National Highways Network Studies Technical Partner 2021-24
Route Treatment Studies

Applying Speed Management on a National Programme of Safety Schemes

Introduction

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- Speed Intervention Safety Benefit Results
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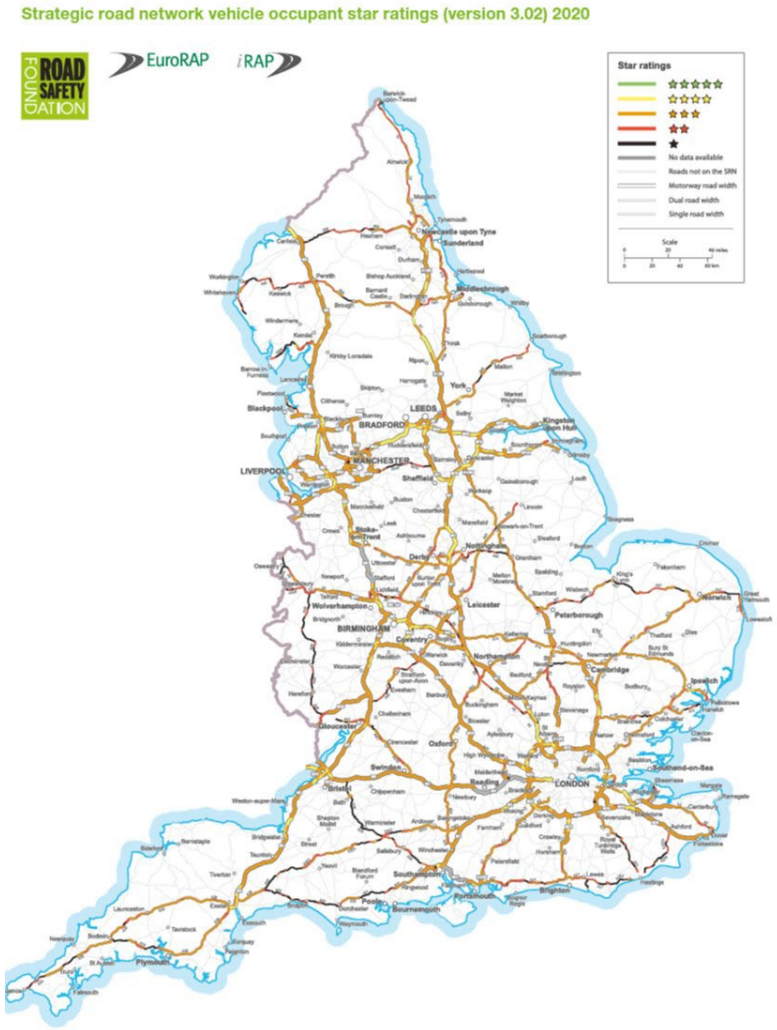
Route Treatment Study Overview

Why undertake these studies?



- Supporting the National Highways ‘Home Safe and Well Strategy’
- Targeting 3-Star Rating or better, vehicle occupants
- Work packages that directly address safety concerns, both realised or predicted
- Typically, legacy All-Purpose Trunk Road (1-2 Star Rating), medium-high crash density
- Piloted approach in 2022, on the A595
- 18 Business Cases (more in development)

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Route Treatment Study Overview

What was the approach?

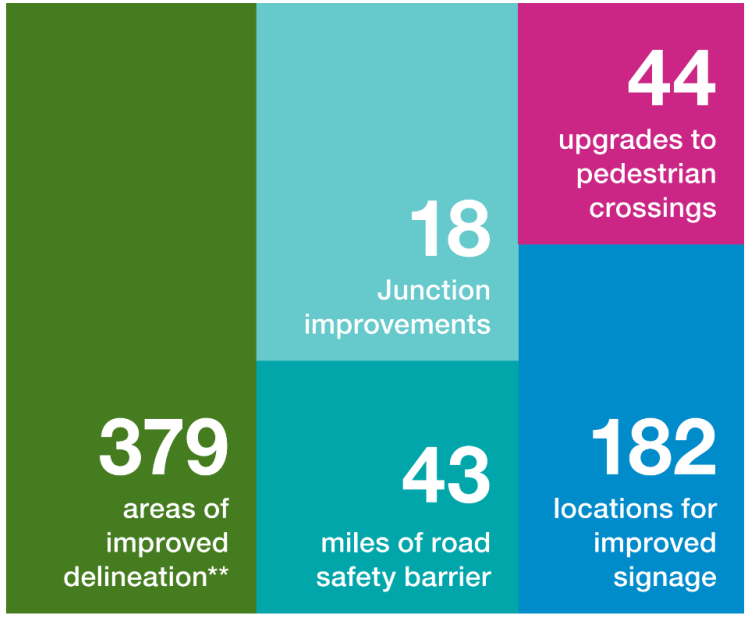
Define the problem and assess need for intervention

Identify solution concepts to address problems

Assess viability of solution concept

Assess the case for investing

Types of treatments*



*Number of treatments for the first nine studies only

**Improved delineation comprises a combination of road markings, high-reflective signage and road studs.

- A proportionate four stage approach was developed comprising adapted PCF products and processes to apply the iRAP methodology
- Aligns with National Highways ‘strategic need’ governance requirements
- A proportionate approach for small scheme enhancements
- iRAP and associated tools and methodologies continue to be developed an updated. The approach continues to be reviewed and assured in coordination with Chief Analyst Division and SES Road Safety.

