Department for Transport

TAG Unit A5.1

Active Mode Appraisal

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Department for Transport

Transport Analysis Guidance (TAG)

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This TAG Unit is guidance for the **Appraisal Practitioner**

This TAG Unit is part of the family **A5 - Uni-Modal Appraisal**

Technical queries and comments on this TAG Unit should be referred to:

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1. Introduction

1.1.1 This Unit gives guidance on how to estimate and report impacts on active modes (e.g. walking and cycling). Specific cycling and walking schemes are often relatively small. The amount of effort devoted to the analysis of such schemes should be proportional to the scale of the project or the scale of impact on cycling and walking modes.

1.1.2 Section 2 describes methods that can be used to forecast demand for interventions targeting active modes; section 3 describes how the key impacts resulting from an intervention should be monetised; section 4 describes how the results should be reported; section 5 discusses sensitivity testing; and section 6 discusses the importance of monitoring and evaluation.

1.1.3 This Unit is most applicable to schemes with a significant active modes focus, but is in principle applicable in all cases. When reading these sections it may help to assume that a scheme aimed at active mode use is being appraised. TAG Guidance on The Transport Appraisal Process describes the option development process, where a cycling or walking scheme may have emerged as the best transport solution for a given problem. TAG Unit A5.5 – Highway Appraisal describes a basic method for treating impacts on pedestrians and cyclists where they are not explicitly included in the modelling approach.

1.1.4 This Unit follows the standard approach to appraisal as explained in Guidance for the Technical Project Manager and TAG Unit A1.1 – Cost-Benefit Analysis. However, issues of particular importance to active modes such as physical activity benefits and journey quality are more fully explained.

1.1.5 Scheme promoters can use the Active Mode Appraisal Toolkit to calculate the key impacts of cycling and walking interventions.[1] The Active Mode Appraisal Toolkit is a spreadsheet model developed within the Department for Transport. The toolkit is aimed at scheme promoters with limited technical expertise, a user guide is published alongside that includes guidance on how to use the tool.

1.1.6 There is significant uncertainty around the use of the techniques and the valuations suggested in this Unit and thorough use of sensitivity testing around core assumptions should be used when presenting results. Therefore this guidance will be most useful in assessing the effectiveness of one cycling and/or walking scheme against another, using similar input assumptions.

[1] Available at: https://www.gov.uk/government/publications/webtag-social-and-distributional-impacts-worksheets

2. Active Mode Forecasting

2.1 Introduction

2.1.1 TAG Unit M1.1 – Principles of Modelling and Forecasting provides guidance on how modelling may be used to estimate future demand for transport facilities. Where cycling and walking schemes form part of a larger set of transport proposals, demand models or spatially aggregate models of the types described in that Unit may be appropriate.

2.1.2 Where cycling and walking is an integral part of a strategy, for example the imposition of 20mph speed restrictions in urban areas, coupled with other changes to create a more appealing environment for pedestrians and cyclists, then model design should include appropriate representation of the alternatives to cycling and walking.

2.1.3 Walking and cycling schemes may be promoted separately from other transport investment proposals and in these circumstances different modelling approaches may be required. This section summarises three possible approaches to forecasting demand for new cycling and walking facilities forecast outside of a formal model. Analysts should also bear in mind the potential impact on the use of other modes.

2.1.4 It is of crucial importance to forecast walk and cycle demand as accurately as possible to produce a successful appraisal. Forecasts are the primary indicator of a scheme's effectiveness, along with estimates of the resulting change in use of other modes. Since the cost of walking and cycling schemes is often relatively low and the scale of impact relatively small, the cost-benefit analysis is highly sensitive to the quality of these forecasts. Sensitivity tests will be necessary to examine the potential impacts in the face of uncertainty. On the cost side, optimism bias (at the appropriate rate) should also be included in the scheme costs (see TAG Unit A1.2 – Scheme Costs).

