



Motorcyclist perceptual lane markings

Australian recent experience

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Recent experience w/ motorcyclist markings

2021

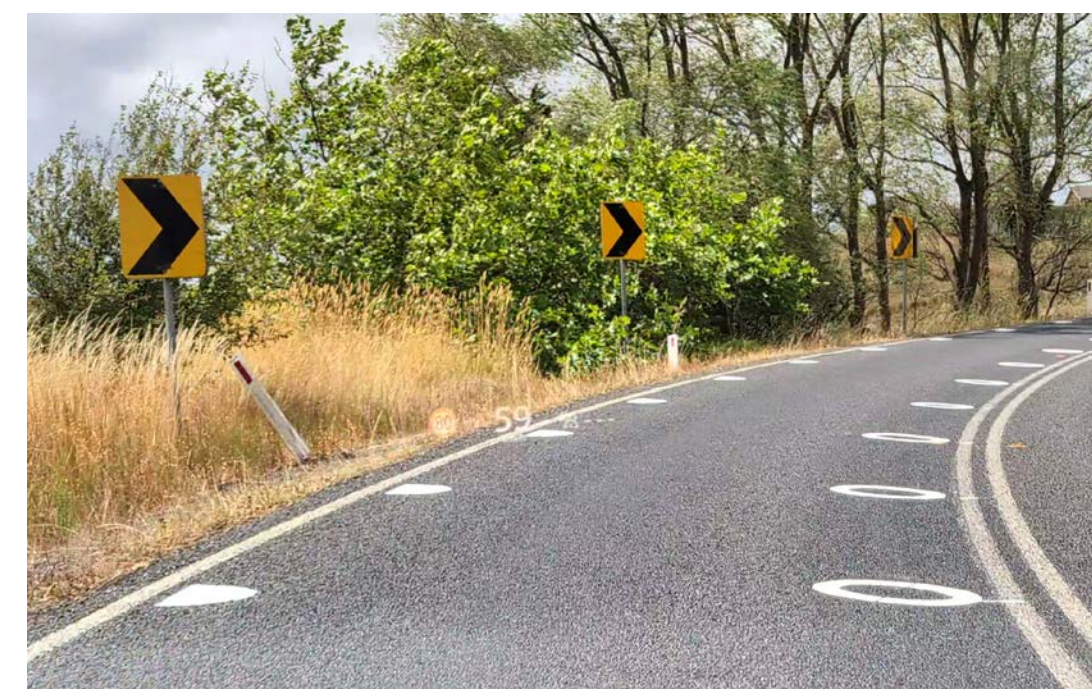
**Pilot trial
2 sites (QLD)**



2026

**Ongoing trial
6 sites (VIC + TAS)**

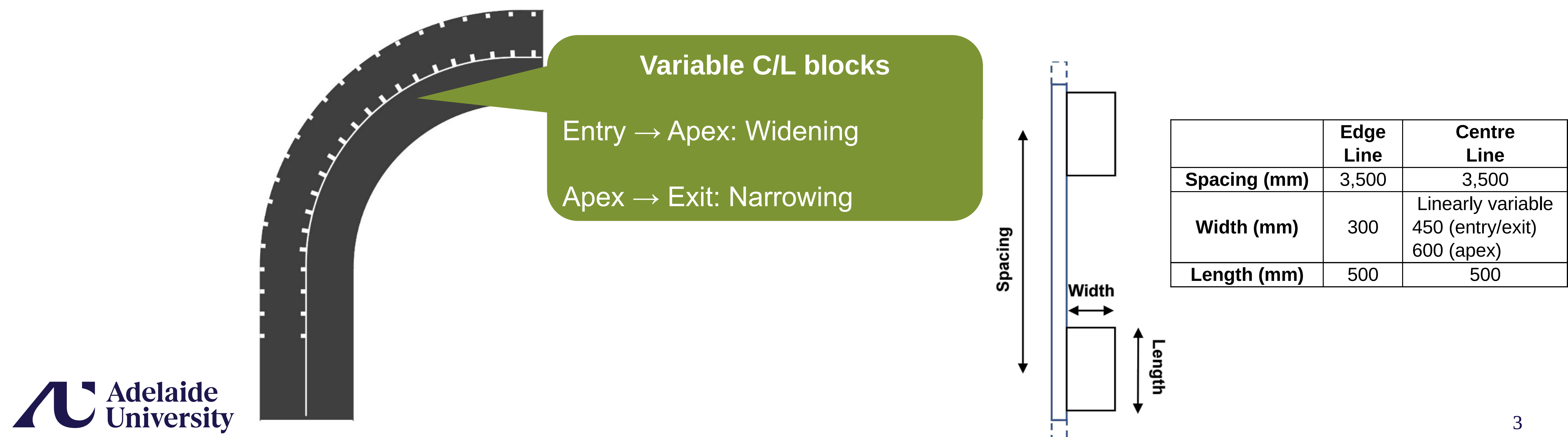
**Preliminary
Results**



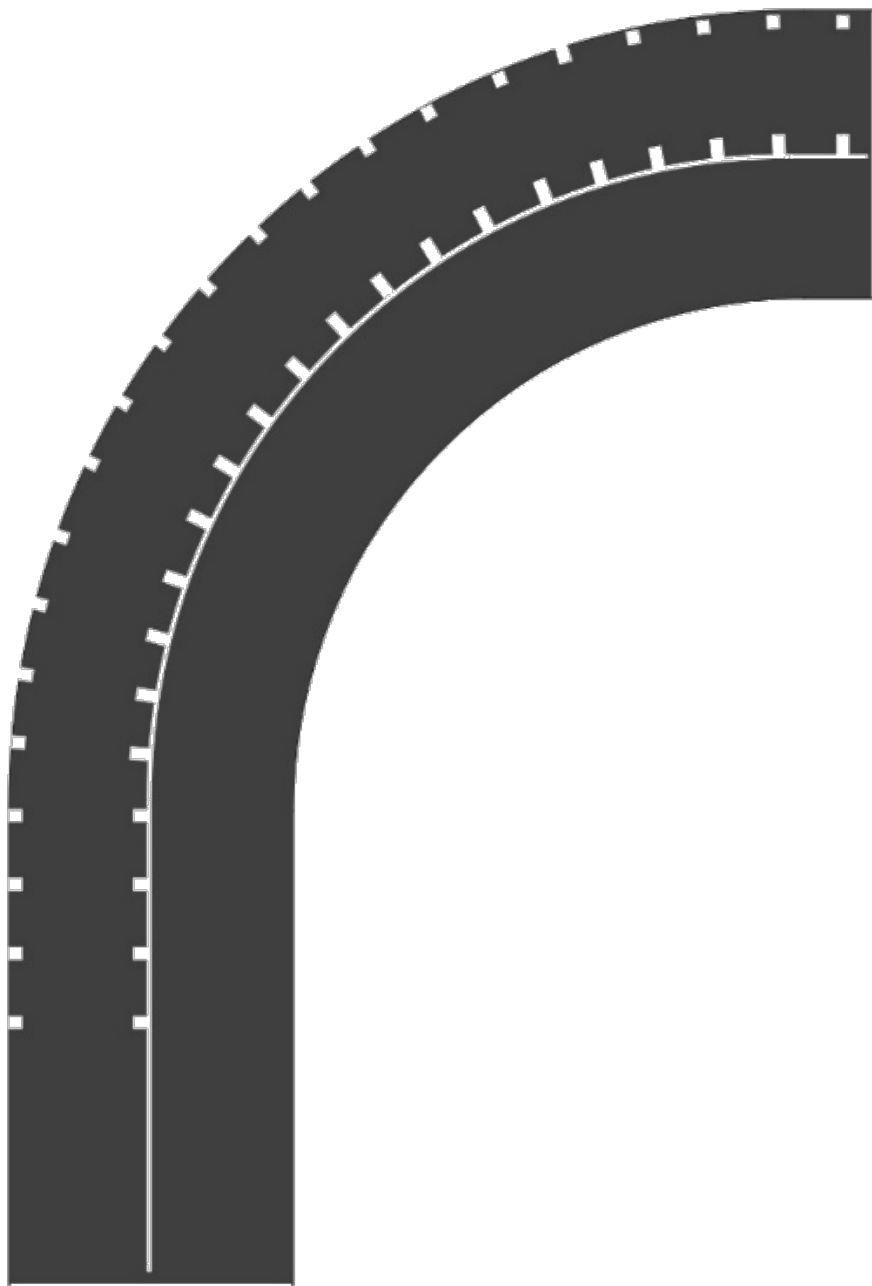
2021 Trial - PCM Design

➤ Peripheral transverse line markings

- o Create **preferred corridor** using peripheral blocks (edge and centre)
- o Designed to prevent **intentional** centreline crossing (right-hand bend)



2021 Trial - PCM Design



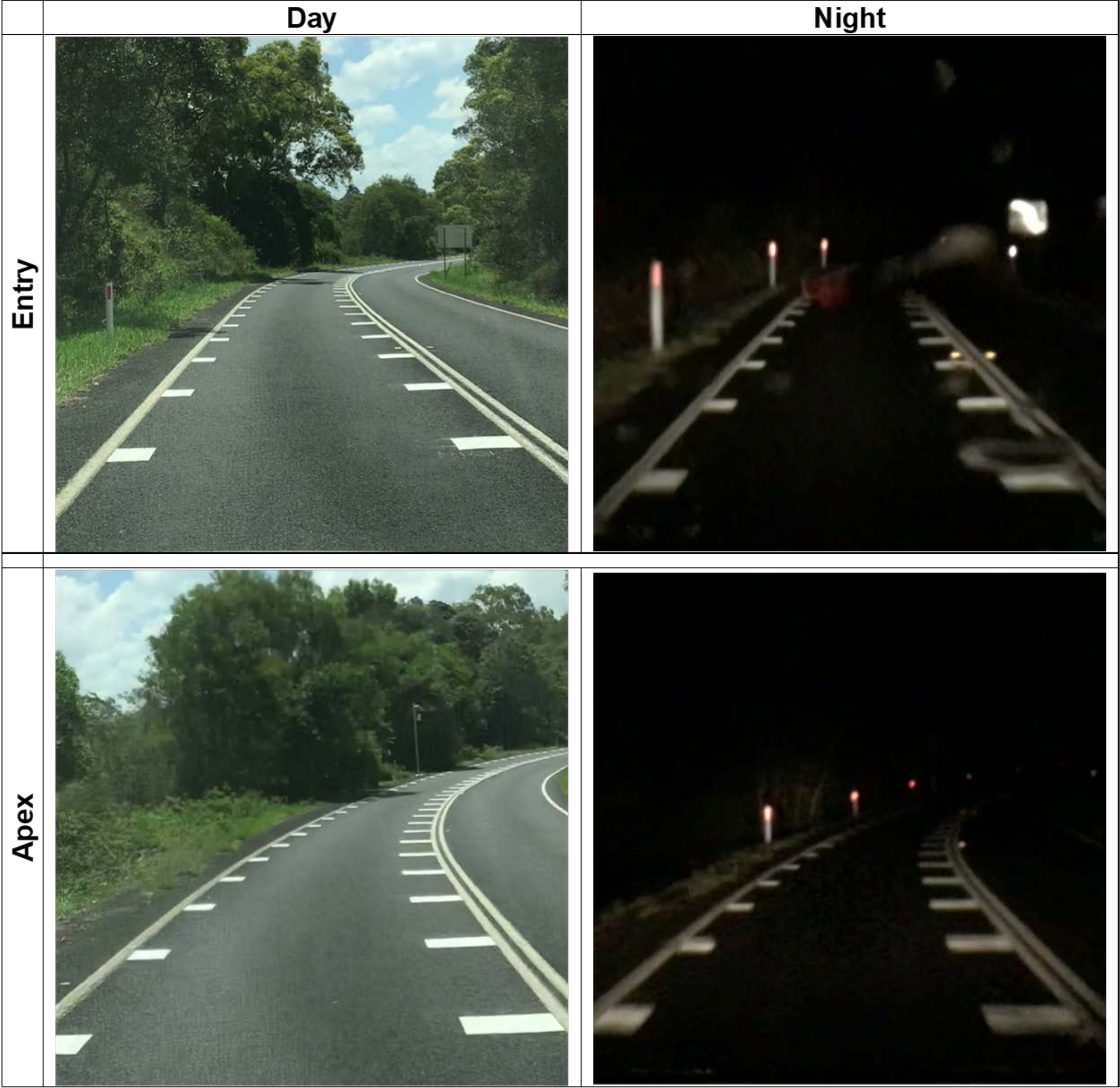
Design Feature	Expected Effect
Peripheral blocks	Perception of narrow lane & mild channelisation effect
Variable centreline blocks	Intuitive and smoothly guidance (potentially increasing compliance & acceptance)
Widening C/L blocks (Entry -> Apex) & Narrowing C/L blocks (Apex -> Exit)	Accentuate expected effect of standard design • Entry – Drifting t/w outside of curve • Throughout – Gradual shifting t/w centreline at safe distance from oncoming traffic

2021 Trial - Implemented Markings

Sharp Curve



Shallow Curve



2021 Trial - Methodology

Before-After

➤ Safety performance evaluated through before-after trial

- o Motorcyclists monitored **before & after** PCM installation
- o Both curves evaluated

➤ Filter criteria

- o Motorcyclist riding in **free flow** condition (i.e., no close vehicles leading / following)
- o No **oncoming vehicle(s)** when negotiating the curve
- o **Dry** road surface

- *Trial NOT advertised (but brief media from QLD Gov.)*
- *No road signage to alert of trial*