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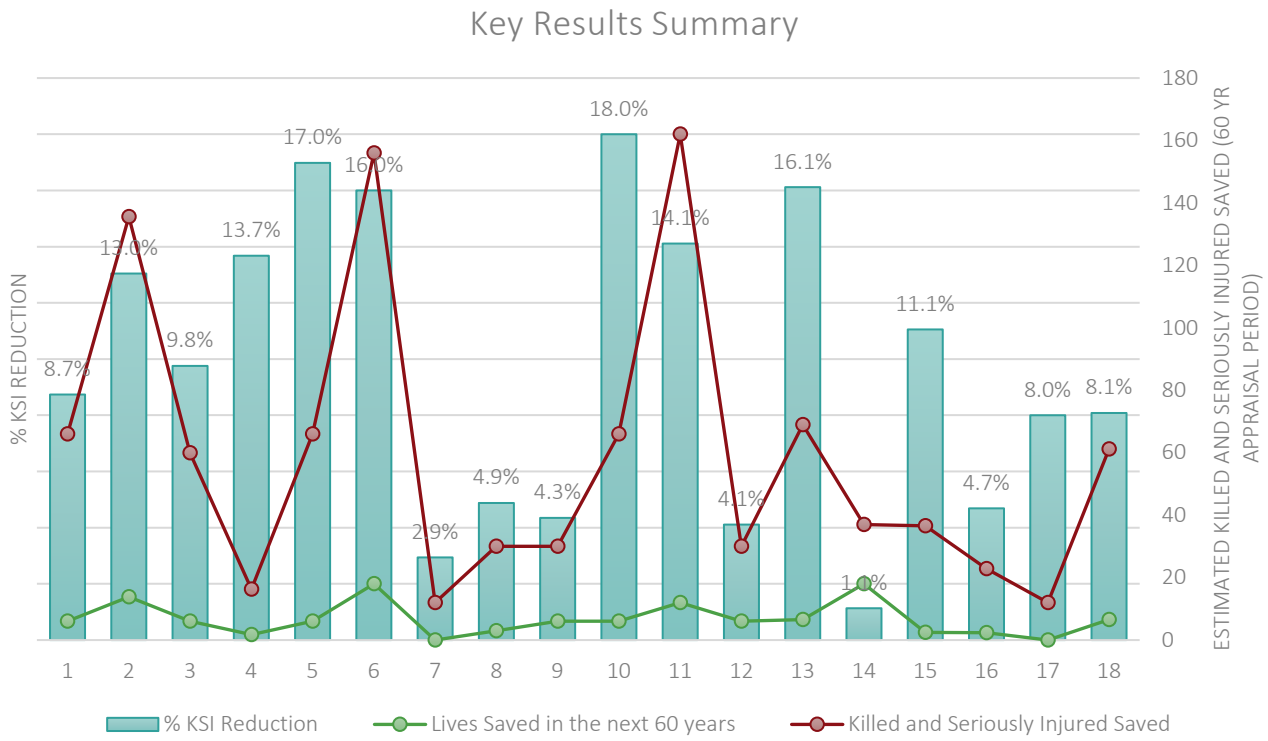
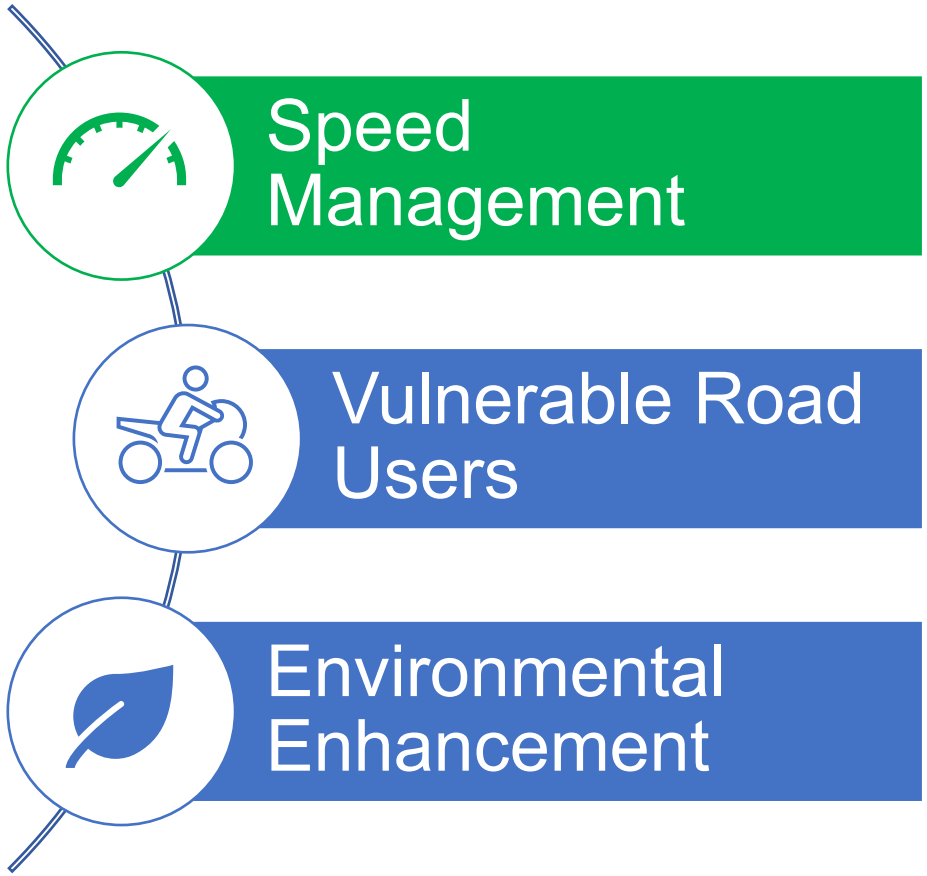
Route Treatment Study Overview

What were the initial results?



Further Development – Speed Management Pilot

What was the objective?



- Application of “safe or functional” speed can help achieve 3-star ambition for not only vehicle occupants, but vulnerable road users too
- Is there value in further engineering measures to enhance the safety benefit to vulnerable users?

