Comfort and Safety

low risk

Overview

Indicator name	**Road safety**		
Indicator number	23	**Indicator type**	Core
Objective	To measure and identify road safety risks and trends in crashes over time on NSW roads		
Application guidance	A healthy environment is one where the road is safe – reducing the risk of injury by design, where the speed and street environment both minimise the risk of serious injury. Factors like road speed and geometry affect the safety of the community. This indicator will support practitioners to understand problems on the network. Based on the outcome of the assessment, practitioners can determine whether intervention and further road safety treatments across the safe system pillars – safer people, vehicles, roads and speed – may be required. Practitioners can use the *AusRAP vehicular risk rating* metric to measure the vehicular road safety risk star rating on State roads. Practitioners can use the *crashes per 100 million vehicle kilometres travelled (VKT)* metric to measure the rate of fatal and serious injury (FSI) crashes occurring relevant to the vehicle kilometres travelled. Practitioners can use the *FSI and casualty crash rates* metric to measure the rate of FSI crashes occurring per kilometre per year on the road network.		

Metric

- AusRAP vehicular risk rating
- Crashes per 100 million vehicle kilometres travelled (VKT)
- FSI and casualty crash rates

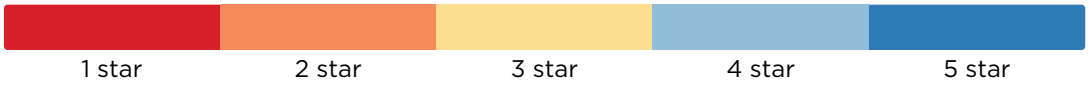
Related indicators

Comfort and Safety
25 Safe speed for environment

Recommendation

- To ensure a detailed and accurate analysis, manual data collection (ie. traffic and speed surveys) should be undertaken
- For high place intensity, surveys should be carried out to determine operating speeds and calculate the safe speed. Other risks should be assessed by a road safety practitioner to indicate any other road safety risks present.
- For rural and urban roads with low place intensity, risks should be assessed by a road safety practitioner to indicate any other road safety risks.
- Analysis of road safety is relevant to the desired road safety outcome of zero trauma on all roads in NSW by 2050 (Future Transport Strategy 2056, pp. 43). Output values will need to trend towards zero for all roads in NSW over the next 30 years to achieve this outcome.
- To complement the analysis of road safety, safe system assessments could be undertaken

Metric – AusRAP vehicular risk rating

Metric unit	Star rating
Description	To measure the AusRAP vehicular road safety risk star rating on State roads
Spatial coverage	Applicable to all NSW, State roads only
Spatial application	This metric is most suitable for link-based analysis based on the State road network
Calculation methodology	**Rating road network** 1. All State roads in NSW are assigned a star rating from 1 – 5, with a rating of 5 representing the lowest risk. The star ratings are calculated from approximately 70 different road attributes including such features as curve radius, surface condition and vertical alignment to name a few (see IRAP reference for more information). *Note: The risk rating can only be assessed at the classified roads link level. The TfNSW AusRAP risk rating is not applicable for vulnerable road users such as bicycle riders and pedestrians.* **Data representation** 2. Assign colour based on the classification below Unit: Star rating  1 star 2 star 3 star 4 star 5 star
Assumption	• Risk ratings are updated on all links whenever any road infrastructure is built • Risk rating is applicable to road users in vehicles only • In locations of high place intensity or increased pedestrian demand (such as bus stops on high speed rural roads), a risk assessment for vulnerable road users should be undertaken
Limitation	• AusRAP is only applicable to classified State roads • Analysis is not applicable to vulnerable road users • Where risk rating is unavailable, risk assessments should be undertaken • For area-based analysis, AusRAP risk rating can be summarised, but not aggregated into a single value
Data source	Centre for Road Safety, SRRA database (AusRAP version 1): opendata.transport.nsw.gov.au/dataset/crash-statistics

Metric – Crashes per 100 million vehicle kilometres travelled (VKT)

