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TRANSPORT ANALYSIS GUIDANCE

The Transport Appraisal Process

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Transport Analysis Guidance (TAG)

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This TAG Unit is guidance for the **TECHNICAL PROJECT MANAGER**

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1 Introduction to the Transport Appraisal Process

- 1.1.1 This TAG Unit builds on the overview of the transport appraisal process described in [Guidance for the Technical Project Manager](#). This Unit gives more detail on the process of appraisal and associated requirements for transport interventions – from initial intervention genesis to the detailed appraisal required to support preparation of business or investment cases to support subsequent approval stages and through to post implementation evaluation.
- 1.1.2 The three stages in the Transport Appraisal Process are as follows:
- **Stage 1 – Option Development.** This involves identifying the need for intervention and developing options to address a clear set of locally developed objectives which express desired outcomes. These are then sifted for the better performing options to be taken on to further detailed appraisal in Stage 2. See Section 2.
 - **Stage 2 – Further Appraisal** of a small number of better performing options in order to obtain sufficient information to enable decision-makers to make a rational and auditable decision about whether or not to proceed with intervention. The focus of analysis is on estimating the likely performance and impact of intervention(s) in sufficient detail. See Section 3.
 - **Stage 3 – Implementation, Monitoring and Evaluation.** See Section 4.
- 1.1.3 This TAG Unit provides guidance on identifying the need for intervention and developing options through an objective-led and evidence-based approach. A key part of this is to undertake appraisal in a proportionate manner and enabling a **lighter touch** approach, where appropriate. This will enable Sponsoring Organisations to ensure interventions have been developed in a robust manner, supported by fit for purpose and proportionate analysis, providing a sound basis for identifying problems and developing solutions.
- 1.1.4 This Unit describes how the appraisal process is used to ensure options to be taken forward for detailed appraisal in Stage 2 have been appropriately tested for feasibility, minimising abortive work resulting from the development and detailed appraisal of options which are unlikely to deliver a satisfactory value for money or are unlikely to be deliverable. It also describes the importance of planning and engagement early and periodically throughout the course of a project, consulting at an early stage and seeking agreement from all parties through tools such as the Appraisal Specification Report (ASR), minimising delays later in the process, and highlighting issues which might be raised at any future approval or inquiry stages.
- 1.1.5 In summary, the following key principles should be followed through the appraisal process:
- There must be a clear rationale for any proposal and it must be based on a clear presentation of problems and challenges that establish the 'need' for a project.
 - There must be consideration of genuine, discrete options, and not an assessment of a previously selected option against some clearly inferior alternatives. A range of solutions should be considered across networks and modes.
 - There should be an auditable and documented process which identifies the best performing options to be taken forward for further appraisal.
 - There should be an appropriate level of public and stakeholder participation and engagement at suitable points in the process. In most cases this should inform the evidence-base which establishes the 'need' for an intervention, guide the option generation, sifting and assessment steps, as well as informing further appraisal in Stage 2.

2 Option Development (Stage 1)

2.1 Introduction

2.1.1 This Section describes Stage 1 of the transport appraisal process - Option Development (Figure 1). It is applicable to all types of intervention, including individual schemes, packages of measures, strategies and plans.

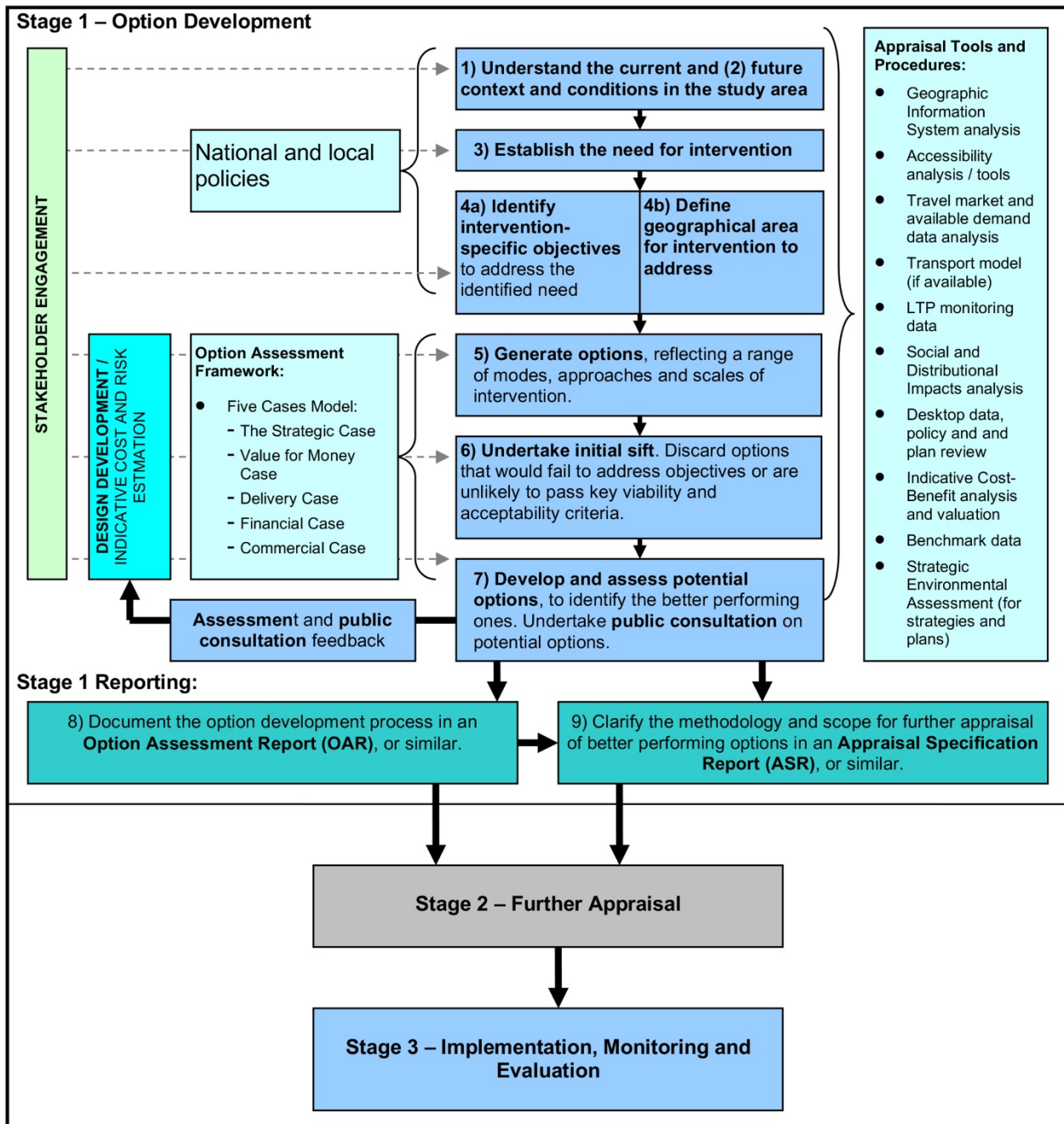


Figure 1 Steps in the Stage 1 process

2.1.2 Stage 1 involves identifying the need for intervention and developing options to address a clear set of locally developed objectives. It involves generating a broad range of options, which reflect a range of modes, approaches and scales of intervention. These are then sifted and assessed against criteria from the [Transport Business Case](#) (DfT, 2011) 'Five Case Model' to identify the better performing options for further appraisal in Stage 2. The focus of assessment is on developing a transparent and appropriate view of the relative merits and disadvantages of different options.

2.2 Core Elements of the Process

2.2.1 The four components of the process are:

- Stakeholder Engagement – Consultation, Participation and Information;
- Level of Design or Specification;
- Costs, Risk and Optimism Bias; and
- Data requirements and analysis.

Stakeholder Engagement - Consultation, Participation and Information

2.2.2 Stage 1 should be informed by engagement with stakeholders on an on-going basis, tailored to the specific circumstances to ensure the approach is proportionate to the scale and complexity of the intervention.

2.2.3 All interested parties - including local people, local authorities, regional partners, statutory bodies, businesses, environmental interests, transport users and operators - will need to be involved in the study, and help shape decisions. Wide participation and consultation will be a key factor in gaining public support and gauging acceptability for options put forward in the studies. A strategy for involving these groups will need to be established early on in the study process. The strategy will need to address who to involve, when and how.

2.2.4 The strategy should make clear from the outset the aims and limits of this involvement, so that suitable techniques can be identified and confusion as to the role of different groups can be avoided.

2.2.5 In particular the strategy should distinguish between the following:

- **Information provision**, a one way process to keep those with an interest in the study informed.
- **Consultation**, where the views of the general public or sectional interests are sought at particular stages of the study and the results are input back into the study process.
- **Participation**, either through the steering group or through other means by which the public and other interests have a direct influence on the outcome of the study.

2.2.6 It is anticipated that engagement with key stakeholders will be on-going throughout Stage 1 and likely to be incorporated in the study management arrangements. Analysts will need to take a view about how and when the views of the public should inform the process. Analysts should also consider options for undertaking consultation as part of existing engagement processes (e.g. to inform local transport planning); scope for drawing consultation evidence collected to date as part of wider engagement exercises; or whether the views of particular stakeholders would provide an adequate representation of public views.

2.2.7 Chapter 7 of the **Guidelines on Developing Urban Transport Strategies** (IHT, 1996) provides advice on the various techniques available for consulting the public. If the study area is large, special attention will be required. Ways of consulting the public over the larger study areas in a cost-efficient manner will need careful consideration. Further guidance can be found in [A Decision Maker's Guidebook](#) (Konsult website).

Level of Design or Specification

2.2.8 In order to undertake appraisal of an intervention it will be necessary for it to be sufficiently well defined and specified. This process of “design” and the level of detail to which it is taken, will have a direct impact on the scope and level of assessment and appraisal that is possible, and the degree of

confidence that can be placed in the results of appraisal. However, it is essential that the process of design be proportionate to the stage of appraisal being undertaken.

2.2.9 For Stage 1, where there are a large number of options, it would be impractical and costly to undertake detailed design and specification. Instead, the design should be sufficient to identify the intervention's location, and key features and characteristics that would drive intervention cost, performance and impact. This level of design should enable:

- the key physical and operational aspects of an intervention to be understood,
- interfaces an intervention might have with its environs to be identified,
- the likely change in transport network and service performance to be estimated; and
- differences between closely competing options to be identified.