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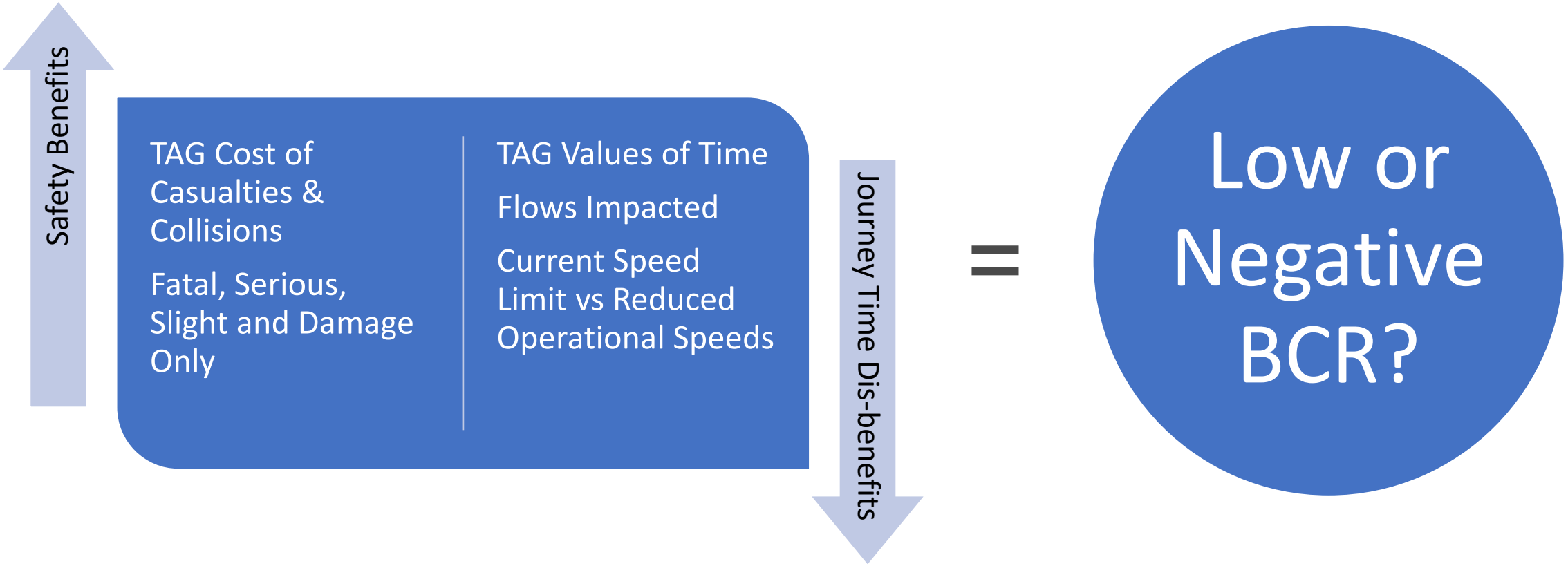
The Challenge Appraising Speed Intervention

Why doesn't the economic appraisal stack up?



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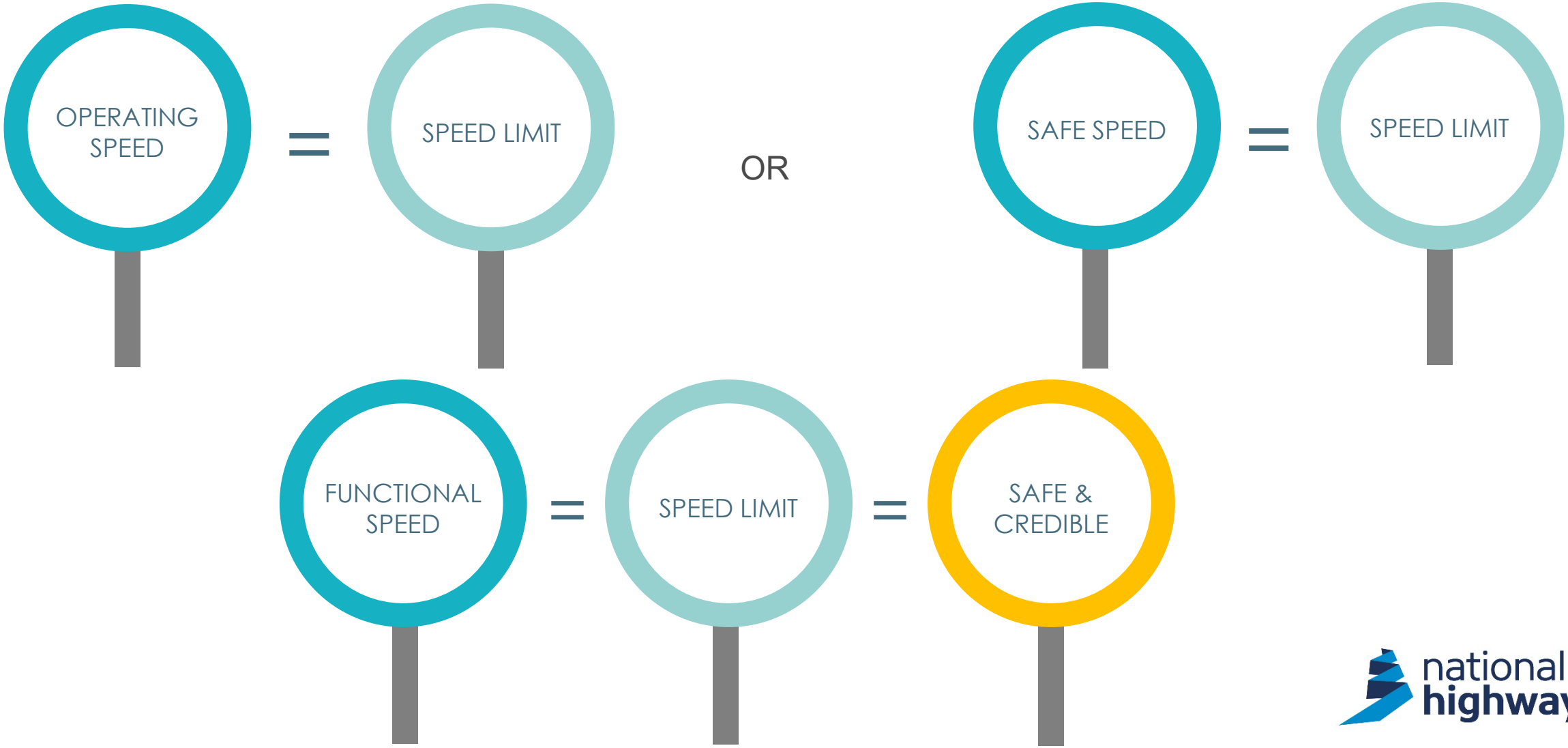
Speed Limits: What is the aim?

