



Drogi zaufania

Zwiększanie Potencjału Na Rzecz Bezpieczeństwa Ruchu Drogowego

Building Road Safety Capacity



**INFRASTRUKTURA
I ŚRODOWISKO**
NARODOWA STRATEGIA SPÓJNOŚCI



Generalna Dyrekcja
Dróg Krajowych i Autostrad

UNIA EUROPEJSKA
EUROPEJSKI FUNDUSZ
ROZWOJU REGIONALNEGO



Safe Systems Theory and Practical Implementation

Brendan Marsh

English Language Secretary

World Road Association TC 3.2

Design and Operation of Safer Road Infrastructure

Safe Systems Working Groups

- Established 2007 (\$750m New Perth Bunbury Highway)
- Assisted the largest projects to aspire Towards Zero
- Membership diverse and independent of project team
- Reports to the CEO of the delivery agency
- Applies the *Towards Zero Framework*

Safe Systems -> Towards Zero

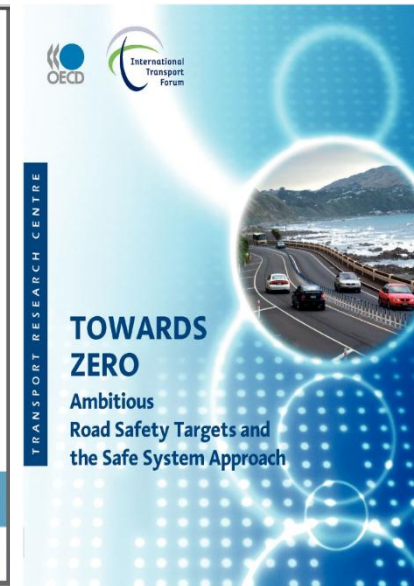
Vision:

A road transport system where crashes resulting in death or serious injury are virtually eliminated.

Engineering View:

Design to keep collisions within the human tolerances for serious injury and death.

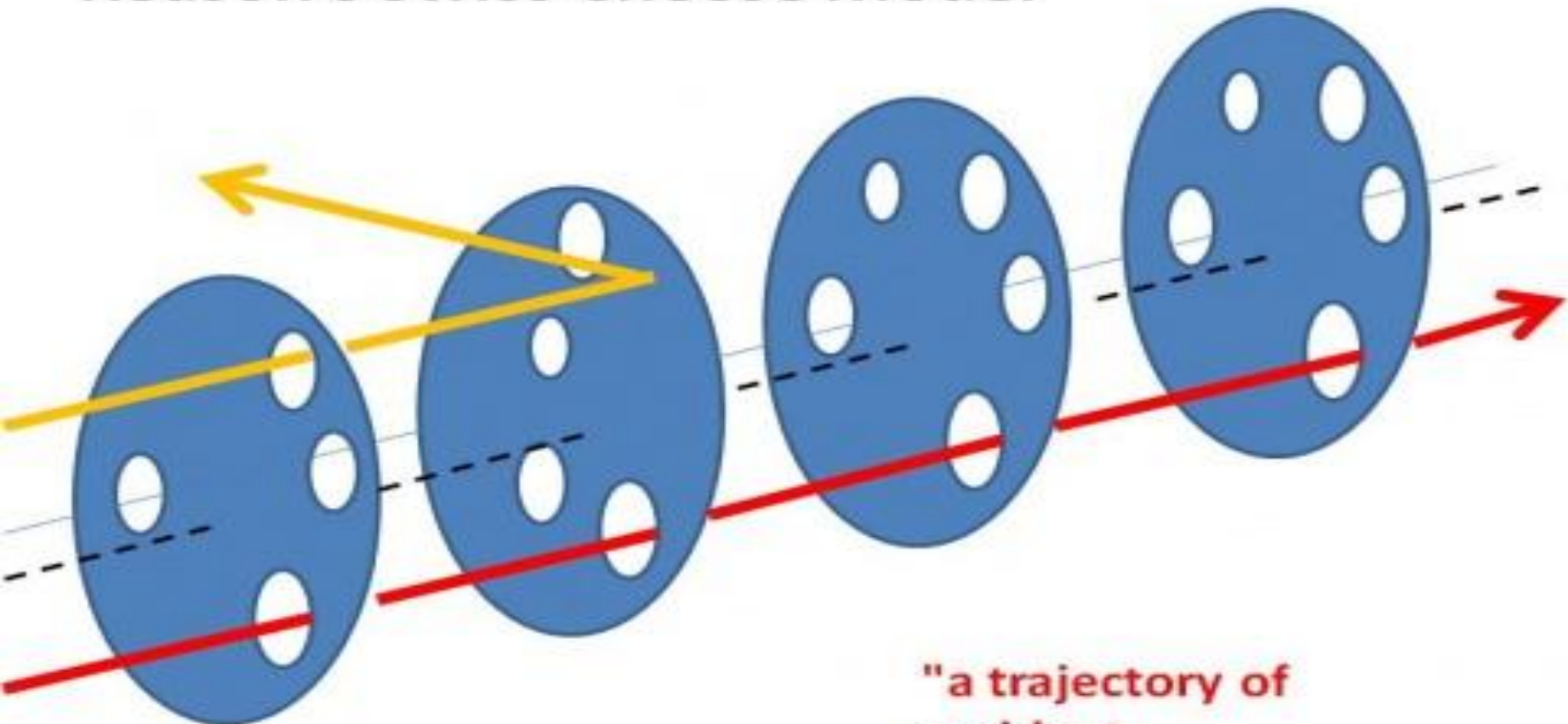
Optimal driver alertness through “Towards Zero” Risks.