2.2.10 Two further sources of guidance on the appropriate level of design and specification are the widely adopted project development stage guidance in the Royal Institute of British Architects (RIBA) Plan of Work Stages (RIBA, 2009) and the Guide to Railway Investment Projects (GRIP) (Network Rail, 2007).

Costs, Risk and Optimism Bias

2.2.11 Costs are as crucial to the assessment and appraisal process as benefits. Therefore, studies will need to include estimates of the costs of implementation, operation, maintenance and enforcement, to an appropriate level of accuracy to enable robust decisions to be made. However, it would not be cost-effective to spend considerable funds designing something in detail, simply so that its cost could be determined with accuracy, only to find subsequently that it fails the appraisal criteria and is rejected. Once the initial assessment / appraisal results become available, it should then be possible to see where the cost estimates are particularly important to the choices which have to be made and for the robustness of the overall recommendations. Further effort may then be directed to refining those costs which have a special influence on the choices to be made.

2.2.12 Procedures need to be established for each of the various kinds of costs, along the following lines:

- **implementation costs** - unit costs for land, construction, vehicles, etc;
- **operating costs** - models of the costs of operating public transport and charging systems;
- **maintenance/ renewal costs** - unit rates or simple models; and
- **enforcement costs** - unit rates or simple models.

2.2.13 These will need to be updated and refreshed as options progress and the level of design or specification develops.

2.2.14 At the option development stage (Steps 6 and 7), the level of accuracy of costs is likely to be low, even where benchmark costs are available from other similar types of intervention. This is usually acceptable, as at this stage the aim of looking at costs is principally to identify options which will be unaffordable or which seem least likely to deliver good value for money.

2.2.15 In order to undertake further appraisal in Stage 2, the accuracy of cost estimates will need to be improved sufficiently to enable robust decisions to be made. The Appraisal Specification Report, or similar (Step 9), will need to identify where better cost information is needed and propose cost effective ways of generating this information.

- 2.2.16 Optimism Bias refers to “a demonstrated, systematic, tendency for project appraisers to be overly optimistic”¹. To redress this tendency appraisers should make explicit empirically based adjustments (i.e. percentage uplift factors) to the estimates of a project’s costs, benefits, and duration. The approach adopted should be consistent with that outlined in HM Treasury Supplementary Green Book Guidance on Optimism Bias (<https://www.gov.uk/government/publications/green-book-supplementary-guidance-optimism-bias>).
- 2.2.17 Throughout Stage 1 - Option Development, the maximum level of Optimism Bias would be expected to apply, reflecting the limited level of design and detailed assessment of risk at this stage of the process.
- 2.2.18 Advice on the treatment of costs in the cost/benefit analysis is given in [TAG Unit A1.2 – Scheme Costs](#). It emphasises the importance of robust base cost estimates including realistic cost inflation assumptions, the use of quantified risk assessments and then the application of the appropriate optimism bias uplifts.
- Data Requirements and analysis**
- 2.2.19 Stage 1 is intended to be a desk-based exercise, using readily available data, supported by stakeholder engagement and public consultation. Analysis tools need to be fit for purpose for the stage of appraisal and need to provide analysts with sufficient information to understand current and future travel demands at the level of detail required.
- 2.2.20 Best use should be made of information collected previously and care should be taken to minimise the effort required to assemble new information.
- 2.2.21 Key data sources are likely to include national sources such as the Census and DfT National Trip End Model (NTEM) forecasts of population, employment and travel demand; UK and Regional transport statistics; local government data such as local planning data; and outputs from other work, such as from Strategic Environmental Assessments.
- 2.2.22 Older data can still be relevant if there have been no consequential impacts during the period since it was collected. For example, older traffic data may still be ‘indicative’ in areas which have seen little development or traffic growth in the intervening years.
- 2.2.23 Where there is sufficient evidence of problems, it will generally be appropriate to use a simple spreadsheet model to identify the extent to which future changes will accentuate or alleviate identified transport problems and provide the required indicative quantitative outputs.
- 2.2.24 While the presumption is that more complex models will not be needed for Stage 1, existing transport models should be considered where sufficiently contemporary in nature and developed to acceptable standards. If an existing transport model does not exist or is not suitable for a particular study, consideration must be given to whether to commit resources to developing a model at this stage of the process, and to the required complexity of that model. Analysts should be clear that a transport model will add sufficient value to the more basic methods of analysis which could be undertaken at this stage of the process.
- 2.2.25 Where there is little existing evidence, and/or the geographical area of interest is large and complex, and/or future land-use changes are likely to influence travel demand, then a transport model (at a level of detail consistent with the nature of the study) may be required.
- 2.2.26 Further advice on modelling and forecasting is given in [TAG Unit M1.1 – Principles of Modelling and Forecasting](#) and [TAG Unit M4 – Forecasting and Uncertainty](#).

¹ HM Treasury Supplementary Green Book Guidance on Optimism Bias, para. 1.1.

2.3 Step 1: Understanding the Current Situation

2.3.1 Step 1 is designed to contribute to developing an understanding of the **current** situation in the study area in terms of:

- current transport and other policies;
- current travel demand and levels of service; and,
- current opportunities and constraints.

Current Transport and Other Policies

2.3.2 This is concerned with developing an understanding of the local, regional and national policies affecting the area of concern. Included in these policies would be those of the transport providers. Other areas of Government policy should also be taken into account, where they impact on the transport sector. Of particular importance are policies relating to land uses and identification of plans and proposals for development that may have implications for the travel market to which any intervention may relate.

2.3.3 Setting out the relevant local, regional and national policies at this stage will help establish the strategic policy context in the study area. The need for intervention identified in Step 3 and the associated intervention-specific objectives in Step 4 are expected to be consistent with these strategic policies. The relevant strategic policies to which the intervention-specific policies relate should be highlighted.

Current Travel Demands and Levels of Service

2.3.4 For a full understanding of the study area and its transport system, it is essential to establish the levels of service and capacity offered by the current transport networks and the current demands for travel by those living in the area and its hinterland. The surveys necessary to collect this information often consume a substantial part of the resources allocated to the study. Best use should be made of information collected previously and care should be taken to minimise the effort required to assemble new information.

Opportunities and Constraints

2.3.5 This is concerned with identifying the physical, legal and institutional **constraints**, and the **opportunities** affecting the area of interest.

2.3.6 There are numerous constraints which limit the potential transport options available, ranging from extensive development in urban areas through to landscape and environmental constraints in most rural areas.

2.3.7 Physical features which may exert special **constraints** on the shape of a transport strategy or plan include sensitive areas of ecological or landscape or heritage importance, built-up areas, hilly terrain, rivers and railways that are expensive to bridge, etc.

2.3.8 There may also be institutional or legal constraints which are important to take into account, such as the provision of private non-residential parking, the provision of elements of the public transport system by private operators who will have their own commercial objectives, etc. The extent to which these institutional and legal constraints have a material bearing on the outcome of the studies could depend on the extent to which the recommendations are developed with the private suppliers of transport.

2.3.9 Early appreciation of any constraints, especially those which may be “show-stoppers”, is essential when developing and assessing options. However, identification of constraints, can limit the option

generation process unnecessarily. Analysts should therefore assess the extent to which each of the identified constraints can or cannot be overcome (and how).

- 2.3.10 In parallel with listing constraints, any **opportunities** to improve the transport system more widely or to have positive impacts on issues of wider concern, such as regeneration, should be noted.
- 2.3.11 Examples of opportunities could include ways of making better use of the existing infrastructure or existing underused assets (e.g. reopening rail lines), transport that opens up development land for regeneration or housing, enhancements to the environment, and so on.

2.4 Step 2: Understanding the Future Situation

- 2.4.1 Step 2 broadly parallels Step 1 in that it is concerned with developing an understanding of problems, but in the future rather than the present. It will include understanding:
- future land-uses and policies;
 - future changes to the transport system;
 - future travel demands and levels of service.
- 2.4.2 Analysts should identify a range of scenarios for the future against which options and subsequent further appraisal would be undertaken; in line with guidance in [TAG Unit M4](#). This is important as the **need** for a project, defined subsequently in Step 3, should be clearly apparent across a range of scenarios.
- 2.4.3 Consideration should also be given to how long it might take to deliver any solution, especially one involving new infrastructure, and therefore to the future travel situation at the likely time of delivery.

Future Land-Uses and Policies

- 2.4.4 The interaction between transport and land use is a two-way relationship. On the one hand, future travel demands will be shaped by future land uses while, on the other hand, changes in the disposition of land uses will be influenced by changes in accessibility provided by the transport system.
- 2.4.5 The traditional transport planning approach has been to assume a particular land-use pattern for the future planning year as a starting point. In a similar manner, at the macro-level, studies should work within the framework set by the National Planning Policy Framework and regional and local development plans. However, at the micro-level, studies should examine the interaction of transport and planning decisions and may consider land-use planning based solutions. This may require study-specific forecasts. The modelling implications for this are discussed in [TAG Unit M1.1](#).
- 2.4.6 It is important to ensure that the approach to planning data forecasts is broadly consistent between studies and that optimism bias is avoided. To ensure that this is achieved forecasts of population, households and employment published by the DfT in the TEMPRO database should be used as a reference case.
- 2.4.7 Further information on forecasting, treatment of uncertainty in forecasting, and use of TEMPRO data is given in [TAG Unit M4](#).

Future Changes to the Transport System and Transport Demand

- 2.4.8 The assessment of a transport intervention involves the comparison of conditions where the scheme is built against conditions where the scheme is not built. In more technical terms this is a comparison between the **'with-scheme'** and **'without-scheme'** cases. The 'without scheme' case needs careful consideration and should involve specifying a **core scenario** based on standard assumptions of economic growth and other trends, and several **sensitivity tests** or **alternative scenarios**.