2.1.5 It is important that the without-scheme case includes the impacts of other schemes that may affect the mode share of active modes (e.g. the introduction of town centre pedestrian areas, or a congestion charging system). Where the impacts of a cycling or walking scheme are being considered in the context of another major scheme, it may be appropriate to include the major scheme in the without scheme scenario to identify the incremental effects on cycling and walking. The methods described below are valid for forecasts over and above the without scheme case. Inaccuracies in the base growth forecasts may cause the benefit-cost ratios of the appraised schemes to be inconsistent with those in other areas.

2.1.6 It is anticipated that demand management measures such as Smarter Choices initiatives should be assessed with a proportionate application of a full appraisal, which is likely to require a demand model. These schemes can achieve relatively large impacts on mode choice and hence the change in the volume of motorised traffic may be significant enough to warrant a full model. TAG Unit M5.2 – Modelling Smarter Choices provides further guidance.

2.1.7 The existing evidence base on how long the demand impact of active mode schemes will last is relatively sparse. For behavioural interventions, such as Smarter Choices initiatives, it may be reasonable to assume initial increases in walking and cycling decline over time. This phenomenon can be represented in forecasts through use of a decay rate, so that demand in the 'with scheme' scenario converges with the 'without scheme' demand forecasts over time. For infrastructure investments however, assuming such a reduction in annual demand over time would be inconsistent with appraisal for other transport modes, where decay rates are not routinely applied. Therefore the recommended default assumption for infrastructure investments for active modes is zero decay.

2.1.8 It is important that consistent assumptions are used when comparing schemes and it is advised when undertaking the analysis to include different forecast assumptions to gauge how successful the scheme may be given different forecasts around the core. It may be that some schemes are more sensitive than others, which may affect the decision of which scheme to adopt were outturn forecasts to be more pessimistic, say, relative to the core scenario.

2.2 Approach 1: Comparative Study

2.2.1 The least complex and costly approach to estimating future levels of cycling and walking is through comparisons with similar schemes. Larger proposals are likely to have greater demand changes and afford better potential for comparison with existing schemes. Examples could include river crossings or the creation of other significant links in a network that reduce time and distance, or comprehensive urban centre networks that significantly change the balance between motor traffic and walking and cycling generalised costs.

2.2.2 The difficulty with this method is the many other transport system and socio-economic differences and changes that may exist between the two study areas. Forecasting and valuing benefits form only part of the decision making process and, depending on other policy aspirations, there may be sufficient confidence in an approach based on comparative study.

2.2.3 Encouraging walking and cycling: Success Stories (DfT, 2004a) provides some useful starting points and some indication of potential levels of change for a variety of schemes that have achieved positive outcomes throughout Great Britain. Other sources of data may include monitoring exercises undertaken before and after a similar scheme has been implemented in the local area. The availability of this data is limited, although scheme-specific monitoring is an area that is receiving greater attention and should be encouraged to increase the number of case studies available and hence improve forecasts in future appraisals.

2.3 Approach 2: Estimating from Disaggregate Mode Choice Models

2.3.1 A general introduction to the use of bespoke and other mode choice models is in TAG Unit M2 – Variable Demand Modelling.

2.3.2 Wardman, Tight and Page (2007) derived a model to forecast the impacts of improvements in the attractiveness of cycling for commuting trips of 7.5 miles or less. The full version of this model gives an expression for the forecast market share for cycling given changes in the utility of the different modes.

2.3.3 The example below of the model only applies to changes in the generalised costs of cycling. As such it implies that the utility of all modes except cycling remain unchanged. However, it is fairly straightforward to extend the logit model to include changes in the generalised costs of other modes following the advice given in TAG Unit M2. Given the assumption of no changes in the costs of other modes the logit model used simplifies to:

$$P_y^f = \frac{P_y^b e^{\Delta U_y}}{P_y^b e^{\Delta U_y} + (1 - P_y^b)}$$

Where:

ΔU_y is the change in utility of the cycling mode, in year *y*

P_y^b is the proportion of those choosing to cycle out of the maximum of those where it is a viable option, without any intervention, in year *y*

P_y^f is the proportion of those choosing to cycle out of the maximum of those where it is a viable option, with intervention, in year *y.*

2.3.4 This formula applies to those who would consider the cycle mode as an option. In reality, a significant proportion of people will never select cycling as a viable transport option. Therefore, the model here should not be applied to the whole population. The survey used to derive this model found that 60% of commuters (the purpose being tested) would never consider cycling. Therefore the result of the formula only applies to the 40% who might. To give a figure for total mode share, one simply multiplies this result through by 40%.

