Highways England BCRs - an Introduction

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(Appendix 3 to minutes)

Purpose

- To give working group an insight to BCRs
- To give signposts to enable individual study
- Share (limited) knowledge

Contents

- Why they exist
- How they are used
- Things they look at
- Data sources

- All tables and images are taken from TAG information referenced on last side

What's a BCR?

- **B**enefit **C**ost **R**atio
- The higher the number, the greater return from the scheme
- Standard approach so all schemes are appraised in the same way to ensure good value for public money
- Work using a discounting process to get to a net present value of benefits – standard investment appraisal techniques
- Large library of factors for the calculations
- Produced using TAG (Transport Analysis Guidance)

Where does it fit in the process

TRANSPORT ANALYSIS GUIDANCE
An Overview of Transport Appraisal

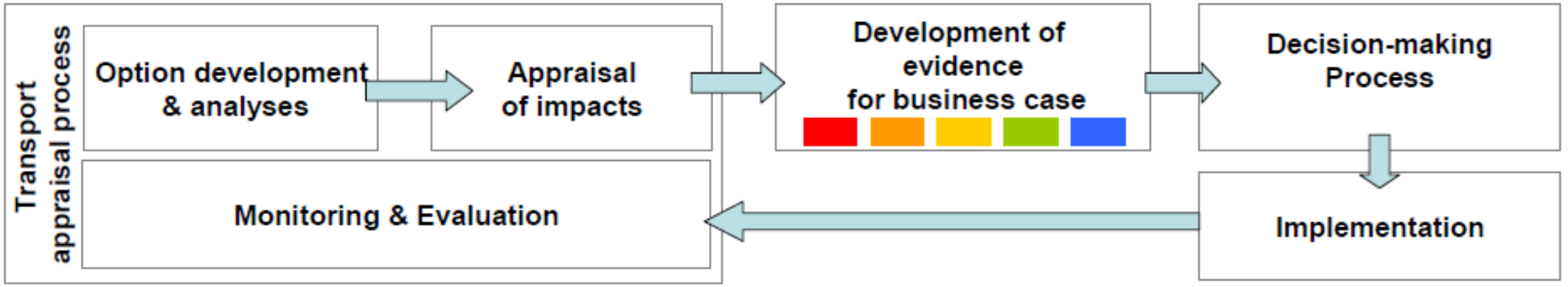
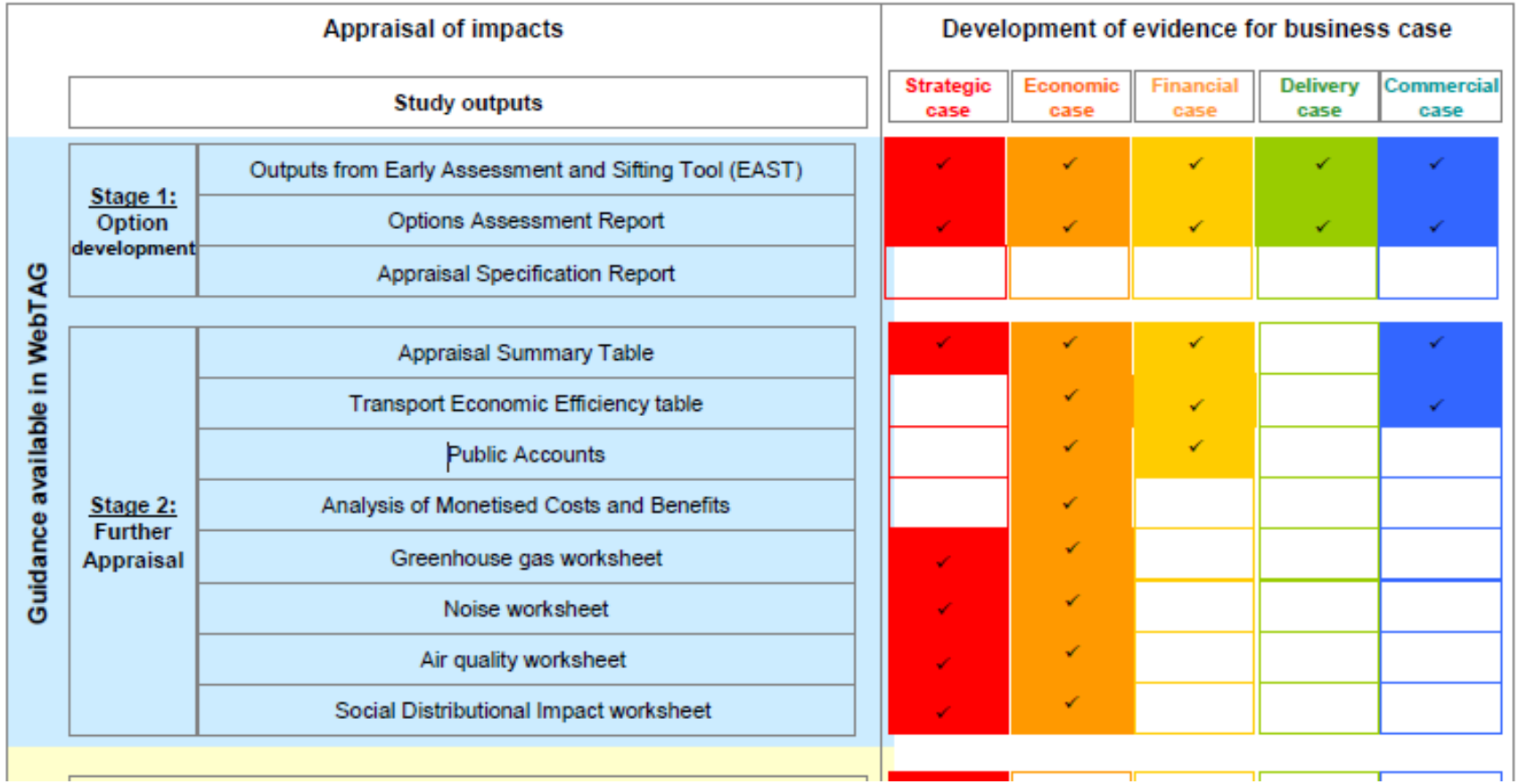


