

Achieving the SDG on halving road deaths and injuries: impacts and the role of Infrastructure



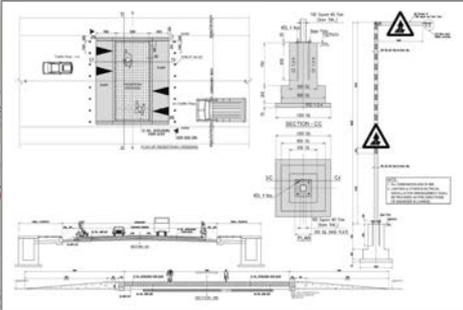
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Star Rating Interactive Session
ADB Transport Forum 2016
12 September 2016

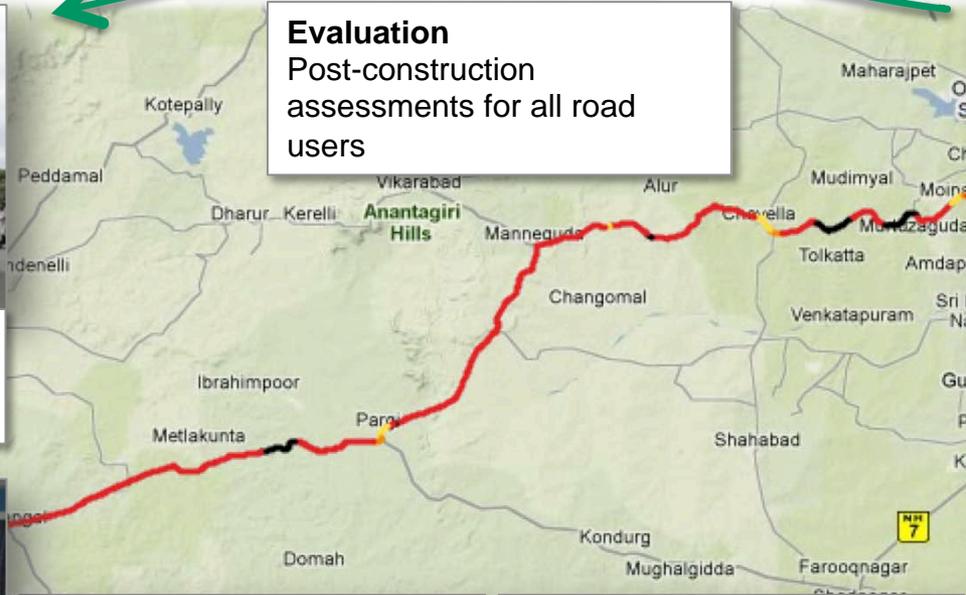
Star Rating and Investment Plan Process



Evaluation
Post-construction assessments for all road users



Implementation
Recommendations built into road designs and projects



Road Survey
Georeference video data of the road collected



Road coding
Infrastructure features that influence road user risk recorded



Star Ratings
For vehicle occupants, pedestrians, bicyclists and motorcyclists



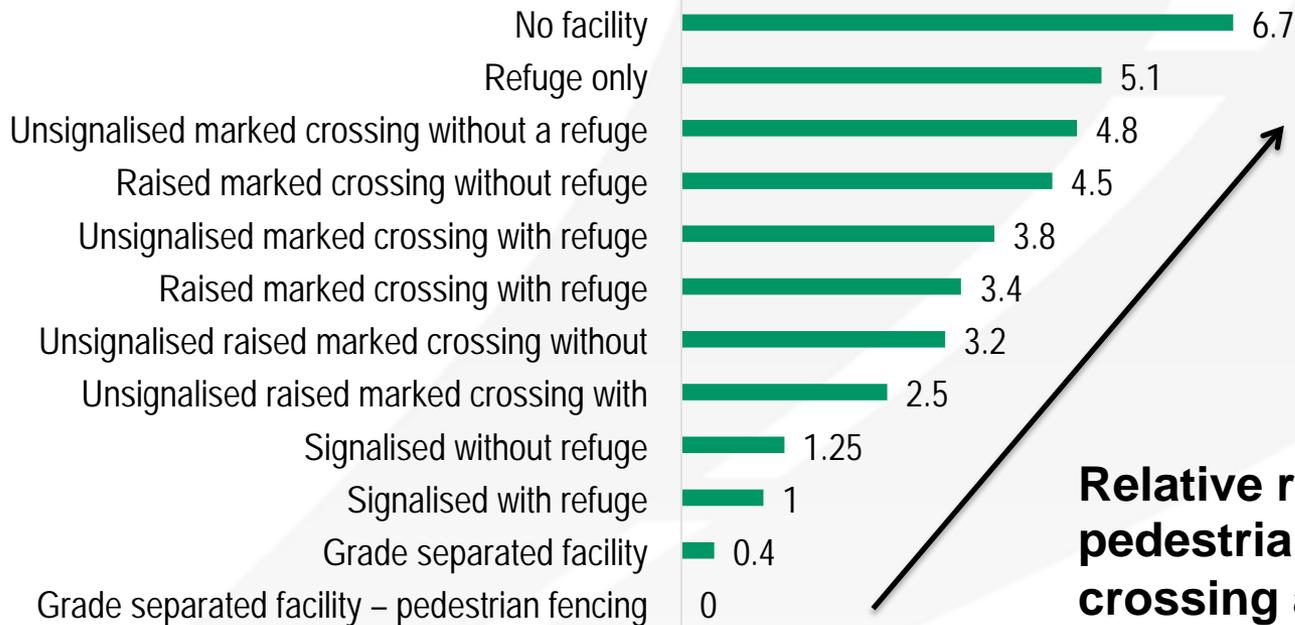
Life-Saving Countermeasures
Recommendations for simple, affordable improvements



Training
For local engineers in risk assessment and countermeasures

iRAP crash modification factors

Risk factors, sometimes called crash modification factors (CMF), are used in the iRAP methodology to relate road attributes and risk of death and serious injury



Relative risk for pedestrians crossing a road

iRAP Road Attribute Risk Factors Pedestrian Crossing Facilities

This factsheet describes the road attribute risk factors used in the iRAP methodology for Pedestrian Crossing Facilities. Pedestrian Crossing Facilities records the presence of purpose built facilities to assist pedestrians to cross the road.

About road attribute risk factors

Road attribute risk factors, sometimes called crash modification factors (CMF), are used in the iRAP Star Rating methodology to relate road attributes and crash rates. Risk factors (or CMF) are described by the Crash Modification Factor Clearing House as follows:

A crash modification factor (CMF) is a multiplicative factor used to compute the expected number of crashes after implementing a given countermeasure at a specific site.

For example, an intersection is experiencing 100 angle crashes and 500 rear-end crashes per year. If you apply a countermeasure that has a CMF of 0.80 for angle crashes, then you can expect to see 80 angle crashes per year following the implementation of the countermeasure ($100 \times 0.80 = 80$). If the same countermeasure also has a CMF of 1.10 for rear-end crashes, then you would also expect to also see 550 rear-end crashes per year following the countermeasure ($500 \times 1.10 = 550$).

Related documents

This factsheet should be read in conjunction with:

- iRAP Methodology Fact Sheets (<http://rap.org/about-ine-3/methodology>)
- Star Rating and Investment Plan Coding Manual (<http://rap.org/about-ine-3/specifications/>)
- Road Safety Toolkit (<http://toolkit.rap.org>)

Risk factors

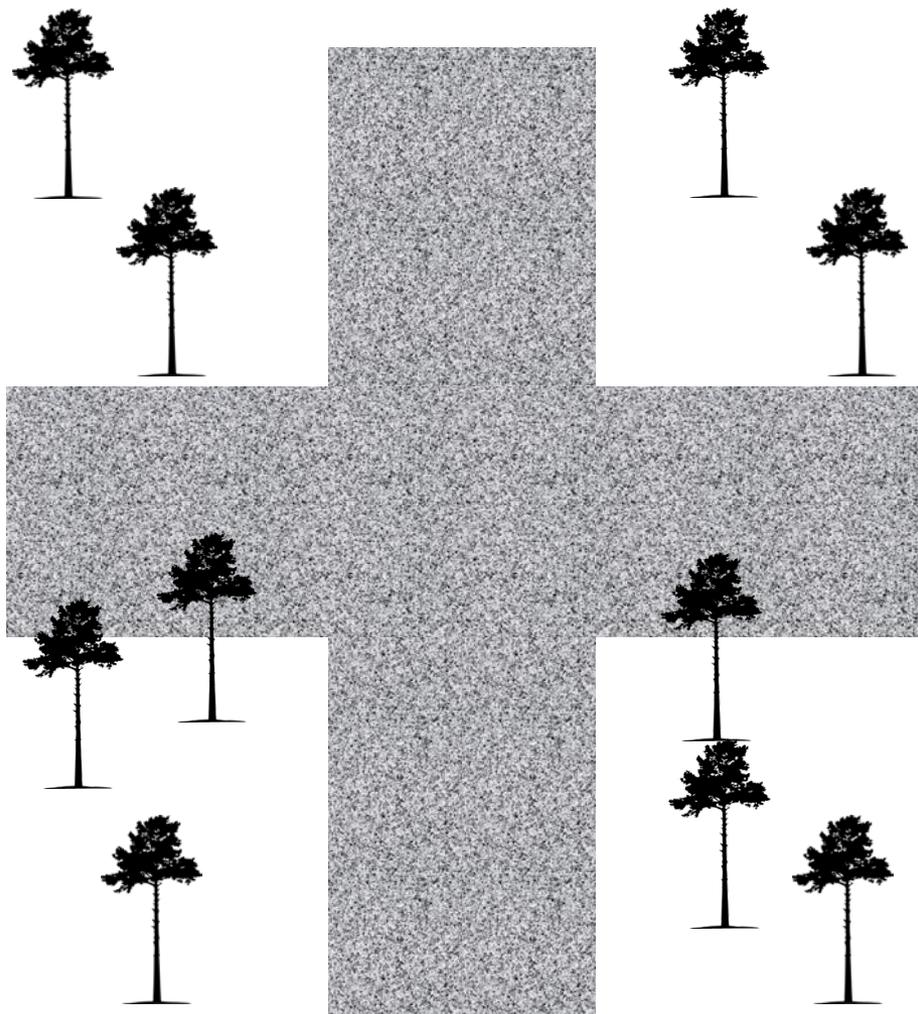
Risk factors by road attribute category, road user type and crash type

