



*Guideline by:*



MINISTRY OF TRANSPORT MALAYSIA



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## ABBREVIATIONS, ACRONYMS & DEFINITIONS

<b>ADS</b>	Advanced Driving Systems
<b>APAD</b>	Land Public Transport Agency (Agensi Pengangkutan Awam Darat)
<b>Applicant</b>	an organisation applying to conduct an AV Trial or AV Passenger Service Trial
<b>Autonomous Vehicle (AV)</b>	An automated or self-driving road vehicle that can operate without assistance from a Safety Officer for at least part of a journey.
<b>AV Passenger Service Trial</b>	The act of testing an AV with passenger(s) on-board on the designated public roads
<b>AV Trial</b>	the act of testing an AV on designated public roads
<b>BSI</b>	British Standards Institution
<b>CCTV</b>	Closed-circuit television
<b>EC</b>	AV Evaluation Committee consists of stakeholders and experts
<b>ERP</b>	Emergency Response Plan
<b>Futurise / Secretariat</b>	A company mandated by the Malaysian Government to lead the National Regulatory Sandbox (NRS) as a public policy advisor to ministries and agencies.
<b>Guideline</b>	Guideline for Public Road Trials of Autonomous Vehicles developed by MOT and Futurise, in cooperation with Local Authorities
<b>ISO</b>	International Organization for Standardization
<b>JPJ</b>	Road Transport Department (Jabatan Pengangkutan Jalan)
<b>Local Authorities</b>	Local authorities consist of the city council, municipal council, or district council which shall include the owner of any private lands involve for the AV Trial and AV Passenger Service Trial
<b>MARii</b>	Malaysia Automotive Robotics and IoT Institute
<b>MIROS</b>	Malaysian Institute of Road Safety Research
<b>MOT</b>	Ministry of Transport Malaysia
<b>MS</b>	Malaysian Standard (Standards Malaysia)
<b>NRS</b>	National Regulatory Sandbox
<b>NxGV</b>	Next-Generation Vehicles
<b>ODD</b>	Operational Design Domain
<b>PDPA</b>	Personal Data Protection Act 2010 (Act 709)
<b>RTA</b>	Road Transport Act 1987 (Act 333)
<b>SAE</b>	Society of Automotive Engineers
<b>Safety Officer</b>	Individuals appointed by the Trial Organisation to ensure the safety during the AV Trial or AV Passenger Service Trial and will retain the driver duties to take over driving of the AV during fallback or to manage the passengers during the on boarding activities.
<b>SMP</b>	Safety Management Plan
<b>Trial Organisation</b>	an organisation that is approved to conduct an AV Trial or AV Passenger Service Trial
<b>Trial Witnessing</b>	Is a test required by the EC (if necessary) to support and validate the test report in the application form submitted by the Trial Organisation.
<b>UNR</b>	United Nation Regulations
<b>UTM</b>	Universiti Teknologi Malaysia
<b>VTA</b>	Vehicle Type Approval

# 1. BACKGROUND

## 1.1 INTRODUCTION

The World Health Organization (WHO) reported that around 1.35 million people were killed yearly as a result of road traffic. Financially, road traffic crashes cost about 3% of each country GDP yearly. A separate study suggested that human error causes at least nine out of ten accidents. Reducing human error risk by shifting and adopting automated/autonomous vehicle technologies and advanced driver's assistance system on vehicles, hold enormous potential to reduce crashes and vehicle-related fatalities.

According to the National Transport Policy 2019-2030, autonomous vehicles are expected to penetrate the transportation industry in Malaysia, dramatically changing existing business models, and requiring a rethink of the current transport regulatory and planning framework. To enable better governance, various parties, from Federal to State and Local Governments, research institutes, global organisations, civil society, as well as the private sector, must cooperate and contribute in the drafting of policies, regulations and laws which take into consideration issues such as security, safety, liability, connectivity, and data privacy.

Understanding the advancement of autonomous vehicle technology in Malaysia, it is a need to provide a safe testing ground for the industry players to facilitate experimentation. Through a collaboration between the Ministry of Transport Malaysia ("MOT") through National Regulatory Sandbox ("NRS") with Futurise since 2019, the first autonomous vehicle testbed ("MyAV") has been successfully developed in Cyberjaya, Selangor in the year 2020 with the first version of guideline established in the same year. In order to support the industry players to move further with the innovation of autonomous vehicle technology, MOT and Futurise are expanding MyAV to other suitable locations that have various types of testing applications such as people mover and transportation as a service.

In the National Automotive Policy (NAP) 2020, the Government through the Ministry of International Trade and Industry (MITI) and its agency, Malaysia Automotive, Robotics and IoT Institute (MARii) had formulated a vision-drive policy in enabling the development of AV and overall mobility ecosystem. Ultimately, the policy aims for ecosystem development towards Connected Mobility covering the technology and expertise development, standards and regulation, legislative, new business opportunities, intellectual property and others.

Knowing the advancement of technology in AV, the NAP 2020 had outlined the definition of AV, regarded as Next Generation Vehicle (NxGV). According to the policy, the NxGV is defined as Energy Efficient Vehicle (EEV) and featured with minimum of Level 3 Vehicle Automation (according to MS 2730: NxGV – Terminology, definitions and levels of Autonomous, Automated and Connected Vehicle). Additionally, the NAP 2020 further provides the roadmaps and blueprints for the AV ecosystem development to set the scene for the implementation landscape in Malaysia.

Simulation testing and vehicle testing are two categories for the AV testing regime. Testing of vehicles generally is divided into controlled and uncontrolled environments. Vehicle testing operations in a controlled environment are operated in a closed space, such as a test circuit or proving ground. However, vehicle testing activities in an uncontrolled environment are operated on public roads and in actual traffic. The performance of the AV system to safely self-manoeuvre without a driver or with the least amount of input from the driver was the primary focus of AV testing at first. Since then, AV technology has advanced, expanding its use to include passenger transportation services like taxis and shuttles. Due to this, current AV testing efforts now involve real passengers in an uncontrolled environment for conducting AV Passenger Service Trial.

Including an actual passenger during AV Passenger Service Trial triggers a safety risk that may result in harm, injury, or even death. Stakeholders must collaborate to implement the proper procedure to protect the passengers participating in the AV

Passenger Service Trial. As such, Section B of the Guideline assists the Trial Organisations in reducing passenger safety risks.

The term "Passenger Service" refers to road transport services for specific categories of users via cars, coaches, and buses. The term "Autonomous Vehicle" in Bahasa Malaysia is "Kenderaan Berautonomi."

## 1.2 PURPOSE OF GUIDELINE

This Guideline for Public Road Trials of Autonomous Vehicles ("Guideline") is intended as a guide for organisations planning to conduct AV Trial and AV Passenger Service Trial. The Guideline sets out pertinent information on the trial routes, application process, safety and technical requirements, and rules governing the conduct of such AV Trial and AV Passenger Service Trial.

This Guideline's main goal is to support the research and development activities concerning AV technologies in the country. The data and information collected from the AV Trial and AV Passenger Service Trial may be used in the future by the relevant authorities to develop a national policy and regulatory framework for AV adoption and application in Malaysia.

This Guideline consists of two (2) sections, namely Section A and Section B:

1. **Section A** - focus solely on the process of AV Trial and its required process including the application process and the trial phase until completion of the AV Trial meanwhile Section B focuses on AV Passenger Service Trial safety. The vehicle for the autonomous vehicle trial carrying passenger must meet all the conditions stated in Section A.
2. **Section B** - serves as a guide for Trial Organisations to take and implement safety precautions during the AV Passenger Service Trial. The primary purpose of Section B is to establish a basic safety guideline to reduce hazards that could result in passenger injury while supporting the country's trials of AV technology. Applicant who would like to conduct autonomous vehicle trial carrying

passenger must refer and comply to all the terms and conditions stated in Section B.

It is the responsibility of any interested party who wishes to conduct AV Trial and AV Passenger Service Trial to refer to the latest version of this Guideline via Futurise's official website or MOT's official website.

The Guideline does not replace existing regulations, road transport rules and statutory standards under the Road Transport Act 1987 ("Road Transport Act").

The Guideline is a living document, and will continuously be reviewed, edited, updated and/or expanded with new criteria or conditions. These new criteria or conditions will be obtained from the lessons learned/analysis/outcome from the trial activities or any new/additional requirements from other stakeholders and regulators.

## **1.3 AV STAKEHOLDERS**

Proper facilitation by the relevant Government agencies especially the regulatory bodies are imperative to ensure policies and regulations are in place to support the proliferation of AV technologies. Below are the main stakeholders supporting the AV ecosystem and their fundamental roles:

### **1.3.1 Ministry of Transport Malaysia ("MOT")**

1. Formulating the policies and to executing the amendments of the existing act, rules, and regulations to support the research and development activities and future adoptions/applications of autonomous driving and autonomous vehicles in Malaysia.
2. Coordinating and supervising the integration of different transport modes that are based on IR4.0, application of Intelligent Transportation System (ITS) and autonomous vehicles technologies to provide seamless travel needs, improve efficiencies, safety and mobility options for people and goods transport.

3. Responsible for regional and international cooperation in the field of transportation and development of AV in Malaysia.
4. Monitoring and reporting on AV Trial and AV Passenger Service Trial activities, research and development on public roads in Malaysia.
5. For the purpose of the AV Trial and AV Passenger Service Trial, providing approval for trials to be conducted on the designated public roads with the cooperation from the Local Authorities.

### **1.3.2 Road Transport Department Malaysia (“JPJ”)**

1. Monitoring, regulating and administration of motor vehicle safety standards, construction and usage regulation to ensure the road-worthiness and safety of the vehicles.
2. Registration and licensing of motor vehicles, including AV/NxGv and vehicles equipped with new technologies, upon gazetting of relevant rules and regulations.
3. Registration and licensing of drivers in Malaysia.
4. Administration and enforcement of road transport laws as stipulated under the Road Transport Act.
5. For the purpose of the AV Trial and AV Passenger Service Trial, to conduct continuous studies and to evaluate technical aspects of the AV during such trials, especially in relation to technologies installed (system and component level) and relevant technical standards for Vehicle Type Approval (VTA) processes in the future.

### **1.3.3 Malaysia Automotive, Robotics and IoT Institute (“MARii”)**

1. Formulating and implementing NAP 2020 as a vision-drive policy to support the development of Next Generation Vehicle (NxGV), which include AV related technologies and its ecosystem in Malaysia.
2. Bridging policy framework introduced by globally recognised platforms such as ISO, APEC, APWG, WP.29 and others.
3. The key point of contact between Government, Industry and Academia for the adoption of AV technology in Malaysia including technology and expertise

localisation, standards development, industry best practice and trade facilitation.

4. Leading stakeholder in validating emerging technologies and digitalisation agenda.
5. Stakeholder in the development of Intelligent Transportation System (ITS) in Malaysia to enable the AV.

#### **1.3.4 Local Authorities**

1. Planning for the transportation-related infrastructure development in the relevant authority areas.
2. The approval authority on the public roads or private roads to be used for AV Trial and AV Passenger Service Trial.
3. Enforcing municipal regulations and by-laws firmly and fairly.
4. Providing autonomous vehicle testbed for the purpose of the AV Trial and AV Passenger Service Trial as stated in Annexure A of this Guideline.

#### **1.3.5 Futurise Sdn. Bhd. (“Futurise”)**

1. Public policy advisor for industry and Government to increase Malaysia's overall competitiveness in the Future Economy through anticipatory policymaking.
2. Conduct industry studies and recommend measures to facilitate innovation in the community and improve the ease of doing business.
3. Mandated by the Government to drive the National Regulatory Sandbox initiative, being a strategic collaboration between the Malaysian government, academia, industries and entrepreneurs to expedite progressive and anticipatory regulatory intervention for the deployment of new industry sectors having strategic impact to the country (“NRS”).
4. The trials of AV are an activity falling within the innovation testing phase, which is a critical component of a regulatory sandbox.

### **1.3.6 Agensi Pengangkutan Awam Darat (“APAD”)**

1. Regulate and monitor the licensing aspects of public service vehicles, tourism vehicles, good vehicles and the railway services in Peninsular Malaysia, via two main functions :-
  - a. Monitoring and regulating operators' performance standards through licensing and stakeholders' engagement; and
  - b. Monitoring the service levels to ensure safe, efficient and reliable services for users.

### **1.3.7 Malaysian Institute of Road Safety Research (“MIROS”)**

1. Conduct comprehensive research on road safety and provide general direction for activities related to road safety research.
2. Assist in the development of objectives, policies and national priorities for the development and administration of road safety.
3. Collect, analyze and manage data related to road safety.
4. Develop, promote the use, add value and commercialize research findings on road safety.

### **1.3.8 Kementerian Kerja Raya (“KKR”)**

1. Study, plan, evaluate and enact new policies for the construction industry (infrastructure and buildings) in line with national development.
2. Coordinate, manage and improve the competence of human and financial resources.
3. Leading the implementation of the country's Intelligence Transportation System (ITS) to improve the effectiveness of the road network, safety and comfort of road users.

### **1.3.9 Universiti Teknologi Malaysia (“UTM”)**

1. Develop holistic talents and prosper lives through knowledge and innovative technologies.
2. Assist in the developments in the field of transportation and development of AV in Malaysia.

- Conduct relevant studies and recommend measures to support the AV ecosystem in Malaysia

<p><b>Policy Maker</b></p>	 <p>KEMENTERIAN PENGANGKUTAN MALAYSIA</p>
<p><b>Authority and Government Agency</b></p>	  <p>KEMENTERIAN KERJA RAYA</p>  <p>MARII INSTITUTE OF AUTOMOTIVE ROBOTICS AND IT MALAYSIA MALAYSIA AUTOMOTIVE ROBOTICS AND IT INSTITUTE</p>  <p>MIROS MALAYSIAN INSTITUTE OF ROAD SAFETY RESEARCH ASEAN ROAD SAFETY CENTRE</p>  <p>KEMENTERIAN PENGANGKUTAN AGENSI PENGANGKUTAN AWAM DARAT</p>
<p><b>Local Authorities</b></p>	 <p>SEPANG DUA JIWA PROBABILITI &amp; BERKUALITI</p>   <p>PERBADANAN PUTRAJAYA</p>   <p>rapidbus</p>
<p><b>Industry and Academia</b></p>	  <p>UTM UNIVERSITI TEKNOLOGI MALAYSIA</p> <p>AV industries AV industry players Academia Associations Insurance companies</p>

Figure 1: Malaysia AV stakeholder ecosystem.

## 1.4 Evaluation Committee

In conjunction with the introduction of this Guideline, MOT, in cooperation with Futurise, have established an Evaluation Committee (EC) with key responsibilities as the following:

1. Reviewing and evaluating any applications to conduct AV Trial and AV Passenger Service Trial submitted by any organisation;
2. Review and verify the safety and the technical specifications of autonomous vehicles prior to the trialling stage;
3. Evaluation of incident reports, accident reports, interim reports and end-of-trial reports; and
4. Propose relevant input to further refine the Guideline based on data collected and feedback received during the AV Trial and AV Passenger Service Trial, to become more comprehensive guidance document for the relevant stakeholders.

