

For the T2 Traffic Control and Surveillance System (TCSS) project to subdivide 14 nos of sub-system as below:

## **1. Central System Software**

The central system consists of computer and networking hardware with associated operating and application software and operational facilities. The System is configured to conform to the following criteria:

- (i) Availability/Reliability/Self Monitoring
- (ii) Usability and Security with built in Safety Verification
- (iii) High Performance
- (iv) Scalability
- (v) Especially for all requirements related to the integration with the completed TKOLTT TCSS system, this would be quite different from the implementation of other TCSS projects.

## **2. Traffic Control Devices**

The purpose of the Trunk Road T2 Traffic Control Device is to facilitate the optimal use by TCSS Central System to improve traffic flow while ensuring motorist safety. To meet this purpose, the signs are generally designed for performance; ease of access, maintenance, and installation.

## **3. Communications System**

The Communication System (CS) consists of a single network to cover both the tunnel area and the adjacent field equipment related to tunnel operation, which should provide the functions of Exchange of field equipment status, Exchange of traffic data from detection system, Exchange of CCTV video and Synchronization of Master Clock. The CS is based on a high-speed Ethernet network with self-healing technology. This Ethernet network is designed to carry all TCCS services in the tunnel and on the open road.

## **4. Closed Circuit Television Surveillance**

The CCTV subsystem for Trunk Road T2 will be connected to the central control equipment provided by TKOLTT TCSS contract such that the control and monitoring of Trunk Road T2 CCTV cameras will be performed by the central control equipment at the ADB.

A total digitized CCTV subsystem including on-site Pan-tilt-zoom CCTV cameras, fixed camera and Video Control Subsystem for Trunk Road T2 TCSS. The CCTV cameras will be terminated at local control cabinet in the immediate vicinity of the cameras to facilitate its connection to T2 COMMS network. The cameras will include mounting brackets and water tank for fixing on gantry/enclosure, lighting pole, underpass and tunnel.

## **5. Building PABX System**

PABX is a business solution for companies that need many lines for in-house and outside calls. It allows companies to use a single access number that has several extensions.

A company that uses PABX acts like a telephone exchange. PABX automates the switching tasks needed to connect calls between extensions.

For T2 TCSS about Building PABX System which covers the following topics:

1. General System Requirement;
2. Installation of Main Distribution Frames;
3. Extension telephones;
4. Sub-PABX;
5. Testing and Commissioning;

## **6. Emergency Telephone Subsystem**

Emergency Telephone System for Trunk Road T2 - Traffic Control and Surveillance System and Associated Works in tunnel which covers the following topics:

1. General System Requirement
2. Installation of Main Distribution Frames;
3. ET Handset;
4. Public Switch Telecommunications;
5. Testing Commissioning;

## **7. Public Address System**

The Public Address System is part of Trunk Road T2 TCSS. The system is to facilitate smooth and stable communication within and between individual buildings in ordinary and emergency situation.

The public system covers:

1. Ventilation Buildings
2. Tunnel Portals
3. Service Gallery
4. Kiosks F

## **8. Radio System**

The Radio System provided shall consist of the following sub-systems:

- a) Operation and Maintenance (O&M) Radio System
- b) HK Police Force (HKPF) radio systems
- c) Fire Services Department (FSD) radio systems
- d) Radio Distribution Network (RDN) to transmit the radio signals to cover the designated areas

All radio equipment will type approved by the Office of the Communication Authority (OFCA), the type approval certificate will be submitted in due course once equipment supplier has been identified.

Re-broadcasting System with break-in for AM and FM systems, FSD, HKP & O&M signal source will be provided by TKO-LTT TCSS contract (No. NE/2017/06) and extended by T2 contractor by either passive feeder cable or Optical Master Unit and Optical Amplifier to cover the required T2 areas.

## **9. Detection System**

Overhead video-based Vehicle Detection Cameras will be installed at various locations of the highway and tunnel including ramps and slip roads to perform principally two functions on a lane-by-lane basis, namely Real-time Traffic Data Collection and Automatic Incident Detection.

Real-time Traffic Data Collection includes the acquisition of vehicle count, vehicle length (as vehicle counts in at least 3 pre-defined and user-configurable length-based bins), vehicle occupancy as a percentage of the time in the reporting interval that is covered by vehicles and average vehicle speed measured over the reporting interval.

The traffic data will be obtained at a regularly but configurable time interval. The data will then be transmitted to the Vehicle Detection of TKO-LTT for further analysis and traffic data display.