- 2.4.9 [Guidance for the Technical Project Manager](#) and [TAG Unit M4](#) describes in detail how to construct scenarios and forecasts for testing options and appraisals. It also describes how to account for uncertainty, such as using an uncertainty log to make assumptions in the appraisal transparent for each constructed scenario. As well as considering changes in land uses and the transport system, studies will also need to consider the impacts of other trends, such as in GDP and taxation, and especially of car purchase and fuel, in estimating future travel demands and levels of service.
- 2.4.10 The sensitivity tests or alternative scenarios are used to provide important information about the robustness of a proposal. If traffic levels/patronage and the resulting appraisal do not vary significantly between the sensitivity tests or alternative scenarios examined, this demonstrates that the project is not sensitive to external uncertainties. Conversely, if there are significant variations in patronage, the decision maker will have a clear view of the risks the project faces, and the analyst can explore ways of mitigating those risks.

2.5 Step 3: Establishing the Need for Intervention

- 2.5.1 In assessing the need for a local intervention and in developing the case for that intervention, analysts should present a sound body of analysis to show the local problems that establish the **need** for an intervention.
- 2.5.2 It should be noted that whilst this unit discusses problems with causes and solutions to ameliorate them, transport intervention may also be appropriate where investment will yield a positive outcome where there is an opportunity to do so (for example supporting growth and development). To this end the term 'problem' can embrace a range of issues from genuine problems to potential opportunities.
- 2.5.3 At this stage of the process, the following should be identified with supporting evidence:
- current transport-related problems;
 - future transport-related problems;
 - underlying causes.
- 2.5.4 Local problems should be framed (or categorised) within the context of the national and local policies, while being clearly rooted in addressing specific local problems and issues.
- 2.5.5 Evidence should demonstrate the scale and significance of the 'transport problem' or 'issue'. Evidence from Steps 1 and 2 will inform this process.
- 2.5.6 It is recommended that analysts invite a challenge from key stakeholders at this point, in order to test whether the rationale for intervention is clear and robust when based on readily available information. If there is insufficient evidence to support or reject the case for intervention, further evidence will need to be collected. This may involve surveys to collect bespoke information or development of a transport model.

Current Transport-Related Problems

- 2.5.7 Problems may be identified in a number of ways, including:
- consulting key stakeholders such as the public or regional and local planners;
 - gathering data and conducting audits on the performance of the transport system;
 - using analytical tools such as existing transport models or existing data sets;
 - benchmarking performance against other places (making sure the geographic, demographic and socio-economic context of those comparators are sufficiently considered).

Future Transport-Related Problems

- 2.5.8 Having established future travel demands in the forecast year for the without scheme case, future problems can be analysed. While audits of specific parts of the transport system are not appropriate in this context, the public, the regional and local transport and planning professionals, transport providers and other transport interests may all be consulted about their views on the forecast changes. It will also be useful to repeat the base year numerical analyses of problems, conducted by comparing conditions with thresholds, but using the forecast travel demands and levels of service for the 'without scheme' case.

Underlying Drivers or Causes

- 2.5.9 It is crucial that the **causes** of the problems are investigated before solutions are generated. Focusing on problems (rather than underlying causes) as the stimulus for option development may result in solutions which 'patch up' the symptoms without addressing the real underlying causes.
- 2.5.10 Problems should not be defined in a way that could bias the statement of objectives, which might then bias the development and selection of options. For example, stating that the problem of traffic congestion in a corridor is due to a lack of road capacity at peak times will inevitably focus attention on the provision of additional capacity. In contrast, starting out by stating that the problem that manifests itself is congestion and that the key driver is the existence of an excess of travel demand over available capacity should open up consideration of additional ways of addressing the problem and its drivers. In this example, provision of park and ride, bus lanes, changing parking availability and charges, could all be expected to reduce the demand for road space.

2.6 Step 4a: Identifying Objectives

- 2.6.1 Analysts should identify a clear set of intervention-specific objectives to address the identified problems. For an individual scheme or packages of measures, these are unlikely to be the same as the local (e.g. Local Transport Plan), regional or national policy objectives, but are likely to align with them where consistent challenges have been identified.
- 2.6.2 Objectives should be informed by an appropriate level of stakeholder engagement and by a realistic appreciation of the issues and context (Steps 1 to 3), reflecting the opportunities and constraints identified in Step 1 and the underlying causes identified in Step 3. They should be consistent with wider local, regional and national objectives identified in Step 1, but focused on addressing the identified need, rather than seeking to contribute to all of these objectives. When identifying objectives at an early stage, they should avoid indications of preferred solutions and be drawn up to enable more specific targets to be developed as the project proceeds and options are refined. Study-specific objectives may also relate to elements within the individual cases of the 5 case model.
- 2.6.3 Consideration should be given to developing a hierarchy of objectives, which clarifies the logic of the intervention and provides a framework for future appraisal and evaluation. A three level hierarchy might consist of:
- **High level or strategic outcomes** – These would typically express the desired end state, and reflect the aims and ambitions for the area or population (e.g. economic development). These are generally objectives to which transport contributes, but not always in a direct manner.
 - **Specific or intermediate objectives** – These would typically represent the intermediate effects of the transport intervention, including the direct and short term objectives which need to be achieved for the high level or strategic outcomes to be realised.
 - **Operational objectives** – These normally represent the desirable outputs which are necessary for the intermediate objectives to be achieved.

- 2.6.4 Operational and intermediate objectives should generally be as SMART (Specific-Measurable-Accepted-Realistic-Time defined) as possible given the nature of the evidence available at this stage of the process, and where appropriate, capable of quantification into specific targets by the end of Stage 1. High level or strategic objectives may need to be expressed in broader, more qualitative terms.
- 2.6.5 Objectives may need to evolve as further evidence is collected later in Stage 1. For example, assessment of options in Step 7 might identify new environmental constraints which need to be reflected in the objectives.
- 2.6.6 The objectives defined here will influence the focus of the appraisal methodology specified in Step 9, and undertaken in Stage 2 – Further Appraisal.

Targets

- 2.6.7 Setting targets will also be an iterative process.
- 2.6.8 In some cases a qualitative target might be more appropriate as a starting point; in other cases the quantitative target could be a range which represents a spread of usable outcomes; and in other cases it might be possible to set minimum performance levels below which a proposal may not be worth taking forward.
- 2.6.9 Setting specific quantitative targets too early in the process might overly shape the search for solutions, or might then require significant revisions later as more evidence becomes available. For example, if a target of 20% is set for mode shift from car at peak times, this might turn out to be unattainable without building a metro and setting very low (and financially unsustainable) fares.
- 2.6.10 Where quantified targets are stated, care should be taken not to introduce bias by inadvertently setting some targets which are easy to meet while others are very difficult, if not impossible, to achieve.

2.7 Step 4b: Define Geographic Area of Impact to be Addressed by the Intervention

- 2.7.1 Analysts should also define the geographical area of impact to be addressed by the intervention, i.e. what corridor or area it should be bounded by. This should be based on:
- an understanding of the geographical scope of the travel market and key origins and destinations (Steps 1 and 2); and,
 - an analysis of the geographical extent of current and future transport problems and underlying drivers (Step 3).
- 2.7.2 The area of impact will be important in Step 5 – Generating Options – in terms of bounding the scope of any options being generated.

2.8 Step 5: Generating Options

- 2.8.1 The purpose of option generation is to develop a range of alternative measures or interventions that look likely to achieve the objectives identified in Step 4a. Analysts should start with a wide range of possible measures, and then narrow these down (in Steps 6 and 7) in a robust, transparent and auditable manner.
- 2.8.2 It is important that as wide a range of options as possible should be considered, including all modes, infrastructure, regulation, pricing and other ways of influencing behaviour. Options should include measures that reduce or influence the need to travel, as well as those that involve capital spend. Revenue options are likely to be of particular relevance in bringing about behavioural change and meeting the Government's climate change goal.

- 2.8.3 Studies should not start from an assertion about a preferred modal solution, or indeed that infrastructure provision is the only answer. Following the Eddington Transport Study², Sponsoring Organisations will be looking to encourage the better use of existing infrastructure and avoiding “solutions in search of problems”. In this context, it is recognised that small schemes can represent high value for money.
- 2.8.4 For public transport schemes, options should include different technologies and lower cost alternatives. For example, where light rail schemes are being considered, alternative bus based options should also be identified.
- 2.8.5 Where highway solutions are being considered, options should include a consideration of different link/junction standards and other alternatives to address the problems in the area, such as public transport provision, demand management policies, traffic management measures and strategies.
- 2.8.6 For maintenance schemes, potential solutions might for example include dealing with the problem by means of traffic management measures, closing the relevant infrastructure, or use of annual maintenance subventions.
- 2.8.7 Sponsoring Organisations will be keen that options involving limited finance, for example better land use, marketing activities or traffic management, are also considered, and that consideration is given to the end-to-end journey experience.
- 2.8.8 Options should at least initially include measures that might not provide a complete solution to the identified problem but which can make a contribution towards achieving the objectives. This is because, as the process develops, possible interventions should be considered not only singly but also in combination with other options. Options that might be rejected at an early stage when looked at in isolation may add value to other options when packaged together.
- 2.8.9 Options should represent reasonably discrete interventions, such as light rail versus guided bus. In contrast, the difference between alignments of a possible road might best be thought of as variants around an option, unless there are clear differences in costs and / or benefits for different alignments.
- 2.8.10 A range of sources and approaches can be used to generate ideas:
- feedback from local stakeholders, colleagues, consultants, neighbouring authorities, and the public – it will be useful to seek views from people living and travelling within the affected geographical area on the types of intervention they consider appropriate;
 - brainstorming sessions or workshops, which can generate ideas by cross-fertilisation between participants’ different perspectives (although these need to be controlled carefully to ensure that the collected views are thorough and unbiased);
 - discussions with Sponsoring Organisations;
 - ideas considered previously may be reviewed to check whether any of the proposals discarded in the past may now be worth reconsidering;
 - benchmarking with suitable comparator areas, which need not be limited to the UK; and,
 - research – including a review of professional journals/press, internet searches to find broadly comparable projects, evidence databases (e.g. Konsult)³, etc.

² The Eddington Transport Study, The case for action: Sir Rod Eddington’s advice to Government (December 2006).