2.3.5 The changes in utility are calculated using the equation below and the coefficients in Table 1. These are empirically-based coefficients of utility derived from the above study that apply to the number of people with short commutes (7.5 miles or less) who could enjoy the benefit provided. Only those coefficients relevant to changes in cycle conditions are shown.

$$\Delta U = t(c_w - c_n)$$

Where:

ΔU is the change in utility of the cycling mode

t is the travel time

c_w is the coefficient of utility on routes with facilities (i.e. the do something, with-intervention case)

c_n is the coefficient of utility on routes with no facilities (i.e. do nothing, without-scheme case)

Table 1 Utility of changes to cycle facilities (Source: Wardman et al, 2007)

Change	Interpretation	Coefficient
Change in time on off-road cycle track	Minutes	-0.033
Change in time on segregated on-road cycle lane	Minutes	-0.036
Change in time on non-segregated on-road cycle lane	Minutes	-0.055
Change in time on no facilities	Minutes	-0.115
Outdoor parking facilities	present/not present	0.291
Indoor cycle parking	present/not present	0.499
Shower/changing facilities plus indoor cycle parking	present/not present	0.699
Payment to cycle	one way payment in pence	0.013

2.3.6 The most favourable cycling conditions are assumed to be on an off-road cycle track (-0.033 ‘utils’ per minute). favourable when compared to a road with no facilities, which has a higher coefficient of disutility (-0.115 ‘utils’ per minute). However, the coefficient is negative because cycling for a minute still produces a disutility, as does travel time more generally.

2.3.7 Using the coefficients supplied in Table 1, the change in utility from ten minutes’ use of a road with no facilities to a segregated cycle track is therefore 0.82 (= 10 * (0.115 - 0.033)). Note that zero overall change in travel time is assumed.

2.3.8 If the base proportion of the population who cycle is 2% of all travellers and we assume that a maximum of 40% would cycle, we derive p_y^b as 5%. The model predicts that the proportion of this population cycling after the change will be 10.7% of the total mode share:

$$0.107 = 0.05 * \exp(0.82) / (0.05 * \exp(0.82) + (1 - 0.05))$$

As discussed, to calculate the total mode share of cycling, should it be required, we can multiply by 40% to get a value of 4.3% of the whole population.

2.3.9 Analysts should note that this model only applies to those who could make use of any change to facilities on short commuting journeys. The impact of a variety of different changes can be calculated but these results should be regarded as very approximate in general application.

2.3.10 In theory, such models could be extended to cover walking but research in this area is problematic. People do not regard walking as a mode of transport in quite the same way as driving, using a bus or even cycling so studying their reaction to changes in the walking environment is difficult.

2.4 Approach 3: Sketch Plan Methods

2.4.1 TAG Unit M1.2 – Data Sources and Surveys provides guidance on nationally available data sets. Sources that may be useful include Census journey to work trip matrices and distances and Department for Transport National Trip End Model (NTEM) forecasts of trip ends by mode (including cycling and walking), journey mileage, car ownership and population and workforce planning data. NTEM modal split figures only reflect demographic factors and increasing car ownership. Local models will take account of changes in the generalised cost of travel by each mode and other impacts of rising incomes and local policy action to influence travellers' "taste" for different modes.

2.4.2 Changes to levels of walking and cycling as evidenced or forecast from these data sources may be approximately estimated by rule-of-thumb calculations. Care needs to be taken when assessing the extent to which a scheme might influence trip making, given the sensitivity of the cost-benefits analysis to the forecasts.

