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Project Appraisal Guidelines Unit 13.1 – Cost Benefit Analysis Using Tool for Economic Appraisal of Active Modes (TEAM)

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This document has been authorised by the Director of Professional Services, Transport Infrastructure Ireland. For any further guidance on the TII Publications system, please contact the following:

Contact: Standards and Research Section, Transport Infrastructure Ireland
 Postal Address: Parkgate Business Centre, Parkgate Street, Dublin 8, D08 DK10
 Telephone: +353 1 646 3600
 Email: infoPUBS@tii.ie

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Updates to TII Publications resulting in changes to

**Project Appraisal Guidelines Unit 13.1 – Cost Benefit Analysis Using Tool for Economic
Appraisal of Active Modes (TEAM) PE-PAG-02046**

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Amendment Details:

A new unit that replaces the previous chapter 4 of PAG Unit 13.0. This new unit provides updated guidance on the appraisal of active modes schemes using TEAM. The guidance primarily covers Cost Benefit Analysis of active modes schemes using the undated version, Version 5, of TII's TEAM tool which is available on the "Supplementary Documents" section of the TII publications website.

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1. Introduction

Tool for Economic Appraisal of Active Modes (TEAM) is an Excel based tool developed by TII for undertaking Cost Benefit Analysis (CBA) of active modes schemes including National Roads projects and greenways.

This PAG Unit 13.1 provides guidance on TII's dedicated Excel-based tool for undertaking a CBA of active modes schemes. This guidance is supplementary to PAG Unit 13 which provides general guidance on the appraisal of active modes.

Cost Benefit Analysis is a method of quantitative economic appraisal for transport schemes and is required for projects costing over €30 million (as per Transport Appraisal Framework (TAF) Guidelines¹), including National Roads schemes where active modes infrastructure is also being provided. Cost Benefit Analysis (CBA) compares the monetised active modes benefits of a proposal (such as health benefits or journey time savings) to its cost and uses this to assess whether a project represents good value for money. Using TEAM to conduct CBA for road and public transport schemes results in a streamlined and consistent appraisal process across different schemes.

1.1 Tool for Economic Appraisal of Active Modes (TEAM)

TEAM is a user-friendly tool that can quickly estimate the main benefits associated with increased levels of walking, cycling and e-bike use. It can be used to carry out a full CBA for an active mode scheme, as it provides a summary of the benefits and economic outputs required by the Project Appraisal Guidelines (PAG) and TAF. It can also be used to simply calculate the active modes benefits for inclusion in another economic appraisal (for example, to add to a CBA for a National Roads scheme which may include an active travel element).

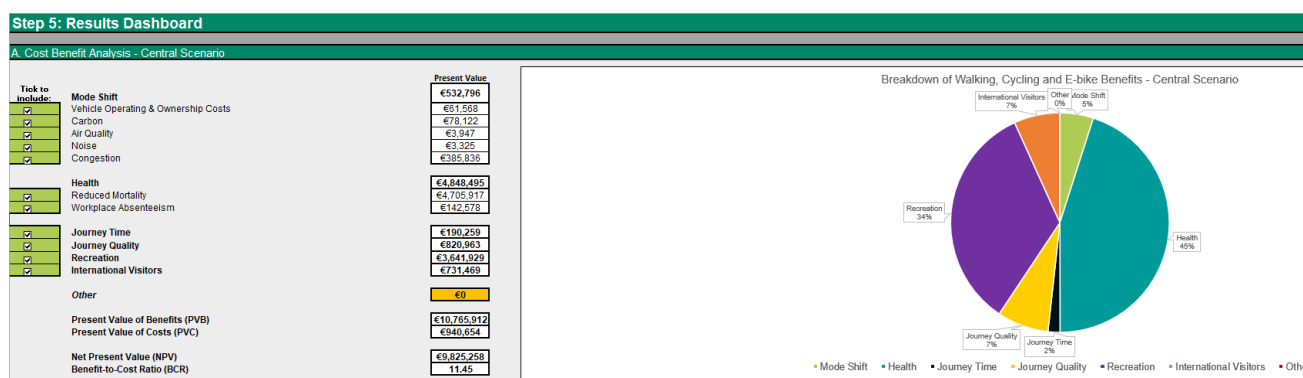


Figure 13.1.1 Example of the Results Dashboard from a TEAM Appraisal

TEAM is based on a series of Excel sheets which combine simple user inputs with background calculations and assumptions to estimate the costs and benefits associated with a proposal, before summarising these results in a results dashboard. There are five main steps to carrying out a CBA using TEAM, each associated with a different Excel sheet in the tool, as shown in Figure 13.1.2.

¹ While the Department of Transport TAF requires CBA for projects over €30 million, TII recommend the use of TEAM for all active travel projects regardless of value.

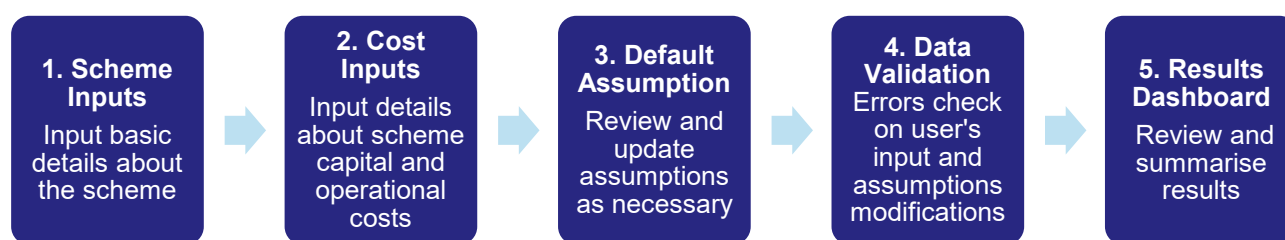


Figure 13.1.2 Steps Involved in Carrying out TEAM Appraisal

TEAM is designed to be easy-to-use, with most steps explained within the tool itself. The use of standard methodologies and default assumptions reduces the data that project teams are required to gather, meaning that TEAM assessments can be carried out with relatively few user inputs. However, the following sections provide further detailed guidance for each of these steps, as well as the specific purpose and requirements of each input and assumption.

TEAM has been in use for the appraisal of active modes of travel since December 2021. The version of the tool described in this PAG Unit 13.1 is version 5. TEAM has been updated in 2026 and evolved to better meet users' needs. Included in this most recent update is revised parameter assumptions, improved treatment of cost inputs, including the ability to enter costs annually, the addition of e-bike as an active mode of travel, the inclusion of additional benefits on the main results dashboard, and a new headline results dashboard that presents the tool's key outputs in accessible language for users.

2. Quantitative Economic Benefits Included within TEAM

TEAM automatically estimates the main economic benefits associated with active modes schemes, including Health, Mode Shift, Journey Time, Journey Quality and Recreation benefits. These benefits are summarised in Table 13.1.1.

Table 13.1.1 Economic Benefits Included in TEAM

Economic Benefit	Description of benefit
Mode Shift Benefits - Benefits for individuals and society from a reduction in car use.	
Vehicle Operating & Ownership Costs	Savings for households due to a reduction in vehicle operating & ownership costs, such as reduced fuel consumption, non-fuel operating costs, and the overall cost of vehicle ownership.
Carbon	Reduction in carbon emissions.
Air Quality	Reduction in emissions of non-greenhouse gases such as nitrous oxides and particulate matter, and improved air quality and health.
Noise	Reduction in noise from vehicles and traffic
Congestion	Reduction in congestion to reduced car use, particularly in urban areas.
Health Benefits - Benefits for users and society associated with increased levels of physical activity.	
Reduced Mortality	Reduction in the risk of premature mortality.
Workplace Absenteeism	Reduction in costs for employers associated with the number of sick days taken.
Other Benefits – other benefits associated with active travel.	
Journey Time	Benefits for users from a reduction in journey times.
Journey Quality	Benefit for utility users from high quality cycling infrastructure.
Recreation	Benefits for recreational users of high-quality walking and cycling infrastructure.
International Visitors	Benefits arising from direct spend of overseas visitors when using the walking and cycling infrastructure.

These benefits are estimated by TEAM using a range of sources and methodologies, most of which are hidden in background sheets to streamline the process for the appraiser. These sources include:

- Calculation of reduced mortality and carbon benefits is based on the methodology of the World Health Organization's Health Economic Assessment Tool (HEAT)² for walking and cycling. Localised parameters from TAF and PAG were used where necessary, including for vehicle emissions factors and the Shadow Price of Carbon.
- Methods and values currently contained in PAG and TAF are used to calculate air quality benefits, vehicle operating and ownership costs, and journey time savings³.
- The methodology for 'Workplace Absenteeism' benefits is based on research from the WHO⁴.
- The marginal external costs of noise and congestion were sourced from the UK Transport Appraisal Guidance, and value transfer techniques were used to convert these into Irish values based on relative exchange rates and real GNP⁵.
- Journey quality values are derived from the journey ambience benefit values (per minute) for cycling facilities provided in the TAF. The tool estimates the amount of time cyclists and e-bike users spend using the cycling infrastructure and multiplies this by the corresponding per minute journey ambience benefit value to calculate the overall journey quality benefit.
- International visitors spend is calculated using Fáilte Ireland's per diem rate per visitor⁶, applied to the estimates of demand from international visitors, and adjusted according to the seasonality evident in the tourism sector and the location where the active mode infrastructure will be provided. Technical methodologies for TEAM and the benefits contained therein are contained in Appendix A.

² WHO, 2017. 'Health Economic Assessment Tool (HEAT) for Walking and Cycling'. Available at: https://www.euro.who.int/__data/assets/pdf_file/0010/352963/Heat.pdf

³ See PAG Unit 6.11 for vehicle operating costs and emissions parameters.

⁴ World Health Organisation (WHO), 2003, Health and development through physical activity and sport, WHO/NMH/NPH/PAH/03.2, Geneva, Switzerland

⁵ Values adapted from Department for Transport, 2026. 'TAG Data Book – Table 5.4.2. Available at: <https://www.gov.uk/government/publications/tag-data-book>

⁶ Fáilte Ireland, 2026. Key Tourism Facts 2024.

3. Additional Benefits of Active Travel Included in TEAM

In addition to estimating the economic benefits of active travel, TEAM also estimates several non-economic benefits to active travel that may be of interest to appraisers of the scheme. The additional benefits TEAM estimates and presents on the main results dashboard are listed in Table 13.1.2.

Table 13.1.2 Additional Benefits Included in TEAM

Additional Benefit	Description of benefit
Carbon Diverted	Benefits in terms of tonnes of CO ₂ emissions diverted from a shift to active modes of travel including walking, cycling, and e-bike.
Time Spent Exercising	The total number of minutes spent exercising from new and existing walking, cycling and e-bike trips.
Life Expectancy	The number of years of increased life expectancy resulting from increased physical daily activity ⁷ .
Number of Trips	The total number of new and existing walking, cycling, and e-bike trips resulting from implementation of new infrastructure.
Trips Diverted from Other Modes of Transport	Trips diverted from other modes of transport including private car, walking, cycling, e-bike, bus and rail. Calculated for walking, cycling and e-bike trips.
Kilometre Travelled	The total number of km travelled from new and existing walking, cycling, and e-bike trips.
Passenger km Diverted from Other Modes of Transport	The total number of passenger km diverted from other modes of transport including private car, walking, cycling, e-bike, bus and rail. Calculated for walking, cycling and e-bike trips.