³ KONSULT – Knowledge on Sustainable Urban Land Use and Transport. <http://www.konsult.leeds.ac.uk/>

2.9 Step 6: Initial Sifting

- 2.9.1 At the end of Step 5, it is possible that some options will have been identified which do not represent sensible solutions. An initial sift should therefore be undertaken to identify any 'showstoppers' which are likely to prevent an option progressing at a subsequent stage in the process.
- 2.9.2 The process involves discarding options that:
- would clearly fail to meet the key objectives identified for intervention;
 - do not fit with existing local, regional and national programmes and strategies, and do not fit with wider government priorities, and,
 - would be unlikely to pass key viability and acceptability criteria (or represent significant risk) in that they are unlikely to be:
 - deliverable in a particular economic, environmental, geographical or social context e.g. options which would result in severe adverse environmental impacts which can not be mitigated against or where the cost of doing so is too high;
 - technically sound;
 - financially affordable; and,
 - acceptable to stakeholders and the public.
- 2.9.3 Part of the initial sifting might include packaging together measures which, on their own, would not achieve the desired outcomes, but which might do so when delivered in combination with each other.
- 2.9.4 The process should involve seeking views from transport and planning professionals, transport providers, and other transport interests.
- 2.9.5 The [Early Assessment and Sifting Tool](#) (EAST) has been developed as a decision support tool to develop, quickly summarise and present evidence on options in a clear and consistent format. It has been designed to assess and compare all types of transport-related options, packages, strategies and plans, across all modes and geographies. Its flexibility allows options to be considered at the early stages of development; however, the level of confidence that can be applied to comparisons facilitated by EAST will depend on the robustness of the underlying evidence base. The tool has not been designed to make recommendations and is not intended to be used for making final funding decisions.
- 2.9.6 Options should be considered and progressed or discarded on the basis of evidence and EAST can be used to facilitate this process. Analysts, in conjunction with other parties involved in the study, will need to identify their own criteria or thresholds for determining which options 'pass' or 'fail' this stage of the process, ensuring that this is clearly explained in reporting.
- 2.9.7 At the end of Step 6, analysts should have discarded unpromising options and identified a sensible number of distinct and feasible (or potential) options for further development and assessment. Decisions made on discarded options should be recorded, in the Option Assessment Report (Step 8), along with supporting evidence.

2.10 Step 7: Development and Assessment of Potential Options

- 2.10.1 At the start of Step 7, it is likely that a number of potential options will still be under consideration; and that the number of options will need to be reduced further in order to identify the better performing ones.

- 2.10.2 Step 7 involves developing potential options to a sufficient level of design/specification and collecting sufficient evidence to be able to distinguish the relative costs, benefits and impacts of the options under consideration.
- 2.10.3 Potential options should be assessed against the [Transport Business Case](#) criteria using the Option Assessment Framework set out in Appendix A.
- 2.10.4 At the end of Step 7, analysts should have identified the better performing options to take forward for further appraisal.

Methodology for assessing potential options

- 2.10.5 This is primarily a desk-based exercise. Site visits may be required, however, environmental surveys will generally not be needed at this stage. Information on current and future travel demands and levels of service will have been collated in Steps 1 and 2 of the process, making best use of existing transport models and data where this is sufficiently contemporary in nature.
- 2.10.6 Appendix A summarises the types of analysis, key input data and tools, and data outputs to be used in the assessment of potential options. The assessment methodology required at this stage of the process, should be broadly based on the detailed guidance provided in Practitioner TAG Units on the assessment of each of the impacts to be addressed in the Appraisal Summary Table (required in Stage 2). However, the approach should be applied proportionately, reflecting the level of evidence required at this stage of the process, i.e. sufficient to be able to distinguish the relative benefits and impacts of options under consideration.
- 2.10.7 The Practitioner Units are designed to take account of the very differing levels of detail of data likely to be available for the assessment and appraisal of interventions.
- 2.10.8 Analysts should provide an assessment of impact for each of the assessment areas listed in the Appendix A tables. It may, however, be appropriate to provide a 'neutral' response if the assessment area does not relate closely to the intervention's objectives and it is clear that the intervention will not have a positive or negative impact on this area of assessment.
- 2.10.9 In general, it is anticipated that analysts will use a 3 or 7 point scale in providing a qualitative assessment of the scale of impact. This will provide compatibility with the requirements of the corresponding Practitioner TAG Units. A prudent approach to scoring should be taken that reflects the quality of information on which scores are being based but ensures any key risks associated with options are highlighted.
- 2.10.10 Analysts should draw on as much quantitative evidence as possible and appropriate in assessing each of the options. In particular, an indicative Benefit Cost Ratio should be estimated where possible, sufficient to enable options to be compared. It is not intended to present the absolute performance of an option though it may be helpful in providing a preliminary indication on whether there is any likelihood of options representing satisfactory value for money. A simple spreadsheet-based approach might involve: factoring the base demand and using unit values to estimate the scale of benefits; use of benchmark costs and unit rates; and generation of simple discounted cash flows in order calculate indicative Present Values over an appropriate appraisal period.

Environmental impacts

- 2.10.11 In assessing environmental impacts, analysts may also wish to refer to guidance on environmental screening and scoping set out in Highways England's Design Manual for Roads and Bridges (DMRB), Volume 11⁴. This provides guidance on exploring the level of environmental risk associated with a project and identifying potential significant environmental effects. This guidance is written for those examining major road schemes, but may of value to those considering projects in

⁴ <http://www.standardsforhighways.co.uk/dmrb/>

other modes. The guidance is based on desk-based collection and analysis of readily available information.

- 2.10.12 Assessment of environmental impacts during this stage of the process will generally be at a level which can be undertaken by individuals with a broad understanding and experience in undertaking environmental assessments. Expertise in specific impact areas (e.g. noise, air quality, etc) will generally not be required until Stage 2 – Further Appraisal (Section 3).

Identifying neutral impacts

- 2.10.13 Some guidance is provided in Table A.2 to assist analysts in determining when it is appropriate to assume options will have a neutral impact on key areas of assessment⁵. It is important that analysts consider this guidance in the context of the option being considered, to ensure that the range of all potential impacts are captured (i.e. are there other impacts which may not be captured by the criteria identified).
- 2.10.14 If the case for assuming a neutral impact is marginal, analysts should err on the side of caution and undertake further appraisal.
- 2.10.15 In the case of environmental impacts, it is assumed that this assessment will have been made in the absence of any primary data from environmental surveys. A neutral assessment should therefore indicate that any potential impacts can be managed through standard mitigation measures, at low cost.
- 2.10.16 For example, noise impacts would be assessed as 'neutral' if resultant levels do not exceed accepted standards or if resultant levels can be addressed with a limited number of noise barriers. Similarly, biodiversity impacts would be assessed as 'neutral' if protected species were present but could be relocated at relatively low cost. However, where major mitigation measures are required which will have a significant impact on cost, for example to address loss of a listed building or creation of extensive lengths of noise barrier, a 'neutral' assessment should not be used.

Level of uncertainty of impact

- 2.10.17 Analysts should identify the level of uncertainty regarding the evidence presented for each area of assessment and the associated estimated impact. This will focus attention on areas which will require further more detailed assessment at a later stage; in clarifying the appraisal methodology in Step 9 and in undertaking further appraisal in Stage 2. The level of uncertainty (high, medium or low; for example) will depend on the quality of information used to make the assessment and the degree of confidence in the outcome of the assessment.

Public consultation

- 2.10.18 It is good practice to draw on evidence about the view of the public regarding potential options, in order to gauge the level of public support and identify any (previously unidentified) public acceptability issues. These views can then be accounted for in selecting the better performing options to be taken forward for further appraisal in Stage 2.

2.11 Step 8: Produce Option Assessment Report, or similar

- 2.11.1 The Option Assessment Report, or similar, should document the Stage 1 process of identifying the need for intervention and the process of option development and selection. In general, the structure of the OAR should be consistent with Steps 1 to 8 set out in this Unit.
- 2.11.2 The Option Assessment Report, or similar, should address the following requirements:

⁵ This guidance is based on the criteria for determining neutral impacts used within Highways England's Project Appraisal Report (PAR) process for assessing interventions costing more than £250,000 - PAR4 Guidance: Project Appraisal Report Guidance Notes, Version 4.1d, December 2007.

- Present a sound body of analysis to provide evidence of the problems and challenges and need for intervention;
- Define the future 'without scheme' case and potential scenarios around this case (e.g. where different growth in travel demand from the core assumptions may increase or reduce transport problems and hence the need for intervention);
- Clearly state the study or intervention-specific objectives and intended outcomes, and enough information to facilitate an understanding of the links between issues and context and the final statement of objectives. Define the geographical area to impact to be addressed by the intervention;
- Document the stakeholder engagement strategy adopted, including stakeholders involved and their role in informing the option development process;
- Document the process of option generation (Step 5), sifting (Step 6), and assessment (Step 7). Decisions made on discarded options should be recorded, along with supporting evidence. The initial supporting evidence for feasible options, as facilitated by EAST⁶, should also be summarised. Analysts should also document how environmental considerations have been taken into account in this process, particularly during the initial sifting stage;
- Document the results of the subsequent assessment of potential options against the Option Assessment Framework. Evidence against the 5 cases should be presented (see Tables A.1 to A.5 for details of the requirements for each case);
- Provide a clear explanation for any neutral assessments which have been made;
- Summarise the headline results across all options considered and provide conclusions on the comparative performance of options; and
- Identify the better performing options (including a low cost solution) to be taken forward for further, more detailed appraisal in Stage 2.

2.12 Step 9: Clarify Modelling and Appraisal Methodology

2.12.1 Where proposals are to be taken forward for further appraisal, analysts should clarify the methodology and scope of further appraisal, and agree this with the Sponsoring Organisation, prior to undertaking the work. The methodology should be documented in an **Appraisal Specification Report (ASR)**, or similar.

Core elements of the Appraisal Specification Report (or similar)

2.12.2 The Appraisal Specification Report, or similar, should set out how appraisal will be undertaken. It should detail the:

- proposed approach to modelling and forecasting;
- the proposed methodology for assessing each of the sub-impacts presented within the AST;
- proposed level of design or specification which will inform the cost estimation, and how better cost information will be obtained; and,
- evidence that views on the appraisal methodology have been sought from the statutory environmental bodies and others.

