For discussion
on 23 March 2016

Legislative Council Panel on Transport

Relocation of Transport Department's Operation Centres to the West Kowloon Government Offices

PURPOSE

This paper seeks Members' support for seeking funding from the Finance Committee ("FC") on the proposal of relocating the following operation centres of the Transport Department ("TD") to the West Kowloon Government Offices ("WKGO"):

(i) the three Area Traffic Control Centres ("ATCCs") in Harbour Building ("HB"), Immigration Tower ("IT") and Kowloon Government Offices ("KGO");

(ii) the Emergency Transport Coordination Centre ("ETCC") in IT; and

(iii) the Traffic Control & Surveillance Systems Centre ("TCSSC") in IT.

BACKGROUND

2. On 5 June 2015, the FC approved the WKGO construction project which will provide accommodation for, amongst others, TD's operation centres mentioned in paragraph 1 above. The location plan of WKGO and the existing operation centres are shown in the **Enclosure**.

3. The Area Traffic Control ("ATC") system uses a central computer to coordinate the operations of on-street traffic signals on a regional basis. It aims at providing a series of green signals for vehicles passing through

various signalised junctions, so as to achieve smooth traffic flow by minimising stops and delays of vehicles at traffic signals. The ATC system also allows TD's staff at the ATCCs to monitor and adjust on-street traffic signals timing in real time having regard to the traffic conditions, particularly to alleviate traffic congestion arising from major traffic incidents. Currently, there are four ATC systems for different parts of Hong Kong, to which some 1 800 signalised junctions throughout the territory are connected –

(a) Hong Kong Island ATC system;

(b) Kowloon, Tsuen Wan, Sha Tin, Tseung Kwan O ATC system;

(c) Tai Po & North Districts ATC system; and

(d) Tuen Mun & Yuen Long ATC system.

These four ATC systems are located in the three aforementioned ATCCs[1], where traffic signals are monitored and controlled by TD's staff in real time.

4. ETCC coordinates the actions and responses of different government departments and public transport operators in emergency situations and during major events which have significant traffic implication, to ensure smooth traffic flow and adequate public relief measures. ETCC also disseminates traffic and incident information to the public through the media to minimise the traffic impact of an incident. The ETCC is manned by TD's staff round the clock to handle traffic incidents and events which have traffic implications. The Traffic and Incident Management System being developed, which is a computerised system to facilitate traffic and transport incident management and dissemination of real-time traffic and transport information to the public, will be commissioned later in 2016 to support the work of ETCC staff, and is a critical system of TD.

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[1] Hong Kong Island ATC system is located in the ATCC in HB. The Kowloon, Tsuen Wan, Sha Tin, Tseung Kwan O ATC system is located in the ATCC in KGO. The Tai Po & North Districts ATC system and the Tuen Mun & Yuen Long ATC system are located in the ATCC in IT.

5. TCSSC manages the Traffic Control and Surveillance Systems ("TCSS") installed at strategic roads and bridges which have no on-site control centre[2]. These TCSS comprise CCTV cameras, vehicle detectors, variable speed limit signs ("VSLS"), lane control signals ("LCS") and variable message signs ("VMS") installed on highways and bridges with central computer facilities to help monitor and control traffic flows. When there is a road incident, TCSS can facilitate TD or the management, operation and maintenance ("MOM") contractor of tunnel / bridge / tolled road to identify it through CCTV. They will then activate changes of appropriate LCS to indicate closure of traffic lanes, adjust VSLS to reduce speed limits and disseminate traffic information through VMS to alert motorists at the upstream. Upon clearance of the incident, TD or the MOM contractor concerned will resume all LCS, VSLS and VMS to their normal states. Currently, the TCSS on the Shenzhen Bay Bridge and the Tolo and Fanling Highways (section between Ma Liu Shui and Tai Hang) are not managed by any MOM contractor and are managed by the TCSSC, which will also operate the TCSS that will be installed at the Hong Kong Link Road connecting the Hong Kong-Zhuhai-Macao Bridge with the Hong Kong Boundary Crossing Facilities.

PROPOSAL

6. We propose to relocate the existing ATCCs, ETCC and TCSSC to the new co-located operation centre in WKGO, with a backup centre for the ATCCs to be set up in HB. In addition, a unified interface, which is elaborated in paragraphs 10 to 11, will be provided for accessing all four ATC systems upon relocation. New equipment will be provided at the co-located operation centres to enhance the capability of the various systems in handling traffic management. Telecommunication line will also be redirected. The proposal will be at an estimated non-recurrent cost of $129,303,000.

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[2] On-site control centres are premises located at or near strategic roads and bridges equipped with TCSS, and provided with personnel to perform TCSS operations. For example, the Tsing Sha Control Area in Route 8 is equipped with TCSS and has an on-site control centre to operate the TCSS.

