



# 17<sup>th</sup> Asia Pacific Forum on Intelligent Transport Systems

Brisbane Convention & Exhibition Centre  
Queensland, Australia | 12-15 April 2021



# ITS Developments in Hong Kong

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- ❖ ITS Initiatives and Developments in Hong Kong
- ❖ Looking Ahead



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# Hong Kong by the Numbers



**275 sq-km**  
Built-up Area  
**1,100 sq-km**  
Land Area



**7.51 M**  
Population  
**70%**  
Within 500m of Rail Station



**3.88M**  
Labour Force



**26 %**  
Population over 60



**12.44 M**  
Daily PT Passenger Trips  
**90%**  
Daily Passenger Trips on PT



**55.9M**  
Annual Visitor Arrival  
**78%**  
Visitors from Mainland China



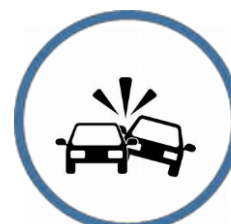
**2100km**  
Length of Public Road  
**+4%**  
Growth in past 10 years



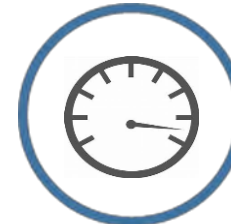
**797,600**  
Total Licensed Motor Vehicles  
**+40%**  
Growth in past 10 years



**766,000**  
Total number of Parking Spaces  
**+0.8%**  
Annual Growth in past 10 years



**16,100**  
Road Traffic Accidents



**21.5kph**  
Car Journey Speed (HK Island)



**274.5%**  
Mobile Subscription Rate  
**95.3%**  
Household Broadband Penetration



# Challenges

- Competing use of land for buildings, transport, recreation, ...
- Public Transport plays an important role. Over 12 million passenger journeys on public transport every day with railway being the backbone
- Economical use of roads for private cars, public transport modes and pedestrians
- Increasing demand of efficiency, fast emergency response as well as a comfortable and healthy transportation environment



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# **ITS INITIATIVES & DEVELOPMENTS IN HONG KONG**



Intelligent Junction

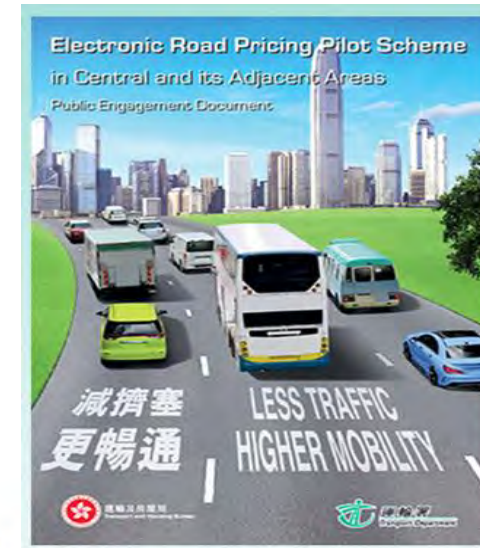
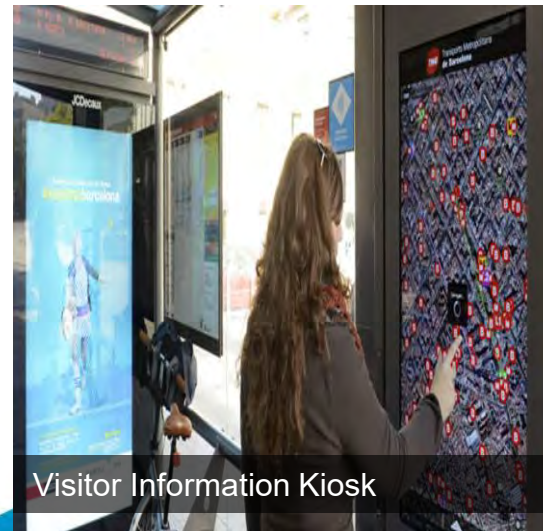
Car/Bike S...



