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[REDACTED]

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National Transport Commission  
Level 3, 600 Bourke Street  
MELBOURNE VIC 3000

By email: [automatedvehicles@ntc.gov.au](mailto:automatedvehicles@ntc.gov.au)

To whom it may concern,

**RE: Automated Vehicle Safety Reform consultation**

I am an urban design manager at a major Sydney council. My expertise includes urban design, strategic planning particularly for urban renewal and street design with a focus on walking and cycling.

**1. Introduction**

I welcome this opportunity to provide advice on Australia's automated vehicle safety reforms.

I appreciate that the discussion paper acknowledges the potential dangers associated with the operation of automated vehicles and many of the potential proposed legislative inclusions are very sensible. However, the paper does not adequately prioritise the safety of vulnerable people using roads and streets, potentially rendering people walking and cycling as secondary to vehicle users. The emphasis on vehicle technology and infrastructure overshadows the needs of non-vehicular road users.

This legislation must also be used as an opportunity for a step change in the move toward zero road deaths and serious injuries. It must work as an overlay to state laws that are inadequate to this task.

This submission supports most aspects of the paper and is structured around the following themes:

- Adopt principles for any future legislation.
- Create the case for improvements to how road safety legislation is framed - to avoid injury to people, including creating an explicit hierarchy of safety considerations determined by people's vulnerability.

- Create strong and certain financial incentives that drive corporations to make vehicles increasingly safe following a steep trajectory.
- Operation of automated vehicles must improve, not reduce, priority and space allocation for people walking, cycling and using public transport.

I make the following recommendations:

1. Adopt principles to underpin the operation of the legislation (see section 2 below)
2. Adopt a road user hierarchy similar to the TfNSW Road User Space Allocation Policy. This would put the access and safety of pedestrians and bike riders at the top of hierarchy of consideration in urban street environments, followed by public transport users, then ride-share, freight and private vehicle users (see section 3 below)
3. The future legislation must include a requirement for automated vehicles to prioritise protection of people according to a vulnerability index (see section 4 below)
4. Be clear that any changes to road laws must increase the rights of people who are walking or otherwise using streets while not in vehicles, for example to use streets to walk, cross, and enjoy outdoors.
5. Ensure the national safety legislation leads best practice, rather than relying on poor state legislation
6. The legislation should require all automated vehicles to demonstrate that, at the first year of operation (2024), they are involved in less crashes and with less injuries than human drivers per km travelled across all contexts (measured separately).
7. The legislation must ensure that over time relative safety of operation compared to human drivers must increase.
8. The legislation must establish hurdles for introduction of automated vehicles into Australia including:
  - demonstrate in a comparable country that they operate more safely than human drivers per km travelled in urban, suburban and rural contexts (separately).
  - pass difficult Australian digital and real life simulations at 100% success
  - pass government assessed real life operations (i.e driving assessor in vehicle for >5000 hrs of driving in difficult environmental situations/scenarios)
9. Ensure legislation creates a framework requiring a corporation with sufficient capital be located in Australia.
10. Fines must be set at levels that ensure that it is more profitable for companies to expend capital making their vehicles operate more safely than to risk further fines (see section 7 below)
11. Undertake modelling to determine required level of fines to drive safety improvements.
12. Undertake research to overcome legal limitations to high and certain fines.
13. Design the fine framework so that they will be imposed whenever an automated vehicle is involved in a crash.
14. Ensure legislation requires automated vehicles to operate to minimise use of road space and develop a framework that demonstrates how this can be practically measured.
15. Develop legislated data sharing requirements that include pedestrian data to inform better safety practices and urban planning. This data should help identify pedestrian accident hotspots to guide interventions.
16. Legislate requirement for automated vehicles to demonstrate understanding of human non-verbal communication.
17. Legislate identification requirements for automated vehicles.

I would welcome the opportunity to discuss this submission further.

## 2. Future legislation must include principles

The legislation must be based on best practice principles that must guide the formation and application of the law.

### **Recommendation:**

Adopt the following principles:

- The corporation who designed the automated vehicle must be responsible during its entire life
- Each automated vehicle design/system must not operate in Australia until it is demonstrated to be extremely safe
- Automated vehicles must prioritise safety of people over all other considerations
- Safety of people must be prioritised according to their vulnerability
- The injury rate must decline according to a legislated trajectory
- Fines must be imposed on automated vehicle corporations that incentivise them to invest in improving safety
- Vehicles must be operated to minimise emissions
- Vehicles must be operated to minimise the need for vehicle related road space

## 3. Safe automated vehicles contribute to climate change more than active and public transport

All private passenger vehicles and freight vehicles have high embodied carbon, high operational energy use and use road space inefficiently making cities and towns more carbon intensive in their creation and operation. See, for example, the Climate Council report *Shifting Gear: The Path to Cleaner Transport*.