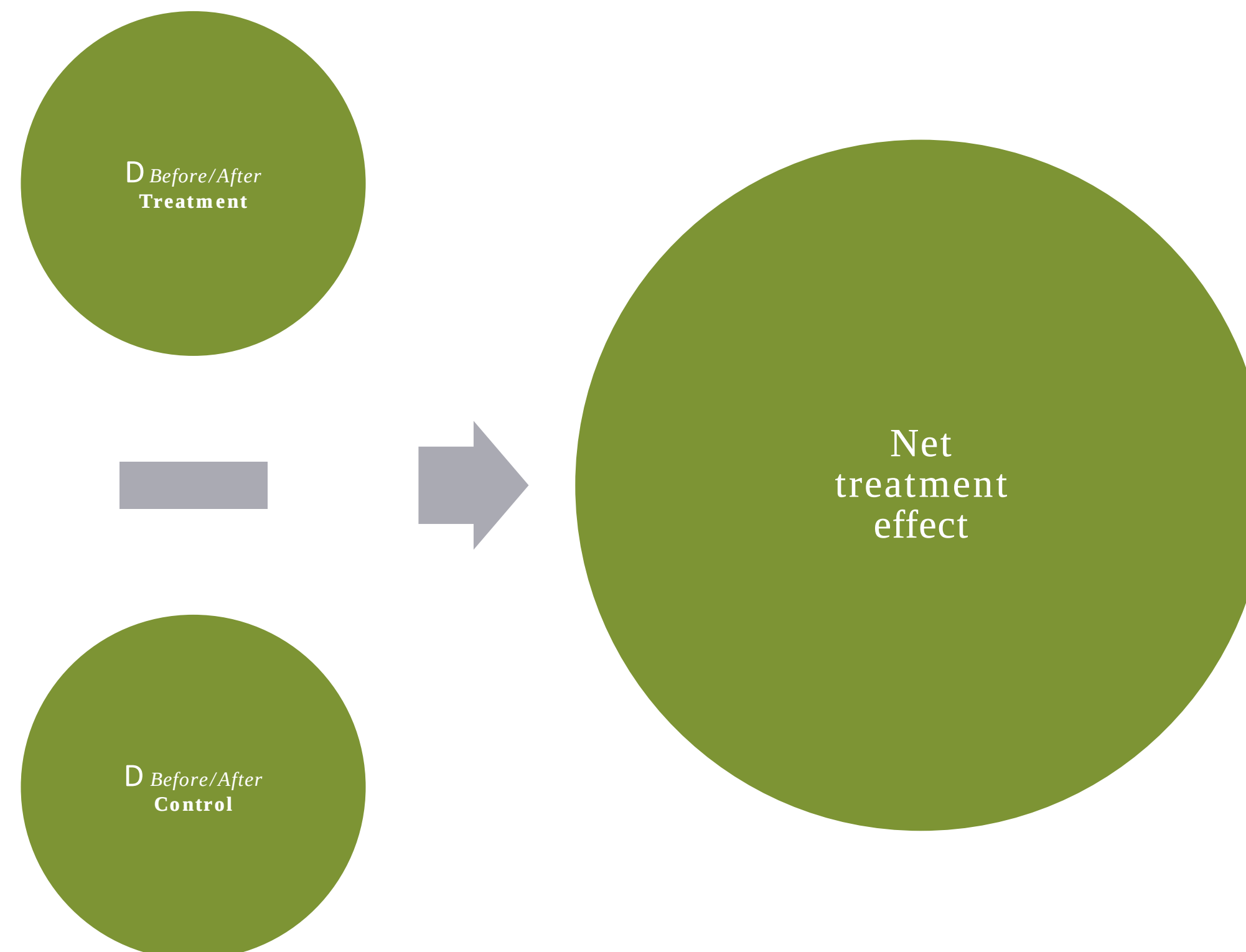


Source: Google Maps

2021 Trial - Methodology

Controlled Approach

- **Control sites paired to treated sites**
 - Discount for possible confounding factors (e.g., weather effects)
 - Account for existing PCMs (e.g., roadside guide posts, CAMs)



WHAT?

WHERE?