Is the perception around speed limits appropriate?



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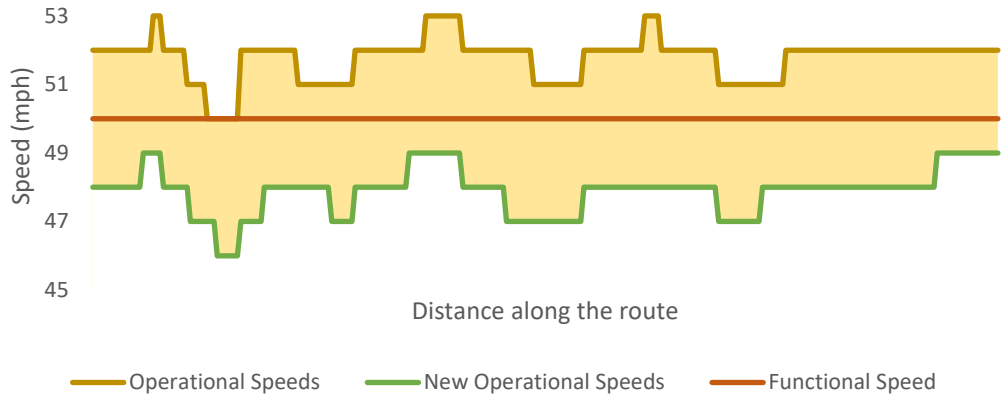
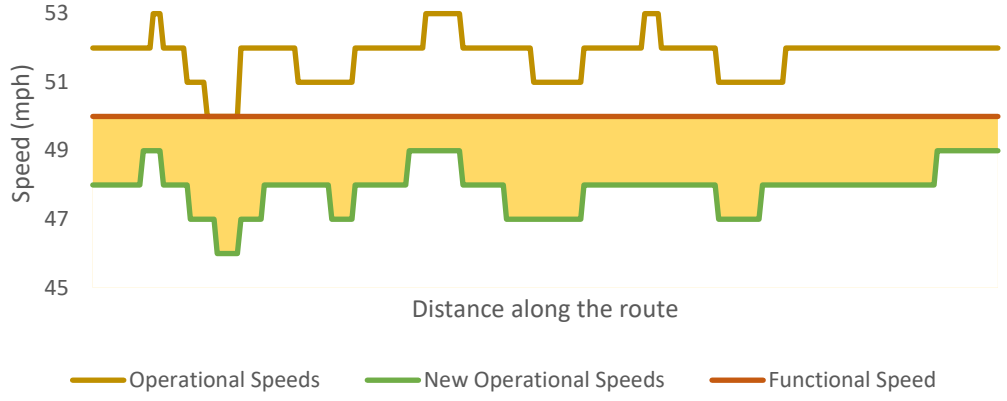
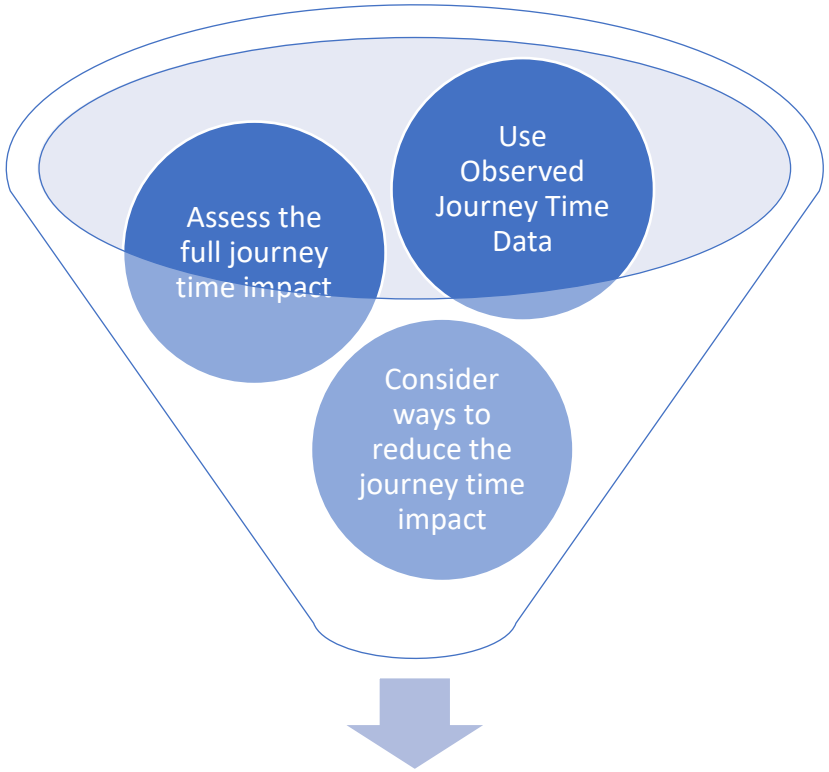
Assessing Speed Impacts

How can journey time assessments be approached?



