Penang Transport Master Plan

Penang State Government's Response to NGOs' Statement

5 May 2016

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Halcrow's TMP Recommendations.

Halcrow's TMP Recommendations

- Penang Transport Master Plan (PTMP) report which was done by Halcrow had been adopted as Penang State Government's official document on 25 March 2013.

- Based on the Halcrow's recommendations, State Government had come out with several project as per the study, which included:
  - **3 MAJOR HIGHWAYS & UNDERSEA TUNNEL** constructed by Zenith BUCG
  - **BICYCLE MASTER PLAN** which now progressively done by MBPP
  - **PENANG ACCESSIBILITY ACTION GROUP (PAAG)** to look into the accessibility improvement plan

- The PTMP report by Halcrow was the foundation used during Request for Proposal (RFP) exercise – Project Delivery Partner (PDP).

- All the short-term, long-term including cost effective measures recommended by Halcrow were carried out by different parties in a holistic way.

Positive Public Response on PTMP.

Positive Public Response on PTMP

- To-date the State Government has proactively conducted a **TOTAL OF 18 OPEN DIALOGUES** with all relevant stakeholders.
  - Overall received **POSITIVE SUPPORT**.

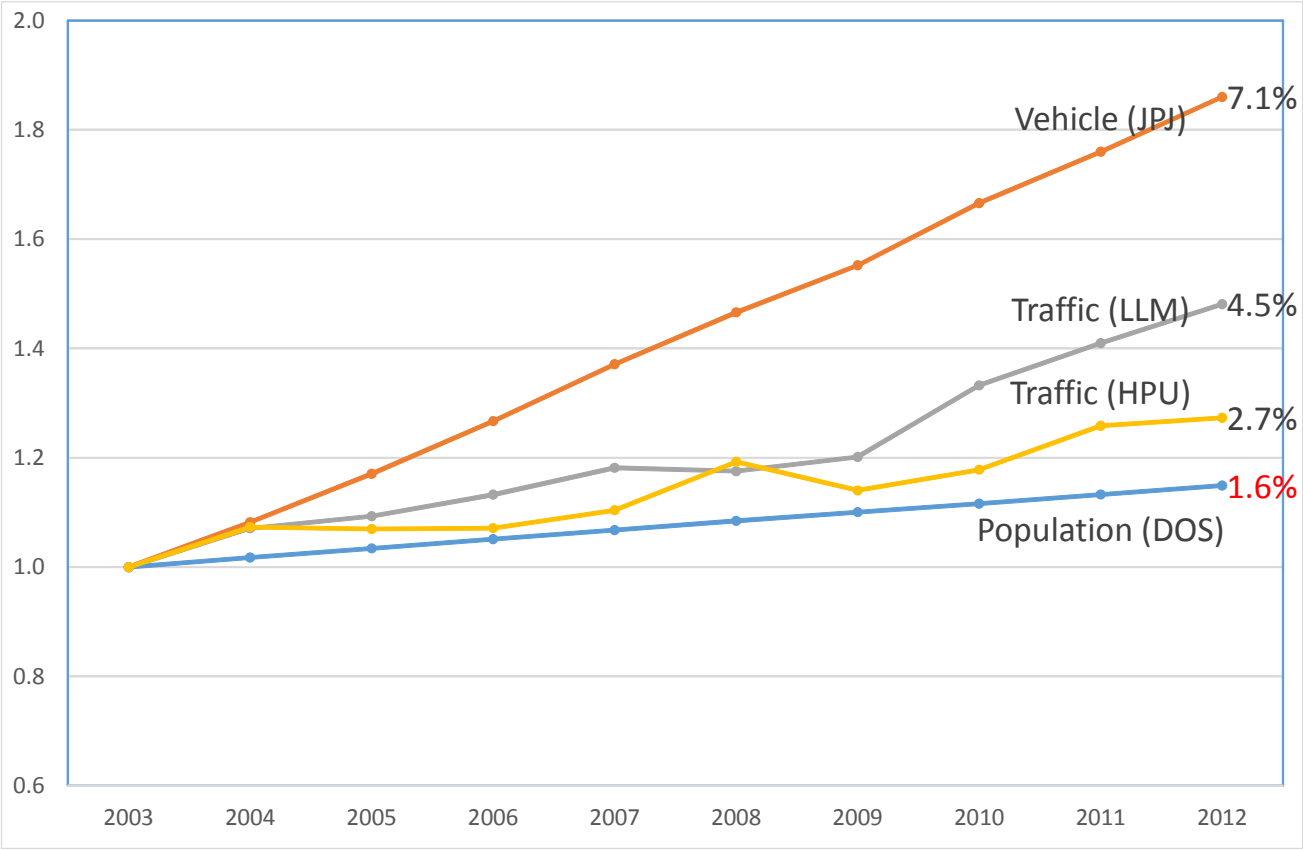
- The State Government welcomes feedback and comments from all parties, including Non-Governmental Organisations (NGOs).

- Why is the State Government committed to implement the PTMP?
  - Encourage use of public transport
  - Mitigate traffic congestion

Traffic growth main driver for ridership.

Ridership Model

- **TRAFFIC GROWTH** is a main driver to the ridership model:
  - **HIGHER THAN POPULATION GROWTH**
  - Traffic growth is driven by economic growth, tourist arrivals, etc.
- Other drivers:
  - Department of Statistics' population projection
  - Population growth from future developments



Vehicle (JPJ) - Registered Vehicles

State Government has appointed independent consultant for peer review of PTMP project feasibility and ridership.

Multiple transit systems – common in all cities.

Transit Systems Dependent on Demand etc.

- *Transit systems for each corridor are decided from various factors:*
  i. **TARGET 40% PUBLIC TRANSPORT MODE SHARE**
  ii. **TRAVEL DEMAND & DEVELOPMENT**
  iii. **ALIGNMENT CONSTRAINTS**
  iv. **SYSTEM CAPACITY, PERFORMANCE & SAFETY**
- *The PTMP is used to as a* **GUIDE** *to ensure proper future planning.*
  - *Can be reviewed every 5 years*
- **NOT ALL LINES WILL BE IMPLEMENTED AT ONCE**

Appropriate Systems To Match Demand

- *Most appropriate system for the Komtar-Penang Airport corridor – LRT system. Why?*
  - *Airport passengers increase from* **6.5 MIL TO 20 MIL PASSENGERS**
  - *Bayan Lepas industrial zone will be expanded by* **1,000 ACRES**.

		Demand (PPHPD) – Mode	
	Corridor	**Halcrow TMP Year 2030**	**Improved TMP Year 2055***
1.	George Town - Bayan Lepas	2,200 - Tram	14,700 – LRT
2.	George Town - Ayer Itam	1,300 - Tram	6,200 – Monorail
3.	George Town - Tg Bungah	1,200 - Tram	5,800 – Monorail
4.	Bayan Lepas extension to SRS	no mention	7,500 – LRT
5.	George Town - Butterworth	no mention	6,000 – LRT

Comparison Between Systems

LRT has higher performance in terms of **CAPACITY, SPEED** *and* **JOURNEY TIME**.

