Garw Valley Economic Impact Study

Wales Rural Development Programme

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Garw Valley – Economic Impact Study

The following document provides an assessment of the economic benefits of developing a new 1km walking and cycling link in the Garw Valley between Bryngarw Park and Abergarw.

The proposed route will connect the regional 884 route to NCN 4. The cycle path will run alongside a heritage railway line, improving access to Bryngarw Country Park.

This document provides economic evidence to accompany wider feasibility study of the proposed developments that is being undertaken by Sustrans Cymru as part of the Wales Rural Development Programme.

1 Executive Summary

1.1 Key outputs from the economic appraisal

The economic benefits of the Garw Valley route have been appraised based on expected annual cyclist and pedestrian usage on the proposed route after construction is completed. The economic benefits of this annual usage have been appraised as if observed for the next 20 years (i.e. a 20-year appraisal period has been used).

The following figures are key outputs related to the estimated current and future usage on the route, and the associated economic benefits from the economic appraisal. For a full description of these outputs, including the methodology used to arrive at these values, please see the main body of the report.

This analysis estimates a baseline level of annual cycling and walking usage by local users before estimating usage on the constructed route based on uplift seen in previous infrastructure projects. The post-construction usage estimates are derived from the Infrastructure Impact Tool (IIT), local data from past schemes in the surrounding area and other comparable sites. The post-construction usage scenarios include an estimated annual number of trips and are presented as low, middle and high scenarios.

Current annual usage estimate

Current usage on the route is estimated using data from a Route User Intercept Survey (RUIS) conducted on site. The estimated Annual Usage Estimates (AUEs) are:

- 9,022 cycling AUE
- 59,674 walking AUE

Forecasted/future annual usage estimate (cyclists)

These estimated values are based on scenarios that have been developed around the cyclist Infrastructure Impact Tool (IIT) output.

Table 1: Cyclist usage scenarios (Executive Summary)

Baseline AUE	Percentage increase in cyclist usage	Post-scenario AUE
9,022	153%	22,825
	173%	24,630
	193%	26,434

Forecasted/future annual usage estimate (pedestrians)

These estimated values are based on scenarios that have been developed around the pedestrian Infrastructure Impact Tool (IIT) output.

Table 2: Pedestrian usage scenarios (Executive Summary)

Baseline AUE	Percentage increase in pedestrian usage	Post-scenario AUE
59,674	141%	143,814
	161%	155,748
	181%	167,683

Estimated economic benefits (including health)

The following economic benefits have been estimated using the Benefit-Cost Ratio tool, and using the usage information in the previous tables as inputs.

Table 3: Estimated economic benefits (Executive Summary)

	Post-scenario AUE (cycling)	Post-scenario AUE (pedestrian)	Economic benefits	Benefit-Cost Ratio
Low usage change	22,825	143,814	£1,480,309	3.0
Medium usage change	24,630	155,748	£1,706, 886	3.4
High usage change	26,434	167,683	£1,933,403	3.9

The following illustrates the estimated economic benefits (including those as a result of health benefits) of the middle usage scenario in greater detail. A full breakdown of the estimated benefits for all scenarios is provided in Section 5.5 of the report.

Under the middle scenario, where the shared use route sees a 173% increase in cycling and 161% increase in walking trips above baseline, the benefits are:

- A total of 155,748 walking trips and 24,630 cycle trips being made on the route each year
- Total economic benefits of £1,706,886
- Health benefits of £1,310,008
- Recreational expenditure of £1,018,433

Given the estimated costs of construction and maintenance, this level of usage results in a Benefit-Cost Ratio of 3.4.