These benefits are estimated by TEAM using a range of assumptions and methodologies, most of which are hidden in background sheets, to streamline the process for the appraiser. These sources include:

- Total carbon emissions avoided are derived from total km travelled by mode of travel and emissions factors sourced from the WHO Health Economic Assessment Tool (HEAT)⁸

⁷ The model assumes that the same individuals contribute to daily active travel demand when estimating life expectancy. This approach is a simplifying assumption. In reality, and particularly for greenways that attract more transient users, these daily users might change over time.

⁸ WHO HEAT emissions factors can be found here <https://www.who.int/publications/i/item/9789289052788>

- Life expectancy benefits are derived from the minutes of time spent exercising daily which are calculated within the model for walking, cycling and e-bike modes of transport. Two studies^{9, 10} have been used to translate changes in physical activity to changes in life expectancy.
- The total number of new and existing walking trips are based on user demand inputs to the model.
- The number of km travelled are derived from the default assumptions on minutes of travel by mode, speed of travel by mode and user inputs on the scheme length.
- Time spent exercising is derived within the model from demand inputs on number of users, inputs on scheme length, and default assumptions on speed of travel.
- Trips diverted from other modes of transport are based on demand inputs to the model by the user and default trip diversion rates.
- Km diverted from other modes of travel are calculated within the model using number of trips diverted and average km travelled by mode of travel.

⁹ Minimum amount of physical activity for reduced mortality and extended life expectancy: a prospective cohort study - The Lancet - [https://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(11\)60749-6/abstract](https://www.thelancet.com/journals/lancet/article/PIIS0140-6736(11)60749-6/abstract)

¹⁰ Physical Activity and Life Expectancy: a life table analysis - <https://research-repository.griffith.edu.au/server/api/core/bitstreams/ede896ad-8ece-4cdc-b1e6-6a6e2b16838b/content>

4. Costs of Active Travel Schemes in TEAM

TEAM considers a range of costs associated with an active travel scheme. These include capital costs, contingency allowance, operational and maintenance costs, and refurbishment and replacement costs.

4.1 Capital Costs and Contingency

Capital costs comprise all costs incurred in the development and delivery of an active travel scheme prior to it becoming operational. These may include, but are not limited to, design, land acquisition, planning, surveys, construction, project management, and professional fees.

Total capital costs should be estimated across the planning and construction phases of the scheme and input to TEAM according to the expected project programme. The timing of capital expenditure is an important determinant of appraisal results because costs are subject to economic discounting. Expenditure incurred earlier in the appraisal period has a greater present value and therefore a larger negative impact on CBA results than expenditure incurred later in the project lifecycle.

All capital costs should be entered into the model in real prices (i.e. excluding inflation) and should exclude VAT. Users must specify the price base year of the cost estimates so that the model can convert costs to 2016 prices, consistent with TAF requirements.

Capital cost estimates should include an appropriate contingency allowance to reflect the level of project risk and uncertainty at the stage of scheme development. Contingency allowances can represent a significant proportion of total project costs particularly at the early stages of project design. This should be reviewed and reduced as risks are mitigated, transferred or eliminated.

As with other capital costs, the timing of contingency expenditure should be reflected in the cost profile entered into the model as its present value will vary depending on when the expenditure is expected to occur. Contingency allowances should be entered in real prices and exclude VAT.

4.2 Operation and Maintenance Costs

Operational and maintenance costs comprise all costs incurred after the scheme becomes operational to maintain service quality, safety, and asset condition throughout the appraisal period. These costs may include routine maintenance activities such as cleaning, vegetation management, drainage maintenance, surface repairs, inspections and the upkeep of signage, road markings, and other infrastructure assets such as lighting.

The model allows operational and maintenance costs to be entered either as an average annual cost or on an annual basis over the appraisal period. Costs should be estimated to reflect the ongoing operation and routine maintenance requirements of the scheme.

As operational and maintenance costs are subject to economic discounting, the timing and profile of expenditure should be reflected as accurately as possible. All costs should be entered in real prices, that is excluding inflation and should exclude VAT. Operational and maintenance costs also require a price base year to be input to the model.

4.3 Refurbishment and Replacement Costs

Refurbishment and replacement costs comprise significant non-recurring expenditures required to restore, renew, or replace infrastructure assets during the appraisal period.

For active travel schemes these costs may include pavement resurfacing, major structural repairs, or the full replacement of infrastructure where assets have reached the end of their service life. Unlike routine maintenance costs, refurbishment and replacement costs typically occur at specific points in time and can represent a substantial proportion of the whole life cost of a scheme.

The model allows refurbishment costs to be entered in the year in which they are expected to occur, and requires the year to be specified for when full reconstruction of the infrastructure costs occur. As these costs are subject to economic discounting the timing of expenditure should be reflected as accurately as possible, costs which occur later in the appraisal period will have a lower present value than costs incurred earlier.

All refurbishment and replacement costs should be entered in real prices, that is excluding inflation, they should also exclude VAT and be accompanied by the price base year the costs are expressed in.

4.4 Shadow Prices

Two adjustments may be applied to the costs input to the model: a Shadow Price of Public Funds (SPPF) adjustment and a Shadow Price of Labour (SPL) adjustment. Users are asked to input the proportion of costs which are publicly funded to which the SPPF adjustment factor of 130% is applied. This adjustment reflects the opportunity cost of raising and allocating public funds, recognising that public expenditure imposes wider economic costs beyond the direct expenditure itself. Users are also requested to enter the proportion of costs which are attributable to labour to which the SPL adjustment factor is applied.

The default SPL factor is 100% reflecting the difference between market wages and the economic opportunity cost of labour. A SPL factor below 100% accounts for the potential that labour employed on a project may not be fully displaced from alternative productive employment, resulting in an economic cost that is lower than the corresponding financial cost. This is only relevant for regions or periods with high unemployment.

5. Detailed Steps for Carrying out a CBA using TEAM

5.1 Sheet 1 – Scheme Inputs

The first step of a TEAM appraisal allows the input of basic details about a scheme, as well as details of the scenarios being tested.

5.1.1 Section A - Scheme and Infrastructure Details

The first set of questions aims to provide basic details regarding the scheme, including:

- **Scheme Area Type** – Choose between five area types that best describe the location of the scheme:
 - Dublin City (the area administered by Dublin City Council)
 - Greater Dublin Area (counties Dublin, Kildare, Wicklow, Meath)
 - Regional Cities (Cork, Limerick, Galway, Waterford)
 - Other towns / urban districts (with a population greater than 1,500)
 - Rural (areas with a population of less than 1,500).

The location should reflect the location where the majority of users are based. For example, if a scheme passes through a rural area but is primarily aimed at connecting two nearby towns, choose 'Other towns / urban districts'. The chosen location will affect the 'diversion rates' that are used by the tool, which refers to the modes new users are assumed to have shifted from.

- **Scheme Geographical Region** – The region in which the scheme is being delivered. Choose between seven administrative regions in Ireland:
 - Dublin
 - East / Midlands
 - South East
 - South West
 - Shannon (Sometimes referred to as 'Mid West')
 - West
 - North West (Sometimes referred to as 'Border')

This information is required to consider the likelihood that an international visitor will visit a particular region. This captures an element of regional preferences of international visitors when engaging in walking and cycling during their time in Ireland¹¹. Regional choice reflects the location of where the majority of users are based. Further details are available in Section A.5.

- **Scheme Opening Year** – Input the year that the scheme/intervention is expected to be complete and open to users.

¹¹ In 2019 Ireland received 9.674 million overseas visitors, and 361,000 took part in cycling, which equates to 3.7%.
https://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/3_Research_Insights/4_Visitor_Insights/KeyTourismFacts_2019.pdf?ext=.pdf Accessed March 2023

- **Scheme Length** – Input the total length of the scheme / route corridor in question in kilometres.
- **Demand Split** – This should only be used where there are significant differences in demand across various sections of a scheme. Demand may vary in terms of users (commuters, recreational users, or international tourists) and demand values (higher or lower) for each section length. See Figure 13.1.3 for hypothetical example of an extension to an existing scheme.

How long is the scheme in question? (in kilometres)	50.00				
Is there different type of demand for different sections on the new scheme?	Yes				
Break down the total scheme length into different types of infrastructure (in kilometres):	Existing infrastructure	SECTION A	SECTION B	SECTION C	SECTION D
Off-road segregated cycle trails (e.g. Greenways, Cycle Trails, Cycleways)	10.00	10			
On-road cycle-track <i>with</i> physical separation from traffic (e.g. kerbs, verges, bollards)	7.50		7.5		
On-road cycle lane <i>without</i> physical separation from traffic (e.g. painted lanes)	0.00				
Wider lane	0.00				
Shared bus lane	0.00				
No dedicated facilities	0.00				
	17.50	10	7.5		
Break down the total scheme length into different types of infrastructure (in kilometres):	Proposed infrastructure (with existing infrastructure)	SECTION A	SECTION B	SECTION C	SECTION D
Off-road segregated cycle trails (e.g. Greenways, Cycle Trails, Cycleways)	20.00	20			
On-road cycle-track <i>with</i> physical separation from traffic (e.g. kerbs, verges, bollards)	30.00		30		
On-road cycle lane <i>without</i> physical separation from traffic (e.g. painted lanes)	0.00				
Wider lane	0.00				
Shared bus lane	0.00				
No dedicated facilities	0.00				
	50.00	20	30		

Figure 13.1.3 Example of Inputting Route Infrastructure Details

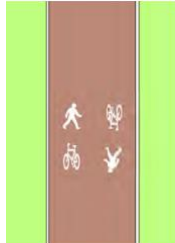
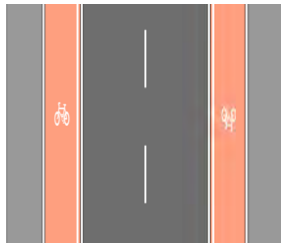
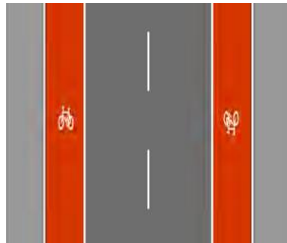
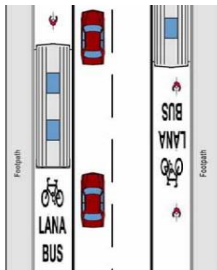
- **Infrastructure Breakdown** – Provide a breakdown of the types of infrastructure along the route/corridor under the existing situation, and under the proposed situation/option. This should break down the total scheme length in kilometres across six potential types of infrastructure, as follows:
 - Off-road segregated cycle trails, (e.g. Greenways, Cycle Trails, Cycleways)
 - On-road cycle-track with physical separation from traffic (e.g. kerbs, verges, bollards)
 - On-road cycle lane without physical separation from traffic (e.g. painted lanes)
 - Wider lane
 - Shared bus lane
 - No dedicated facilities

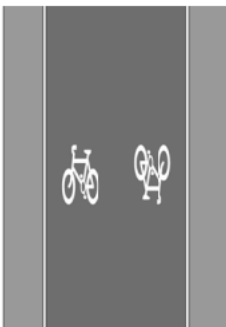
It is important to differentiate between infrastructure types, as there are different benefits that are calculated for each type. If the scheme is a new route, the 'Existing infrastructure' field should describe the infrastructure type of the nearest alternative route, which in most cases, is likely to be 'no dedicated facilities'. Examples of different types of cycling infrastructure are displayed below from the NTA's (2023) Cycle Design Manual¹² in Figure 13.1.4.¹³

¹² Available from: <https://www.nationaltransport.ie/publications/cycle-design-manual/>

¹³ These types of cycling infrastructure are for the purposes of example only. TII standards for cycling infrastructure can be found in DN-GEO-03047 Rural Cycleway Design (Offline & Greenway).