Figure 1 Relationship between the transport appraisal process and the decision-making process

Process stages

TRANSPORT ANALYSIS GUIDANCE
An Overview of Transport Appraisal



Guidance available in WebTAG		Appraisal of impacts: Study outputs	Development of evidence for business case: Strategic case	Economic case	Financial case	Delivery case	Commercial case
	Stage 1: Option development	Outputs from Early Assessment and Sifting Tool (EAST)	✓	✓	✓	✓	✓
		Options Assessment Report	✓	✓	✓	✓	✓
		Appraisal Specification Report					
	Stage 2: Further Appraisal	Appraisal Summary Table	✓	✓	✓		✓
		Transport Economic Efficiency table		✓	✓		✓
		Public Accounts		✓	✓		
		Analysis of Monetised Costs and Benefits		✓			
		Greenhouse gas worksheet	✓	✓			
		Noise worksheet	✓	✓			
		Air quality worksheet	✓	✓			
		Social Distributional Impact worksheet	✓	✓			

Example of outcomes (Chichester consultation summary)

Feature	Option 1	Option 1A	Option 2	Option 3	Option 3A
Air quality	Not significant beneficial effects as several properties in the St Pancras AQMA would experience improvements, however there would be a deterioration in air quality at Stockbridge AQMA, where NO_2 levels would slightly increase.	Not significant adverse effects as there would be improved air quality in the St Pancras AQMA, although several properties in the Stockbridge AQMA would experience a deterioration in air quality, with increased NO_2 levels.	Not significant beneficial effects as there would be an overall benefit to air quality, with several properties in the St Pancras AQMA experiencing benefits from reduced NO_2 levels.	Not significant beneficial effects as several properties in the St Pancras AQMA would experience improvements, however there would be a deterioration in air quality at Stockbridge AQMA, where NO_2 levels would slightly increase.	Not significant beneficial effects as several properties in the St Pancras AQMA would experience improvements, however there would be a deterioration in air quality at Stockbridge AQMA, where NO_2 levels would slightly increase.
Cultural heritage	Significant adverse effects on Fishbourne Conservation Area and the setting of 4 Grade II Listed buildings, and the AoNB from the proposed flyover at Fishbourne junction.	Significant adverse effects on Fishbourne Conservation Area and the setting of 4 Grade II Listed buildings, and on the AoNB from the proposed flyover at Fishbourne junction.	Significant adverse effects on Fishbourne and Chichester Conservation Areas, the setting of 5 Grade II Listed buildings, and the AoNB from the proposed flyover at Fishbourne junction.	No significant effects upon the historic environment anticipated.	Significant adverse effects on Chichester Conservation Area.
Landscape	Significant adverse effects due to proposed flyovers at Fishbourne and Bognor junctions.	Significant adverse effects due to proposed flyovers at Fishbourne and Bognor junctions.	Significant adverse effects due to proposed SLR and flyovers at Fishbourne, Stockbridge, Whyke and Bognor junctions.	Only limited effects anticipated.	Significant adverse effects due to proposed flyover at Bognor junction.
Nature conservation	Significant adverse effects on Chichester Gravel Pits and Leythorne Meadow SNCI, and Fishbourne Meadow SNCI.	Significant adverse effects on Chichester Gravel Pits and Leythorne Meadow SNCI, and Fishbourne Meadow SNCI.	Significant adverse for effects on Chichester Gravel Pits and Leythorne Meadow SNCI, and Fishbourne Meadow SNCI. There would be loss of hedgerow and other habitat from the creation of the SLR.	Would not have a direct or indirect effect on designated sites within the study area.	Significant adverse effects on Chichester Gravel Pits and Leythorne Meadow SNCI.