The EC consists of stakeholders and experts in the field of regulation, automotive automation technologies and transportation as follows:

1. Ministry of Transport Malaysia ("MOT")
2. Road Transport Department Malaysia ("JPJ")
3. Futurise Sdn Bhd ("Futurise")
4. Kementerian Kerja Raya ("KKR")
5. Malaysian Institute of Road Safety Research ("MIROS")
6. Agensi Pengangkutan Awam Darat ("APAD")
7. Malaysia Automotive Robotics and IoT Institute ("MARii")
8. Universiti Teknologi Malaysia ("UTM")

In addition to the EC members listed above, MOT and Futurise will invite relevant organisations from time to time to be a part of the EC, including local authorities representatives involved in the trial of autonomous vehicle(s) when necessary and according to specific needs/areas of discussion.

## 2. SECTION A: AV TRIAL

### 2.1 APPLICATION PHASE

#### 2.1.1 Routes for Trial

The designated routes available for trial under respective Local Authorities are described in Annexure A. Trial Organisation may also refer the designated routes via Futurise's official website. Trial Organisation must conduct the AV Trial only on the designated routes with no deviations or detours.

The duration of a trial is as follows:

1. Route A - a period of at least six (6) months commencing from the approval date; and
2. Route B - a period of at least twelve (12) months commencing from the approval date.

##### 2.1.1.1 Change in Routes

All trial routes are subject to evaluation and approval by the EC. In the event of any change in Route A and/or Route B, a public announcement notifying of such change will be published on Futurise's official website. It is the Trial Organisation's responsibility to review the website regularly.

#### 2.1.2 Application Process

##### 2.1.2.1 Application for Route A

1. To conduct an AV Trial on Route A, an organisation must obtain prior approval from Futurise.
2. Applicants shall be required to complete the application form which can be downloaded via Futurise's official website.

3. The completed application form must be submitted with the Safety Management Plan (as described in Section 2.1.3) and all other required supporting documents to Futurise via e-mail address ([myav@futurise.com.my](mailto:myav@futurise.com.my)).
4. All applications are to be submitted to Futurise at least one (1) month prior to the targeted trial start date for Route A.

The EC shall be officially notified on the application for the AV Trial by the Applicant(s) and to be provided with any supporting documents required submitted through Secretariat.

#### 2.1.2.2 Application for Route B

1. To conduct a trial on Route B, Trial Organisation must first obtain special approval from MOT (to be applied via Futurise) after being assessed and endorsed by the EC.
2. Trial Organisation may only submit an application for Route B upon prior and successful completion of an AV Trial on Route A for a continuous period of at least six (6) months. Repeatability performance of AV Trial success in Route A must be included in Trial Organisation's Route B application for assessment by the EC.
3. Trial Organisation shall be required to complete the application form which can be downloaded via Futurise's official website.
4. The completed form must be submitted together with an End-of-Trial Report (as described in Section 2.3.1) for Route A together with all other required supporting documents to Futurise via e-mail address ([myav@futurise.com.my](mailto:myav@futurise.com.my)).
5. All applications are to be submitted to Futurise at least one (1) month prior to the targeted trial start date for Route B.
6. Under the circumstances, if the Applicant can prove that they have completed sufficient testing and assessment equivalent to the Route A environment, MOT may consider waiving the requirement for the Applicant to complete Route A and allow the Applicant to proceed directly to conduct the trial at Route B subject to any other terms and conditions that is deemed

reasonable for EC to impose. In such an instance, the Applicant must submit a formal written request to EC providing sufficient justification and supporting documents for EC's consideration. If necessary, the applicant may be required to conduct a Trial Witnessing to ensure that the AV system and vehicle are ready and safe for the AV Trial at Route B.

7. Once endorsed by the EC, Futurise will submit the application to MOT for further deliberation and final decision.

The application process flow for both Route A and Route B is shown in Figure 2 below.

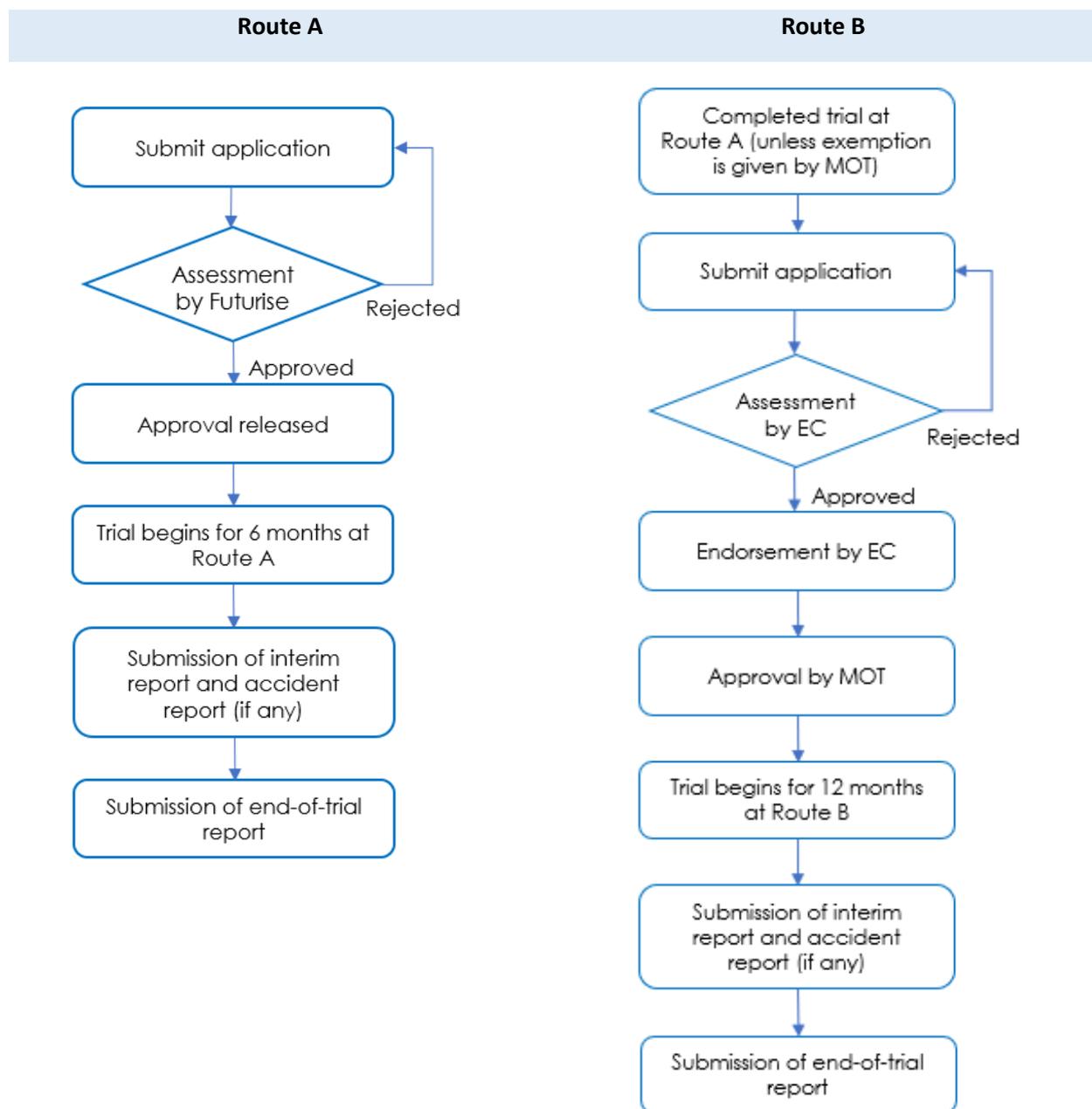


Figure 2: Trial application process flow for Route A and B

### 2.1.3 Safety Management Plan

The Safety Management Plan (SMP) aims to identify, outline, mitigate, and manage key safety risks that may arise from the trialling activities. Trial Organisation must have in place the SMP outlining all key relevant safety risks for the execution of the trial and how these risks will be mitigated or eliminated. The submission of the SMP is mandatory which is a supporting document for any AV Trial and AV Passenger Service Trial application. Applicant can download the Safety Management Plan (SMP) template via Futurise's official website. The SMP should include and address seven (7) key safety risks below:

#### 2.1.3.1 Cybersecurity

Artificial intelligence and machine learning system in AV are vulnerable to external attacks that could compromise the functioning of the vehicle and disrupt the safety elements. In addition to considering these threats during the design phase, Trial Organisation must take appropriate security measures such as validation and continuous risk assessment to prevent any unexpected situations and/or malicious attacks. Trial Organisation need to have a high level of preparedness and possess adequate response capabilities to handle cybersecurity issues.

All related parties involved with the Trial must be aware of the existence of any recorded data and ensure full compliance with applicable laws.

In managing data such as vehicle parameters (driving mode, vehicle speed, steering and braking command and activation) and sensor data (camera and lidar), Trial Organisation should refer to established security standards such as the BSI BS 10754-1:2018 Information Technology – Systems Trustworthiness – Governance and Management Specification as guidance.

Where personal data is collected by Trial Organisation, all parties must comply with the requirements of the PDPA in relation to processing, collection, movement, and protection of such data.

#### 2.1.3.2 Road Users

Road users such as drivers and passengers of other motor vehicles, cyclists and pedestrians will need to be critically considered and identified in the SMP in all trialling activities. Trial Organisation must take into consideration real-world behaviours by these road users which also include road workers involved in road construction and maintenance, road detours and roadblocks.

#### 2.1.3.3 Road Infrastructure

Diverse physical road infrastructure such as road pavements, road marks, road dividers, road signs, traffic lights, streetlight poles, building structures, crossings, junctions, and potholes will all need to be considered as part of the SMP. Road construction work that may be present along the trial routes includes road signs, dividers, machines, and equipment. Physical road infrastructures must be able to be recognized and analyzed by the onboard AV technologies in order to perform the necessary decisions and actions in ensuring the safety of the trial.

#### 2.1.3.4 System Failure

The SMP must outline the procedures to respond to all circumstances related to trial failure due to hardware, software or human errors. The procedure should include system redundancy and fallback options to prevent a collision from happening and/or reduce the impact of an accident when operating in autonomous mode. It is mandatory to have installed a notification system to alert the driver/operator during the trial of any systems or components failures. The notification system may be in any form, provided that the critical information is effectively conveyed and monitored throughout the trial. For failure and error that leads to safety issues, the Safety Officer

must immediately take control and manoeuvre the AV to a safe position to stop for system diagnostic and error rectification. The trial may continue once all AV systems and components are verified to be in safe and working order.

In the event of an accident, Trial Organisation should act and respond according to the Safety Trial Procedure (refer to Section 3.3) and file a report accordingly (refer to Section 4.3).

#### 2.1.3.5 Fallback

Fallback is a transition for the Safety Officer to take over the vehicle control from the automation system either by system request or by driver direct intervention and must be included in the SMP. It is an important feature in the event of AV system failure and error to prevent collisions or mishaps. The fallback features and mechanisms must be proven to be effective before any trialling can begin (in Route A or Route B).

The fallback feature must be incorporated in the AV system as a mechanism for the Safety Officer to intervene in taking over control of the vehicle. The fallback mechanism, such as the switch lever shown in Figure 3, must be designed to be within close reach of the Safety Officer so that he or she can easily intervene and activate the mechanism during an emergency.



Figure 3: Fallback mechanism switch.

#### 2.1.3.6 Safety Officer

It is mandatory for the Safety Officer to be present in the vehicle at all times during the AV Trial and AV Passenger Service Trial. The Safety Officer must be sufficiently trained to competently operate the AV systems and components, to respond to any safety issues and error notifications, and to take control of the vehicle immediately, and must be vigilant at all times when in the vehicle throughout the trial. A Safety Trial Procedure must be developed by the Trial Organisation (refer to Section 3.2) and to be referenced by the Safety Officer during AV Passenger Service Trial.

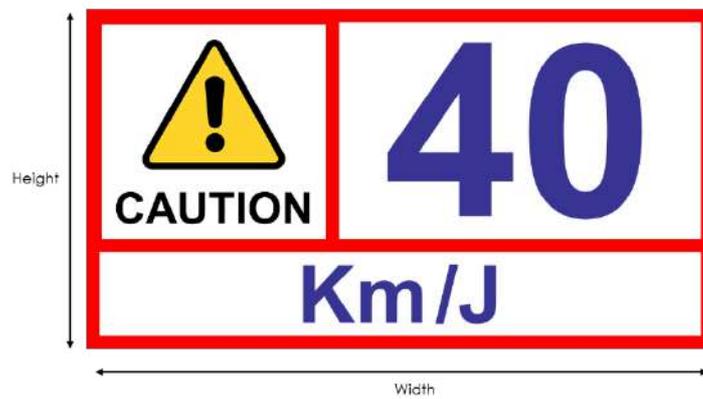
The Applicant must also provide written evidence that the Safety Officer has undergone proper and sufficient training related to the AV systems, components, and operations. Evidence that the driver/safety officer/operator is fit for duty may also be required. The driver/safety officer/operator must also behave with integrity, be responsible and accountable, and in an ethical manner throughout executing the trial.

#### 2.1.3.7 Vehicle Identifier

The AV must be equipped with a warning sign and a sticker, according to Figure 4.1 (a) and 4.1(b) respectively , with an amber beacon light as shown in Figure 4.2, during the AV Trial and AV Passenger Service Trial on both routes. The warning sign and beacon light must be supplied by the Trial Organisation. The warning sign must be affixed on both sides and the rear of the vehicle. The beacon light must be located on the roof of the vehicle. These are to alert other road users and vehicles as a safety precaution.



Figure 4.1 (a): Warning Sign



Sign Position	Height	Width
Back	13.7 cm	23.3 cm

Figure 4.1 (b): Speed Limit

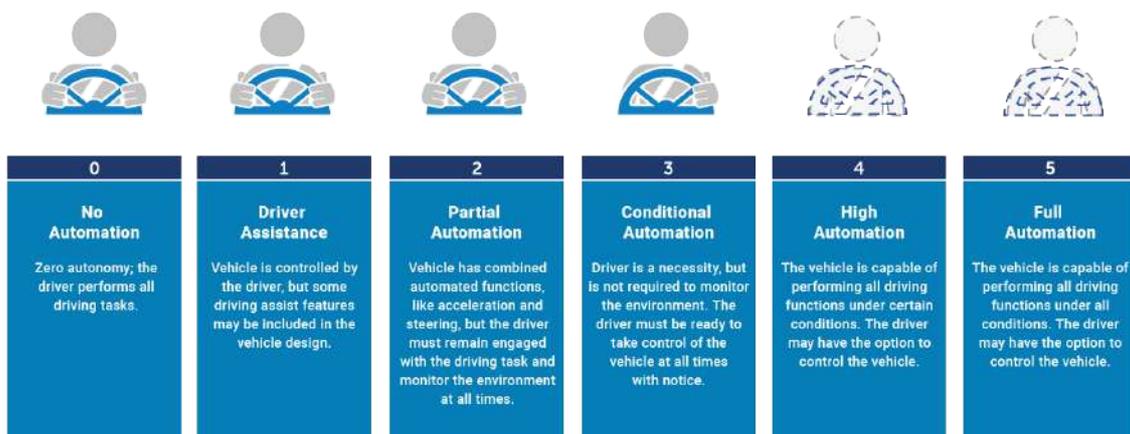


Figure 4.2: Amber Beacon Light

## 2.1.4 Vehicle Technical Specifications

The Road Transport Act was enacted to make provision for the regulation of motor vehicles and of traffic on roads and other matters with respect to roads and vehicles. Whether newly manufactured or imported as new or second-hand, the vehicle used for the AV Trial and AV Passenger Service Trial in Malaysia must comply with all the rules under the Road Transport Act. The rules include that the vehicle must be registered with JPJ, thus fulfilling the VTA requirements and complies to the relevant mandatory standards United Nations Regulations (UNR) and Malaysian Standard (MS) as shown in Annexure B.