- **Journey Time Savings** – This should only be used in the case of interventions that remove detours or improve permeability along specific routes, such as bridges, under/overpasses, or the provision of shortcut routes. If a route does so, the user will be asked to provide an estimate of how many minutes the average pedestrian and/or cyclist will save, which will be used to calculate the journey time savings benefit.

Cycle Link	Road Design	Example of Facility
Off-Road Two-way cycle route, typically shared with pedestrians, but segregation is also possible. Typically located off-line (away from vehicular carriageway) or sometimes adjacent to a rural roads.		
On-Road Cycle Track Segregated cycle facilities with generally no buffer between cycle track and carriageway.		
On-Road Cycle Lane Mandatory Cycle lanes are marked on carriageways by a continuous white line and not physically separated from motor traffic. Motor traffic is legally prohibited from entering mandatory cycle lanes, except for access purposes.		
Shared Bus Lane Cyclists are usually permitted to use with-flow and contraflow bus lanes. Whilst not specifically a cycle facility, bus lanes can offer some degree of protection for cyclists as they significantly reduce the amount of interaction with motor traffic.		

Cycle Link	Road Design	Example of Facility
No dedicated facilities / mixed traffic Cyclists share the carriageway with vehicular traffic. Only suitable for roads with low traffic speeds and volumes such as quiet residential or access streets. Traffic management or calming measures are likely required to ensure low traffic speeds and/or volumes.		

Source: NTA, 2023. 'Cycle Design Manual'

Figure 13.1.4 Cycle Link Types

5.1.2 Section B – Demand Scenarios

One of the most important inputs to the tool is the demand scenario, meaning the numbers of pedestrians, cyclists and e-bike users using a scheme before and after an intervention. This demand scenario is used to calculate the benefits associated with a change in the number of pedestrians, cyclists, and e-bike users and it is the most important driver of the appraisal results.

Under this field, the user is asked to input the number of daily pedestrian, cyclist, and e-bike trips in the existing situation, as well as in the future demand scenarios. There are spaces for three demand scenarios: a low, central, and high scenario. The number of trips entered should reflect the total number of trips in an area or along a route corridor, in both directions.

In many cases, it will be difficult to predict how many users are likely to use a scheme, or how an intervention (such as adding segregated facilities) will affect walking, cycling and e-bike user numbers. Guidance is provided in PAG Unit 13 to help estimate demand, particularly in instances where there is little existing data.

This section also seeks four additional pieces of information:

- Annualisation** – An annualisation factor is used to convert average daily demand scenarios to annual values. A default value of 300 (i.e. 300 days per year) is provided, which is based off estimates from cycle counter data in Dublin. Cycle counter data was used to create an accurate assumption for typical travel patterns. If, for example, the annualisation scenario is based on weekday demand, the number of 'working days' may be appropriate to use (i.e., 265 days per year). Alternatively, a simple annual conversion factor of 365 days can be used.
- Recreational users** – When calculating benefits, TEAM distinguishes between 'recreational users' (i.e., people walking, cycling or e-biking for exercise/fun, and with no specific destination in mind), and 'utility users' (i.e., those travelling for a specific purpose or to reach a specific destination such as work, school, shopping etc.). This split affects how benefits are calculated: while 'Mode Shift', 'Journey Quality' and 'Journey Time Savings' are only calculated for utility users, 'Recreation' benefits are limited to recreational users. Benefits arising from domestic visitors are captured within recreational benefits in TEAM.

Appraisers are asked to estimate what proportion of users are likely to be 'recreational users', with the remaining users assumed to be 'utility users'. This is likely to be a high-level judgement based on the location or context of the scheme.

For example, a rural greenway is likely to have a high proportion of recreational users, while an urban scheme connecting to lots of workplaces and shops is likely to be more weighted towards utility users.

This can also depend on the source of demand estimates: for example, estimates that are derived from transport models will generally exclude recreational users, while estimates that come from count or survey data include all user types.

- **International visitors** – Appraisers are asked if the scheme will be used by international visitors. Spending by international visitors is an additional benefit of active travel schemes and some schemes have the potential to attract international visitors. This will generally apply only to schemes of a certain scale, located in certain areas or have unique characteristics that will attract overseas visitors. Justification for the inclusion of benefits associated with international visitors should be provided in the appraisal reporting for the scheme.
- **Proportion of international visitors** – Appraisers can input the estimated percentage of overall daily trips that are likely to be taken by international visitors. This is calculated as a percentage of the total users inputted in 'Section B - Demand Scenarios'. If unsure, this section can be left blank, and a default assumption will be inputted by TEAM.

Consideration needs to be given to whether an intervention is likely to attract new tourism, or whether it will simply displace tourists and economic activity from other locations in the country. One caveat to be noted when including international visitors benefits within TEAM are given below, to avoid overestimating the impact of the proposal.

Only spending from overseas visitors should be included as a benefit within a CBA. While greenways can result in an economic stimulus for local businesses, there is a strong risk of 'displacement' when it comes to domestic spending: for example, a domestic visitor spending money in a café along a greenway would likely have otherwise spent that money in their home county or another part of the county, meaning that the economic benefit is simply being displaced or redistributed from one area to another. Benefits arising from domestic visitors are captured within recreational benefits in TEAM.

5.2 Sheet 2 – Cost Inputs

The second sheet allows the appraiser to input details regarding the capital and current costs of the proposals.

5.2.1 Capital Costs

Capital costs are once-off costs, such as construction costs or planning/design, and are the main costs associated with projects. When inputting capital costs in the tool, the following information is requested:

- **Total Cost (excluding VAT and inflation)** – The total cost in each of the main capital cost categories (e.g. construction, design, land & property etc.) should be entered here. This total should not include Value-Added Tax (as this ultimately returns to the government); nor future inflation (as all prices are converted back to a base year). It should however include any risk associated with this particular cost category. A separate line is provided for general programme risk (sometimes also referred to as optimism bias or contingency).
- **Percentage provided by public funds** – In most cases, all of the project's budget will be supplied by public funds, and this should be kept at 100%. If any private funding is being provided, reduce this value to reflect the non-public fund component for this.

- **Percentage that relates to labour** – Provide an estimate of the proportion of each cost that is spent on labour (i.e. wages, salaries etc.). This percentage is used later for calculating the Shadow Price of Labour. Default percentages have been provided for each cost category.
- **Year of the Cost estimate** – This refers to the price year in which the original cost estimates are based. The tool will then convert these costs into the base year that is being used.
- **Apportionment** – Apportionment relates to the percentage of each cost that is spent in each year. The timeframe for projects often lasts for several years, and different costs can be incurred at different times.
- **Contingency Allowance** – The TEAM tool allows programme risk/contingency allowance to be entered separately from the individual capital cost categories. The contingency allowance should be entered excluding VAT and inflation, together with the relevant price year.
- Users may either retain the default apportionment approach or specify the annual distribution of contingency costs where this information is available. This provides greater flexibility where contingency expenditure is expected to differ from the capital cost profile.
- If the spending profile of the scheme is not known / not relevant: Simply keep the yellow 'Don't Know' box checked, and the tool will automatically apportion costs to the two years before opening.
- If the spending profile of the scheme is known: Make sure the yellow box is unchecked and put percentages under each year indicating what percentage of that cost will be spent. Make sure that each row adds to 100%.

Figure 13.1.5 provides an example of updated cost inputs for a project with a specific annual profile.

Base Capital Costs	Total Cost (excl. VAT and inflation)	What percentage of this cost is provided by public funds?	What percentage of this cost relates to labour?	What is the year of this cost estimate?	How are capital costs apportioned annually? (in percentages)					
					Don't know	2024	2025	2026	2027	2028
Main Contract Construction	€5,000,000	100%	30%	2026	☐	40%	30%	30%		
Main Contract Supervision		100%	50%		☐					
Archaeology		100%	50%		☐					
Advance works and other contracts		100%	30%		☐					
Land & Property		100%	10%		☐					
Residual Network		100%	30%		☐					
Planning & Design		100%	60%		☐					
TII Programme Risk / Contingency Allowance	€500,000	100%	30%	2026	☐	20%	30%	50%		

Figure 13.1.5 Example of Inputting Capital Costs and Contingency

5.2.2 Operating & Maintenance Costs

The tool also asks for annual Operating & Maintenance (O&M) Costs, such as those associated with staffing or day-to-day maintenance. The field also asks for some of the same information as above, including the percentage provided by public funds, the labour percentage and the price year.

If the apportionment of O&M costs is not known over the appraisal period then costs should be input as in Figure 13.1.6, keeping the yellow '**Don't know**' box checked. Once these are inputted, this annual cost is automatically apportioned for each year of the appraisal period, after the scheme opens.

If the apportionment of costs over the appraisal period is known, then the yellow '**Don't know**' box should be unchecked and costs input annually as shown in Figure 13.1.7.

Operating and Maintenance Costs					What are the operating and maintenance costs annually?					
Annual Operating and Maintenance Costs	€10,000	100%	50%	2026	Don't know	2024	2025	2026	2027	2028
					☒					

Figure 13.1.6 Inputting O&M Costs with 'Don't know' selected

Operating and Maintenance Costs					What are the operating and maintenance costs annually?					
Annual Operating and Maintenance Costs		100%	50%	2026	Don't know	2024	2025	2026	2027	2028
					☐			10000	5,000	10,000

Figure 13.1.7 Inputting O&M Costs with 'Don't know' unselected

5.2.3 Refurbishments Costs

When calculating the residual value, it is important to consider potential end of life costs or scrappage fees. Lifetime infrastructure refurbishments are included between mid-refurbishment and full refurbishment of infrastructure along with the years that these would be inputted. Decommission costs refer to the expenses associated with the removal and dismantling of infrastructure or operational assets when they reach the end of their useful and safe operating lives.

According to DN-PAV-03024¹⁴, well designed roads may offer on average between 15 to 20 years of service life before needing **resurfacing**. By ticking the '**Don't know**' checkbox for the scheduled year of resurfacing, the TEAM tool will automatically add resurfacing every 20 years, an example of this is shown in Figure 13.1.8. If the timing of resurfacing costs is known the user should uncheck the yellow 'Don't know' box and input costs annually as is shown in Figure 13.1.9.

According to DN-PAV-03021¹⁵, the design period for a new pavement is 40 years and thereafter an entire **pavement reconstruction** is recommended to be performed. By ticking the '**Don't know**' checkbox for the scheduled year of full reconstruction of infrastructure, the TEAM tool will automatically add reconstruction every 40 years, an example of this is shown in Figure 13.1.8. If the timing of pavement reconstruction is known the user should uncheck the yellow '**Don't know**' box and input the year that pavement reconstruction takes place as is shown in Figure 13.1.9.