2 Background

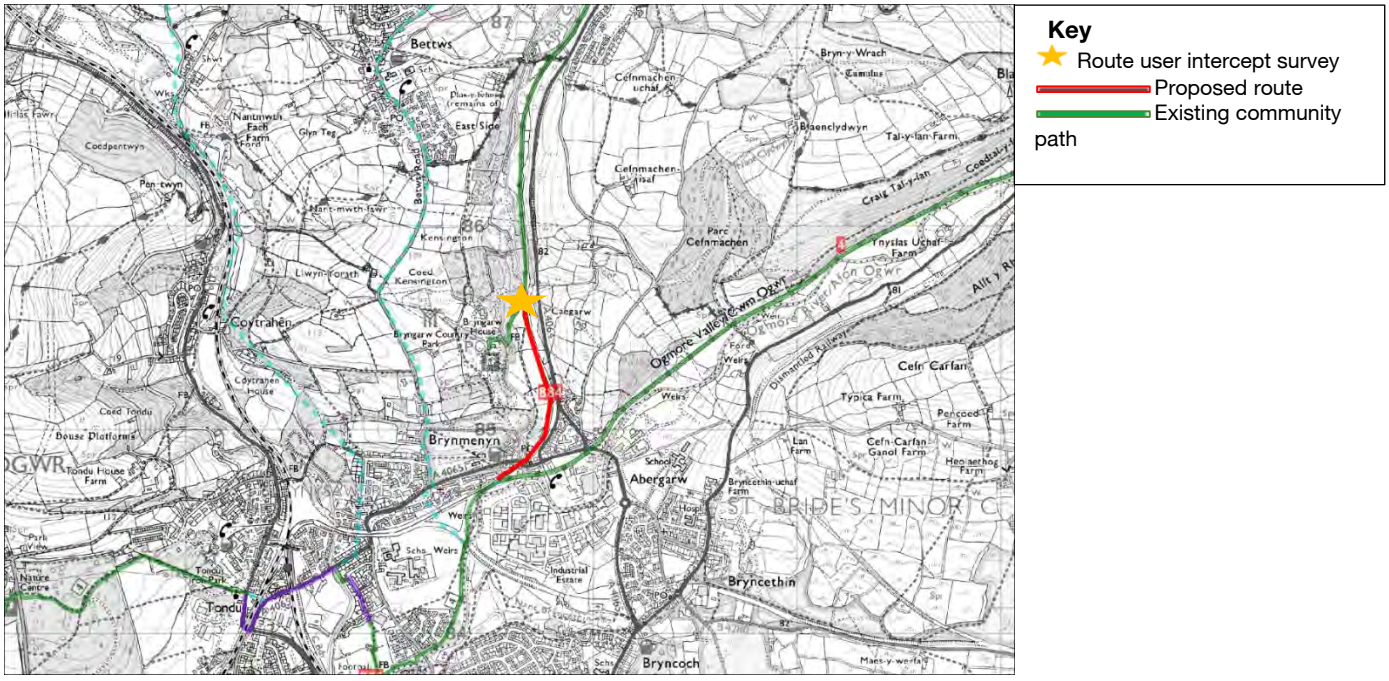
Sustrans' Research and Monitoring Unit (RMU) have undertaken economic analysis for three post-construction usage scenarios of the proposed development of a route between Bryngarw Park and Abergarw.

This document outlines the economic benefits of the proposed route for three usage scenarios.

2.1 Study Area

The proposed new route will run along the Garw Valley from Abergarw to Bryngarw Park. The cycle path will be 1km in length (Figure 1). The green line denotes the existing community path and the red line indicates the proposed new link.

Figure 1: Map overview of proposed route



The economic benefits of this route have been evaluated from usage estimates from local counter data and Route User Intercept Survey's (RUIS). This was then appraised using the Infrastructure Impact Tool (IIT) for cyclists and pedestrians, the Benefit-Cost Ratio tool and the Leisure Cycling and Leisure Walking Expenditure Models (LCEM and LWEM) to determine the economic benefits for both cyclist and pedestrians.

3 Methodology

3.1 Economic Appraisal Tools

Infrastructure Impact Tools (IIT)

The cycling IIT (CIIT) and the pedestrian IIT (PIIT) are based on a database of past infrastructure scheme interventions delivered across the UK. This approach adopts a forecasting approach based on comparable schemes, as recommended by the Department for Transport (DfT) in their WebTAG

Unit A5.1 for Active Mode Appraisal[1]. This approach is also consistent with the Welsh government Transport Appraisal Guidance (WelTAG). In adopting a case study approach, assumptions have been made that infrastructure developments are likely to perform similar to what was observed in the past. This approach is not specific to the local context evaluated here and may not fully integrate all of the unique aspects of the proposed development. It is a generalised approach based on evidence from past schemes and as such should not be considered a definitive calculation of the expected outcomes of a scheme.

The IITs are used to estimate a potential increase in usage from any currently observed usage (i.e. a baseline estimate) to any change that results after a scheme has been constructed. This post-construction estimate is based on evidence of observed cyclist and pedestrian usage pre- and post-infrastructure delivery in the past. The PIIT is a new tool, which was created based on the CIIT model. The data that the PIIT draws on for reference is not as extensive as the number of schemes which feed into the CIIT. The tools do not give estimates in reference to a specific time period over which this usage change is observed or occurs. All outputs from the IIT's are in the form of an annual number of cyclist or walking trips.

Benefit-Cost Ratio (BCR) Tool

Sustrans RMU have developed an economic appraisal tool which is used to estimate the economic benefits of capital investments in walking and cycling based on information provided about the location and usage of the investment .The tool was initially developed to comply with the Department for Transport (DfT)'s guidance, WebTAG (Web-based Transport Appraisal Guidance). In Wales, the Welsh government's Transport Appraisal Guidance (WelTAG) is used, as this is adapted to Welsh-specific objectives and the outcomes and strategic priorities of the Wales Transport Strategy. There are no specific adaptations to the Sustrans RMU BCR tool mandated in the latest version of WelTAG, therefore the BCR tool developed in accordance with WebTAG is compatible for the Welsh context.

The BCR tool requires the following inputs:

- Trip frequency
- Journey purpose
- Trip distance
- Proportion not using a car for any part of their journey
- Proportion who could have used a car for their journey but have chosen not to

The BCR tool provides an estimate of the monetised economic benefits for the following impact areas related to cycling and walking:

- Health (using the WHO HEAT tool)
- Absenteeism
- Amenity

[1] WebTAG Unit A5.1 for Active Mode Appraisal. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/427098/webtag-tag-unit-a5-1-active-mode-appraisal.pdf

- Greenhouse Gas Emissions Reduction
- Accidents Savings
- Decongestion
- Air Quality Improvement
- Noise Pollution Reduction
- Infrastructure Development
- Indirect Taxation (disbenefit)

All economic benefits appraised through the BCR tool are based on a 20 year appraisal time period. This provides an estimate of the economic benefits of a specific level of scheme usage being observed over the next 20 years. All benefits are discounted over the 20-year time period to provide a present-day value.