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## Some Highlights

- Upgrade of HKeMobility
- Smart Parking Meter
- Installation of Traffic Detectors
- Electronic Road Pricing (ERP) Pilot Scheme
- Multi-Lane Free Flow
- Autonomous Shuttle
- Intelligent Traffic Signal System





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# HKeTransport

It's an all-in-one mobile application integrating TD's 3 previous mobile applications ("HKeTransport", "HKeRouting" and "eTraffic News"). With an enhanced user interface, it facilitates faster and more convenient search for routes of different transportation mode, journey times and fares, and disseminates real-time traffic news to enable the users to plan for the most appropriate travel arrangements.



One-stop transport and traffic information of Hong Kong:  
Public Transport, Driving Information and Traffic Information



An integrated route search for public transport\*, walking and driving



(\*includes Mass Transit Railway, Light Rail Transit, Franchised Bus, Residents' Service, Green Minibus, Ferry, Tram and Peak Tram, Cross Boundary Coach to Huanggang / Lok Ma Chau, Bus to Ma Wan and Discovery Bay)





# Simple idea but difficult implementation !

- Data sharing from different public transport operators
- Big and complex data sets



**MTR** – 11 lines, 95 stations, 680 exits

**LRT** – 12 lines, 68 stations

**Bus** – 9 operators, 1394 routes, 4256 stops

**GMB** – 712 routes, 3752 stops

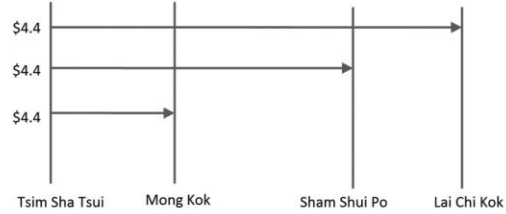
**Tram** – 117 stops

**Ferries** – 43 routes

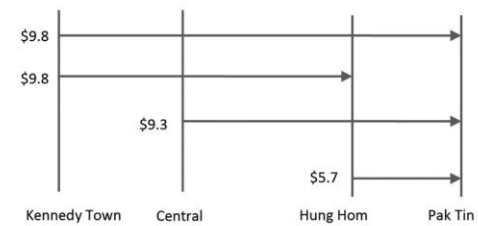


# Big & Complex Data

(a) KMB 6A Flat Fare Structure



(b) KMB / NWFB 104 Uni-directional Section Fare Structure



(c) KMB 64K Two-way Section Fare Structure



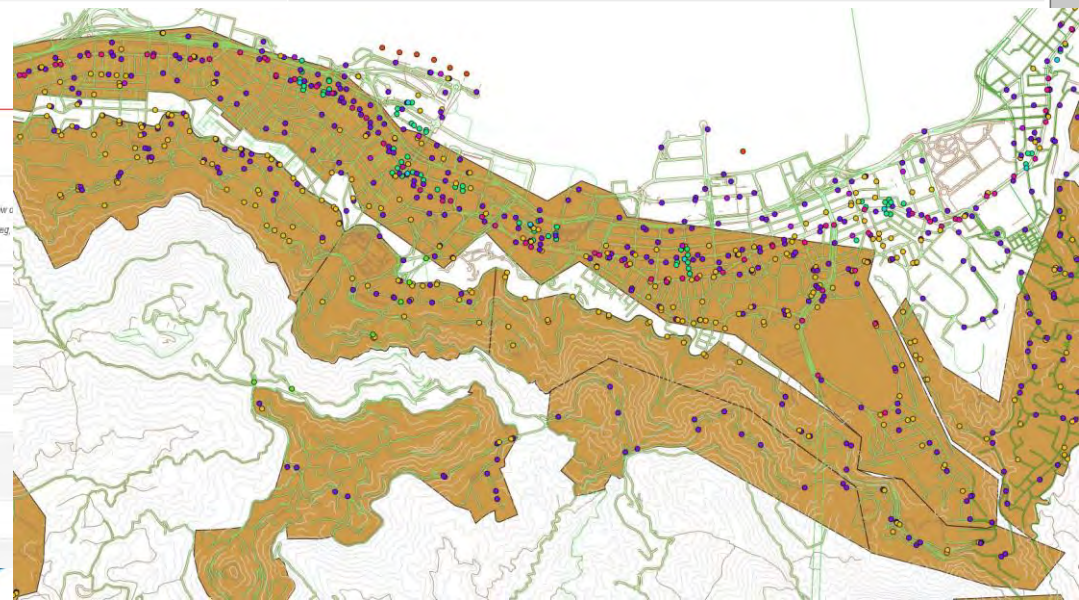
## Timetable

		Frequency (minutes)
Mon to Fri	06:00 - 07:06	12-15
	07:06 - 07:36	6-8
	07:36 - 18:25	10-18
	18:25 - 19:05	20
	19:05 - 22:10	12-15
	22:10 - 23:50	20
Sat	06:00 - 07:06	12-15
	07:06 - 08:20	8-10
	08:20 - 18:25	12-16
	18:25 - 19:05	20
	19:05 - 22:10	12-15