Refurbishments Costs					What are the refurbishment costs annually and full reconstruction (years)?						
					Don't know	2024	2025	2026	2027	2028	2029
Pavement Resurfacing or others	€30,000	100%	30%	2026	☒						
Full Reconstruction of Infrastructure	€500,000	100%	30%	2026	☒						

Figure 13.1.8 Example of Inputting Refurbishments Costs with 'Don't know' selected

Refurbishments Costs					What are the refurbishment costs annually and full reconstruction (years)?						
					Don't know	2024	2025	2026	2027	2028	2029
Pavement Resurfacing or others		100%	30%	2026	☐				15000	15000	
Full Reconstruction of Infrastructure	€500,000	100%	30%	2026	☐	2046					

Figure 13.1.9 Example of Inputting Refurbishments Costs with 'Don't know' unselected

¹⁴ TII Published Standard DN-PAV-03024 – Bituminous Mixtures, Surface Treatments, and Miscellaneous Products and Processes DN-PAV-03024-03 - <https://publications.tii.ie/document/?id=2783>.

¹⁵ TII Published Standard DN-PAV-03021 – Analytic Pavement & Foundation Design DN-PAV-03021 - <https://publications.tii.ie/document/?id=2772>.

5.2.4 Shadow Pricing

The TAF in line with central government guidance specifies three types of shadow prices¹⁶, which have been applied by default in the tool, as follows:

- **Shadow Price of Public Funds (SPF)** – When the government raises funds through taxation, it can introduce economic distortions: taxes such as VAT or income tax raise the price paid for goods and services, which can discourage economic activity that would have otherwise occurred. The purpose of the SPF is to account for the opportunity cost of raising money through taxation, and it should be applied to all publicly-funded expenditure associated with a project or programme. The SPF is set at 130% of all publicly-funded expenditure as recommended in TAF Module 8.
- **Shadow Price of Labour (SPL)** – Spending on some projects, particularly when they are located in an area with high rates unemployment, can have a stimulus effect, creating jobs and reducing the number of people claiming social welfare payments. The purpose of the SPL is to account for this impact by reducing the effective cost any labour-related spending. The SPL is set at 100% as recommended in TAF Module 8.
- **Shadow Price of Carbon (SPC)** – Greenhouse gas emissions from activity in the transport sector contribute to climate change which imposes indirect costs on society. The Shadow Price of Carbon (SPC) is a monetary value that is based on the estimated abatement cost to Ireland of removing carbon and carbon equivalent emissions from the atmosphere in order to meet climate targets and mitigate against the adverse climate impacts. The SPC values are set by the Department of Public Expenditure, NDP Delivery and Reform.

The Shadow Price of Carbon is built in into the TEAM tool. The Results Sheet in the TEAM tool contains an indicator for the amount of carbon avoided with the proposed scheme, and the SPC is applied to this figure to get the cost per tonne of CO2 avoided. SPF and SPL are applied by default in Cost Inputs, as shown in Figure 13.1.10.

Shadow Pricing		Applicable Shadow Price
Include Shadow Price of Public Funds?	☒	130%
Show Shadow Price of Labour?	☒	100%

Figure 13.1.10 Example of Shadow Pricing

5.3 Sheet 3 – Default Assumptions

The calculations in the tool rely on a series of default assumptions, which are listed on Sheet 3 of the Excel-based tool.

¹⁶ In economics, market prices refer to the actual cost that is paid for a good or service in the market, such as the salary that someone is paid to work on constructing an active travel scheme. However, market prices can distort the true economic costs or benefits associated with these activities, such as the fact that spending on labour can reduce unemployment and its associated economic costs. In these instances, shadow prices are used to convert market prices to a value that more closely reflects its true economic cost.

These default assumptions have been developed by TII to reflect the best available data at a national level and aim to make the process of calculating benefits easier and more consistent across schemes. They also aim to reduce the data that project teams are required to gather when appraising a scheme.

The default assumptions should be reviewed, and adjustments can be made if necessary. While appraisers should generally keep the pre-populated value for each assumption, there may be specific circumstances or areas where better data is available and more reflective of the local area. In these cases, this sheet provides the opportunity to replace any default assumption. For example, a scheme will mainly cater for cycling trips between two towns located 8km apart, there may be a justification for using an average journey length of 8km, rather than the default value of 5km. However, any changes to default assumptions should only be made with specific supporting evidence; evidence which should be documented in the report.

5.3.1 Section A – Journey Lengths and Assumptions

Most benefits increase with the length of time someone spends walking, cycling or e-biking as well as the length of car trips replaced by active travel.

This means that assumptions around the length, speed, and direction of a journey can have a significant impact on benefits, particularly health and mode shift benefits. Default assumptions around journey length and duration are shown in Table 13.1.13, along with the source/basis of the assumption.

Table 13.1.3 Journey Lengths and Assumptions

Variable	Default Assumptions	Source / Basis
Average non-recreational walking journey length (km)	1.4 km	Derived from average journey length values (min) taken from TAF 2024, and average journey speed values.
Average non-recreational cycling journey length (km)	6 km	
Average non-recreational e-bike journey length (km)	6 km	
Average walking speed (km/h)	5.1 km/h	Standard all-purpose walking and cycling speeds
Average cycling speed (km/h)	16 km/h	
Average e-bike speed (km/h)	20 km/h	
Average recreational walking trip length (mins)	44 mins	CSO National Travel Survey 2019
Average recreational cycling trip length (mins)	57 mins	
Average recreational e-bike trip length (mins)	83 mins	TII MOVE Spring Survey 2026
Proportion of people making return journeys (%)	92%	TII MOVE 2025 Surveys

5.3.2 Section B – Diversion Rates

When a new pedestrian, cyclist or e-bike user switches to walking, cycling or e-bike when making a journey, diversion rates are used to estimate what mode they are likely to have switched from. This mainly affects the mode shift benefits, but it also has an impact on other benefits.

Outside of formal transport models, there are generally two approaches that could be taken to developing diversion rates. One is to take diversion rates from published studies of substitution rates between transport modes, while the other is to base it off the typical modal split of an area. Due to a lack of relevant studies for Ireland or for non-metropolitan areas, diversion rates in TEAM were developed using the NTA 'National Household Travel Survey 2024' and are based on the typical modal split of each area type; reweighted to exclude the mode of transport in question. These differ according to area type, not least because of the different transport options currently available in different parts of Ireland.

Default diversion rates for each area type are shown in Table 13.1.4 for walking, Table 13.1.5 for cycling and Table 13.1.6 for e-bike. Using Table 13.1.4 as an example, this means that for every 100 new walking trips in a 'rural' area, 15 are assumed to be brand new trips (i.e. they did not shift from any other mode), 79 will be trips diverted from driving, 4 from bus, 1 from cycling and 1 from rail.

Table 13.1.4 Default Walking Diversion Rates

New walking trips from	Dublin City	Greater Dublin Area	Regional Cities	Other towns / urban districts	Rural
Did not previously travel / new trip	15%	15%	15%	15%	15%
Private Car	70%	73%	76%	79%	79%
Walking	0%	0%	0%	0%	0%
Cycling	5%	4%	2%	2%	1%
E-bike	1%	0%	0%	0%	0%
Bus	6%	6%	5%	3%	4%
Rail/Luas	2%	2%	1%	1%	1%

Source: Based on NTA, 2024. 'National Household Travel Survey 2024. (Rewighted all-purpose mode shares excluding walking.)

Table 13.1.5 Default Cycling Diversion Rates

New cycling trips from	Dublin City	Greater Dublin Area	Regional Cities	Other towns / urban districts	Rural
Did not previously travel / new trip	15%	15%	15%	15%	15%
Private Car	62%	64%	67%	70%	75%
Walking	16%	14%	12%	12%	6%
Cycling	0%	0%	0%	0%	0%
E-bike	0%	0%	0%	0%	0%
Bus	5%	5%	5%	3%	3%
Rail/Luas	2%	2%	1%	1%	1%

Source: Based on NTA, 2024. 'National Household Travel Survey 2024. (Reweighted all-purpose mode shares excluding cycling.)

Table 13.1.6 Default E-bike Diversion Rates

New e-bike trips from	Dublin City	Greater Dublin Area	Regional Cities	Other towns / urban districts	Rural
Did not previously travel / new trip	15%	15%	15%	15%	15%
Private Car	62%	64%	67%	70%	75%
Walking	16%	14%	12%	12%	6%
Cycling	0%	0%	0%	0%	0%
E-bike	0%	0%	0%	0%	0%
Bus	5%	5%	5%	3%	3%
Rail/Luas	2%	2%	1%	1%	1%

Source: Based on NTA, 2024. 'National Household Travel Survey 2024. (Reweighted all-purpose mode shares excluding e-bike.)

5.3.3 Section C - Other Travel Assumptions

Other miscellaneous travel assumptions have an impact on a range of benefits, such as the background journey growth rate (mainly affecting the future number of users), vehicle occupancy rates (mainly affecting mode shift benefits), and demographic data (mainly affecting health benefits, which are only calculated for adult users). These are shown in Table 13.1.7.

Table 13.1.7 Other Travel Assumptions

Variable	Default Assumption	Source
Annual background journey growth rate (%)	1.0%	Based on general population growth
Private Car Occupancy rate	1.5 passengers	PAG Unit 6.11, Table 6.11.34
Bus occupancy rate	14.3 passengers	WHO Health Economic Assessment Tool
Percentage of trips made by adults (18-70)	69%	Analysis of NTA 'National Household Travel Survey 2024'
Percentage of adult population in labour force	74.5%	Analysis of 'Labour Force Survey' data Quarter 4 2025

5.3.4 Section D - Appraisal Assumptions

This set of assumptions are appraisal assumptions, which are used for setting the general rules and boundaries of the economic appraisal. These are mostly based on guidance in the Infrastructure Guidelines and TAF and should not be changed unless for a specific reason associated with a particularity of the scheme. These assumptions are shown in Table 13.1.8.

The 30-year appraisal period is defined with reference to the Opening Year. The opening year and the appraisal year must be differentiated.

The default assumption does not include Residual Value due to the recommendation by PAG/TAF to limit the appraisal period to 30 years for active mode projects (given the uncertainty of long-term forecasting for active modes).

Table 13.1.8 Appraisal Assumptions

Variable	Default Assumption	Source
Appraisal Start Year	Current Year	-
Discount Rate	4.0%	TAF Module 8 – Detailed Guidance on Appraisal Parameters
Residual Discount Rate	3.5%	
Price Base Year	2016	
Appraisal period (years)	30	
Residual Value Period (years)	30	
Residual Value Consideration	No	
Real GNP per capital annual growth rate (2025+)	2.3%	

5.3.5 Section E – International Visitors Assumptions

This set of assumptions are associated with the economic impacts arising from spending by international visitors when using walking, cycling and e-bike infrastructure. International visitors, on average, spend more per trip than domestic and local visitors in an area.

Therefore, the direct spending (i.e., expenditure on overnight accommodation, restaurants and activities) arising from their presence on the scheme should be captured.

There are several default assumptions included to quantify the international visitor's component within TEAM. A regional factor captures the likelihood of international visitors being drawn to the scheme based upon the regional distribution of international visitors. Default regional demand values for are outlined in Table 13.1.9, indexed to the region with the highest proportion of international visitors in the West.

