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SAFE SYSTEM END STATE

EXAMPLE: RURAL CONNECTOR ROADS

CASE STUDY: HEALESVILLE–KOO WEE RUP ROAD, VIC

Eliminating
serious road trauma
by 2050

CASE STUDY SUMMARY

This case study demonstrates how a Victorian rural connector road project aligns with the Safe System End State for Rural Roads described in Austroads' Charting a Path to Zero framework.

Healesville–Koo Wee Rup Road (an M2 road) is a strategically important rural connector linking Melbourne's south-east with South Gippsland and regional Victoria. Prior to upgrade, the corridor experienced increasing traffic demand, an alarming serious-crash history and limited Safe System infrastructure.

The upgrade introduced key Safe System features including carriageway duplication, median separation, intersection upgrades (mainly roundabouts rather than grade-separation), roadside protection and separated active transport facilities. While these treatments represent substantial progress towards the ultimate Safe System End State, the corridor does not yet achieve all end-state requirements, particularly in relation to intersection treatments.

The case study illustrates how current infrastructure investments can progressively move an existing corridor toward the ultimate 2050 Safe System End State, while recognising that achieving the full end state is likely to require further improvements over time.

Austroads Charting a Path to Zero Report: https://austroads.gov.au/publications/road-safety/ap-r743-25

