



ASEAN  
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SMART CITIES  
TRUST FUND  
Asian Development Bank

# ASEAN Australia Smart Cities Trust Fund (AASCTF) Penang Smart Mobility Micro- Simulation Model Development

AASCTF Networking Days

June 2022





# Introduction

- TO-06 aims to develop transportation modelling capabilities within Digital Penang and MBPP. This will enable **ongoing independent transport planning** with best practice processes
- The study team is developing a **micro-simulation transport model** of Georgetown Penang in collaboration with the authority
- Developing **knowledge of modelling processes** through ongoing engagement with MBPP and Digital Penang
- Providing **accredited training** and software for MBPP to have ongoing capabilities in using transport micro-simulation modelling

## Acknowledgements:

Zabari Zainal, Project Manager @ Digital Penang

Yiheng Xu, Smart Mobility Consultant @ Ramboll Singapore





# Georgetown's Mobility Challenges

**Narrow Streets**



**On-Street Parking**



**Lack of footpaths**

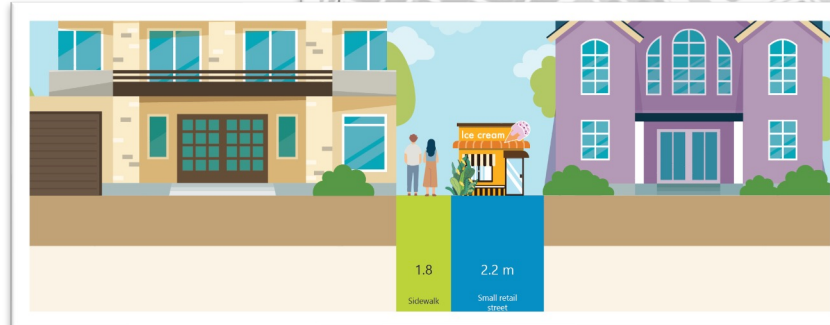
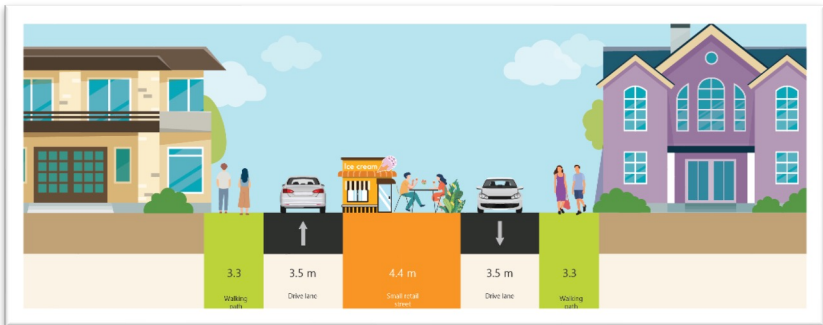
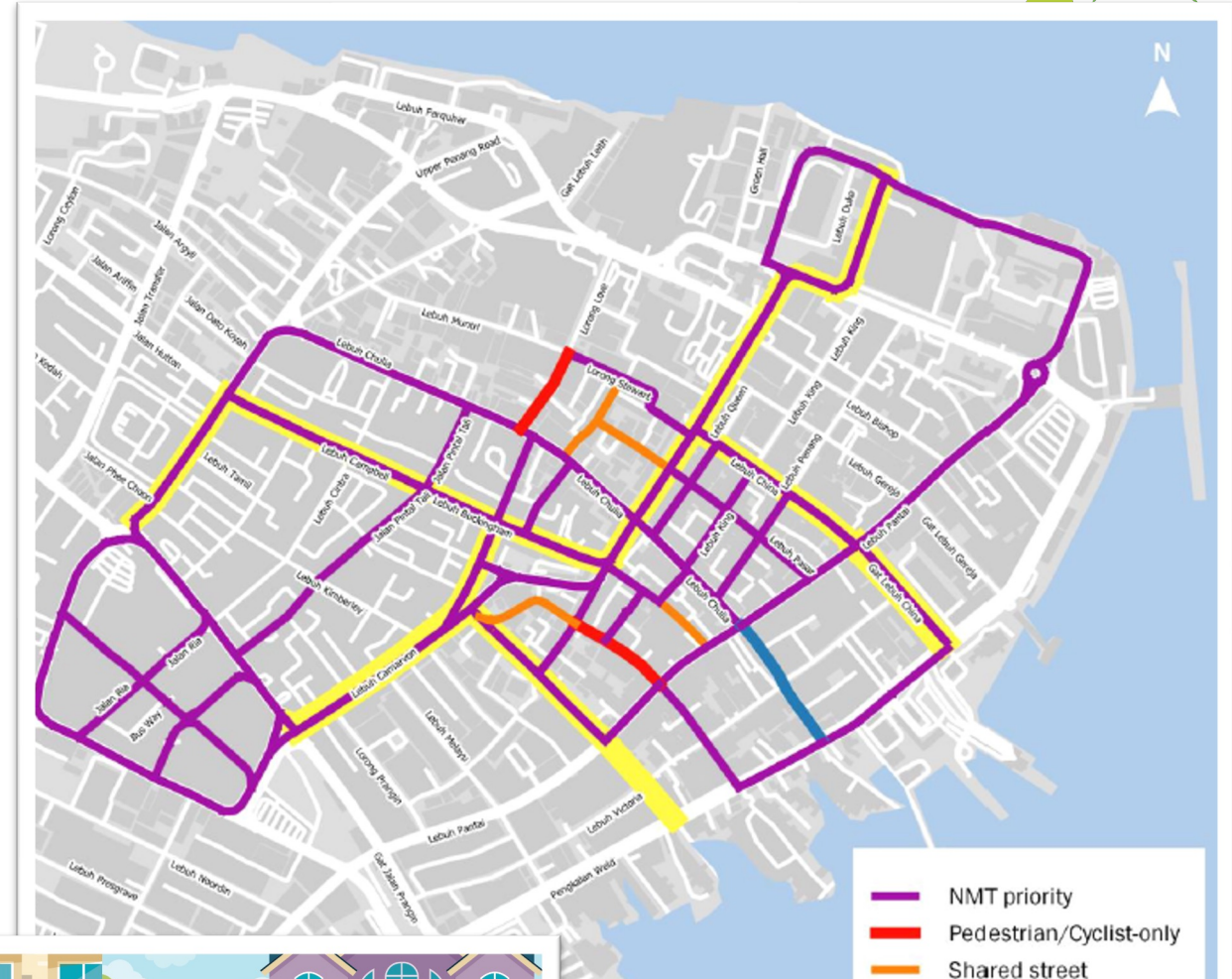