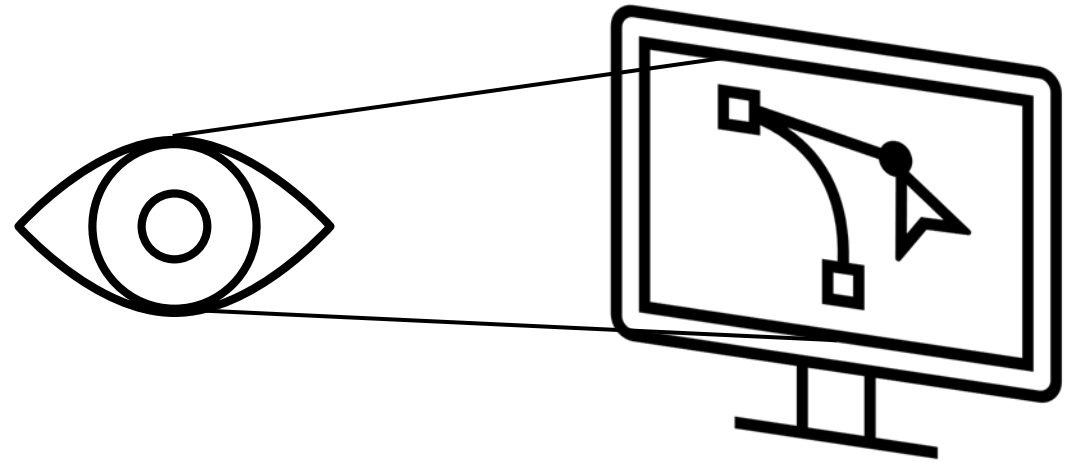
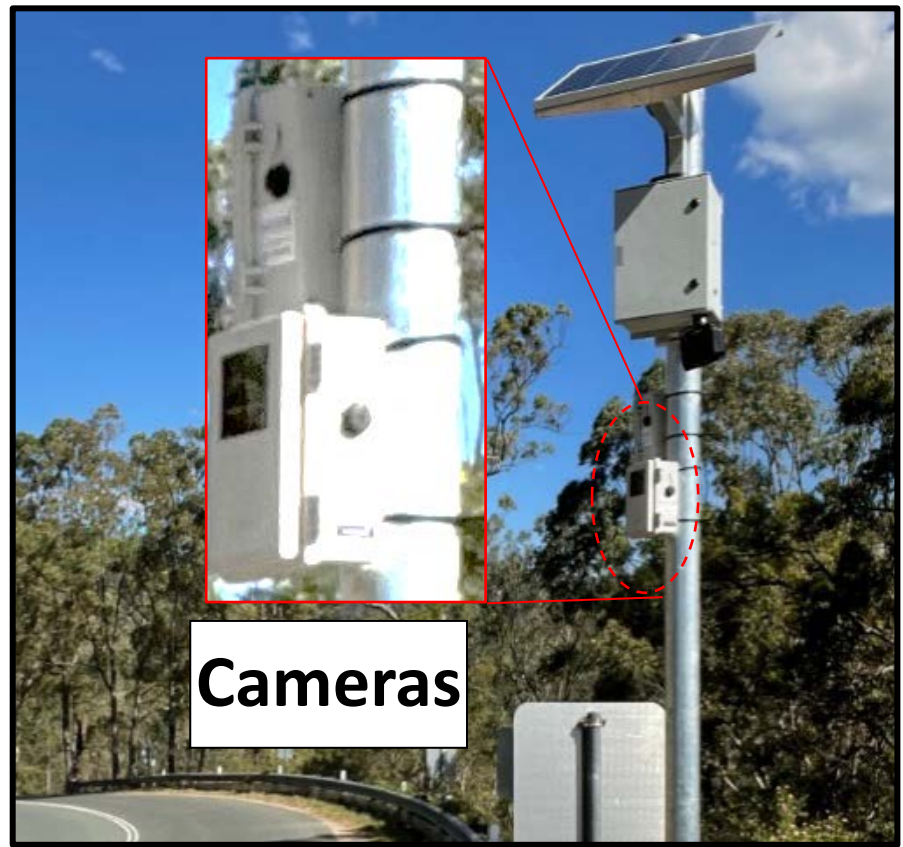
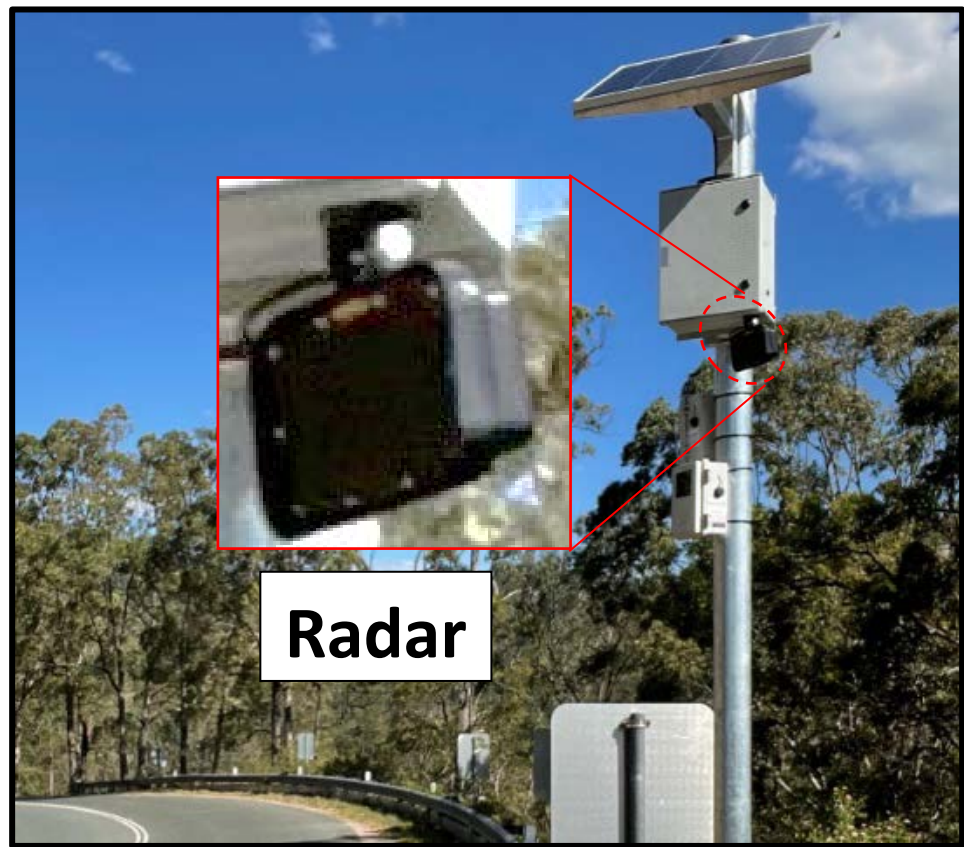
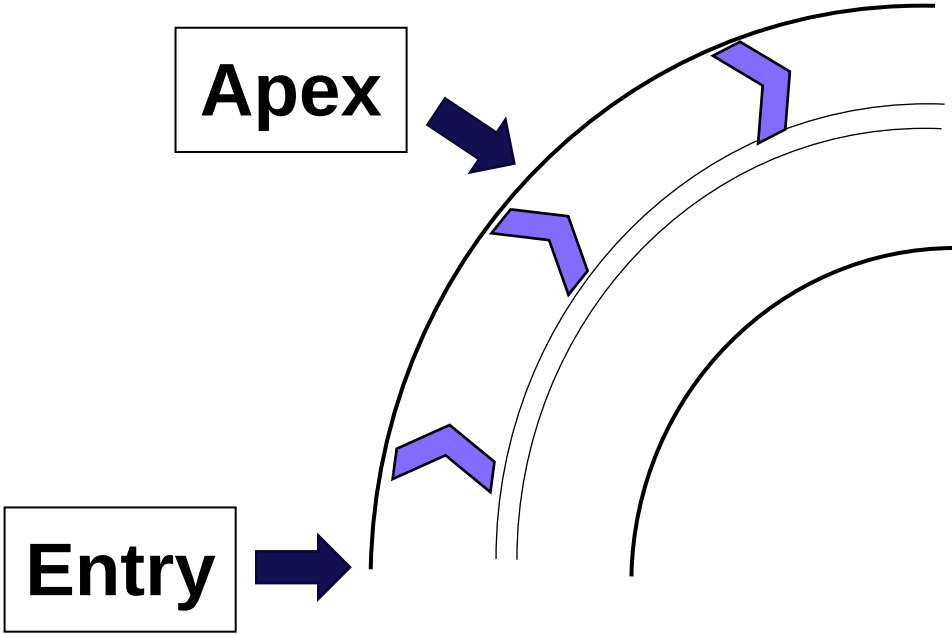
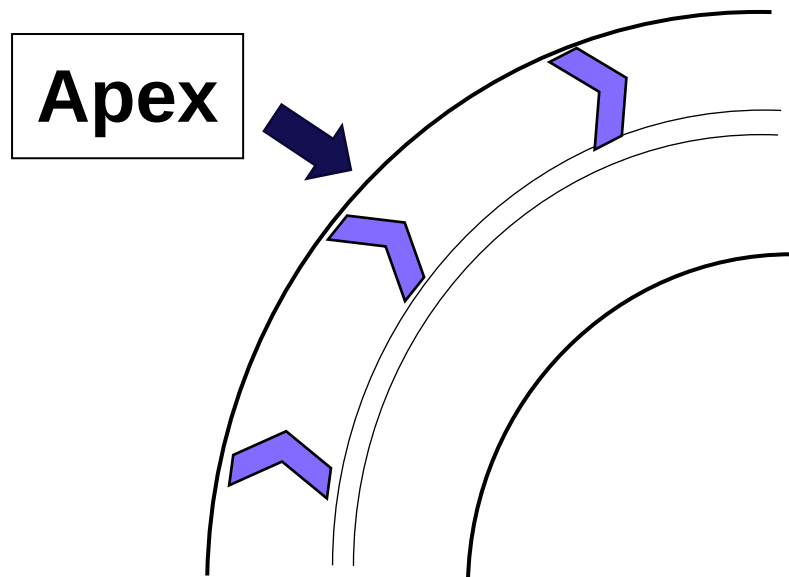
HOW?

UNITS?