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RURAL CONNECTOR ROADS

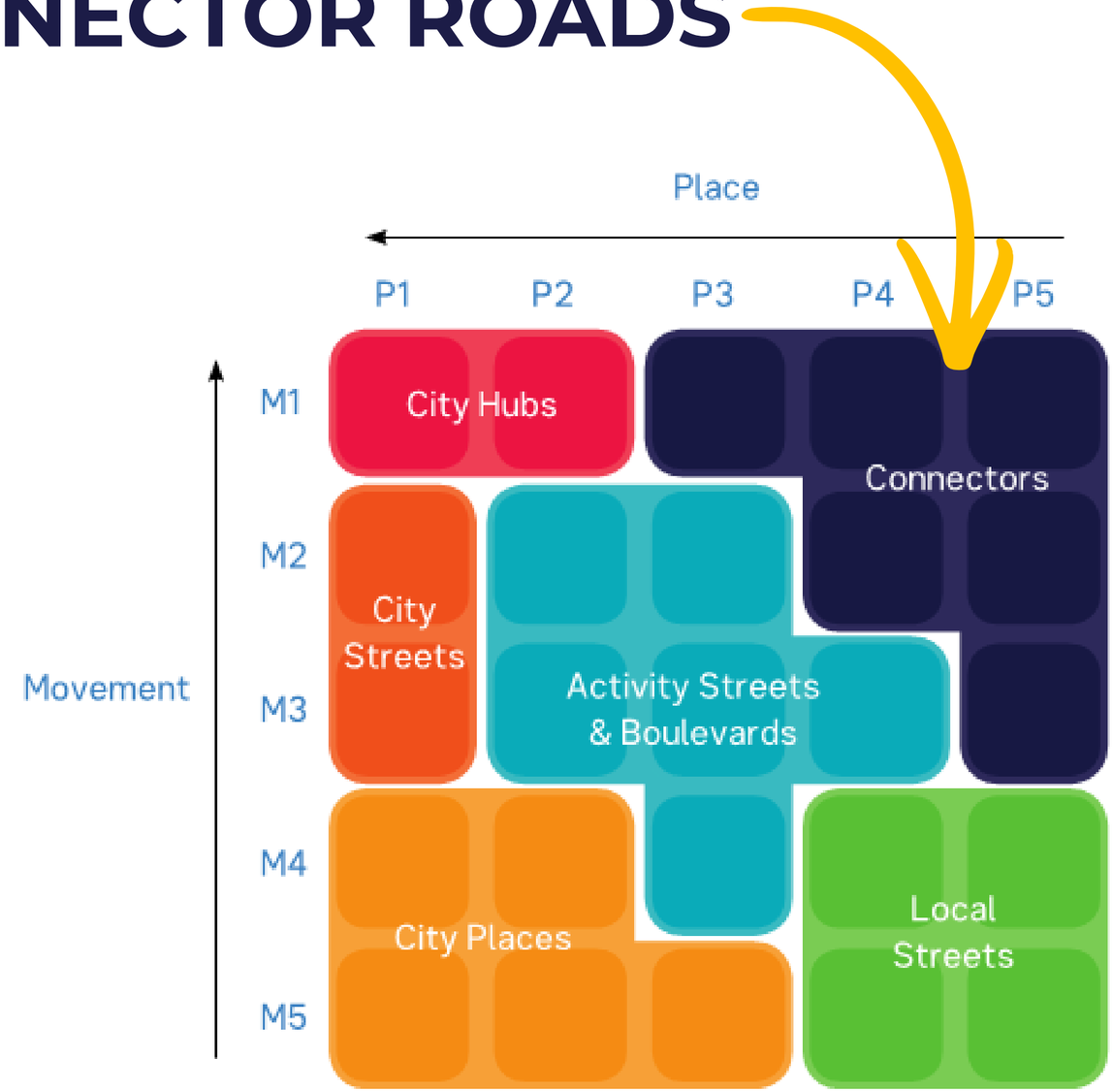

Image Source: https://www.vic.gov.au/movement-and-place-victoria

SAFE SYSTEM END STATE: RURAL CONNECTOR ROADS

Under Victoria's Movement and Place Framework, Rural Connector Roads (for example, M2 roads) perform an important movement function by connecting regional centres, towns, employment areas and freight-generating land uses across longer distances.

Consistent with Austroads' Charting a Path to Zero framework, the 2050 Safe System End State for Rural Connector Roads seeks to eliminate fatal and serious injury risk through a combination of safe roads and roadsides, safe speeds and safe vehicles. The overarching principle is that both length and intersection design operate within human injury tolerance limits so that foreseeable road-user mistakes do not result in death or serious injury.

Along the length of the route, opposing traffic flows are physically separated using continuous median barriers, roadside hazards are shielded through continuous roadside barriers, and access is controlled strictly. Infrastructure is designed to minimise the likelihood and severity of head-on, run-off-road and other high-severity crashes.

At intersections, the Safe System End State seeks to eliminate or control high-severity conflict points. Intersections are grade-separated where warranted by traffic volumes and network function, while remaining at-grade intersections are designed to substantially reduce crash risk through treatments such as roundabouts.

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RURAL CONNECTOR ROADS: 2050 SAFE SYSTEM END STATE

Rural Connector Roads	Vehicle Requirements	Infrastructure Requirements	Maximum Travel Speed Requirements
For example, a divided multi-lane roads with a physical median	• Autonomous Emergency Braking (AEB) for Pedestrian, Cyclist, Rear-End, Intersection and Head-On Collision Avoidance • Intelligent Speed Assistance (ISA) – Speed Limiting Function • Lane Keeping Assist (LKA) and Emergency Lane Keeping (ELK) • Electronic Stability Control (ESC) • Seatbelt Interlock Systems • Heavy Vehicle Front, Side and Rear Underrun Protection Systems	• Full continuous flexible side barriers • Full continuous flexible mid barriers • Grade separation at all intersections • Barrier/fencing to prevent • pedestrian access • Off road separated lanes for bicycles • and micro-mobility devices	• 100 km/h, BUT 80 km/h for heavy vehicles NB: If any of the Vehicle or Infrastructure requirements are not met (for example some at-grade intersections are not grade-separated or some roadside hazards are not shielded by continuous barriers), the speed limit needs to be reduced to match the road environment (e.g. reduced to 80km/h).

TRUONG, J.; STRANDROTH, J.;LOGAN, D.B.; JOB, R.F.S.; NEWSTEAD, S. UTILISING HUMAN CRASH TOLERANCE TO DESIGN AN INTERIM AND ULTIMATE SAFE SYSTEM FOR ROAD SAFETY. SUSTAINABILITY 2022, 14, 3491.

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RURAL CONNECTOR ROADS: 2050 SAFE SYSTEM END STATE

Image Source: The image is produced using generative AI for demonstration purposes only.

INTRODUCING THE CASE STUDY

HEALESVILLE–KOO WEE RUP ROAD

Image Source: https://bigbuild.vic.gov.au/projects/roads/healesville-koo-wee-rup-road-upgrade/image-gallery

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INTRODUCING THE CASE STUDY...