	LRT	Monorail	Tram	BRT	Bus
Typical capacity (PPHPD)	**18,500**	7,000	**4,500**	2,500	500
Speed (kph)	**35**	30	**20**	25	15
Journey time (mins)	**40**	45	**70**	55	90
Headway (mins)	2	3	4	3	5
No of car/train (or "veh")	4	4	2	2	1
No of pax/car @ 4.8 pax/sq m	160	90	160	60	60
Construction costs/km (RM mil) @ 2015 prices	220	170	>40* (at-grade)	110	

To have a dedicated tramway with high capacity, cost is estimated to be more than RM220mil per km – utility relocations, land acquisitions, time, etc.

Multiple Systems in Major Cities

- *Established cities are known to run* **MULTIPLE TRANSIT SYSTEMS** *functioning as a single integrated network:*

LONDON	PARIS	AMSTERDAM
· Underground metro · Light rail • Tram • Commuter rail • High-speed train	· Underground metro · Commuter rail · Tram · High-speed train	· Underground metro · Light rail · Tram

Different transit systems in London

High Speed 1

Underground metro

Light rail

Trams (street level transit) not feasible.

No Planned Corridor For Rail Transit

- *New transit lines need to be* **PARACHUTED ON THE ROAD SPACE TO MINIMISE LAND ACQUISITION AND SOCIAL IMPACT**
- *To achieve State Government's objective – <u>40% public transport mode share</u>:*
  - *Proposed systems needs* **HIGH CAPACITY,** *hence the need for* **DEDICATED CORRIDOR**

Adverse Impacts With Trams

- *If the State Government were to build trams:*
  - *Will have to* **SACRIFICE TRAFFIC LANES** *to accommodate dedicated corridor*
  - *Severe* **TRAFFIC IMPACT** *to already congested road system*
- *If the State Government were to <u>maintain the number of traffic lanes</u>:*
  - *Will have to* **ACQUIRE ADJACENT LAND AND BUILDINGS** ***(costly exercise)***
  - *Massive social consequences and* **PUBLIC OUTCRY**

Major Inconvenience With Trams

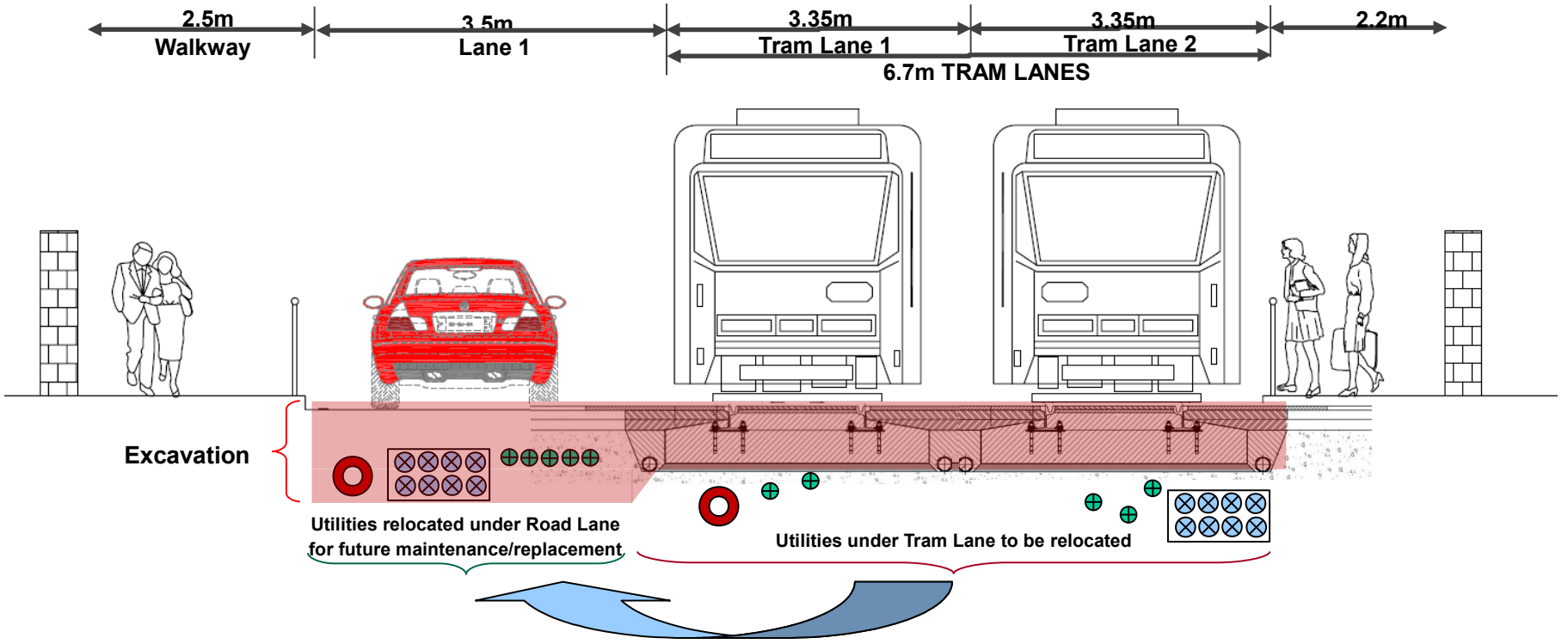
- *During construction, there will be <u>long periods of disruption</u> to the local communities:*
  - **TOTAL ROAD CLOSURES** *(> 2 years) to allow for utilities relocations*
  - *Extend construction period* **FROM 6 TO 8 YEARS**

Tram works roadworks at Princes Street, Edinburgh, Scotland, UK

Total Road Closures With Trams

Businesses Will Suffer During Utilities Relocation

Massive Utilities Relocation



- *Relocation of underground utilities is required.*
- **NO OPPORTUNITY** *for future utility maintenance under tramway.*

Traffic Conflicts Inevitable – During Operation

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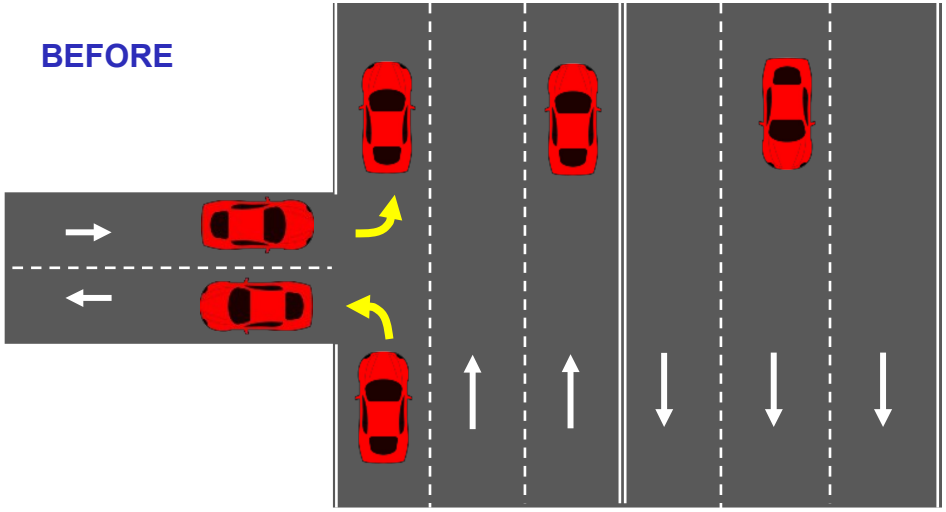