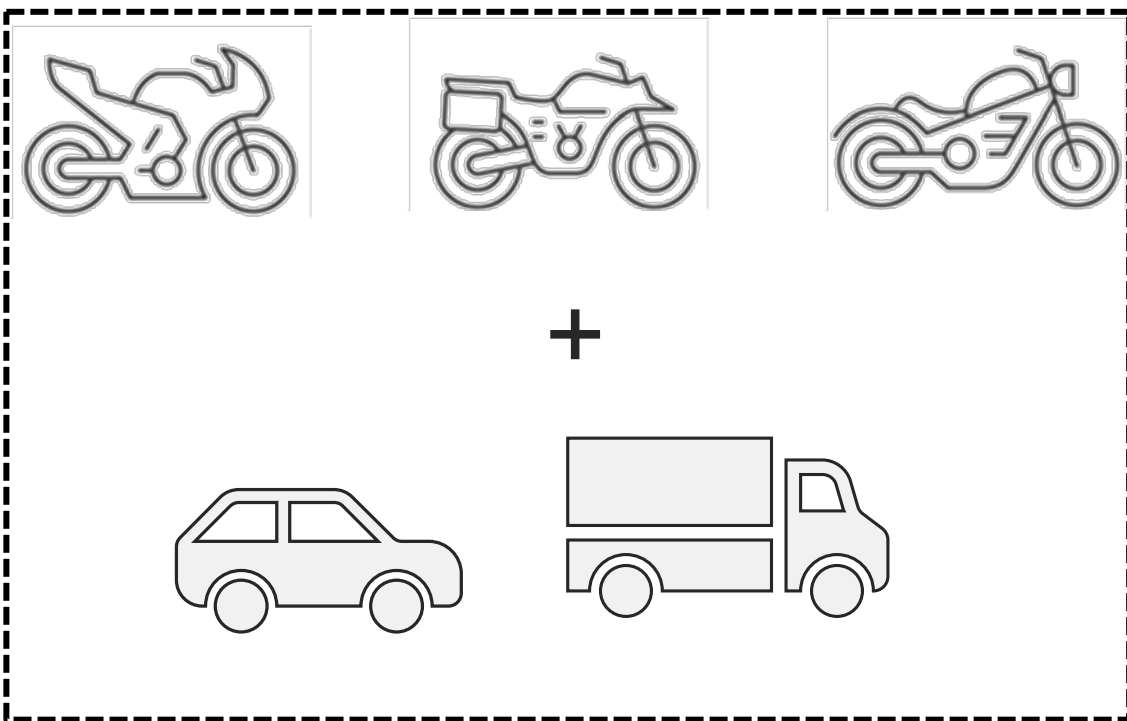

Speed


Lane Position


Vehicle Classification

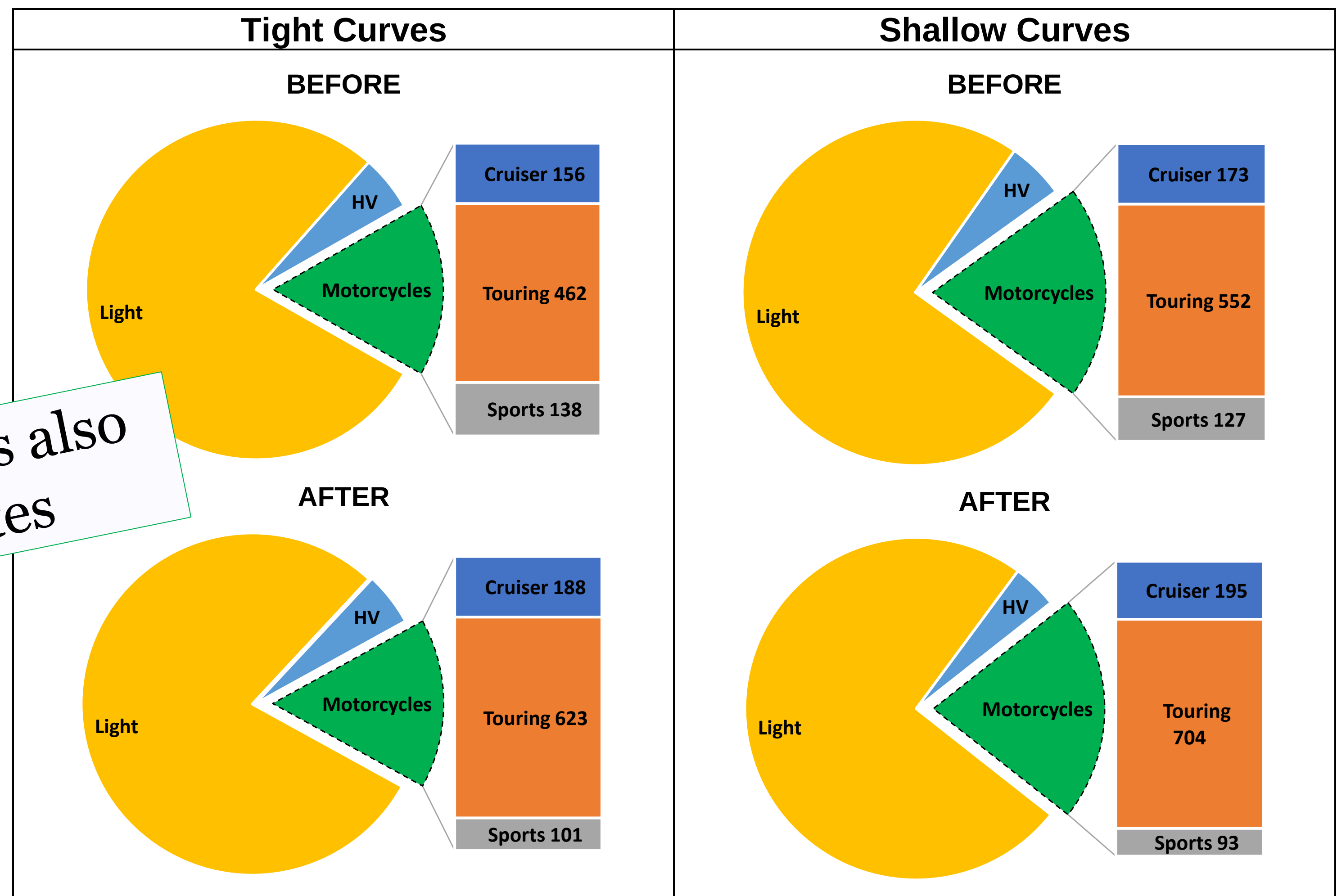


Km/h



2021 Trial - Results

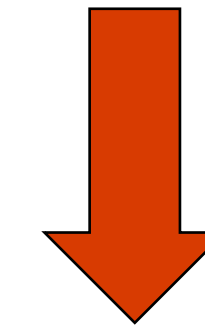
Detected vehicles



Similar proportions also
for **Control** sites

2021 Trial - Results

Mean travels speed at apex



	Motorcycle Categories	Treatment			Control			Controlled Variation
		Before	After	Variation	Before	After	Variation	
Tight Curves (Pair #1)	ALL Motorcycles	52.6	50.8	-1.8	42.1	42.2	0.0	-1.8
	• Cruiser	49.1	47.4	-1.8	38.4	38.6	0.2	-2.0
	• Touring	53.0	50.9	-2.1	42.4	42.4	0.0	-2.1
	• Sports	54.2	56.4	2.3	45.6	45.6	0.0	2.3
	Light Vehicles	47.3	45.7	-1.6	37.4	37.1	-0.3	-1.3
	Heavy Vehicles	45.2	41.5	-3.7	35.8	35.0	-0.8	-2.9
Shallow Curves (Pair #2)	ALL Motorcycles	88.4	84.6	-3.8	91.9	91.4	-0.5	-3.3
	• Cruiser	88.2	82.6	-5.5	92.2	90.9	-1.3	-4.2
	• Touring	87.5	84.8	-2.7	91.3	91.5	0.2	-2.9
	• Sports	92.5	87.0	-5.5	95.8	91.6	-4.2	-1.2
	Light Vehicles	81.1	80.4	-0.7	84.5	85.3	0.9	-1.5
	Heavy Vehicles	76.3	75.0	-1.3	81.0	80.0	-1.0	-0.3