**Lack o**



# Previous Studies

- No shortage of great ideas!
  - Penang Transport Masterplan
  - Penang Green Transport Plan
    - Pedestrianised Streets
    - Public Transport Improvements
- A need for assessment, evaluation and communication





# Introduction to PTV Vissim

World's leading **multimodal traffic simulation** software PTV Vissim digitally reproduces the traffic patterns of all road users.

PTV Vissim evaluates and improves the **performance of traffic**, forming the basis for traffic **planning decisions** and address road traffic challenges, such as congestion and emissions.





# Vissim Model Use Cases

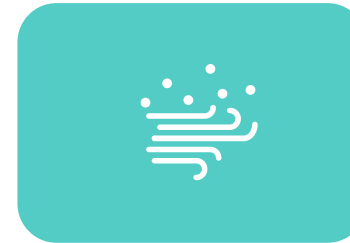
- As an accurate replication of the real-world situation, the Vissim model can be used to test:



Changes to  
Road Network



Changes to  
Traffic Demand



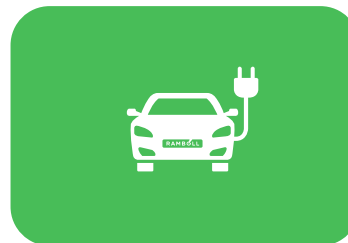
Climate Impact  
/ Emissions



Pedestrian  
Facilities



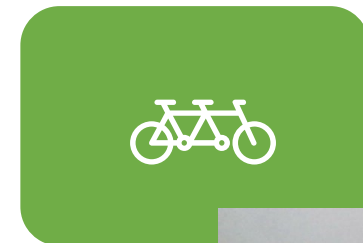
Public Transit  
Proposals



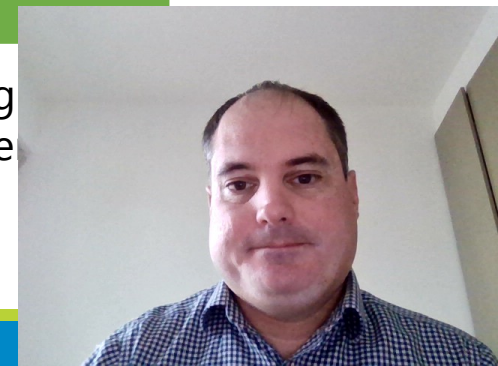
Future Mode of  
Travel (EV/AV)