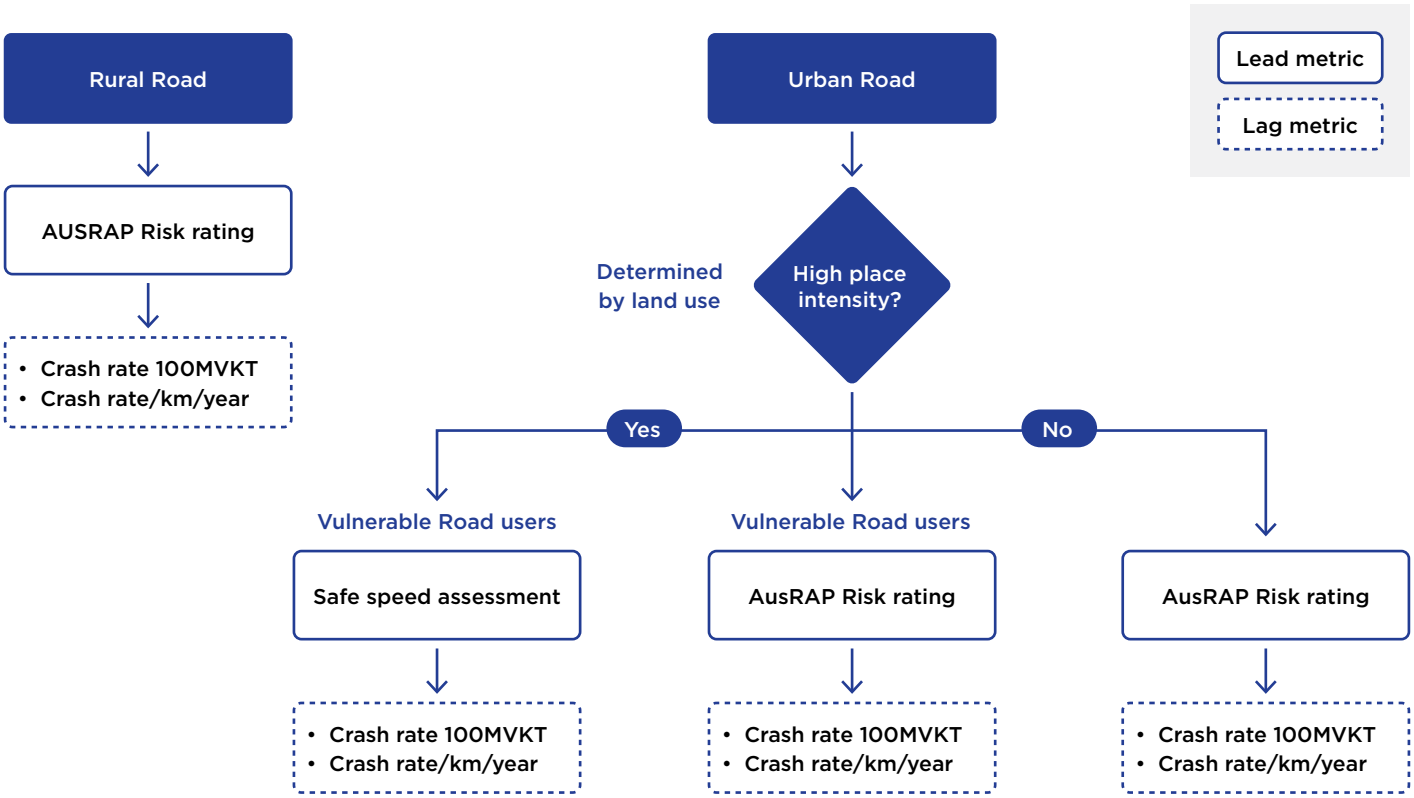
Metric unit	Crashes per 100MVKT
Description	To measure the rate of fatal and serious injury (FSI) crashes occurring relevant to the vehicle kilometres travelled
Spatial coverage	Applicable to all NSW
Spatial application	This metric is most suitable for link-based analysis based on the road network
Calculation methodology	**Calculate FSI 100MVKT** 1. Calculate FSI 100MVKT using the following formula: $$FSI\ 100MVKT = \frac{(FSI\ Crashes \times 100{,}000{,}000)}{(Link\ Length \times AADT \times 365 \times nYearsData)}$$ **Aggerate to longer lengths or areas** 2. Calculate the sum of total kilometres travelled over the crash period and the sum of FSI crashes for all links during the crash period, when aggregating to longer lengths or areas. The following formula can be used: $$FSI\ MVKT = \frac{Sum\ (FSI\ Crashes\ all\ links) \times 100{,}000{,}000}{Sum(Km\ travelled\ during\ crash\ period\ all\ links)}$$ Where total kilometres travelled during the crash period for each link $$= Link\ Length \times AADT \times 365 \times nYearsData$$ *Note: Rates should be calculated for the following crash types in the following road environments:* • *Rural road – FSI and casualty crashes for all road users* • *Urban road, low place intensity – FSI for all road users* • *Urban road, high place intensity – FSI for all road users and FSI for vulnerable road users*
Assumption	• Five years crash data is available • Where possible, rates should be calculated from observed traffic volumes and the most recent five-year finalised crash data available • Traffic volumes are known, or the estimate is reasonably accurate • Analysis is applied at the road link level, but can be aggregated up to longer lengths (or area-based analysis) if two of the following three components of FSI per 100MVKT are known for each link: link length, AADT, crash count • For area-based analysis, crash rates can be aggregated up to an overall single area value
Limitation	• Accurate traffic volumes are difficult to obtain • This is a lag metric to measure the road safety performance of roads across NSW • FSI per 100MVKT is not a true indication of the risks for road users, and should be used in conjunction with the AusRAP vehicular risk rating metric, where possible
Data source	• Centre for Road Safety, SSA database: opendata.transport.nsw.gov.au/dataset/crash-statistics • Manual collection of traffic volumes

