



Eliminating serious road trauma by 2050

Zero Pathway Development – How to develop Zero Pathways

What is a Zero Pathway?

A Zero Pathway is a jurisdiction-specific, long-horizon roadmap for eliminating road deaths and serious injuries—built by applying the Planning for Zero Framework (PfZF) to a particular jurisdiction’s context.

It is not a generic “Vision Zero statement” or a standard action plan. It is:

- A tailored strategic response to the jurisdiction’s systemic risks and safety gaps, defined against a Safe System End State (SSES) and validated via residual risk analysis.
- Comparable to a road safety strategy and action plan, but with a key difference: it explicitly plans long-term strategic response from today to the adopted Safe System End State target horizon (commonly expressed as 2050), while also supporting interim targets (e.g. 2030), using a structured approach (baseline future trauma → residual trauma → additional interventions needed).¹
- Context-specific by design: jurisdictions vary in challenges, resources, and capacity—so “one size fits all” is inappropriate. Zero Pathways incorporates unique jurisdictional circumstances, capability and capacity, and road safety strategy needs and cycles.

In short, a Zero Pathway translates the PfZF blueprint into a practical, sequenced, and monitorable pathway for your jurisdiction.

How could a jurisdictional practitioner develop an effective Zero Pathway?

Start with the PfZF planning logic (the ‘technical spine’)

PfZF is the core planning blueprint: it combines Safe System analysis, backcasting, and road safety intervention and performance monitoring, and it treats enabling institutional functions (management, engagement, investment, etc.) as essential—not optional. See the PfZF Technical Steps Guide.

Step 1 – Specify the desired future Safe System End State (SSES)

Adopt the good-practice definition of “zero harm”, as suggested in the Glossary of Terms & Definitions, and the 2050 zero target, then specify SSES based on human biomechanical tolerance for injury outcomes.

¹ Technical note (projecting baseline and residual trauma): Baseline future trauma is first projected under a business-as-usual scenario (i.e., what fatalities and serious injuries are expected if current and already-planned programs continue, including expected fleet and technology changes). Residual trauma is then estimated by applying the assumed Safe System measures and operating conditions to identify what deaths and serious injuries would still occur (due to implementation timing, technology limits, or unresolved crash scenarios). The difference between these projections and the interim/end-state targets is then used to specify the additional interventions and enabling actions—plus their scale and sequencing—needed to close the gap.

Practitioner intent: make the end state explicit enough that you can later test gaps and residual risks.

Step 2 – Validate the end state and analyse residual risk

Quantify how much serious trauma the SSES eliminates and identify residual fatal or serious injuries not addressed by the SSES assumptions (infrastructure, speeds, vehicles, etc.).

Practitioner intent: ensure the end state is more than an aspirational diagram. Step 2 tests the proposed SSES against real fatal and serious-injury crashes to show which crash scenarios would still produce death or serious injury under the assumed infrastructure, speeds and vehicle safety, and to explain why (e.g., limits of current technology, operating conditions outside design assumptions, incomplete rollout, or unresolved crash types). This helps practitioners refine the end state and identify where additional measures—or innovation—are needed.

Step 3 – Systemic risk and safety gap analysis²

Compare the current system against the SSES to identify systemic differences and jurisdiction-specific challenges, based on trauma characteristics.

Practitioner intent: turn your crash/trauma story into a “system story” that can be acted on.

Step 4 – Strategic response and pathways (this is where the Zero Pathway is formed)

Develop the pathway to zero as the strategic response to systemic risks and safety gaps:

1. Establish the business-as-usual (BAU) baseline of future fatalities and serious injuries (FSI), reflecting current and already-planned measures and expected changes.
2. Apply the proposed strategic response (e.g. a new action plan) to the BAU baseline to estimate FSI prevented and the FSI remaining over time, and how these results track against interim and end-state targets.
3. Identify additional interventions and enabling actions—and their scale and sequencing—needed to further reduce the remaining FSI and close any gap to the targets.

Practitioner intent: build a long-term reform and investment program that is credible, sequenced, and grounded in the “gap to target”.

Step 5 – Performance monitoring and governance

Create a monitoring framework with performance indicators and output indicators tailored to the pathway, and pair it with governance that assigns accountability when progress is off-track.

Practitioner intent: make the pathway governable—measurable, owned, and reviewable.

Run a ‘maturity and needs’ assessment to decide how to tailor and stage your pathway

The PfZF provides 11 recommendations to enhance jurisdictions’ maturity and capability to more effectively adopt and apply the PfZF’s steps. See the table below.

² Safety gaps are where the current network does not meet Safe System End State (SSES) requirements (i.e., missing system attributes by road type/Movement & Place context), while residual risk is the fatalities and serious injuries expected to remain after applying the SSES assumptions (or during the transition) due to limits such as incomplete rollout, technology/operating envelope constraints, non-conformities, or unresolved crash scenarios.