⁶ <https://www.gov.uk/government/publications/transport-business-case>

- 2.12.3 The Appraisal Specification Report will contain an [Appraisal Specification Summary Table \(ASST\)](#). The ASST will propose a methodology for appraisal, set out against each of the challenges or sub-impacts in the AST. The fully completed AST will then be submitted at Stage 2 – Further Appraisal (see Section 3).
- 2.12.4 The report should be informed by the OAR, plus additional technical inputs required to inform the modelling approach. Analysts should refer to the Practitioner TAG Units in specifying the proposed proportionate appraisal methodology. Stage 1 might inform the model specification by indicating a suitable study area, by suggesting which model components are needed (e.g. mode choice), or by identifying what is needed to satisfy environmental (and other) assessments.

Methodology for assessing the sub-impacts presented in the AST

- 2.12.5 The methodology and rationale for the approach for each of the AST sub-impacts should be presented in the [Appraisal Specification Summary Table \(ASST\)](#) and supporting commentary. In general, a separate ASST should be produced for each option being appraised, although it is recognised that these may be the same for similar types of option.
- 2.12.6 The proposed methodology should be proportionate in nature and reflect:
- the scale and severity of impacts identified in the OAR;
 - the level of uncertainty about estimated impacts; and
 - the focus of the local objectives (identified in Step 4a).
- 2.12.7 The appraisal effort should be focused on 'larger' impacts (both beneficial and adverse), those where there is uncertainty about the scale of the benefit, and those which could make a difference to the overall economic case or Value for Money (VfM) categorisation⁷.
- 2.12.8 Analysts should review information presented in the OAR in determining the requirement for further appraisal evidence for each of the sub-impacts in the AST. They should identify:
- those areas where sufficient evidence has been collated to date to give a high degree of certainty about the scale, direction and severity of impact;
 - those areas where insufficient evidence has been collected to be confident about the scale and severity of impact; and
 - those areas estimated to have a moderate or large impact on the overall value for money of the proposal.
- 2.12.9 For challenges assessed as 'neutral' in the OAR, analysts and Sponsoring Organisations should review the evidence to determine whether it is sufficient to give a high degree of certainty that the impact would remain 'neutral' if further appraisal was undertaken to fully meet the requirements in the Practitioner TAG Units. Where the evidence is deemed sufficient, the impact can be categorised as '**assumed neutral**' and no further appraisal will be required. The use of the term 'assumed' indicates that the assessment has been made without undertaking further detailed appraisal. In such cases where scheme promoters and officials agree that further analysis is not required for the particular sub-impact, the corresponding fields for the AST – that is to be submitted in Stage 2 – should be greyed-out to indicate that no further analysis has been conducted.
- 2.12.10 A similar approach can be adopted for impacts identified as having a slight positive / adverse impact in the OAR, using the terms '**assumed slight positive**' and '**assumed slight adverse**'.
- 2.12.11 For challenges where the evidence presented in the OAR is deemed insufficient to give a high degree of confidence about the scale or severity of the impact, and those where the impact has

⁷ Guidance on Value for Money (DfT, 2017).

been assessed as 'moderate' or 'large', further appraisal should be undertaken. For some areas, it will be necessary to fully meet the appraisal requirements set out in the Practitioner TAG Units. For other areas, analysts may be able to present a strong case for applying the Practitioner guidance in a reduced form.

2.12.12 The proposed appraisal methodology should also reflect the focus on the local objectives identified in Step 4a, which reflect the need for intervention. For example, where the primary objective for intervention is to address a road safety problem, then the appraisal of safety benefits should be undertaken in a comprehensive manner. However, providing there is sufficient evidence to give a high degree of certainty that the intervention will not result in any moderate or large negative impacts, then further appraisal of these impacts would not be required.

2.12.13 Where more than one option is being appraised (which will generally be the case), different appraisal methodologies and model specifications may be required for different options. This will generally be the case where the options under consideration reflect a range of modes, scales of intervention, and capital/revenue-based initiatives. Analysts and Sponsoring Organisations should be satisfied that the methodologies proposed for each of the options will allow sufficient comparison of the relative benefits and impacts of the individual options.

Proposed level of design or specification to inform the cost estimation

2.12.14 Specific design will become more established where preferred options emerge and are ready to be tested in Stage 2. This may lead to more informed refinements of the cost estimates reported in the Public Accounts table. Further details are provided in Section 3.1.

Stakeholder input

2.12.15 The statutory environmental bodies (Environment Agency, English Heritage and Natural England), should be given the opportunity to inform the methodology for the appraisal of environmental impacts, set out in the ASR. Promoters should generally set out a broad methodology in the first instance, but there should be an opportunity for the relevant environmental bodies to inform the final methodology. The level of involvement which these organisations will wish to have in refining the methodology will vary depending on the scale and severity of potential environmental impacts identified in the OAR (Step 8).

2.12.16 Analysts may also wish to seek views from other relevant stakeholders.

2.12.17 Analysts should clarify the purpose of the ASR document to stakeholders, and clarify its role in providing analysts and Sponsoring Organisations with confidence that further appraisal will be sufficiently robust to inform decisions about whether or not to proceed with intervention.

Scope for proportionality

2.12.18 It is anticipated that the main scope for proportionality will relate to the proposed approach to modelling and in the assessment of environmental impacts.

2.12.19 For example, evidence presented in the OAR may have determined that there is no likely impact against certain environmental criteria such as heritage or ecology due to the lack of relevant environmental features in the study area or the characteristics of the intervention being assessed meaning that no interaction would take place. In such instances an 'assumed neutral' assessment might reasonably be suggested and no further assessment identified as the approach to appraisal in Stage 2.

2.12.20 In addition, evidence presented in the OAR could be used to determine the need to develop a noise or air quality model. If background air quality is already good and changes in traffic flows are minimal there may be little point in undertaking a detailed assessment.

2.12.21 Other savings are likely to be determined by the focus of the local objectives identified in Step 4a. They may be little need to undertake further appraisal of wider economic impacts, regeneration, accessibility and physical activity benefits, if these are not reflected in the local objectives and there is a high degree of certainty that there are no moderate or large adverse impacts.

2.12.22 Potential savings in the economic areas of transport economic efficiency and reliability are likely to depend on savings which can be achieved in the development of a transport model, rather than in the appraisal methodologies themselves.

Agreeing and Updating the Appraisal Specification Report

2.12.23 The appraisal methodology and modelling approach should be agreed between the analyst and the Sponsoring Organisation, prior to undertaking the work. In some cases, Sponsoring Organisations might recommend a more proportionate approach than that identified by the analyst.

2.12.24 In some cases, Sponsoring Organisations may agree that very limited further appraisal or refinement of the evidence presented in the OAR is required. This may occur where there is a clearly identified preferred option, and it is clear that the preferred option:

- is best and will deliver against objectives;
- AND presents very good value for money (VfM);
- AND presents no significant risks / showstoppers.

2.12.25 The agreed version of the ASR should be applied unless:

- the intervention changes significantly (to the extent that costs or appraisal outcomes are altered in a way that impacts on the value for money assessment), or
- further work identifies the need for a more detailed assessment methodology, for example, because some new archaeological issues have arisen.

2.12.26 The analyst should then decide how best to undertake more detailed appraisal. The ASR should be updated and re-agreed with the Sponsoring Organisation.

2.12.27 Changes to the modelling approach, following initial agreement with the Sponsoring Organisation should only be proposed in exceptional circumstances.

2.12.28 The need to reflect any changes in WebTAG will need to be determined by the Sponsoring Organisation on a case-by-case basis.

2.12.29 In the case of any significant change to the intervention, the revised proposal must also be re-tested against the objectives for intervention.

3 Further Appraisal (Stage 2)

3.1 Introduction

3.1.1 This Section describes Steps 10 to 12 relating to Stage 2 of the process - Further Appraisal (see Figure 2). It is primarily aimed at the appraisal of individual schemes and packages of measures.