2.4.3 Popularity of walking and cycling may also vary from place to place with the acceptability of those modes in those areas, as well as their attractiveness. For example, local walk and cycle initiatives may change the overall attractiveness of these modes without consideration of individual infrastructural schemes. At any rate, background growth, such as that forecast by NTEM, in walking and cycling is required so that the change in demand brought on by a scheme may be compared to the reference case scenario that will experience the background growth.

2.4.4 An approximate elasticity estimate for the change in demand for cycling in a district, based on a change in the proportion of route that has facilities for cycle traffic (cycle lanes, bus lanes and traffic free route), is +0.05. This has been derived from models of the variation in cycle use at ward level (specifically a revision of the models used in Parkin, 2004). As an example, a district might have 2,000 trips by bicycle per day with a total road length of 500 kilometres and an existing length of cycle facilities in the district of 50 kilometres. A scheme is proposed to create a new off-carriageway cycle route of 10 kilometres in length. The new cycle facilities increase the proportion of cycle facilities by 20% (from 10% to 12% of total road length). The expected increase in cycle trip numbers would be 1% (+.05 * 20%), or 20 trips per day (1% * 2000 trips). It should be noted that this is a useful, albeit approximate method for predicting the increase in demand for cycling and the results may differ somewhat from the more multifaceted approach described when estimating from disaggregate mode choice models.

2.5 Other Considerations

2.5.1 Forecasting does not usually distinguish between children and adults. In respect of cycling and the journey to school it may be appropriate to explicitly consider the different responses that children may make to schemes.

2.5.2 Catchments for new public transport modes are based around distances from existing public transport nodes and the topography of the catchments is also sometimes considered. Where there is a proposal for a significant walking or cycling route, for example a traffic-free route along a previously inaccessible green corridor, it may be appropriate to consider analogous techniques.

2.5.3 In comparison to other modes, the choice for walking and cycling is more likely to be influenced by the journey purpose because this affects, for example, the amount of luggage that needs to be carried and the type of clothing that it is appropriate to wear. It may be appropriate to consider modelling techniques that explicitly account for journey end activity.

2.5.4 Estimation of the demand for cycling and walking might also need to take into account the different types of user. For example, pedestrians could be characterised as “striders”, who are using walking to get somewhere and might be sensitive to changes in travel time or “strollers”, who might be less concerned about travelling efficiently but more sensitive to environmental factors (Heuman, 2005). DfT (2004b) suggests a number of different types of “design pedestrian types” and “design cyclist types”. These include commuters, utility cyclists and shopper/leisure walkers all of which might be expected to react differently to different interventions in the form of facilities.

3. Calculation of Key Impacts

3.1.1 Table 2 below shows the key indicators that govern most of the costs and benefits that need to be measured to undertake an appraisal. The figure in **Appendix A:** shows how the indicators inter-relate to the impacts appraised in schematic form. The subsequent guidance explains these in greater detail.

Table 2 Indicators used in the economic appraisal of walking and cycling schemes

Indicator	Used to appraise
Cycling and walking users	Journey quality
New individuals cycling or walking	Physical activity Journey quality
Car kilometres saved	Accidents GHG emissions, air quality and noise Indirect tax revenue Travel time (decongestion)
Commuter trips generated	Absenteeism

3.1.2 TAG Unit A1.1 – Cost Benefit Analysis provides guidance on appraisal periods. Most walking and cycling schemes will have finite project lives and/or significant uncertainty around the longevity of impact (particularly for demand management schemes) so that the sixty year appraisal period recommended for large-scale infrastructure projects might not be applicable. The length of appraisal period will have a significant impact on the appraisal and monetised estimates of impacts should be subject to sensitivity tests around the appraisal period (sensitivity testing is discussed further in section 5). Where longer appraisal periods are used it is vital that all maintenance and renewal costs during the appraisal period are included in cost estimates.

3.1.3 TAG Unit A1.1 also requires all monetary values in appraisal to be presented in real, discounted values (in the Department's base year) and in the market prices unit of account. This applies to walking and cycling schemes just as it does to other schemes.