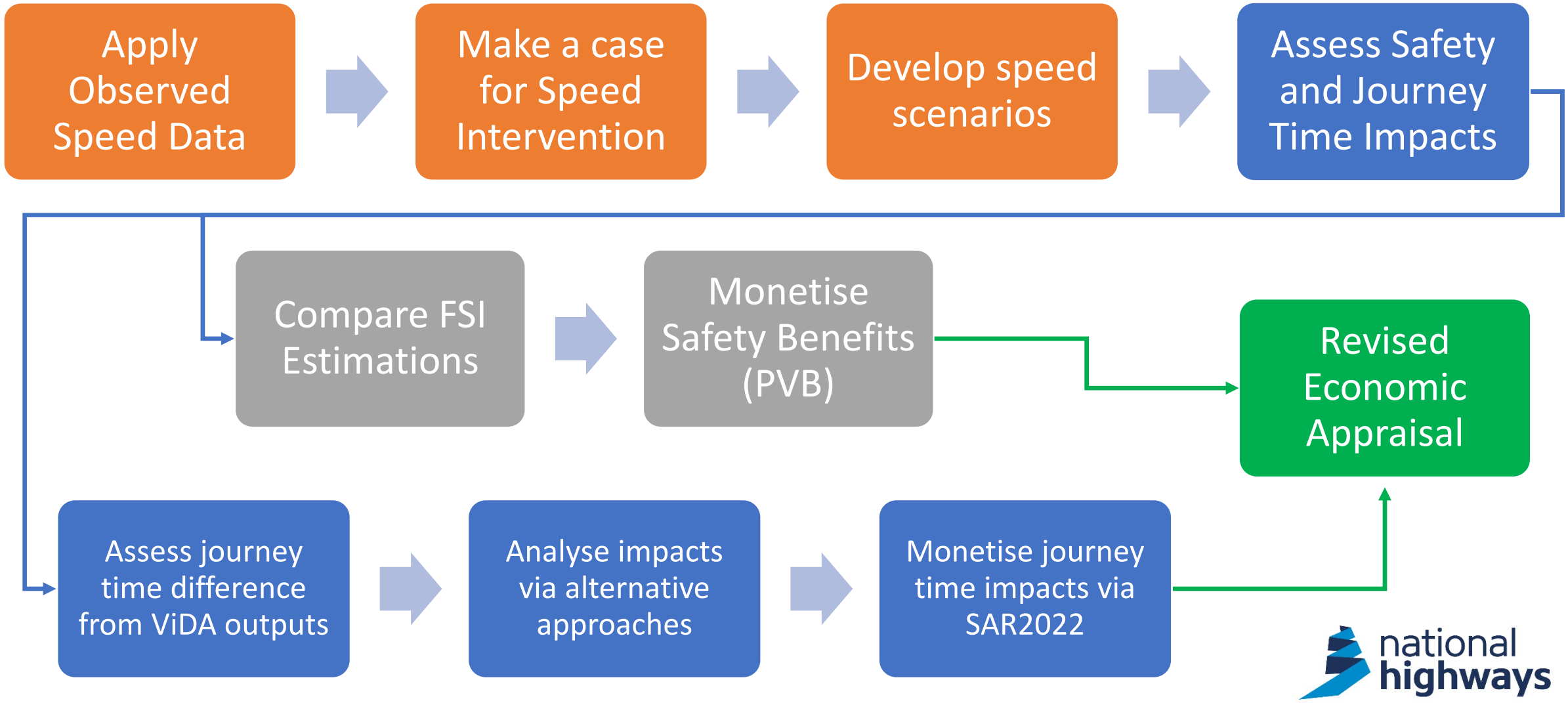




Improved Strategic Case Narrative

Speed Management Pilot Approach

How to incorporate speed appraisal into the studies?



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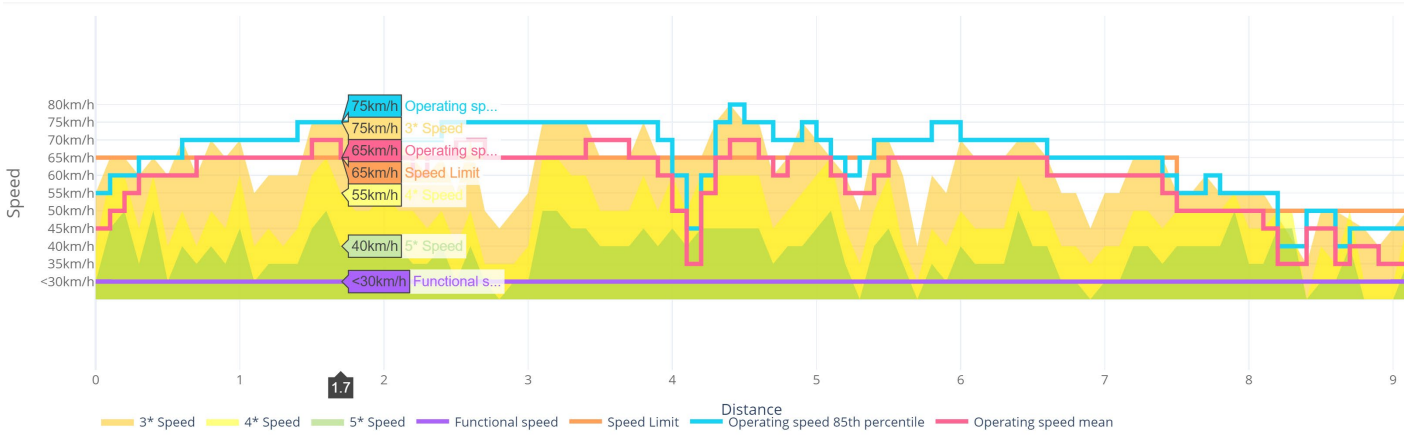
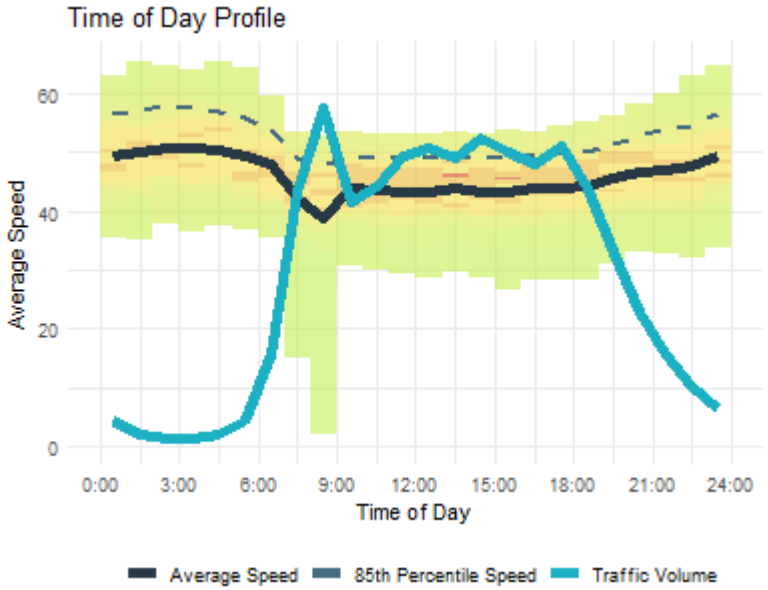
Speed Management Pilot Approach

What's the value of Observed Speed Data?