Construction  
Disruptions

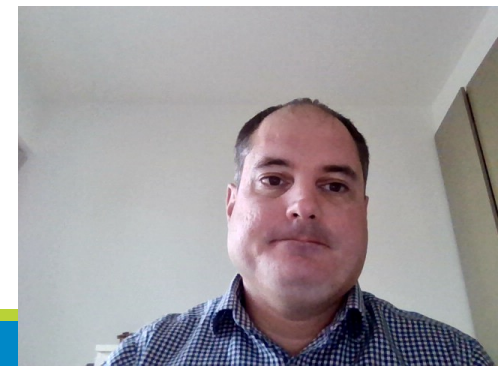
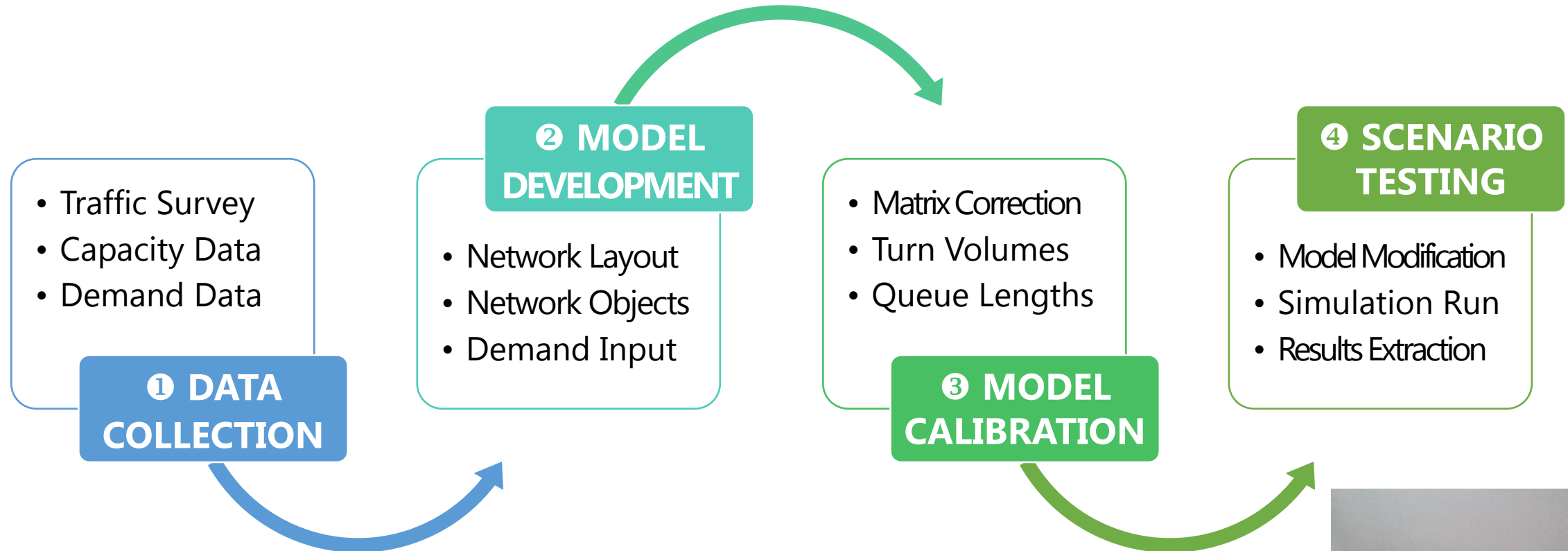