Safe Systems

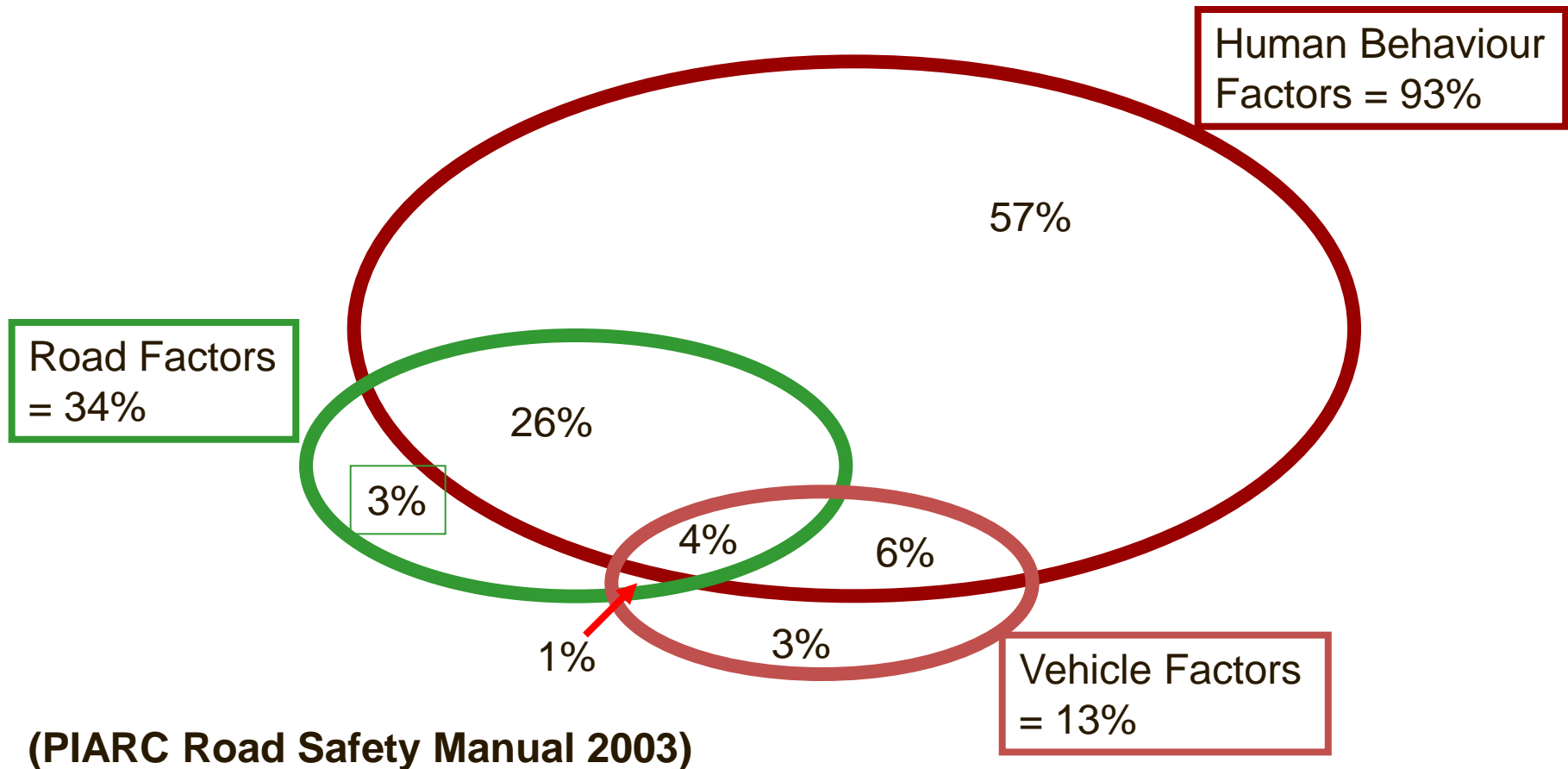
- Human Fallibility
- Shared Responsibility
- Pillars of Road Safety:
 - Road Safety Management
 - Safer Roads and Mobility
 - Safer Vehicles
 - Safer Road Users
 - Post Crash Response

