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SUBMISSION FROM NZAA ON LAND TRANSPORT RULE: TRAFFIC CONTROL DEVICES (BILINGUAL SIGNS) AMENDMENT 2023

1. The NZ Automobile Association (NZAA) appreciates the opportunity to comment on (Land Transport Rule: Traffic Control Devices (Bilingual Signs) Amendment 2023. The NZAA has over 1.8 million members.

Submission structure

2. This submission is structured to cover general feedback up front under the following categories:
 - Introduction
 - User testing and order of implementation
 - Languages must be effectively differentiated
 - The impact of lines of text on safety
 - Reconsideration of sign placement
3. In the **Appendix** we provide specific comment on each of the 7 proposals covering the different traffic sign categories covered in the consultation document.

Executive Summary

4. The focus of our submission is on the safe introduction of bilingual traffic signage. In order to achieve this, we recommend:
 - user testing is required on proposed signs before they are implemented in the roading environment and bilingual advisory signs should be implemented and evaluated before warning and regulatory signage
 - the reconsideration of the 'one series up' method to differentiate the two languages as it is not effective
 - the lines of text on the proposed signs should follow international best practice of a maximum of four lines of text
 - sign placement should be revisited when installing new traffic signs

Introduction

5. We recognise that Waka Kotahi is aiming to achieve a number of objectives with this proposal including facilitating the revitalisation of the Māori language. The focus of this submission is on the singular issue of the safe introduction of bilingual traffic signage – which is only one of the objectives of the programme.
6. As we note throughout our submission, we consider that there are some safety issues that need addressing in sign design before they are finalised for a safe introduction.
7. Traffic signs are distinct from general signage and have unique requirements. As outlined in Waka Kotahi NZ Transport Agency research note 005 (2021) on Bilingual traffic signage: *'relative to non-traffic signage, travel speeds mean that users of traffic signage face briefer windows to observe, interpret and correctly act on the information provided by signs'* and *'They must also be understood by the full range of people who travel on New Zealand's roads including locals, visitors and tourists'*. The consequences of interpreting a traffic sign incorrectly can be a death or serious injury crash. As such, we strongly support Design Principle 1 – 'The design of signs must be safe for transport system users'.
8. A key phrase in the consultation document is: *'The design of traffic signs must always be safe and the presentation of te reo Māori culturally appropriate – these are bottom lines and so no compromise will be made'*. We consider that for some traffic signs, achieving these bottom lines may be difficult, and more design work will be needed to find effective ways of delivering on both of these objectives.

User testing and order of implementation

AA recommendation: *user testing is required on proposed signs before they are implemented in the roading environment and bilingual advisory signs should be implemented and evaluated before warning and regulatory signage*

User testing

9. The large number of signs and the likelihood the final sign designs will be in use for decades means these are significant decisions with long lasting impacts. The design/layout of each bilingual traffic sign is critical.
10. As quoted in the WK 2021 research note 005: *"Arguably the experimental research has pointed towards a negligible negative effect on safety, with post hoc assessments finding no negative effect on DSIs **if the design is done well**. However, in some cases best-practice design and cultural needs may conflict, and **sub-optimal sign design could lead to negative outcomes that are more than substantial'***.
11. As such we consider that it is essential that there is user testing of the design/layout for all the proposed signage to ensure we are implementing change in a way that we can be confident that Design Principle 1: *'The design of signs must be safe for transport users'* will be met.
12. For example, on page 16 of the consultation document there is discussion of other signs which will be looked at in a future phase: *'...These signs include 'School Patrol' and temporary traffic management stop/go/slow signs. **Waka Kotahi is working with Waikato University to undertake research on design options and driver responses to these signs. The outcomes of this research***

will be used to inform proposals for phase two of this programme'. We consider that this level of testing and rigour should also undertaken for all of the sign designs covered in this current consultation round. There is a reference in the document to a subsection of proposed signs being checked with NZ Association of Optometrists for colour comprehension, but nothing beyond that.