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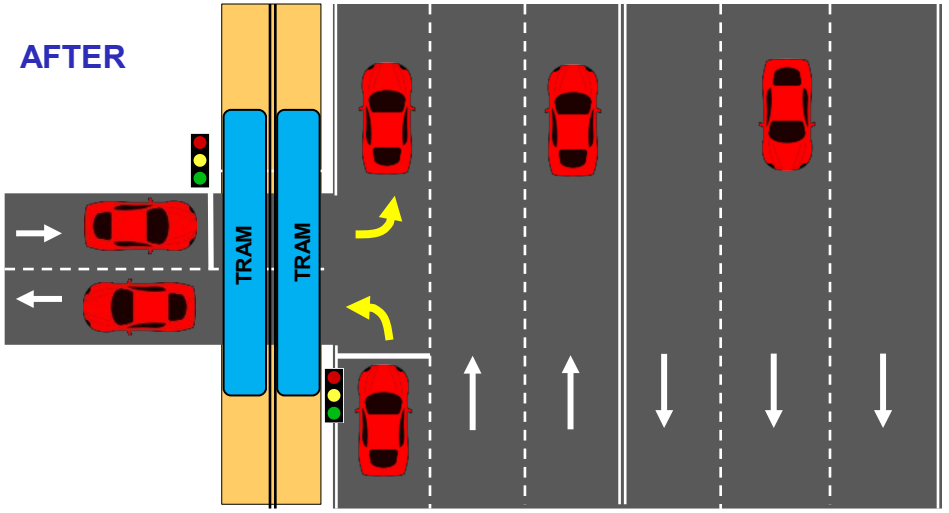

SIGNALISED
T-JUNCTION

Motorists Will Bear The Brunt – During Operation

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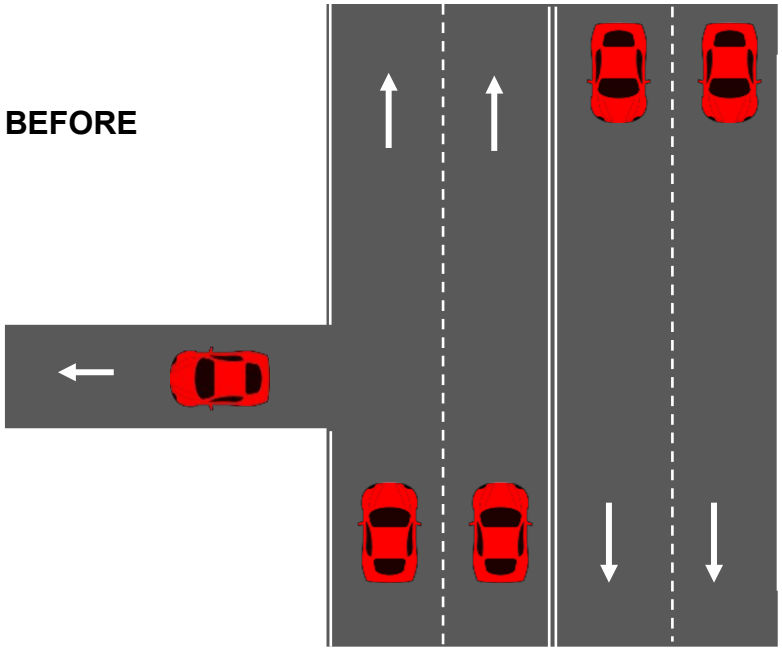

