time so as to ascertain the exact location and extent of damages and to complete the necessary maintenance work as soon as possible.

- (b) In the event of a major accident, bridges in TMCA or TSCA may be closed which cause traffic congestion between the two Control Areas. Under this situation, it is difficult for the engineering staff to mobilize the bridge inspection vehicle expeditiously from one Control Area to the other to provide support. Therefore, two bridge inspection vehicles must be provided in each Control Area to ensure adequate equipment for emergency inspection and repairing.
- (c) Major traffic accident or vessel collision may result in damage on the bridges or road surfaces in the Control Areas, making it impossible for the bridge inspection vehicle to pass through the damaged locations. Therefore, the bridge inspection vehicles in the TMCA will be stationed at Tsing Yi and Lantau Island (i.e. TMCA Tsing Yi Administration Building and TMCA parking area for working vehicles near Lantau Toll Plaza; see Appendix 3) so that the bridge inspection vehicles can be mobilized from Tsing Yi and Lantau Island respectively to reach the incident site as soon as possible. Similarly, in the TSCA, the bridge inspection vehicles will be stationed at Tsing Yi and Stonecutters Island (i.e. TSCA Nam Wan Administration Building at Tsing Yi and the works area of the East Tower of Stonecutters Bridge at Stonecutters Island; see Appendix 4) to ensure that the bridge inspection vehicles can reach the incident site expeditiously from both Tsing Yi and Stonecutters Island respectively to avoid delay in inspection and maintenance work.

7. Besides, the provision of additional bridge inspection vehicles can also enhance the routine inspection and maintenance works of the bridge structures in TMCA and TSCA. At present, each bridge inspection vehicle is required to be maintained, inspected and repaired at the depot regularly. During this period, the bridge inspection vehicle will not be available for use. In this regard, if there are two bridge inspection vehicles in each Control Area, in the event of breakdown or inspection and maintenance of one of the vehicles, the other bridge inspection vehicle will still be available for use by the engineering staff to undertake the inspection and maintenance work of the bridge structures, thereby enhancing inspection and maintenance efficiency.

8. While the management, operation and maintenance of TMCA and TSCA have been contracted out, the Government is responsible for

providing the necessary vehicles and equipment for the operators to ensure efficient and effective inspection and maintenance of the highway facilities in these two Control Areas. The Government, as the owner of the vehicles, would ensure smooth and flexible changeover of the vehicles from one operator to another upon expiry or termination of a contract.

FINANCIAL IMPLICATIONS

Capital Expenditure

9. HyD estimates the capital expenditure of procurement of the two bridge inspection vehicles to be \$27.56 million. The amount would be reflected in the Estimates of the relevant years. The relevant breakdown is as follows –

	Quantity	Sub-total (\$ '000)	Total (\$ '000)
(a) Bridge inspection vehicles			22,800
(i) TMCA	1	11,400	
(ii) TSCA	1	11,400	
(b) Electrical and Mechanical Services Trading Fund (EMSTF) project management charges			3,620
(c) Contingency (5% of item (a) above)			1,140
		Total	27,560

10. Regarding paragraph 9(a) above, the estimated cost of \$22.8 million is for the manufacturing, assembly, testing and commissioning, as well as operation and maintenance training for the two bridge inspection vehicles.

11. Regarding paragraph 9(b) above, the estimated cost of \$3.62 million is for meeting the charges of the EMSTF for managing the project, which includes preparing the design, specifications and tender documents; overseeing the tendering process; undertaking site inspection; monitoring the fabrication, testing and commissioning of the vehicles and monitoring any defect rectification work by Electrical and Mechanical Services Department (EMSD).

12. Regarding paragraph 9(c) above, the estimated cost of \$1.14 million is the contingency to cater for uncertainty in market price fluctuation and currency exchange, which is 5% of the expenditure at paragraph 9(a) above.

13. The estimated cash flow requirement is as follows –

Financial Year	\$ '000
2017 – 2018	5,512
2018 – 2019	19,292
2019 – 2020	-
2020 – 2021	2,756 ¹
Total	27,560

Recurrent Expenditure

14. The recurrent cost for the operation and maintenance of the two proposed bridge inspection vehicles will be \$848,000 per annum from 2020-21 onwards. The required recurrent expenditure would be reflected in the Estimates of the relevant years.

15. According to existing policy, the operating cost of Government tolled roads should be recovered through toll charges. Since the depreciation

¹ The cash flow requirement in financial year 2020-21 is for the remaining payment after expiry of the warranty period.

costs of the proposed procurement of one of the bridge inspection vehicles are part of the operating costs of Lantau Link, it will be taken into account when setting the toll charges for Lantau Link in future. The procurement of the other bridge inspection vehicle is for the use of Stonecutters Bridge which is a toll-free bridge.