Metric – FSI and casualty crash rates

Metric unit	Crashes per kilometre per year
Description	To measure the rate of FSI crashes occurring per kilometre per year on the road network
Spatial coverage	Applicable to all NSW
Spatial application	This metric is most suitable for link-based analysis based on the road network
Calculation methodology	**Aggerate to longer lengths or areas** 1. Calculate the FSI crashes for each road link by multiplying the rate by the length of the link and the number of years of crash data then sum the total FSI crashes and the total length when aggregating to longer lengths or areas **Calculate the FSI crash rate** 2. Use summed values from Step 1 to calculate FSI crash using the following formula: *FSI Crash Rate = FSI Crashes / Link Length / nYearsData* *Note: Rates should be calculated for the following crash types in the following road environments:* • *Rural road – FSI and casualty crashes for all road users* • *Urban road, low place intensity – FSI for all road users* • *Urban road, high place intensity – FSI for all road users and FSI for vulnerable road users*
Assumption	• Five years crash data is available • Where possible, rates should be calculated from observed traffic volumes and the most recent five-year finalised crash data available • Traffic volumes are known, or the estimate is reasonably accurate • Analysis is applied at the road link level, but can be aggregated up to longer lengths (or area-based analysis) if two of the following three components of FSI per 100MVKT are known for each link: link length, AADT, crash count
Limitation	• Crash rates may appear abnormally high on very short links • This is a lag metric to measure the road safety performance of roads across NSW • Crash rate is not a true indication of the risks for road users, and should be used in conjunction with the AusRAP vehicular risk rating metric, where possible
Data source	• Centre for Road Safety, SRRA database: opendata.transport.nsw.gov.au/dataset/crash-statistics • Centre for Road Safety, SSA database: opendata.transport.nsw.gov.au/dataset/crash-statistics

Guidance on applicability of metrics

The flow chart below is a basic guide on how to use the various road safety metrics by identifying the study area as urban or rural, and determining the place intensity.



Reference

- TfNSW, Future Transport Strategy 2056 (2018): future.transport.nsw.gov.au/future-transport-strategy
- iRAP, Vida: vida.irap.org/en-gb
- iRAP, Methodology fact sheets: irap.org/en/about-irap-3/methodology