Pedestrian Crossing Facilities	Pedestrian likelihood – not at a school	Pedestrian likelihood – at a school with a school zone crossing supervisor during school start and finish times	Pedestrian likelihood – at a school zone crossing supervisor	Pedestrian severity
Grade separated facility	0.40	0.30	0.40	90
Signalised with refuge	1.00	0.95	1.00	90
Signalised without refuge	1.25	1.20	1.25	90

iRAP

Example: Class II Highway

Level terrain, speed 80km/h, AADT = 10,000 vpd, 1 curve per km, 1 intersection per km



Star Rating Scores

Relative risk of death and serious injury

XX.XX – Star Rating Score, (XX%) – Reduction in risk

Baseline



30.92



1 star



2 stars



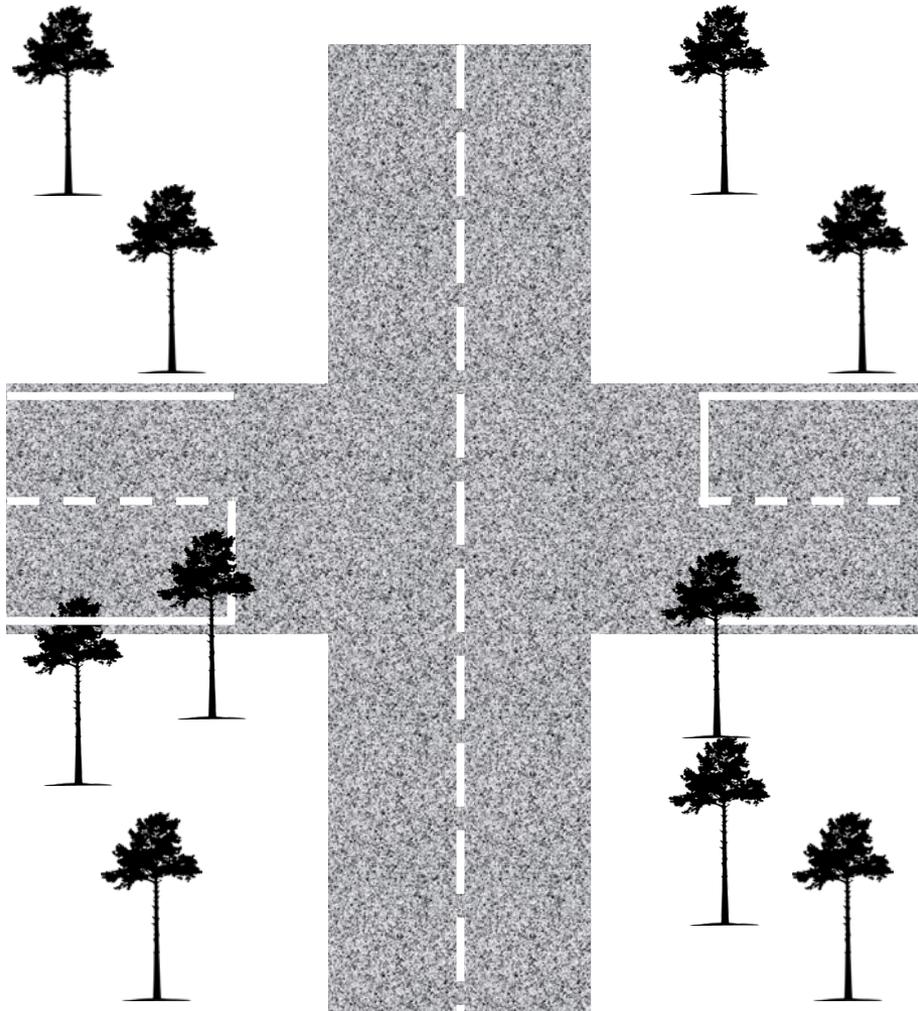
3 stars



4 stars

Example: Class II Highway

Level terrain, speed 80km/h, AADT = 10,000 vpd, 1 curve per km, 1 intersection per km



Star Rating Scores

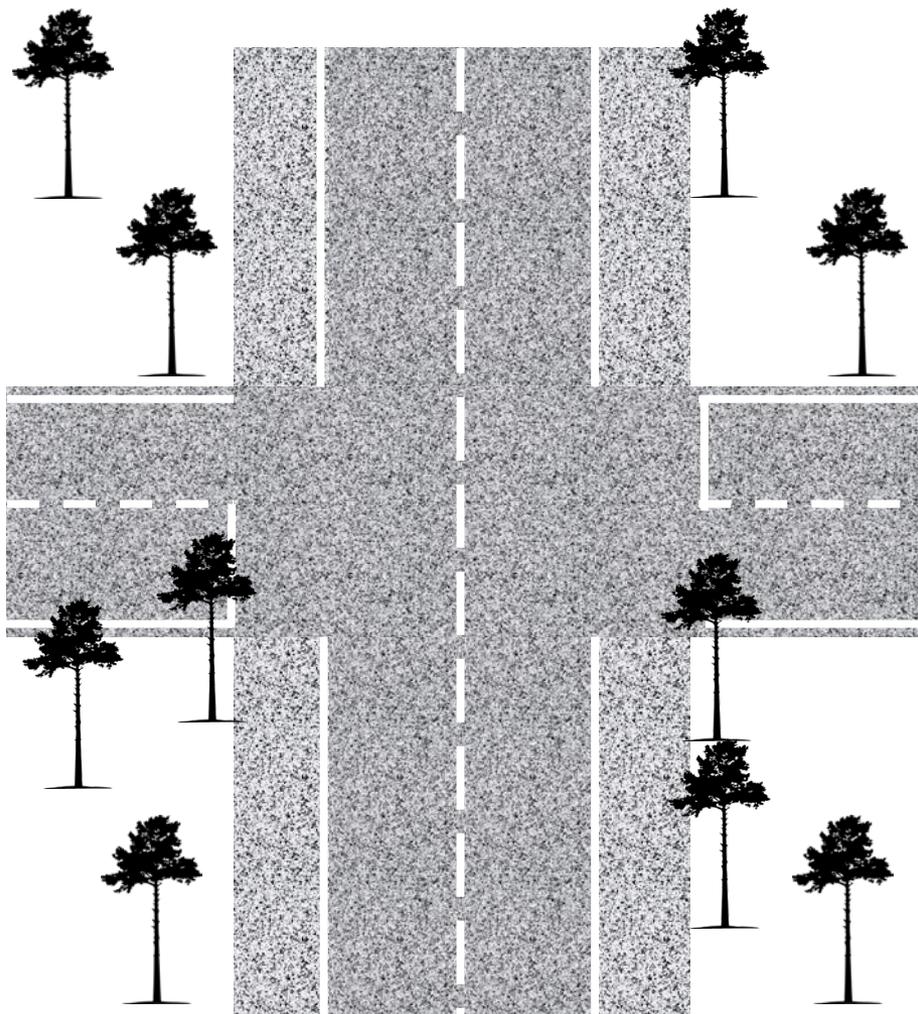
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Example: Class II Highway