- Enhanced granularity (speeds attributed to smaller sections of the network, and filtering flexibility)
- Interrogation at time of day
- Mean Speeds & 85th Percentile Speeds vs Speed Limits and 3-Star Speeds





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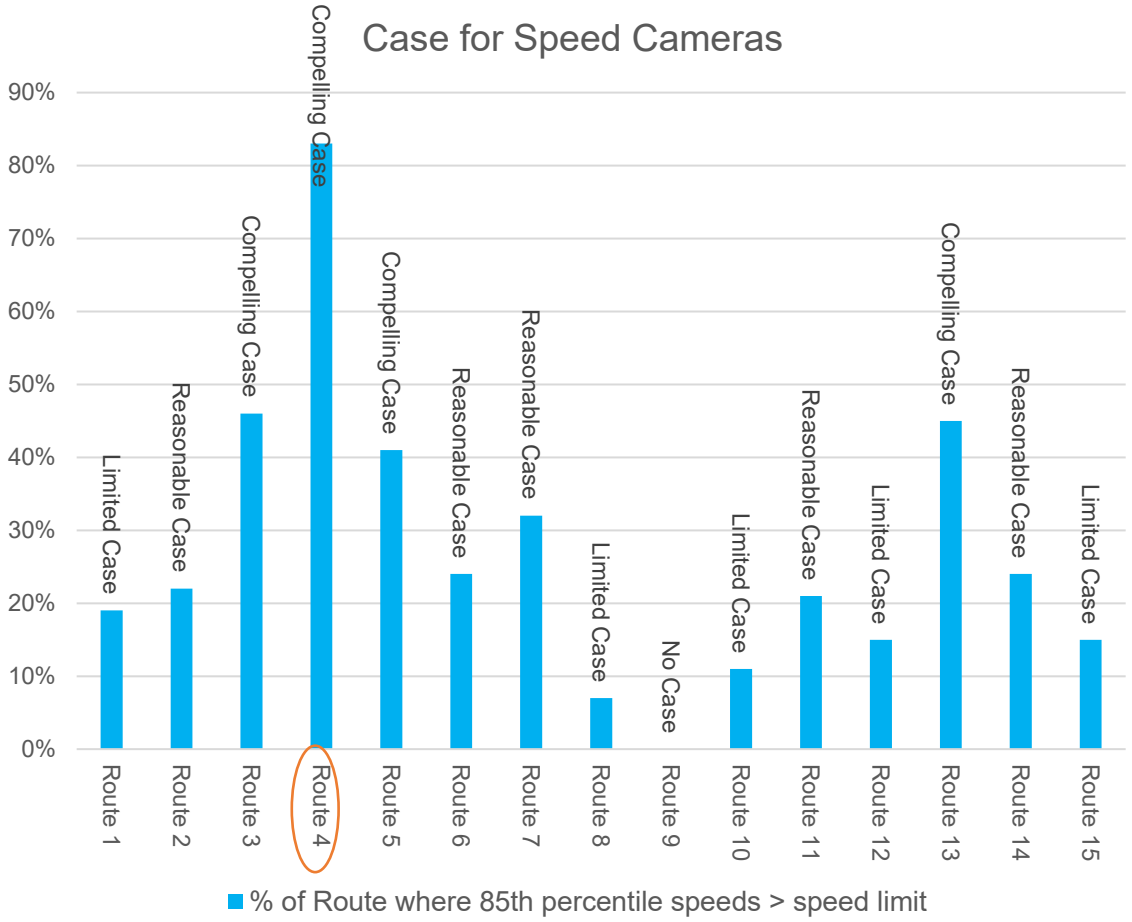
Making a Case for Speed Measures

How to identify routes/corridors for speed intervention?

There is a case for speed intervention of some form across all routes



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Testing Scenarios for Speed Management

What scenarios have been tested?

Scheme Ref	Scenario Description	Purpose
1a	Core Scenario - previously Reported	Engineering Treatments Only
1b	Core Scenario - revised with updated speed data	Engineering Treatments Only
4	Core + Average Speed Cameras at 70mph	Speed Compliance
5	Core + Average Speed Cameras at 50mph	Speed Reduction
6	Core + Average Speed Cameras at 70mph + additional Vulnerable User Countermeasures	Speed Compliance + Further Measures
7	Core + Average Speed Cameras at 50mph + additional Vulnerable User Countermeasures	Speed Reduction + Further Measures

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Summary of Impacts for Appraisal

What benefits have been assessed?

Benefit	Approach
Safety Benefits	Review and update base FSI estimate (new speed data) Review and update Scenarios with speed+ interventions Calculate FSI reduction – ViDA/RRT appraised via DfT Road Safety Impacts tool (now CAVE)
Journey Time	No transport modelling (assume no flow change or re-routing) ViDA modelled 85th percentile speeds by 100m section compared Use SAR2022 to monetise journey time delays per user over 12hr weekdays
Resilience / Reliability	Approach established and currently based on critical incidents only
Noise	Qualitative – nature of road to be considered (rural/urban)
Road User Emissions	Qualitative – negligible impacts/benefits due to minimal speed change
Other – Health Benefits	Adopt UCAT where active travel scheme tested