Reason's Swiss Cheese Model

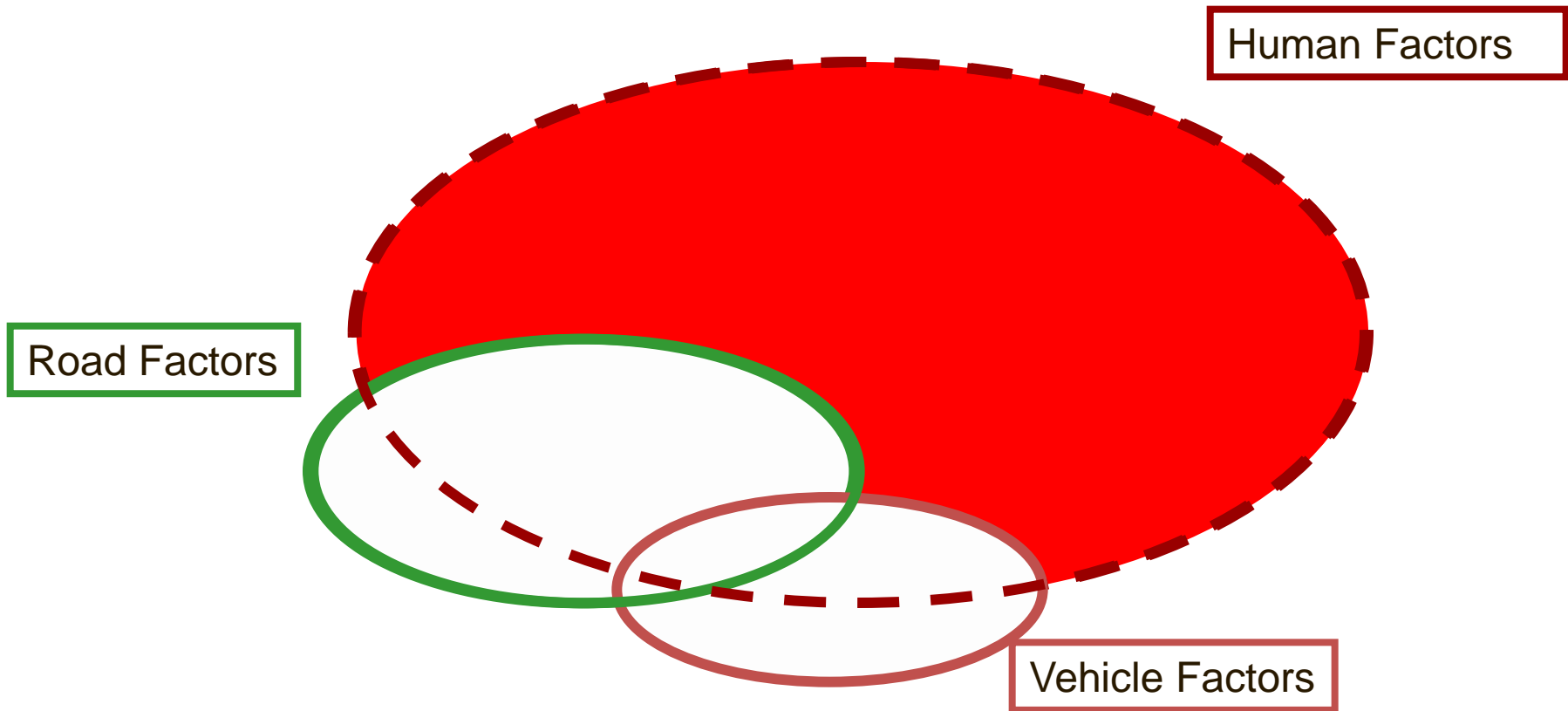


"a trajectory of
accident
opportunity"