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Star Rating Scores

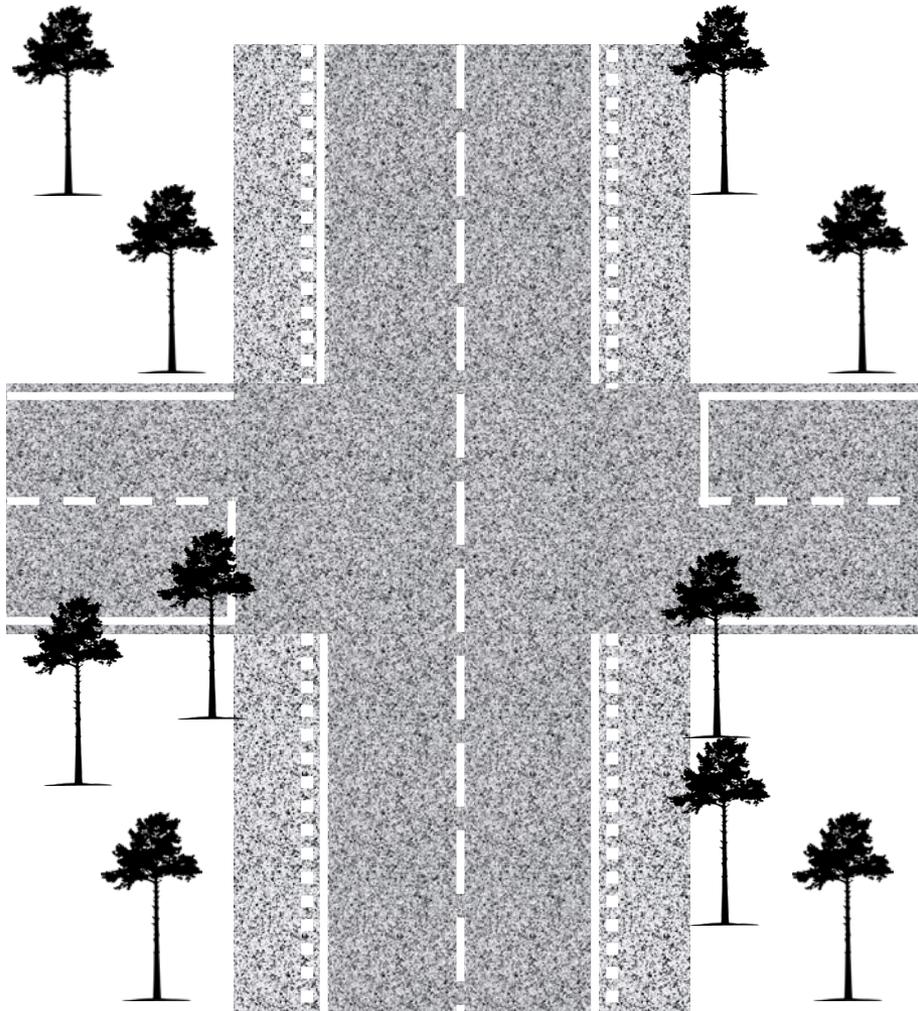
Relative risk of death and serious injury

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Example: Class II Highway

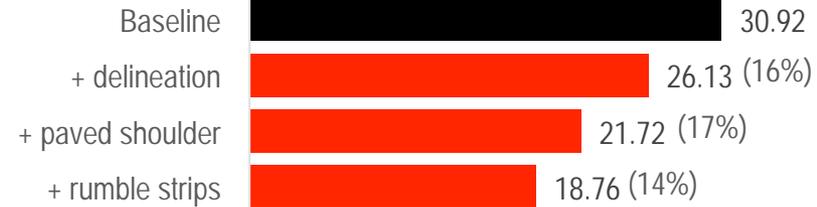
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Star Rating Scores

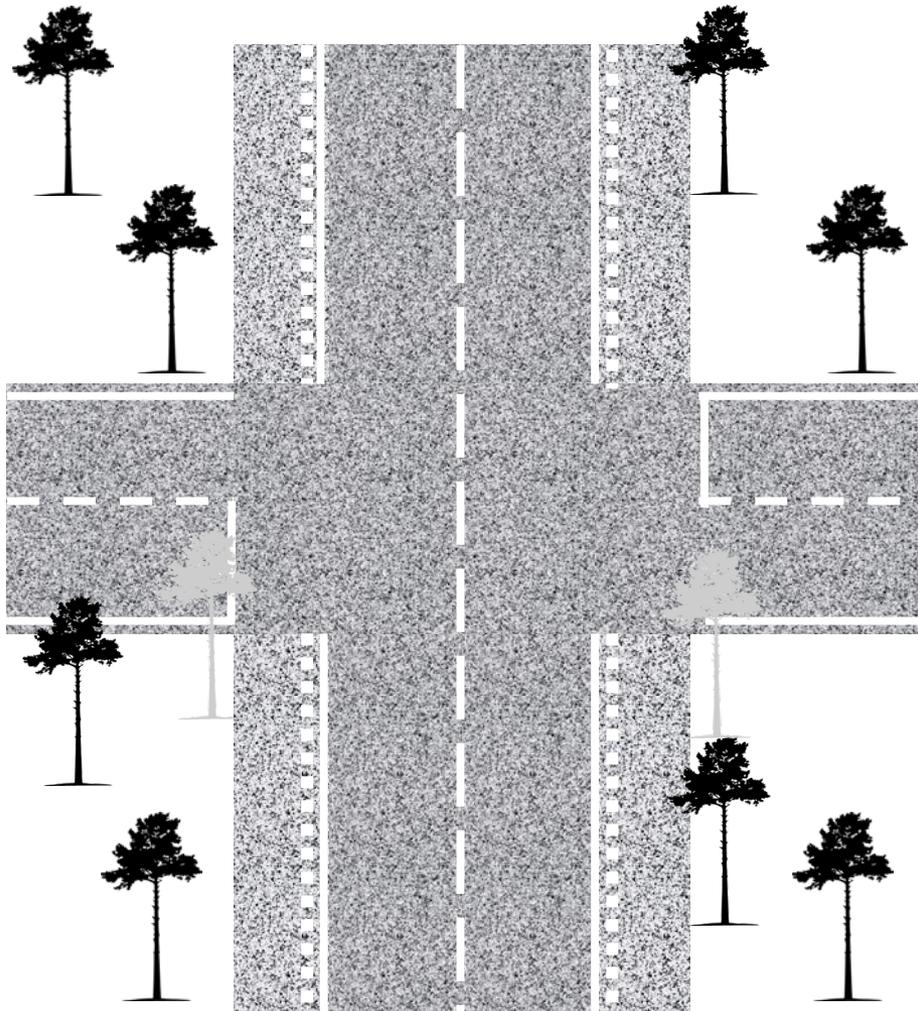
Relative risk of death and serious injury

XX.XX – Star Rating Score, (XX%) – Reduction in risk



Example: Class II Highway

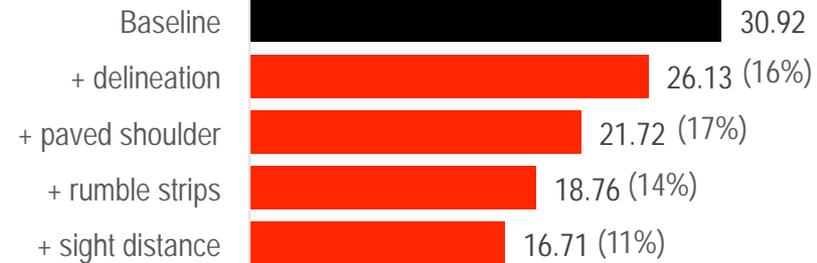
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Star Rating Scores

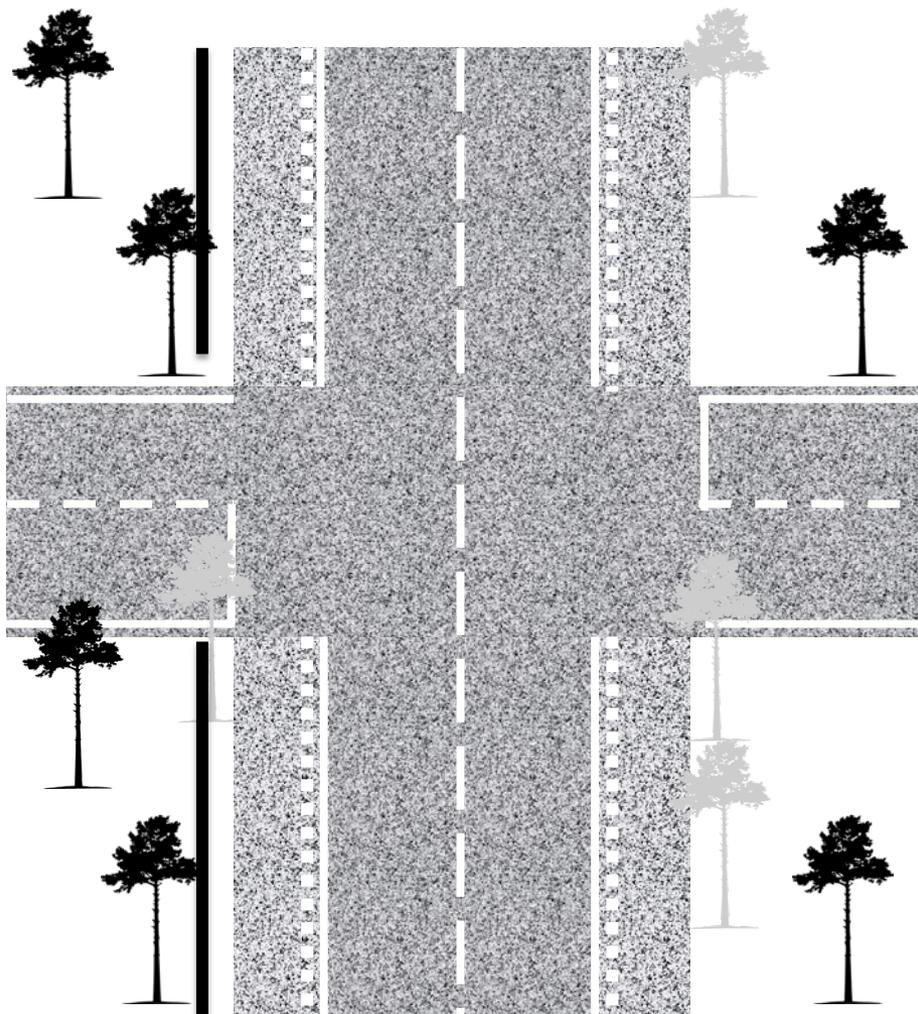
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Example: Class II Highway