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HEALESVILLE–KOO WEE RUP ROAD

Image Source: https://bigbuild.vic.gov.au/projects/roads/healesville-koo-wee-rup-road-upgrade/image-gallery

Healesville–Koo Wee Rup Road is best understood as a rural connector road (an M2 corridor), and the applicable Safe System End-State is therefore Rural Connector Road.

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CONTEXT: HEALESVILLE–KOO WEE RUP ROAD UPGRADE

The Healesville–Koo Wee Rup Road upgrade was driven by the need to duplicate about 10 kilometres of a key north–south arterial in Melbourne's outer south-east. The corridor links the Princes Freeway and South Gippsland Highway and as a primary route for trips from metropolitan Melbourne to Bass Coast, including Phillip Island and South Gippsland.

Before the upgrade, the road was already under heavy pressure from both regional traffic and freight. About 21,000 vehicles a day used the route, including around 4,200 heavy vehicles, and that between 2016 and September 2021 the corridor recorded at least 43 incidents resulting in 5 fatalities and 21 serious injuries.

The project intent was not simply to add lanes and capacity, but to create a safer and more consistent corridor through Pakenham South and towards Koo Wee Rup.

Image Source: https://bigbuild.vic.gov.au/projects/roads/healesville-koo-wee-rup-road-upgrade/image-gallery