The AV must be recognised as self-sufficient based on the precedent, set by the "SAE J3016 Levels of Driving Automation" as shown in Figure 5. Trial at either Route A or Route B is only allowed using autonomous vehicles up to Level 3 only.



Source: [https://www.nhtsa.gov/sites/nhtsa.gov/files/nhtsa\\_sae\\_automation\\_levels.png](https://www.nhtsa.gov/sites/nhtsa.gov/files/nhtsa_sae_automation_levels.png)

Figure 5: SAE automation levels.

Any application submitted must provide clear and detailed AV technical information consisting of safety protocols and technologies at both system and component levels. Installation of the technologies in the AV should be in accordance with established standards such as the International Organization for Standardization (ISO), Society of Automotive Engineers (SAE), UNR or MS. This is to enable study to be undertaken by

the JPJ on the technical specifications of the AV for possible fulfilment of the VTA process in the future.

For the purpose of EC endorsement and approval, Applicants through Secretariat shall provide the EC with relevant technical details in accordance to MS 2730: NxGV – Terminology, definitions and levels of Autonomous, Automated and Connected Vehicle consisting of the following:

1. System Safety;
2. Failsafe Response;
3. Human Machine Interface and Operator Information;
4. Object and Event Detection and Response (OEDR);
5. Operational Design Domain (ODD) for Automated Mode;
6. Validation for System Safety;
7. Cybersecurity and Over-the-air issues;
8. Software Updates; and
9. Event Data Recorder (EDR) and Data Storage System for Automated Driving (DSSAD).

### **2.1.5 Registration, Licensing and Safety Requirements**

The Applicant must ensure that the vehicles to be installed with AV technologies (component and system) have a valid motor vehicle registration with JPJ. The driver must hold a valid Malaysian competent driving licence in the relevant class when driving the vehicle. The usage of the vehicle on the road must adhere to all road traffic rules and regulations under the Road Transport Act.

In addition, the trialling vehicles must be equipped with the following:

1. a fallback mechanism as mentioned in Section 2.1.3.5.
2. a warning system that must be able to immediately and effectively alert and warn the Safety Officer of any system failure or error during the trial so that necessary safety actions can immediately be taken.
3. a suitable fire suppression system for road vehicle application.

- an emergency stop (E-stop) switch, as shown in Figure 6, as a safety mechanism used to mechanically switch off all systems in an emergency, when the AV cannot be shut down in the normal manner.



(a)



(b)

Figure 6: a) An example of an E-stop switch, (b) Position of E-stop switch near the safety officer/operator reach.

The AV must be equipped with data collection capability to record all trial activities and operations. The collected data and information as listed in Section 2.3.3 will be required for the purpose of conducting investigations, or to address any road safety issues or to be used in the study by the JPJ on the technical specifications of the AV.

In addition, the Trial Organisation ensure that the vehicles hardware modifications and conversions are safe, based on best engineering practices, and does not alter the vehicle original technical, system and components specification or the conventional vehicle operation under normal driving conditions. Sensors and components installed either inside or outside the vehicle must be safely secured so as not to cause any harm to other road users.

### **2.1.6 Insurance**

It is mandatory for all applicants to obtain relevant and adequate liability insurance coverage prior to any trialling activities. The liability insurance coverage must be sufficient to cover the vehicle and other road vehicles, product, public road users including pedestrians, road infrastructures, 3rd party owned buildings and physical infrastructures, occupational health and safety, and any other related risks. Suggested insurance types that can be obtained prior to conducting any trial include but not limited to:

1. Product insurance
2. CGL insurance for other road users and infrastructures

As proof, the Applicant must submit relevant documentation of the acquisition of such liability insurance coverage along with the application form.

### **2.1.7 Compliance with Law**

Unless a specific exemption has been granted by MOT, the Trial Organisation must comply with all applicable laws when conducting the AV Trial and AV Passenger Service Trial including:

1. Vehicle standards/regulations, road rules and traffic laws under the Road Transport Act 1987;
2. Road traffic safety standards under ISO 39001 Road Traffic Safety Management System; and
3. Data protection and privacy laws under Personal Data Protection Act 2010 ("PDPA").

### **2.1.8 Liability and Indemnity**

The Trial Organisation agrees and accepts that its participation in the AV Trial or AV Passenger Service Trial are at its own risk as required by the laws. MOT, APAD, JPJ, Futurise, MIROS, MARii, UTM, Local Authorities and other related government agencies

involved shall not be liable for any harm, injury or losses caused or incurred by the Trial Organisation's participation in the AV Trial or AV Passenger Service Trial howsoever.

The Trial Organisation agrees to indemnify, defend and hold harmless MOT, APAD, JPJ, Futurise, MIROS, MARii, UTM, Local Authorities and other related government agencies involved from and against any and all costs, claims, damages, liabilities, losses and expenses of whatsoever nature howsoever suffered, incurred or sustained by them, either individually or separately, which arise due to non-compliance of the Trial Organisation with any of the terms of this Guideline, or by the breach of any applicable law, or any injury to, or death of, a natural person, or any loss of, or damage to, real or personal property of any person, which is caused or contributed to by the Trial Organisation in relation to the AV Trial or AV Passenger Service Trial.

### **2.1.9 Right of Removal**

The Trial Organisation may be removed from the AV Trial or AV Passenger Service Trial by the EC:

1. if the Trial Organisation has committed or undertaken any fraud, dishonesty, deceit, misconduct, or similar actions including providing any false or incorrect information;
2. where the Trial Organisation is in breach or non-compliance with any of the terms of this Guideline; and/or
3. if the Trial Organisation's conduct is inappropriate or contrary to the spirit or intention of the AV Trial or AV Passenger Service Trial.

## **2.2 TRIALLING PHASE**

### **2.2.1 Trial Permitted Hours**

A Trial Organisation may conduct the AV Trial and AV Passenger Service Trial on Route A and Route B only during such days and time period as stated below:

Days : Monday to Sunday  
Time : 10:00 am to 12:00 pm  
: 02:00 pm to 05:00 pm

### **2.2.2 Safety Trial Measures**

The Trial Organisation should create a checklist of safety measures for the AV in pre-test check before each AV Trial or AV Passenger Service Trial starts. Among the measures that should be included are:

1. General vehicle inspection involving powertrain, electrical, suspension, and chassis systems to ensure the AV is safe to operate. Vehicle identifiers and beacon lights must be operational during the AV Trial or AV Passenger Service Trial.
2. Critical AV system inspection involving software, components, equipment, and instruments to ensure the AV is safe and operational as intended. Data logger and camera to record all AV Trial or AV Passenger Service Trial must always be operational.
3. The Safety Officer must possess the fitness and readiness to conduct the AV Trial or AV Passenger Service Trial. The Safety Officer must be reminded of the required routine and respond to all possible situations.
4. Aware of abnormal traffic and weather conditions that may cause the AV system to fail. Trial Organisations must decide whether to abort the AV Trial or AV Passenger Service Trial if the conditions are inappropriate.

### **2.2.3 Safety Trial Procedures**

The Trial Organisation must develop Safety Trial Procedures to act and respond in emergency or accident during the AV Trial or AV Passenger Service Trial . The Safety Trial Procedures must provide for all possible emergency situations and should clearly set out the steps and processes for the Safety Officer to effectively undertake. A written copy of the Safety Trial Procedures must always be available in the AV during the AV Trial and AV Passenger Service Trial as a reference for the Safety Officer. The

Safety Officer is required to comply with the procedures in the event of an emergency or accident.

## 2.3. POST-TRIAL PHASE

### 2.3.1 End-of-Trial Report

Upon completion or the expiry of the AV Trial or AV Passenger Service Trial, the Trial Organisation is required to submit an End-of-Trial report to Futurise's official website on the trial activities and outcomes. The template of the report can be downloaded via Futurise's official website . This report must consist the summary of the AV Trial or AV Passenger Service Trial activities, results, findings, conclusions, recommendations (especially in the aspects of safety, AV future applications and adoptions in Malaysia, and in the aspect of technical regulations and standards amendments) and outcomes but should not disclose any commercially sensitive information.

The End-of-Trial report shall be reviewed and endorsed by the EC for the purpose of recognition beyond the trial and a copy must be submitted to MOT and JPJ respectively.

#### 2.3.1.1 Technology Evaluation by the EC

Trial Organisation must provide detailed information regarding the technology adoption and development for the purpose of the trialling. Such information shall include the overall planning for the AV related technology, technical specifications and regulations adoption and localisation in Malaysia. Amongst the information to be submitted to EC include the following (but may be expanded/added):-

1. AV solutions – *i.e.* drive by wire, Artificial Intelligence, Sensor integration, etc;
2. Vehicle Localisation and Mapping;
3. Vehicle Cognition System;
4. Communication Protocol and Connectivity; and
5. Any other technology-related.

### 2.3.1.2 Data Sharing

The AV Trial and AV Passenger Service Trial activities are subjected to data and information sharing between Trial Organisation and the EC for the purpose of studying and preparing the legal framework towards AV adoptions in Malaysia. Trial Organisation must agree and consent with data sharing and depository of data (excluding commercially sensitive data and information) with the key EC stakeholders. All parties shall consent to not disclosing the shared data to external non-relevant parties related to this Guideline.

### 2.3.2 Monthly Interim Report

The Trial Organisation must submit progress reports to Futurise on monthly basis. The template of the report can be downloaded via Futurise's official website. Apart from reporting the AV Trial and AV Passenger Service Trial status, the report must also state and include descriptions of events and incidents that involve:

1. Near-miss accidents.
2. Safety Officer activating the fallback to take over the control of the vehicle due to error/failure or to avoid accidents.
3. Public suggestions, views and complaints, if any, regarding the trial activities of the AV.

Where any stakeholders in the EC requests an earlier report, the Trial Organisation shall comply with such request and submit a report within seven (7) calendar days from the date of request.

### 2.3.3 Accident Report

A major incident is defined as a crash or collision involving the AV Trial and AV Passenger Service Trial vehicle or a contravention of any road transport rules and regulations under the Road Transport Act 1987 such as driving exceeding the speed

limit or violation of a red-light signals. The Trial Organisation must adhere to the existing road collision reporting requirements as stipulated in the Road Transport Act 1987.

It is also the responsibility of the Trial Organisation to inform Futurise and submit an initial notification via e-mail or smart phone's applications on any major or minor incident within fifteen (15) minutes of the occurrence of the event. Thereafter, the Trial Organisation must submit an initial report to Futurise via Futurise's official website within three (3) hours and a full report within twenty-one (21) days of the incident occurring. For the full report, the Trial Organisation must collect, prepare and provide all data and information relevant to the incident so as to provide a complete and comprehensive description of the events that have occurred. The data and information must be provided in a format that can be read and interpreted by the authorities. The Trial Organisation must also assist to explain/provide clarification of the data and information for the authorities.

The relevant data and information in the full report should include but shall not be limited to the following:

1. Time, date and location;
2. Nature and description of the accidents;
3. Automation status (e.g., automated system, human driver/operator, transitioning);
4. Traffic, road, and weather conditions;
5. Environment;
6. Vehicle information (vehicle speed, brake and accelerator applications);
7. Sensor information in relation to other road users and the surrounding road;  
and
8. Identity of the vehicle operator at the time of the incident.

Authorities reserve the right to request for additional reports, data and information where deemed necessary and the Trial Organisation shall comply with such request in a prompt and timely manner.

### **2.3.4 Trial Extension**

Any Trial Organisation that wishes to extend the AV Trial and AV Passenger Service Trial is required to submit the end-of-trial report before applying to Futurise via Futurise's official website for a trial period extension.

### 3. SECTION B: AV PASSENGER SERVICE TRIAL

This Section B encompasses, but is not limited to, generic passenger safety procedures for the Trial Organisation to comply in safeguarding the passenger from injury. It explains the areas that may help the Trial Organisation ensure the safety of the passengers participating in the AV Passenger Service Trial.

For the avoidance of doubt, Trial Organisation for AV Passenger Service Trial shall completed the same process mentioned under *Figure 2: AV Trial application process for Route A and Route B* and comply with the requirements set forth under Section A of this Guideline.

#### 3.1 ELIGIBILITY FOR AV PASSENGER SERVICE

##### 3.1.1 Trial Organisation

1. Before applying for the AV Passenger Service Trial, the applicant must complete test in Route A and/or B as required in Section A of this Guideline. EC may ask the applicant to conduct a Trial Witnessing, pertaining to the operational domain of passenger service if it is deemed essential. It is to ensure that the AV system and vehicle are ready and safe for the AV Passenger Service Trial.
2. The applicant shall be required to complete the application via Futurise's official website. The applicant must complete the application form with all other required supporting documents to Futurise via e-mail at [myav@futurise.com.my](mailto:myav@futurise.com.my).

3. Figure 7 shows the flow chart of the AV Passenger Service Trial process.

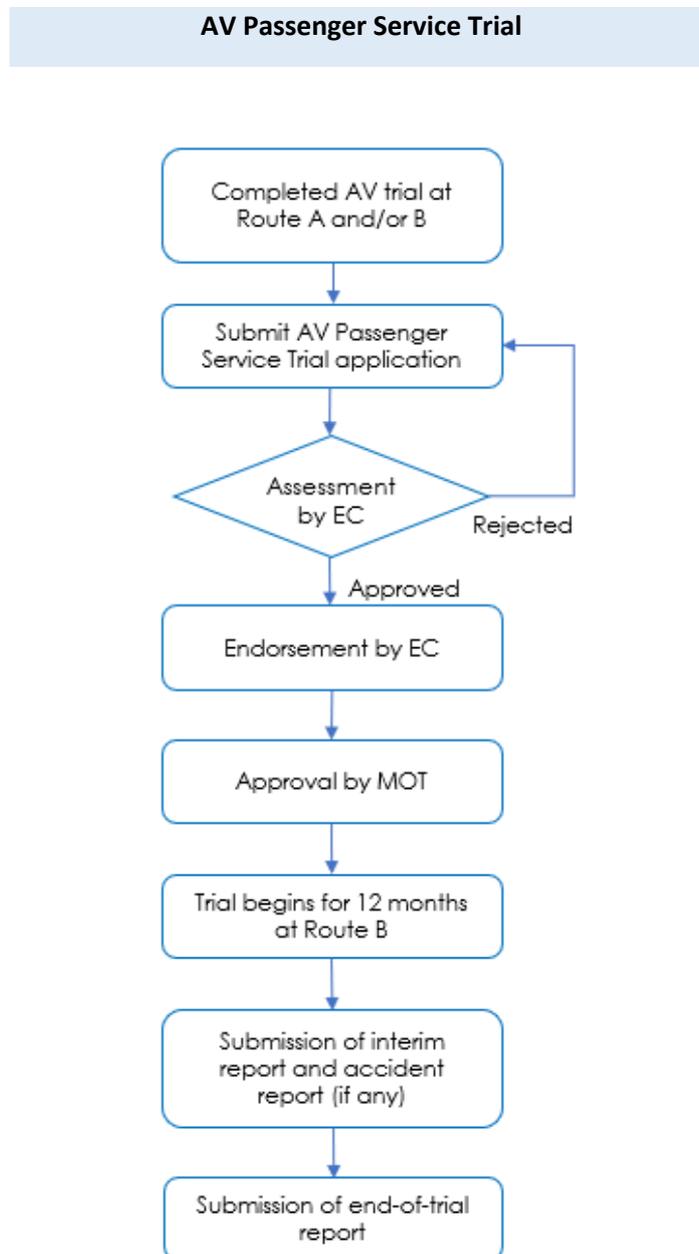


Figure 7: Flow chart of the AV Passenger Service Trial process.