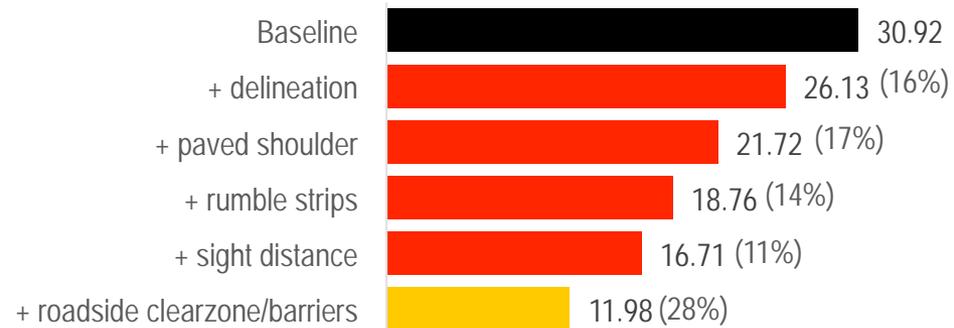
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Star Rating Scores

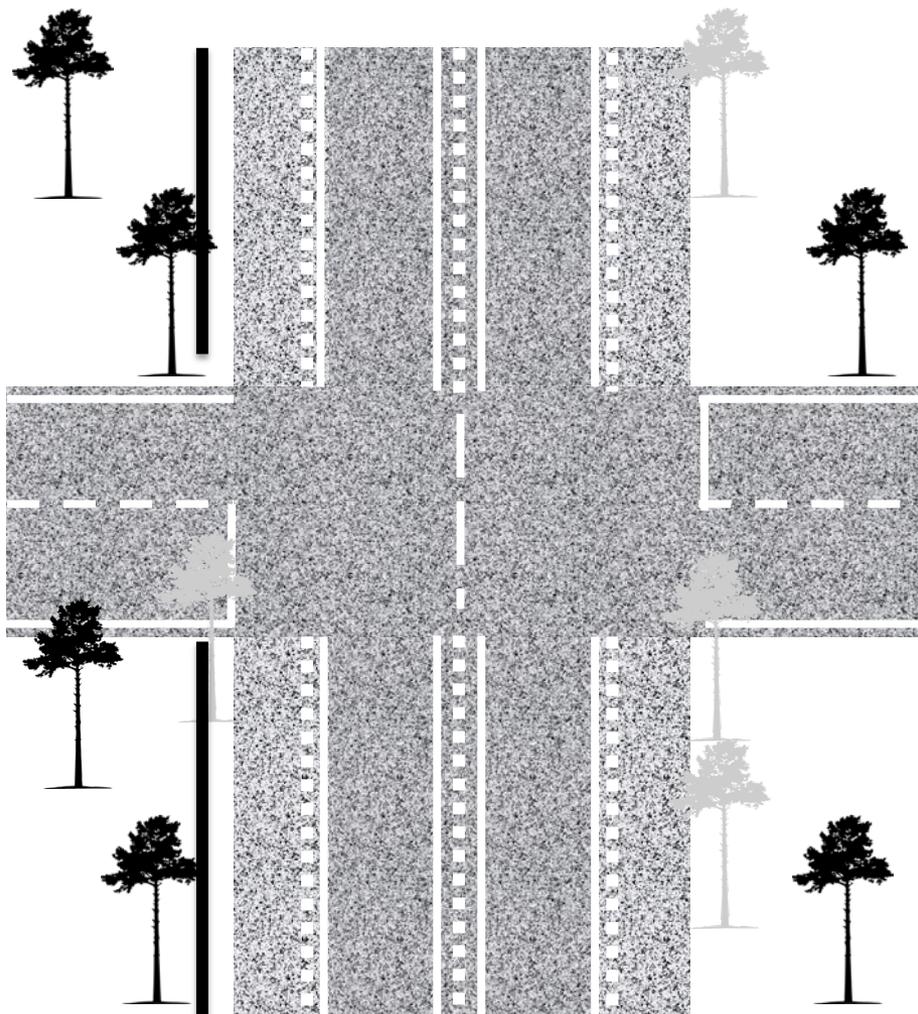
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XX.XX – Star Rating Score, (XX%) – Reduction in risk



Example: Class II Highway

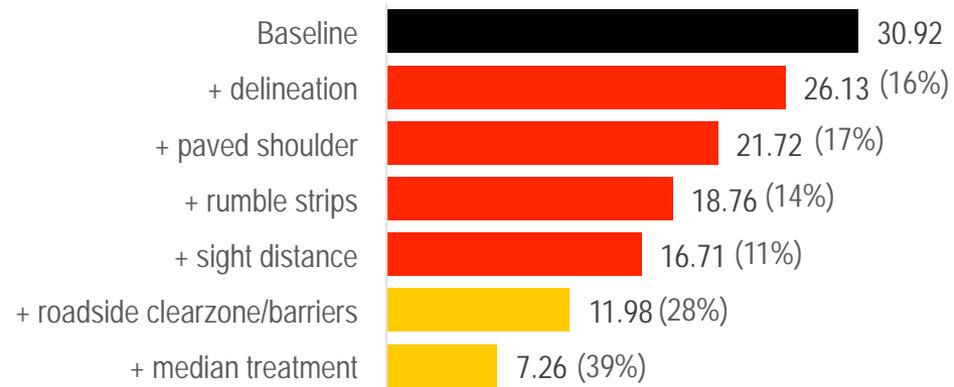
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Star Rating Scores

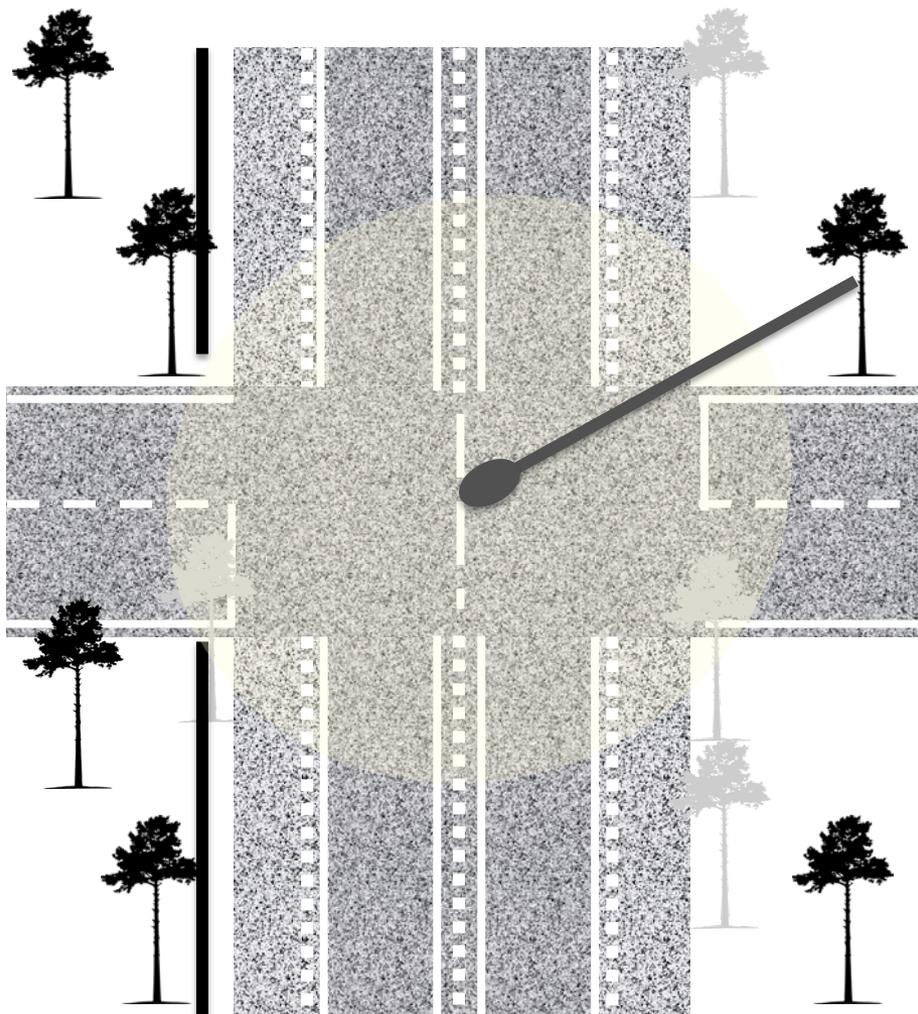
Relative risk of death and serious injury

XX.XX – Star Rating Score, (XX%) – Reduction in risk



Example: Class II Highway

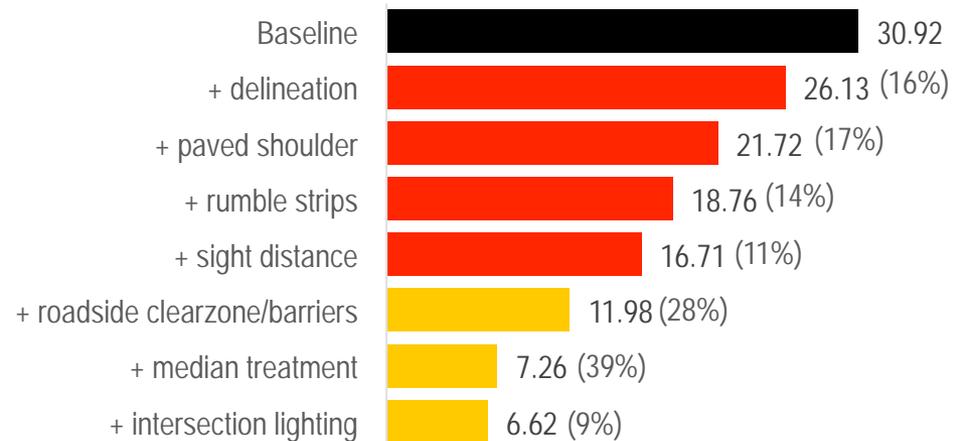
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Star Rating Scores