Cycling  
Improve





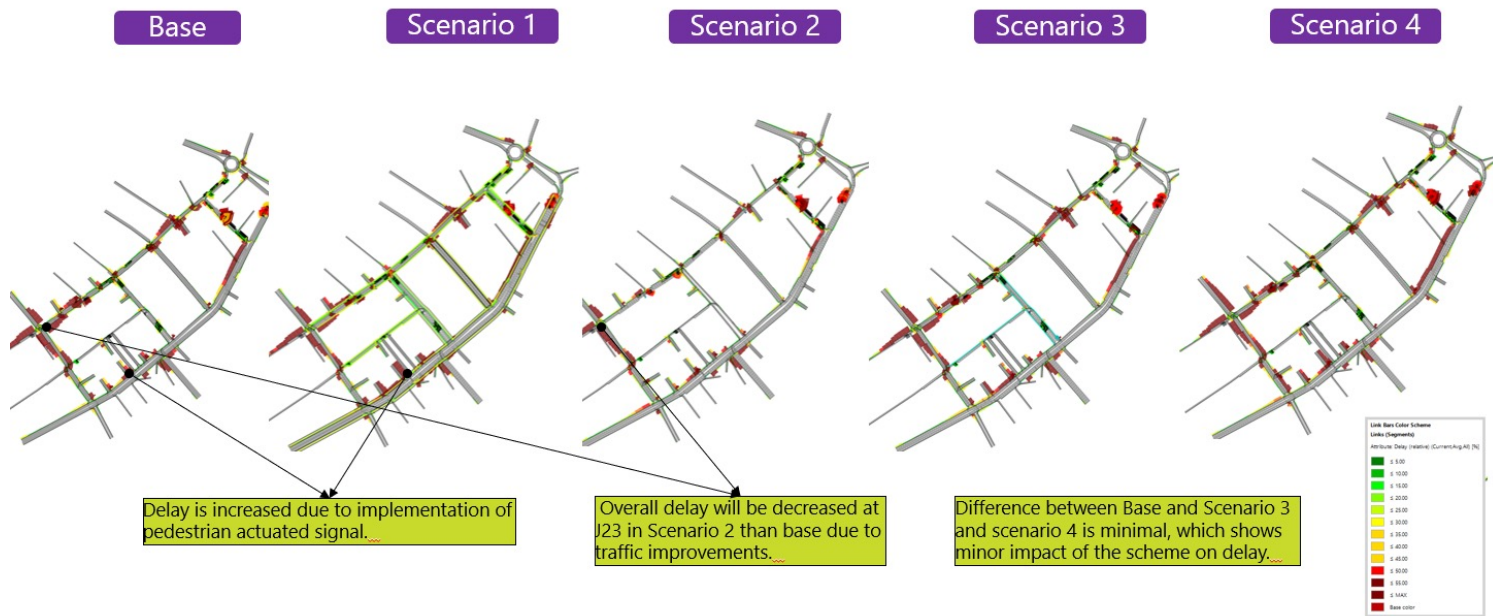
# Simulation Study Work Flow



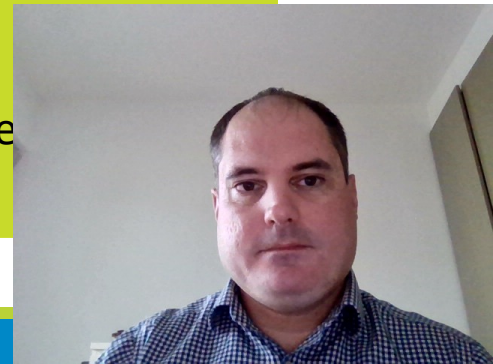


# Better Decision Making

- By comparing options through simulation, MBPP will be able to quantify benefits and trade-off's
- New ideas can rapidly be assessed without capital expenditure



- Travel time
- Travel time reliability
- Public transport performance
- Queue lengths
- Delay
- Density
- Parking
- Vehicle e