IMPLEMENTATION PLAN

16. HyD plans to commence the proposed procurement of bridge inspection vehicles together with EMSD and Government Logistics Department (GLD) in the second quarter of 2017. The overall procurement process will be co-ordinated and undertaken by HyD and will take about 20 months to complete. The process includes preparation of tender documents, tender, assessment of tenders and award of contract, design and manufacturing, testing and delivery of vehicles, etc. The implementation plan is scheduled as follows –

	<u>Activities</u>	<u>Target completion date</u>
(a)	Preparation of tender documents - EMSD will prepare the tender documents with relevant information provided by HyD	May 2017
(b)	Tender, evaluation and award of contract - GLD will conduct the tender with the assistance of HyD and EMSD in tender evaluation. GLD will be responsible for awarding the contract	October 2017
(c)	Manufacturing, testing and delivery of vehicles - The design and manufacturing of the bridge inspection vehicles will be carried out by the awarded contractor. After the manufacturing, HyD and	December 2018

EMSD will jointly undertake the testing of the bridge inspection vehicles. Finally, the contractor will deliver the bridge inspection vehicles and train the relevant operators of the vehicles.

- (d) Commissioning of bridge inspection vehicles January 2019
- Under the supervision of HyD and EMSD, the bridge inspection vehicles will be handed over to the TMCA and TSCA Operators for commissioning.