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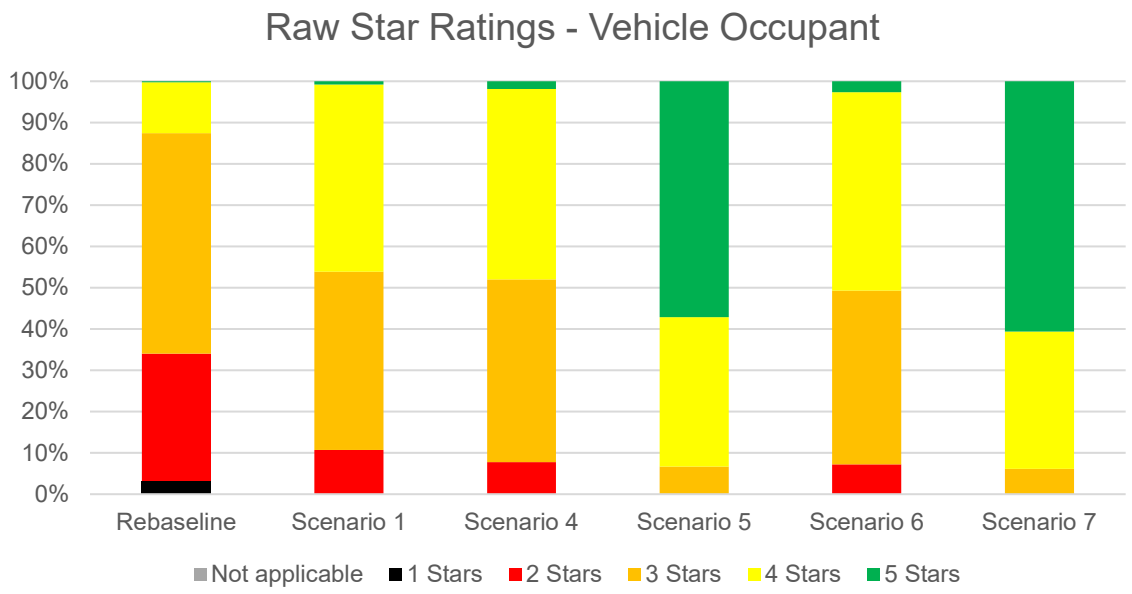
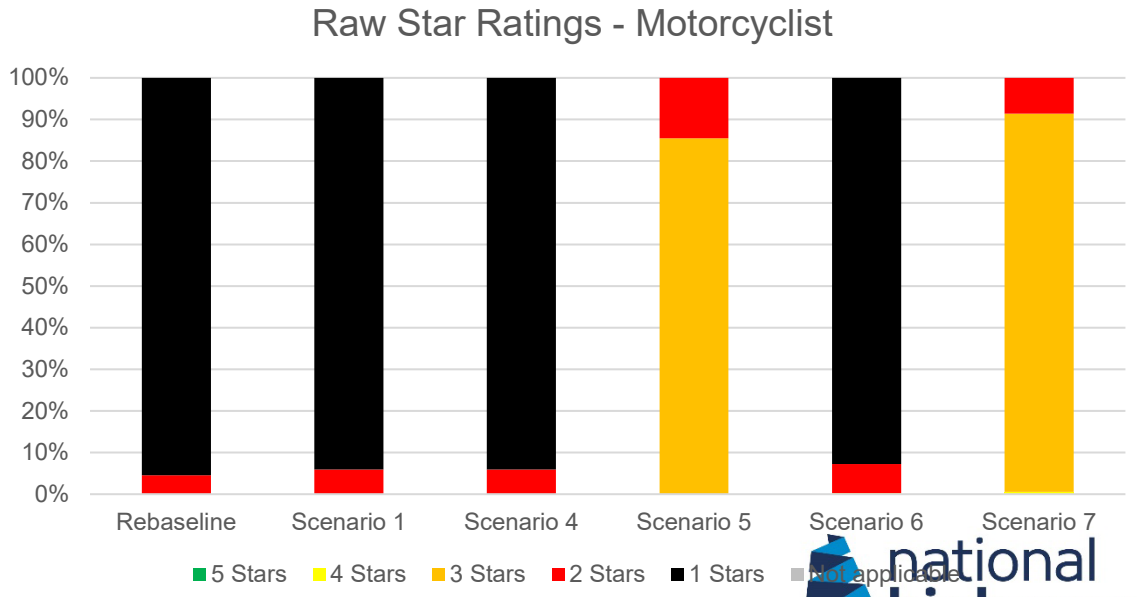
Pilot Speed Intervention Safety Benefit Results

What are the Star Rating Impacts?

Raw Star Ratings - Vehicle Occupants						
	Rebaseline	Scenario 1	Scenario 4	Scenario 5	Scenario 6	Scenario 7
3 star or better	65.95%	89.27%	92.23%	99.99%	92.67%	100.00%
5 Stars	0.27%	0.80%	1.88%	57.10%	2.68%	60.59%
4 Stars	12.33%	45.31%	46.11%	36.19%	47.99%	33.24%
3 Stars	53.35%	43.16%	44.24%	6.70%	42.09%	6.17%
2 Stars	30.83%	10.72%	7.77%	0.00%	7.24%	0.00%
1 Stars	3.22%	0.00%	0.00%	0.00%	0.00%	0.00%
Not applicable	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Raw Star Ratings - Motorcyclists						
	Rebaseline	Scenario 1	Scenario 4	Scenario 5	Scenario 6	Scenario 7
3 star or better	0.00%	0.00%	0.00%	85.52%	0.27%	91.42%
5 Stars	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
4 Stars	0.00%	0.00%	0.00%	0.00%	0.00%	0.54%
3 Stars	0.00%	0.00%	0.00%	85.52%	0.27%	90.88%
2 Stars	4.56%	5.90%	5.90%	14.48%	6.97%	8.58%
1 Stars	95.44%	94.10%	94.10%	0.00%	92.76%	0.00%
Not applicable	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%