# Better Communication



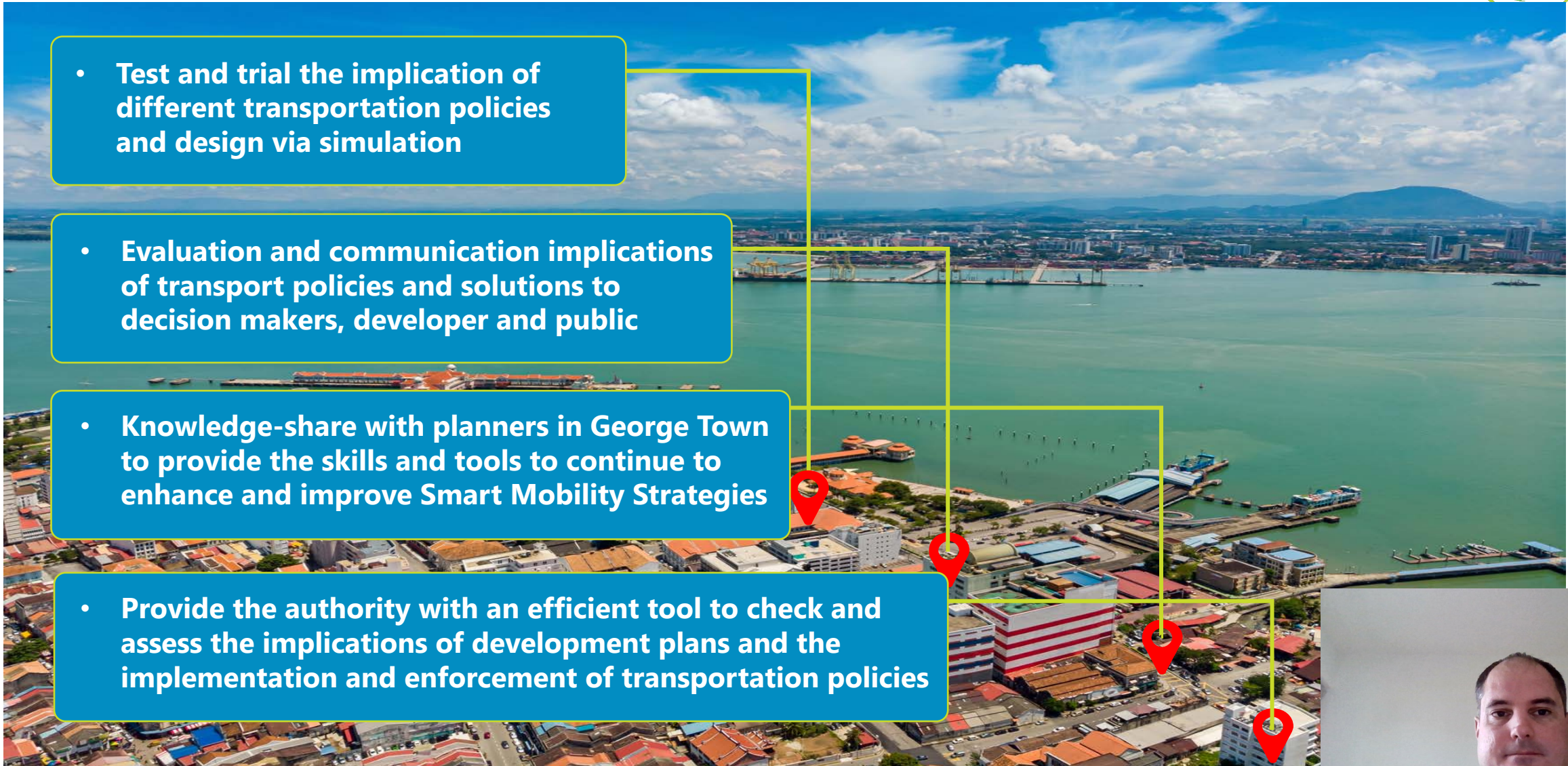
- Improved engagement with stakeholders and the community





# Summary

- Test and trial the implication of different transportation policies and design via simulation
- Evaluation and communication implications of transport policies and solutions to decision makers, developer and public
- Knowledge-share with planners in George Town to provide the skills and tools to continue to enhance and improve Smart Mobility Strategies
- Provide the authority with an efficient tool to check and assess the implications of development plans and the implementation and enforcement of transportation policies





# Stage 2 Introduction

## Full Area Model

- Expanding and calibrating the Vissim model to an extended area of historical Georgetown.
- Evaluate the potential impact of the strategies as tested, and advise on enhancements.

## TIA Guideline Changes

- Recommend changes to the TIA guidelines and / or other plans for Penang.
- Recommend any other strategies to achieve pathways to implementation.

## Accredited Vissim Training

- Full and accredited PTV Vissim training course for potential future users of the simulation model.