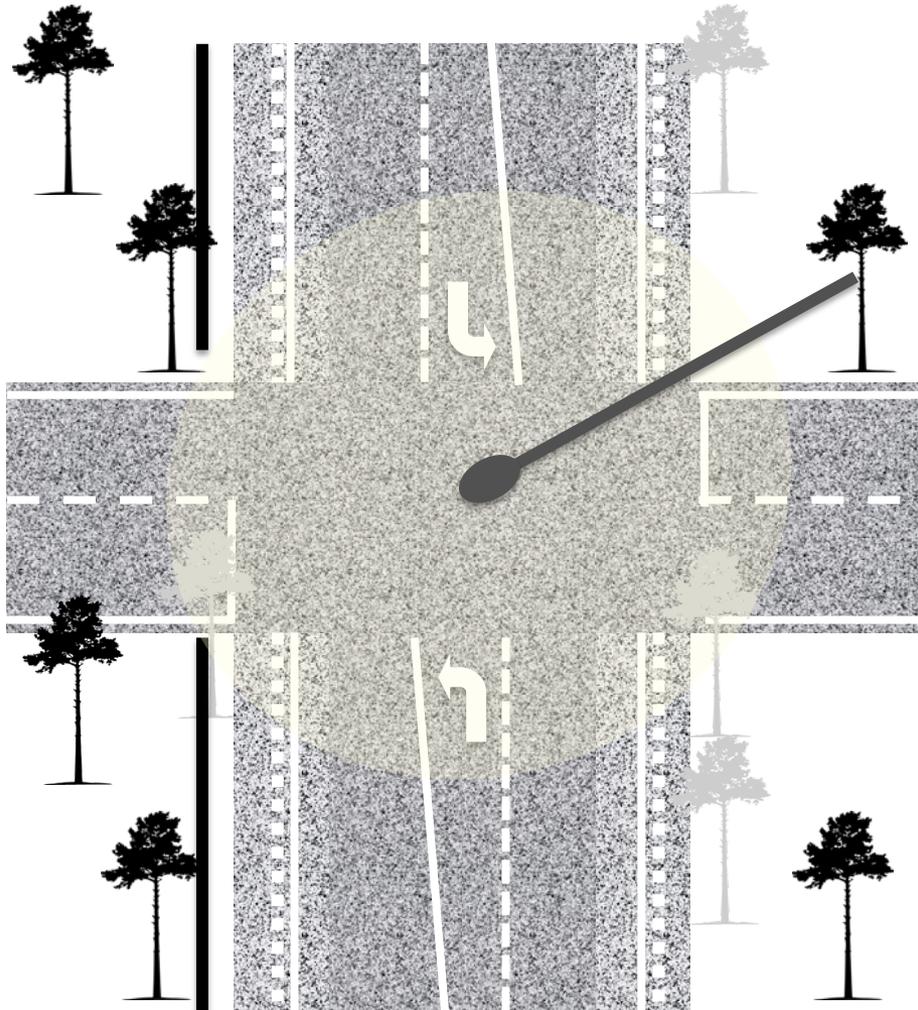
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Example: Class II Highway

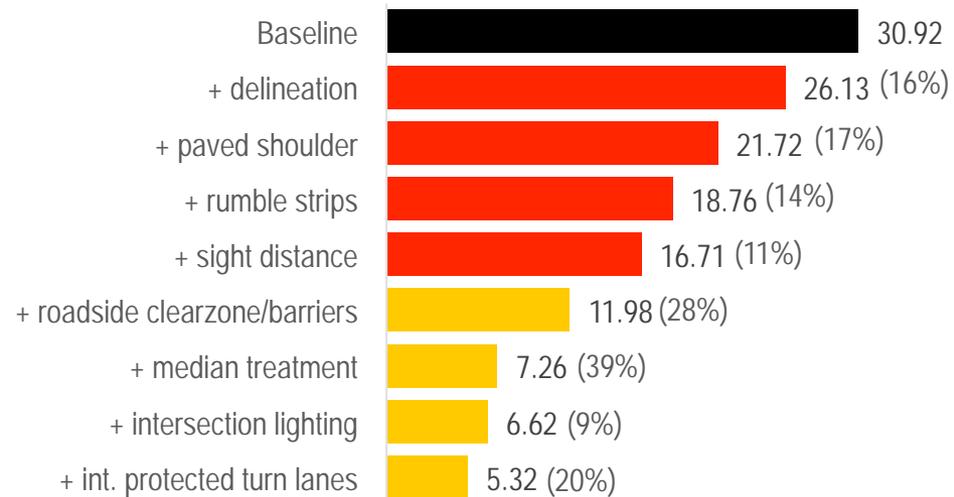
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Star Rating Scores

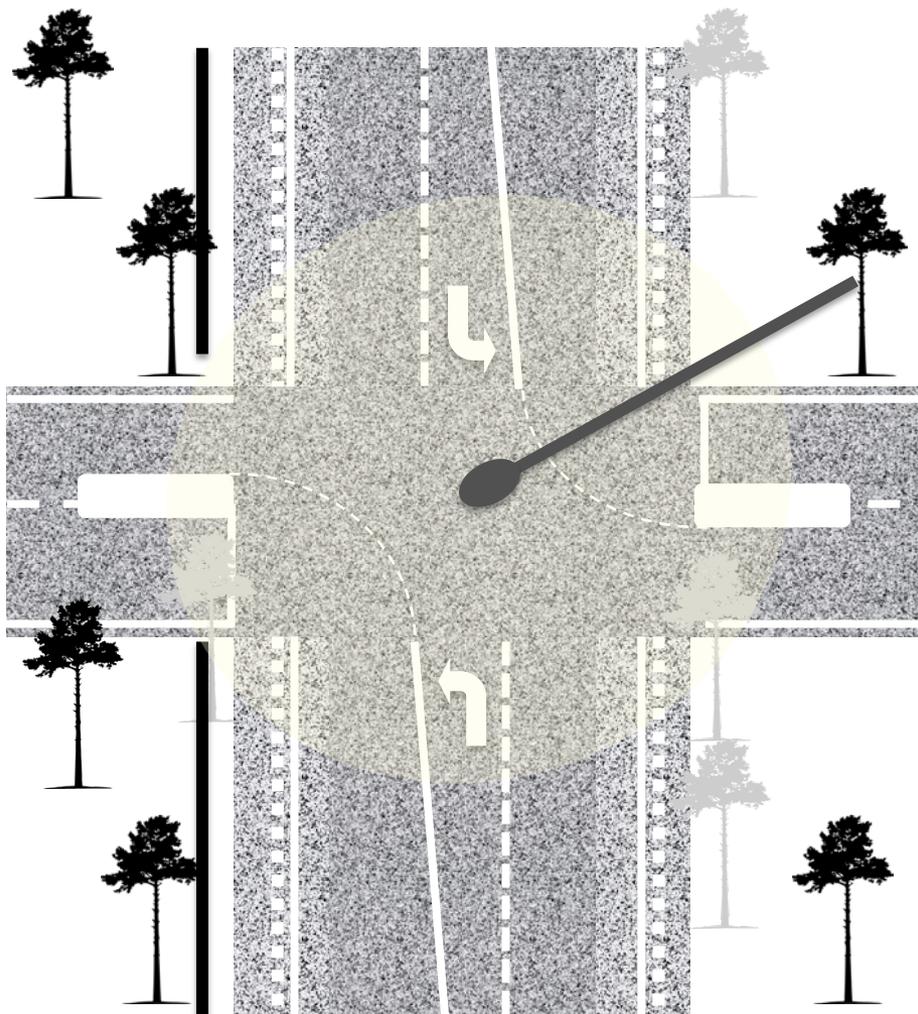
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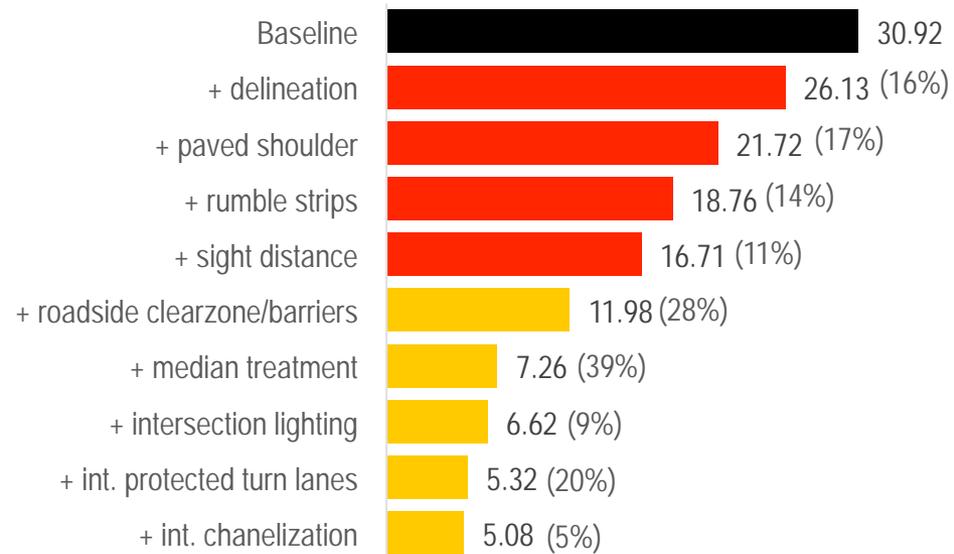
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Star Rating Scores