3.2 Physical Activity Impacts

3.2.1 Physical activity impacts typically form a significant proportion of benefits for active mode schemes. The recommended method for estimating physical activity impacts of active travel is based on monetising the change in mortality resulting from a change in walkers and cyclists, i.e. the benefits from gaining life years. The method requires estimates of the number of new walkers or cyclists as a result of the scheme. This approach is supported by a strong evidence base, which is also included in WHO's 2014 update of its Health Economic Assessment Tool. More detailed guidance on estimating these benefits is given in the physical activity section of TAG Unit A4.1 - Social Impact Appraisal.

3.3 Absenteeism Impacts

3.3.1 Improved health from increased physical activity (such as walking or cycling) can also lead to reductions in short term absence from work. These benefits can be estimated using the methods in TfL (2004), details of which are given in TAG Unit A4.1. The method requires estimates of the number of new walkers and cyclists who are commuting; the time per day they will spend active; and average absenteeism rates and labour costs.

3.4 Journey Quality Impacts

3.4.1 Journey quality is an important consideration in scheme appraisal for cyclists and walkers. It includes fear of potential accidents and therefore the majority of concerns are about safety (e.g. segregated cycle tracks greatly improve journey quality over cycling on a road with traffic). Journey quality also includes infrastructure and environmental conditions on a route. As an impact which is apparent to users, the journey quality benefits should be subject to the 'rule of a half' (see TAG Unit A1.3 – User and Provider Impacts) – current users of the route will experience the full benefit of any improvements to quality but the benefits for new cyclists/walkers should be divided by two.

3.4.2 The evidence in this area is fairly limited. Analysts should use judgment, or potentially a 'sliding scale' approach to value journey quality impacts depending on the perceived quality of an intervention, using published research figures as a guide to the maximum value for an improvement. The journey quality section of TAG Unit A4.1 provides further guidance and the values for estimating journey quality impacts for cyclists and pedestrians are given in TAG Data Book, respectively. Analysts must ensure that when the benefits of schemes are compared against one another, consistent assumptions are made concerning journey quality monetary benefits.

3.5 Accident Impacts

3.5.1 Accident benefits (or disbenefits) are calculated from changes in the usage of different types of infrastructure by different modes and the accident rates associated with those modes on those types of infrastructure. Therefore accident analysis should take account of changes in accidents involving pedestrians and cyclists, resulting from changes in walking and cycling and the infrastructure used, and the impact of mode switch on accidents involving other road users.

3.5.2 The accidents section of TAG Unit A4.1 provides guidance on forecasting and valuing active mode accidents. Where there is significant mode switch, the marginal external cost (MEC) method (TAG Unit A5.4 – Marginal External Congestion Costs) can be used as a simplified approach to estimate the change in accidents generated by a change in car kilometres.

3.6 Environmental Impacts

3.6.1 The environmental benefits from a walk or cycling scheme are achieved through a reduction in motorised traffic and hence a reduction in the associated externalities. The assessment of disbenefits such as noise, air pollution and greenhouse gases are explained in TAG Unit A3 – Environmental Impact Appraisal and TAG Unit A5.4 describes how these impacts can be estimated using the MEC method. Other environmental factors such as the impact on landscape and biodiversity should also be considered.

3.6.2 Some schemes will have more accurate information through use of a formal transport model. Where information on speeds and types of vehicle affected are available, more accurate estimates of greenhouse gas impacts can be estimated using tables in the TAG Data Book for fuel consumption (Table A1.3.11), carbon emissions (Table A3.3) and carbon values (Table A3.4).

3.7 Decongestion and Indirect Tax Impacts

3.7.1 Mode switch from car to active modes will benefit those who continue to use the highways (decongestion benefit) and impact on indirect tax revenues. The MEC method used to estimate accident and environmental benefits from reductions in car use can also be applied to these impacts (see TAG Unit A5.4).