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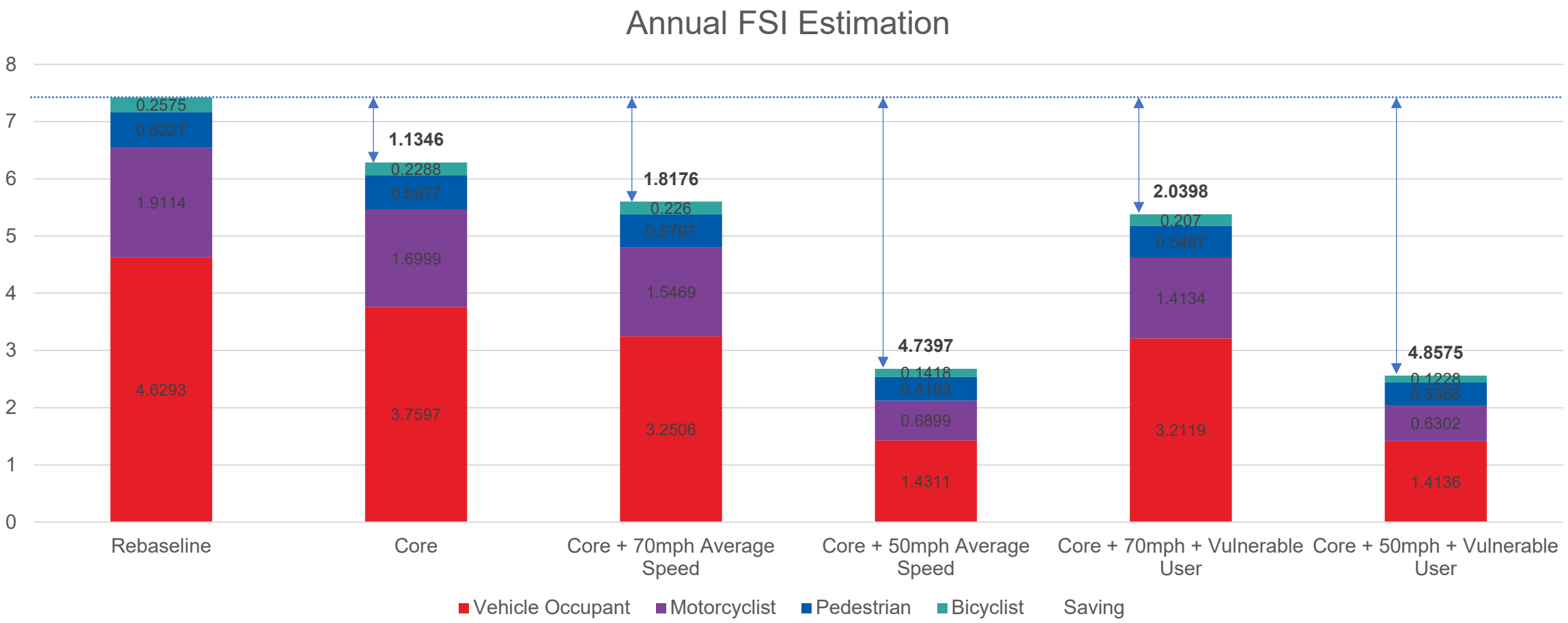
Pilot Speed Intervention Safety Benefit Results

What are the FSI Estimation Impacts?



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Pilot Speed Intervention Safety Benefit Results

What are the overall Safety Benefits?

Scheme Ref	Corridor/Scheme	FSI Saving (from re-baseline)	PVB change relative to core engineering scenario
1b	Core Scenario - revised with updated speed data	1.13	
4	Core + Average Speed Cameras at 70mph	1.78	Speed compliance = **57% increase**
5	Core + Average Speed Cameras at 50mph	4.73	Speed reduction = **318% increase**
6	Core + Average Speed Cameras at 70mph + additional Vulnerable User Countermeasures	2.01	Motorcycle friendly barriers = **77% increase**
7	Core + Average Speed Cameras at 50mph + additional Vulnerable User Countermeasures	4.86	Speed reduction and barriers = **328% increase**

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Journey Time Appraisal

Some Alternative Approaches

Traditional Approach	Commercial Users Only	Above Functional Speeds	Above Safe Speeds
• Using TomTom Journey Time Data • WebTRIS total flow data	• Car Business, LGV, HGV proportions (from RTM) of total flow • Reduces the number of users negatively impacted	• Only dis-benefit where operational speeds are above the appropriate speed assigned given its set of characteristics	• Only dis-benefit where operational speeds are above the Safe Speed (i.e. speed to achieve an iRAP 3-star rating)

Note: *appraisal approaches shown above go beyond current appraisal guidance and primarily set out to demonstrate the strategic case for speed management intervention.*

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Speed Management Pilot Appraisal Results

How are the BCRs impacted?

S.No	Scheme	Appraisal Approach Options			
		A	B	C	D
		Traditional approach – new speed data	JT dis-benefit only for relevant users	Functional speeds	Safe Speeds
		BCR (Safety Benefits & Journey Time Dis-benefits / Estimated Cost)			
1	Core Scenario	1.57			
4	Core + Average Speed Cameras at 70mph	-2.17	-0.06	2.05	2.22
5	Core + Average Speed Cameras at 50mph	-38.81	-17.55	-26.21	-6.95
6	Core + Average Speed Cameras at 70mph + Vulnerable User Countermeasures	-1.11	0.12	1.35	1.45
7	Core + Average Speed Cameras at 50mph + Vulnerable User Countermeasures	-24.33	-10.96	-16.40	-4.29

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Findings

- Engineering treatments (i.e. motorcycle friendly barrier) have minimal impact on FSI estimation, particularly for high-speed roads. Speed reduction is key to reduce risk to motorcycles.
- Journey Time Dis-benefits will most likely outweigh Safety Benefits when Speed Intervention is introduced to Route Treatment Studies
  - Example route: a 25 second delay over 12km with 61,000 flows per day equates to c.£34m of dis-benefit
- Functional speed and 3-star speed approach reduces the impact of Journey Time delay - however where there are significant reduction in speeds, the economic case is significantly impacted
- Speed compliance measures save 0.69 FSIs per annum for each minute of journey time lost per user;
- Speed reduction measures save 0.34 FSIs per annum for each minute of journey time lost per user

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How this can be used going forwards?

- Observed journey time data should underpin the iRAP modelling when assessing speed interventions
- Economic Appraisal of safety schemes is currently on the basis of all users impacted, for the full journey time saved/lost below the current speed limit
- Alternative approaches can be used to bolster the Strategic Case for speed management scenarios
- Calls for a review of policy for speed management schemes to move towards a safe system (i.e. the cost of a life vs value of time)

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