13. In particular, user testing should be undertaken before finalising an overall approach for which language is given primacy in the traffic sign designs. The aim is for road users to quickly identify the language they are most confident reading and understanding. As Waka Kotahi 2021 Research Note 005 states, *'The research has shown that where a specific language is understood by most people, placing that language in a position of primacy above a supplementary language enhances sign comprehension for most road users'*. This is not the approach of the bilingual signs proposed in this consultation. The impact of language primacy will also depend on how differentiated the languages are from each other across the suite of signs proposed – with the greatest impact likely to be where there is the least differentiation between the English and te reo Māori text.
14. Recent research undertaken by WSP for the AA Research Foundation focussed on older driver safety. This research noted that due to degeneration of our eyesight as we age there was a specific need for text on traffic signs to be as large as possible and the preview time needed to be at least 2 seconds. With the longevity of road signs and the aging population, the needs of older drivers need to be carefully considered.
15. In the 2021 Consultation on the Kura/School signage where Waka Kotahi were comparing italic versus bold font they noted 'Waka Kotahi undertook specific research on whether international experience could inform which approach to recommend. This research focused on print media and computer screen text, **as no research on traffic signs was identified**. This research found small decreases among reader performance for both italic and bold fonts. **When reading a book these decreases were immaterial, but when driving they may be compounded or significant when decisions are quick, with more serious consequences**'. This also shows why user testing is necessary.

Order of implementation

16. We also note that Waka Kotahi research concludes a phased approach should be followed to sign introduction. We support this and suggest that advisory signs should be introduced first with decisions on warning and regulatory signs considered following evaluation of bilingual advisory sign implementation. This would also help manage the cost implications which will flow from the increased size of signage.
17. Waka Kotahi 2021 Research note 005 researched bilingual signage from a number of countries around the world and it was noted that it was extremely rare to see bilingual safety and regulatory signage, with the exception of Wales. Consequently, there is no research and best practice approaches from overseas to support introducing these categories of signs in New Zealand with confidence in regard to safety outcomes.
18. The Waka Kotahi 2021 research note 005 suggests that *'One potential approach could be to target specific sign categories, such as advisory signage, for implementation first, **on the basis that these present the lowest level of risk in terms of increased reaction times**. Other sign categories could be scheduled for replacement over an extended period, **enabling evaluation of the initial phase to inform later implementation**'*.

Monitoring Plan

19. Regardless of the implementation approach chosen for the introduction of the bilingual traffic signs programme, a monitoring plan should be in place before implementation (as recommended in Waka Kotahi Research note 005).

Languages must be effectively differentiated

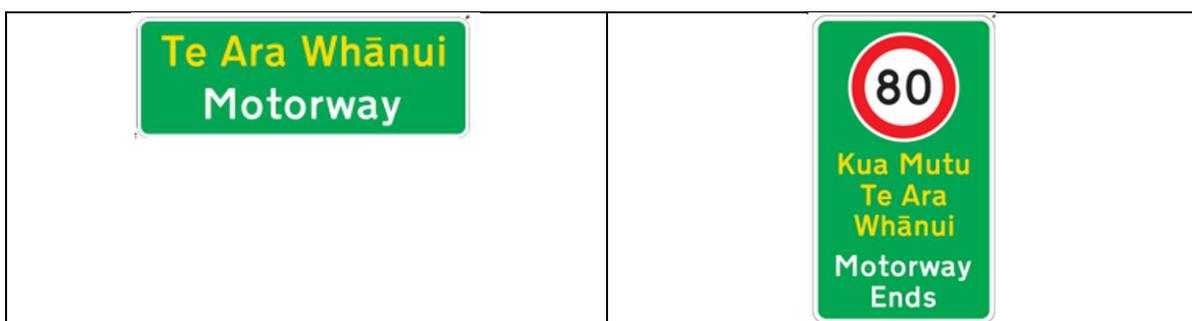
AA recommendation: *The ‘one series up’ method to differentiate the two languages is not effective and should be reconsidered.*