### **3.1.2 Safety Officer**

1. The Safety Officer for the AV Passenger Service Trial must meet all the requirements outlined in Section A.
2. A Safety Officer must always be present in the vehicle during the AV Passenger Service Trial.
3. The Safety Officer's responsibilities during the AV Passenger Service Trial are outlined in Section 3.4.4.

### **3.1.3 Passenger**

1. AV Passenger Service Trial are exclusive to the selected passengers that have received written approval from MOT. The Trial Organisation must attach the list of passengers to the trial application form and submit it to MOT (to be applied via Futurise's Website) two (2) weeks before the trial date.
2. The Trial Organisation must select passengers who may safely participate in the AV Passenger Service Trial within these conditions:
  1. Age 18 years and above,
  2. No special needs (physical or mental disabilities),
  3. No illness or medium to long-term chronic conditions (pregnancy, casts/braces, surgical convalescence),
  4. Ability to grip and secure by restraint, and
  5. Agreed to comply with all the terms and conditions.
3. For the avoidance of doubt, the conditions mentioned above are also applicable to the passenger during trial witnessing activities.

### **3.1.4 Test Route, Schedule, and Conditions**

1. The planned routes, timeline, and requirements for the AV Passenger Service Trial are described in Section A, unless MOT has approved specific exemptions for the Trial Organisation.

## 3.2 STANDARD OPERATING PROCEDURE (SOP) FOR PASSENGERS

The Trial Organisation must develop a Standard Operating Procedure (SOP) for the selected passengers participating in the AV Passenger Service Trial. The SOP must be included in the passenger safety briefing before the trial and be accessible for reference, either digitally or physically. The SOP must be easy to grasp with the help of graphics and illustrations for passengers from various backgrounds. The SOP document must be attached to the trial application form.

The Trial Organisation may need to update the SOP following the most recent update of the 'Guideline for Public Road Trials of Autonomous Vehicles', or the AV Evaluation Committee (EC) request or instruction. The SOP for the passengers must include (3.2.1) Pre-Boarding, (3.2.2) Boarding, (3.2.3) On-Board, (3.2.4) Alighting, and (3.2.5) Emergency, as explained below.

### 3.2.1 Pre-boarding

The pre-boarding procedures for the passenger to:

2. Be aware of the expected pre-boarding activities and steps in the form of a flow chart.
1. Be aware of the approved route and stops.
2. Use the online platform application or similar platform for the service (if applicable).
3. Refer to the timetable/schedule of the service.
4. Wait at the designated locations and areas.
5. React and behave as the vehicle approaches.
6. React after the vehicle has stopped, which involves:
  1. When and how the passenger opens the door or waits for the automated doors to open.
  2. When and how the passenger enters the vehicle.
3. Be aware of all possible risks and hazards during the pre-boarding.

4. Recognize incidents, followed by how to react, or communicate with the Safety Officer.

### **3.2.2 Boarding**

The boarding procedures for the passenger to:

1. Be aware of the expected boarding activities and steps in the form of a flow chart.
2. Be aware of available visual or sound indicators, and safety infographics in the vehicle as guidance.
3. Enter the vehicle.
4. Register for recognition for being among the listed passenger via application (if applicable).
5. Manually close the door (if applicable).
6. Move inside the vehicle and take a seat.
7. Fasten the seat belt (if applicable).
8. Be aware of possible risks and hazards during boarding.
9. Recognize incidents, followed by how to react, or communicate with the Safety Officer.

### **3.2.3 On-board**

The on-board procedures for the passenger to:

1. Be aware of the expected on-board activities and step in the form of a flow chart.
2. Expect when the vehicle starts to move.
3. Behave accordingly while the vehicle is moving.
4. Aware of the signals and information from available visual or sound indicators.
5. Be aware of possible risks and hazards during on-board.
6. Be aware of the expected vehicle behaviour.
7. Recognize incidents, followed by how to react, or communicate with the Safety Officer.

8. Be aware of emergency switch availability and the penalty for misuse.

### 3.2.4 Alighting

The alighting procedures for the passenger to:

1. Be aware of the expected alighting activities and steps in the form of a flow chart.
2. Notify the vehicle to stop at the desired destination (if applicable).
3. Unfasten the seat belt (if applicable).
4. Getting off the seat and moving out of the vehicle
5. Manually close the door (if applicable).
6. React and behave as the vehicle departs.
7. Be aware of possible risks and hazards during alighting.
8. Recognize incidents, followed by how to react, or communicate with the Safety Officer.

### 3.2.5 Emergency

The emergency procedures for the passenger to:

1. Recognize incidents, followed by how to react, or communicate with the Safety Officer.
2. Be aware of the expected activities and steps during an emergency in the form of a flow chart.
3. Communicate with the Safety Officer.
4. React and respond according to the Safety Officer.
5. Contact the first responders in certain conditions.
6. Be aware of possible risks and hazards during recovery and rescue.

## 3.3. RISKS

The potential risks that could arise during the AV Passenger Service Trial operations are highlighted in this section. The Trial Organisation must be aware of the hazards that

have been identified and then take the necessary precautions to lessen or eliminate those risks. The risk mentioned in this Section B is not, however, all-inclusive, and it should not be restricted. The Trial Organisation is encouraged to discover additional potential dangers to guarantee that the AV Passenger Service Trial is as safe as possible.

Different types of AV vehicles may pose varying levels of risk. When conducting their AV Passenger Service Trial, the Trial Organisation must consider the general categories of risks listed below without limitation. This Section B classifies the risks involving Safety Officers and passengers into three categories: (3.1) Vehicle Crash, (3.2) AV System Failure, and (3.3) Improper Vehicle Design & Dynamics.

### **3.3.1 Vehicle Crash**

1. In the event of a crash, the Safety Officer and the passengers are at risk.
2. The Safety Officer, passengers, and other road users may suffer harm, injuries, or even death from crash.
3. The passive safety features that come with the vehicle may not function to protect the occupants of the vehicle and other road users during a crash.
4. The Safety Officer and passenger failed to act reasonably given their duty of care which may lead to a crash.
5. The impact of a crash may result in serious bodily harm to the Safety Officer and passengers, including shattered bones, traumatic brain injuries, spine injuries, internal organ injuries, and more.
6. A crash could result in a fire and explosion.
7. A crash can potentially throw the Safety Officer and passenger out of the seat or vehicle, resulting in serious injury.
8. The Safety Officer and passenger may be trapped inside the car after a crash, making it impossible for them to escape or be rescued.
9. Safety Officer and passenger evacuation from a crash may cause an accident involving another road vehicle.

10. A secondary crash involving another road vehicle may occur following the removal of passengers from a stalled vehicle.

### **3.3.2 AV System Failure**

1. If errors in the AV system are not detected and alerted to the Safety Officer, it may lead to a crash.
2. If the Safety Officer fails to immediately respond accordingly following an error in the AV system, it may lead to a crash.
3. ODD in the AV system may not represent the actual environments the ADS needs to operate may lead to a crash.
4. AV that operates outside the ODD may lead to a crash.
5. The Safety Officer, passengers, and other road users may be exposed to fire and electrocution risks if the AV system fails.
6. Extreme environments such as downpours, floods and potholes may lead the AV system to fail, or the vehicle to crash.
7. A malfunctioning AV system may force-lock the doors, preventing the occupants from escaping or being rescued.
8. Automated doors that open or close incorrectly by the AV system put the passenger's limb in danger of becoming caught in the door's movement and injuring themselves.
9. The passenger may fall inside or outside the vehicle while entering or exiting the vehicle if the AV system fails to detect the passenger's movements.
10. Passengers may experience anxiety as a result of the vehicle's erratic movement by the AV system.

### **3.3.3 Improper Vehicle Design and Dynamics**

1. The vehicles' interior and exterior design may not be appropriate for the activities covered by the AV Passenger Service Trial, which could result in an accident and injury to the passenger.

2. Improper vehicle motions, such as aggressive acceleration, deceleration and turning during the trial may result to incident. Aggressive vehicle motions may also cause the Safety Officer and passenger to be discomfort, drowsy, imbalance and dismount from the seat.
3. Inadequate air conditioning, ventilation, seats, and other cabin features may cause discomfort and other health problems.

### **3.4. MITIGATIONS**

The risk mitigation strategies used in this Guideline are commonly classified as follows but are not limited. These are the actions that the Trial Organisation must take for the AV Passenger Service Trial. The Trial Organisation is encouraged to implement additional measures to guarantee that the AV Passenger Service Trial is as safe as possible.

#### **3.4.1 AV Design, Testing & Validation**

1. The Trial Organisation must consider how the control layers; sensing, perception, planning, and actuation of the AV system will safely accommodate passenger service trial operations.
2. The Trial Organisation must consider how the vehicle's overall design will safely accommodate the AV Passenger Service Trial. The Trial Organisation must inspect and ensure the vehicle's passive safety is operational. The organisation must ensure the conditions of the air conditioning, ventilation, seats, and other cabin features do not cause discomfort and other health problems.
3. The Trial Organisation must consider how the vehicle's driving dynamics will safely accommodate the AV Passenger Service Trial from causing discomfort and other health problems.
4. The Trial Organisation is responsible for ensuring the vehicle's interior and exterior designs are suitable for the activities covered by the AV Passenger Service Trial to avoid endangering the Safety Officer and passenger.

5. The anticipated trial environment and conditions must be met to successfully test and validate the AV system's ODD. The Trial Organisation must consider the passenger as part of the element in the ODD.
6. According to Section A, the vehicle must be capable of acting safely, morally, and in compliance with all applicable laws. If the vehicle has been modified, the Trial Organisation must ensure that it is safe to accommodate passenger service activities. Safety justification of the minor modification must be included as an attachment in the application form.
7. The Trial Organisation must inform and educate the nearby first responders about the vehicle and AV system before the trial period to assist them in rescue and incident handling in an emergency.
8. Upon application submission, a witness trial by the Trial Organisation may be requested by the EC to support the assessment as described in Figure 7.

### **3.4.2 Passenger Service**

1. The Trial Organisation must conduct a safety briefing for the selected passengers. All selected passengers should be aware of the SOP and safety-related measures.
2. The SOP must be made available to the passengers, either digitally or physically before the trial. The SOP's content must be easy to understand for the passenger and include graphics.
3. The Trial Organisation must ensure that only authorised passengers are permitted to board the vehicle during the AV Passenger Service Trial.
4. The number of passengers must only be at most 70% of the vehicle's maximum capacity (including the Safety Officer).
5. The Trial Organisation must provide an indicator on the vehicle, either visual information or an audio announcement to (i) Notify the vehicle's departure and arrival, and (ii) guide the passenger's boarding and alighting. The Trial Organisation must attach evidence of the indicator's installation to the trial application form.

6. Sufficient time must be provided for the passenger to board and alight the vehicle.
7. There must be an emergency switch for the passenger. The Trial Organisation must attach evidence of the emergency switch installation to the trial application form.
8. An emergency switch is required to open the door if the vehicle has automated doors.
9. A platform for passengers to offer feedback or lodge a complaint about the service must be made available by the Trial Organisation. The platform must also be accessible by the related authorities to monitor.
10. In addition to the vehicle identifier as stated in Section A, the vehicle must also be equipped with a warning sign, according to Figure 8 during the AV Passenger Service Trial. The Trial Organisation must supply the warning sign. The warning sign must be on both sides and the vehicle's rear.



Figure 8: Warning sign "PASSENGER ON BOARD".

### 3.4.3 Emergency Response Plan

1. The Trial Organisation must develop an Emergency Response Plan (ERP) that foresees the sequence of steps they will take in the case of a significant crisis to protect the passengers and limit the effect. The ERP helps Trial Organisations deliver top-notch services and keep their operations secure.

2. During the AV Passenger Service Trial, the ERP is meant to act as a reference point and a manual for managing crises.
3. The ERP contains information that offers efficient risk-based responses and how the risks connected with passenger service execution will be eliminated or minimised. Refer template in Annexure C. The Trial Organisation must attach the ERP document to the trial application form.
4. The Trial Organisation is responsible for ensuring that all their personnel involved with the trial, particularly the Safety Officer, are aware of and adhere to the ERP.

#### **3.4.4 Safety Officer**

1. The Safety Officer must be present inside the vehicle at all times to act as a Safety Officer and ensure that all actions involving the vehicle and passengers are done correctly and safely.
2. Safety Officer must fasten the seat belt.
3. All Safety Officers involved with the AV Passenger Service Trial must sign an indemnity form supplied and kept by the Trial Organisation.
4. It is the duty of the Safety Officer to:
  1. Inspect and ensure that the vehicle is fit for the trial activities daily.
  2. Ensure all passengers wear seat belts and secure in their seats. Any safety concerns must immediately be addressed to the passengers.
  3. Constantly monitor and be alert on the AV system's operation.
  4. The Safety Officer must act immediately to prevent an incident from occurring in the event of a malfunction or error.
  5. In an emergency, Safety Officer must respond appropriately following the SOP and guide the passenger to safety.
  6. The Safety Officer has the right to remove any passengers if they are found to disrupt the trial with respect to and not limited to the non-compliance of the SOP.

### **3.4.5 Passenger**

1. The Trial Organisation must conduct a safety briefing for the selected passengers before providing the service to ensure that their boarding, travel, and alighting behaviours are appropriate and safe. The organisation must make every effort to ensure that the Safety Officer and selected passengers are familiar with the safe operation and SOP of the trial activities.
2. The Trial Organisation must make every effort to ensure that the Safety Officer and selected passengers are reminded of the safety and SOP through sufficient signs and pamphlets in the vehicle.
3. Effective communication between the Safety Officer, passenger, and Trial Organisation must be available for assistance requests, feedback, and emergency alarms throughout the duration of the AV Passenger Service Trial.
4. All selected passengers must sign an indemnity form, supplied, and kept by the Trial Organisation.

### **3.5. MONITORING AND ENFORCEMENT**

1. The vehicle must be equipped with data collection capability, as stated in Section A.
2. The vehicle must have on-board CCTV to record all Safety Officer and passenger activities during the trial. The vehicle must also have front and rear view cameras to record the driving and traffic during the trial. The Trial Organisation must attach the evidence of the CCTV and camera installation to the trial application form.
3. Authorities will use the data, information, and video footage gathered if necessary to conduct investigations, address any road safety issues, or conduct research.
4. Trial Organisations must submit the required reports as outlined in Section A. The report must also address passenger safety concerns and non-compliances during the trial. The organisation must include any SOP non-compliance and near-miss events occur during the trial activities in the reports.

5. The Trial Organisation must be able to submit the collected data, information, and video footage to the authorities to conduct investigations, address any road safety issues, or conduct research if necessary.