## Schedule departures

Schedule departures	Frequency (minutes)
00:10 - 00:50	20
00:50 - 01:15	25
01:15 - 03:55	20
03:55 - 04:10	15
04:10 - 05:50	20

First Leg	To Destination Direction	Second Leg	To Destination Direction	Suggested Interchange Points <small>Passengers can also interchange at any bus stops that are shared by both legs</small>	Fare Discount on Second Leg <small>(adult fare)</small>
					Discount (\$) <small>the amount shown below c the fare of the second leg lower</small>
<b>Yau Tsim Mong (Tai Kok Tsui) → Tuen Mun (On Ting/Yau Oi/Sam Shing/Chi Lok/Gold Coast/Siu Lam)</b>					
33A, 37	Tsuen Wan	61M	Tuen Mun	Hing Fong Road Near Che Fong Street	\$4.2
<b>Yau Tsim Mong (Tsim Sha Tsui Star Ferry) → Tsz Wan Shan</b>					
5C, 5P, 5	Tsz Wan Shan	3B	Tsz Wan Shan	Tai Tung House	\$4.2
<b>Yau Tsim Mong (Tsim Sha Tsui) → Wong Tai Sin (Tsui Chuk Garden)</b>					
3C	Tsz Wan Shan	211	Tsui Chuk Garden	Lung Cheung Road (Eastbound) Near Wong Tai Sin Railway Station	\$4.2
<b>Yau Tsim Mong (Jordan) → Sha Tin (Hin Keng/ Royal Ascot)</b>					
81, 81S	Sha Tin	88K	Hin Keng /	Sha Tin Central B/T	\$4.2





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Multiple solutions which can be prioritized by time, fare, mode

The screenshot shows the HKeMobility app interface. At the top, there is a navigation bar with icons for Route Search, Public Transport, Traffic Information, Bookmarks, and Cycling Facilities. Below this, there are three mode selection buttons: Ride (selected), Drive, and Walk. The main content area displays the start and end points: Airport (Ground Transportation Centre) (Bus) and The Hong Kong Polytechnic University. A search bar is also present. Below the search bar, there is a yellow banner with a link to 'Latest news on franchised bus services'. The bottom section shows a list of route options with columns for Transfer, Fare, and Time. A map on the right side shows the geographical context of the routes, with a red pin marking the destination. The map includes labels for various locations like Needle Hill, Beacon Hill, Lion Rock, Kowloon, and High West.

Transfer	Fare	Time
1 MTR → MTR	\$65	50 mins
2 S56 → MTR 1, 21, 40	\$24.9	55 mins Last Update: 15:07:52
3 MTR → MTR	\$100	55 mins

Map labels: Needle Hill, Beacon Hill, Lion Rock, Kowloon, High West, Hong Ko Island, Ap Lei Chau, Ma Wan, Tsing Yi.

Scale: 3 km  
Last Updated: 03-06-2021, 3:07:08



Fast automatic response at times of incidents





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### HKeMobility

Route Search | Public Transport | Traffic Information | Bookmarks | Cycling Facilities

EN | 繁 | 簡

Origin: Airport (Ground Transportation Centre) (Bus) | \$33 | 80 mins | 15:19:55

**Detail**

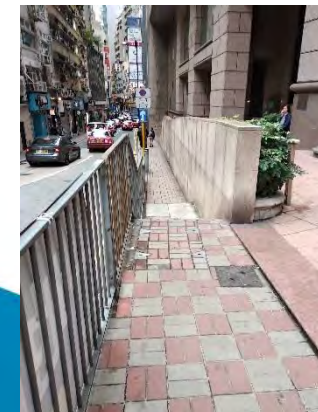
- On** Airport (Ground Transportation Centre)
- ( 18 mid stops )
- Off** Hung Hom Station