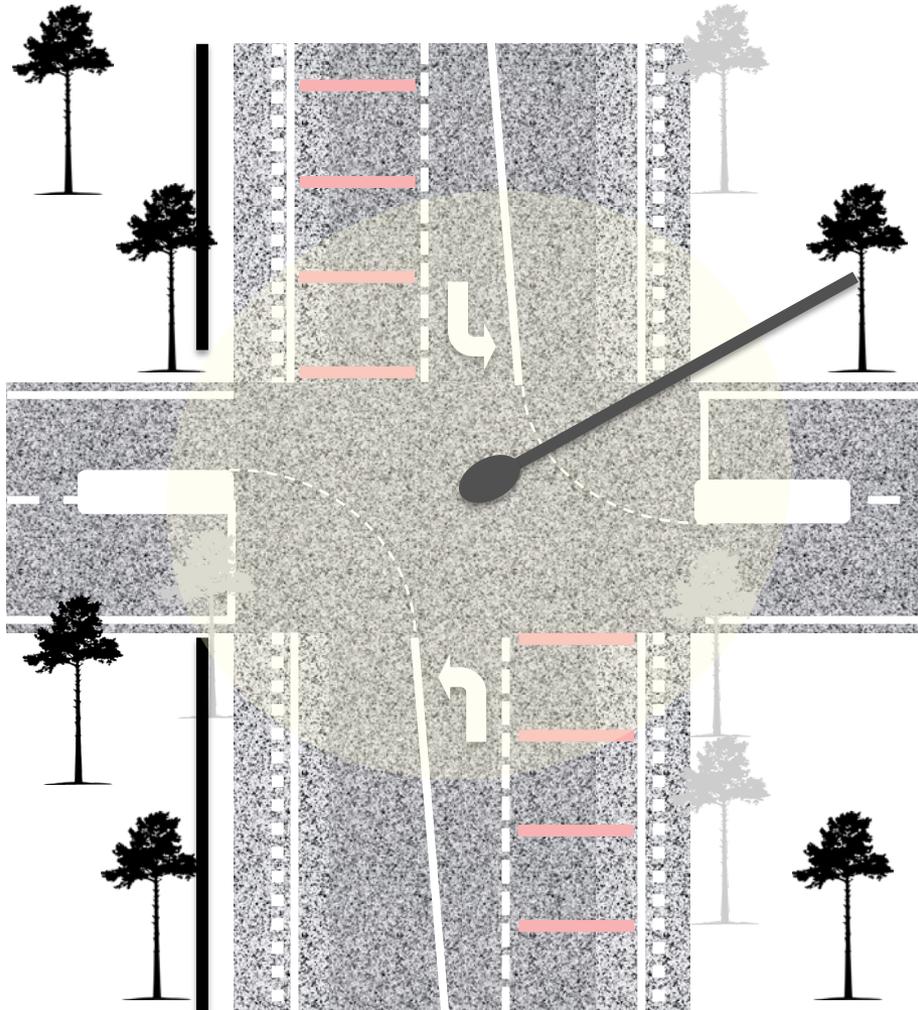
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Example: Class II Highway

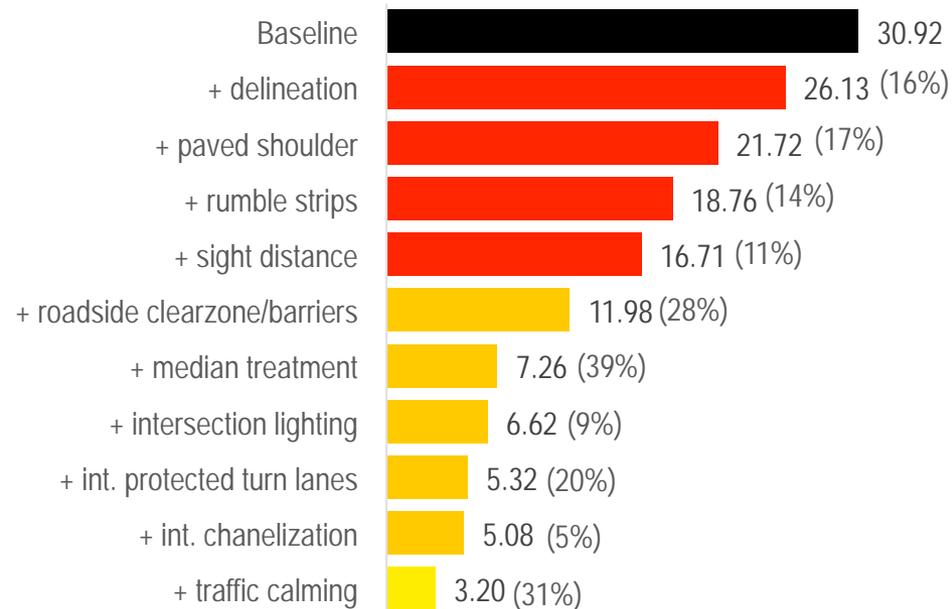
Level terrain, speed 80km/h, AADT = 10,000 vpd, 1 curve per km, 1 intersection per km



Star Rating Scores

Relative risk of death and serious injury

XX.XX – Star Rating Score, (XX%) – Reduction in risk



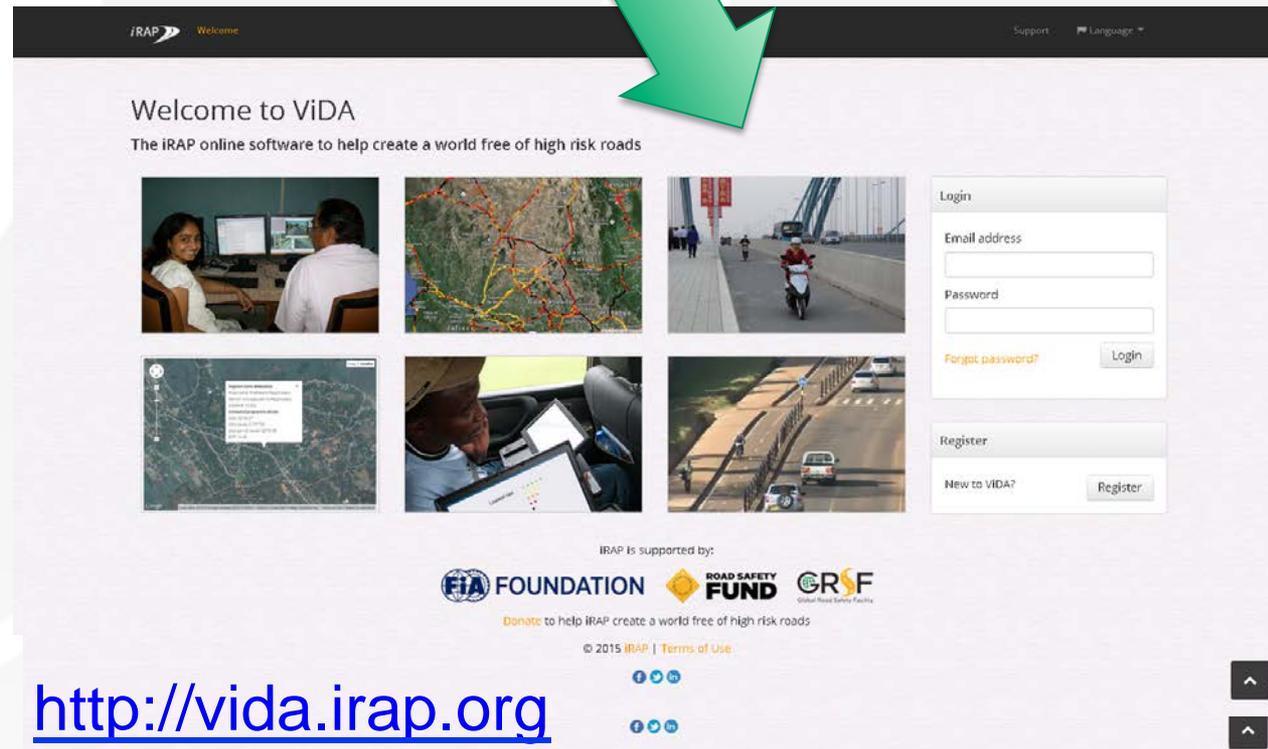
Resources

- <http://www.irap.org>:
 - Methodology fact sheets
 - Specifications
- <http://vida.irap.org>
 - iRAP online software
 - Star Rating Demonstrator
- <http://toolkit.irap.org>
 - Road Safety Toolkit