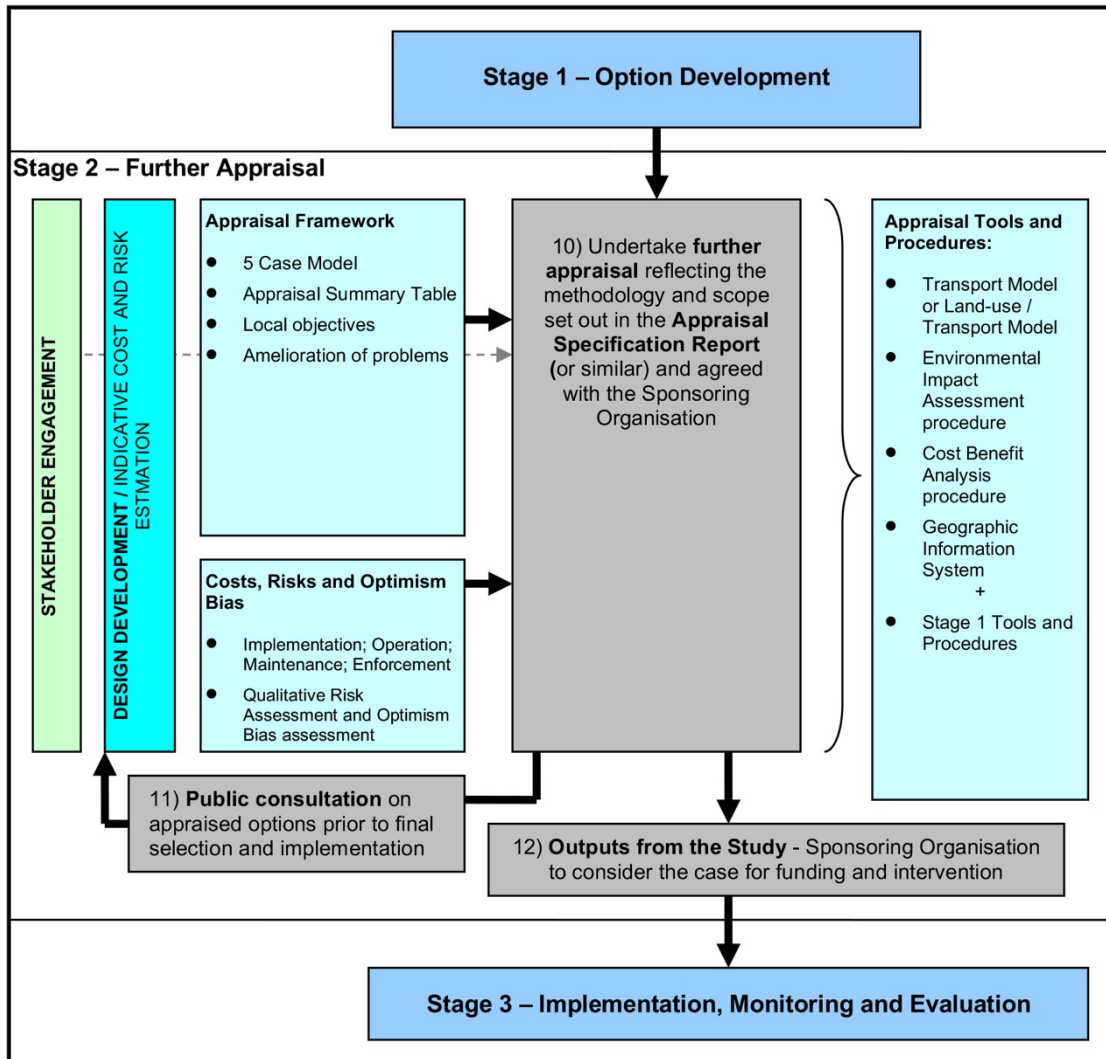


Figure 2 Steps in the Stage 2 process

3.1.2 Stage 2 involves the further appraisal of a small number of better performing options in order to obtain sufficient information to enable decision-makers to make a rational and auditable decision about whether or not to proceed with intervention. The focus of analysis is on estimating the likely performance and impact of intervention(s) against criteria in the [Transport Business Case](#). This should provide Sponsoring Organisations with sufficient evidence to decide whether or not to proceed with intervention.

3.1.3 This stage is typically the longest stage within the overall transport appraisal process. As Figure 2 of [Guidance for the Technical Project Manager](#) shows, stage 2 in the transport appraisal process feeds into two decision-points in the decision-making process. The requirements of collecting sufficient data for the modelling and environmental analysis work and their implementation is also most substantial at this stage. In addition, the duration of this stage may be affected by other factors, such as the time required to obtain interim approvals and to obtain statutory powers to implement the proposal, and, in some cases, the impact of scheme procurement processes.

Stakeholder Engagement - Consultation, Participation and Information

- 3.1.4 Stage 2 should be informed by engagement with stakeholders, tailored to the specific circumstances to ensure the approach is proportionate to the scale and complexity of the intervention. This should include public consultation on appraised options prior to final selection and implementation (Step 11).

Level of Design or Specification

- 3.1.5 For Stage 2, a greater level of design detail is expected. This will enable detailed appraisal to be undertaken and a quantified estimate of costs (specific to the intervention in question) to be derived; providing sufficient confidence in the feasibility of the design.
- 3.1.6 The level of design or specification should be further refined to support appraisal at the procurement and implementation stages in the intervention life cycle.

Costs, Risks and Optimism Bias

- 3.1.7 Cost should be estimated in accordance with the approach outlined in the Appraisal Specification Report.
- 3.1.8 At Stage 2, analysts should review the level of Optimism Bias applicable in the light of:
- the extent to which risk in cost estimation has been captured in the quantified risk assessment undertaken on cost and programme; and
 - improved cost and programme certainty in keeping with progress in design development.
- 3.1.9 Any reduction in recommended Optimism Bias factors applied should be based on a clearly reasoned and evidenced analysis of the extent to which contributory factors to Optimism Bias have been mitigated.
- 3.1.10 Advice on the treatment of costs in the cost/benefit analysis is given in [TAG Unit A1.2 – Scheme Costs](#). It emphasises the importance of robust base cost estimates including realistic cost inflation assumptions, the use of quantified risk assessments and the application of the appropriate optimism bias uplifts.

3.2 Data Requirements and Tools

Transport Model

- 3.2.1 Stage 2 requires the quantitative analytical output to be robust enough to provide detailed forecasts for the relevant impacts that are taken into the appraisal. At this stage, a formal model of the transport system will usually be required. This will involve either adapting an existing model or creating a new model. In either case, the model specification will have been agreed with the Sponsoring Organisation in the ASR. Further advice is given in [Guidance for the Technical Project Manager](#).
- 3.2.2 Where a transport model is used, this differs from the requirements in Stage 1 in a number of ways, with a model used in Stage 2 requiring a greater level of detail. This includes a detailed representation of the transport network and more detail in the dimensions of the model, including the detail of the representation of the travel market. Models used in full appraisal are also expected to demonstrate a superior standard of calibration and validation against contemporary observed traffic/travel characteristics (these are described in the guidance units for the practitioner).

Cost/Benefit Analysis Procedure

- 3.2.3 The Department's TUBA software, appropriate for fixed and variable trip matrix scheme analysis, can be used to determine economic efficiency costs and benefits due to a scheme intervention through use of modelled cost matrices.
- 3.2.4 Of particular importance in these calculations is the consistent and explicit treatment of flows of taxes, so that impacts on the Exchequer can be identified, and flows of fares, tolls and charges paid by travellers, and revenues received by transport operators, can be accounted for. These payments and receipts appear in the cost/benefit analysis as costs and benefits. Thus, the information required for the appraisal of the financial consequences on the Exchequer and the transport operators is automatically contained within a full cost/benefit analysis and can be identified separately.
- 3.2.5 Further analysis is required to be undertaken in order to monetise several environmental and social impacts that feed in to the cost/benefit analysis. These can often take considerable resources in themselves and should be adequately planned for in the appraisal work. Various sub-models may be required that use output from the main transport model in order to capture these impacts, for example air quality analysis often requires a model of some sophistication in order to adequately inform an Environmental Impact Assessment. It should be ensured that such models are compatible at the model design stage. Noise and greenhouse gas emissions are also monetised, as well as some social impacts such as accidents, journey quality and physical activity.
- 3.2.6 [TAG Unit A1.1 – Cost Benefit Analysis](#) provides advice on how the cost/benefit analysis should be undertaken and on the sources for the economic parameter values required for the calculations.

3.3 Step 10: Undertake Further Appraisal

- 3.3.1 Further appraisal of better performing options, against the 'without scheme' scenario(s) should reflect the methodology and scope set out in the Appraisal Specification Report (or similar) (Stage 1, Step 9) and agreed by the analyst and Sponsoring Organisation.

3.4 Step 11: Public Consultation on Appraised Options

- 3.4.1 A consultation exercise should be undertaken before the decision makers reach a conclusion about the preferred option. Consultation with Environmental Bodies (Natural England, English Heritage, and the Environment Agency) and the public is legally required at the draft plan/programme stage where a Strategic Environmental Assessment is undertaken.
- 3.4.2 Public consultation on the appraised options will inform the detailed design process.

3.5 Step 12: Outputs from the Study

- 3.5.1 Dependent upon the type of study, outputs will be reported in a variety of forms to a variety of audiences. In general the outputs of studies should be provided at a level of detail that enables the different players to contribute to the debate and make their decisions in a fully informed manner, and the conclusions should be set out in a clear and logical manner without over-burdening the reader with information.

4 Implementation, Monitoring and Evaluation (Stage 3)

4.1 Introduction

- 4.1.1 This Section describes Steps 13 and 14 relating to Stage 3 of the process – Implementation, monitoring and evaluation. It is applicable to all types of interventions, including individual schemes, packages of measures, strategies and plans.

Level of Design or Specification

- 4.1.2 At Stage 3, the level of design needs to be sufficient to enable implementation.
- 4.1.3 In terms of the widely adopted project development stage guidance in the Royal Institute of British Architects (RIBA) Plan of Work Stages, analysts should refer to RIBA Work Plan Stages G to L (Tender Documents, Tender Action, Mobilisation, Construction to Practical Completion, After Practical Completion), in the case of all types of intervention.
- 4.1.4 For rapid transit, tram, metro and rail interventions, analysts should refer to GRIP Stages 6 to 8 (Construction, Testing & Commission, Scheme Handback, Project Close-Out).
- 4.1.5 For interventions that do not involve the introduction of physical infrastructure to any significant degree e.g. smarter choices or technology options, the principles of design stages as per RIBA and GRIP will still be of relevance.

4.2 Step 13: Implementation Programme

Some interventions will involve a considerable amount of expenditure and a large number of concerted actions, spread out over a number of years. These need to be phased appropriately so that the transport system develops in the most effective manner.

4.3 Step 14: Monitoring and Evaluation

- 4.3.1 Analysts should identify indicators to verify whether implementation is 'on track', and to what extent the intervention is achieving its intended objectives (and addressing the underlying causes of the problems identified). Although WebTAG does not provide guidance on this stage, separate guidance is available in [HMT's Magenta Book](#). An example of good practice in evaluation is also available from Highways England's [Post Opening Project Evaluation](#) programme.

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6 Document Provenance

The guidance in this TAG Unit builds on advice in the [Guidance for the Senior Responsible Officer](#). This restructured [guidance for the technical project manager](#) is based on previous TAG Units 2.1.2 to 2.1.4 on the overall approach to option assessment, appraisal and evaluation.

Appendix A Option Assessment Framework

Table A.1 - Option Assessment Framework (Strategic Fit)

Assessment areas	Types of analysis	Key Input Data	Outputs	Determining Neutral Impacts
Regional Transport and Spatial Strategy and local objectives fit				
Regional Policy Alignment	Collation and presentation of relevant objectives. Review of alignment against objectives evidenced by the other areas of assessment carried out.	Latest policy documents and outputs from other areas of option assessment.	Tables presenting a qualitative score of how the option does AND does not align with policy objectives. Tables should be structured around national and local objectives. Tables should include a commentary clearly referencing other areas of assessment that supports the view on objectives alignment.	-
Local Policy Alignment				
Meeting intervention objectives - Addressing problems and challenges				
Scheme Objectives Fit	Review of performance against the specific objectives for any intervention option identified - evidenced by the other areas of assessment carried out (see below).	Locally developed objectives identified in Step 4a, and outputs from other areas of option assessment.	Tables presenting a qualitative scoring of how the option does AND does not meet the objectives for intervention. Tables should include a commentary clearly referencing other areas of assessment that have informed the score given.	-

Table A.2 - Option Assessment Framework (Value for Money)

a) Impact on the Economy

Assessment areas	Assessment Method	Key Input Data	Outputs - Evidence for the AST	Determining Neutral Impacts
Business users and transport providers	<p>Business Users: Assessment of the extent to which journeys can be made within a reasonable time and at reasonable cost, focusing on improvement in end to end journey times and money costs. The focus should be on the connectivity benefits to freight, business and commuting users only. Adoption of simple spreadsheet or other "light touch" models to derive annual and PVB in line with WebTAG principles. Demand derived from travel market analysis as part of evidence base to identify need for intervention in first instance - adopt "worst case" principle in deriving potential beneficiaries. Indicative 'with intervention' and 'without intervention' savings, derived through simple journey cost impact assessment of option design/specification relative to 'without intervention' scenario.</p>	<p>Stage 1 level design and specification characteristics. Travel market demand data and prudent assumptions on proportion to be affected intervention. Assumptions on road and vehicle types and fares/charges applied. Model input data, if available. Values of Time and Vehicle Operating Cost parameters from the TAG Data Book.</p>	<p>key Impacts: Commentary on overall impacts. Monetary Assessment: Indicative £ PV time impacts; £ PV money travel costs.</p>	There is no change to journey times or to money travel costs.