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PROJECT MAP

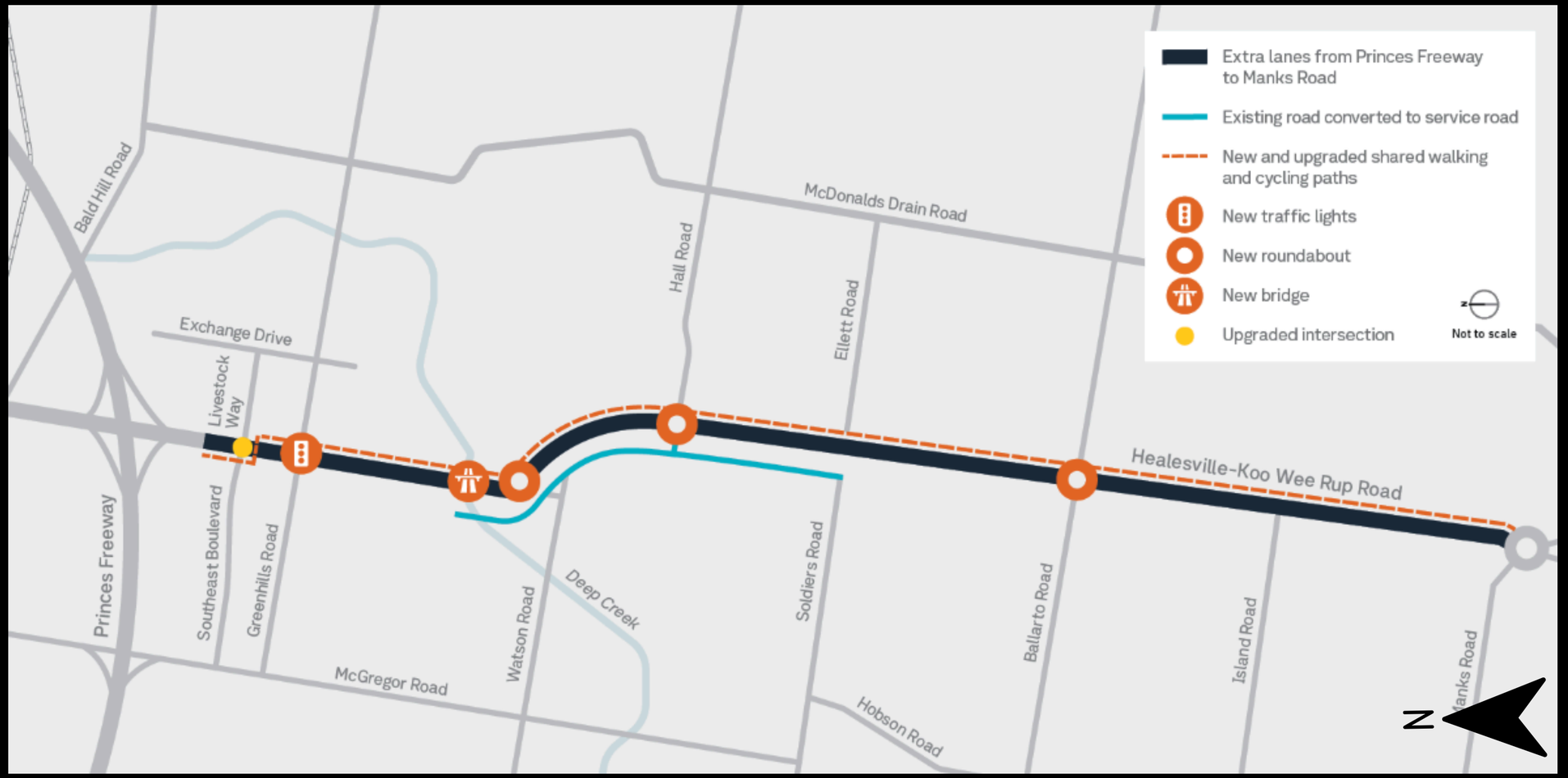

Image Source: https://bigbuild.vic.gov.au/projects/roads/healesville-koo-wee-rup-road-upgrade/image-gallery

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HEALESVILLE–KOO WEE RUP ROAD

WHAT WAS THERE BEFORE

On the north section, Healesville–Koo Wee Rup Road was an undivided arterial road with one through lane in each direction and a posted speed limit of 80 km/h. It ran through undeveloped urban-fringe land, with farming properties on both sides except for industrial land north of Greenhills Road. Only a short section at the Southeast Boulevard/Livestock Way intersection was already duplicated and signalised before the wider upgrade.

Across the broader corridor, the project's purpose was to duplicate about 10 km of road between Manks Road and Princes Freeway East, because the route had become a key north–south link.

WHAT IS THERE NOW

The upgrade delivered a new lane in each direction, upgraded intersections at Livestock Way and Greenhills Road, 10 km of shared walking and cycling paths with safety barriers, two new bridges over Deep Creek, a roundabout south of Deep Creek, conversion of a section of the old road into a service road, and roundabouts at Hall Road and Ballarto Road.

The finished road has two separated lanes in each direction, continuous safety barriers, new traffic lights at Greenhills Road, three new roundabouts, and new shared user paths.

The corridor predominantly operates at 100 km/h, with 40 km/h advisory speeds applying through the roundabouts.

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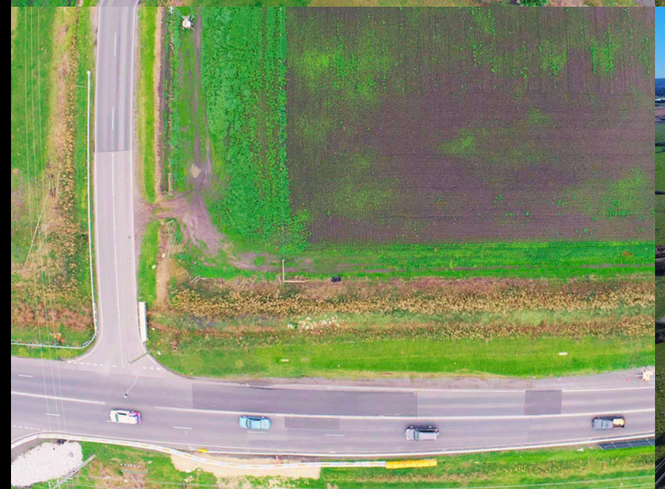
WHAT WAS THERE BEFORE



WHAT IS THERE NOW

Image Sources:
Left:
https://www.aurecongroup.com/projects/transport/healesville-koo-wee-rup-road-upgrade

Right:
https://bigbuild.vic.gov.au/projects/roads/healesville-koo-wee-rup-road-upgrade/image-gallery

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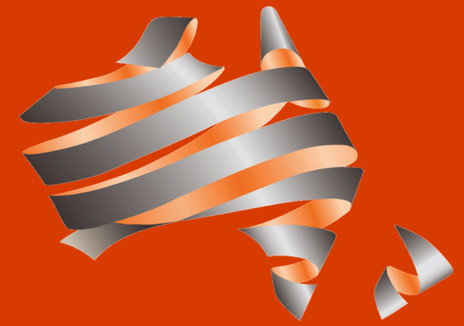

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