## Model Handover

- Conduct a simulation model handover (base year and scenarios tested) to the authority.

## Monitoring & Evaluation

- GESI Action Plan
- M&E Action Plan / Tracker



# Scenario Testing Summary – Interactive Report



## AASCTF PENANG SMART MOBILITY MICRO-SIMULATION MODEL DEVELOPMENT

Trial Area Model Scenario Testing Report

Hello.

I am an interactive file. Please refer to the following icons for easy navigation.

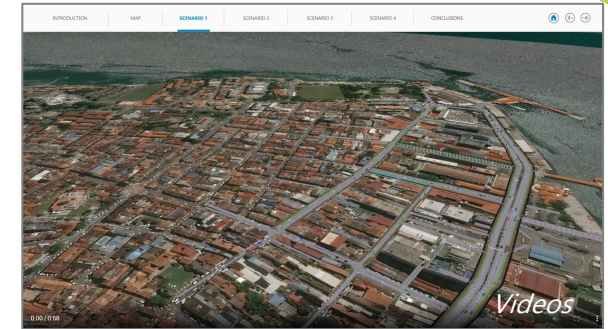
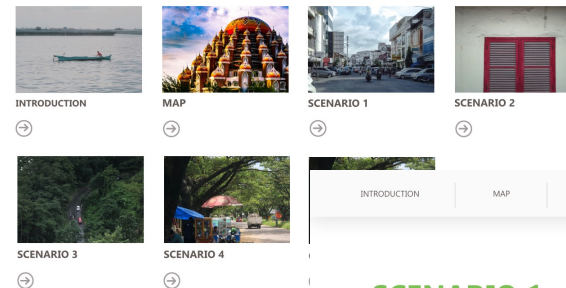
- ➡ Use the arrows to move between pages.
- 📍 Click the information button to learn more about our work.

Let's begin! ➡

**DETAILED OUTPUT**

- Level of Service**: The Highway Capacity Manual (HCM) uses the concept of Level of Service (LOS) as a qualitative measure to describe operational conditions of vehicular traffic. The criterion for determining LOS is the number of vehicles in seconds per vehicle.
- Delay**: Delay is the time loss of a traveller while waiting for transportation or while standing on a road network or in a queue for a particular service or facility which is represented by the passenger time requirements that will require desirable movement of traffic.
- Density**: Traffic density is defined as the number of vehicles occupying a unit length of roadway. The density may be defined as traffic density (no. vehicles or units per kilometre) of a highway section and the number of vehicles or units per kilometre of a road section. Traffic density may also be defined as the number of vehicles per kilometre of a road section. The space-time curve (jam density, average flow, and traffic concentration) and the clear gap between vehicles.
- Pedestrian travel time**: Average time taken for a vehicle to travel from one location to another within the road is defined as vehicle travel time.
- Speed**: Speed is defined as distance covered by a vehicle in a specific time period. Average speed is defined as speed calculated by a vehicle over a given stretch of road while the vehicle is in motion.

*Results*



**SCENARIO 1**

**DESCRIPTION**

Scenario 1, proposed for this study focuses on providing priority pedestrian and cyclist corridors in the core area of Georgetown. These facilities would mean pedestrians and cyclists will enjoy wider space when commuting through the city and be given priorities at key junctions. Overall, these measures are designed to improve the pedestrian experience and reduce the travel time needed through the city, resulting in a larger shift from traditional private car mode to walking and cycling. Visum simulation model is being used to test out the effectiveness on the priority scheme, as well as the impact on vehicular traffic when these schemes are implemented.

Traffic schemes proposed within this scenario are outlined in below table

ROAD	DETAILS
Gat Lebuh China	Provision of pedestrian pathway, walking path, small retail streets, cyclist priority and landscaping are proposed
Pengkalan Weld	Pedestrian pathway, landscaping, cyclist priority and actuated pedestrian signal at two locations are proposed
Beach Street	Provision of pedestrian pathway and streetlights are proposed
Lebuh Victoria	Provision of pedestrian pathway and streetlights are proposed
Gat Lebuh Geraja	Pedestrian pathway, small retail street and landscaping are proposed
Downing Street	Provision of pedestrian pathway and landscaping are proposed

📍 Click on the location icon for detailed information on road improvements in this scenario