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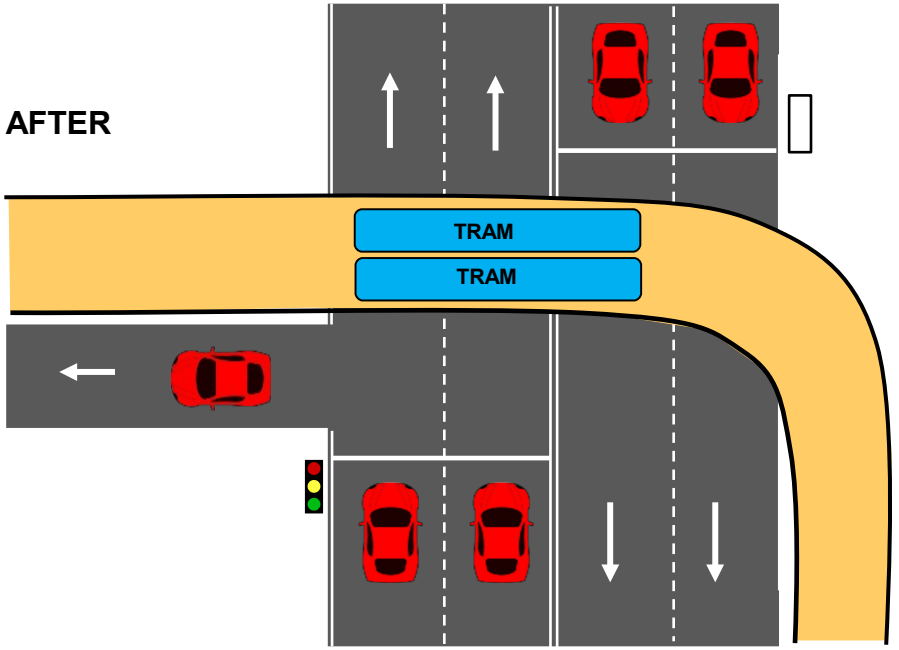
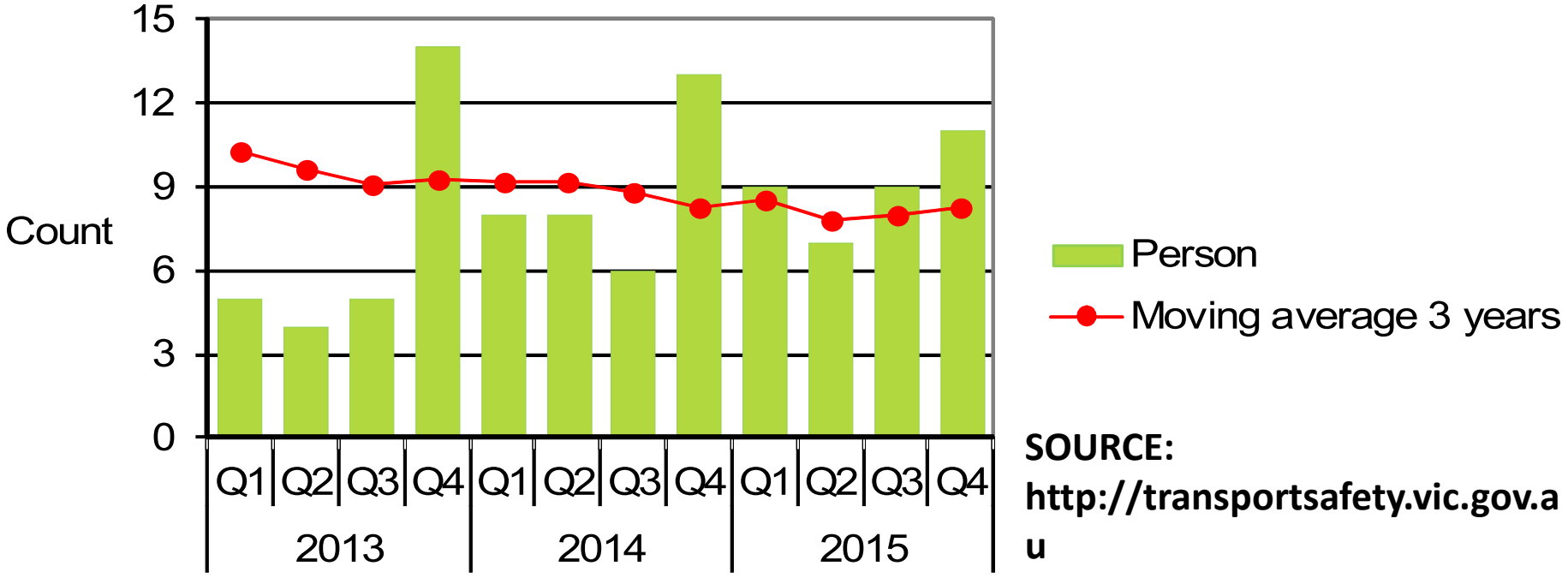
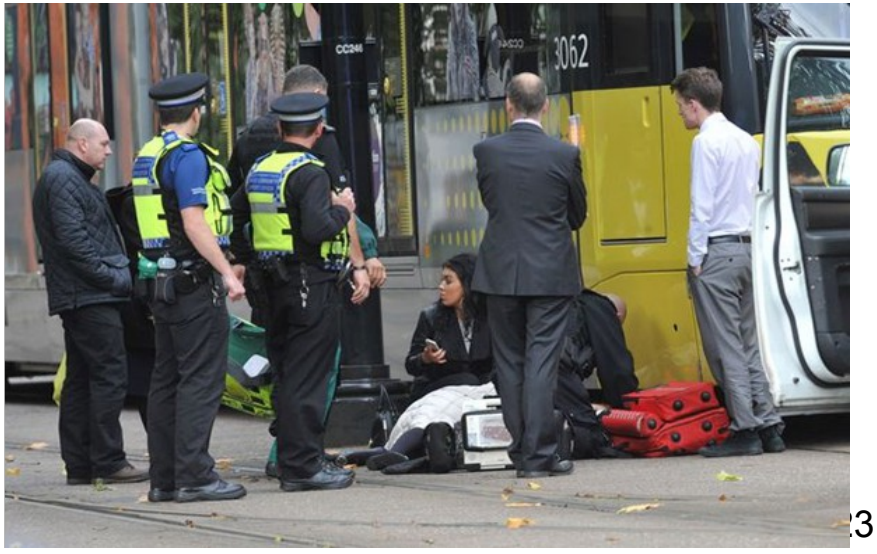


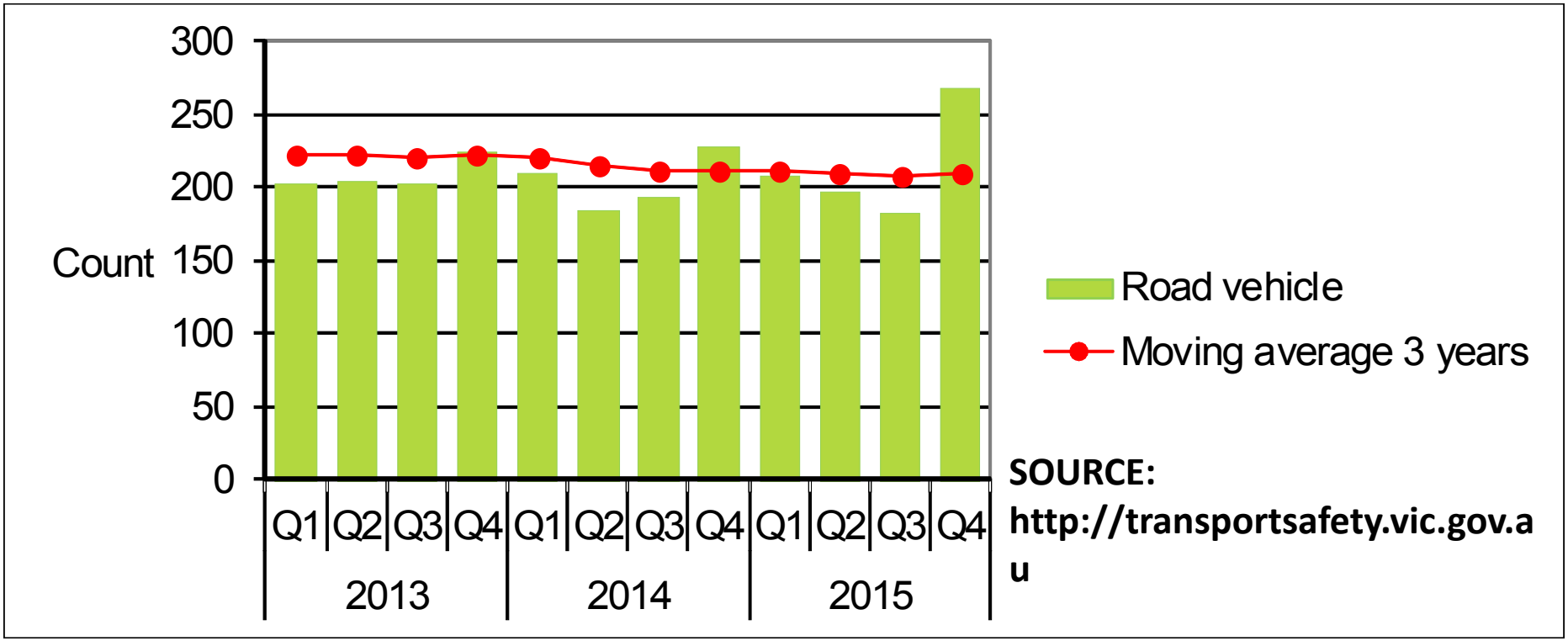
Tram-Pedestrian Accidents – During Operation



SOURCE: http://transportsafety.vic.gov.au



Tram-Road Vehicle Accidents – During Operation



Street Level Transit System Is Not Cheaper

- **SYDNEY CBD AND SOUTH EAST** 12km **LRV PROJECT** (street level), *reported a budget overrun of AUD$600mil to AUD$2.2bil for* **AUD$183mil per km**
- *Proposed 21km Bayan Lepas LRT with a similar capacity of* **18,000 passengers** *per hour per direction is estimated to cost about* **RM220mil per km**

Transit System	Length	Cost (per km)	Total Cost	Grade Level
Sydney LRV Project	12km	AUD$183mil	AUD$2bil	Street Level
Bayan Lepas LRT	30km	RM220mil	RM7bil	Elevated

AUD$1 = RM3

Komtar-Penang Airport Corridor.