Contributing Factors to Crashes

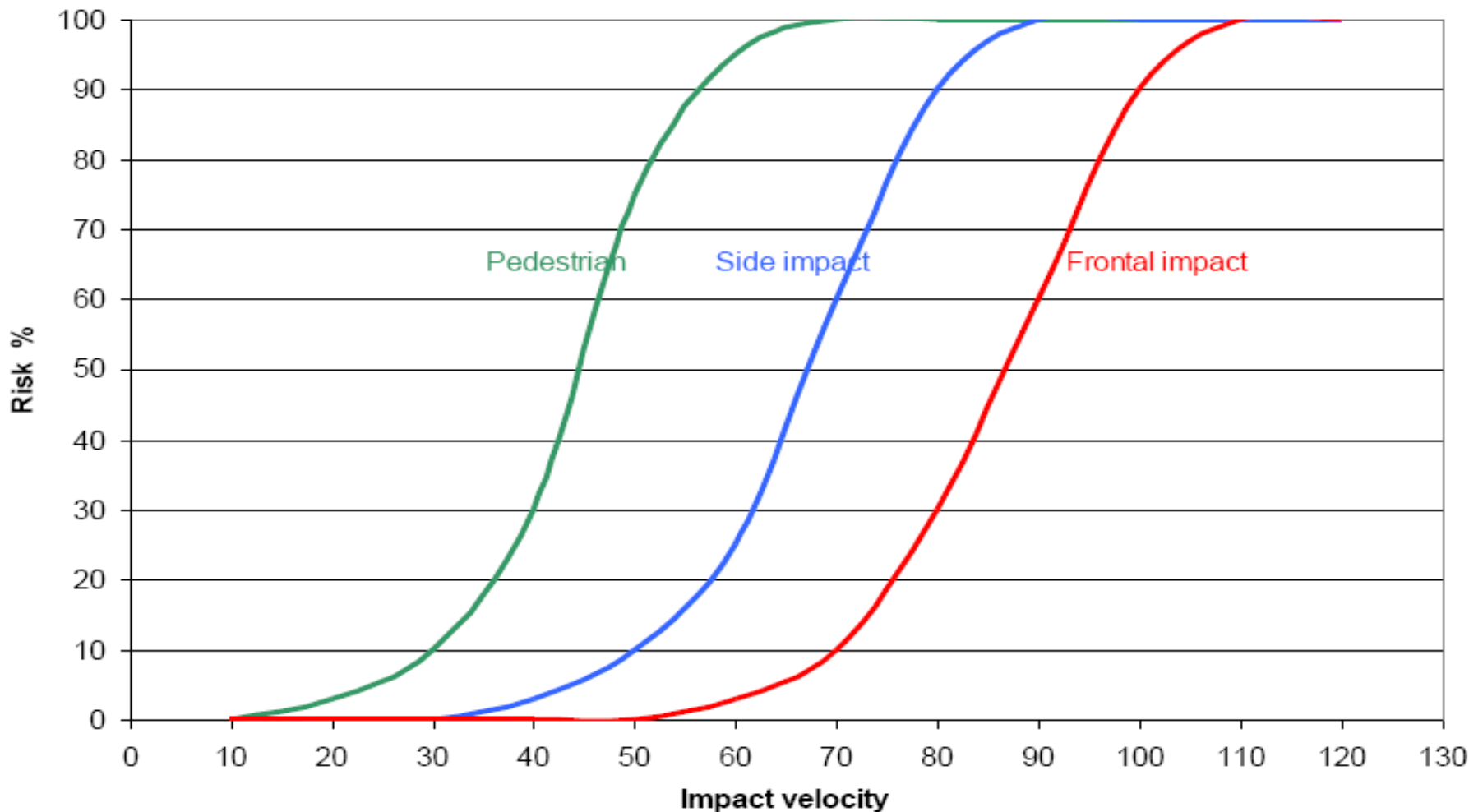


Reliable Prevention of Serious Injury and Death



Roads and vehicles tools are relatively reliable.

Risk of fatal injury related to impact velocity



(Claes Tingvall, Swedish Road Administration)

Crash Types

Human Tolerance

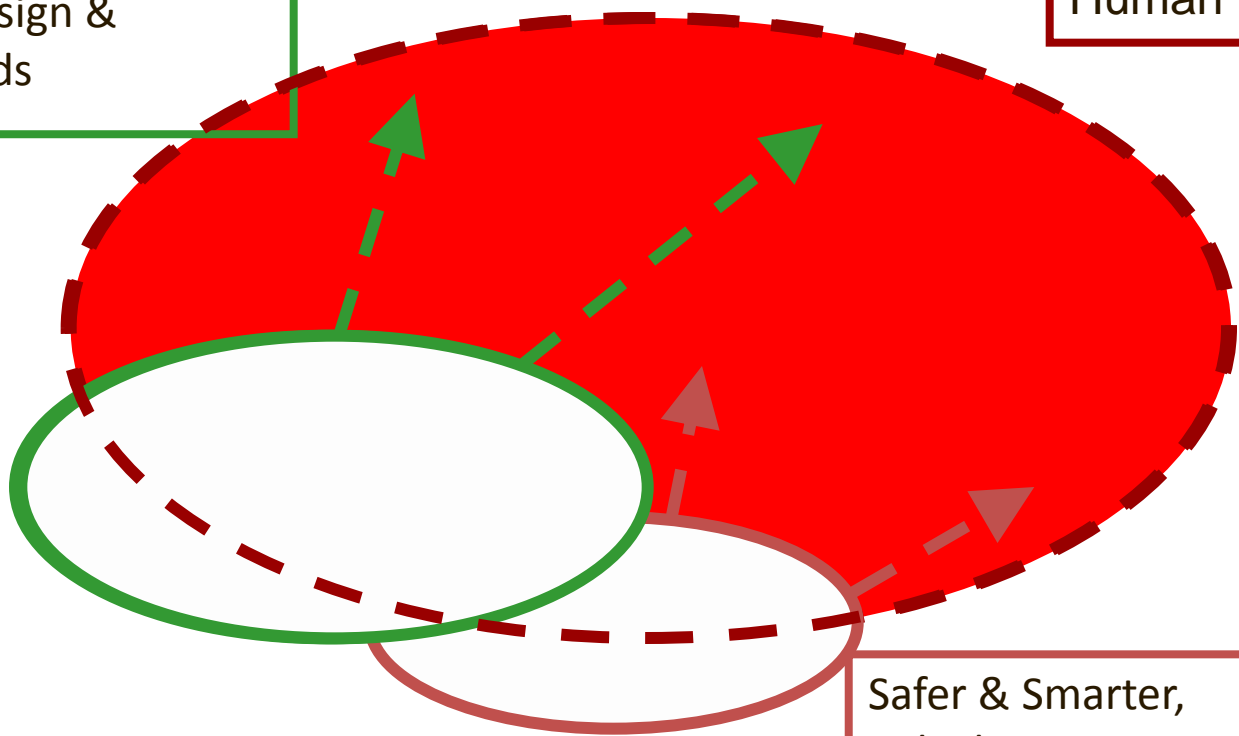
- Run off / Head On / Rear End / Roll Over < 70km/h
- Side impact < 50km/h
- Unprotected < 30km/h