20. With several of the signs proposed, we do not believe their designs meet design principle 2 - ‘Languages must be differentiated’. This design principle states ‘Te reo Māori and English must be sufficiently differentiated for transport system users to quickly identify the language they are most confident reading and understanding. This is especially important for signs used in high-speed environments.
21. Specifically, we have concerns that the ‘one series up’ differentiation method (increasing the font series used for te reo Māori) is not sufficient to distinguish between English and te reo Māori at the level that is required for traffic signage. The signs we refer to here are those where both languages are in the same colour and capital text and the difference in font series is very difficult to distinguish. Examples as below:



22. Without any user testing being undertaken, there is no evidence to provide comfort that road users will be able to quickly differentiate between te reo Māori and English on these signs. We consider they are difficult to differentiate between in the consultation document’s static images and propose that this would be even more difficult at driving speed. We do not believe the font size is enough to differentiate the languages. We propose they need an extra method of differentiation applied (colour, type case, etc).
23. The impact of the lack of significant visual differentiation of the two languages on these signs is compounded by the relative position of the two languages. Waka Kotahi 2021 Research note 005 (p 29) states
- ‘The research has shown that where a specific language is understood by most people, placing that language in a position of primacy above a supplementary language enhances sign comprehension for most road users’.
 - It also discusses that ‘In many cases where the indigenous language is placed in a position of spatial primacy, **additional methods of differentiation are used** to enhance comprehension by visually drawing a distinction between the two texts. These include varying font types and sizes, as well as the use of upper-case letters and colour’...
 - ‘using visual means to differentiate two languages on a sign is a critical strategy for enhancing public safety when a less commonly spoken language is placed in a position of spatial primacy.

24. In regard to the proposal to use the 'one series up' differentiation method on the yellow permanent warning signs, we acknowledge that this was the final differentiation method chosen for the already implemented Kura/School signs following consultation and therefore these proposed signs are consistent with that approach. However, in the Kura/School sign consultation, our submission supported the Waka Kotahi preferred option for the languages to be distinguished using Italics.
25. We do support, on differentiation grounds, the alternative discussed (but not proposed in the final set) in the consultation document for motorway/expressway signs (shown below). These signs use colour to effectively differentiate the languages. We note that this deviates from the design principle of 'maintaining consistency and familiarity of signs' by not retaining capital case for the sign family, but we consider that principle secondary to the requirement for differentiation – the ability to read and understand the signs easily is more important than consistency or familiarity principles. We would also support user testing of an additional variation where one of the languages was in upper case. However, there are likely to be reasons behind the current use of capital case on motorway signage, perhaps due to the high-speed environment, and any unintended consequences need to be considered by safety specialists. In addition, as mentioned throughout this submission, these decisions should not be made based on viewing these in on screen/paper and should be tested by users.



The impact of lines of text on safety

AA recommendation: the lines of text on the proposed signs should follow international best practice of a maximum of four lines of text

26. The consultation document outlines that New Zealand follows international best practice in traffic sign design. This includes understanding that research has shown sign complexity and the quantity of text have an impact on reading comprehension, contributing to a decrease in driver performance. Keeping terms/phrases as short and simple as possible, preferably under four lines in total, can significantly lessen negative safety effects. This was also noted in the 2021 Waka Kotahi Research Note 005.
27. There are several signs proposed in the document which will result in 4 lines or greater of text which goes against this safety best practice.