**Walk to Destination**  
439 m | 7 mins



## The various walking paths and environments

- Path types: *along vehicular road / back streets / crosswalk / footbridge / subway / MTR way / escalator / staircase / lift*
- Path environments: *pedestrian flow / degree of greenness / road width / brightness / covered / air-conditioning / traffic light...*





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# Smart Parking Meter



- The New Parking Meters will
  - support payment of parking fees through multiple means;
  - support remote payment of parking fees through mobile applications; and
  - be equipped with vehicle sensors to detect whether a parking space is occupied, and provide real-time information to assist motorists in finding vacant parking spaces.
- Information on the locations of parking meters with parking spaces being occupied but without payment of parking fees will facilitate the Hong Kong Police Force to enhance the efficiency of enforcement actions.



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# Installation of Traffic Detectors

- Facilitate more efficient response to traffic incidents on SRN
- Provide more real-time traffic data to the public via electronic platforms e.g. DATA.GOV.HK, HK eTransport, SMPS etc.
- Building up Big Data for transport in Hong Kong for Big Data Analysis



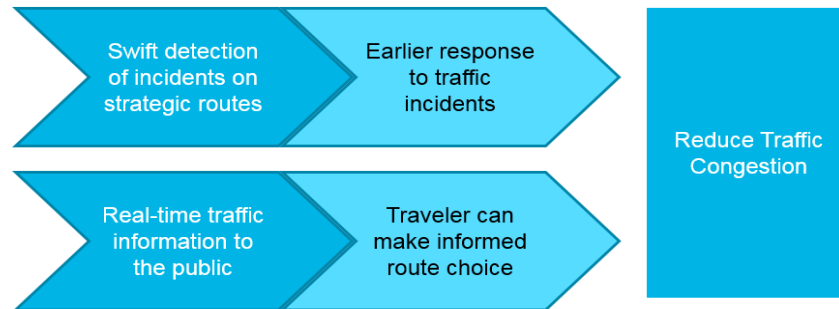
Automatic Licence Plate Recognition Detector



Video Detector



Bluetooth Detector



## Stage 1

- Installation of about **550 sets** of Traffic Detectors along the selected Strategic Routes (approx. ~500m interval)
- Target to be completed by **end 2020**

## Stage 2

- Installation of about **660 sets** of Traffic Detectors at remaining section of Strategic Routes & Major Roads
- Target to be completed by **end 2020**



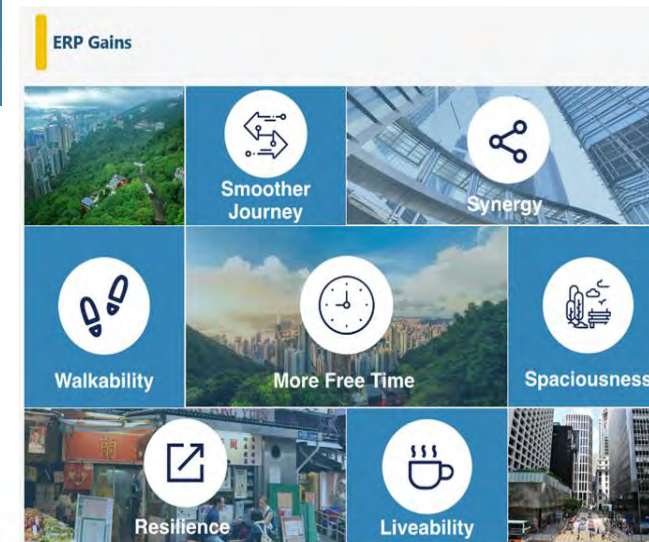


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# Electronic Road Pricing (ERP)



- Hong Kong ERP Pilot Scheme (1983-1985)
- Feasibility Study on ERP (1997-2001)
- Congestion Charging Transport Model – Feasibility Study (2006-2009)
- Report on Road Traffic Congestion in Hong Kong (2014)
- ERP Pilot Scheme in Central & its adjacent area – Feasibility Study (2017- date)





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# Multi-Lane Free Flow

**Multi-Lane Free Flow (MLFF) Tolling** is an electronic toll collection system that allows high-speed free-flow tolling for all road users driving through the toll gantry without the need of toll plaza and toll booths, i.e. to eliminate stop and go.