Table 13.1.9 Weighted Likelihood Adjustment Factor for International Tourist per Region Assumptions in Regional Demand for International visitors

Regional Demand for Cycling Tourism	Dublin	East & Midlands	South East	South West	Shannon	West	North West
(%) Factor of Regions visited by international visitors	67%	56%	60%	62%	54%	100%	82%

The default daily spend for international visitors is calculated by using Fáilte Ireland's per diem spending rate of €168 per visitor¹⁷. This rate is the average daily spend of international visitors nationally. The *per diem* rate is adjusted in line with projected real GNP growth per capita to 2016 values as per the TAF Guidelines.

If, for example, the user finds the scheme will attract a higher or lower average daily spend, this can be inputted accordingly if specific evidence is given to justify an increase or decrease in the assumption.

An annualisation factor is applied as a default assumption to capture the seasonal component of international visitors in Ireland. A value of 210 days corresponds to the tourist season based on Fáilte Ireland's 'Key Tourism Facts'. If the appraiser determines that the scheme will have international visitors, a default assumption of 4% of total users is automatically in-built into the TEAM tool. This is taken from TII's MOVE research on Greenways across Ireland. This is included to avoid overestimation of international visitors on a given scheme. These assumptions are summarised in Table 13.1.10.

¹⁷ Fáilte Ireland, 2024. Key Tourism Facts 2024.

Table 13.1.10 International Visitor Assumptions

Variable	Default	Source
Daily international visitor spend	€168	Fáilte Ireland Key Tourism Facts 2024 (2024 values)
Annualisation factor for seasonality	210	Fáilte Ireland Key Tourism Facts 2024
International visitor demand	4%	TII MOVE Survey 2025-2026

5.4 Sheet 4 – Data Validation

The Data Validation is designed to check for errors in the inputs provided by the user in sheets “1. Scheme Inputs” and “2. Costs Inputs”. It also verifies any modifications made to the default assumptions in sheet “3. Default Assumptions”. The Data Validation contains three main sections:

- A. Errors Verification
- B. Warnings
- C. Default Assumptions Modifications

5.4.1 Section A – Errors Verification

Any errors that have occurred in the calculations and are preventing results being produced will be listed in the errors verification output as shown in Figure 13.1.11. These errors are in relation to scheme inputs (Sheet 1. Scheme Inputs) and cost inputs (Sheet 2. Cost Inputs). These primary errors result in no outcomes until they are amended.

A. Errors Verification

List of errors found:

Well done, no errors were found!

Figure 13.1.11 Data Validation Dashboard - Example of Errors Verification Output

5.4.2 Section B – Warnings

A list of warnings is displayed to check user inputs in scheme inputs (Sheet 1. Scheme Inputs) and cost inputs (Sheet 2. Cost Inputs), i.e., a value may be an input error. Once notified, it is important to review and correct the errors listed and then recalculate the tool to yield results. If inputs are in fact correct and required, an explanation is required to justify these changes, as shown in Figure 13.1.12. Supporting evidence from reliable sources should accompany such modifications.

B. Warnings	
List of Default Assumptions modifications: Well done, no errors were found!	Explanation from the user on Default Assumptions modifications (include sources):

Figure 13.1.12 Data Validation Dashboard - Example of Warnings Output

5.4.3 Section C – Default Assumptions Modifications

The tool will output a list of changes in relation to modifications made to the default assumptions (Sheet 3. Default Assumptions). An explanation is still required to justify the changes, as shown in Figure 13.1.13 (green box), and must be supported by evidence from reliable sources.

C. Default Assumptions Modifications	
List of Default Assumptions modifications: - A change was made in Expenditure of an International Visitor in Ireland (€/day) (Cell B84 from 3. Default Assumptions). Default value: 96. New value: 100.	Explanation from the user on Default Assumptions modifications (include sources):

Figure 13.1.13 Data Validation Dashboard - Example of Default Assumptions Modifications Output

5.5 Sheet 5 – Results Dashboard

The Results Dashboard summarises the results of the TEAM assessment, based on the inputs and assumptions used in previous sheets. The Results Dashboard contains six sections:

- A. Cost Benefit Analysis
- B. Annual Non-Economic Benefits
- C. Annual Economic Flows
- D. Sections Distribution
- E. Sensitivity Analysis
- F. Other Economic Indicators.

5.5.1 Section A – Cost Benefit Analysis

This section shows the main results of the CBA, including the present value of economic benefits for each benefit category. Several outputs are displayed in this section:

- **Present Value of Benefits (PVB)** – The PVB is the sum of monetised economic benefits over a project's appraisal period. This section shows the PVB for each individual benefit, as well as for the entire project. It is also accompanied by a pie chart to show how benefits compare.

If undertaking an active modes CBA as part of a National Roads scheme, then the PVB from TEAM can simply be added into the overall project CBA.

A cell (highlighted in yellow) is provided where the value of any additional benefits calculated outside of TEAM be added to the overall PVB.

- **Present Value of Costs (PVC)** – This is the total sum of capital and operating costs over the project's appraisal period, which have been adjusted to take the Shadow Prices (described previously) into account. An annual breakdown of the present value of costs is also calculated / provided at the bottom of the sheet.
- **Net Present Value (NPV)** – The NPV is the PVB minus the PVC and represents the additional or net economic benefit provided by the scheme. A positive NPV indicates that the measured economic benefits are greater than the costs, while a negative NPV indicates that the costs are greater than the benefits.
- **Benefit-to-Cost Ratio (BCR)** – The ratio of economic benefits to economic costs. A BCR of at least 1 means that the benefits outweigh the costs, while a BCR of less than 1 indicates that the costs outweigh the benefits.

These outputs and the results of the CBA should be summarised within the Appraisal section of the Project Appraisal Report for projects costing between €5 million and €30 million, and should be summarised in the Economic Appraisal section of the Preliminary Business Case for projects greater than €30 million. It should be noted that even if the NPV is negative or the BCR is less than one, this does not mean that the project is not worthwhile. The tool only includes benefits that are possible to monetise in Ireland, and there are many additional benefits provided by walking, cycling and e-biking that are not reflected in the CBA, such as the creation of an integrated transport network or improvements in accessibility and social inclusion.

See PAG Unit 13 for guidance on qualitative appraisal of active modes schemes which may be considered as part of any recommendations or conclusions.

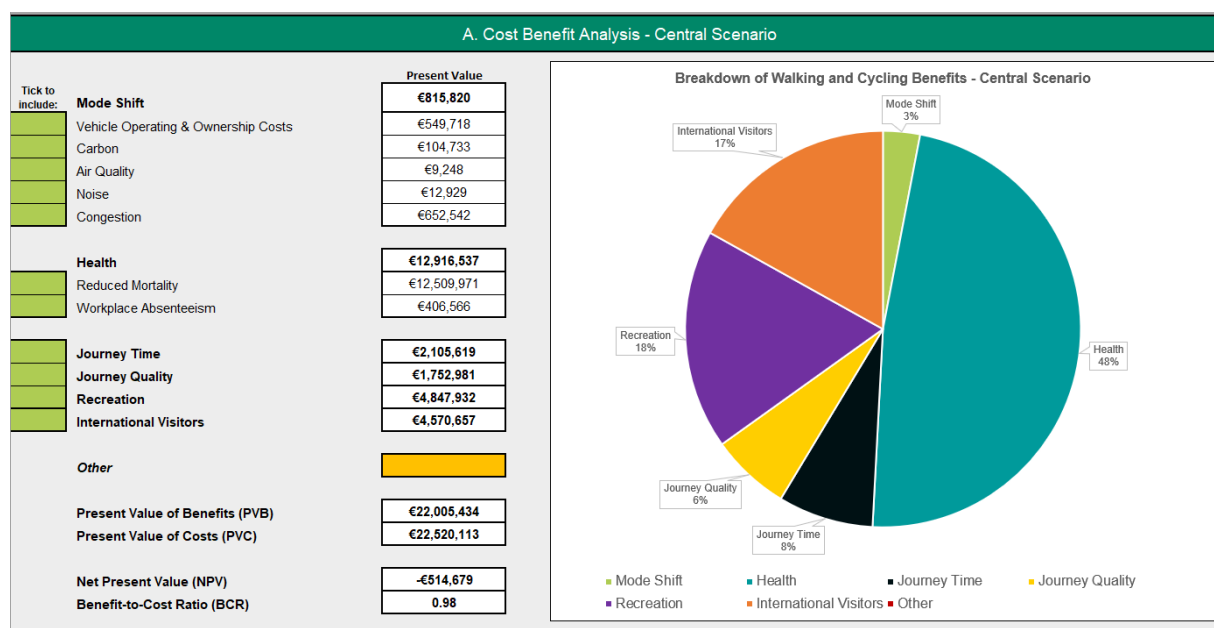


Figure 13.1.14 Results Dashboard - Example of CBA Outputs

5.5.2 Section B – Annual Non-Economic Benefits

This section presents the non-monetised outputs of the TEAM tool assessment over the appraisal period. The outputs include the tonnes of CO₂ diverted and a range of active travel indicators for walking, cycling and e-bike trips.

For each active mode, the tool provides information on the number of new and existing trips, active travel kilometres, time spent exercising and the number of trips and passenger kilometres diverted from other transport modes. The section also reports the estimated increase in life expectancy associated with increased daily exercise.

Figure 13.1.15 provides an example of the annual non-monetised results for walking. Equivalent outputs are provided separately within the tool for cycling and e-bike trips.

B. Non-Monetised Results								
CO2 Diverted		2024	2025	2026	2027	2028	2029	2030
Tonnes of CO2								
Tonnes of CO2 Diverted	335	-	-	-	10	10	10	10
Plot Area								
Walking trips, km travelled, time spent exercising and life expectancy		2024	2025	2026	2027	2028	2029	2030
Life expectancy (years)								
Increase in life expectancy from increased daily exercise (walking)	3.9							
New and existing walking trips								
Number of new walking trips	1,269,649	-	-	-	36,500	36,885	37,234	37,806
Number of existing walking trips	641,173	-	-	-	18,433	18,617	18,803	18,991
Total number of walking trips	1,910,821	-	-	-	54,933	55,492	56,037	56,597
Active Travel Km - Walking								
New	4,150,608	-	-	-	119,322	120,515	121,721	122,338
Existing	2,096,057	-	-	-	60,258	60,860	61,469	62,084
Total	6,246,665	-	-	-	179,580	181,376	183,189	185,021
Time spent exercising (minutes)								
New Trips	50,785,942	-	-	-	1,480,000	1,474,600	1,489,346	1,504,239
Existing Trips	25,646,901	-	-	-	737,300	744,673	752,120	759,641
Total	76,432,842	-	-	-	2,197,300	2,219,273	2,241,466	2,263,880
Walking trips diverted from:								
Private Car	178,303	-	-	-	5,126	5,177	5,229	5,281
Cycling	12,512	-	-	-	360	363	367	371
E-bike	3,128	-	-	-	30	31	32	33
Bus	15,641	-	-	-	450	454	459	463
Rail	6,256	-	-	-	180	182	183	185
Passenger Km diverted from:								
Private Car	247,039	-	-	-	7,102	7,173	7,245	7,317
Cycling	17,336	-	-	-	438	438	438	438
E-bike	4,334	-	-	-	125	126	127	128
Bus	20,982	-	-	-	623	623	623	623
Rail	6,256	-	-	-	180	182	183	185

Figure 13.1.15 Results Dashboard – Example of Annual Non-Economic Benefits

5.5.3 Section C – Annual Economic Flows

This section provides the annual present value of costs and benefits over the appraisal period. This will show how the costs and benefits of the project change over time. Annual economic flows are presented for the central, low and high demand scenarios. The section also provides undiscounted annual benefits separately for pedestrian, cyclist and e-bike users.