2021 Trial - Results

- Increased proportion riding below speed limit (threshold 10 km/h below limit)
- Likely due to PCM treatment
 - Evident at treatment sites
 - Negligible at control sites

Speed thresholds

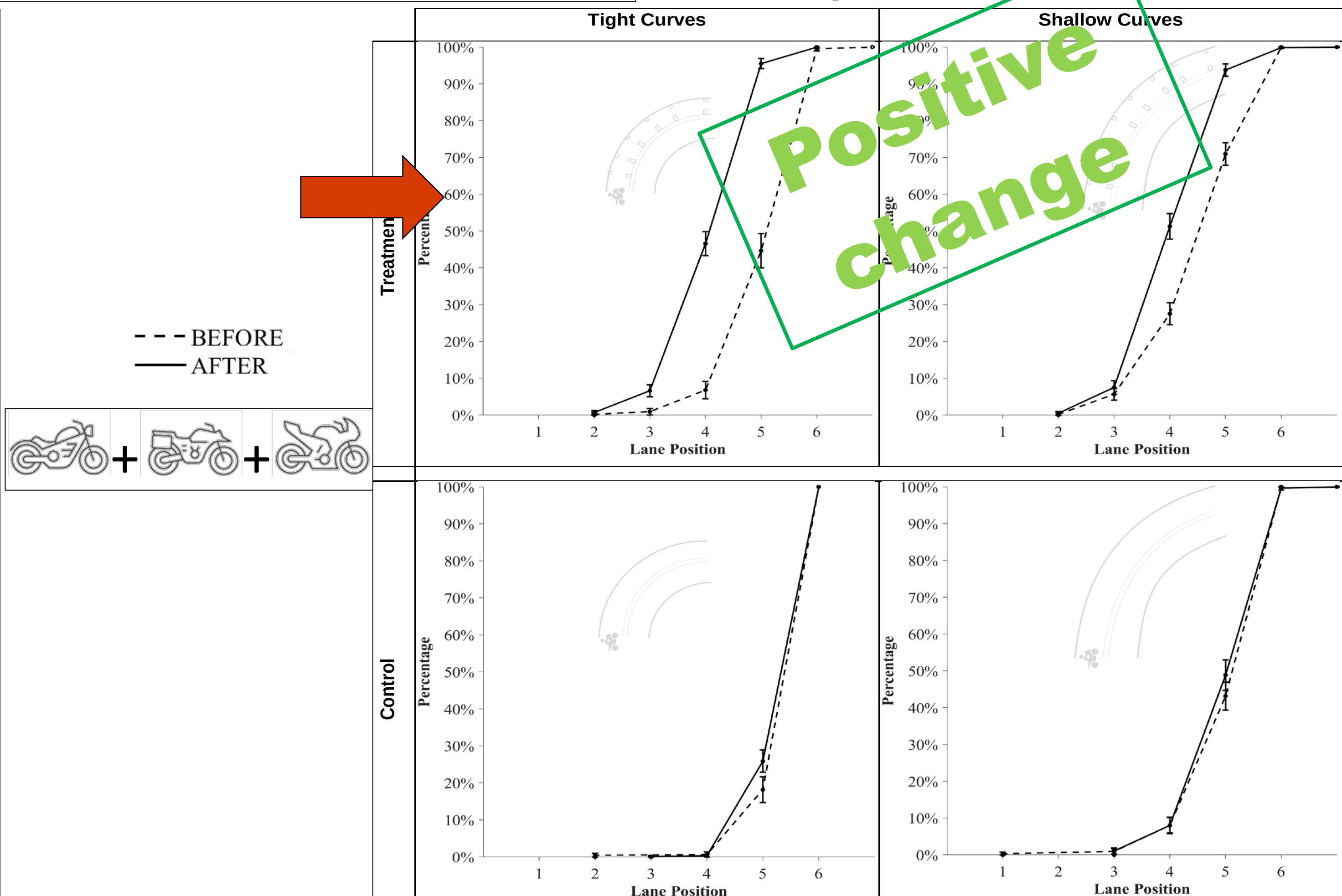
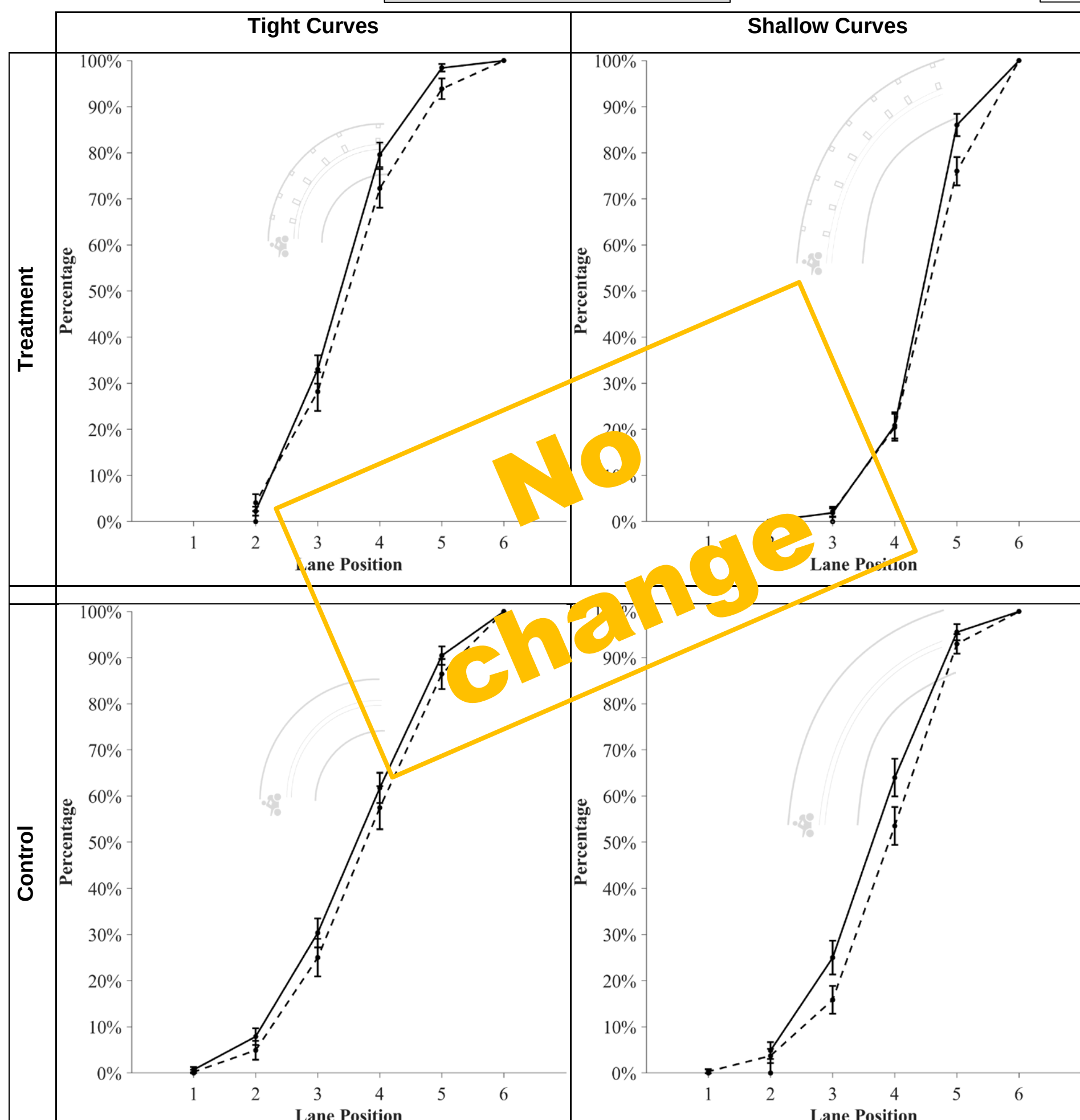
Curve Type	Site Type	Period	PERCENTAGE OF MOTORCYCLES			
			<=40 km/h (%)	<=50 km/h (%)	<=60 km/h (%)	> 60 km/h (%)
Tight Curves (Pair #1)	Treatment	Before	2.6	37.0	86.6	13.4
		After	5.5	50.2	89.6	10.4
		Variation	2.9	13.2	3.0	-3.0
	Control	Before	33.2	95.1	100	-
		After	35.3	94.7	100	-
		Variation	2.1	-0.4	0.0	-
		Controlled Variation	0.8	13.6	3	-3
			<=80 km/h (%)	<=90 km/h (%)	<100 km/h (%)	> 100 km/h (%)
Shallow Curves (Pair #2)	Treatment	Before	18	53.1	91.1	8.9
		After	31.2	67.9	95.9	4.1
		Variation	13.2	14.8	4.8	-4.8
	Control	Before	11.7	39.2	83.4	16.6
		After	14.2	39.5	81.7	18.3
		Variation	2.5	0.3	-1.7	1.7
		Controlled Variation	10.7	14.5	6.5	-6.5