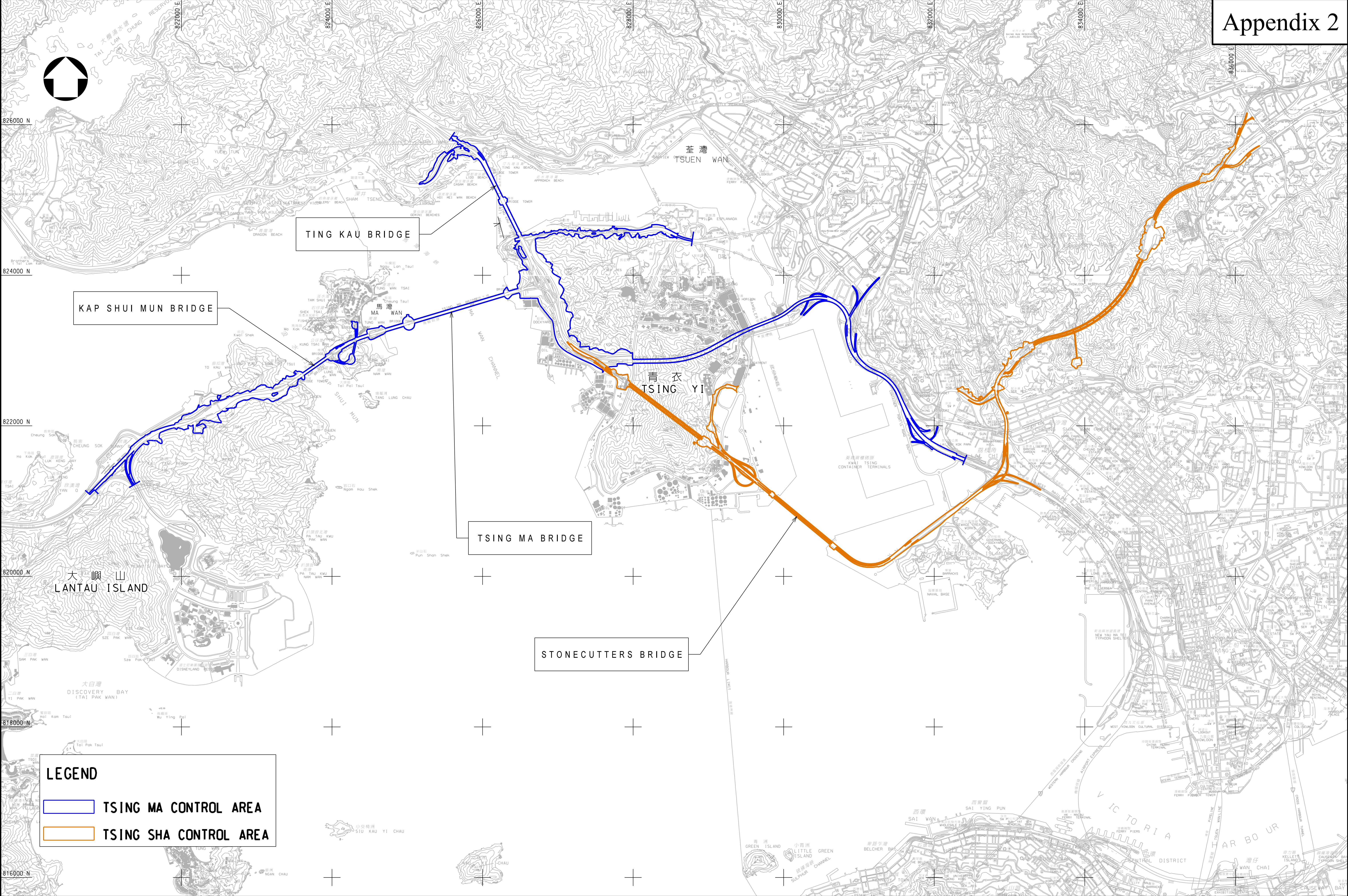
ADVICE SOUGHT

17. Members' views and support are sought on the proposal to procure one bridge inspection vehicle for TMCA and one bridge inspection vehicle for TSCA.

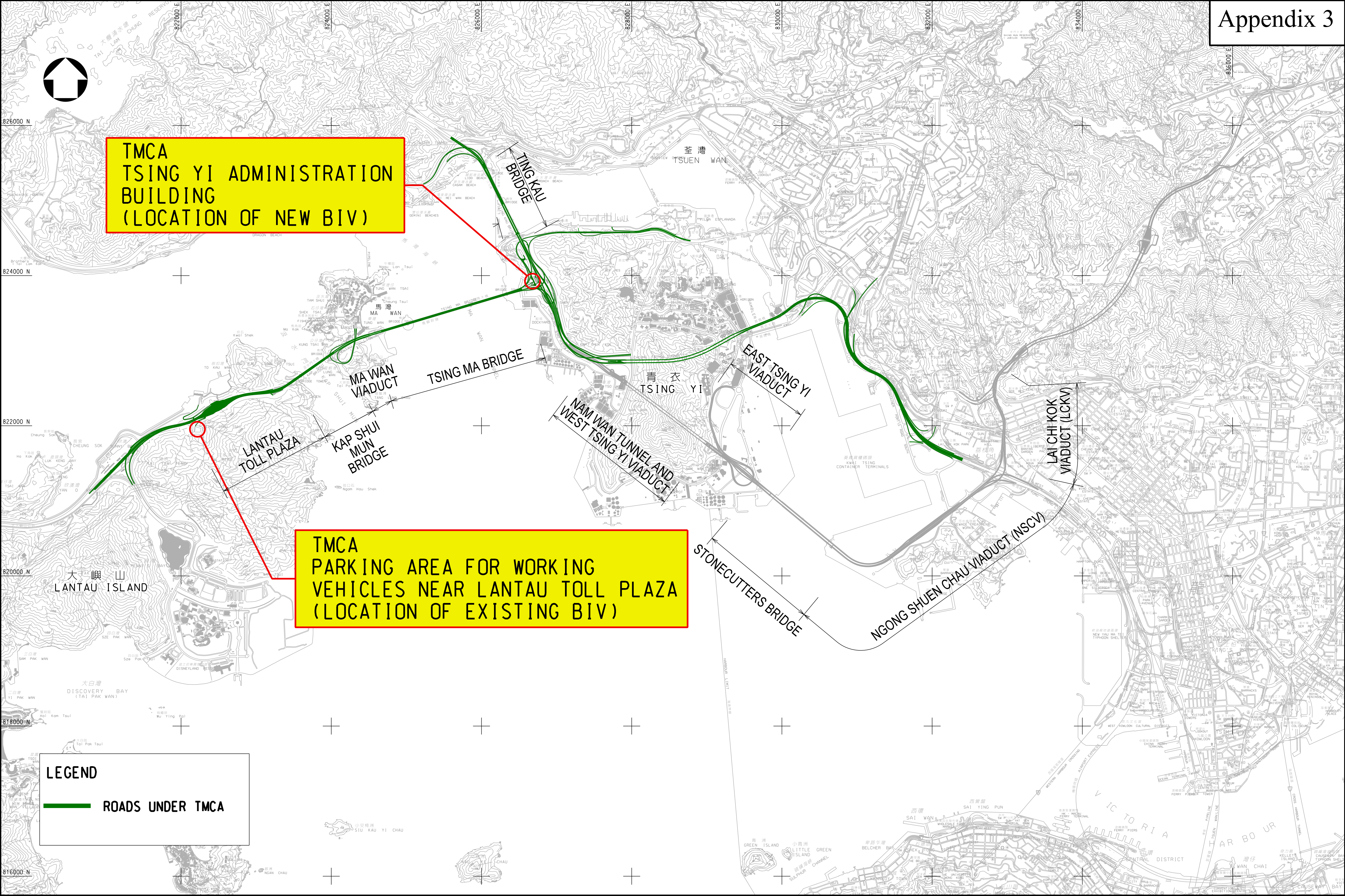
**Transport and Housing Bureau
Highways Department
December 2016**