1ST TMP Project – Bayan Lepas LRT

- *Bayan Lepas LRT is the first TMP to be implemented:*
  - *Studies show it is* **ECONOMICALLY VIABLE (EIRR > 10%)**
- *It is an LRT system:*
  - **ELEVATED**
  - *The* **MAIN N-S BACKBONE** *connecting Komtar to the airport*
  - **CONNECTS TO SEBERANG PERAI** in future
- *As lines are implemented at different times,* **INVARIABLY THERE WILL BE DIFFERENT SYSTEMS** *(system technology changes rapidly with time)*
- *More important is the* **SEAMLESS TRANSFER** *of transit passengers:*
  - **PHYSICAL INTEGRATION**
    @ interchanges at Sia Boey and The Light
  - **SINGLE TICKETING SYSTEM**

Komtar-Penang Airport Corridor – Transit System Has To Be Elevated

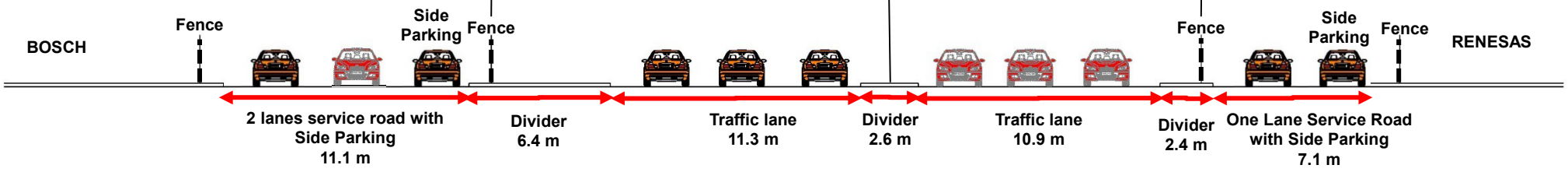
- *For the Komtar-Penang Airport dedicated corridor,* **OVER 91% OF TOTAL ALIGNMENT HAS TO BE ELEVATED** *(19km out of 21km). Why?*
  - *To avoid re-signalising / overhaul road junctions*
  - *To avoid traffic impact to connecting/ adjacent roads*
  - *To avoid lane closures and removal of parking space*
  - *To avoid encroachment into buildings and land acquisitions*

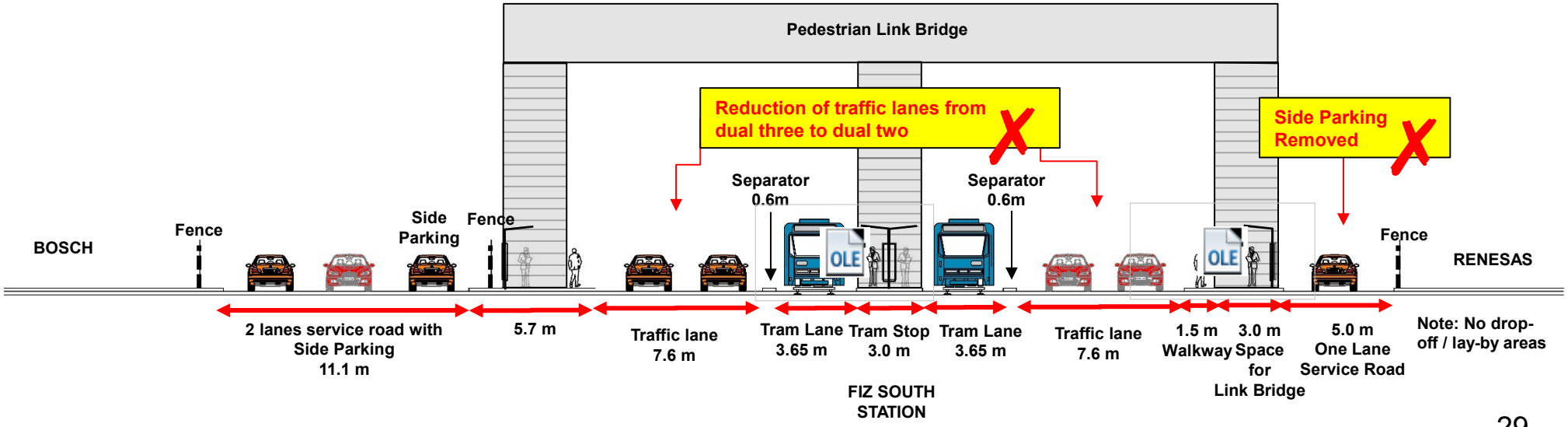
ELEVATED RAIL TRANSIT = ELEVATED LRT

Komtar-Penang Airport Corridor - Lane Closures and Removal Of Parking Space (Tram)