- First implementation in [TKO-Lam Tin tunnel in 2021](#).
- MLFF Technologies to be adopted including [RFID](#), [ANPR](#), [On-board Unit \(OBU\)](#) as well as [GNSS \(optional\)](#)
- Trial includes field equipment, central system & back-end office provision, evasion detection and enforcement provision, data communication, power supply and probe vehicles



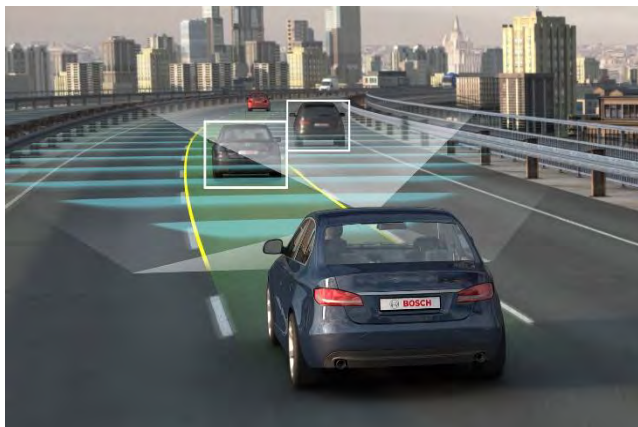


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# Autonomous Shuttle

Trials being conducted at various locations:

- West Kowloon Cultural District;
- Zero Carbon Building;
- Science & Technology Park; and
- Hong Kong International Airport





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## Intelligent Traffic Signal System

Optimises  
allocation of  
green times  
→ Reduce  
congestion and  
delay





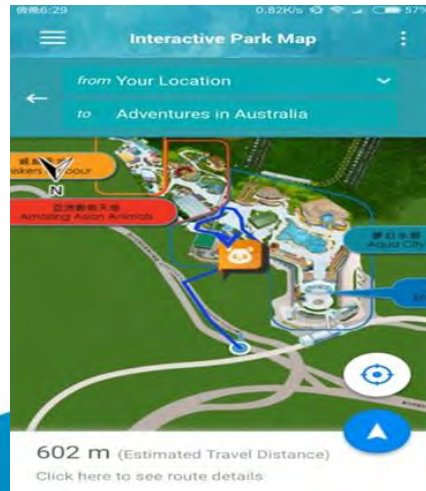
# Goals

- Upon implementation of the above, people will be able to –
- enjoy more environmental friendly transport modes, including use of cleaner fuel to improve air quality and address other environmental concerns
- plan their journeys more efficiently with real-time traffic information
- enjoy better traffic planning and management through enhanced use of data analytics
- enjoy easy and efficient travel with smart airport
- enjoy a pedestrian-friendly environment



## Other Up-Coming ITS Projects/Initiatives

- Automated Parking System
- Seat Occupancy & Seat Belt Fastening Detection for Green Minibus
- Electric Mobility Device (EDM)





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# Automated Parking System





# Technical Study on Seat Occupancy & Seat Belt Fastening Detection for Green Minibus

## Technical solutions

In the POC on-site trial, TD will test the performance of pressure-sensitive switch and infrared sensor for occupancy detection, and reed switch and hall effect sensor for seat belt fastening detection.

Seat occupancy detection			Seat belt fastening detection		
Option	Name of technical solution	Illustration	Option	Name of technical solution	Illustration
1	Pressure-sensitive switch		1	Reed switch	
2	Infrared sensor		2	Hall effect sensor	

<p><b>Pressure-sensitive switch</b> shall be placed on the seat to detect any change of pressure on its surface.</p>	<p><b>Infrared sensor</b> shall be placed between the back and seat of the chair. The transmitter will transmit an infrared wave which will be reflected back to the receiver once it hits an object.</p>	<p><b>Reed switch</b> shall be fixed on seat belt buckle to detect if the magnet fixed on the tongue of seat belt is in close proximity to the reed switch (i.e. seat belt is fastened).</p>	<p><b>Hall effect sensor</b> shall be fixed on seat belt buckle to detect the voltage difference produced when the magnet fixed on the tongue of seat belt is approaching / leaving the sensor.</p>
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Display method	Details	
LED signal installed above passenger seats		<p>The LED signal shall display seat occupancy and seat belt fastening status of each seat. A green light signal will be displayed if a seat is not occupied. A red light signal will be displayed if a seat is occupied but the seat belt is not fastened. The light signal will be off if a seat is occupied with seat belt is fastened.</p>
LCD screen installed adjacent to driver's seat (for driver's information)		<p>The LCD screen shows a GMB floor plan with indication of individual seat. Seat occupancy and seat belt fastening status of each seat, and the corresponding numbers in total will be presented.</p>
LCD screen installed adjacent to passenger entrance (for passengers' information)		

We will also study the feasibility to disseminate seat occupancy information in a mobile application. No personal information will be collected in the technical study. The collected data/information shall only be used by TD and the GMB Operators involved in the POC on-site trial internally.