C. Monetised Results								
Discounted Annual Economic Flows (€000s) - Central Scenario		2024	2025	2026	2027	2028	2029	2030
Discount Rate for Economic Appraisal		4.0%	4.0%	4.0%	4.0%	4.0%	4.0%	4.0%
Vehicle Operating & Ownership Costs	€61.6	-	-	-	€3.1	€3.0	€2.9	€2.8
Carbon	€78.1	-	-	-	€2.3	€2.3	€2.3	€2.3
Air Quality	€3.9	-	-	-	€0.2	€0.2	€0.2	€0.1
Noise	€3.3	-	-	-	€0.1	€0.1	€0.1	€0.1
Congestion	€385.8	-	-	-	€14.1	€14.0	€13.9	€13.8
Reduced Mortality	€4,705.9	-	-	-	€37.1	€37.8	€38.0	€38.1
Workplace Absenteeism	€142.6	-	-	-	€1.1	€1.2	€1.3	€1.4
Journey Time	€190.3	-	-	-	€7.0	€6.9	€6.8	€6.8
Journey Quality	€821.0	-	-	-	€30.0	€29.8	€29.5	€29.3
Recreation	€3,641.9	-	-	-	€133.2	€132.4	€131.5	€130.7
International Visitors	€731.5	-	-	-	€26.8	€26.6	€26.4	€26.2
Present Value of Benefits (€000s)	€10,765.9	€0	€0	€0	€255	€291	€327	€362
Present Value of Costs	-€751.0	€0	€383	€388	€0	€0	€0	€0
Economic Net Present Value	€10,015.0	€0	€383	€388	€255	€291	€327	€362

Figure 13.1.16 Results Dashboard – Example of Annual Economic Flows

5.5.4 Section D – Sections Distribution

This section provides the monetised benefits attributed to the different mode types if a demand split has been incorporated into the scheme inputs. The walking, cycling and e-bike benefits are broken down into their contributing factors including mode shift, health, journey time, journey quality, recreation, and international visitors. It should be noted that the tool must be ‘calculated’ to process the inputs and provide the correct results. This can be done by clicking the “Calculate” button in sheet 5 – Results Dashboard.

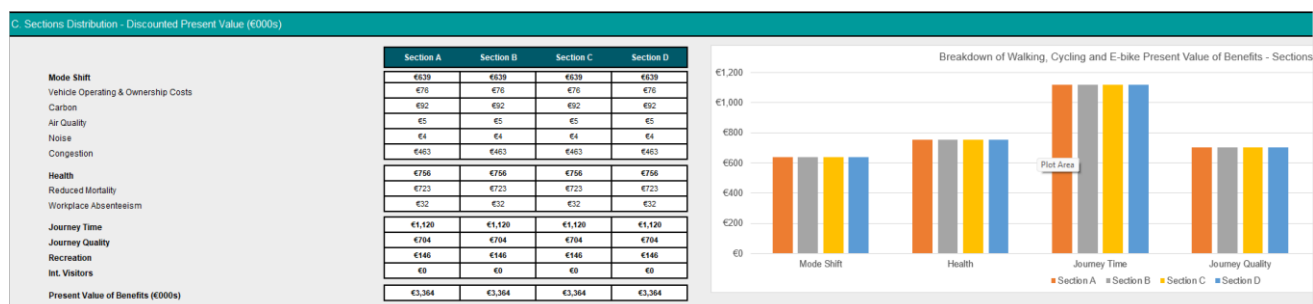


Figure 13.1.17 Results Dashboard – Example of Sections Distribution

5.5.5 Section E – Sensitivity Analysis

The PAG and TAF require sensitivity analysis to be done when carrying out CBA. The purpose of sensitivity analysis is to demonstrate how changes in demand, benefits or costs would affect the overall CBA results, and to show the potential range of values. TEAM facilitates three types of sensitivity analysis as a default:

- **Demand** – The range of the PVB under the low, central and high demand scenarios.
- **Benefits** – The range of the PVB when benefits are adjusted by $\pm 20\%$
- **Costs** – The range of the PVC when costs are adjusted by $\pm 20\%$

The combined impacts of these sensitivity tests on the BCR are also displayed in this section, showing the potential range of the BCR under different scenarios. For example, Figure 13.1.18 below shows the range of the BCR between 6.37 and 26.11 when both demand and costs are varied.

D. Sensitivity Analysis - Potential Range of Benefits & Costs

Demand Sensitivity

	Low	Central	High
Present Value of Benefits	€5,744,032	€10,765,912	€15,685,549

Benefits Sensitivity

	-20%	-10%	+0%	+10%	+20%
Present Value of Benefits	€8,612,730	€9,689,321	€10,765,912	€11,842,504	€12,919,095

Costs Sensitivity

	-20%	-10%	+0%	+10%	+20%
Present Value of Costs	€600,768	€675,863	€750,959	€826,055	€901,151

D. Sensitivity Analysis - Combined BCRs

Demand Sensitivity

	Low	Central	High
-20%	9.56	17.92	26.11
-10%	8.50	15.93	23.21
+0%	7.65	14.34	20.89
+10%	6.95	13.03	18.99
+20%	6.37	11.95	17.41

Benefit Sensitivity

	-20%	-10%	+0%	+10%	+20%
-20%	9.18	10.32	11.47	12.62	13.76
-10%	10.32	11.61	12.90	14.19	15.48
+0%	11.47	12.90	14.34	15.77	17.20
+10%	12.62	14.19	15.77	17.35	18.92
+20%	13.76	15.48	17.20	18.92	20.64

Figure 13.1.18 Results Dashboard – Example of Sensitivity Analysis

In most circumstances these three sensitivity tests should satisfy PAG and TAF requirements. If required, sensitivity tests on other variables can be carried out by saving a version of the tool, adjusting the variables of interest (for instance, variables in the default assumptions tab), and comparing the results with the original TEAM assessment.

5.5.6 Section F - Other Economic Indicators

This section includes some other useful economic indicators provided by the tool, including:

- **Costs** – This provides an estimate of the present value of costs per kilometre, and per user. This can be useful when trying to compare routes in terms of their cost-effectiveness.
- **Carbon** – This provides an estimate of the total tonnes of CO2 avoided by the scheme, based on the estimated shift from private cars to walking/cycling.
It also shows the 'Cost per tonne of CO2 avoided' which is an indicator of the cost-effectiveness of the scheme in terms of reducing carbon emissions.
- **Mode Shift** – This provides an estimate of the total driving kilometres shifted to walking/cycling by the scheme. It also shows the 'Cost per driving kilometre avoided', which is an indicator of the cost-effectiveness of the scheme in terms of shifting car users to active modes.
- **Benefit per km travelled** – The benefits for users and society for each kilometre travelled by pedestrians, cyclists and e-bike users.

Figure 13.1.19 provides an example of the other economic indicators reported by the TEAM tool.

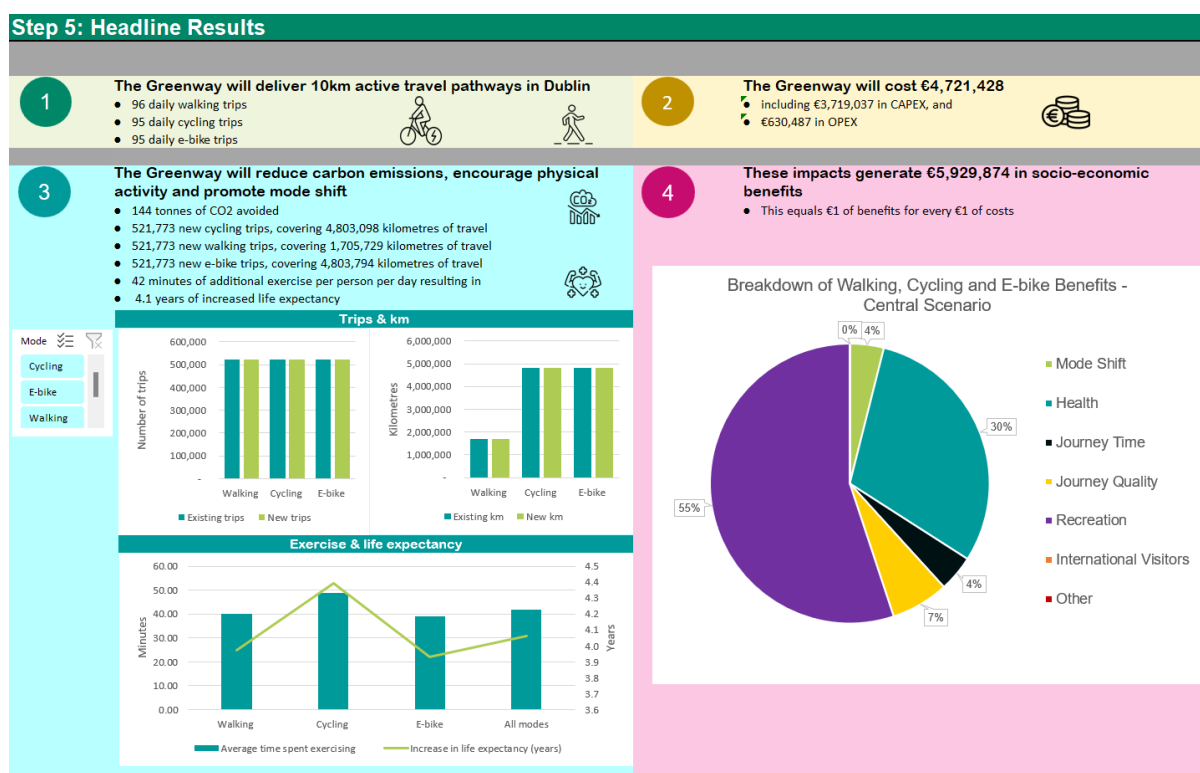
E. Other Economic Indicators	
Costs	
Cost per new user	€2,503
Cost per user	€1,669
Cost per scheme km	€75,096
Carbon	
Total tonnes of CO2 avoided	335
Cost per tonne of CO2 avoided	€2,240
Mode Shift	
Annual vehicle kilometres avoided	49,328
Cost per driving kilometre avoided	€15.22
Benefit per km travelled	
Pedestrians	€1.30
Cyclists	€0.67
E-bike	€0.53

Figure 13.1.19 Results Dashboard – Example of Other Economic Indicators

5.6 Sheet 6 – Headline Results Dashboard

In addition to Sheet 5 – Results Dashboard, TEAM tool has a ‘Scheme on a Page’ Headline Results Dashboard. This dashboard emphasises the story of the investment being appraised or evaluated and includes both monetary and non-monetary outputs. It has been designed for easier communication with a non-technical audience. The scheme on a page dashboard highlights the behaviour change that results from investment in a new active travel scheme including number of new trips undertaken, number of km travelled, and additional exercise undertaken as a result of implementation of the scheme. The costs and benefits of the scheme are also summarised in accessible language.

Figure 13.1.20 shows the Headline Results dashboard for an example scheme.