	Transport providers: Calculation of changes in revenue to transport providers utilising simple spreadsheet demand and revenue models drawing on travel market analysis as part of evidence base to identify need for intervention in first instance - adopt "worst case" assumptions in revenue calculation.	Stage 1 level design and specification characteristics. Travel market demand and revenue data and prudent assumptions on proportion to be affected by intervention. Fares and charge assumptions.	Key Impacts: Commentary on overall impacts. Monetary Assessment: Indicative £ PV revenue.	There is no change in passenger numbers and fare or charge levels.
Reliability	A qualitative assessment of the impact of the option on reliability based on review of Stage 1 level design and specification. Reliability impacts need only be identified where intervention has been designed to address reliability. Otherwise, present "at least no worse off" evidence. The focus should be on the reliability benefits to freight, business and commuting users and transport providers.	Stage 1 level design and specification characteristics. Change in journey times, ratio of flow to capacity and number of incidents	Key Impacts: Commentary on overall impacts. Quantitative Assessment: None Qualitative Assessment: using 3 point scale: Neutral, Beneficial, Adverse.	There is no change to journey times, the ratio of flow to capacity or the number of incidents.
Wider impacts	Note – Only a limited number of schemes are expected to generate Wider (economic) impacts. Where impacts are likely to be significant and vary significantly between options, indicative assessments should be based on estimated changes in travel times between employment areas and the evidence in TAG Unit A2.1 .	Guidance in the A2 TAG Units Wider Impacts Dataset Details of employment locations and estimated travel time savings.	Key impacts: Commentary on impact on agglomeration. Quantitative Assessment: None. Qualitative Assessment: Qualitative assessment using: None, Slight, Moderate, Large scale.	Agglomeration: Scheme falls outside the Functional Urban Areas defined in TAG Unit A2.4 or does not improve accessibility to a local employment centre.

b) Impact on the Environment

Assessment areas	Assessment Method	Key Input Data	Outputs - Evidence for the AST	Determining Neutral Impacts
Noise	Collation and review of all relevant and readily available baseline environmental conditions data. Desktop and GIS based identification of likelihood and potential severity of impact, given nature of intervention option.	Local environmental/planning information and data: Noise mapping, location and numbers of receptors or proxies (e.g. population density). Traffic flows. Stage 1 level design and specification.	Key Impacts: Commentary on overall impacts. Quantitative Assessment: Estimated numbers of people in the area who are likely to be annoyed. Qualitative Assessment: using 3 or 7 point scale, as appropriate (see Notes below). Monetary Assessment: Indicative Present Value of Benefits (£PVB).	For options impacting on the highway, a neutral assessment can be assumed if: - the intervention does not provide noise mitigation (interventions which do will generally have a positive impact) and there are no properties within 300 metres of the road centre line; OR - change in change in traffic flow is less than 25%; and change in percentage of heavy goods vehicles is less than 20%; and change in speed is less than 10 kph.

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Air quality	Collation and review of all relevant and readily available baseline environmental conditions data, followed by desktop and GIS based identification of likelihood and potential severity of impact, given nature of intervention option.	Local environmental/planning information and monitoring data. Stage 1 level design and specification.	Key Impacts: Commentary on overall impacts. Quantitative Assessment: Estimated change in assessment score of PM ₁₀ and NO ₂ . Estimated change in NO _x emitted. Qualitative Assessment: using 3 or 7 point scale. Monetary Assessment: Indicative Present Value of Benefits (£PVB).	For schemes affecting the highway, there are no properties within 50m of the edge of carriageway. If this criterion is not met then the impact can be still be regarded as neutral if change in AADT is less than 700 vehicles and change in speed is less than 5kph.
Greenhouse gases	Emissions rates per km and indicative volumes and distances as estimated for 'Improve connectivity', under 'Support economic growth'.	Stage 1 level design and specification. Indicative volumes and distances as estimated for 'Improve connectivity', under 'Support economic growth'. Emissions rates per km of travel and DECC price per tonne of carbon.	Key Impacts: An indication of the key drivers which are responsible for any change in conditions. Quantitative Assessment: Estimated change in tonnes of carbon emitted. Monetary Assessment: Indicative Present Value of Benefits (£PVB).	-
Landscape	Collation and review of all relevant and readily available baseline to establish the characteristic and locally distinctive features of an area. Desktop and GIS based identification of likelihood, potential severity and incremental impact, given nature of intervention option.	Local environmental/planning information and data: Magic (www.Magic.gov.uk), Natural England, Landscape Character Assessments. Stage 1 level design and specification.	Key Impacts: Commentary on overall impacts. Quantitative Assessment: Does the option impact on a designated site: Yes/No. Qualitative Assessment: Qualitative assessment using 3 or 7 point scale, as appropriate (see Notes below).	The intervention is wholly within the carriageway or highway verge or existing rail line boundary, is not within or adjacent to a national landscape designation such as National Park or AONB and does not involve the installation of lighting, signals, large signs, gantries, masts or traffic calming measures.
Townscape	Collation and review of all relevant and readily available baseline to establish the urban characteristics. Desktop and GIS based identification of likelihood and potential severity of impact, given nature of intervention option.	Local environmental/planning information and data. Stage 1 level design and specification.	Key Impacts: Commentary on impacts on the coherence and distinctiveness of townscape resources. Quantitative Assessment: Number of strategically important views and/or key vistas directly affected. Qualitative Assessment: using 3 or 7 point scale, as appropriate (<i>see Notes below</i>).	Townscape impacts will apply to projects located in built-up areas (which includes cities, towns and villages), or where a project will serve to reduce traffic flows in a built-up area and, in so doing, will facilitate improvements to the townscape. For the project's impact to be neutral it must be wholly within the carriageway or highway verge or existing train line boundary; not within or adjacent to a sensitive site (key vistas or strategically important view); and not involve the installation of vehicle or pedestrian barriers, lighting, signals, large signs, gantries, masts or traffic calming measures.

Historic Environment	Collation and review of all relevant and readily available baseline to establish the heritage character for an area including NMR to establish known built heritage, archaeology and potential for archaeology. Desktop and GIS based identification of likelihood, potential severity and incremental impact, given nature of intervention option.	Local environmental/planning information and data: English Heritage Listed Buildings online, National and County Monument Records, Magic, historical maps and aerial photographs. Stage 1 level design and specification.	Key Impacts: Commentary on overall impacts. Quantitative Assessment: Does the option impact on a designated site (Grade I and II*, WHS, SM, Registered Park or Garden, Conservation Areas: Yes/No. Qualitative Assessment: using 3 or 7 point scale, as appropriate (see Notes below).	The intervention is wholly within the carriageway or highway boundary or existing rail boundary. The intervention does not impact directly through land take or indirectly through proximity, on archaeological or national, regional or local built heritage sites (Grade I and II*), World Heritage Site, Scheduled Monument, Registered Park or Garden, Conservation Areas.
Biodiversity	Collation and review of all relevant and readily available baseline to establish the characteristic biodiversity and earth heritage features of an area. Desktop and GIS based identification of likelihood, potential severity and incremental impact, given nature of intervention option.	Local environmental/planning information and data: Magic (www.Magic.gov.uk), Natural England, Biological Records Centre. Stage 1 level design and specification.	Key Impacts: Commentary on overall impacts. Quantitative Assessment: Does the option impact on a designated site (Ramsar, SPA, SAC, SSSI, CWS, SINC): Yes/No. Qualitative Assessment: using 3 or 7 point scale, as appropriate (see Notes below).	The intervention is wholly within the carriageway or highway verge or existing rail line boundary AND no additional landtake is required. The intervention does not impact directly through landtake or proximity to, international, national, regional and local designated sites.
Water environment	Collation and review of all relevant and readily available baseline environmental conditions data. Desktop and GIS based identification of likelihood and potential severity of impact, given nature of intervention option.	Local environmental/planning information and data: Environment Agency, Magic (www.Magic.gov.uk). Stage 1 level design and specification.	Key Impacts: Commentary on overall impacts on river catchments, flood risk, and groundwater.. Quantitative Assessment: Extent of development in the floodplain (measured as length (km) in flood zone 3b). Residual Flood Risk (measured as length (km) in flood zone 2). Water Quality Standards Qualitative Assessment: using 3 or 7 point scale, as appropriate (see Notes below).	There is no change to the highway or rail line drainage or to the means of discharge, and there is negligible change to the volume and quality discharged.

c) Impact on the Society

Assessment areas	Assessment Method	Key Input Data	Outputs - Evidence for the AST	Determining Neutral Impacts
Non-business users	Qualitative assessment of the impact of the option on, reliability and connectivity for non-work and non-commuting journeys. Estimate impact on travel times, costs and reliability for leisure trips using the approaches outlined for commuting and business trips in the Reliability challenge above.	Stage 1 level design and specification characteristics. Travel market demand data and prudent assumptions on proportion to be affected intervention. Assumptions on road and vehicle types and fares/charges applied. Values of Time and Vehicle Operating Cost parameters from the TAG Data Book . Change in journey times, ratio of flow to capacity and incident numbers.	Key Impacts: Commentary on overall impacts. Qualitative Assessment: using 3 or 7 point scale, as appropriate (see Notes below). Monetary Assessment: Indicative £ PV time impacts; £ PV money travel costs.	See Reliability entry above