JUSTIFICATIONS

Relocation of Operation Centres

7. As all TD's offices are required to be vacated from IT and move into WKGO upon the latter's completion, at the very least the Tai Po & North District and the Tuen Mun & Yuen Long ATC systems, the ETCC and the TCSSC (which are now located in IT) will have to be relocated to WKGO. It would enable staff and other resources to be used most efficiently and would be in the best interest of effective overall monitoring of the entire territory's traffic situation and handling of cross-district traffic incidents if the other operation centres, now located in HB and KGO, to be accommodated in WKGO as well.

8. The relocation of the four systems in ATCCs, one system in ETCC and three systems in TCSSC to the new co-located centre in WKGO involves dismantling, relocating and assembling sophisticated computer systems and telecommunication equipment. The relocation project is complex and requires a high level of expertise and accuracy in its planning, design, and coordination because eight traffic control systems are involved. In particular, as these systems are crucial in assisting TD's work on traffic management, their relocation has to be properly arranged to minimise disruption to services. Specialist consultants will thus be employed to carry out the planning, design, tendering, and supervision of the associated re-location work.

9. In addition, there are currently some 700 CCTV cameras installed at major road junctions and strategic road sections to capture real time traffic images. These CCTV cameras are connected to several discrete CCTV systems operated by different user interfaces, depending on the time at which the cameras were procured. The CCTV systems are in turn connected to the ATCCs, ETCC and TCSSC, providing real-time traffic images to TD's staff at these centres to perform traffic management duties such as traffic monitoring, adjustment of traffic signals, incident handling and information dissemination, etc. Upon relocation of the operation centres to WKGO, these discrete CCTV systems will be aligned and connected to a centralised CCTV system operated under a unified user interface to facilitate the operation of the various operation centres at the WKGO.

Unified Interface for ATC Systems

10. Due to different brands and implementation times of the four ATC systems[3], their system software and hardware are different and have different user interfaces. TD staff operating one ATC system have to undergo training in order to be able to operate the other ATC systems. Staff familiar with one ATC system cannot be deployed to operate another ATC system they are unfamiliar with, handicapping efficiency in utilising staff resources.

11. Upon relocation of the three ATCCs to WKGO, a unified graphical user interface ("GUI")[4] for accessing all the four ATC systems will be developed to achieve efficiency gain through sharing of the operation resources. To materialise a unified GUI, the software and hardware of ATC systems of the same brand will be aligned to the same version / capability. The unified GUI will be capable of accessing different brands of the ATC system to facilitate operations. Operators will be trained to operate the unified GUI instead of separately trained to operate individual ATC systems. A smaller number of categories of software / hardware in the ATC systems will also reduce maintenance overheads. Hence, manpower and other resources can be more efficiently and flexibly deployed to meet the fluctuating workload of ATC system operations, including deploying more staff for particular districts to deal with major events and traffic-related incidents.

Backup Centre for ATCCs

12. At present, the three ATCCs operating respectively in HB, KGO and IT provide backup functions for each other. In the event that one of the ATCCs cannot be accessed, commands for operating traffic signals and CCTV images can be made available at other ATCCs.

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[3] Hong Kong Island ATC system was implemented in 2006; Kowloon, Tsuen Wan, Sha Tin, Tseung Kwan O ATC system in 2012; Tuen Mun & Yuen Long ATC system in 2009; and Tai Po & North Districts ATC system in 2005 which is now being renewed. Two brands of ATC system are currently employed.

[4] A GUI is an interface appearing on the computer screen, which allows users to interact with the system through graphical icons.

13. Upon relocation of the ATCCs to WKGO, an off-site backup centre in HB will have to be set up to allow continuous operation of traffic signals and CCTV images in the event that serious incidents occurred in WKGO, e.g. outbreak of fire, which cause damage to the equipment or other unexpected adverse consequences, the equipment in the backup centre will allow limited ATC systems operation, e.g. 200 critical signal junctions, to be resumed in the shortest possible time. The archives stored in the backup centre will allow complete recovery of the ATC systems when the damage of the computer equipment in WKGO has been repaired. We consider HB the most suitable location for the backup centre because the existing facilities on Hong Kong Island ATCC could be re-used as far as possible.

14. As regards the ETCC and TCSSC, their off-site backup centres currently located at the Mong Kok Government Offices will continue to serve the purpose.

Provision of New Equipment and Redirection of Telecommunication Lines

15. The existing equipment and facilities at the ATCCs in the HB, IT and KGO, including video walls, uninterruptible power supply ("UPS"), operator terminals and ancillary equipment, were acquired through different projects at various times over the past decades. Most of them will have been operated for ten to 13 years by the time of relocation. While we shall re-use serviceable equipment as much as practicable[5], new video walls and equipment ancillary to the video walls will need to be set up in WKGO.