2021 Trial - Results

Positioning cumulative distribution

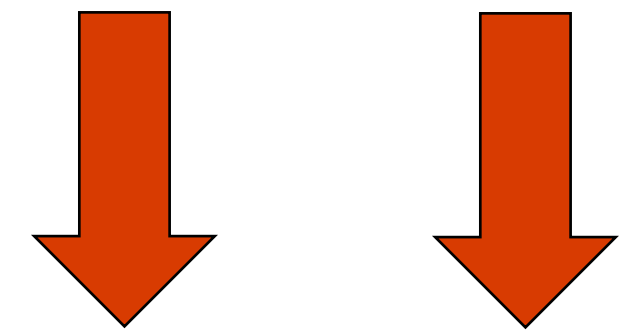
Entry

Apex



2021 Trial - Results

Positioning thresholds



➤ **Decreased** proportion riding closest to C/L

➤ **Increased** proportion riding in most left 2/3 of the lane

PERCENTAGE OF ALL MOTORCYCLES														
			Entry						Apex					
			<=1	<=2	<=3	<=4	<=5	>=6	<=1	<=2	<=3	<=4	<=5	>=6 ⁺
Tight Curves (Pair #1)	Treatment	Before	0.0	4.1	28.2	72.3	93.9	6.1	0.0	0.2	0.9	6.8	44.7	55.3
		After	0.0	2.2	33.0	79.6	98.4	1.6	0.0	0.7	6.6	46.6	95.5	4.5
		Variation	0.0	-1.9	4.8	7.3	4.5	-4.5	0.0	0.5	5.7	39.8	50.8	-50.8
	Control	Before	0.2	4.9	25.0	57.5	86.4	13.6	0.0	0.4	0.4	0.6	18.2	81.8
		After	0.7	7.9	30.3	61.8	90.4	9.6	0.0	0.0	0.1	0.4	25.9	74.1
		Variation	0.5	3.0	5.3	4.3	4.0	-4.0	0.0	-0.4	-0.3	-0.2	7.7	-7.7
		Controlled Variation	-0.5	-4.9	-0.5	3.0	0.5	-0.5	-	0.9	6.0	40.0	43.1	-43.1
Shallow Curves (Pair #2)	Treatment	Before	<=1	<=2	<=3	<=4	<=5	>=6	<=1	<=2	<=3	<=4	<=5	>=6
		After	0.0	0.0	2.2	20.5	76.0	24.0	0.0	0.2	5.6	27.5	70.9	29.1
		Variation	0.0	0.1	1.9	20.9	86.0	14.0	0.0	0.5	7.5	51.3	93.8	6.2
	Control	Before	0.0	0.1	-0.3	0.4	10.0	-10.0	0.0	0.3	1.9	23.8	22.9	-22.9
		Before	0.4	3.7	15.8	53.5	93.0	7.0	0.3	0.3	0.9	8.0	43.1	56.9
		After	0.0	4.9	25.0	64.0	95.5	4.5	0.0	0.0	1.1	8.0	48.8	51.2
		Variation	-0.4	1.2	9.2	10.5	2.5	-2.5	-0.3	-0.3	0.2	0.0	5.7	-5.7
Controlled Variation	0.4	-1.1	-9.5	-10.1	7.5	-7.5	0.3	0.6	1.7	23.8	17.2	-17.2		
+ Only two events detected with motorcycles crossing the centreline (Lane position = 7)														

2021 Trial - Conclusions

➤ **Lane positioning**

- o PCM influencing riders' lane position at apex
- o Future coupling w/ 'gating' PCM suggested

➤ **Speed**

- o Moderate overall speed calming effect
- o Indication the PCM can increase rider's alertness

➤ **Compatibility w/ Safe System (supporting treatment)**

- o Safe road users / Safe speeds / Safe roads

➤ **Suggested 'targeted' implementation**

- o Apply to critical curves (no 'blanket' application!)