FIZ SOUTH STATION

- Lane reduction
- Side parking removed



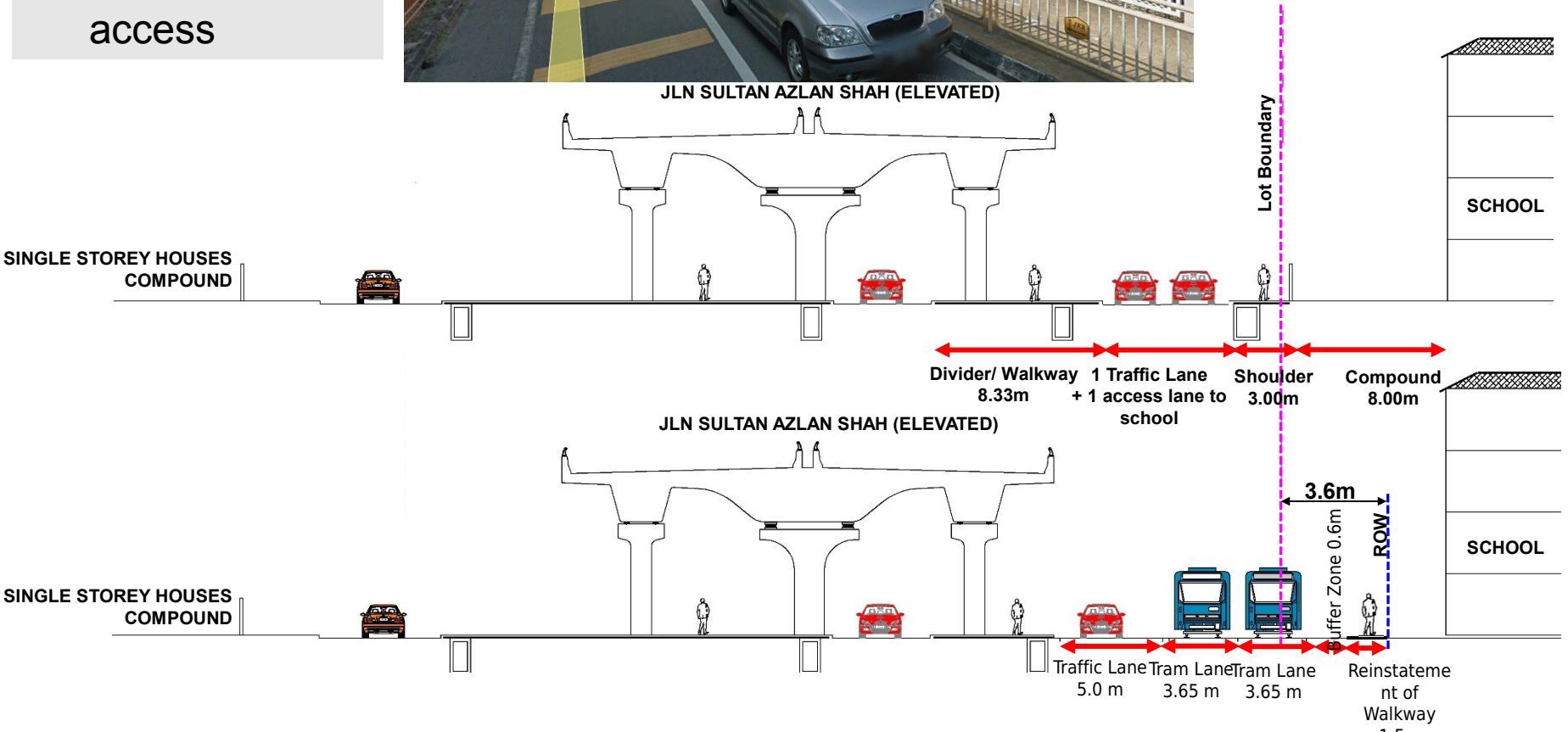


Komtar-Penang Airport Corridor - Encroachment, Blocked Access And Land Acquisition (Tram)

Kwang Hwa School

- Encroachment
- Land acquisition
- Lane reduction
- Blocked access

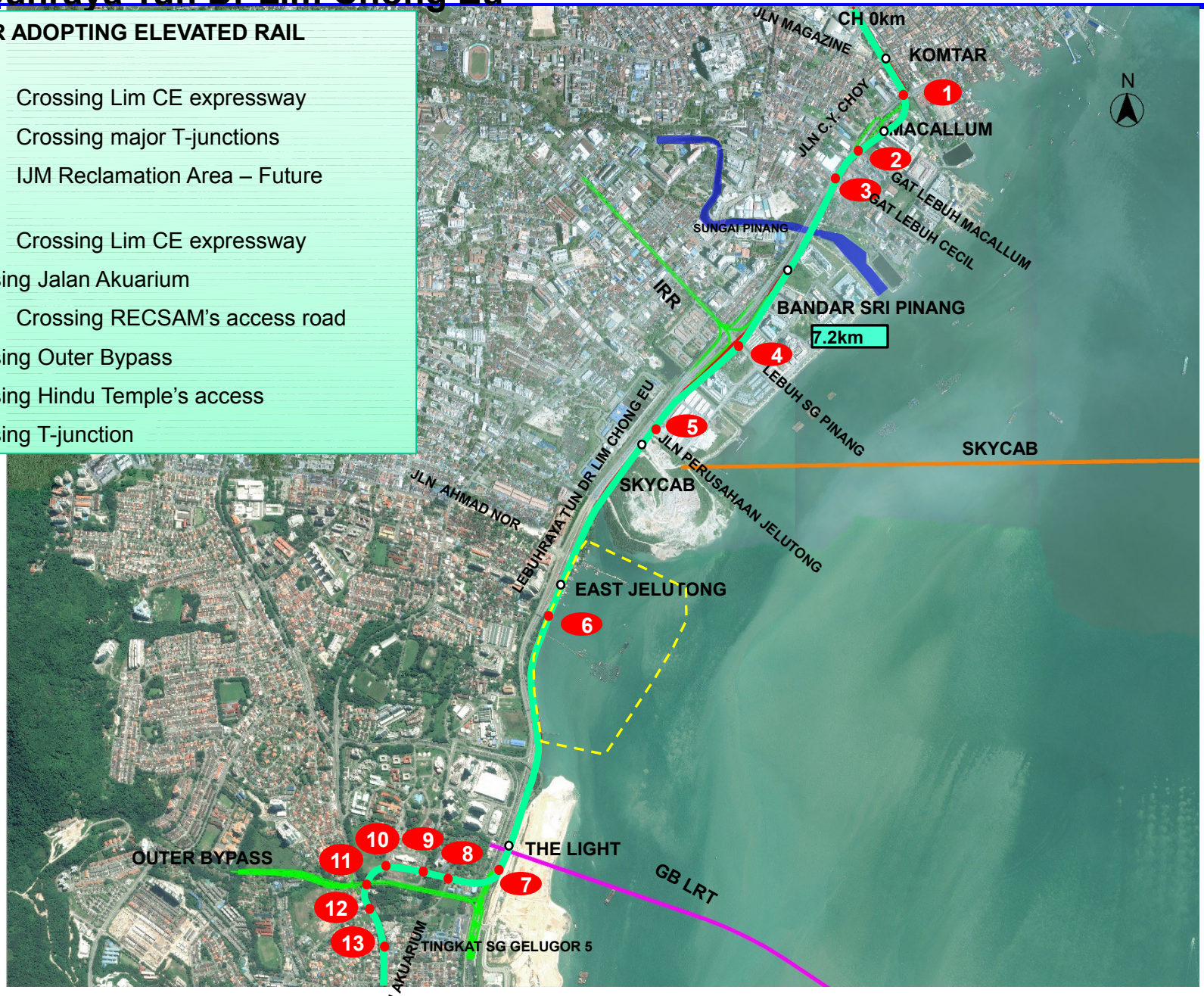
- Tram lane encroaches into school compound (internal car park affected)
- Access to / from school affected / blocked by tram lanes
- Land acquisition (school compound)



Elevated Rail Transit
@ Lebuhraya Tun Dr Lim Chong Eu

REASONS FOR ADOPTING ELEVATED RAIL TRANSIT :