16. Upon relocating the operation centres to WKGO, all the existing telecommunication lines connecting the on-street traffic signal controllers and CCTV cameras on Hong Kong Island ("HKI") have to be extended across the harbour to WKGO. In order to reduce telecommunication costs, a telecommunication hub on HKI is required for termination and concentration of the existing ATC and CCTV telecommunication lines on

[5] For instance, the existing UPS in HB and video walls in IT will be refurbished and re-used in the HB backup centre.

HKI before transmitting to WKGO[6]. HB is considered the most suitable location for providing the telecommunication hub function as all the existing ATC and CCTV telecommunication lines on HKI already terminate at HB. Hence, the proposed off-site backup centre for the ATCCs in HB will also serve as the telecommunication hub of the ATC and CCTV cameras on HKI.

FINANCIAL IMPLICATIONS

Non-recurrent expenditure

17. It is estimated that the non-recurrent expenditure of the proposal will be $129,303,000 over five financial years from 2016-17 to 2020-21. The breakdown is as follows :

		($'000)					
	Items	**2016-17**	**2017-18**	**2018-19**	**2019-20**	**2020-21**	**Total**
(a)	Relocate equipment in TD's operation centres to WKGO	0	0	0	19,507	19,507	39,014
(b)	Re-direct telecommunication lines and establish a backup centre in HB	0	0	0	10,828	10,829	21,657
(c)	Alignment and integration of ATC systems and CCTV systems	0	0	0	9,474	9,474	18,948

[6] Currently, traffic signal controllers and some CCTV cameras on HKI are connected point-to-point to the Hong Kong Island ATCC in HB. Upon relocation, instead of moving all individual ends of telecommunication lines now connecting to HB to WKGO directly, we will keep the ends in HB, gather the data before relaying them to WKGO via high speed data lines.

(d)	Provision of video walls and ancillary equipment at WKGO	0	0	0	11,502	11,502	23,004
(e)	Project management	350	1,751	1,751	7,401	5,166	16,419
(f)	Contingency	0	0	0	0	10,261	10,261
	Total	**350**	**1,751**	**1,751**	**58,712**	**66,739**	**129,303**

18. On paragraph 17(a) above, the estimated expenditure of $39.01 million is for dismantling, transporting, reconnecting, testing and commissioning of all related equipment, including various generations/types of ATC and CCTV systems in the three existing ATCCs in HB, KGO and IT, and the existing ETCC and TCSSC in IT for traffic signals control at WKGO.

19. On paragraph 17(b) above, the estimated expenditure of $21.66 million is for the following items:

(i) re-direction of telecommunication lines for connecting the on-street traffic signal controllers, CCTV cameras and other field equipment from the three existing ATCCs in HB, KGO and IT, and the existing ETCC and TCSSC in IT to WKGO; and

(ii) establishment of the backup centre and telecommunication hub in HB.

20. On paragraph 17(c) above, the estimated expenditure of $18.95 million is for the following items:

(i) alignment and integration of the operating systems, traffic control application software and system hardware of the four ATC systems. Latest version available in the industry for all four ATC systems will be adopted so that a unified user interface can be provided; and

(ii) alignment and integration of various CCTV systems to a new centralised CCTV system with a unified user interface.

21. On paragraph 17(d) above, the estimated expenditure of $23.00 million is for the provision of unified video walls, UPS for various systems in the operation centres, and operator terminals amongst other ancillary equipment required in the WKGO operation centre.

22. On paragraph 17(e) above, the estimated expenditure of $16.42 million is for meeting the project management cost for the relocation project, which includes employment of specialist consultants for preparing tender documents, overseeing the tendering process, undertaking contract management, supervising the relocation and installation works, and testing and commissioning the new systems in the operation centres, including the backup centres.

23. On paragraph 17(f) above, the estimated expenditure of $10.26 million represents a 10% contingency on the items set out in paragraphs 17(a) to (d).

Recurrent expenditure

24. The estimated annual recurrent expenditure for maintaining the relocated and integrated systems in WKGO will be $63.4 million, which is $6.6 million higher than that of the existing systems. The annual recurrent expenditure will be absorbed by TD.