✓ Prevent the above, then > 100km/h may be safe

Grow the Road and Vehicle Tools

Sustainable Design &
Intelligent Roads

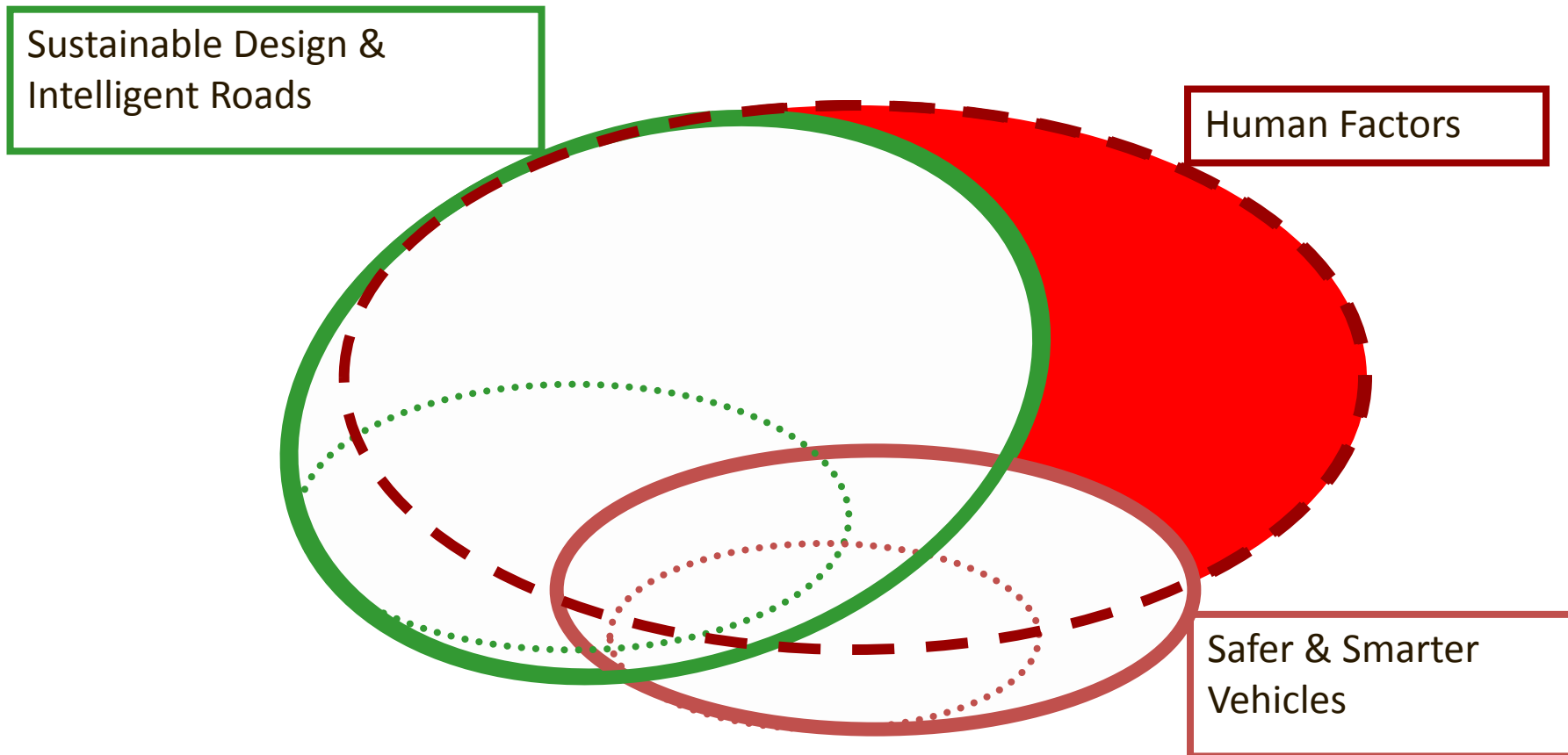
Human Factors



Safer & Smarter,
Vehicles

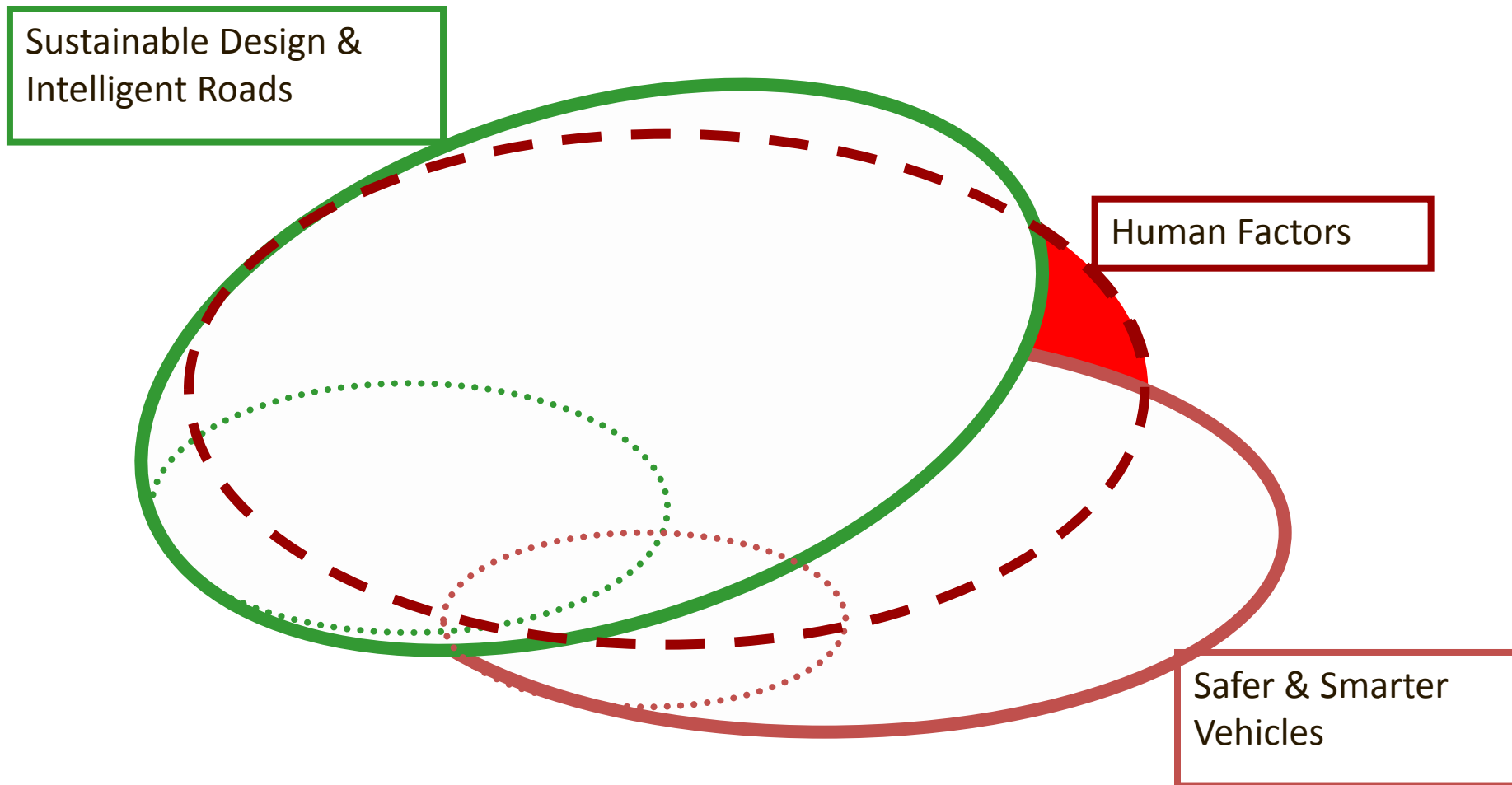
Innovate to find Sustainable Solutions!

Reduce possibilities for serious injury & death.



Reduce the FSI relevance of the human

Towards Zero



Sustainability

- Finite budget
 - Extensive road network
 - Environmental values
 - Social values
 - Responsibility
- ✓ *Use innovation processes*

Hierarchy of Control

1. *Sustainable Solutions*

2. Real time *crash risk* reduction

3. '*Reduce the crash risk*' road engineering, education and enforcement.

✓ Apply in planning, design and audit.

Matrix of Possibility

Pillars Hierarchy	Road Safety Management	Safer Roads and Roadsides	Safer Vehicles	Safer Road Users	Post Crash Response
Sustainable Solutions	✓	✓	✓	X	X
Real Time Risk Reduction	✓	✓	✓	✓	✓
General Risk Reduction	✓	✓	✓	✓	✓