Trips & km

Number of trips

Kilometres

Walking Cycling E-bike

Existing trips New trips

Existing km New km

Exercise & life expectancy

Minutes

Years

Walking Cycling E-bike All modes

Average time spent exercising

Increase in life expectancy (years)

Breakdown of Walking, Cycling and E-bike Benefits - Central Scenario

Mode Shift

Health

Journey Time

Journey Quality

Recreation

International Visitors

Other

Figure 13.1.20 'Scheme on a Page' – Headline Results Dashboard

5.7 Sheet 7 – Distributional Impacts Dashboard

The distributional impacts dashboard shows how benefits of a scheme are distributed across individuals of different income levels in society. The dashboard is provided for exploration and research purposes and enables users to examine the distributional effects of a scheme.

Distributional analysis is concerned with measuring the impact of a project across different social groups. This approach assigns a higher social value to the benefits impacting lower income households relative to higher income households. The methodology is based on guidance set out in UK *Treasury's Green Book* (2026).

Distributional impact analysis is a new feature within the TEAM tool and has not yet been tested or established within the Irish transport appraisal context. The approach is not currently supported under the Transport Appraisal Framework (TAF) and should therefore be treated as supplementary information only. These outputs are provided for exploration and research purposes, to support consideration of how scheme benefits are distributed across society. However, they are not part of the core TAF appraisal framework and should not be used as evidence within the core appraisal case, nor used in place of or combined with the primary appraisal results presented in the main assessment dashboard.

Distributional impacts are calculated using welfare weights which are derived from calculating the marginal utility of income for different income groups of society across geographical region. The welfare weights follow the principle of diminishing marginal utility of income, meaning that an additional €1,000 of benefit is more valuable to a low-income household than to a high-income household. In other words, the value of additional economic benefits for a recipient will fall as their income rises. It should be noted that, because of welfare weighting, the total benefits of the scheme under distributional analysis may differ from the total benefits presented in the Cost Benefit Analysis (CBA).

Figure 13.1.21 shows a snapshot of the main results section of the Distributional Impacts Dashboard.

Distributional Impacts - Present Value (€000s)										
Percentile:		10th	20th	30th	40th	50th	60th	70th	80th	90th
Mode Shift		170	108	86	70	57	46	36	27	18
	Vehicle Operating & Ownership Costs	20	12	10	8	7	5	4	3	2
	Carbon	25	16	13	10	8	7	5	4	3
	Air Quality	1	1	1	1	0	0	0	0	0
	Noise	1	1	1	0	0	0	0	0	0
	Congestion	123	78	62	51	41	33	26	20	13
	Health	1,543	980	779	635	519	418	327	245	159
Reduced Mortality	1,498	951	756	616	504	406	317	238	155	
Workplace Absenteeism	45	29	23	19	15	12	10	7	5	
Journey Time	61	38	31	25	20	16	13	10	6	
Journey Quality	261	166	132	108	88	71	55	42	27	
Recreation	1,159	736	585	477	390	314	245	184	120	
Int. Visitors	233	148	118	96	78	63	49	37	24	

Figure 13.1.21 Distributional Impacts Dashboard

Appendix A - Technical Methodology for Parameters and Benefit Calculation

This Appendix details the methodologies and sources used for calculating the benefits used in TEAM. This appendix includes:

- A.1 – Mode Shift Benefits, including Carbon, Air Quality, Noise, Congestion, and Vehicle Operating & Ownership Costs
- A.2 – Health, including Reduced Mortality and Absenteeism
- A.3 – Journey Time
- A.4 – Journey Quality and Recreation
- A.5 – International Visitors

A.1 Mode Shift Benefits

As mode shift benefits are based on the shift from private vehicles to walking, cycling or e-bike, the first step is to estimate this shift; or the amount of vehicle kilometres ‘diverted’ from private cars. This diversion can be expressed either ‘per vehicle-kilometre’ or ‘per passenger kilometre’, although most factors are expressed per vehicle kilometre.

Table A.1 Daily Private Car kilometres Diverted

Code	Calculation	Variable	Value	Source / Basis
A		Number of new non-recreational daily trips		Based on user estimates of the number of daily trips, and the proportion that are ‘utility’ trips.
B		% of trips assumed to be diverted from private cars	Location-specific diversion factors for private cars.	Default assumption based on location modal splits from NTA ‘National Household Travel Survey’ 2024 data. 15-20% of trips assumed to be new trips
C	A x B	Number of daily trips diverted from cars		
D		Average length of diverted trips (mins)	16.3 min (Walking) 22.6 min (Cycling) 18.1 min (E-bike)	TAF, 2026. Module 8.13.6 for walking and cycling, e-bike trip length derived from average distance of cycling trip and e-bike speed
E	C x D	Daily car passenger minutes diverted (min)		
F		Average walking/cycling speed (km/h)	5.1 km/h (Walking) 16 km/h (Cycling) 20 km/h (E-bike)	Walking value based on NTA ‘RM Spec4 Active Modes Model Specification Report’. Cycling value based on research carried out on users of urban greenways in Dublin (O’Driscoll, 2019)

Code	Calculation	Variable	Value	Source / Basis
				E-bike value based on international research across countries (Maurer, Meister, Axhausen, 2025)
G	$E/60 \times F$	Daily car passenger kilometres diverted (km)		
H		Average car occupancy	1.5 people	Default assumption based on factors contained in PAG Unit 6.11
I	G / H	Daily car vehicle kilometres diverted (km)		

To estimate mode shift benefits, the diverted passenger/vehicle kilometre should be multiplied by the relevant factors for carbon, air quality, vehicle operating / ownership costs, noise and congestion. These factors are derived from a variety of sources and are shown in the tables below.

For estimating future values, 2016 carbon emissions should be increased in line with the Shadow Price of Carbon specified in the TAF, while 2016 values of air quality, noise and congestion should be increased in line with real GNP growth per capita. As vehicle operating and ownership costs are assumed to increase in line with the general rate of inflation, future values should remain in 2016 prices in the CBA. Daily mode shift values should be converted to annual values using appropriate annualisation factors.

Table A.2 Carbon Emissions

Code	Calculation	Variable	Value	Source / Basis
A		Daily car vehicle kilometres diverted (km)		
B		Daily car trips diverted		
C	$A / 1.5$	Daily car passenger kilometres diverted (km)		
D		Vehicle GHG operational emissions factors (g/vkm)	Grams per vehicle km by vehicle, year and area type	TII 2024. 'PAG Unit 6.11 – National Parameters Values Sheet'. Table 16
E		'Cold-start' emissions factors (g/trip)	150.4 grams (Urban) 122 grams (Rural)	WHO, 2023. 'Health Economic Assessment Tool (HEAT) for walking and cycling – Methods and user guide on physical activity, air pollution, injuries and carbon impact assessment'. Tables 3, 4 and 5.
F		Energy supply factors per passenger kilometre	28.4 grams (Urban) 23 grams (Rural)	
G		Vehicle manufacturing emissions per passenger kilometre	19.9 grams	

Code	Calculation	Variable	Value	Source / Basis
H	$(A \times B) + (B \times E) + C \times (F+G)$	Daily carbon emissions avoided (g)		
I		Shadow Price of Carbon	Annual price per tonne specified.	TAF 2026 Module 8, Table 4
J	$C \times D$	Daily value of CO ₂ emissions avoided		

Table A.3 Air Quality

Code	Calculation	Variable	Value	Source / Basis
A		Daily car vehicle kilometres diverted (km)	Intermediate Calculation	
B		Vehicle non-GHG emissions factors (g/vkm)	Grams per km for PM and NOx by vehicle, year and area type	TII, 2024. 'PAG Unit 6.11 – National Parameters Values Sheet'. Table 6.11.7
C	$A \times B$	Daily non-GHG emissions avoided (g)		
D		Other non-GHG costs (€/tonne)	Annual costs for non-GHG gases in 2016 values, assumed to continue to increase in line with real GNP growth per capita.	TII, 2024. 'PAG Unit 6.11 – National Parameters Values Sheet'. Table 6.11.7.
E	$C \times D$	Daily value of non-GHG emissions avoided (€)		

Table A.4 Vehicle Operating & Ownership Costs

Code	Calculation	Variable	Value	Source / Basis
A		Daily car vehicle kilometres diverted (km)	Intermediate Calculation	
B		Fuel costs (€ per litre)		TII, 2024. 'PAG Unit 6.11 – National Parameters Values Sheet'. Table 6.11.15.
C		Forecast fuel consumption (litres per 100km)		TII, 2024. 'PAG Unit 6.11 – National Parameters Values Sheet'. Table 6.11.16.

Code	Calculation	Variable	Value	Source / Basis
D		Non-fuel costs (€ per km)		TII, 2024. 'PAG Unit 6.11 – National Parameters Values Sheet'. Table 6.11.17.
E	$D + (B \times C/100)$	Vehicle Operating Costs per km (€)		
F		Vehicle Ownership Costs per km	€0.105 (Urban) in 2016 prices €0.119 (Rural) in 2016 prices	Estimate based on CSO, 2016. 'National Household Budget Survey 2015-2016'.
G	$(A \times (E + F)) \times 50\%$	Daily value of vehicle operating & ownership costs avoided (€) (subject to the 'rule of a half')		

Table A.5 Marginal External Cost of Noise

Code	Calculation	Variable	Value	Source / Basis
A		Daily car vehicle kilometres diverted (km)	Intermediate Calculation	
B		Marginal external cost of noise per km (€)	€0.0022 (Urban) €0.0011 (Rural) In 2016 values and prices	Adapted from Department for Transport, 2023. 'WEBTAG Data Book v1.13.1 – Table A 5.4.2a. Values for urban and rural roads transferred to Irish values and prices.
C	$A \times B$	Daily value of external cost of noise avoided (€)		

Table A.6 Marginal External Cost of Congestion

Code	Calculation	Variable	Value	Source / Basis
A		Daily car vehicle kilometres diverted (km)	Intermediate Calculation	
B		Marginal external cost of congestion per km (€)	€0.27 (Dublin and cities) €0.212 (Other urban) €0.015 (Rural) In 2016 values and prices	Adapted from Department for Transport, 2025. 'WEBTAG Data Book v2.02. Values for 'Inner and Outer Conurbations', 'Other Urban' and 'Rural' adjusted for Irish road volumes and Level of Service and transferred to Irish prices.

Code	Calculation	Variable	Value	Source / Basis
C	A x B	Daily value of external cost of congestion avoided (€)		

A.2 Health

Improved health outcomes associated with greater levels of physical activity has many health benefits for users, society and businesses. Two benefits associated with health are included in TEAM: 'reduced mortality' and 'absenteeism'.

A.2.1 Reduced Mortality

'Reduced mortality' refers to the change in the relative risk of early death due to increased levels of physical activity. TEAM uses the World Health Organisation's (2024) *Health Economic Assessment Tool*¹⁸ methodology to estimate the benefits associated with a reduction in relative mortality risk due to increased levels of walking, cycling and e-bike use. This methodology has been updated using Irish-specific parameters where necessary.

'Reduced mortality' benefits are based on the number of new users and the time spent walking or cycling. The steps involved are summarised in Table A.7 below, although more detailed guidance can be found in the HEAT guidance.

Table A.7 Reduced Mortality Benefit Calculation

Code	Calculation	Variable	Value	Source / Basis
A		Risk of all-cause mortality	0.0019	DoT, 2020. 'Common Appraisal Framework'
B		Relative risk	0.89 (walking) 0.90 (cycling) 0.90 (e-bike)	WHO, 2024 'Health Economic Assessment Tool'.
C		Reference volume of physical activity	168 minutes / week (walking) 100 minutes / week (cycling) 100 minutes / week (e-bike)	WHO, 2024 'Health Economic Assessment Tool'.
D		Risk reduction cap	30% (walking) 45% (cycling) 45% (e-bike)	WHO, 2024 'Health Economic Assessment Tool'.