### **3.6. LIABILITIES**

1. The Trial Organisation recognises and accepts that its participation in the AV Passenger Service Trial is at its own risk.
2. MOT, APAD, JPJ, Futurise, MIROS, MARii, UTM, Local Authorities and other related government agencies engaged are not accountable for any harm, injury, or losses caused or incurred due to the AV passenger service trial.
3. The Trial Organisation is responsible for keeping its AV in safe working order and assigning Safety Officers who are fully qualified and capable of using them. The AV must be in excellent working order, and any faults discovered must be addressed immediately to avoid an occurrence that results in passenger injury while the AV is in service.
4. The Trial Organisation must obtain relevant and adequate liability insurance coverage before any trialling activities. In addition to the insurance types stated in the Section A, the organisation must also obtain group personal accidents to cover the selected passengers.
5. The insurance provider may demand that the Trial Organisation reveal all vehicle information, AV system capabilities, selected passenger information, trial route, service schedule and other trial conditions in order to apply for the insurance.
6. The Trial Organisation must attach the evidence of the procured liability insurance to the trial application form.
7. All Safety Officers and passengers must sign an indemnity form supplied and kept by the Trial Organisation.

### 3.7. APPLICATION SUBMISSION

In addition to meet the requirements stated in Section A, the submission for the AV Passenger Service Trial must also consist of the following:

1. Completed trial application form,
2. SOP (for passenger) document,
3. ERP document,
4. List and details of selected passengers,
5. If applicable, safety justification of any design interior and exterior minor modifications,
6. Evidence of:
  1. Route A and/or B test completion (report),
  2. CCTV and front-rear view cameras installations,
  3. Visual and audio indicators for passengers during boarding, on-board, alighting and emergency,
  4. Emergency switches for the passenger, and
  5. Communication platform for feedback or complaints.
7. Upon approval, procured insurance covering the selected passengers must be shown prior to the AV Passenger Service Trial.

## 4. CONTACT DETAILS

### 4.1 **MINISTRY OF TRANSPORT MALAYSIA (MOT)**

No. 26, Jalan Tun Hussein, Presint 4  
62100 Putrajaya  
Wilayah Persekutuan Putrajaya  
Tel: +603-8000 8000  
Attention to: Undersecretary, Land Division

### 4.2 **ROAD TRANSPORT DEPARTMENT MALAYSIA (JPJ)**

Aras 3-5, No. 26, Jalan Tun Hussein, Presint 4  
Pusat Pentadbiran Kerajaan Persekutuan  
62100 Putrajaya  
Wilayah Persekutuan Putrajaya  
Tel: +603-8000 8000  
Attention to: Bahagian Kejuruteraan Automotif

### 4.3 **FUTURISE SDN. BHD.**

Block 3710, Persiaran APEC Cyber 8  
63000 Cyberjaya  
Selangor Darul Ehsan  
Tel: +603-8315 6033  
Attention to: Innovation Ecosystem Division

### 4.4 **MALAYSIA AUTOMOTIVE, ROBOTICS AND IOT INSTITUTE (MARI)**

Block 2280, Jalan Usahawan 2  
Cyber 6  
Selangor Darul Ehsan  
Tel: +603-8318 7742  
Attention to: Strategy and Policy Development Division  
Email: spd@marii.my

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## ANNEXURE A

Routes for trials:

1. Cyberjaya, Selangor
2. Putrajaya, Wilayah Persekutuan
3. Iskandar Puteri, Johor
4. MRANTI Park, Wilayah Persekutuan
5. BRT Sunway, Selangor

### A1. CYBERJAYA, SELANGOR

There are two (2) routes available for trials in Cyberjaya, Selangor under Majlis Perbandaran Sepang (MPSepang), being Route A and Route B. Applicants must conduct the AV Trial and AV Passenger Service Trial only on these two (2) designated routes with no deviations or detours.

#### A1.1 Route A

1. Route A shown in Figure A.1 is a route for AV Trial and AV Passenger Service Trial in a controlled environment within the Futurise building compound located at Block 3710, Persiaran Apec, Cyber 8, 63000 Cyberjaya, Selangor.
2. The route is currently a public road providing limited access to offices and parking within the compound.
3. The route measures a total distance of 800 metres.
4. The road is made of asphalt.
5. The road design is a two-lane single carriageway (two lanes with oncoming traffic in each direction), separated by lane markings.
6. The route comprises of intersections and road humps without traffic lights.

7. Along the route, there are parked vehicles (mostly cars and motorcycles), temporary road marking cones, road signs, streetlights, trees, fire hydrants and buildings.
1. The presence of pedestrians is minimal.
2. Under normal conditions, traffic congestion is free flow.
3. The advisory speed limit for Route A is 20 km/h, the speed limit for the trial is 20 km/h.



Figure A.1: Route A in Cyberjaya.



Figure A.2: Route A road conditions in Cyberjaya.



Figure A.3: Route A road conditions in Cyberjaya.

## A1.2 Route B

1. Route B shown in Figure A.4 consist of roads from Persiaran Apec, Persiaran Rimba Permai, Persiaran Ceria, Persiaran Cyber Point Selatan and Jalan Cyber Point 5 in Cyberjaya, Selangor.
2. Route B is a public road with a real-world driving environment where Trial Organisation can conduct its AV Trial and AV Passenger Service Trial .
3. The route is used by the public for daily commute purposes.
4. The route measures a total distance of 6.25 km.
5. The road is made of asphalt.
6. The route consists of roads with a four-lane single carriageway (two lanes in each direction) and a six-lane single carriageway (three lanes in each direction), separated by a road divider.
7. The route comprises of intersections, road humps, zebra crossings and traffic lights.
8. Along the route, there are temporary road marking cones, temporary road dividers, road signs, streetlights, trees, bus stops and buildings.
9. Occasionally, there may be road constructions at a few locations along the route. The presence of pedestrians is very minimal.
10. Under normal conditions, traffic congestion is free flow.
11. The advisory speed limit for Route B is 60 km/h, however for trials the speed limit is 40 km/h.

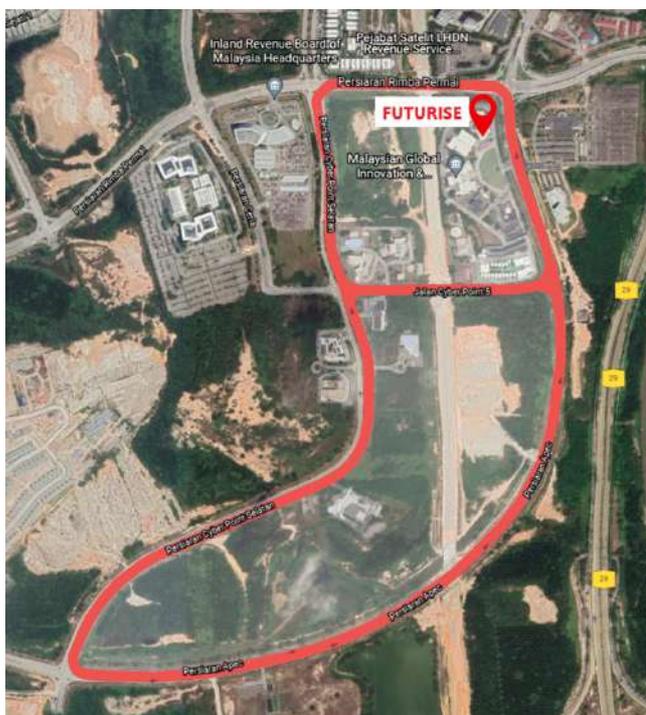


Figure A.4: Route B in Cyberjaya



Figure A.5: Route B road conditions in Cyberjaya.



Figure A.6: Route B road conditions in Cyberjaya.

### A1.3 Contact Details

Sepang Municipal Council (MPSepang)  
Persiaran Semarak Api, Cyber 1  
63200 Cyberjaya  
Selangor Darul Ehsan  
Telephone: +603-8319 0200 / +603-8319 0300  
Attention to: Smart City Unit

## A2. PUTRAJAYA, WILAYAH PERSEKUTUAN

There are two (2) routes available for trials in Putrajaya, Wilayah Persekutuan under Perbadanan Putrajaya, being Route A and Route B. Applicants must conduct the AV Trial and AV Passenger Service Trial only on these two (2) designated routes with no deviations or detours.

### A2.1 Route A

1. Route A shown in Figure A.7 is a route for AV Trial and AV Passenger Service Trial in a controlled environment within Taman Wetland Putrajaya.
2. Route A is currently a public road providing limited access to offices (Nature Interpretation Center Building), open parking space, public park (Wetland Park) and recreational areas.
3. The route measures a total distance of 2.7 km.
4. The road is made of asphalt.
5. The road design is a combination of a two-lane single carriageway (two lanes with oncoming traffic in each direction), separated by lane markings and a single-lane one direction.
6. The route comprises of intersections and roundabout without traffic lights.
7. Along the route, there are parked vehicles (mostly cars), road signs, trees, gazebos and buildings.
8. The presence of pedestrians and cyclist ranges from minimal to medium.
9. Under normal conditions, traffic congestion is very rare.

10. The speed limit for trial is 20 km/h.

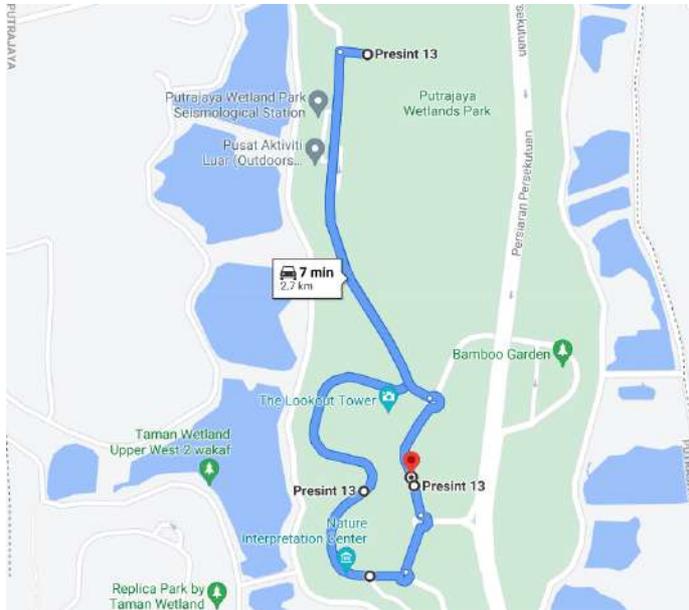


Figure A.7: Route A in Putrajaya.

## A2.2 Route B

11. Route B shown in Figure A.8 is located within Persiaran Perdana, Lebuh Bestari and Jalan P18.
12. Route B is a public road with a real-world driving environment where Trial Organisation can test its autonomous systems and functions.
13. The route provides access to offices (government and private), parking space, boulevard, square, residential and school areas.
14. The route is being used by public for daily commute purposes.
15. The route measures a total distance of 12 km.
16. The road is made of asphalt.
17. The road design is a combination of a six-lane single carriageway (three lanes in each direction separated by boulevard median) and a two-lane in each direction separated by road divider.
18. The route comprises of intersections, road humps, zebra crossing, roundabout and traffic lights.
19. Along the route, there are parked vehicles, road signs, trees, temporary road marking cones, bus stops and buildings.

20. The presence of pedestrians, cyclist and other road user ranges from medium to high.
21. There may be road constructions along the routes.
22. Under normal conditions, traffic congestion ranges from medium to high.
23. The Trial Organisation is required to use a special dedicated lane for public transport that will be implemented at Persiaran Perdana and Jalan Sultan Salahuddin.
24. If there is a need for the AV to stop for rectification purposes, the Trial Organisation is required to use the taxi stop point/taxi layby.
25. The speed limit for trial is 40 km/h.

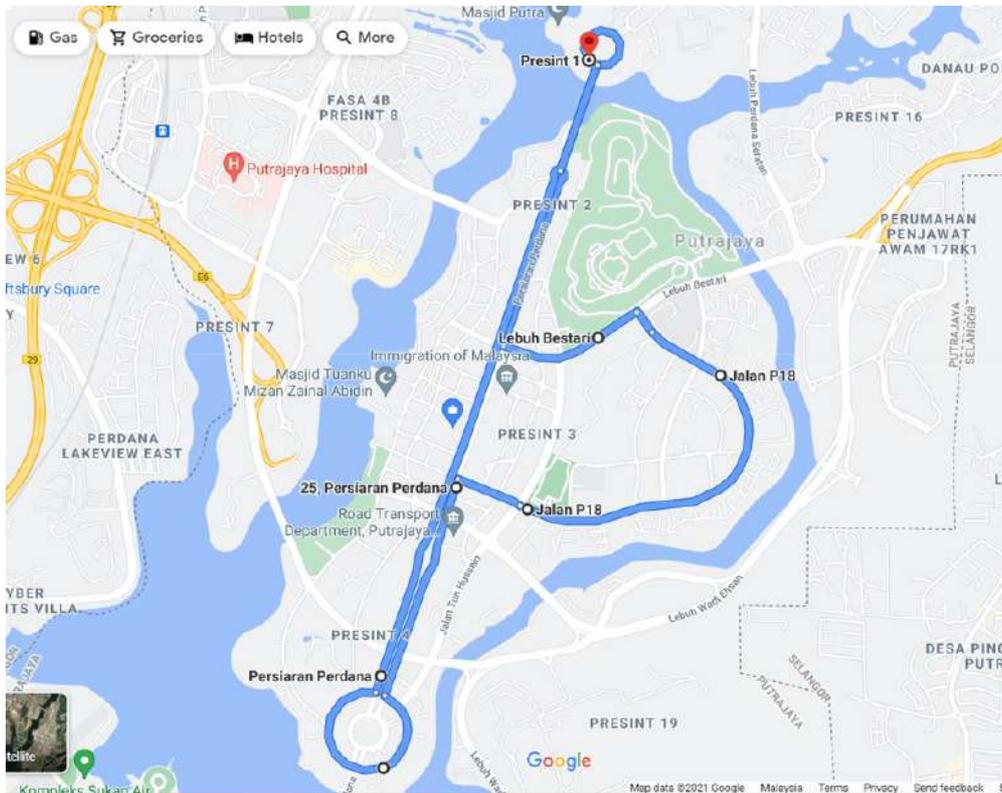


Figure A.8: Route B in Putrajaya.

### A2.3 Contact Details

Perbadanan Putrajaya  
Kompleks Perbadanan Putrajaya  
24, Persiaran Perdana, Presint 3  
62675 Putrajaya  
Telephone: +607-8000 8000

Attention to:

1. Encik Mohd Musabri Shaharom
2. Puan Fatimatuzzahrah Hosni
3. Encik Mohd Fahmi Mohd Ali

### A3. ISKANDAR PUTERI, JOHOR

There are two (2) routes available for trials in Iskandar Puteri, Johor under Majlis Bandaraya Iskandar Puteri, being Route A and Route B. Applicants must conduct the AV Trial and AV Passenger Service Trial only on these two (2) designated routes with no deviations or detours.

#### A3.1 Route A

4. Route A shown in Figure A.9 & A.10 is a private road with a real-world driving environment within the area of Educity where Trial Organisation can conduct its AV Trial and AV Passenger Service Trial .
5. The route measures a total distance of 5 km.
6. The road is made of asphalt.
7. The route consists of roads with four-lane single carriageway (two lanes in each direction), separated by a road divider and a bicycle lane.
8. The route comprises of intersections, road humps, zebra crossings, roundabouts and road shoulder walkways.
9. Along the route, there are temporary road marking cones, temporary road dividers, road signs, streetlights, tree, bus stops and buildings.
10. The speed limit for trial is 20 km/h.