Geology and Soils	There is contaminated land associated with the historic landfills along the route of the A27 between Bognor and Portfield junctions, and the historic fuel depot at Bognor junction.				
Materials	Effects associated with the transportation of materials and imports of primary aggregates and/or fill material, and exports of surplus waste material have been identified for all route options.				
Noise and vibration	There would be an overall reduction in noise levels, due to the implementation of mitigation measures such as noise screening and thin course road surfacing, which can reduce noise levels.	There would be an overall reduction in noise levels, due to the implementation of mitigation measures such as noise screening and thin course road surfacing, which can reduce noise levels.	There would be an overall reduction in noise levels, due to the implementation of mitigation measures such as noise screening and thin course road surfacing, which can reduce noise levels.	Lower potential for changes to noise levels, due to the limited scale of the improvement works.	There would be an overall reduction in noise levels, due to the implementation of mitigation measures such as noise screening and thin course road surfacing, which can reduce noise levels.
Effects on all travellers	Not significant adverse effects on public rights of way and drivers due to construction works being carried out while the A27 remains open. However, any loss of public rights of way or crossing facilities would be replaced where possible, to reduce severance caused by the A27. Safety is a primary consideration when designing new non-motorised user facilities.				
Community and private assets	Significant adverse effects are anticipated in terms of community severance and private assets, with the anticipated loss of 5 buildings.	Significant adverse effects are anticipated in terms of community severance and private assets, with the anticipated loss of 5 buildings.	Significant adverse effects are anticipated in terms of community severance and private assets, with the anticipated loss of 20 buildings.	Significant adverse effects are anticipated in terms of community severance and private assets, although no buildings would be lost.	Significant adverse effects are anticipated in terms of community severance and private assets, with the anticipated loss of 2 buildings.
Road drainage and water environment	There are areas of Flood Zone 3 along the proposed route at Stockbridge and Portfield junctions, with Flood Zone 2 located at Whyke, Bognor and Portfield junctions. Finished road levels would therefore ensure no flooding of the carriageway and no blockage of flow paths that may increase flooding elsewhere. Potential effects on water quality would be managed by pollution prevention and best practice construction methods.				
Construction duration	41 months	23 months	41 months	15 months	27 months
Construction costs (millions)	£182m	£139m	£280m	£47m	£172m
BCRs (benefit to cost ratio)	2.5	2.5	2.7	4.1	2.3
Value for money	High	High	High	High	High
Average peak journey change on A27 (minutes)	-4 mins 23 secs	-2 mins 58 secs	-5 mins 40 secs	-2 mins 55 secs	-4 mins 5 secs
On local routes (minutes)	-1 mins 22 secs	-1 mins 9 secs	-2 mins 10 secs	-0 mins 22 secs	-1 mins 14 secs