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# Electric Mobility Device (EDM)



## Site Trials of Electric Mobility Devices Application

APPLY NOW

The purpose of the site trials is to understand



the public acceptance on the use of motorised PMDs and PAPCs on cycle tracks



the interaction between motorised PMDs, PAPCs and bicycles



the effectiveness of certain safety requirements to be imposed on users of motorised PMDs and PAPCs

Eligible applicants for the site trials shall satisfy the following requirements

01

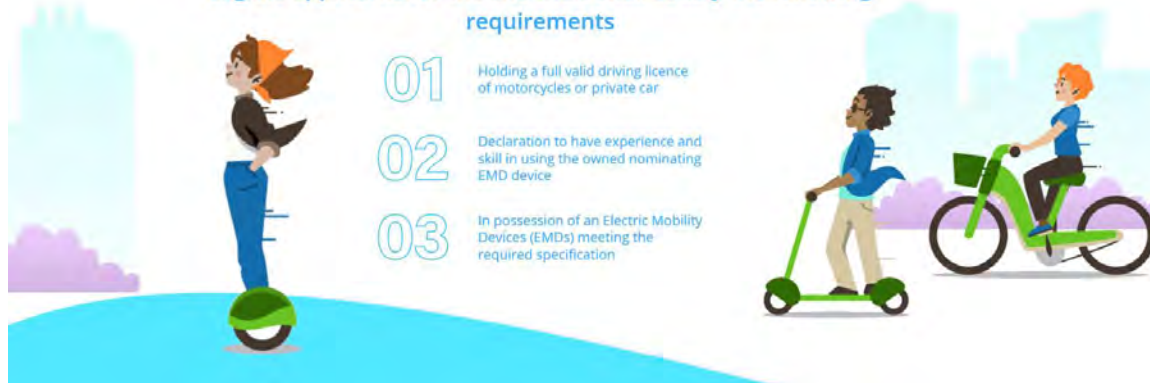
Holding a full valid driving licence of motorcycles or private car

02

Declaration to have experience and skill in using the owned nominating EDM device

03

In possession of an Electric Mobility Devices (EDMs) meeting the required specification



## Electric Mobility Devices (EDMs) are banned on roads

Using EDMs (for example, electric scooters and electric bicycles) on carriageways, footpaths or cycle tracks may commit an offence under the Road Traffic Ordinance (Cap. 374), its subsidiary legislation and other relevant legislation.



Science Park- Cycle track adjacent to Pak Shek Kok Promenade  
2020. Dec 11-13  
10:00 - 18:00



Tsung Kwan O - Cycle track adjacent to Tsung Kwan O Waterfront Park  
2021 Jan 29-31  
10:00 - 18:00



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# LOOKING AHEAD



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# HKSMART CITY BLUEPRINT

[Vision and Mission](#) [I&T in Combating COVID-19](#) [Smart Areas](#) [Smart Village Pilots](#) [Governance](#) [Dashboards](#)



Text Size 繁 简

## SMART MOBILITY



> More

## SMART LIVING



## SMART ENVIRONMENT



## SMART PEOPLE



## SMART GOVERNMENT



## SMART ECONOMY





1. achieve the “SIGMA” vision to bring overarching benefits to the sustainable development of our transport system -
  - Safe: Reduces the risk of traffic fatality or injury;
  - Informative: Provides useful information to road users;
  - Green: Promotes the use of environmentally-friendly modes of transport;
  - Mobile: Moves people and goods expeditiously and efficiently, meeting the needs of both users and operators; and
  - Accessible: Delivers easily-reachable and reliable transport services
2. facilitate the achievement of technology advancement and industry development in vehicle-to-everything (V2X) and autonomous vehicles (AVs) and ultimately introduction of connected AVs
3. enhance walkability and pedestrian wayfinding system



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# Thank You !



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