- **Loc 1** Crossing Lim CE expressway
- **Loc 2-5** Crossing major T-junctions
- **Loc 6** IJM Reclamation Area – Future Junctions
- **Loc 7** Crossing Lim CE expressway
- **Loc 8** Crossing Jalan Akuarium
- **Loc 9-10** Crossing RECSAM's access road
- **Loc 11** Crossing Outer Bypass
- **Loc 12** Crossing Hindu Temple's access
- **Loc 13** Crossing T-junction



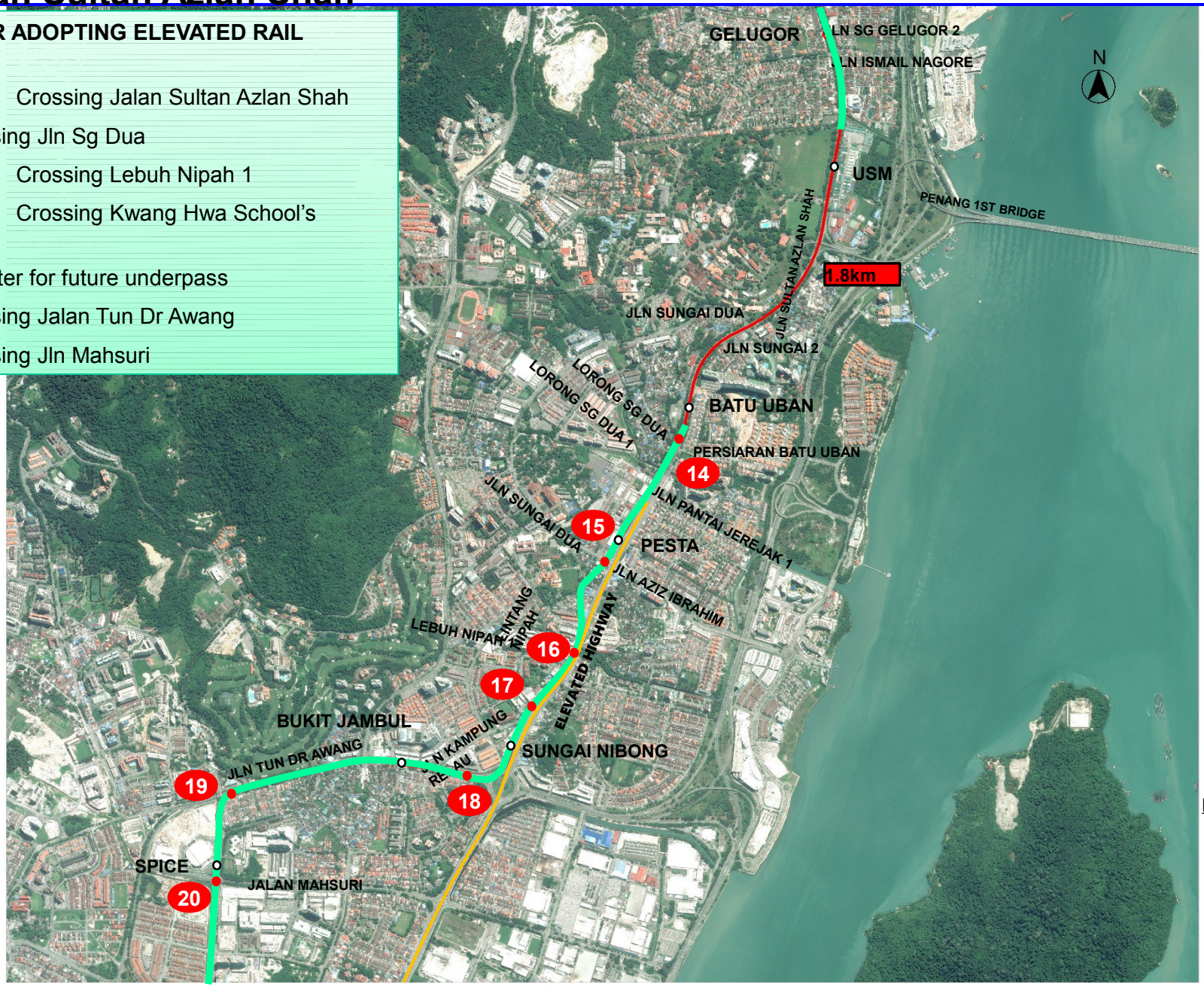
Legend

Elevated Section

Elevated Rail Transit
@ Jalan Sultan Azlan Shah

REASONS FOR ADOPTING ELEVATED RAIL TRANSIT :

- **Loc 14** Crossing Jalan Sultan Azlan Shah
- **Loc 15** Crossing Jln Sg Dua
- **Loc 16** Crossing Lebuh Nipah 1
- **Loc 17** Crossing Kwang Hwa School's Access
- **Loc 18** To cater for future underpass
- **Loc 19** Crossing Jalan Tun Dr Awang
- **Loc 20** Crossing Jln Mahsuri