11.



Figure A.9: Route A in Iskandar Puteri.



Figure A.10: Route A in Iskandar Puteri.

### A3.2 Route B

12. Route B shown in Figure A.11, 12 and 13 is a public road with a real-world driving environment where Trial Organisation can conduct its AV Trial and AV Passenger Service Trial .
13. The route is used by the public for daily commute purposes.
14. The route measures a total distance of 20 km.
15. The road is made of asphalt.
16. The route consists of roads with four-lane single carriageway (two lanes in each direction) and six-lane single carriageway (three lanes in each direction), separated by a road divider and a bicycle lane.
17. The route comprises of intersections, road humps, roundabouts, traffic lights and road shoulder walkways.
18. Along the route, there are temporary road marking cones, temporary road dividers, road signs, streetlights, tree, bus stops and buildings.
19. The speed limit for trial is 40 km/h.

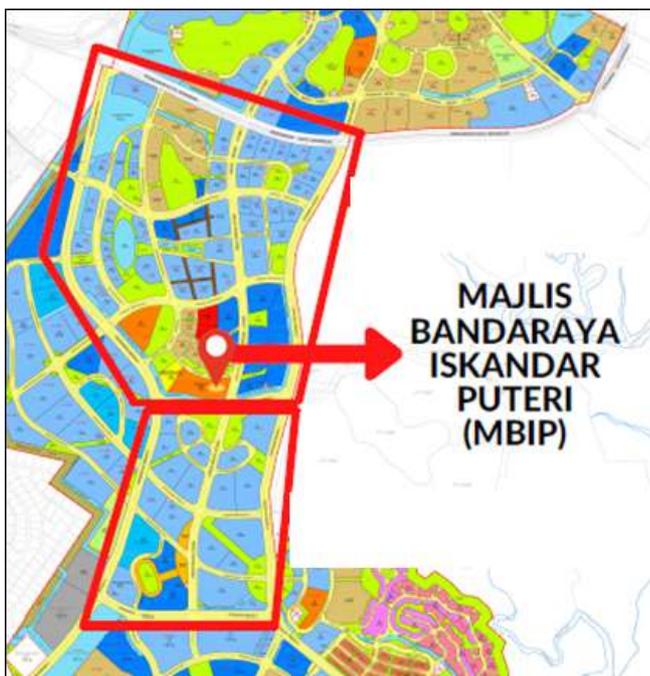


Figure A.11: Route B in Iskandar Puteri.



Figure A.12: Route B in Iskandar Puteri.

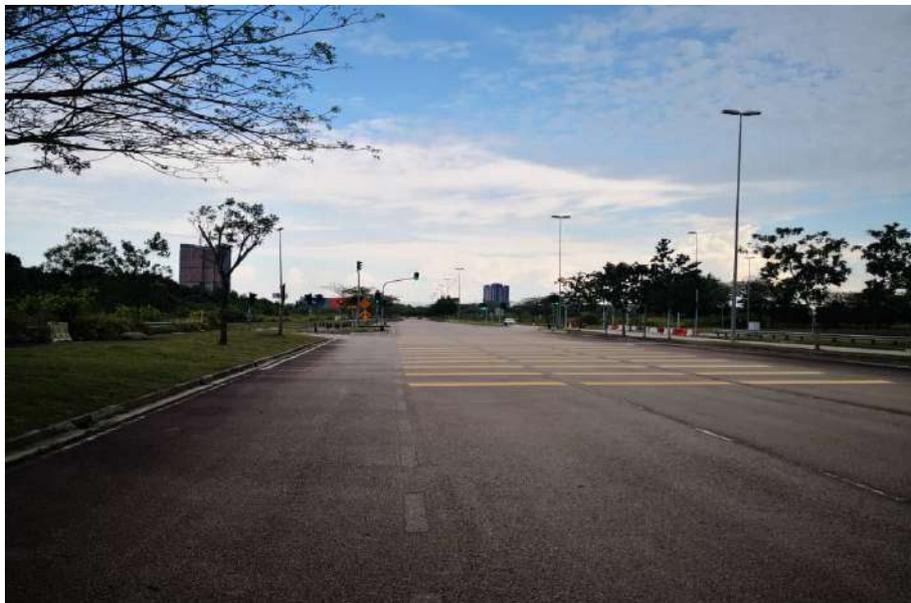


Figure A.13: Route B in Iskandar Puteri.

### A3.3 Contact Details

Medini Iskandar Malaysia Sdn Bhd  
B-FF-02, Medini 6, Jalan Medini Sentral 5  
Bandar Medini Iskandar Malaysia  
79250, Iskandar Puteri, Johor  
Telephone: +607-509 8500/ +607-509 8501  
Attention to: Encik Danny Ebinesan

Educity Iskandar Education Enterprise Sdn Bhd  
A18 & A19, Medini 9, Persiaran Medini Sentral 1  
Bandar Medini Iskandar Malaysia  
79250, Iskandar Puteri, Johor  
Telephone: +607-535 3000  
Attention to: Dr. Sakina Sofia Baharom

## A4. MRANTI Park, Wilayah Persekutuan

There are two (2) routes available for trials in MRANTI Park, Wilayah Persekutuan under Dewan Bandaraya Kuala Lumpur (DBKL), being Route A and Route B. Applicants must conduct the AV Trial and AV Passenger Service Trial only on these two (2) designated routes with no deviations or detours.

### A4.1 Route A

20. Route A shown in Figure A.14a, A.14b, A.14c and A.14d is the route for AV Trial and AV Passenger Service Trial in a controlled environment within the MRANTI Park compound located at MRANTI Park, 43300 Kuala Lumpur, Federal Territory of Kuala Lumpur.
21. Route A consist of multi-level parking and rural campus areas.
  1. Multi-level parking area: The multi-level parking area shown in Figure A.14a and A.14b is currently a public road providing limited access to

offices and parking within the compound. The area is used by the public for daily commute and parking purposes.

2. The area measures a total size of 10,000 m<sup>2</sup>.
3. The area is a real-world driving environment where Trial Organisation can conduct its AV Trial and AV Passenger Service Trial.
4. The area comprises of outdoor and indoor parking areas. The indoor area is a two-level storey building, consists of parking spaces, rooftops, ramps, dividers, and structure pillars. The outdoor area consists of parking space, road dividers, road signs, streetlights, trees, and buildings.
5. The road within the indoor area is made of cement, while the outdoor area is made of asphalt.
6. The area is provided with access to 5G network. The presence of pedestrians is minimal and hardly any traffic being presence.
7. The advisory speed limit is 20 km/h, the speed limit for the trial is 20 km/h.



Figure A.14a: Route A – Multi-level parking area.

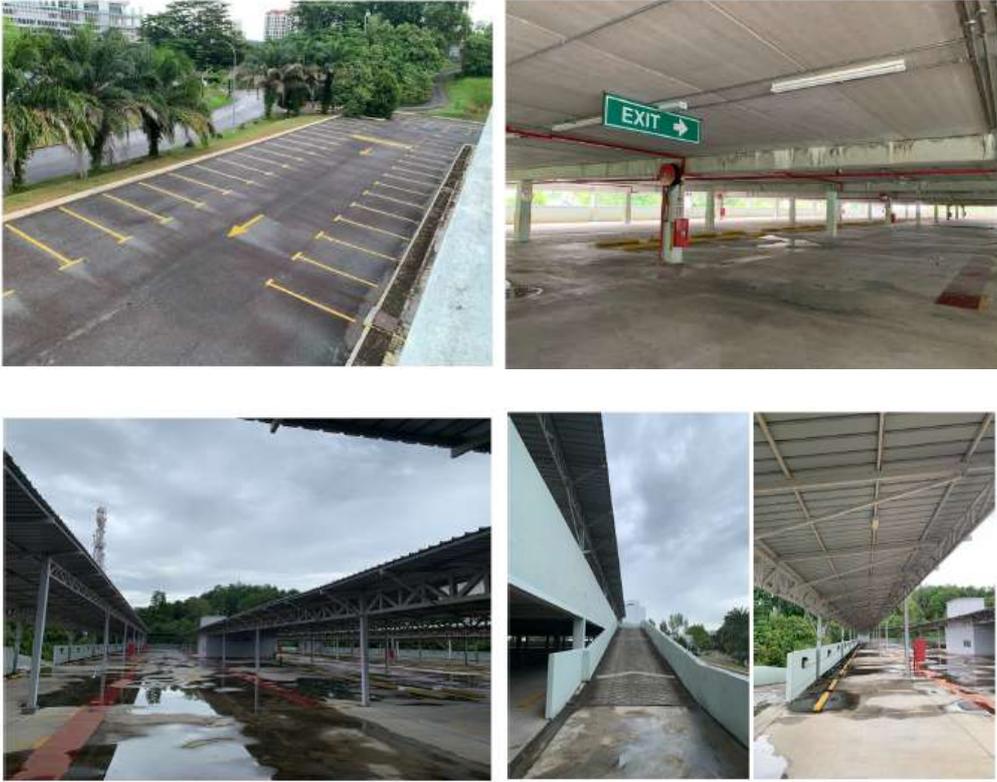


Figure A.14b: Route A – Multi-level parking indoor and outdoor areas.

1. Rural campus area:
  1. The rural campus area shown in Figure A.14c and A.14d is currently a public road providing limited access to institution and offices within the compound. The route is used by the public for daily commute purposes.
  2. The designated route of the area measures a total distance of 3.6 km.
  3. The route is a real-world driving environment where Trial Organisation can conduct its AV Trial and AV Passenger Service Trial.
  4. The road design is a two-lane single carriageway (two lanes with oncoming traffic in each direction), separated by lane markings.
  5. The route comprises of intersections, roundabout and road humps without traffic lights.

6. Along the route, there are parked vehicles (mostly cars and motorcycles), overhead structures, road dividers, temporary road marking cones, road signs, streetlights, trees, and buildings.
7. The presence of pedestrians is minimal.
8. Under normal conditions, traffic congestion is free flow.
9. The advisory speed limit for Route A is 30 km/h, the speed limit for the trial is 20 km/h.

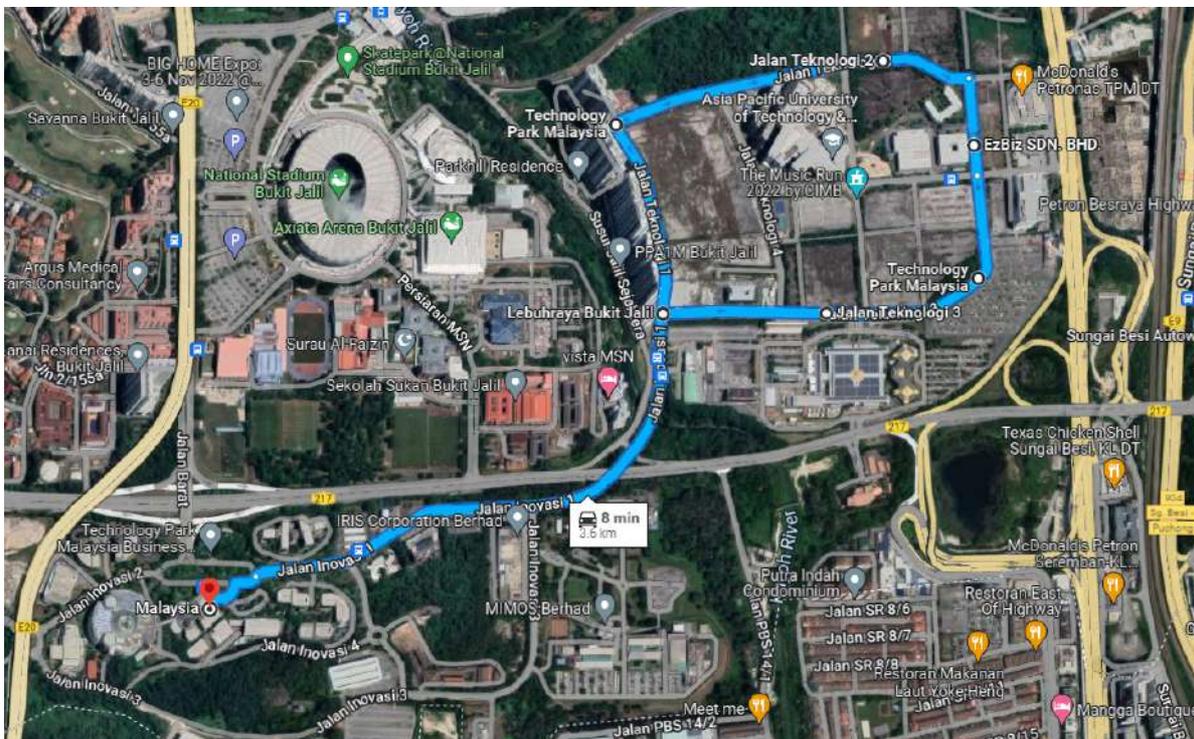


Figure A.14c: Route A – Designated route of the rural campus area.



Figure A.14d: Route A - Rural campus area.

#### A4.2 Route B

2. Route B shown in Figure A.15a, A.15b, A.15c and A.15d is the route for AV Trial and AV Passenger Service Trial in a controlled environment within the MRANTI Park compound located at MRANTI Park, 43300 Kuala Lumpur, Federal Territory of Kuala Lumpur.
3. Route B consists of four-lane highway and urban area.
4. Four-lane highway:
  1. The four-lane highway shown in Figure A.15a and A.15b is currently a public road providing access to land developments nearby. The route is used by the public for daily commute purposes.
  2. The designated route measures a total distance of 3.1 km.
  3. The route is a real-world driving environment where Trial Organisation can conduct its AV Trial and AV Passenger Service Trial.

4. The highway road design is a four-lane single carriageway (four lanes with oncoming traffic in each direction), separated by lane markings.
5. The route comprises of intersections and roundabouts without traffic lights.
6. Along the route, there are parked vehicles (mostly cars and motorcycles), overhead structures, road dividers, temporary road marking cones, road signages, streetlights, trees, and buildings.
7. The presence of pedestrians is minimal.
8. Under normal conditions, traffic congestion is free flow.
9. The speed limit for the trial is 40 km/h.



Figure A.15a: Route B – Designated route of the four-lane highway area.



Figure A.15b: Route B – Four-lane highway area.

5. Urban area:

1. The urban area shown in Figure A.15c and A.15d is currently a public road providing limited access to offices and parking spaces within the compound. The route is used by the public for daily commute purposes.
2. The designated route measures a total distance of 3.9 km.
3. The route is a real-world driving environment where Trial Organisation can conduct its AV Trial and AV Passenger Service Trial.
4. The road design is a two-lane single carriageway (two lanes with oncoming traffic in each direction), separated by lane markings.
5. The route comprises of intersections and roundabouts without traffic lights.