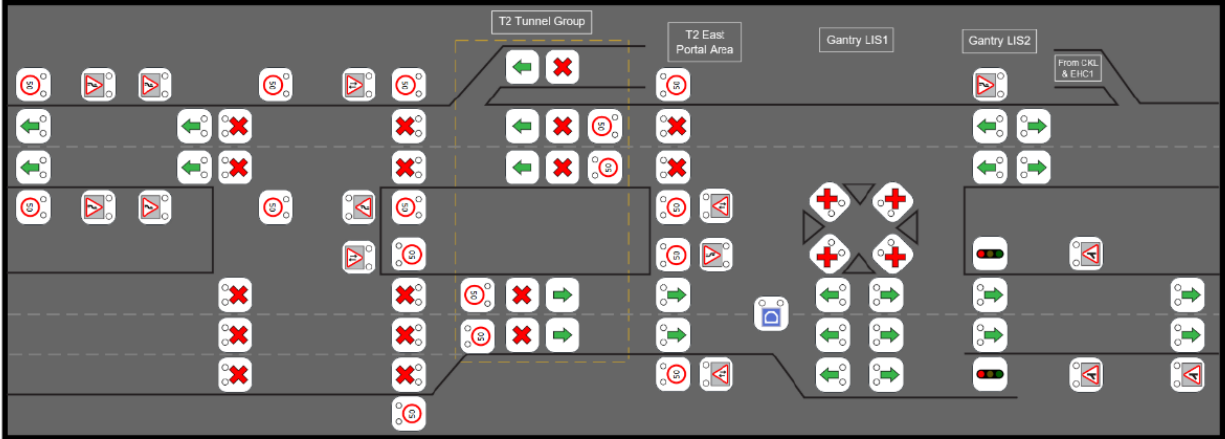
## **10. Manual Fallback Control System**

The Manual Fallback Control System (MFCS) component of the ED/2020/03 – Trunk Road T2 Tunnel Traffic Control and Surveillance System (T2 TCSS) acts as a backup to the Central Computer System. It is designed to integrate seamlessly with the normal control and monitor mechanisms yet still be able to “take over” should the occasion arise. A sample screenshot of the MFCS is shown as below:

MFCPS PANEL  
Active

Traffic Plan (T2)

TRAFFIC PLAN



It is understood that the contract of TKO-LTT would provide a complete set of central hardware for this contract. This set of hardware will be used to perform all site commissioning and local tests before allow everything connecting back to TKO-LTT system (i.e., switchover to make TKO-LTT / T2 back to one single system).

### 11. Operation Facilities

The Video Wall Display is clearly viewable from all operator locations in the central control room. Ethernet Switches to be installed by T2 to connect CCTV decoder. CCTV monitor to be installed for displaying T2 Cameras.

The CCTV monitors on the Video Wall Displays should be arranged in structurally sound interlocking banks and integrated with the Large LCD Display Panels. CCTV monitors will be installed on video wall enclosure.

### 12. Enforcement System

Speed enforcement cameras were introduced in tunnel that are used for calls for service for the apprehension of criminals or prevention of criminal violations and investigation of illegal actions within the tunnel.

For Speed Enforcement Camera System, stipulates to be deployed on a rotational basis across eight sites and integrates with the backend server equipment of the TKO-LTT contract.

### 13. Power Distribution System

The Power Distribution System should distribute power supply to all Trunk Road T2 Traffic Control and Surveillance System (TCSS) equipment installed in open roads, buildings, kiosks, service gallery, CKR underpass and tunnel from the power points (single/three phases power) provided by various interfacing civil contractors and E&M contactors in various areas, including:

- T2 West Portal
- T2 East Portal
- T2 West Ventilation Building (WVB)
- T2 East Ventilation Building (EVB)
- Main Tunnel & Branch Tunnel
- Western Approach Road
- LT interchange
- Service Gallery
- Operator Kiosk C
- Operator Kiosk F
- CKR Underpass S21
- TKO-LTT West Ventilation Building (WVB)
- TKO-LTT & T2 Administration Building

### 14. Optical Fibre System

The Government Optical Fibre System (GOFs) should be configured as separate fiber cable through eastbound and westbound tunnel tube to ensure continuous communication and connectivity services for the Third Party.

The whole GOFs involves various sections and civil contracts, including Central Kowloon Route, Trunk Road T2, Tseung Kwan O – Lam Tin Tunnel

- Tseung Kwan O Interchange (NE/2017/01) and CBL.

#### Legends

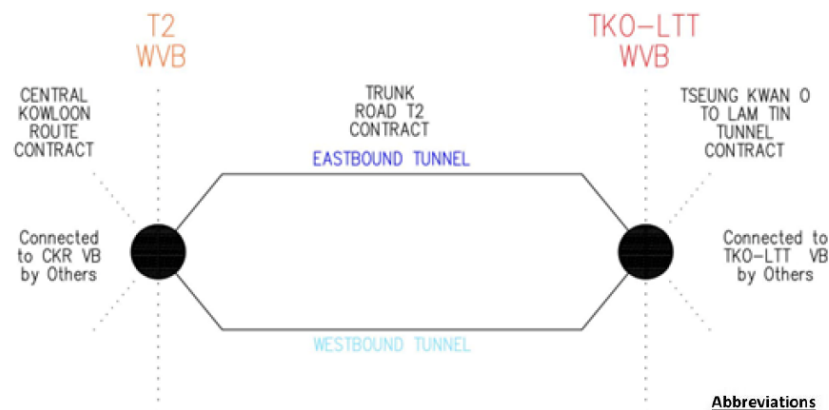
— 24-Core Fibre Optics Cable



Signal Breakout Point - Standalone Lockable Equipment Cabinet inside the room

----- Provided by service

- 1 The provision works for Government Optical Fibre System (GOFs) is for the Third Party.
- 2 The 24-Core Fibre Optics Cable shall not form a Part of the TCSS Communication Backbone.



#### Abbreviations

CKR	Central Kowloon Route
EVB	East Ventilation Building
GOFs	Government Optical Fibre System
TKO-LTT	Tseung Kwan O - Lam Tin Tunnel
WVB	West Ventilation Building
VB	Ventilation Building

Figure 3.1 - System Overview Schematic for GOFs