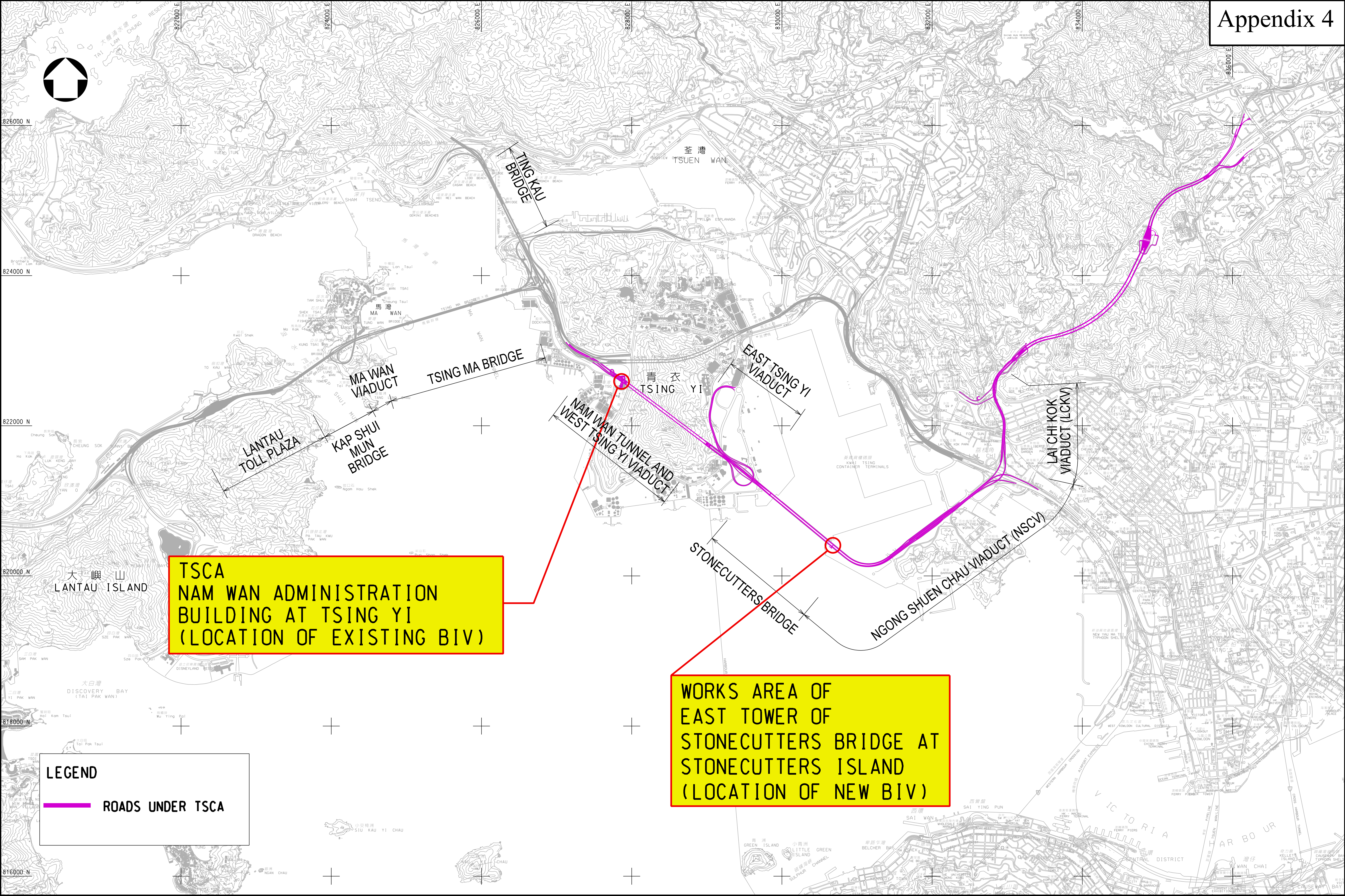
BRIDGE INSPECTION VEHICLE



TSING MA CONTROL AREA AND TSING SHA CONTROL AREA



LOCATIONS OF BRIDGE INSPECTION VEHICLES (BIV) IN TSING MA CONTROL AREA (TMCA)



LOCATIONS OF BRIDGE INSPECTION VEHICLES (BIV) IN TSING SHA CONTROL AREA (TSCA)