6. Along the route, there are parked vehicles (mostly cars and motorcycles), road dividers, temporary road marking cones, road signs, streetlights, trees, and buildings.
7. The presence of pedestrians is minimal.
8. Under normal conditions, traffic congestion is free flow.
9. The speed limit for the trial is 40 km/h.<sup>4</sup>

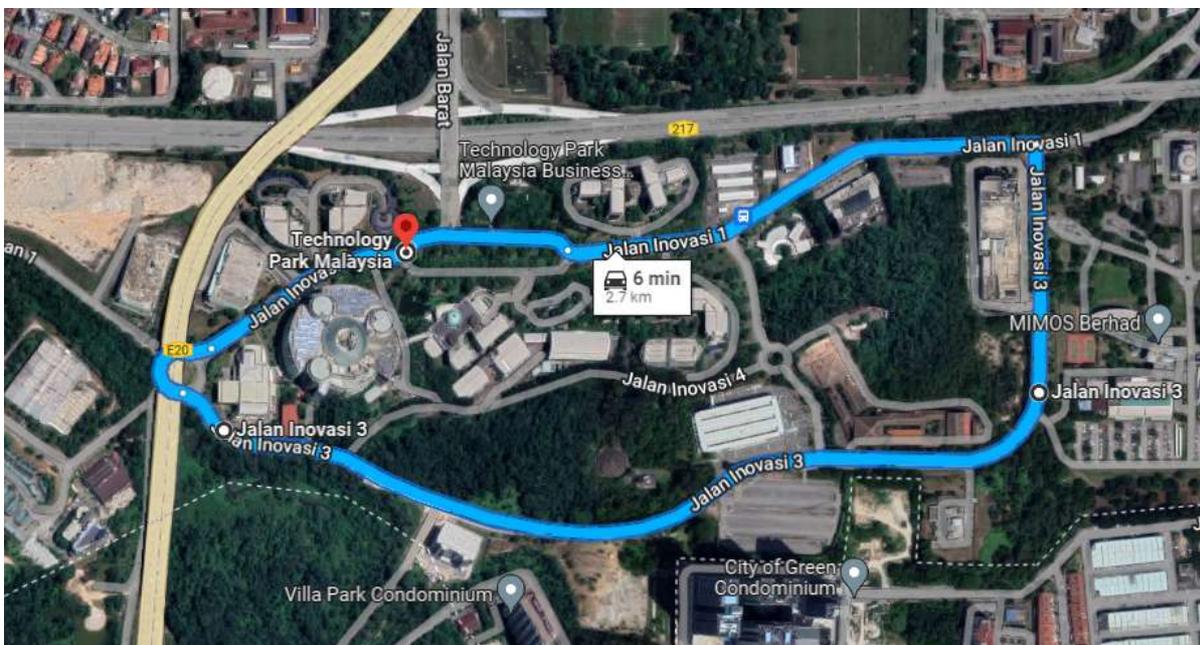


Figure A.15c: Route B – Designated route of the urban area.



Figure A.15d: Route B – Urban area.

### A4.3 Contact Details

Malaysian Research Accelerator for Technology & Innovation (MRANTI)  
Hive 5 (Enterprise 4)  
Taman Teknologi MRANTI  
Bukit Jalil, 57000 Kuala Lumpur,  
Wilayah Persekutuan Kuala Lumpur  
Tel: +603-8998 2020  
Email: hello@mranti.my  
Attention to: Goh Pin Kuan

## A5. BRT Sunway, Selangor

The BRT (Bus Rapid Transit) Sunway Line is under Prasarana Malaysia Berhad. The BRT Sunway Line is Prasarana's right of way bus rapid transit line that is part of the Klang Valley Integrated Transit System. The BRT Sunway line located at Bandar Sunway, Selangor is an elevated road that is only accessible to authorised vehicles. There is one (1) route available for trials within the BRT Sunway line, being Route A. Applicants must conduct the AV Trial and AV Passenger Service Trial only on the designated route with no deviations or detours.

### A5.1 Route A

6. Route A shown in Figure A.16a and A.16b is within the BRT Sunway line for AV Trial and AV Passenger Service Trial.
7. Route A is a controlled environment that measures a total distance of 5.4 km.
8. The road is made of asphalt.
9. The road design is a two-lane single carriageway (two lanes with oncoming traffic in each direction), separated by lane markings.
10. The route is comprising of seven (7) stop stations.
11. Along the route, there are bus stops, temporary road marking cones, road signs, trees, and buildings.
12. The presence of pedestrians is none.
13. Under normal conditions, traffic congestion is free flow.
14. The advisory speed limit for Route A is 40 km/h, the speed limit for the trial is 20 km/h.

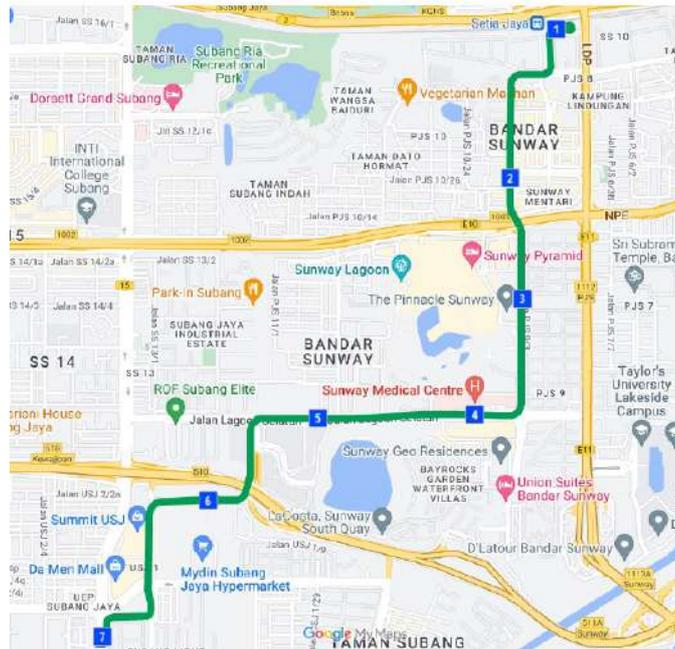


Figure A.16a: Route A – Designated route of the BRT Sunway line.

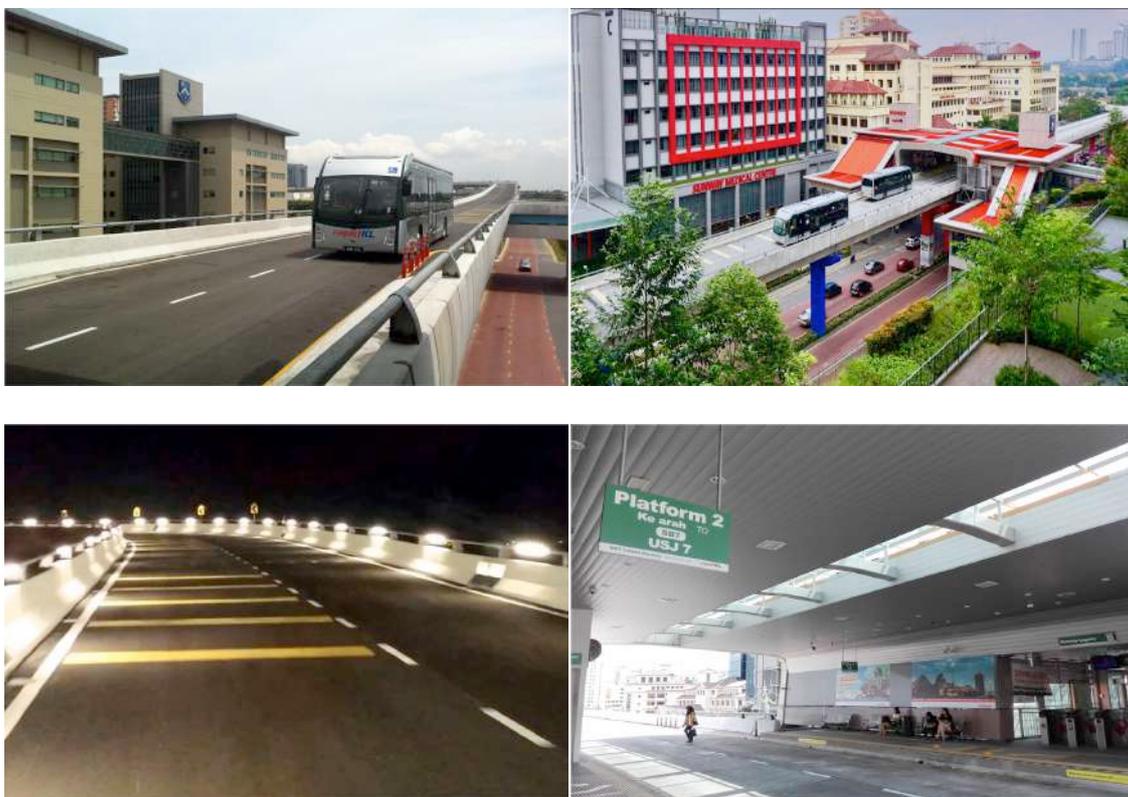
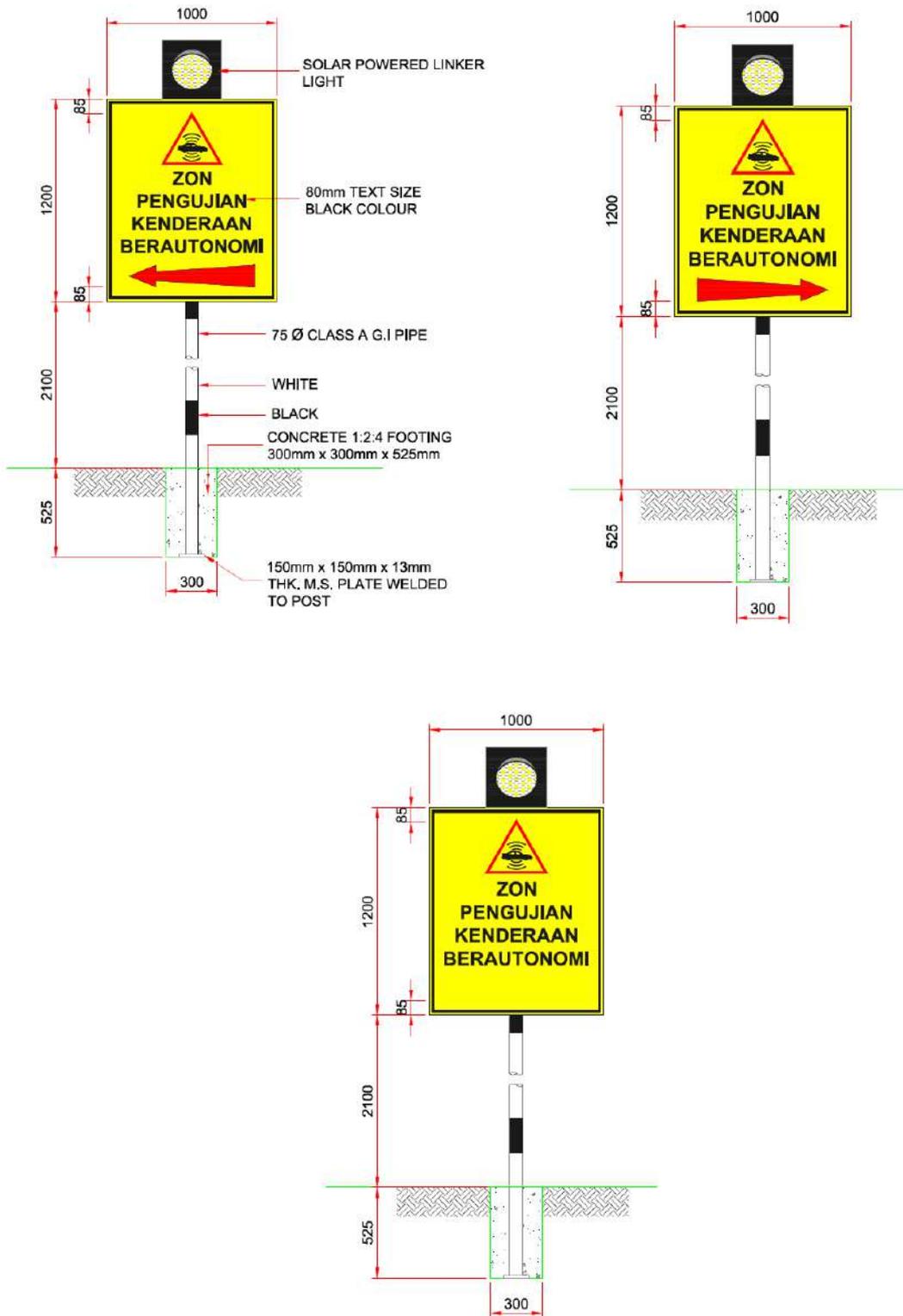


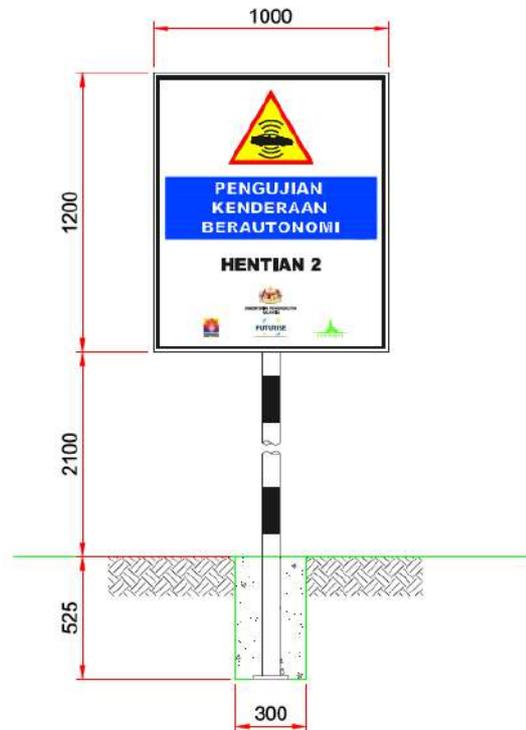
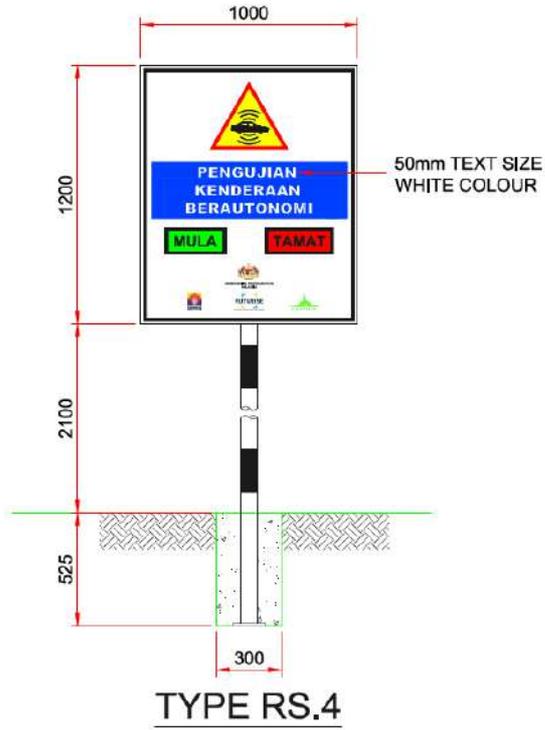
Figure A.16b: Route A – BRT Sunway line.

## A5.2 Contact Details

Rapid Bus Sdn Bhd (subsidiary of Prasarana Berhad)  
Kompleks Rapid Bus Cheras Selatan,  
Lot 1499, Jalan KB 2/15  
Balakong, 43300 Seri Kembangan, Selangor  
Telephone: +603-8946 2000  
Attention to: Syed Mohd Faisal Syed Kamaruddin.