Access the Demonstrator on 2 Ways

Memory stick

Register online



IRAP Welcome

Support Language

Welcome to ViDA

The iRAP online software to help create a world free of high risk roads

IRAP is supported by:

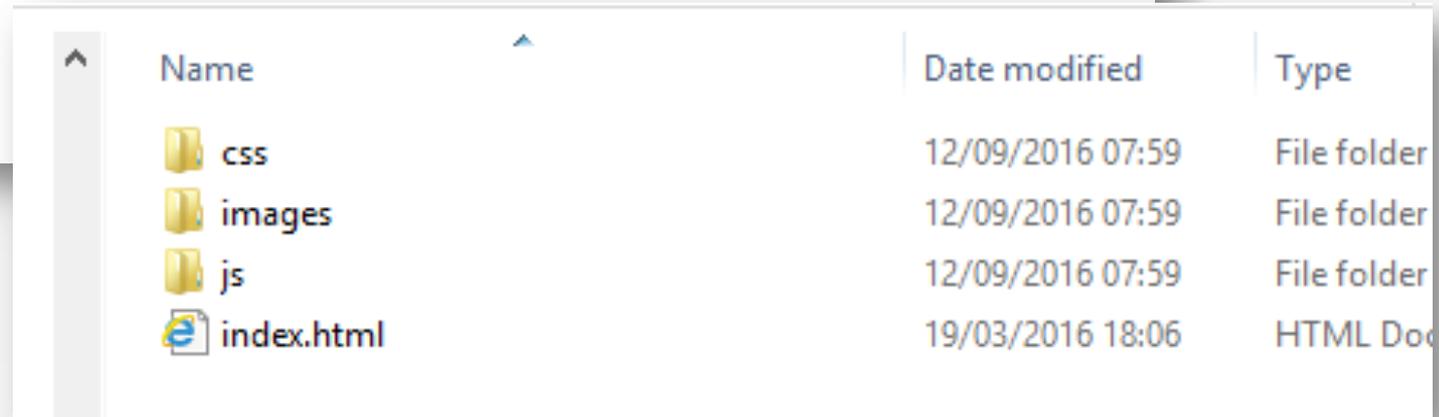
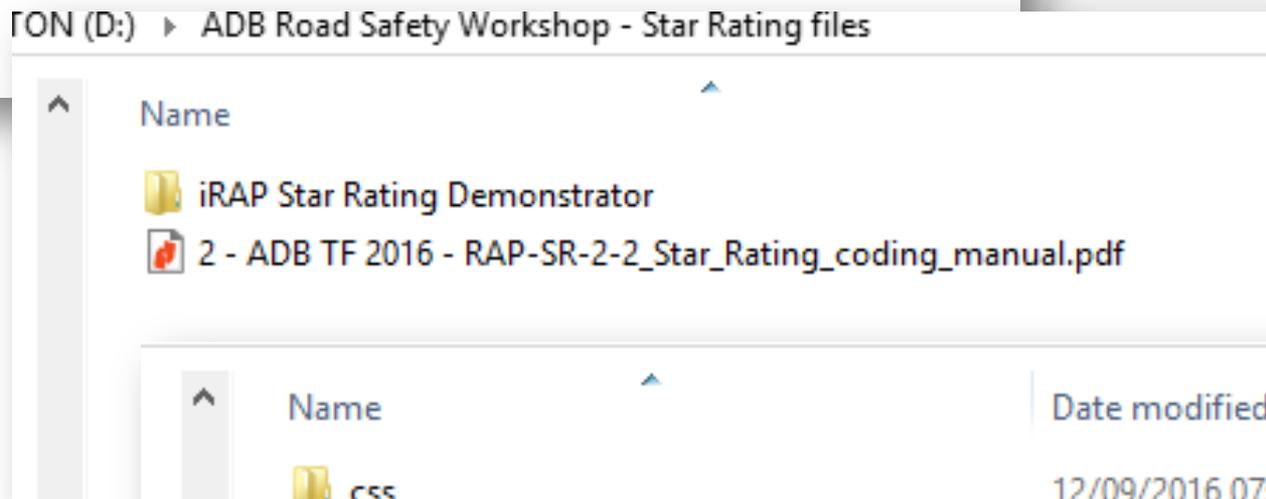
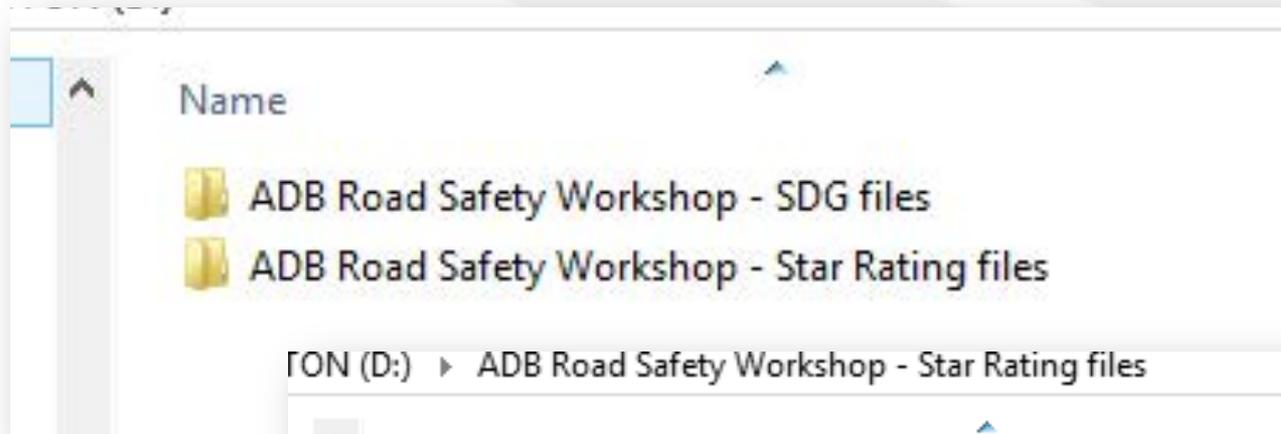
FIA FOUNDATION **ROAD SAFETY FUND** **GRSF**
Global Road Safety Facility

Donate to help iRAP create a world free of high risk roads

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<http://vida.irap.org>

Memory Stick



Star Rating Demonstrator



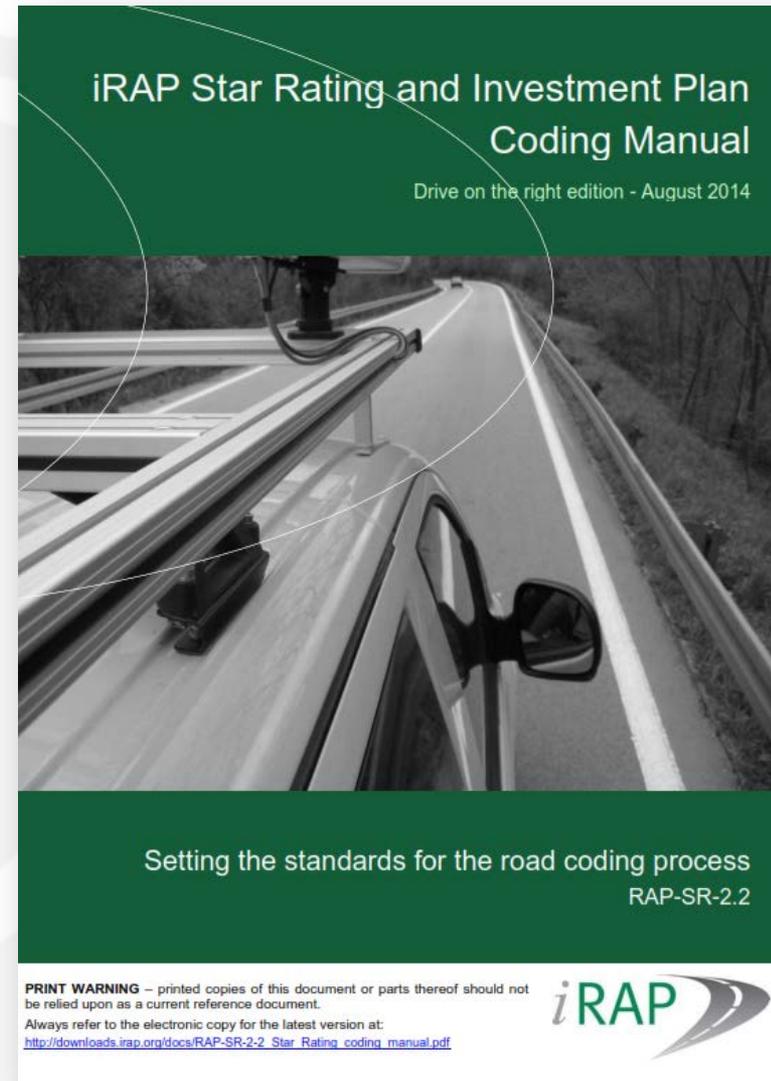
The screenshot shows the iRAP Star Rating Demonstrator interface. The navigation tabs are: **Star Ratings**, **Chart**, **Roadside**, **Mid-block**, **Intersections**, **Flow**, **VRU facilities and land use**, and **Speeds**. The **Roadside** tab is selected. Below the tabs, there are filter options for roadside severity:

- Roadside severity - driver-side distance: 0 to <1m
- Roadside severity - driver-side object: Safety barrier - metal
- Roadside severity - passenger-side distance: 0 to <1m
- Roadside severity - passenger-side object: Safety barrier - metal