3.7.2 The diversion factors in TAG data book table A.5.4.7 can be used to calculate the change in vehicle kilometres.

3.7.3 The diversion factors have been based off a 2022 study carried out by academics from a consortium of the University of the West of England, Sustrans, Transport for Quality of Life, and the University of Westminster. This rapid evidence assessment involved searching and sifting relevant academic and grey literature as well as making enquiries to experts in the field to identify other material such as unpublished studies. After the sift, an appropriate refreshed car-cycle diversion factor of 0.24 was derived from the findings of a road user intercept survey of seven English cities.[2] The recommended cycling diversion factors for other (non-car) modes have been adjusted proportionately to ensure that cycling diversion across all modes sums to 100%.[3]

3.7.4 The diversion factors indicate how passenger trips on other modes would be affected if an intervention lead to an increase or decrease in bus patronage. For example with a full choice set, if there are 100 new cyclists, there are 24 fewer people travelling by car.

3.7.5 The diversion factors should be used for uni-modal appraisal. If more complex modelling is required see TAG guidance for modelling practitioners.

3.7.6 The diversion factors can be used to calculate the effect of the intervention on road congestion, and the related decongestion benefits. There is currently no guidance on how to appraise the effects of an increase in cycle use on other modes.

3.7.7 Car user trips should be converted in to car vehicle kilometres when these diversion factors are used to calculate decongestion benefits with MECs. The change in car kilometres due to the intervention can be calculated by dividing

[2] These findings are summarised in Sloman, Dennis, Hopkinson, Goodman, Farla, Hiblin and Turner (2019), Summary and Synthesis of Evidence: Cycle City Ambition Programme 2013-2018.

[3] Prior to the 2022 study, all recommended cycling diversion factors in TAG were drawn from Dunkerley, Wardman, Rohr and Fearnley (2018), Bus fare and journey time elasticities and diversion factors for all modes.

the total distance of passenger trips by the average car occupancy rate. Average car occupancy rates can be found in TAG data book table A.1.3.3.

3.7.8 A similar calculation can also be made for taxi journeys. Bespoke analysis of National Travel Survey data carried out by the Department for Transport found an average taxi occupancy rate of 2.4 (not including the driver) between 2002 and 2016.

3.7.9 Diversion factors vary based on the choice set of transport modes which are available. For instance if light rail is not an available alternative, diversion to cycling from other modes will increase. If all the recipient/source modes listed in the table are available alternatives (even if not of interest for scheme) then the diversion factors can be read directly from TAG databook table A.5.4.7.

3.7.10 If not all recipient/source modes are available then the values can be renormalized so that all available alternatives sum to 1. For instance if light rail was not available in a metropolitan area, then all other values should be divided by 0.91(=1-0.09.) Diversion to/from car would become 0.26(=0.24/0.91.) This method assumes that passengers are equally split across all other modes and is therefore an approximation.

3.7.11 The literature review only found sufficient evidence to estimate values for metropolitan areas and we would expect diversion factors to differ based on the length and purpose of the trip. Scheme promoters can use different values if they can justify it with relevant evidence. It is recommended the TAG values are used as a sensitivity test.

3.7.12 It may be appropriate to use the cycling diversion factors to provide an indicative estimate for walking diversion factors, where alternative bespoke evidence on walking is not available. The Department's Active Mode Appraisal Toolkit applies this approach as the default assumption for walking, but further work is needed to improve the evidence base in this area.

3.8 Time Saving Impacts on Active Mode Users

3.8.1 While many active mode schemes may aim to increase demand for walking and cycling through improved quality of facilities, they may also result in time savings to pedestrians and cyclists through provision of quicker or shorter routes. In such circumstances the time saving benefits should be estimated using the ‘rule of a half’ method described in TAG Unit A1.3 – User and Provider Impacts and the values in TAG Data Book.

4. Reporting the Impacts of Walking and Cycling Schemes

4.1.1 The impacts of a walking and/or cycling scheme should generally be reported in the same way as any other scheme, using the same reporting tables.

4.2 Transport Economic Efficiency (TEE) Table

4.2.1 Impacts on walkers and cyclists, in qualitative or monetised form, should be reported in the 'Other' column of the TEE table, split by business, commuting and other journey purposes. Where decongestion benefits for road users are calculated using the MEC method, these should be recorded as time benefits in the 'Road' column[4].