The climate change impact resulting from use of vehicles contributes more to reducing the safety (and health) of Australians than road injuries.

National automated vehicle safety legislation must acknowledge climate related safety risks and ensure that automated vehicles do not operate in ways that create more demand for road space for vehicles at the expense of space for people walking, cycling and using public transport. Ideally the legislation would adopt the space hierarchy from the Transport for NSW Road User Space Allocation Policy (<https://www.transport.nsw.gov.au/system/files/media/documents/2021/road-user-space-allocation-policy.pdf>).

### **Recommendations:**

Adopt a road user hierarchy similar to the TfNSW Road User Space Allocation Policy. This would put the access and safety of pedestrians and bike riders at the top of hierarchy of consideration in urban street environments, followed by public transport users, then ride-share, freight and private vehicle users.

Ensure legislation requires automated vehicles to operate to minimise use of road space and develop a framework that demonstrates how this can be practically measured.

For example, the legislation must include mechanisms that prevent competing groups of automated taxis constantly circulating on streets waiting to pick up passengers. This aspect

of any legislation requires research to clearly define potential problems so that they can be addressed.

#### **4. This legislation must be used as a reset for how safe operation of vehicles is understood nationally**

##### **4.1. National legislation must prioritise people**

Any national safety legislation must introduce a clear requirement for automated vehicles to prioritise protecting people from harm over all other considerations. In determining their actions automated systems must be required to protect all people independent of the legality or predictability of their behaviour.

They must prioritise actions to protect people who are more vulnerable to injury using a vulnerability hierarchy/weighting. Such a vulnerability hierarchy/weighting may look like the following, where actions to protect people at the top are prioritised over, animals and property at the bottom. Protective action must be commensurate to vulnerability:

100. People not in vehicles (sub-hierarchy) - not all people are equally vulnerable and the index should differentiate Children of different ages, Elderly of different ages, People with disability including wheelchair users, other people
99. People on bicycles, other micro mobility devices, motorbikes and similar low mass exposed vehicles
80. People in low mass vehicles (index varies by mass)
70. People in older vehicles that lack safety features like airbags for passengers
50. People in vehicles that have good safety features (including people in any future automated vehicles)
20. Animals
10. High value trees (in urban areas)
5. Private property
1. protecting the vehicle itself

For people in vehicles the index should decrease as the mass of the vehicle increases.

The safety of people in the automated vehicle must not be artificially prioritised within the hierarchy. Vehicle safety ratings must reflect the hierarchy.

**Recommendation:**

The future legislation must include a requirement for automated vehicles to prioritise protection of people according to a vulnerability index.

**4.2. The legislation must not reduce or limit rights for people walking or cycling or imply that others should do this**

The paper is focused on establishing regulatory frameworks for automated vehicles but lacks explicit measures ensuring pedestrian safety. The section on safety standards (Section 3.2) predominantly addresses vehicular and passenger safety without sufficient consideration of pedestrian risks in mixed-traffic environments.

We are concerned that the consultation document says:

*Existing road rules placed on drivers, pedestrians and bicycle riders about causing a traffic hazard will be updated so these road users must not illegally obstruct the path of automated vehicles as well as other road users. (p39)*

This implies that human rights and may be eroded.

**Recommendation:**

It must be very clear that any changes to road laws must increase the rights of people who are walking or otherwise using streets while not in vehicles, for example to socialise.

**4.3. State legislation is poor**

State legislation that regulates the use of roads and streets is not compatible in many ways with safe, healthy, sustainable and inclusive transport and access systems. Any potential national legislation that manages the safety of automated vehicles must adopt best practice as an overlay to state laws. It must not prioritise the rights and safety of people in vehicles over other people.

**Recommendation:**

Ensure the national safety legislation leads to best practice, rather than relying on poor state legislation.

**4.4. The legislation must define a framework of good (automated vehicle) behaviour.**

All other considerations, for example travel time (speed) must not be prioritised over extremely safe operation. This may mean that automated vehicles are required to operate at no more than 30km/h in most urban environments.

Good safe behaviour may include, for example, if a vehicle detected a person exhibiting behaviour that suggested that they are about to cross the road the vehicle must act to allow them to do so safely.

## **5. A high bar for safety that gets higher over time**

This legislation must drive Australia toward zero road deaths on a steep trajectory.

### **Recommendations:**

The legislation should require all automated vehicles to demonstrate that, at the first year of operation (2024), they are involved in less crashes and with less injuries than human drivers per km travelled across all contexts (measured separately).

Over time relative safety of operation compared to human drivers must increase.

For example, by 2030 automated vehicles should be 10 times safer than human drivers and by 2050 100 times safer.

Safe operation must be driven by financial incentives that are discussed below.

