Australian Electric Vehicle Association
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TECHNOLOGIES TO PROTECT VULNERABLE ROAD USERS
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This paper began as a position statement on the design rule for Acoustic Vehicle Alerting Systems. After discussion in the Policy Advocacy Working Group, it has been broadened to take account of other technologies to protect pedestrians and other vulnerable road users.

Australian Design Rule ADR 113

In early 2024 the Federal Government implemented a new Australian Design Rule: *ADR 113, Acoustic Vehicle Alerting Systems for Quiet Road Transport Vehicles*. This rule specifies "minimum sound emission requirements for passenger and goods vehicles that can be propelled for any period of time without an internal combustion engine operating, to aid pedestrians and other vulnerable road users in detecting the presence of those vehicles".

The Rule requires electric, hybrid and hydrogen fuel cell cars, trucks and buses to be fitted with an Acoustic Vehicle Alerting System (AVAS). The AVAS must emit an audible signal at speeds up to 20 km/h. An AVAS is mandatory for all new models from November 2025 and for all vehicles from November 2026.

The new Design Rule followed the release of a consultation paper in early 2023. That paper cited a survey by the Monash University Accident Research Centre which "found that people in [the vision impaired] community had an increased feeling of vulnerability on roads due to electric vehicles, with 35 per cent of those who participated in the survey reporting that they had experienced either a collision or near-collision with an electric vehicle"[1]. AEVA is uncertain about the representative nature of the survey sample, but in any case we would like to see actual data, if it exists for any country, on the number of collisions between EVs and pedestrians.

AEVA agrees that EVs produce very little noise at speeds lower than 20 km/h. We also note that all drivers have a responsibility to avoid risks to pedestrians, regardless of whether the pedestrian notices the vehicle. In our comments on the consultation paper, we stated that we would be "happy with an ADR mandating that all new light vehicles come with an

[1] Liu, S., Fitzharris, M., Oxley, J., and Edwards, C. (2018). *The impact of electric/hybrid vehicles and bicycles on pedestrians who are blind or have low vision*. Clayton: Monash University Accident Research Centre.

acoustic warning system for low-speed driving, but that this warning system may be activated, or de-activated by the driver whenever the conditions make sense".

AEVA certainly supports reasonable, evidence-based measures to protect vulnerable pedestrians. We note that "vulnerable pedestrians" may include the vision impaired, the hearing impaired, the elderly, children, those distracted by mobile devices, those wearing ear buds or headphones, and those affected by drugs or alcohol.

Research into pedestrian accidents

ICE vehicles are noisier than EVs, but that is no guarantee of pedestrian safety. We note, for example, that the pedestrian road toll includes an average of seven children killed and 60 injured each year in low-speed driveway accidents[2]. SUVs and 4WD vehicles are over-represented in these figures, indicating that the noise generated by combustion engines is an ineffective warning signal.

If the quietness of EVs represents a significant risk, we would expect to see elevated pedestrian accident numbers in countries with high EV penetration, such as Norway. There does not seem to be any data supporting this assumption. In fact, there is Norwegian data indicating that since 2010 there has been a "rather strong" reduction in fatalities and major and minor injuries for cyclists and pedestrians, but the overall risks for all road users have remained stable since 2018[3]. Norway adopted AVAS for new models in 2019.

An important research paper[4] published in 2018 (before AVAS was regulated) found that only 30% of EVs in Norway were equipped with AVAS and that most had a "pause" switch. The paper cited data from a survey by the Norwegian Electric Vehicle Association which found that 83% of drivers had never experienced a dangerous situation with pedestrians. The most common reported incident involved people wearing headphones. Between 2013 and 2017 there was no evidence that electric vehicles in Norway were more likely to be involved in accidents with pedestrians. There had been only two fatal accidents involving EVs, none with pedestrians or bikes involved and none where AVAS might have reduced the risk. Less than 1% of all accidents between 2013 and 2017 (150 out of 20,000) causing injury involved an electric vehicle despite EVs representing 52% of Norwegian new car sales in 2017.

We are, however, aware of some recent research[5] which found that in Great Britain during 2013-2017, pedestrians were twice as likely to be hit by an electric car or hybrid-electric car than by a petrol or diesel car, with the risks being higher in urban areas. This finding suggests that the lack of vehicle noise when ambient noise is high may increase the risk.

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[2] Kidsafe Victoria. Driveway safety. https://www.kidsafevic.com.au/road-safety/driveway-safety/

[3] Norwegian Centre for Transport Research. Road traffic risk in Norway, 2021/22. https://www.toi.no/getfile.php/1377472-1709805610/Publikasjoner/T%C3%98I%20rapporter/2024/2012-2024/2012-2024_Summary.pdf

[4] Truls Berge. Experience and perception of AVAS on electric vehicles in Norway. INTER-NOISE and NOISE-CON Congress and Conference Proceedings (2018). https://www.ingentaconnect.com/contentone/ince/incecp/2018/00000258/00000007/art00024

[5] Phil J Edwards et al. Pedestrian safety on the road to net zero: cross-sectional study of collisions with electric and hybrid-electric cars in Great Britain. Journal of epidemiology and community health, 21 May 2024.

Further clarity is needed on the decibel level needed for any emitted sound to be effective, especially in areas of high ambient noise like a big city, and where some pedestrians may be wearing headphones.

Other technologies to protect pedestrians

AEVA prefers to see priority given to technologies which will reduce risks for all types of vulnerable pedestrians and which apply to all types of vehicles.

In this context AEVA notes that Australian Design Rule *ADR 98/01: Advanced Emergency Braking* (AEB) will be mandatory for all new models by August 2024, and for all cars by August 2026. AEB uses radar to automatically apply the brakes when a car is too close to another vehicle or a pedestrian and the driver does not respond. AEB has great potential to reduce accidents with cyclists and pedestrians. It can remove the human factor when there is inattention by the driver, and it has the potential to be accompanied by an auditory warning. Base model EVs already come with this technology as standard.

We also note that Australian Design Rule *ADR 108: Reversing technologies* will be mandatory for new models from November 2025, and from November 2027 for all vehicles. This Rule aims to ensure optimal vision when reversing. Nearly all EVs including base models and many conventional vehicles already have this technology, and the reversing risks largely relate to older SUV and 4WD vehicles with limited rear vision.

Conclusions

In summary, AEVA understands the concerns raised by organisations representing the visually impaired. While the evidence about the effectiveness of AVAS in reducing pedestrian is mixed, we do acknowledge the significance of the recent UK research. We accept that many EVs available in Australia already come with AVAS fitted, often with optional activation, and that the new Design Rule will result in further uptake.

We look forward to the uptake and further development of both rear vision technology and the AEB standard as currently tested and proposed by both the Australasian New Car Assessment Program (ANCAP) and the European New Car Assessment Programme (EuroNCAP). These tests provide an objective and reproducible way to assess the technology which is most likely to mitigate human factors in low-speed pedestrian collisions with vehicles of all types and all vulnerable road users.