4.3 Public Accounts (PA) Table

4.3.1 TAG Unit A1.2 – Scheme Costs provides guidance on estimating scheme investment and operating costs. Costs of walking and cycling schemes should be treated in the same way as for other schemes; including appropriate adjustments for risk and optimism bias and presented in the market prices unit of account.

4.3.2 Where there is significant mode shift and the MEC method has been used, the change in indirect tax should be recorded. Note that costs in the PA table are recorded as positive values so that a reduction in indirect tax revenue should appear as a positive value.

4.4 Analysis of Monetised Costs and Benefits (AMCB) Table

4.4.1 Sub-totals from the TEE and PA tables should be carried over to the AMCB table. Monetised estimates of physical activity (comprising health and absenteeism impacts), journey quality, accidents and environmental impacts following the methods described in this unit should also be included in the AMCB table.

4.5 Appraisal Summary Table (AST)

4.5.1 Monetised estimates should also be recorded in the 'Monetary' column of the appropriate rows of the AST. Practitioners should refer to TAG Units relating to specific impacts for guidance on what should be recorded in the 'Summary of

[4] The decongestion benefits include both time and vehicle operating cost (e.g. fuel) savings but time savings tend to dominate.

key impacts' column and any further quantitative information that should be reported.

4.6 Non-monetised Impacts

4.6.1 The appraisal should also consider impacts that it is not possible to monetise. Practitioners should refer to TAG Units relating to the specific impacts for further guidance on how they should be assessed and reported in the AST.

5. Sensitivity Testing

5.1.1 A critical issue with the appraisal of walking and cycling schemes is that the above analyses can be highly sensitive to the forecasts and assumptions used. Therefore, in all cases it is advised, to produce as robust an analysis as possible, that sensitivity tests are undertaken on the core assumptions made.

5.1.2 Key assumptions to consider in sensitivity testing include the following, but other variables may also be relevant:

- **Length of appraisal period**. How long will the benefits really last before reinvestment is required? This is especially pertinent if demand management measures are being appraised or considered;
- **Rate of decay of users and benefits**. The existing evidence base is relatively sparse on how long the benefits of active mode schemes last. Therefore the impact of different forecast assumptions on the scale of benefits should be tested (potentially including negative decay rates to represent increased use encouraging others to take up active modes over time). It may be that some schemes are more sensitive than others, which may affect the decision of which scheme to adopt were outturn forecasts to be more pessimistic, say, relative to the core scenario.
- **Quantum of journey quality benefits**. It can be particularly difficult to assess the size of journey quality benefits to apply, not only in terms of the values to adopt, but the applicability of those values to users. The latter will depend on the length of time users are exposed to improvements (e.g. cyclists will often not use a full length of improved infrastructure for their journey). Different unit benefits per user should be tested to better understand how this impacts on the potential scheme benefits.
- **Other key assumptions**. All other assumptions underpinning the appraisal need careful consideration and justification since these will impact on the sensitivity of the scheme assessment and the resulting costs and benefits produced. For example, assumptions concerning average journey length will be important. In the case of a pedestrian bridge, for example, the scheme may encourage more walkers but will result in less health benefits if, say, journey times are reduced as a result of the connectivity benefits derived by

the new crossing. The active mode appraisal spreadsheet toolkit[5] supporting this guidance contains default assumptions around journey speeds and lengths, but where these are varied by the user based on local evidence the results may be highly sensitive to changes made.

6. Monitoring and Evaluation

6.1.1 Monitoring and evaluation are important elements of implementing schemes that affect walking and cycling. Monitoring and evaluation should take place in a timely manner and planning monitoring and evaluation will help to clarify scheme aims and objectives.

6.1.2 Data arising from evaluation exercises will add to the current evidence base. This will be of great use when forecasting for subsequent schemes, especially if similar schemes are planned in the future and in light of the importance of sustainable transport options to health and the environment. Since post-scheme monitoring should be an important part of the implementation of a successful scheme, an estimate of the costs to do so should be included in the scheme costs.