Reconsideration about sign placement

AA recommendation: sign placement should be revisited when installing new traffic signs

28. Alongside the design of each bilingual traffic sign, there should be consideration given to whether adjustments need to be made to the requirements for sign placement. The change in size required by some signs and/or the increased complexity may mean that their current required distance from the intersection/hazard/feature may no longer give adequate warning to road users. In addition, when signs which are larger in size replace current smaller signs, it will be necessary to reassess the location is still appropriate (e.g. free from foliage, other roadside furniture and adequate site lines are maintained).

Specific feedback on each proposal/design category

29. Please see the appendix which provides our feedback on each specific proposal category, following the format of the consultation document.

Conclusions

30. The NZAA welcomes the opportunity to input on the bilingual traffic signs consultation and requests the issues we have raised above and in the appendix are addressed.

31. The NZAA will be pleased to provide any further comment as appropriate, please contact me in the first instance.

Yours sincerely



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APPENDIX 1: Specific feedback on each design category

1. In this section, we follow the consultation document through and provide feedback on each 'Proposal Category'. Please note we have repeated our general points in our comment on each proposal category deliberately, to fit in with the format of the proposals.

Proposal 1 – Destination Signs

2. The proposed bilingual destination signs cover a mixture of regulatory and advisory signs. We repeat our assertion that all signs should be user-tested prior to any decisions being made on final sign design. At the very least, advisory signs should be implemented and evaluated prior to any decisions on regulatory signage.
3. Notwithstanding that, our general comments are:
 - We support the use of colour to differentiate the two languages
 - Support the use of hospital and airport service symbols on these signs to allow road users to quickly identify the direction of these important destinations
 - Support the dual option for 'Welcome to' signs (te reo Māori sign on the left-hand side of the road, with English sign on the right).
 - We are concerned these proposals will result in signs of four lines or greater of text, going against best practice safety principles that signage should contain less than four lines of text

Proposal 2 – Public and active transport signs

4. The proposed bilingual public and active transport traffic signs are all regulatory signs. We repeat our assertion that all signs should be user-tested prior to any decisions being made on final sign design. At the very least, bilingual advisory signs should be implemented and evaluated prior to any decisions on regulatory signage.
5. Notwithstanding that, our general comments on this section are:
 - The Cycle Lane and Bus Only signs differentiate the languages using the 'one series up'. As discussed earlier in our submission we do not consider this method of differentiation is sufficient to distinguish between te reo Māori and English in the context of traffic signage.
 - In contrast, the 'Bus Stop' sign uses colour to differentiate the languages, and we think this is much more effective.
 - We are concerned these proposals will result in signs of four lines or greater of text, going against best practice safety principles that signage should contain less than four lines of text
 - Clearly understandable signage for bus-only lanes, roads where private cars are banned or areas with congestion charging zones are going to be a growing issue as more cities in New Zealand look at introducing these features. For these initiatives to work well, the signs need to be understood quickly and correctly by a driver who may be unfamiliar with the area and only have a very short window to see a sign before potentially facing a fine or driving where they are not allowed to. As an example, \$2.5M in fines were issued in six months for a 150m section of Queen Street following a ban of private vehicles in 2022.
 - Below is an example of this kind of signage. It is imperative that careful consideration is given as these signs are developed and the potential impacts of regulatory signage beyond

safety. Where a driver may face financial penalties for not understanding a sign the need to ensure quick and clear understanding should be tested thoroughly.



Proposal 3 – Walking and cycling wayfinding signs

6. The proposed bilingual walking and cycling wayfinding signs are all advisory signs. We repeat our assertion that all signs should be user-tested prior to any decisions being made on final sign design.
7. Notwithstanding that, our general comments on this section are:
 - We support the use of colour to differentiate the languages
 - We are concerned these proposals will result in signs of four lines or greater of text, going against best practice safety principles that signage should contain less than four lines of text. Signage aimed at pedestrians does not have the same time pressure, as they are able to stop for as long as necessary to consider the signs. However, cyclists will face unique pressures on time and attention while riding which need to be considered carefully.