Physical activity	Identification of whether intervention is likely to generate significant additional numbers walking or cycling with indication of numbers of each.	Option description/characteristics. GIS analysis of 15mins and 30mins walk and cycle catchment.	Key Impacts: Commentary on overall impacts. Quantitative Assessment: If a walk/cycle scheme, then estimate change in the number of persons walking and cycling, average journey time, resultant change in mortality – based on initial catchment analysis. Qualitative Assessment: Qualitative assessment using 3 or 7 point scale, as appropriate (see Notes below).	There is no change to the length and number of walking and cycling trips made.
Journey quality	Qualitative assessment of changes to the end to end journey experience of transport users (considering traveller care; travellers' views; and traveller stress).	Stage 1 level design and specification characteristics. Indicative estimate of number of users affected.	Key Impacts: Commentary on overall impacts. Quantitative Assessment: None. Qualitative Assessment: using 3 point scale – Neutral, Beneficial, Adverse.	There is no change to: - the provision of facilities and information for users or the cleanliness and general environment within public transport vehicles and interchanges; - to traveller views; or - to the factors affecting traveller stress (frustration, fear of potential accidents, and route uncertainty).
Accidents	If evidence base has highlighted accidents as amongst the key problems and challenges to be addressed, then review likelihood of options addressing problem in the light of Stage 1 design / specification characteristics and potential to impact on traffic flows. If accidents NOT identified as a problem/challenge driving intervention then analysis should be limited to reviewing option design/characteristics to ensure no significant accident risk is introduced.	Road safety incident data and KSI statistics for highway network for area relevant to intervention options. Stage 1 level design and specification characteristics. Indicative forecasts of changes in traffic levels / speeds at hotspots. Traffic flows from analysis undertaken for 'improve connectivity', under the 'Support Economic Growth' scenario.	Key Impacts: Commentary on potential safety impact. Quantitative Assessment: None. Qualitative Assessment: Qualitative assessment using 3 or 7 point scale, as appropriate (see Notes below). Monetary Assessment: Indicative Present Value of Benefits (£PVB).	There is no change in network conditions or traffic flows and patterns.
Security	If evidence base has highlighted crime or security as amongst the key problems and challenges to be addressed, then review likelihood of options addressing problem in the light of Stage 1 design specification/characteristics. If security NOT identified as a problem/challenge driving intervention then analysis should be limited to reviewing Stage 1 design/characteristics to ensure no significant security risk will be introduced.	Crime statistics and any safety perception data for the area relevant to potential intervention. Stage 1 level design and specification characteristics.	Key impacts: Commentary on overall impacts. Quantitative Assessment: None. Qualitative Assessment: Qualitative assessment using 3 point scale: Neutral, Beneficial, Adverse.	There is no change to the likely incidence of crime or fear of crime related to road users (including non-motorised).

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Access to services	Assessment of level of impact on people accessing the transport system, especially those households without a car. Accessibility impacts need only be identified where intervention has been designed to address accessibility. Otherwise present "at least no worse off" evidence.	250m walking distance catchment area around scheme based on GIS analysis.	Key impacts: Commentary on catchment affected. Quantitative Assessment: None. Qualitative Assessment: Qualitative assessment using 3 or 7 point scale, as appropriate (see Notes below).	There is no change in the routes served by the public transport system.
Affordability	Assessment of level of impact on the affordability of the transport system to users. Affordability impacts need only be identified where intervention has been designed to address affordability. Otherwise present "at least no worse off" evidence.	Stage 1 level design and specification characteristics.	Key impacts: Commentary on impact of option on affordability. Quantitative Assessment: None. Qualitative Impacts: using 3 or 7 point scale, as appropriate (see Notes below).	There is no change in fares / travel costs to users.
Severance	Evidence-based judgmental assessment of the impact of the transport intervention on severance, and estimation of the indicative numbers of people who will be affected. See TAG Unit A4.1 for further guidance.	Stage 1 level design and specification characteristics.	Key impacts: Commentary on impact of option on severance. Quantitative Assessment: None. Qualitative Assessment: using 3 or 7 point scale, as appropriate (see Notes below).	There is no change to the routes used by pedestrians, equestrians or cyclists; or to the standard and quality of the routes which might result in a change of patronage.
Option values	Qualitative assessment of the impact of the option on communities in terms of the option value associated with service additions / withdrawals.	Stage 1 level design and specification characteristics. Indicative estimate of number of households affected.	Key Impacts: Identify which group of transport services are the source of any additional (or reduced) option and non-use value. Quantitative Assessment: Number of households affected. Qualitative Assessment: using 3 or 7 point scale, as appropriate (see Notes below).	The project does not result in the provision of new public transport services.

Notes on the use of qualitative scales

7 point qualitative scale = large adverse, moderate adverse, slight adverse, neutral, slight beneficial, moderate beneficial, large beneficial. In some cases, it will be sufficient to use a 3 point scale. The scale used should be sufficient to distinguish the relative impacts of different options.

d) Public Accounts

Assessment areas	Assessment Method	Key Input Data	Outputs - Evidence for the AST	Determining Neutral Impacts
Cost to broad transport budget	Central Government: Estimation of capital and operating/maintenance costs based on application of standard unit rates. Application of credible worst case inflation and optimism bias in line with relevant guidance and discounted consistent with WebTAG to derive Present Values (£PVs).	Stage 1 level design and specification characteristics. Unit cost rates or benchmark costs for other similar types of intervention. Inflation and optimism bias rates.	key Impacts: Commentary on overall impacts. Monetary Assessment: Indicative £PVC (Central Government)	Not applicable.

	Local Government: As for central government for local government contribution to scheme costs.	Stage 1 level design and specification characteristics. Unit cost rates or benchmark costs for other similar types of intervention. Inflation and optimism bias rates.	key Impacts: Commentary on overall impacts. Monetary Assessment: Indicative £PVC (Local Government)	Not applicable.
Indirect tax revenues	Estimate of indirect tax and revenue impacts on public sector based on indicative changes in volume and fares, charge and tax rates per kilometre or trip.	Stage 1 level design and specification characteristics. Assumed fares, charge and indirect tax levels.	Monetary Assessment: Indicative £PVB (Indirect Tax Revenues)	Not applicable.

e) Distributional impacts

Assessment areas	Assessment Method	Key Input Data	Outputs - Evidence for the AST	Determining Neutral Impacts
Separate rows required to represent assessment of each of the 8 indicators: user benefits noise air quality accidents security severance accessibility affordability	High level assessment of potential social and distributional impacts relating to user benefits, noise, air quality, accidents, security, severance, accessibility, and personal affordability; as described in TAG Unit A4.2 .	Census data. GIS catchment analysis of area impacted by intervention.	Distributional Impacts: Qualitative assessment using a 7 point scale. Identification of the vulnerable group that is negatively impacted on.	-

f) Indicative Benefit Cost Ratio

Assessment areas	Assessment Method	Key Input Data	Outputs	Determining Neutral Impacts
Cost to Private Sector	As for broad transport budget (central government) above for private sector contribution to scheme costs	Stage 1 level design and specification characteristics. Unit cost rates or benchmark costs for other similar types of intervention. Inflation and optimism bias rates.	Indicative £PVC (Private Sector), where possible.	Not applicable.
Indicative Net Present Value	Present Value of Benefits (PVB) (estimated in a) to e) above) - Cost to Private Sector- Present Value of Costs (PVC) (estimated in f) above)	Outputs from a) to f) above (PVC and PVB)	Indicative £NPV, where possible.	Not applicable.
Indicative Economic BCR	(PVB-Cost to Private Sector)/PVC	Outputs from a) to f) above (PVC and PVB)	Indicative BCR, where possible.	Not applicable.

Table A.3 - Option Assessment Framework (Financial Case)

Assessment areas	Types of analysis	Key Input Data	Outputs	Determining Neutral Impacts
Capital and Revenue Costs				
Outturn cost to implement	Establish likely cost of implementation (in outturn not in PV terms as per appraisal)	Capital cost estimates from Impact on Public Accounts and Indicative Benefit Cost/Ratio	£outturn	Not applicable.
Operating and maintenance costs	Establish likely ongoing operating and maintenance costs (in outturn not in PV terms as per appraisal)	Capital cost estimates from Impact on Public Accounts and Indicative Benefit Cost/Ratio sections above	£outturn	Not applicable.
Funding assumptions				
Funding allocation	Initial assessment of funding "allocation" by source, depending on the nature of the intervention, i.e. beneficiaries and their willingness to pay	Assess funding based on outputs from above and "rate of return" criteria per funding source (e.g. DfT BCR). Use simple spreadsheet model. Assume "rate of return" if not readily available.	How would outturn cost be split between different bodies. Supporting commentary relating to types of benefits associated with different sources.	Not applicable.

Table A.4 - Option Assessment Framework (Delivery Case)

Assessment areas	Types of analysis	Key Input Data	Outputs	Determining Neutral Impacts
Likely delivery agents	Establish complexity of scheme delivery. Identify delivery agent(s). Relate complexity to identified delivery agent(s).	Professional expertise.	Qualitative assessment on level of delivery agent interest and support. Identification of any potential showstoppers.	Not applicable.
Stakeholder acceptability	Identify key stakeholders and acceptability/support criteria. Assess the potential for support / objection in context of assessed intervention impacts/performance.	Stakeholder consultations. Impact and performance assessments.	Qualitative assessment on the level of stakeholder support / challenge. Identification of any potential showstoppers.	Not applicable.
Public acceptability / interest	Identification of key issues that are likely to generate public interest / objection.	Assessment of intervention option impacts and their distribution. Results of any relevant consultation.	Qualitative assessment on the likely level of public support / challenge. Identification of any potential showstoppers.	Not applicable.

Table A.5 - Option Assessment Framework (Commercial Case)

Assessment areas	Types of analysis	Key Input Data	Outputs	Determining Neutral Impacts
Route to market	Initial review of possible procurement routes and level of difficulty / risk - likely level of market interest.	Number of delivery agents, funding sources, stakeholders and contractors potentially involved.	Qualitative assessment on the level of challenge faced to procure intervention - identification of any potential showstoppers.	Not applicable.