Some of the things covered – selection, based on WG interests (1)

TAG Unit	Section Title	Unit Title	Worksheet	Table Title
			Annual Parameters	Forecast annual economic and demographic parameters
A 1.3	User &	Values of time	A 1.3.1	Values of time per person (working and non-working)
	Provider		A 1.3.2	Forecast values of time per person (working and non-working)
	Impacts		A 1.3.3	Car and vehicle occupancies (2000); Annual percentage change in car passenger occupancy up to 2036
			A 1.3.4	Proportion of travel and trips in work and non-work time
			A 1.3.5	Market price values of time per vehicle based on distance travelled
			A 1.3.6	Forecast market price values of time per vehicle based on distance travelled
		Operating costs	A 1.3.7	Fuel and electricity prices and components
			A 1.3.8	Fuel / energy consumption parameter values
			A 1.3.9	Forecast proportion of car, LGV and other vehicle kilometres using petrol / diesel / electricity
			A 1.3.10	Forecast assumed vehicle fuel efficiency improvements to 2035
			A 1.3.11	Forecast fuel / energy consumption parameters
			A 1.3.12	Forecast vehicle fuel / energy cost formulae parameters (work)
			A 1.3.13	Forecast vehicle fuel / energy cost formulae parameters (non-work)
			A 1.3.14	Non-fuel resource vehicle operating costs
			A 1.3.15	Forecast non-fuel resource car operating costs to 2035
		Social Impact of buses	A 1.3.16	Proportion of bus trips by car ownership, trip purpose and concessionary travel pass status.
			A 1.3.17	Proportion of bus trips by that would “not go” if bus not available.
			A 1.3.18	Value of the social impact per return bus trip
A 3.1	Environmental	Noise Impacts	A 3.1	Monetary valuation of changes in noise
A 3.2	Impacts	Air Quality Impacts	A 3.2	Damage cost and marginal abatement cost values by pollutant
A 3.3		Greenhouse Gases	A 3.3	Carbon dioxide emissions per litre of fuel burnt / kWh used
A 3.4			A 3.4	Forecast non-traded, £ per tonne of CO_2e

Some of the things covered – selection, based on WG interests (2)

TAG Unit	Section Title	Unit Title	Worksheet	Table Title
A 4.1	Social & Distributional Impacts	Social Impact Appraisal	A 4.1.1	Average value of prevention per casualty by severity and element of cost
			A 4.1.2	Average value of prevention per road casualty by class of road user
			A 4.1.3	Average value of prevention of road accidents by severity and element of cost
			A 4.1.4	Average value of prevention per road accident by severity & class of road: all hours
			A 4.1.6	Value of journey quality benefit of cycle facilities, relative to no facilities
			A 4.1.8	Option and non-use values
A 5.4	Appraisal	Marginal External Congestion Costs	A 5.4.1	Proportion of total traffic by region, congestion band, area type & road type
			A 5.4.2	Marginal external costs, by road type and congestion band
			A 5.4.3	Car traffic shares by time of day
			A 5.4.4	Marginal external costs, by region and time of day
M 2.1	Variable Demand Modelling		M 2.1	Values of time by income band for non-work purposes (£/hr)
M 2.2			M 2.2	Values of time by income band for work purposes (£/hr)
M 3.2	Assignment Modelling		M 3.2.1	Segmented values of bus quality interventions (generalised minutes)
M 4.2	Model Forecasting & Uncertainty		M 4.2.1	Forecast fuel price and income adjustment factors
			M 4.2.2	Car cost series for rail demand forecasting
			M 4.2.3	Car and bus journey time series for rail demand forecasting
COBALT	Accidents & Casualties		COBALT 1	Costs per accident / casualty
			COBALT 2	Annual rates of growth of accident values
			COBALT 3	Link & Combined Link / Junction: accident rates & change factors
			COBALT 4	Severity rates (Link / Combined)
			COBALT 5	Link & Combined Link / Junction: casualty rates & change factors

TAG references – please explore

- TAG overview https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/427073/webtag-tag-overview.pdf
- TAG home page https://www.gov.uk/guidance/transport-analysis-guidance-webtag#webtag-data-book
- Data book https://www.gov.uk/government/publications/webtag-tag-data-book-july-2016