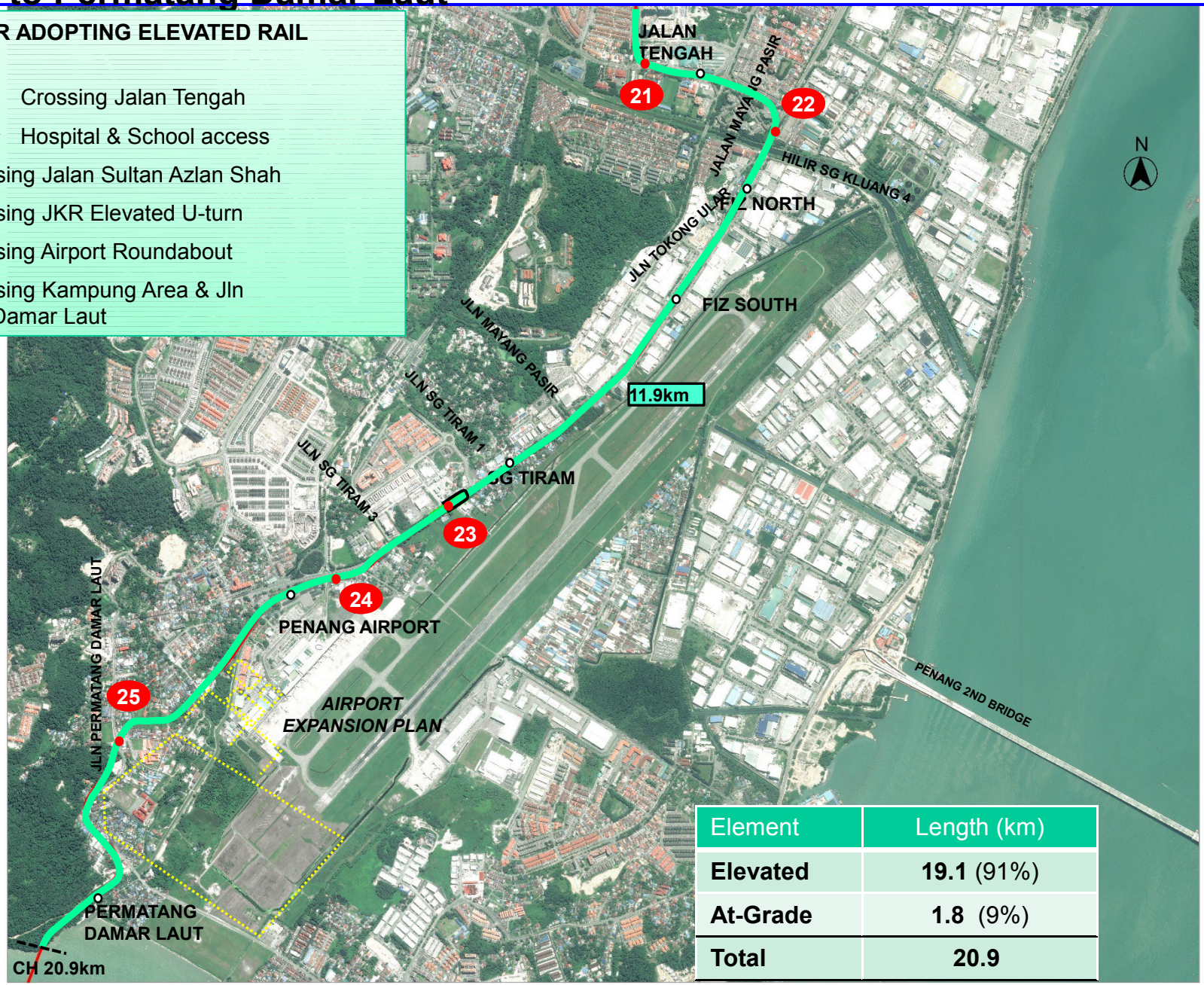


Elevated Rail Transit

@ FIZ to Permatang Damar Laut

REASONS FOR ADOPTING ELEVATED RAIL TRANSIT :

- **Loc 21** Crossing Jalan Tengah
  - Hospital & School access
- **Loc 22** Crossing Jalan Sultan Azlan Shah
- **Loc 23** Crossing JKR Elevated U-turn
- **Loc 24** Crossing Airport Roundabout
- **Loc 25** Crossing Kampung Area & Jln Permatang Damar Laut



Element	Length (km)
Elevated	**19.1** (91%)
At-Grade	**1.8** (9%)
Total	**20.9**

Legend

- Elevated Section
- At-Grade Section

Tram in Heritage Zone.

Heritage Preservation in George Town

- *Heritage Tram (street level) is in line with George Town as a* **HERITAGE CITY.**
  - **MOBILITY WITHIN HERITAGE ZONE**
  - **TOURIST ATTRACTION**
- **NO ELEVATED STRUCTURES** *within the World Heritage Site.*

Monorails suitable as transit systems.

Monorails are SAFE & Suitable

- *There are* **2 TYPES OF MONORAILS** *– transit and theme parks.*
- *Major cities with transit monorails –* **CHINA, JAPAN, SOUTH KOREA, CHINA, INDIA, BRAZIL AND UNITED STATES.**

Sao Paulo Monorail

Emergency walkway

Las Vegas Monorail

Emergency walkway

Operational Transit Monorails In Other Countries

LOCATION	COUNTRY	NAME	YEAR OPENED	LENGTH
Chongqing	China	Chongqing Monorail (Lines 2 & 3)	2005	86.8 km
Mumbai	India	Mumbai Monorail	2014	19.54 km
Kitakyushu	Japan	Kitakyushu Monorail	1985	8.8 km
Naha, Okinawa	Japan	Okinawa Monorail	2003	12.8 km
Osaka Prefecture	Japan	Osaka Monorail	1990	28 km
Tokyo	Japan	Tokyo Monorail	1964	17.8 km
Western Tokyo	Japan	Tama Toshi Monorail Line	1998	16 km
Kuala Lumpur	Malaysia	Kuala Lumpur Monorail	2003	8.6 km
Daegu	S. Korea	Daegu Metro (Line 3)	2015	23.9 km
Las Vegas Strip	US	Las Vegas Monorail	2004	6.3 km
São Paulo	Brazil	São Paulo Metro (Line 15)	2014	2.9 km

Highways still needed.

Highways Still Needed

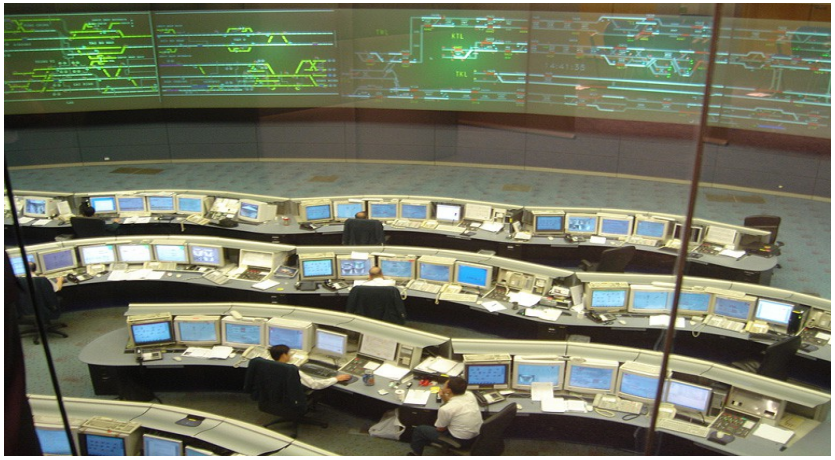
- 40% public transport mode shift **CANNOT HAPPEN OVERNIGHT – NEEDS TO BE ENCOURAGED PROGRESSIVELY.**
- *Eg. Full electronic tolling – took >25 years to implement in Klang Valley.*
- **HIGHWAYS STILL NEEDED** to cater for the **GROWTH OF REMAINING 60% PRIVATE VEHICLES.**
- *Lessons from Singapore – Despite achieving 60% public transport mode share, the island republic is still building new highways.*

As of 2014, there were 163 km of expressways in Singapore, with new highways in the pipeline.

Financial model for PTMP.

Sale of Reclaimed Land To Finance The PTMP

- *Reclaimed land and PTMP components* **BELONG SOLELY TO THE STATE GOVERNMENT**
- *Proceeds from the* ***SALE OF RECLAIMED LAND VIA PUBLIC AUCTION*** *will be used to fund the PTMP components that are to be implemented.*
- *Implementation of each PTMP component (whether rail or road) depends on:*
  - **ECONOMIC VIABILITY**
  - **FUND AVAILABILITY**
- *Each PTMP component to be implemented will be tendered out via* ***OPEN TENDER.***
- *The State Government is studying options for* **SUSTAINABLE RAIL OPERATIONS**



THANK YOU