## ROAD SIGNAGES DESIGN





Note:

1. For the road signages used in Putrajaya, the structure is designed to be portable, and the base of the pillars is not planted to the floor. The height does not exceed 7' and its position is in line with the eye level of pedestrians, cyclists and public vehicles and complies to Arahan Teknik (Jalan) JKR – Manual On Traffic Control Devices and Advertisement Design Guidelines For Putrajaya (SADG) 2000.

## ANNEXURE B

List of mandatory compliances with United Nations Regulations (UNR) and Malaysia Standards (MS):

1. Component Level
2. System Level

### COMPONENT LEVEL

Mandatory Standards

No.	UN Regulations		Min. Series	Vehicle Category			Remark
				M1	M2	M3	
1	Approval of retro-reflecting devices for power-driven vehicles and their trailers.	R3	02	✓	✓	✓	To accept UN R150 as option.
2	Approval of devices for the illumination of rear registration plates of power-driven vehicles and their trailers.	R4	00	✓	✓	✓	To accept UN R148 as option.
3	Approval of direction indicators for power driven vehicles and their trailers.	R6	01	✓	✓	✓	To accept UN R148 as option.
4	Approval of front and rear position lamps, stop-lamps and end-outline marker lamps for motor vehicles (except motorcycles) and their trailers.	R7	02	✓	✓	✓	To accept UN R148 as option.
5	Approval of safety-belts, restraint systems, child restraint systems and isofix child restraint systems for occupants of power driven vehicles.	R16	06	✓	✓	✓	Upload document for component level only.

	Approval of vehicles equipped with safety belts, safety-belt reminder, restraint systems, child restraint systems, isofix child restraint systems and i-size child restraint systems.						
6	Approval of reversing and manoeuvring lamps for power-driven vehicles and their trailers.	R23	00	✓	✓	✓	To accept UN R148 as option.
7	Approval of advanced-warning triangles.	R27	04	✓	✓	✓	To accept UN R1 MS1409/ MS2294 option.
8	Audible warning devices and of motor vehicles with regard to their audible signals.	R28	00	✓	✓	✓	Upload for document component level only.
9	Approval of pneumatic tyres for motor vehicles and their trailers.	R30	02	✓			
10	Approval of safety glazing materials and their installation on vehicles.	R43	00	✓	✓	✓	Upload for document component level only.
11	Approval of devices for indirect vision and of motor vehicles with regard to the installation of these devices.	R46	02	✓	✓	✓	Upload for document component level only.
12	Uniform provisions concerning the approval of pneumatic tyres for commercial vehicles.	R54	00		✓	✓	Not apply to tyre types identified by speed
	And their trailers.						Category symbols corresponding to speeds below 80 km/h.
13	Approval of motor vehicle headlamps emitting an asymmetrical passing beam or a driving beam or both and equipped with filament lamps and/or light-emitting diode (led) modules.	R112	01	✓	✓	✓	To accept UN R149 as option.

14	Approval of tyres with regard to rolling sound emissions and/or to adhesion on wet surfaces and/or to rolling resistance.	R117	02	✓	✓	✓	
15	Road vehicle – rear and side marking.	MS 828	Latest version		✓	✓	For Public Service Vehicle (PSV) only.

#### Mandatory – If Fitted Standards

(Each of the UNR will become mandatory, if the item has been fitted on the motor vehicle.)

No.	UN Regulations	Min. Series	Vehicle Category			Remark	
			M1	M2	M3		
1	Approval of power-driven vehicle front fog lamps.	R19	04	✓	✓	✓	To accept UN R149 as option.
2	Approval of power-driven vehicle's halogen sealed-beam headlamps (HSB) emitting a European asymmetrical passing beam or a driving beam or both.	R31	03	✓	✓	✓	
3	Approval of rear fog lamps for power-driven vehicles and their trailers.	R38	00	✓	✓	✓	To accept UN R148 as option.
4	Approval of headlamp cleaners, and of power driven vehicles with regard to headlamp cleaners.	R45	01	✓	✓	✓	
5	Approval of mechanical coupling components of combinations of vehicles.	R55	01	✓	✓	✓	
6	Approval of special warning lamps for power driven vehicles and their trailers.	R65	00	✓	✓	✓	
7	Approval of rear marking plates for slow moving vehicles (by construction) and their trailers.	R69	01	✓	✓	✓	1. For vehicle moving speed below than 40 km/h

							(by construction).  2. To accept UN R150 as option.
8	Approval of rear marking plates for heavy and long vehicles.	R70	01			✓	1. For vehicle category as under UN R70.  2. To accept UN R150 as option.
9	Approval of parking lamps for power-driven vehicles	R77	00	✓	✓	✓	To accept UN R148 as option.
10	Approval of daytime running lamps for power driven vehicles.	R87	00	✓	✓	✓	To accept UN R148 as option.
11	Approval of side-marker lamps for motor vehicles and their trailers.	R91	00	✓	✓	✓	To accept UN R148 as option.
12	Approval of motor vehicle headlamps equipped with gas-discharge light sources.	R98	01	✓	✓	✓	To accept UN R149 as option.
13	Approval of gas-discharge light sources for use in approved gas-discharge lamp units of power driven vehicles.	R99	00	✓	✓	✓	
14	Approval of retro-reflective markings for vehicles of category M, N and O.	R104	00		✓	✓	To accept UN R150 as option
15	Approval for the production of retreaded pneumatic tyres for motor vehicle and their trailers.	R108	00	✓			
16	Approval for the production of retreaded pneumatic tyres for commercial vehicles and their trailers.	R109	00		✓	✓	
17	Approval of cornering lamps for power-driven vehicles.	R119	01	✓	✓	✓	To accept UN R149 as option.

18	Approval of adaptive front-lighting systems (AFS) for motor vehicles.	R123	01	✓	✓	✓	To accept UN R149 as option.
19	Approval of light emitting diode (LED) light sources for use in approved lamp units on power driven vehicles and their trailers.	R128	00	✓	✓	✓	

## SYSTEM LEVEL

### Mandatory Standards

No.	UN Regulations	Min. Series	Vehicle Category			Remark	
			M1	M2	M3		
1	approval of vehicles with regard to electromagnetic compatibility.	R10	04	✓	✓	✓	
2	Approval of vehicles with regard to door latches and door retention components.	R11	03	✓			
3	approval of vehicles with regard to the protection of the driver against the steering mechanism in the event of impact.	R12	04	✓			
4	approval of vehicles of categories M, N and O with regard to braking.	R13	11		✓	✓	Previous series is acceptable if the vehicle is equipped with Vehicle Stability Control (VSC).
5	Approval of passenger cars with regard to braking.	R13H	01	✓			The followings are accepted: (i) R13H.00 including ESC, or (ii) R13H.01 or above with additional compliance to R140.
6	Approval of vehicles with regard to safety belt anchorages, isofix	R14	06	✓	✓	✓	To accept MS 75 as option.

	anchorages systems and isofix top tether anchorages.						
7	Approval of safety-belts, restraint systems, child restraint systems and isofix child restraint systems for occupants of power driven vehicles.	R16	06	✓	✓	✓	Upload document for system level only.
8	Approval of vehicles equipped with safety belts, safety-belt reminder, restraint systems, child restraint systems, isofix child restraint systems and i-size child restraint systems.						
9	Approval of vehicles with regard to the seats, their anchorages and any head restraints.	R17	08	✓	✓	✓	(1) Series 07 is accepted until 31 December 2023. (2) To accept UN R80 as option for M2 & M3 Category.
10	Approval of motor vehicles with regard to their protection against unauthorized use.	R18	03		✓	✓	
11	Approval of vehicles with regard to their interior fittings.	R21	01	✓			

#### Mandatory – If Fitted Standards

(Each of the UNR will become mandatory, if the item has been fitted on the motor vehicle.)

No.	UN Regulations	Min. Series	Vehicle Category			Remark	
			M1	M2	M3		
1	Approval of headlamp cleaners, and of power driven vehicles with regard to headlamp cleaners.	R45	01	✓	✓	✓	

2	The measures to be taken against the emission of gaseous and particulate pollutants from compression-ignition engines and positive ignition engines for use in vehicles.	R49	DOE	✓	✓	✓	Mandatory for vehicle use  Compression-Ignition Engines, LPG or CNG, subject to DOE approval.
3	Approval of vehicles with regard to their equipment which may include: a temporary use spare unit, run flat tyres and/or a run flat system, and/or a tyre pressure monitoring system.	R64	02	✓			<ol style="list-style-type: none"> <li>1. Not mandatory to submit R141 if comply to R 64.02;</li> <li>2. Mandatory to submit R141 if comply with R64.03;</li> <li>3. If the specifications of the spare tire (Temporary Use SpareUnit) are the same as the original tire, UN R64 is not required and only need to submit UN R141.</li> </ol>
4	Approval of specific equipment of vehicles of category m and n using liquefied petroleum gases in their propulsion system.	R67	01	✓	✓	✓	Mandatory for vehicle use LPG and its specific Equipment.
5	Approval of vehicles of category m and n fitted with specific equipment for the use of liquefied petroleum gases in its propulsion system with regard to the installation of such equipment.						

6	Approval of internal combustion engines or electric drive trains intended for the propulsion of motor vehicles of categories m and n with regard to the measurement of the net power and the maximum 30 minutes power of electric drive trains.	R85	00	✓	✓	✓	Mandatory for full electric powered vehicle / electric powertrain.
7	Approval of battery electric vehicles with regard to specific requirements for the construction and functional safety.	R100	00	✓	✓	✓	Mandatory for Full Electric Powered Vehicle / Electric powertrain.
8	Uniform provisions concerning the approval of passenger cars powered by an internal combustion engine only or powered by a hybrid electric power train with regard to the measurement of the emission of carbon dioxide and fuel consumption and/or the measurement of electric energy consumption and electric range, and of categories M1 and N1 vehicles powered by an electric power train only with regard to the measurement of electric energy consumption and electric range.	R101	01	✓			Mandatory for Hybrid Electric Vehicle & Energy Efficient Vehicle (EEV).
9	Specific components of motor vehicles using compressed natural gas (CNG) and / or liquefied natural gas (LNG) in their propulsion system.	R110	01	✓	✓	✓	Mandatory for vehicle use LNG or CNG and its specific equipment.
	Vehicles with regard to the installation of specific components of an approved type for the use of compressed natural gas (CNG) and / or liquefied natural gas (LNG) in their propulsion system.						
10	Approval of specific LPG (liquefied petroleum gases) retrofit systems to be installed in motor vehicles for the use of LPG in their propulsion system.	R115	00	✓	✓	✓	Mandatory for LPG or CNG retrofit system.

	Approval of specific CNG (compressed natural gases) retrofit systems to be installed in motor vehicles for the use of CNG in their propulsion system.						
11	Concerning the burning behaviour and / or the capability to repel fuel or lubricant of materials used in the construction of certain categories of motor vehicles.	R118	02			✓	Mandatory for Class II and Class III.
12	Approval of partitioning systems to protect passengers against displaced luggage, supplied as non-original vehicle equipment.	R126	00	✓			
13	Approval of motor vehicles with regard to the lane departure warning system (LDWS).	R130	00		✓	✓	
14	Approval of motor vehicles with regard to the advanced emergency braking systems (AEBS).	R131	01		✓	✓	

## ANNEXURE C

- . A template for Emergency Response Plan ( ERP) as an example.
- !. *The information required as stated in the template below is compulsory to be incorporated in the Applicant's ERP.*

*Additional process, plan or information that is deemed important by the Applicant shall be added in the ERP. However, the applicant is prohibited from excluding the information as provided below.*

### EMERGENCY PERSONNEL NAMES AND PHONE NUMBERS

Designated responsible Safety Officer(s) during the AV Trial / AV Passenger Service Trial at designated route: \_\_\_\_\_

1. Name: \_\_\_\_\_  
Phone: \_\_\_\_\_  
Designation : \_\_\_\_\_
2. Name: \_\_\_\_\_  
Phone: \_\_\_\_\_  
Designation : \_\_\_\_\_
3. Name: \_\_\_\_\_  
Phone: \_\_\_\_\_  
Designation : \_\_\_\_\_

## VEHICLE EVACUATION

1. Vehicle evacuation procedure either via announcement or manual available in the AV.
2. The following information shall be announced or incorporated in the manual before the AV Trial / AV Passenger Service Trial : -
  1. Emergency exits
  2. Locations of fire extinguishers
  3. Emergency switches

## EMERGENCY PHONE NUMBERS

1. Fire Department: \_\_\_\_\_
2. Ambulance: \_\_\_\_\_
3. Police: \_\_\_\_\_
4. Local Authorities: \_\_\_\_\_

## EMERGENCY REPORTING

Emergencies to be reported by Safety Office to the Secretariat shall cover the following events:

1. Major vehicle crash/accident/collision
2. Major medical attention and injuries
3. Fire
4. Other (Specify) \_\_\_\_\_

## MEDICAL EMERGENCY

1. Contact details of :-
  - Nearest hospital / clinic within 5km radius (public and private)
  - Ambulance (availability)
  
2. Provide the following information:
  1. Nature of medical emergency,
  2. Location of the emergency (address, vehicle description),
  3. Your name and phone number from which you are calling.
  
3. Process involving body injury during the AV Trial or AV Passenger Service Trial
  
4. Details of the Safety Officer or any trained personnel in CPR and First Aid to provide the required assistance prior to the arrival of the professional medical help:  
  
Name: \_\_\_\_\_ Phone: \_\_\_\_\_  
  
Name: \_\_\_\_\_ Phone: \_\_\_\_\_
  
5. If personnel trained in First Aid are not available, as a minimum, attempt to provide the following assistance:
  1. Stop the bleeding with firm pressure on the wounds
  2. Clear the air passages in case of choking.

## FIRE EMERGENCY

Contact details of :-

1. Nearest fire & rescue department within 5km radius

Once alert on the fire, the Safety Officer and passengers must:

1. Leave the vehicle using the designated doors.
2. Assemble in a safe area.
3. Remain outside and away from the vehicle.

Safety Officer must:

1. Disconnect utilities and equipment unless doing so jeopardizes the safety.
2. Coordinate an orderly evacuation of passengers.
3. Perform an accurate head count of passengers.
4. Determine a rescue method to locate the missing passenger.
5. Provide the Fire Department personnel with the necessary information about the vehicle.
6. Assist in an emergency evacuation.

## VEHICLE STALL

In the event of a vehicle stall, certain precautionary measures should be taken depending on the geographical location and environment of the vehicle:

1. Unnecessary power supply, electronic equipment and appliances should be switched off.
2. Safety Officer to determine whether it is safe to evacuate the passenger and assemble in a safe area.
3. Notify the Manager about the vehicle stall by calling \_\_\_\_\_.
4. Determine the recovery method.

## SEVERE WEATHER AND NATURAL DISASTERS

Flood:

1. Be ready to evacuate as directed by the Safety Officer.
2. Climb to high ground and stay there.
3. Avoid walking or driving through flood water.

Downpour:

1. Safety Officer to manually take over the AV system.
2. Stay calm and await instructions from the Safety Officer.
3. Stay in the vehicle.

## TRAINING

The following Safety Officers have been trained to ensure a safe and orderly emergency evacuation of passengers:

Safety Officer 1:

Name:

Designation:

Training date:

Safety Officer 2:

Name:

Designation:

Training date:

Safety Officer 3:

Name:

Designation:

Training date:

