

# Star Ratings for Road Safety Audits

Greg Smith, International Road Assessment  
Programme (iRAP)



# Purpose of the manual

Help countries position to implement the CAREC Strategy, Global Plan and achieve Global Road Safety Performance Target 3

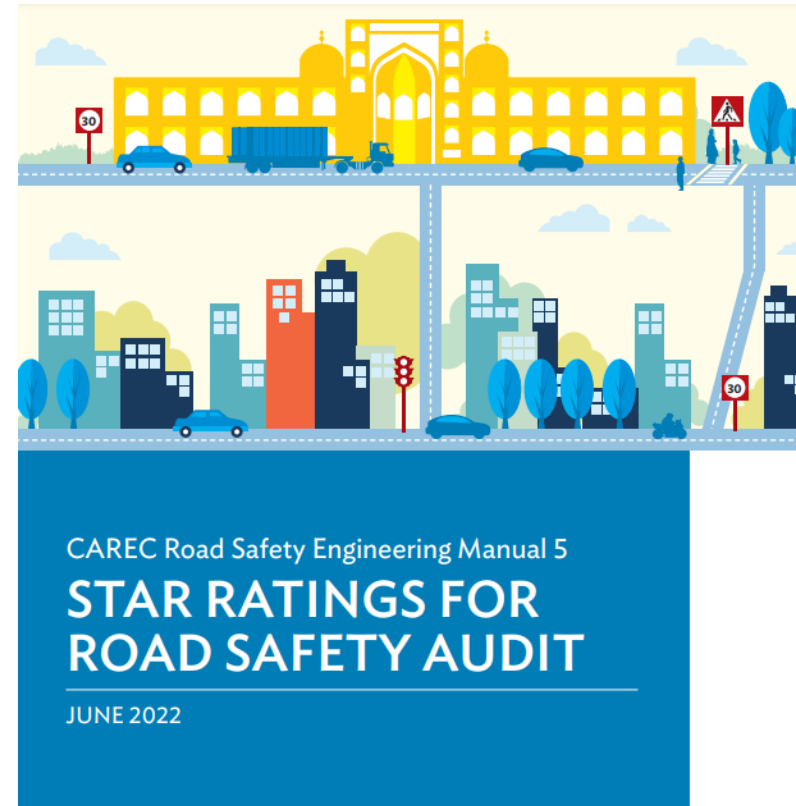


Undertake road safety audits on all sections of new roads (pre-feasibility through to detailed design) and complete assessments using independent and accredited experts to ensure a minimum standard of 3 stars or better for all road users.



# Purpose of the manual

Share approaches for how policy makers and practitioners can use Road Safety Audits (RSA) and iRAP together



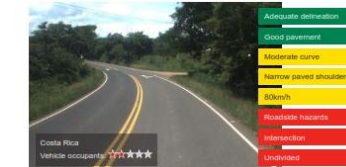
# What is a Road Safety Audit?

- A formal design review
- Independent of the design
- Qualitative
- Globally well-known

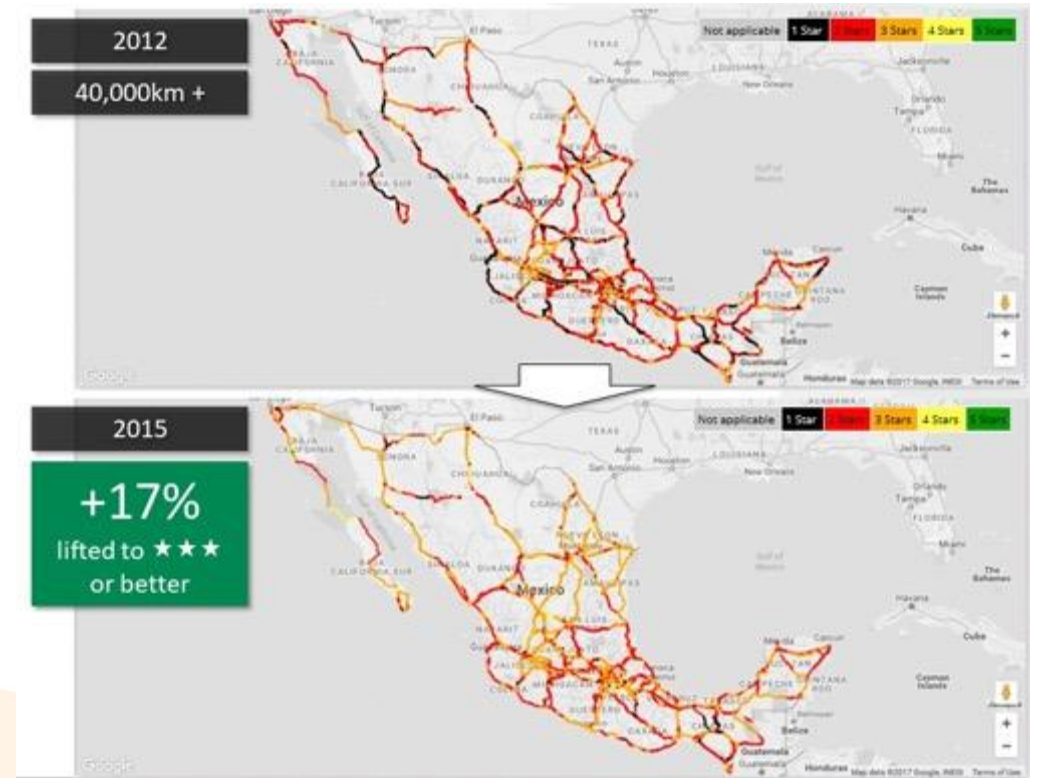


# What is the iRAP methodology?

- Developed with world-leading road safety researchers
- Star Rating is based on data and objective
- 5-stars = safest, 1-star = least safe
- Can be undertaken on all roads without reference to detailed crash data



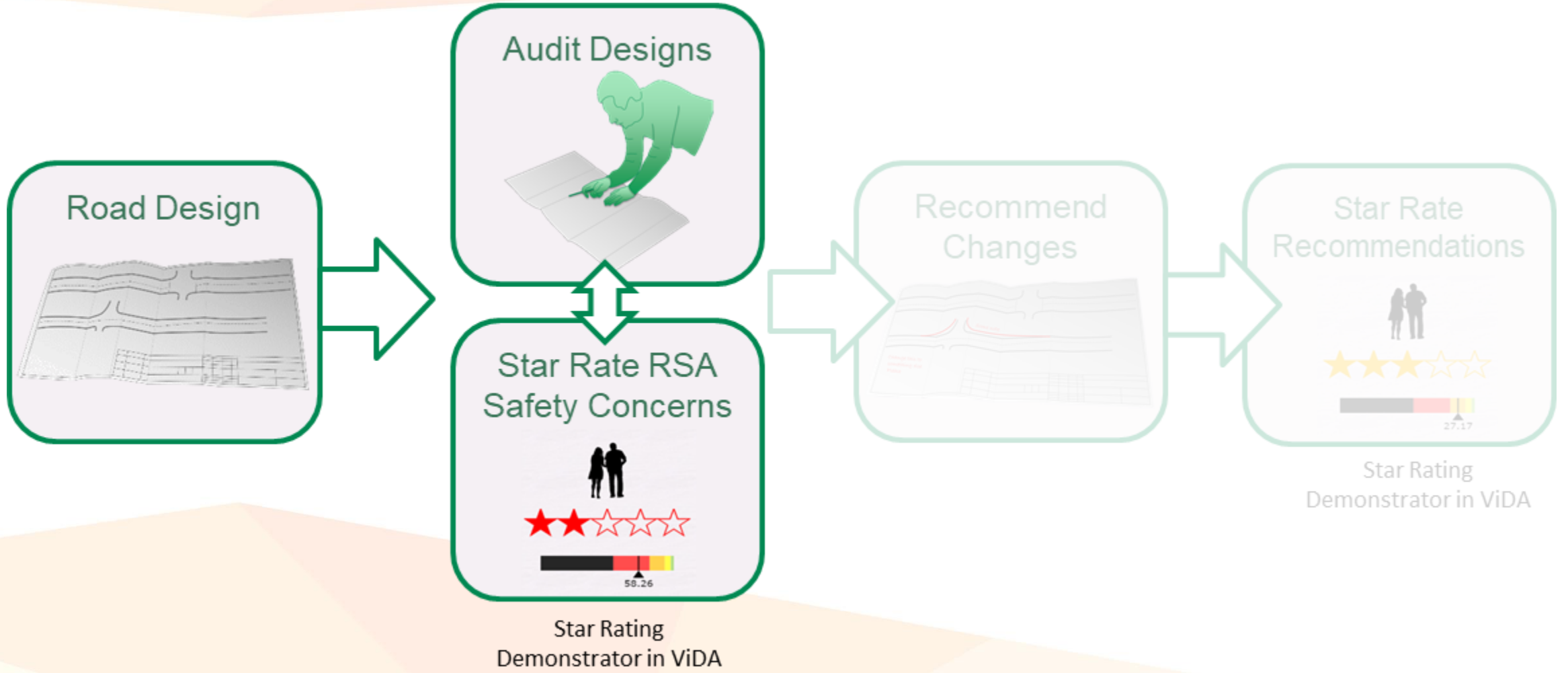
# Experience + data = optimal outcomes



# Three fundamental approaches

Outputs	Level 1	Level 2	Level 3
Stars for specific safety concerns and recommendations	✓	✓	✓
Stars for length of design		✓	✓
Fatality estimations			✓
Investment plan			✓
Can be used to measure against targets	Partial	✓	✓

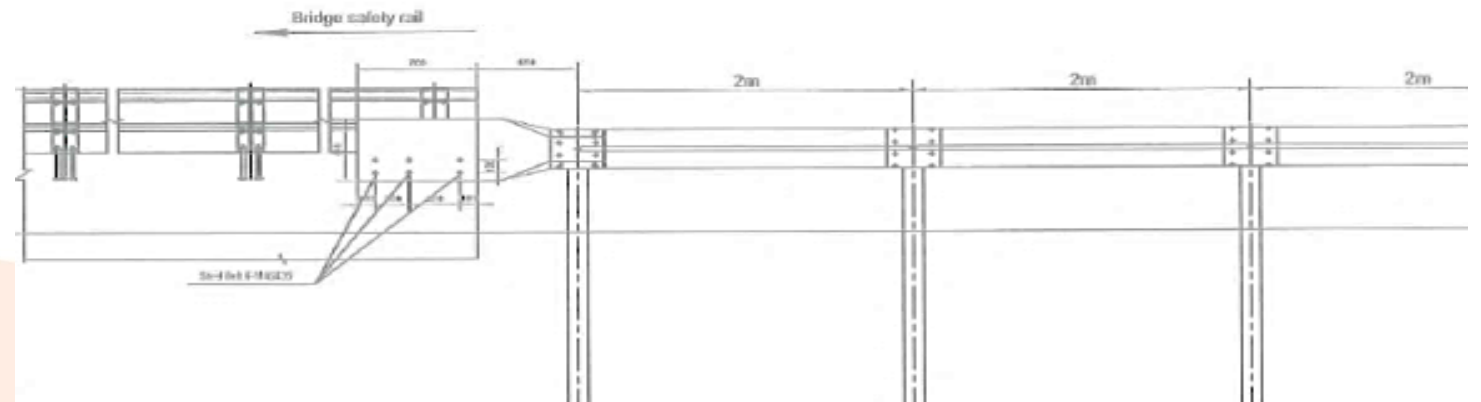
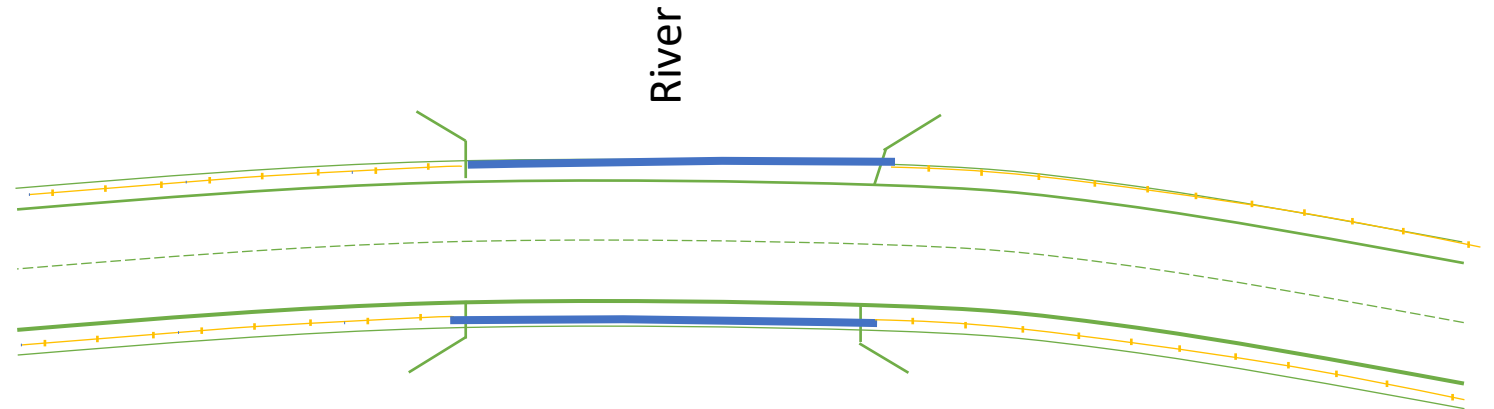
# Level 1 Approach





# Review the design and visit the site

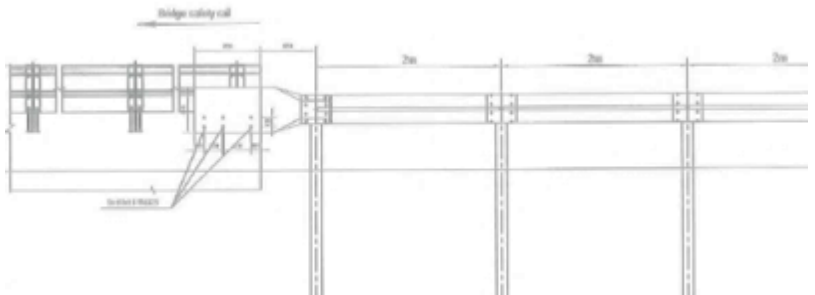
Speed Limit: 100km/h  
85<sup>th</sup> percentile speed: 100km/h  
AADT: 7,000  
Pedestrians: 1-5 peak hour  
Bicyclists: 1-5 peak hour

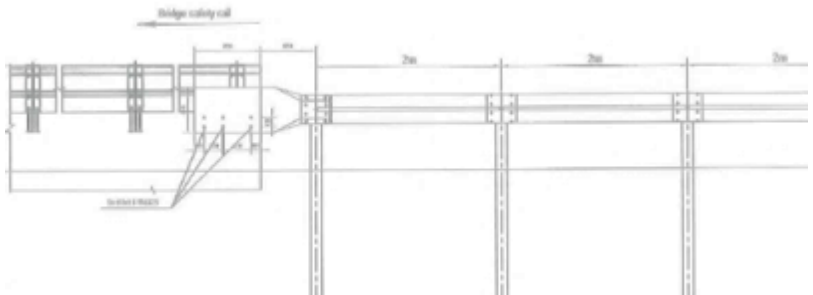


# The Safety Concern



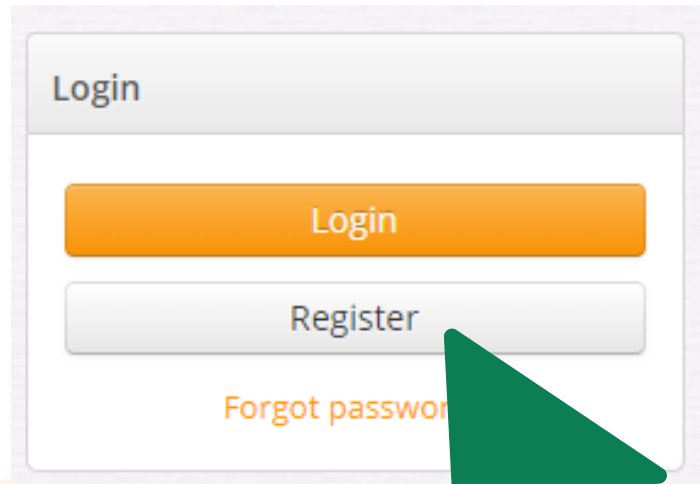
Risk		Frequency of Possible Crash			
		Frequent	Probable	Occasional	Improbable
Severity of Possible Crash	Catastrophic	Intolerable	Intolerable	Intolerable	High
	Serious	Intolerable	Intolerable	High	Medium
	Minor	Intolerable	High	Medium	Low
	Limited	High	Medium	Low	Low

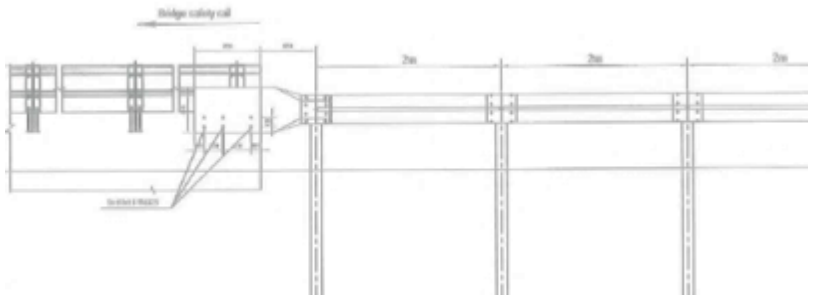




Ref	Safety Concern	Risk
3.1	<p>The transition between guardrail and bridge barrier is not adequate. In the last part of the guardrail there is no stiffening necessary for the transition to the bridge barrier. In the event of a collision, the guardrail would be more deformed than the bridge barrier, which would thus be a dangerous rigid obstacle.</p> 	Medium

Ref	Safety Concern	Risk	Star Rating (Initial Design)
3.1	<p>The transition between guardrail and bridge barrier is not adequate. In the last part of the guardrail there is no stiffening necessary for the transition to the bridge barrier. In the event of a collision, the guardrail would be more deformed than the bridge barrier, which would thus be a dangerous rigid obstacle.</p> 	Medium	

# Star Rating Demonstrator

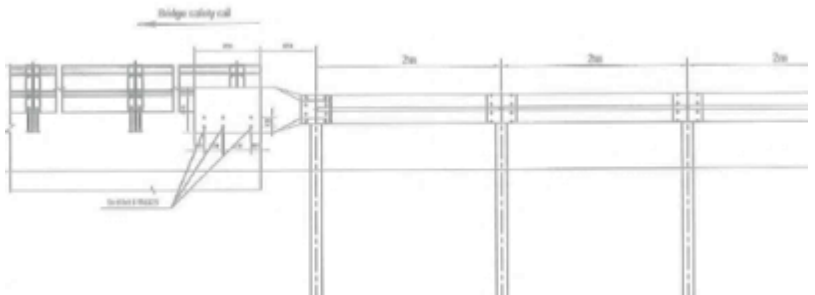


[www.vida.irap.org](http://www.vida.irap.org)



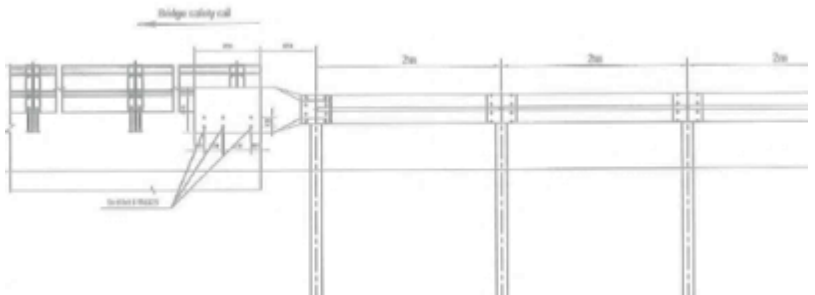


Ref	Safety Concern	Risk	Star Rating (Initial Design)
3.1	<p>The transition between guardrail and bridge barrier is not adequate. In the last part of the guardrail there is no stiffening necessary for the transition to the bridge barrier. In the event of a collision, the guardrail would be more deformed than the bridge barrier, which would thus be a dangerous rigid obstacle.</p> 	Medium	   

# Recommendation



Ref	Safety Concern	Risk	Star Rating (Initial Design)	Recommendation
3.1	<p>The transition between guardrail and bridge barrier is not adequate. In the last part of the guardrail there is no stiffening necessary for the transition to the bridge barrier. In the event of a collision, the guardrail would be more deformed than the bridge barrier, which would thus be a dangerous rigid obstacle.</p> 	Medium		<ul style="list-style-type: none"> <li>Ensure an appropriate transition between the two types of barriers to avoid performance changes. This can be achieved by progressive stiffening of the guardrail, for example by reducing the spacing of the posts.</li> </ul> 



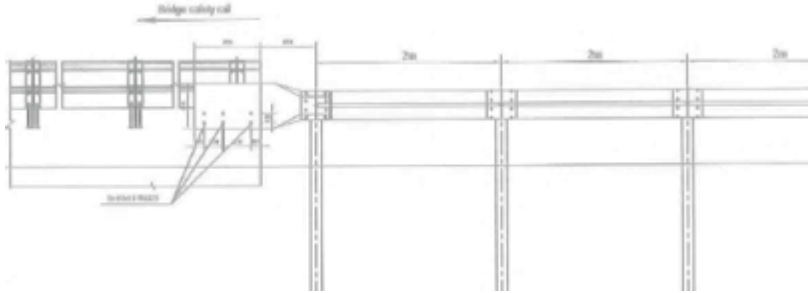









Ref	Safety Concern	Risk	Star Rating (Initial Design)	Recommendation	Star Rating (with recommendations)	Client Response
3.1	<p>The transition between guardrail and bridge barrier is not adequate. In the last part of the guardrail there is no stiffening necessary for the transition to the bridge barrier. In the event of a collision, the guardrail would be more deformed than the bridge barrier, which would thus be a dangerous rigid obstacle.</p> 	Medium		<ul style="list-style-type: none"> <li>Ensure an appropriate transition between the two types of barriers to avoid performance changes. This can be achieved by progressive stiffening of the guardrail, for example by reducing the spacing of the posts.</li> </ul> 		

## Initial design

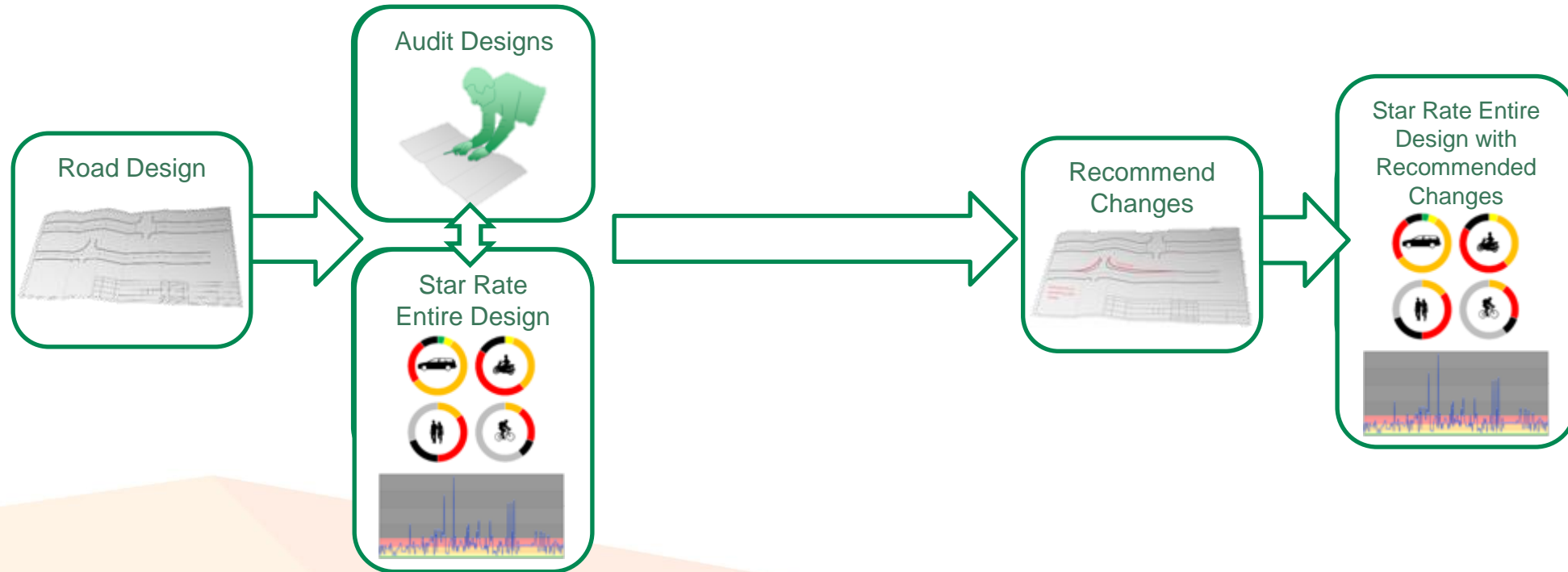


## With recommendation



Ref	Safety Concern	Risk	Star Rating (Initial Design)	Recommendation	Star Rating (with recommendations)	Client Response
3.1	<p>The transition between guardrail and bridge barrier is not adequate. In the last part of the guardrail there is no stiffening necessary for the transition to the bridge barrier. In the event of a collision, the guardrail would be more deformed than the bridge barrier, which would thus be a dangerous rigid obstacle.</p> 	Medium	   	<ul style="list-style-type: none"> <li>Ensure an appropriate transition between the two types of barriers to avoid performance changes. This can be achieved by progressive stiffening of the guardrail, for example by reducing the spacing of the posts.</li> </ul> 	   	

# Level 2 Approach



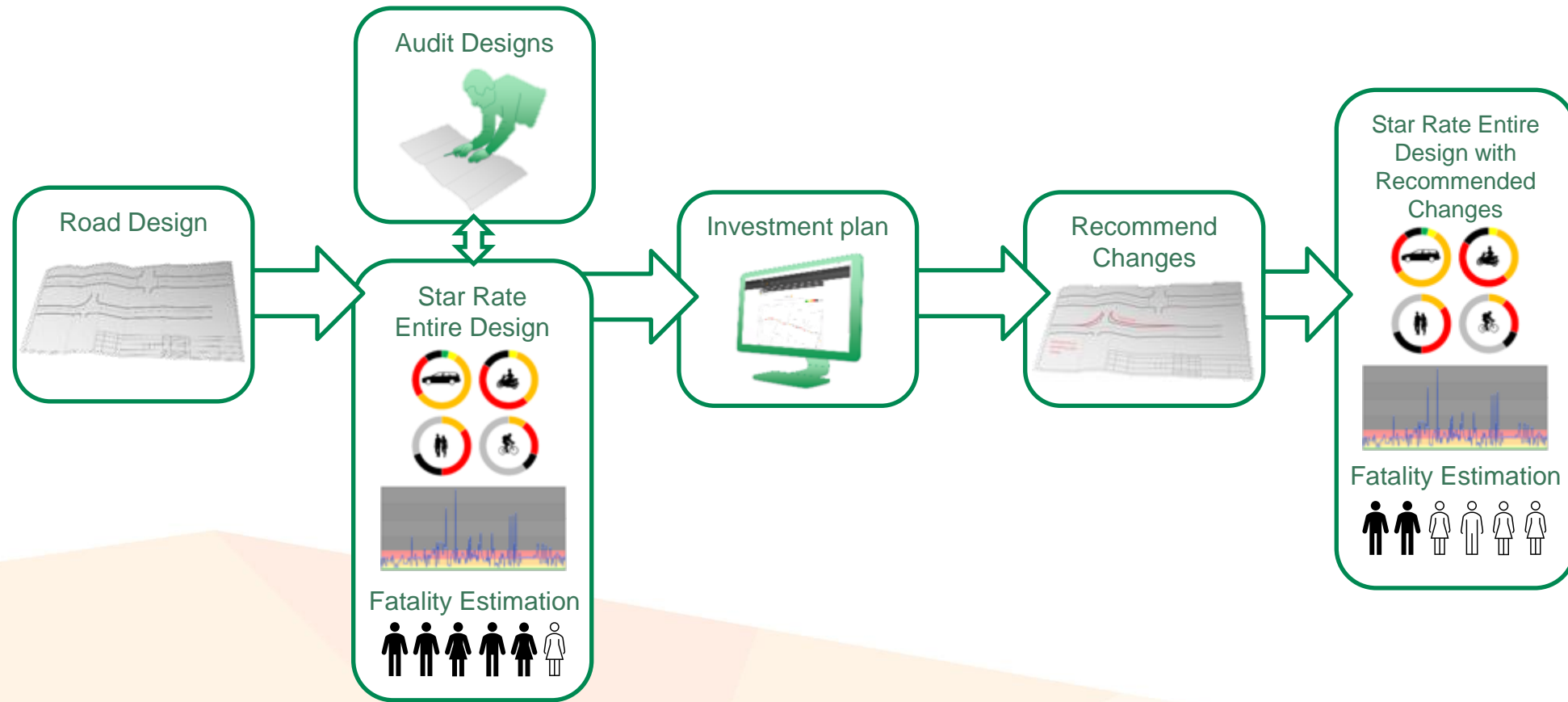
# Level 2 Approach

Target:  
3-stars or  
better



Not applicable 1 Star 2 Stars 3 Stars 4 Stars 5 Stars

# Level 3 Approach



# Level 3 Approach

## Initial Highway Upgrade Design (Before SR4RSA)



Predicted Fatality and Serious Injuries:

Vehicle Occupants: 3.6    Motorcyclists: 22.8    Pedestrians: 2.7    Bicyclists: 6.2

**TOTAL: 35.3**

## Altered Highway Upgrade Design (After SR4RSA)

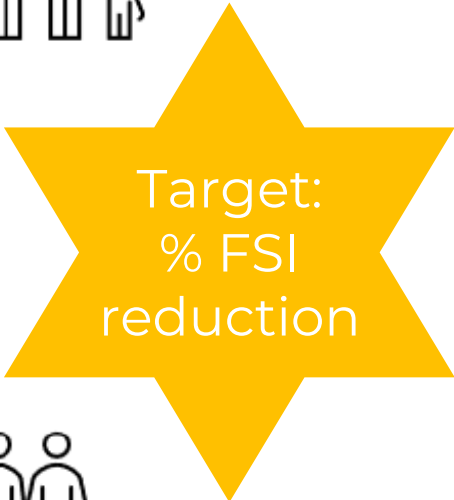


Predicted Fatality and Serious Injuries:

Vehicle Occupants: 1.6    Motorcyclists: 9.8    Pedestrians: 1.4    Bicyclists: 2.2

**TOTAL: 15.0**

**(58% reduction in Fatal and Serious Injuries)**







# Conclusion

- Bring together experience of auditors with data and evidence in the iRAP methodology
- Uses tools that are available for free worldwide
- Various approaches available to suit project
- Align with Global Road Safety Plan and Global Road Safety Target 3



**TARGET 3**  
**2030**

★★★★

Target 3: By 2030, all new roads achieve technical standards for all road users that take into account road safety, or meet a three star rating or better.