Conclusions

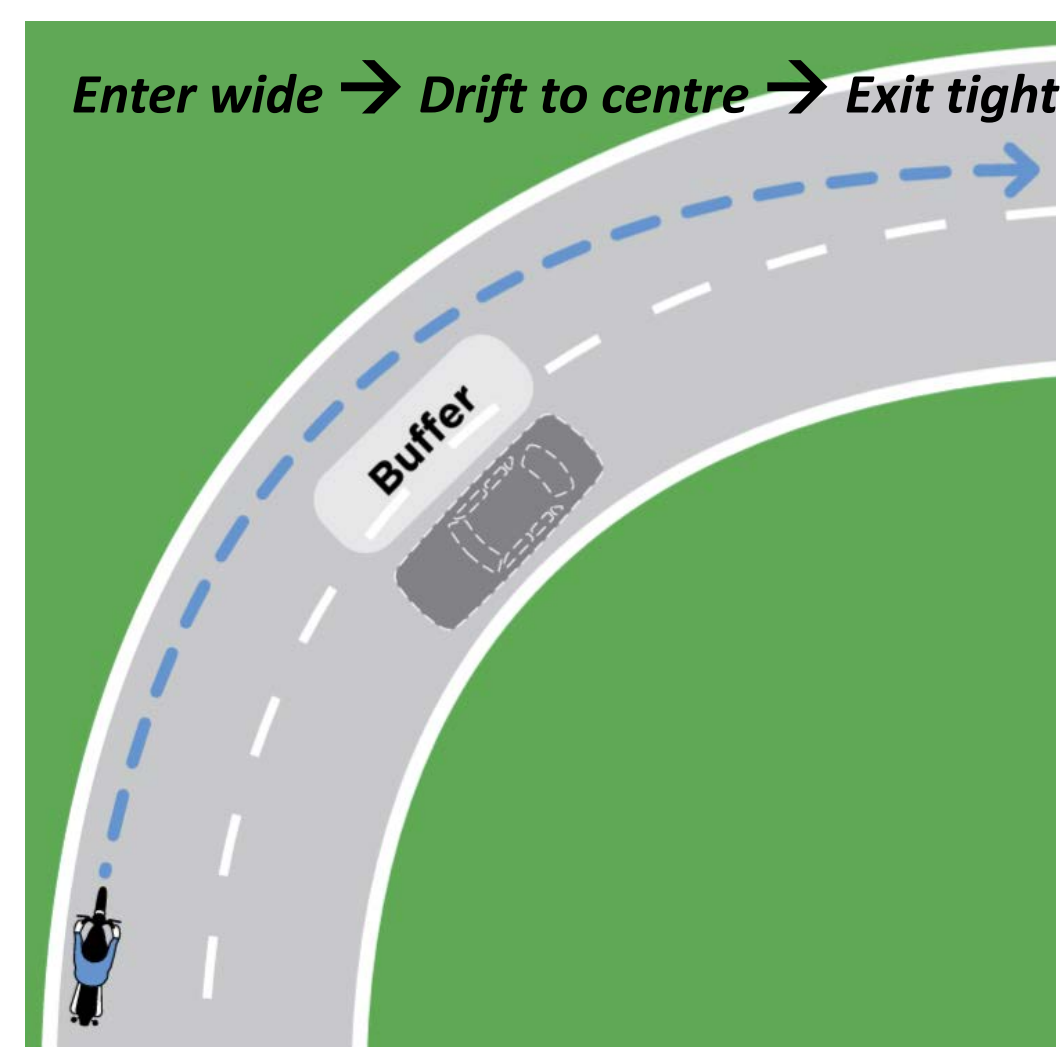


Project report available

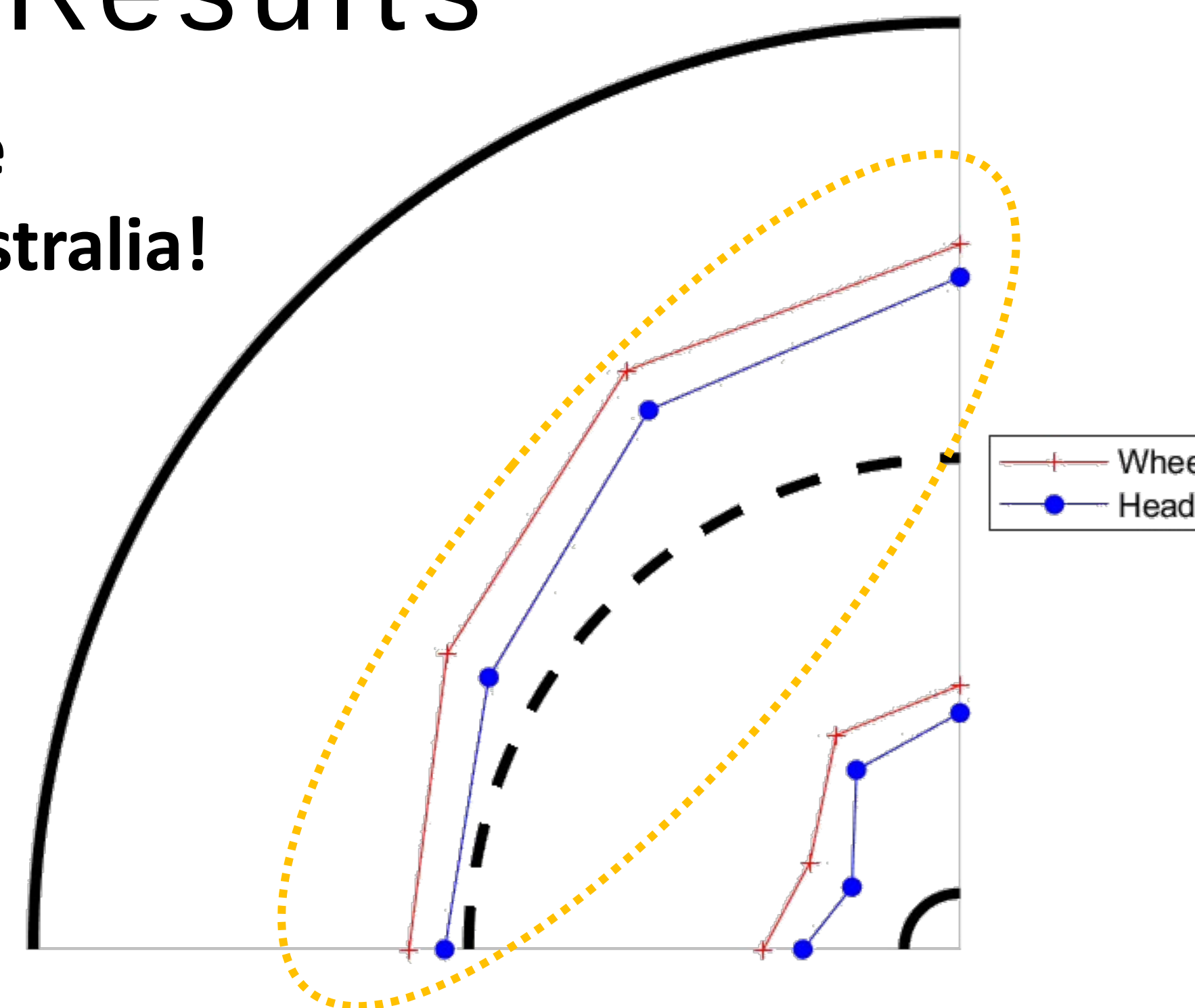


2026 Trial – Preliminary Results

- Observed average trajectories differ from the *'start wide, end tight'* approach taught in Australia!



Source: [Motorcycle Rider Handbook](#), TfNSW



- Initial review indicating riders going over the marking! (Particularly for elliptical shapes)



The Centre for Automotive Safety Research is proudly supported by



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and Transport

Questions?