Interactive Session

1. Each group will use the Star Rating Demonstrator to produce iRAP Star Ratings for 4 road user types
2. Use the iRAP Demonstrator to explore potential road safety engineering improvements
3. Suggest up to 5 countermeasures
4. Determine what the Star Ratings would be with the countermeasures
5. Report back to the group

Coding Manual



<http://www.irap.org/en/about-irap-3/specifications>

Image #1



Image #2



Image #3



Image #4

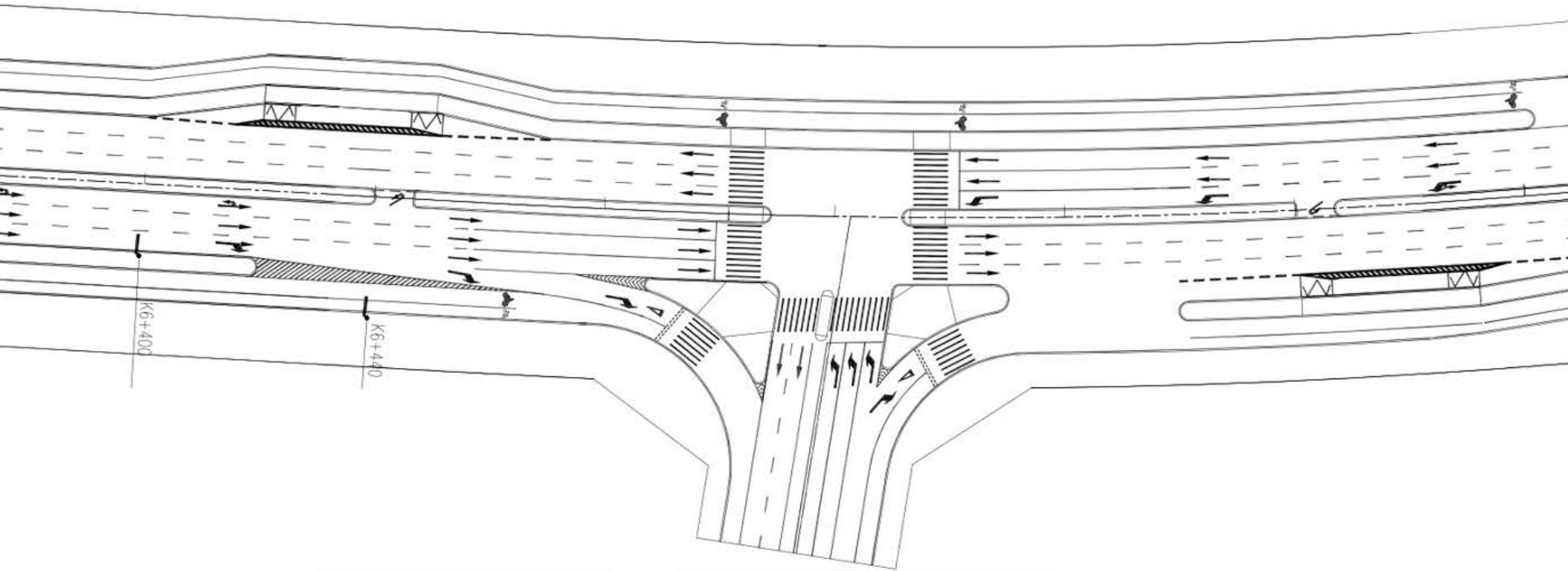


Image #5



Image #6



Image #7



Group 1	Bruce Highway, QLD, Australia			
Road user	Vehicle Occupants	Motorcyclists	Pedestrians	Bicyclists
Star Rating Score (SRS)	21.7	27.0	93.3	86.1
Star Rating	2 star	1 star	1 star	1 star

Suggested countermeasures

1.	<i>Improve delineation (road markings, road studs and signage)</i>
2.	<i>Install traffic signals at intersection</i>
3.	<i>Provide a cross-traffic turn lane at intersection</i>
4.	<i>Provide an on-road motorcycle lane</i>
5.	<i>Install a concrete median barrier before and after intersection</i>

Road user	Vehicle Occupants	Motorcyclists	Pedestrians	Bicyclists
Star Rating Score (SRS)	15.8	21.5	63.3	22.5
Star Rating	3 star	2 star	3 star	3 star

Philippines

Pedestrians: ★★☆☆☆☆

One lane each direction

Good sight distance

80km/h

Narrow paved shoulder

No formal footpath

No pedestrian crossing

No school zone

No street lighting

Australia

Pedestrians: ★★★★★

40km/h

Footpaths

Raised pedestrian crossing

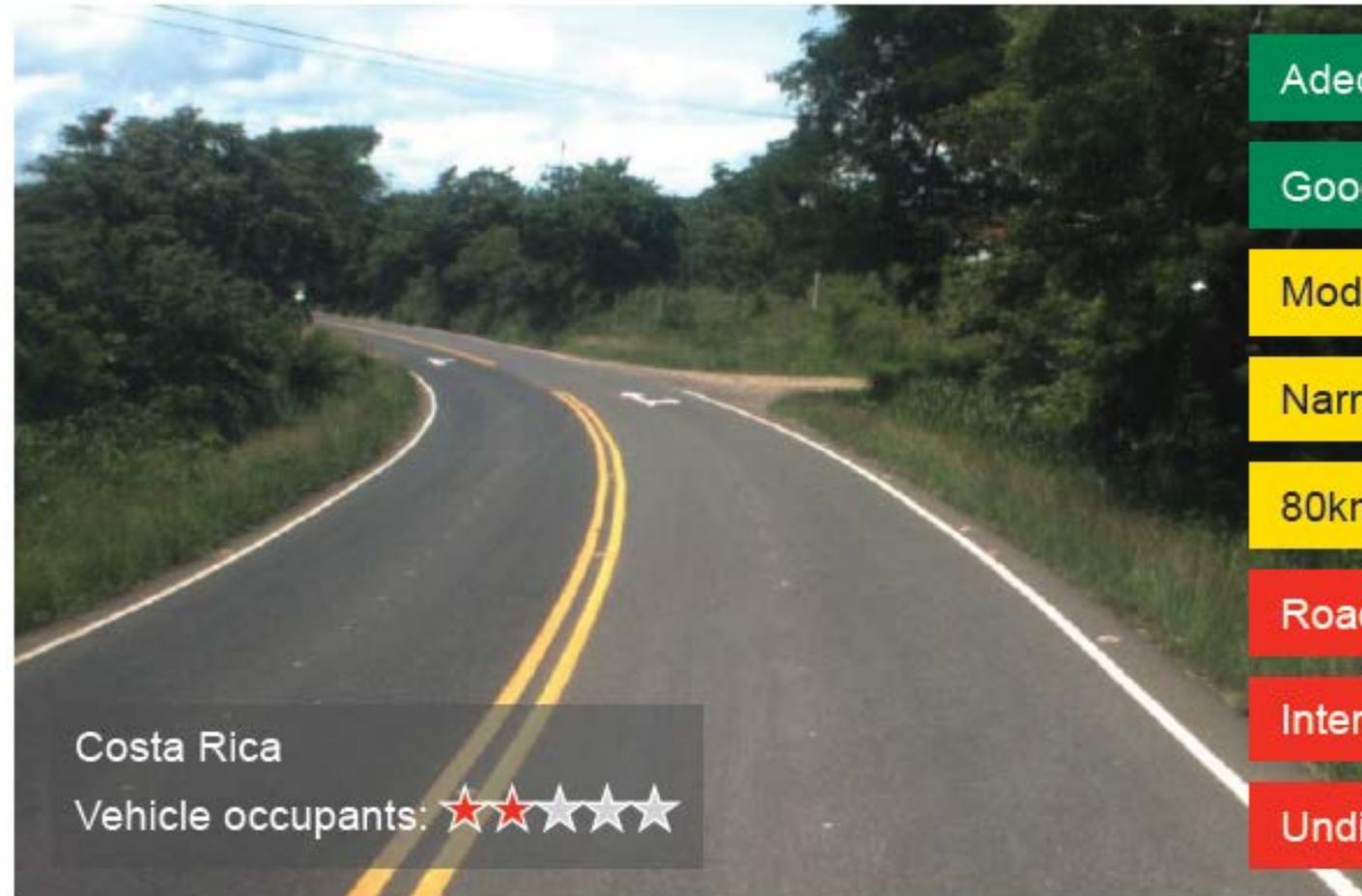
Street lighting

1 lane in each direction

Good sight distance

Managed parking

Median island



Costa Rica

Vehicle occupants: ★★☆☆☆

Adequate delineation

Good pavement

Moderate curve

Narrow paved shoulders

80km/h

Roadside hazards

Intersection

Undivided



Brazil

Vehicle occupants: ★★★★★

Roadside safety barriers

Median safety barriers

Good delineation

Wide paved shoulders

No intersection

Straight

Two lanes each direction

80km/h

Brazil

Bicyclists: ★★★★★

No intersection

Good sight distance

80km/h

No bicycle facilities

No street lighting

Poor pavement

No shoulder

Poor delineation

China

Bicyclists / e-bicyclists: ★★★★★

Bicycle lane

Street lighting

Good pavement

No intersection

No vehicle parking

Two lanes each direction

Good sight distance

50km/h