Proposal 4 – General advisory and permanent warning signs

8. The proposed bilingual general advisory and permanent warning signs cover a mixture of regulatory, warning and advisory signs. We repeat our assertion that all signs should be user-tested prior to any decisions being made on final sign design. At the very least, Advisory signs should be implemented and evaluated prior to any decisions on warning and regulatory signage.
9. Notwithstanding that, our general comments on this section are:
 - All of the signs proposed in this section differentiate the languages using the 'one series up' method. As discussed earlier in our submission, we do not consider that this method of differentiation is sufficient to distinguish between English and te reo Māori in the context of traffic signage. We propose these signs need an extra method of differentiation applied (colour, type case). For the yellow warning signs we support the different approach proposed for the temporary warning signs in proposal 6 – where the languages are differentiated by sentence case and consider this could be also used for these signs. For the red/white regulatory signs we think the approach proposed for the R6-2B Bus Stop signs could be used here – colour differentiation of the text.
 - We are concerned these proposals will result in the R1-6.1 signs having four lines of text, going against best practice safety principles of signage containing less than four lines of text. The lack of obvious differentiation in languages also adds to this complexity.

Proposal 5 – Motorway and Expressway Signs

10. The proposed motorway and expressway signs cover a mixture of regulatory and advisory signs. We repeat our assertion that all signs should be user-tested prior to any decisions being made on final sign design. At the very least, Advisory signs should be implemented and evaluated prior to any decisions on regulatory signage.
11. Notwithstanding that, our general comments on this section are:
 - All of the proposed motorway and expressway signs differentiate the languages using ‘the one series up’ method. As discussed in detail earlier in our submission, we do not consider that this method of differentiation is sufficient to distinguish between English and te reo Māori in the context of traffic signage.
 - The consequences of not being able to quickly differentiate the languages are exacerbated in a high-speed motorway environment. We propose these signs need an extra method of differentiation applied (colour, type case).
 - We do support, on differentiation grounds, the alternative discussed (but not proposed in the final set) in the consultation document for motorway/expressway signs. These alternative signs use colour to effectively differentiate the languages. We note that this deviates from the design principle of ‘maintaining consistency and familiarity of signs’ by not retaining capital case for the sign family, but we consider that principle secondary to the requirement for differentiation – the ability to read and understand the signs easily is more important than consistency or familiarity principles. We would also support user testing of an additional variation where one of the languages was in upper case. However, there are likely to be reasons behind the current use of capital case on motorway signage, perhaps due to the high-speed environment, and any unintended consequences need to be considered by safety specialists. In addition, as mentioned throughout this submission, these decisions should not be made based on viewing these in on screen/paper and should be tested by users.
 - We are concerned these proposals will result in signs of four lines or greater of text, going against best practice safety principles of signage containing less than four lines of text. The lack of obvious differentiation in languages also adds to this complexity.

Proposal 6 – Temporary Warning Signs

12. We repeat our assertion that all signs should be user-tested prior to any decisions being made on final sign design. At the very least, Advisory signs should be implemented and evaluated prior to any decisions on warning signage.
13. Notwithstanding that, our general comments on this section are:
 - Support sentence case differentiation as it provides clearer differentiation and will minimise the sign size increase (which creates a greater than average hazard for this category of signs). We consider the differentiation need is more important than the design principle of maintaining consistency and familiarity of signs by not retaining capital case for the entire sign family. We think this approach should be used for permanent warning signs also.
 - The consultation document proposes that a dual approach option was considered to combat the impacts of larger signs (a single sign for each language), but instead of having te reo Māori sign on the left-hand side and English on the right, the signs would be set up on the same side of the road sequentially, with a distance between them. We note that while this would mean the supporting infrastructure would not need to be changed (frames, stands and trucks), it would double the number of signs, cluttering the network and also increasing the setting up and packing down timeframes increasing risk exposure for workers. On this basis, our preference would be for the signs to be increased in size to account for both languages on one.