6.1.3 Monitoring of schemes is **essential** both before and after implementation. A set of 'before scheme' data is required to establish a Without Scheme case against which to compare forecasts. The purpose of collecting post-scheme evaluation data is to ensure that the impact of any scheme is identified to:

- check whether the predictions made about a scheme were correct;
- determine whether a scheme was a success or not;
- analyse why it was effective (or otherwise);
- identify what can be learned from the scheme; and
- inform the analysis and appraisal of future schemes.

6.1.4 Evaluation can also be used to publicise a scheme and make the lessons learned available to the wider transport planning community. Useful guidance on the evaluation of Road Safety Education Interventions is contained in 'Guidelines for Evaluating Road Safety Education Interventions' (DfT, 2004c) and much of this may be applicable to the evaluation of a walking or cycling scheme.

6.1.5 The advent of Smarter Choices Initiatives also make monitoring and evaluation of vital importance. The data collected will assist in quantifying demand shifts through the introduction of softer measures and the propensity for people to change modes having received better information to make more informed choices. There is an evident overlap with the needs of transport models to forecast these changes in demand effectively, requiring relatively large volumes

[5] Available at: https://www.gov.uk/government/publications/webtag-social-and-distributional-impacts-worksheets

of good quality data. Table 3 details the potential monitoring requirements of cycling and walking schemes.

Table 3 Minimum Monitoring Requirements of Cycling and Walking Schemes

	Data to be collected
Prior to scheme implementation	Number of cyclists/pedestrians per day Utility/leisure split Journey time Origins and destinations
Scheme Details	Length of scheme Environmental improvements (landscaping, vegetation etc) Safety/security improvements (lighting, CCTV etc) Links with other schemes (part of a network, parking, resting places, crossings etc) Information (signage)
Following scheme implementation	Number of cyclists/pedestrians per day Utility/leisure split Mode shift (previous journey mode) Previous journey route (if transferred) Journey time Origins and destinations

6.1.6 Methods of monitoring cycling include the following:

- National Travel Survey, National Traffic Census, National Population Census (National level)
- Automatic Traffic Counters (ATCs) (including pneumatic tube counters, piezoelectric counters and inductive loops)
- Manual Classified Counts (MCC)
- Cordon and Screenline Counts
- Destination Surveys
- Interview Surveys

6.1.7 Monitoring techniques that should be used for walking include:

- Origin/destination surveys
- Household surveys and travel diaries
- Manual counts
- Automatic count methods (including video imaging, infrared sensors, piezoelectric pressure mats).

6.1.8 Further information on each of these monitoring techniques; how to select survey sites; and when to undertake surveys is provided in the 'Traffic Advisory Leaflets Monitoring Local Cycle Use' (DETR, 1999) and 'Monitoring Walking' (DETR, 2000).

7. References

DETR (1999) Monitoring Local Cycle Use, TAL 01/99, January.

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8. Document Provenance

This TAG Unit forms part of the restructured TAG guidance, taking previous TAG Units as its basis. It is based on previous Units 3.14.1 Guidance on the Appraisal of Walking and Cycling Schemes, which became definitive guidance in 2009, and 3.5.5 Impacts on Pedestrians, Cyclists and Others, which was based on Appendix G of Guidance on the Methodology for Multi-Modal Studies. The case study in the appendix has been updated to reflect changes to values in other guidance units.

This guidance was updated in December 2017 to reflect new research commissioned by the DfT into the health benefits of walking and cycling.

A.1.1 This guidance was also updated in May 2020 taking out Appendix B with added text directing users to an Active Mode Appraisal Toolkit User Guide

A.1.2 This guidance was updated in November 2022 to reflect new evidence on cycling diversion factors.

Appendix A: Summary Of Active Mode Scheme Appraisal Process

This figure shows the basic processes used to collect together the various cost and benefit elements for the appraisal of a walking and cycling scheme