Table: Jurisdictional maturity improvement recommendations in order to apply the PfZF

#	Primary & Related Secondary Recommendations	Detailed Recommendations
1	Primary 1: Vision Setting	Adopt definitions for Zero Harm, Serious Injury and Network Safety Plan as outlined in this project in road safety strategy development and monitoring/evaluation.
2	Vision Setting: Secondary	Jurisdictions to consider international best practice and include a target of zero road trauma by 2050, as well as ambitious interim targets for serious trauma in their road safety strategies. Jurisdictions also need to accept the need for transformational changes in order to achieve these targets.
3	Primary 2: Data Management	Develop the data management system necessary to undertake development of a pathway to zero trauma (Planning for Zero Framework). As a minimum, this needs to include fatal and serious injury crash data, in-depth trauma data, relevant road asset and hierarchy data for the arterial and local road network, relevant vehicle fleet safety data.
4	Data Management: Secondary	Jurisdictions to set up a framework ³ and develop the capacity to undertake ongoing in-depth crash investigations for fatal road crashes, to enable the analysis of residual risks and case-by-case trauma modelling. The focus in these investigations should be to systematically analyse injury mechanisms and causes of fatal outcomes to understand and take action to address system gaps in line with international best practice.
5	Primary 3: Planning for Zero Framework	Jurisdictions are to adopt a Planning for Zero Framework, including the steps recommended in this report.
6	Planning for Zero Framework: Secondary	Each jurisdiction is to utilise the Safe System End States identified in this project and bring together key stakeholders to define a Safe System End specific to their jurisdiction.
7	Planning for Zero Framework: Secondary	Jurisdictions should validate their Safe System End State by analysing residual risks to understand why some future severe crashes are still expected to occur and to ensure that risks are reduced to the tolerable levels required by the targets set for 2030 and 2050.
8	Planning for Zero Framework: Secondary	Jurisdictions to undertake a gap analysis (by mapping the developed Safe System End States against their current road network) to understand the gap in all system components between the current road system and the future Safe System End State.
9	Planning for Zero Framework: Secondary	Jurisdictions to utilise the validation of the Safe System End States and the Systemic Risks and Safety Gaps to develop evidence-based and empirically derived pathways that achieves near-zero outcomes long term while at the same time achieves near-term trauma targets.

³ An example of systematic in-depth studies of fatal crashes is the approach taken by road authorities in [Sweden](#). The intent here, however, is not to require a comprehensive, STRADA-style system in every jurisdiction; a scalable model—such as thematic investigations of priority crash types using a representative sample, and shared capability where needed—can still provide robust insights for residual-risk analysis. A good Danish-style, more “approachable than STRADA” example is the Danish Road Traffic Accident Investigation Board (HVV) model: it conducts in-depth investigations of selected serious/fatal crashes, then aggregates those case investigations into thematic reports (i.e., focused on a priority crash problem) that identify recurring causal/contributory factors and produce prevention recommendations.

#	Primary & Related Secondary Recommendations	Detailed Recommendations
10	Planning for Zero Framework: Secondary	Jurisdictions to develop a Performance Monitoring Framework in relation to the identified pathway to achieve zero trauma. In addition, implement a road safety management system that triggers action in response to the follow-up of indicators.
11	Primary 4: Road Safety Management	Jurisdictions to undertake a similar documentation of enablers and blockers for all institutional management functions listed in the World Bank Global Road Safety Facility (GRSF) guidance relevant for their organisation. This includes the identification of all barriers against the adoption and implementation of strategic responses based on the Safe System End State and identify enablers to overcome these barriers.

For a mainly state-government-level practitioner, this becomes a practical entry point:

- assess your jurisdiction’s progress/alignment with the recommendations (maturity)
- assess where help is needed most (needs)
- use the output to prioritise maturity-improvement actions.

How to use this practically: treat the maturity/needs results as the implementation staging logic for your Zero Pathway. For example, if your monitoring system is weak (Rec 10), your pathway should explicitly include “build measurement + governance capability” as an early reform stream, not as a footnote.

See the Key Capability Improvement Activities for a suggested list of maturity-improvement actions developed as part of the Charting a Path to Zero project.

Confirm your minimum enabling foundations (the ‘delivery muscle’)

According to the PfZF’s blueprint, successful application of the framework depends on enabling aspects alongside the technical steps:

- Road safety management capability (coordination, legislation, funding, promotion, knowledge transfer)
- A systematic way to identify enablers and blockers
- Robust data systems for planning, implementation and monitoring.

This aligns tightly with several recommendations from Table 2 1, especially:

- Data management minimum set (FSI crash data, in-depth trauma data, road asset/hierarchy data, fleet safety data)
- Building capacity for in-depth fatal crash investigation to support residual risk analysis and case-by-case trauma modelling
- Documenting enablers/blockers across institutional functions using Austroads guidance (i.e. [Best Practice Guidance in Road Safety Management and Leadership: Proven Initiatives and Case Study Examples](#)).

Practitioner takeaway: an “effective” Zero Pathway isn’t only a list of interventions; it is a capability-building and governance program that makes those interventions feasible and sustained.

Translate into a practical Zero Pathway structure (What you actually produce)

To be consistent with the framework's intent and structure, a jurisdictional Zero Pathway should usually include, as a minimum:

1. Vision and targets: zero by 2050 + interim targets, grounded in agreed definitions (and positioned as requiring transformational change).
2. SSES: defined and validated end state assumptions for your network/context.
3. Systemic risk & safety gap profile: your "why we're not safe yet" system diagnosis.
4. Strategic response to 2050:
 - a. BAU baseline → residual trauma → additional interventions/reforms needed
 - b. A staged program (e.g., 0–5, 5–10, 10–25 years), with sequencing that reflects feasibility and capacity.
5. Monitoring + governance: SPIs/output indicators and accountability mechanisms that trigger action when performance is off track.
6. Enablers/blockers plan: what must change institutionally to deliver the pathway (funding, legislation, coordination, capability, etc.).