## **6. A high first hurdle for introduction of automated vehicles into Australia**

The proposal to regulate testing of vehicles before they are used in Australia is sensible but faces significant technical challenges due to the complexity of automated vehicle systems. These features of any future system can be viewed as supportive of safety but not sufficiently reliable to ensure it. Gaming of such regulation, like emissions standards, would be expected so they must be as rigorous as possible.

### **Recommendations:**

The legislation must establish hurdles for introduction of automated vehicles into Australia including:

- demonstrate in a comparable country that they operate more safely than human drivers per km travelled in urban, suburban and rural contexts (separately).
- pass difficult Australian digital and real life simulations at 100% success
- pass government assessed real life operations (i.e driving assessor in vehicle for >5000 hrs of driving in difficult environmental situations/scenarios)

## **7. Financial incentives to improve safe operation of automated vehicles must exceed costs by a significant margin**

The paper correctly identifies that all heavy, fast vehicles are very dangerous and that ceding responsibility for their safe operation to machines is inherently risky.

### **7.1. Value**

The potential value to corporations of operating automated vehicles is very substantial and potentially equal to the value of all the costs associated with using people to drive vehicles. Over time the value may be even higher than this value. The value is also many orders of magnitude higher than the cost of any damage done in crashes.

The cost of improving automated systems is very substantial as demonstrated by the difficulty, despite huge investment, in creating usable safe systems over the last decade.

The proposals to ensure that there are entities that can be held liable for the ongoing safety of the operation of automated vehicles in Australia and that those entities have sufficient funds to cover costs of fines etc are supported. These features are essential.

**Recommendation:**

Ensure legislation creates a framework requiring a corporation with sufficient capital be located in Australia.

## 7.2. Liability or fines

The part of the framework that must be stronger than proposed in the paper relates to liability which should be reframed as “financial penalties to ensure corporations invest in making vehicles operate more safely over time” or “fines”.

The legislation must include a framework for clear financial penalties that are so strong and certain so that corporations take them seriously because they cannot be avoided when their vehicles are involved in crashes where people are injured.

**Recommendation:**

Fines must be set at levels that ensure that it is more profitable for companies to expend capital making their vehicles operate more safely than to risk further fines.

Setting fines will require financial modelling of the likely costs of improving safety performance. Fines must automatically ratchet up in a way that ensures that operators are kept on the target safety performance pathway toward zero deaths and serious injuries. This would introduce an incentive to focus development of technologies to target specific gaps in AV safety.

This aspect of any legislation requires considerable work because of the current limitations on strict liability and fines. These limitations must be overcome since automated vehicle operating corporations stand to make substantial profits from entry into the Australian market and avoiding or deferring fines or liability through lengthy court processes may reduce the disincentive to put products into the market that are not extremely safe.

In designing any liability or fine framework the reasonableness and legality of actions taken by other people including people walking and cycling must not reduce the responsibility of the manufacturers of automated vehicles to protect those people from harm. For example, the fact that a person who is drunk (or a child) runs onto the road without looking must not reduce the automated vehicle operator’s liability for a fine if that person is injured or killed.

Any potential sanction to revoke the licence of automated vehicle operators once they are in use is unlikely to be able to be used due to the economic and political impacts of doing so. This makes clear frameworks of financial penalties that disincentivise initial introduction of unsafe vehicles more important.

**Recommendations:**

Undertake modelling to determine required level of fines to drive safety improvements

Undertake research to overcome legal limitations to high and certain fines

Design the fine framework so that they will be imposed whenever an automated vehicle is involved in a crash

## **8. Additional considerations**

### **8.1. Data sharing practices**

The data sharing protocols (Section 5.2) are primarily designed to benefit vehicle operations and traffic management, with little reference to pedestrian, cyclists and non-automated vehicle users data. This oversight could hinder the development of pedestrian safety measures informed by comprehensive data analytics.

#### **Recommendation:**

Develop legislated data sharing requirements that include pedestrian data to inform better safety practices and urban planning. This data should help identify pedestrian accident hotspots to guide interventions.

### **8.2. Human communication**

Future vehicles must be able to detect and understand very subtle human social interactions. For example, when traffic lights are out at an intersection and competing streams of people driving, walking and riding must negotiate passage by making eye contact and agreeing (subtly) who will proceed first and second and so on.

#### **Recommendation:**

Legislate requirement for automated vehicles to demonstrate understanding of human non-verbal communication.

### **8.3. Clear identification of automated vehicles**

Automated vehicles must use a universally understood signal (like displaying a specific pattern or colour of lights) when they are in automated operation mode so that people understand that their interactions with the vehicle are not with a person driving but with a machine system.

#### **Recommendation:**

Legislate identification requirements for automated vehicles.



I look forward to hearing the result of your consultation. Please contact me if there is any aspect of this submission that you wish to discuss.

Sincerely,

A handwritten signature in black ink, appearing to be 'JMcN', written in a cursive style.

Jesse McNicoll