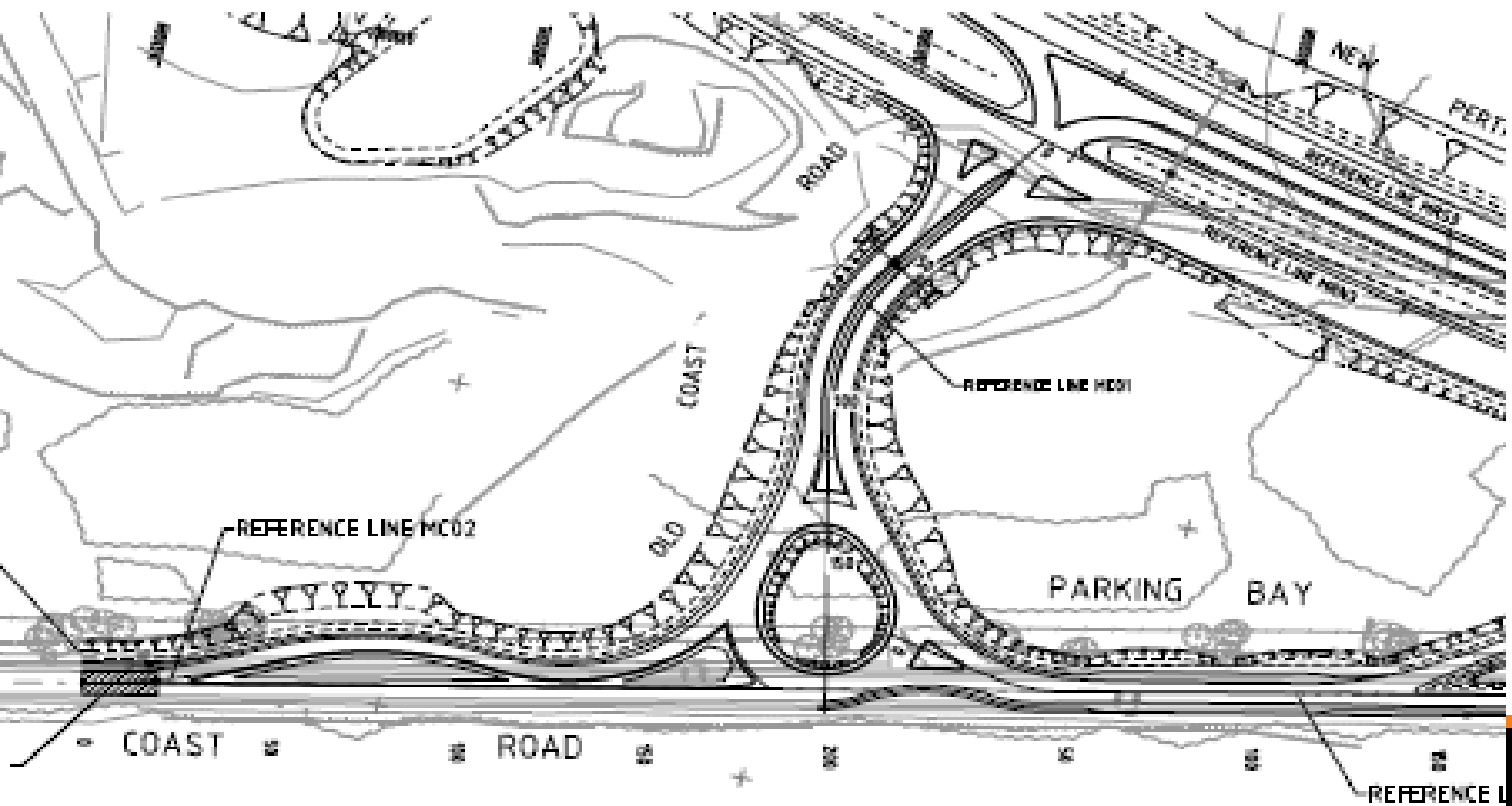
Results

Project 1: 25% reduction in KSI's compared with previous best practice

Projects 2-12: - Safety

- Project cost savings
- Improved transport outcomes
- Innovative design

Old Coast Road approach to NPBH

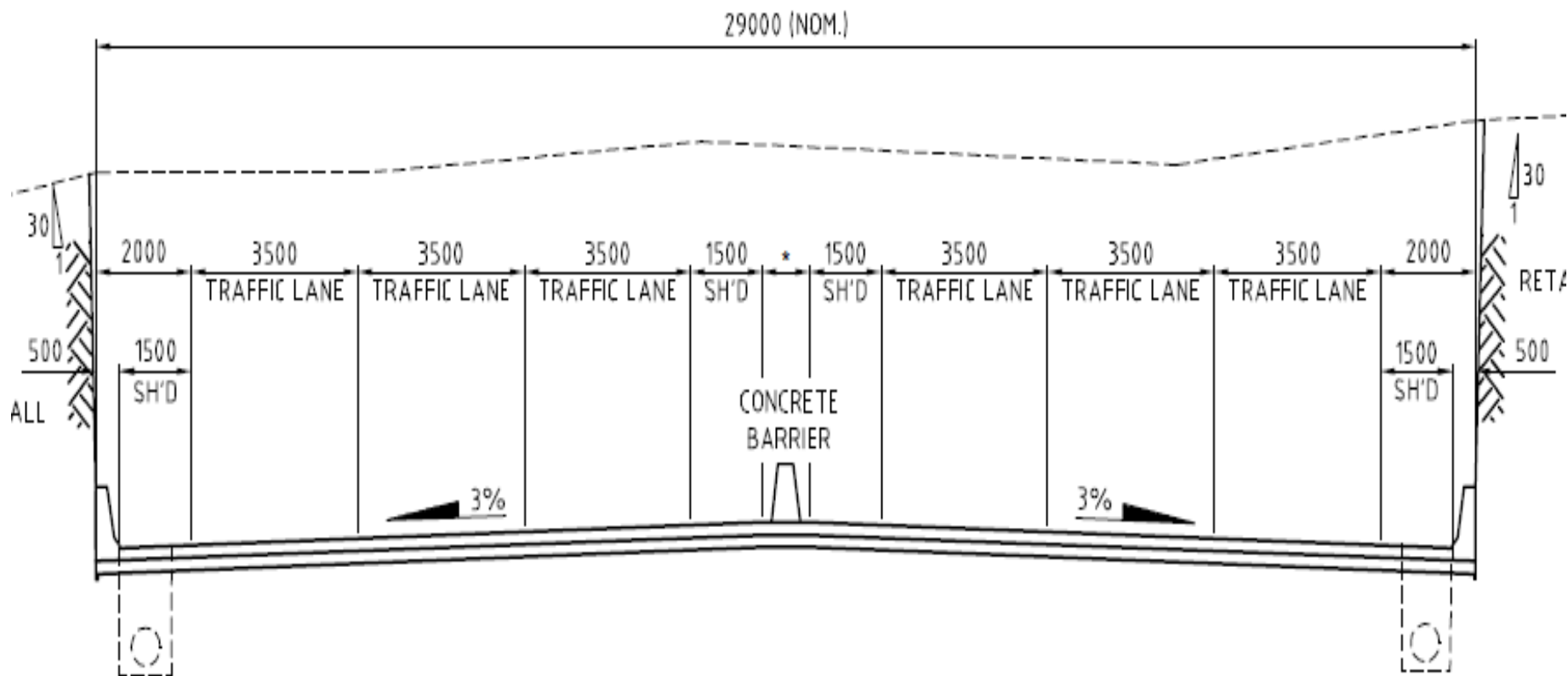


The Roundabout



Cross-section

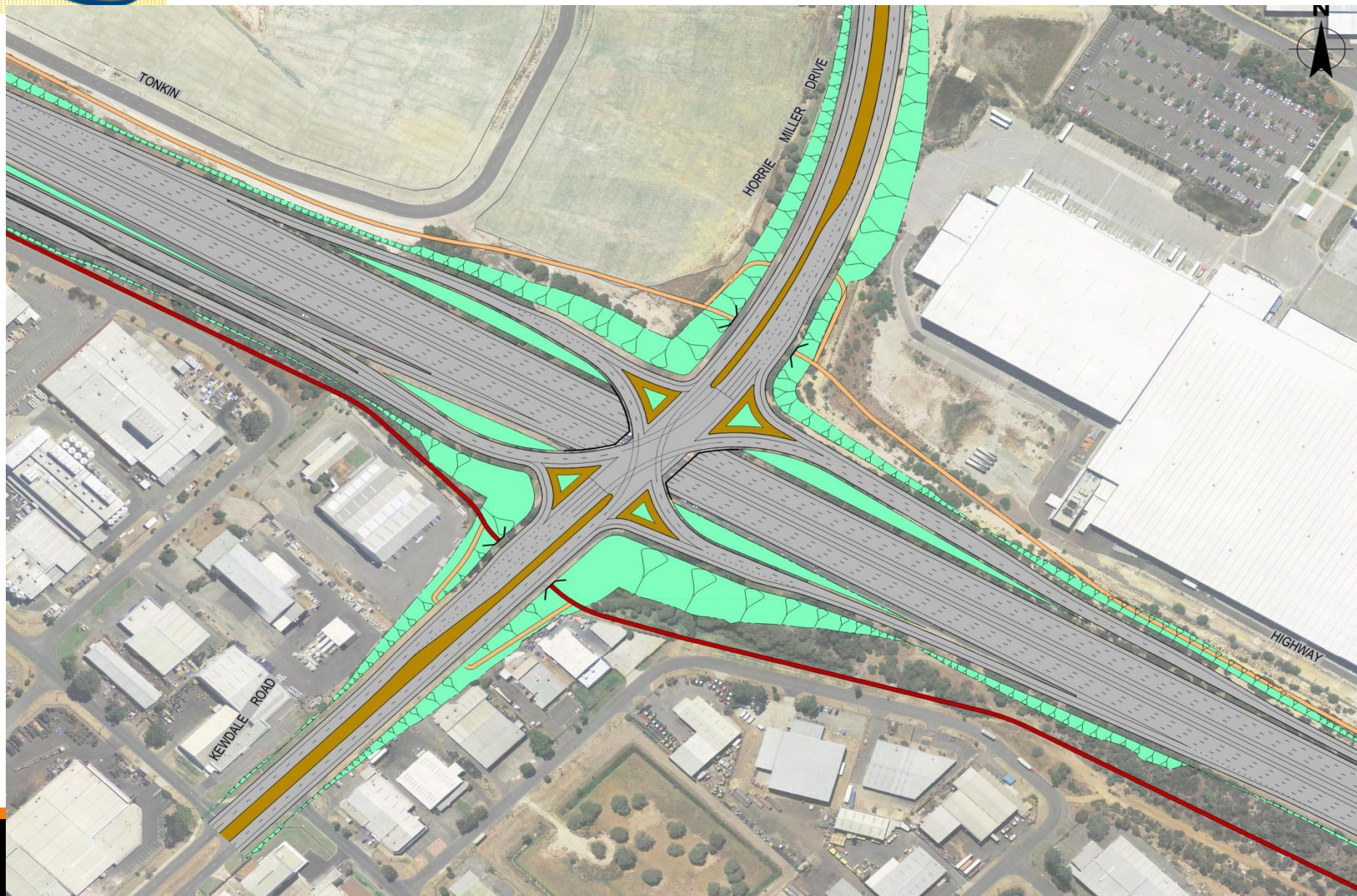
Cross section



Double Crossover Diamond



Single Point Interchange



- Lower potential crash energies to within the human tolerances, *by design*
- Seek to cause safe driver behavior, *by design*
- Consider all the pillars
- Challenge the standards
- Use innovation processes
- Start in the planning

Thank you.

Further information or assistance:

- *Email: Brendan.Marsh@marbrekar.com.au*
- *Phone: +61 8 6102 4656*
- *Mobile: +61 427 515 677*
- *Skype: brendanjohnmarsh*

Join the discussion:

- *Road Safety Professionals group within the www.linkedin.com forum.*