IMPLEMENTATION PLAN

25. If funding could be secured in the second quarter of 2016, we plan to start the implementation of the project in the third quarter of 2016 for completion by the third quarter of 2020. The proposed programme is as follows :

	Activity	Target Completion Date
(a)	Select and employ consultants	First quarter 2017
(b)	Complete the review and strategy formulation	Third quarter 2017
(c)	Complete detailed design and preparation of tenders documents	Third quarter 2018
(d)	Invite tenders	Third quarter 2018
(e)	Award contracts	First quarter 2019
(f)	Commence site installation	Fourth quarter 2019
(g)	Effect changeover and removal	First quarter 2020
(h)	Complete fine-tuning and remaining work	Third quarter 2020

WAY FORWARD

26. Subject to Members' views, we plan to seek FC's funding approval as early as practicable.

ADVICE SOUGHT

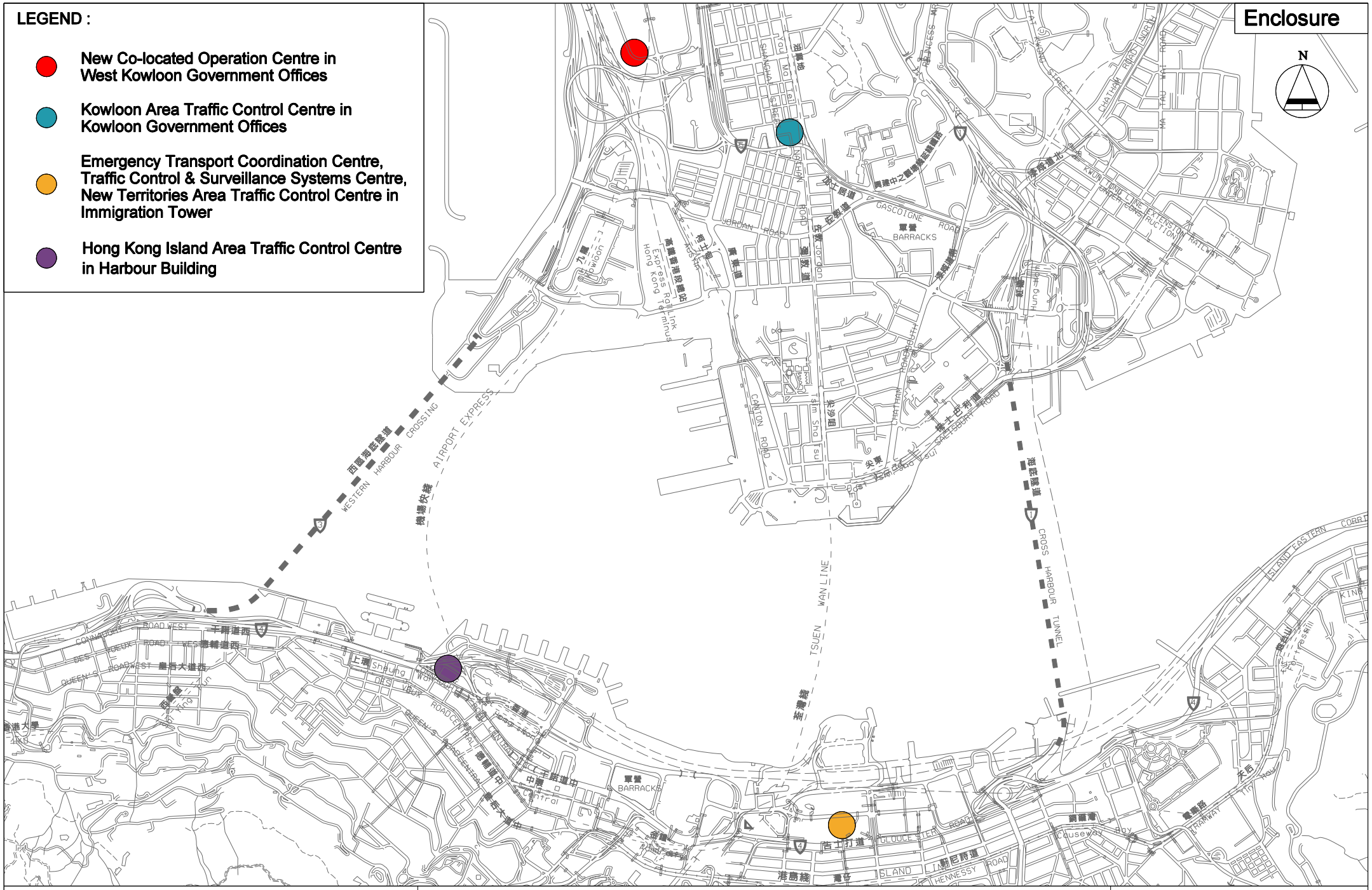
27. Members are invited to provide comments and support the proposal.

Transport and Housing Bureau
Transport Department
March 2016

Enclosure

LEGEND :

- New Co-located Operation Centre in West Kowloon Government Offices
- Kowloon Area Traffic Control Centre in Kowloon Government Offices
- Emergency Transport Coordination Centre, Traffic Control & Surveillance Systems Centre, New Territories Area Traffic Control Centre in Immigration Tower
- Hong Kong Island Area Traffic Control Centre in Harbour Building



The Location Plan of West Kowloon Government Offices

Relocation of Transport Department's Operation Centres to the West Kowloon Government Offices

運輸署
Transport Department