¹⁸ WHO, 2024. 'Health Economic Assessment Tool (HEAT) for walking and cycling – Methods and user guide on physical activity, air pollution, injuries and carbon impact assessment'. Available at: Health economic assessment tool (HEAT) for walking and cycling - <https://www.who.int/europe/tools-and-toolkits/health-economic-assessment-tool-for-walking-and-cycling>

Code	Calculation	Variable	Value	Source / Basis
E		Weekly time spent walking / cycling per user (minutes)		Estimated based on assumptions regarding average journey lengths/speeds for recreational and non-recreational users.
F	$(1-B) \times (E/C)$	Relative risk reduction (capped at values contained in D)		
G	$A \times F$	Absolute risk reduction per user (i.e. no. of fatalities 'prevented per person).		
H		Value of avoided fatality	€2,778,132 (2016 prices)	TAF 2026, Module 8 Table 13
I	$G \times H$	Relative mortality benefit per adult user (€)		

The relative mortality benefit per user should be multiplied by the total number of adult users of the scheme. By default, TEAM assumes that on average 75% of trips are made by adults. It should also be noted that the number of unique users can differ from the number of trips, particularly if the same user makes a return journey on the scheme. This should be taken into account in the calculation if necessary.

Reduced mortality benefits are assumed to be phased in over five years, with 20% of the annual benefit occurring in Year 1, 40% in Year 2, 60% in Year 3, 80% in Year 4, and 100% in the years thereafter.

The value of a future avoided casualty should be updated in line with real GNP growth per capita.

A.2.2 Absenteeism

Increasing physical activity increases productivity in the economy by reducing short-term sick leave. The median absenteeism rate for short terms sick leave is 4.6 days and 5.8 days for the private and public sector, respectively.

The number of employees in public sector employment is about 21% of total employment in Ireland, based on CSO employment tables. Calculating average sick leave taken in Ireland by weighting the relative proportions of private and public sector employment gives an overall estimate of 4.9 days per year.

A cycling or walking intervention of 30 minutes per day reduces absenteeism in a reduction in short-term sick leave by between 6% and 32% per annum¹⁹. The lower bound of 6% is to be applied in appraisals to estimate the reduction in absenteeism per employee per year.

¹⁹ World Health Organisation, 2003. 'Health and development through physical activity and sport', WHO/NMH/NPH/PAH/03.2, Geneva, Switzerland.

Table A.8 Absenteeism

Code	Calculation	Variable	Value	Source / Basis
A		Daily time spent walking / cycling / e-bike per user (minutes)		Estimated based on assumptions regarding average journey lengths/speeds for recreational and non-recreational users.
B		Reference volume of physical activity	30 minutes per day	WHO, 2003. 'Health and development through physical activity and sport'.
C		Risk reduction cap	6%	TAF, 2026. Based on WHO, 2024.
D	$6\% \times (A/B)$	Relative risk reduction		
E	$D \times 7.5 \times 4.9$	Average hours saved per employed user		Average of 4.9 sick days per year, and assuming 7.5 hours in a working day.
F		Value of in-work time per hour	€26.16 in 2016 prices and values	TAF, 2026. Module 8. Table 6.
G	$E \times F$	Absenteeism benefit per employed user		

The absenteeism benefit per user should be multiplied by the total number of *adult* users of the scheme *who are in employment*. TEAM assumes that on average 75% of trips are made by adults, and that of those adult users, 74.5% are in the labour force – meaning that absenteeism benefits only apply to around 56% of all users.

As with reduced mortality benefits, it should also be noted that the number of unique users can differ from the number of trips, particularly if the same user makes a return journey on the scheme. This should be taken into account in the calculation.

Absenteeism benefits are also assumed to be phased in over five years, with 20% of the annual benefit occurring in Year 1, 40% in Year 2, 60% in Year 3, 80% in Year 4, and 100% in the years thereafter. The value of a future absenteeism benefits should be updated in line with real GNP growth per capita.

A.3 Journey Time

The methodology for estimating journey time savings is contained within TAF. Journey time savings associated with active mode schemes are typically only applied when the scheme results in a direct and visible reduction in average journey times, such as:

- Bridges and under/overpasses that provide a shorter and more direct route along a corridor;
- New routes or shortcuts offering a more direct route along a corridor;
- Upgrades to signal timings for pedestrians, cyclists and e-bike users that reduce the time they must wait.

The average minutes saved by pedestrians, cyclists and e-bike users should be estimated manually based on the circumstances, with journey time saving benefits estimated using the values contained in TAF. Future values should be updated in line with real GNP growth per capita. New users of the scheme are subject to the 'rule of a half', meaning that they only receive half of the benefits as existing users.

A.4 Journey Quality & Recreation

Journey quality benefits refer to the value that users perceive from improved cycling infrastructure, such as the value that they place on safety or the potential for recreation.

For non-recreational users of a scheme (i.e. commuting, education, shopping trips etc.), the values for Journey Quality are based on willing-to-pay values for different types of infrastructure, as estimated in TAF. The total number of minutes spent on each section of the scheme should be estimated based on the section lengths, average speeds and total number of trips, and then journey quality values applied to the minutes spent on each type of infrastructure, using the rates contained in Table A.9.

Table A.9 Incremental Journey Quality Values per Minute (Compared to No Dedicated Infrastructure)

Value of journey ambience benefit of cycle facilities relative to no Facilities (2016 prices & 2016 values)		
Scheme type	2016 €/min	Value Year
Off-road segregated cycle track	€0.104	2016
On-road segregated cycle lane	€0.044	2016
On-road non-segregated cycle lane	€0.044	2016
Wider lane	€0.027	2016
Shared bus lane	€0.011	2016

Source: TAF

For recreational users of walking and cycling infrastructure, similar willingness to pay values were estimated using data from TII's Mobility and Outdoor Value (MOVE) 2025 surveys. The time spent by walkers, cyclists and e-bike users on six surveyed greenways was analysed alongside their reported expenditure per trip. Average expenditure per user per minute was then calculated and used as a proxy for the willingness-to-pay (WTP) value of time spent on a greenway.

For other cycling infrastructure types, WTP values were estimated using the relative WTP weights reported in the DfT UK Active Mode Appraisal Toolkit (AMAT). The greenway WTP value per minute was used as the baseline value, and the AMAT relative weights for each infrastructure category were applied to this baseline to derive WTP values per minute for the remaining cycling infrastructure types.

Table A.10 Incremental Recreation Values per Minute (Compared to No Dedicated Infrastructure)

Value per minute	Pedestrians (€/min)	Cyclists (€/min)	E-bike (€/min)	Value Year
Greenway / off-road segregated	€0.131	€0.087	€0.087	2016
On-road segregated cycle lane	€0.000	€0.031	€0.031	2016
On-road non-segregated cycle lane	€0.000	€0.028	€0.028	2016
Wider lane	€0.000	€0.019	€0.019	2016
Shared bus lane	€0.000	€0.007	€0.007	2016

These values can be applied to *recreational* users using a similar methodology as journey quality. However, as these values are associated with a high-quality off-road greenway, they should only be applied to the time spent on *segregated* infrastructure.

Future values for both Journey Quality and Recreation should be updated in line with projected GNP growth per capita. New users of the scheme are subject to the ‘rule of a half’, meaning that they only receive half of the benefits as existing users.

A.5 International Visitors

TEAM includes ‘Recreation’ benefits which captures the local use of high-quality greenway/cycling infrastructure for leisure or exercise, associated with domestic tourism.

The international visitors benefit encompasses the value associated with increased levels of spending by international visitors *whose primary reason is to visit the greenway*. International visitors spend significantly more than domestic and local users (e.g., on accommodation, food and entry fees for attractions) and therefore should be included within the CBA.

Consideration needs to be given to whether an intervention is likely to attract new tourism, or whether it will simply displace tourists and economic activity from other locations.

Depending on the scheme, the tourism benefits can be significant, particularly for a tourism-focused greenway project, or a project that links to an existing popular tourism attraction.

Data from existing greenways was used as the primary source of data for tourism demand analysis, results from the MOVE survey and Fáilte Ireland’s tourism statistics regarding visitor trends and spending²⁰ were used to develop the parameters included in the TEAM tool.

To calculate the international visitor benefits, a *per diem* spending rate is the basis of the value per visitor, which is adjusted for the regional attractiveness of walking, cycling and e-bike use, and the seasonality of the tourism sector.

²⁰ See Fáilte Ireland, 2021. ‘Key Tourism Facts 2019’. Available at:
https://www.failteireland.ie/FailteIreland/media/WebsiteStructure/Documents/3_Research_Insights/4_Visitor_Insights/KeyTourismFacts_2019.pdf?ext=.pdf

Appraisers are required to estimate and justify what proportion of users on a scheme are from overseas. Table A.11 provides a breakdown of how the international visitors variables were inputted into TEAM.

Table A.11 International Visitors Calculation

Code	Calculation	Variable	Value	Source / Basis
A		International visitor expenditure per day in Ireland	€168	Fáilte Ireland. 'Key Tourism Facts 2024'
B	Internal calculation	Conversion Factor	€138.2	Conversion to 2016, as per TAF
C		Tourism seasonality factor	210	Fáilte Ireland. 'Key Tourism Facts 2024'
D		International visitor demand	3.97%	TII's MOVE Surveys 2025
En		Regional distribution of international tourists	Further details outlined in Table A.12	MOVE Surveys 2025
Fn	$E6 \times E_n / 100\%$	Weighted regional distribution of international tourists		
G	$0.5 \times (F_n + 0.5)$	Weighted regional distribution of international tourists adjusted		

The calculations used to determine the regional distribution of international visitors were indexed to the region with the highest proportion of international visitors that visited greenways in that region. A value of 100% was assigned to the West region which received the highest proportion of visitors and is used to index the relative likelihood or attractiveness of tourism per region. A lower bound fixed value of a minimum of 50% is applied to the regional percentages to produce a final weighted percentage for each region, taking into account the level of attractiveness of other regions. This adjustment recognises the regional differences in likelihood of visiting.

Table A.12 Regional Distribution of International Visitors in Ireland

Codes for En	Description	Value	Source
E1	Proportion of international visitors who visited greenways in Dublin region	3%	Regions greenway visits engaged in – international visitors (%)", according to the MOVE Survey 2025
E2	Proportion of international visitors who visited greenways in East & Midlands region	1%	
E3	Proportion of international visitors who visited greenways in South East region	2%	

Codes for En	Description	Value	Source
E4	Proportion of international visitors who visited greenways in South West region	2%	
E5	Proportion of international visitors who visited greenways in Shannon region	1%	
E6	Proportion of international visitors who visited greenways in West region	10%	
E7	Proportion of international visitors who visited greenways in North West region	6%	



Ionad Ghnó Gheata na Páirce,
Stráid Gheata na Páirce,
Baile Átha Cliath 8, D08 DK10, Éire



www.tii.ie



+353 (01) 646 3600



Parkgate Business Centre,
Parkgate Street,
Dublin 8, D08 DK10, Ireland



info@tii.ie



+353 (01) 646 3601