Health Economic Assessment Tool (HEAT)

The (WHO) Health Economic Assessment Tool (HEAT) is used to evaluate the health-related economic benefits of walking and cycling. The benefits calculated through HEAT relate to the reduced mortality generated through a specific number of walking and cycling trips. All health-related economic benefits are calculated over a 20 year appraisal time period, to maintain compatibility with the WebTAG-generated economic outputs.

The World Health Organisation issued HEAT 4.0 in November 2017 as an update to the previous tool. HEAT 4.0 is currently under review by the WHO and likely to be reissued with further amends.

As a result, the version of HEAT used in this appraisal is the previous version of HEAT, available at: http://old.heatwalkingcycling.org

Leisure Expenditure Model Tools: Cycling and Walking

Sustrans RMU has developed two models which calculate the economic benefit to an area from recreational cycling and walking in terms of 'spend per head' and the job roles these activities create.

The **Leisure Cycling Expenditure Model**[2] was originally developed in 2007 in association with the University of Central Lancashire (UCLAN) to estimate the impact of cycle tourism. It has been iteratively updated, most recently in 2017.

The model was developed based on an extensive data collection exercise undertaken between 2001 and 2006 on long-distance routes in the North of England, using user surveys, automatic counter data and travel diaries. The model can be used to estimate the economic impact of cycle tourism based on an estimate of annual 'spend per head' for all recreational cyclist users on the route. This estimate of cycle tourism-related expenditure is differentiated according to home-based and recreational tourist users. The outputs are indicative, rather than precise, estimates of the potential direct economic impact of investing in recreational cycling and give an estimate of the annual tourism-related economic

[2] Previously titled the Recreational Expenditure Model (REM)

benefits of recreational cycling usage on a proposed route. This is in terms of tourism expenditure and the social value of tourism per year.

The **Leisure Walking Expenditure Model** (LWEM) is a tool for estimating the economic benefit of leisure walking in terms of the expenditure it contributes to the local economy. This model originated from the Recreation Expenditure Model (now the LCEM) and builds on expenditure data collected from route users over a number of years.

It is based on data collected from Route User Intercept Surveys (RUIS) across the UK (though mainly in Wales and Scotland). The model estimates the total annual spend for all home- and holiday-based leisure walkers. It also calculates the number of full time equivalent (FTE) roles this spend would support. In order to further understand the effect of the expenditure, spend and FTE roles are split by sector.

4 Garw Valley RUIS Data

Baseline AUE

An Annual Usage Estimate (AUE) is required to calculate the expected economic benefits from the proposed route construction. This shows the potential number of trips that we would expect to be using the route if it were approved and constructed.

5 Assessment of Economic Benefits

This section outlines the economic benefits of the proposed Garw Valley route including:

- The economic value of congestion, greenhouse gas (GHG) emissions, noise pollution and amenity benefits accrued through mode shift encouraged by the route
- Health-related benefits of increased walking and cycling on the proposed routes
- Direct and indirect job creation from infrastructure works and increased recreational walking on the routes
- Overall positive return on investment

5.1 Annual Usage Estimate

An Annual Usage Estimate (AUE)[3] is required to calculate the expected economic benefits from a proposed route development. This came from a Route User Intercept Survey (RUIS) carried out in the location identified in Figure 1.

The AUE was calculated using (RUIS) data from the commissioned survey (Table 1).

***Table 4**: RUIS Annual Usage Estimate (AUE) data*

Site	Region	Year	Cycling AUE	Walking AUE
Garw Valley RUIS	Wales	2017	9,022	59,674

[3] An Annual Usage Estimate (AUE) refers to the number of individual cycling trips made annually on a route

The baseline pedestrian and cyclist AUEs for Garw Valley are as follows:

Table 5: Baseline AUE for Garw Valley cycle path

Route Name	Baseline Cycling AUE	Baseline Pedestrian AUE
Garw Valley cycle path	9,022	59,674

The baseline is an estimation of 'current usage' relevant to the proposed route i.e. usage that exists but is not currently facilitated due to route not existing. Therefore it is an estimation of the current number of journeys which may be occurring in the local area that could be using the proposed route.

5.2 AUE increase scenarios

To forecast the expected economic benefits of the route, a range of post-intervention scenarios where usage has increased above the baseline are set.

These scenarios are based on outputs from the **Infrastructure Impact Tools (IIT)** for cyclists and pedestrians which provides an estimate of the expected cycling and pedestrian usage increases based on a database of past schemes where infrastructure of a similar type has been delivered. The IIT models were run using the baseline AUE and the infrastructure category 'Cycle and pedestrian track' for the urban rural classification of 'Rural'.

The IIT provides an indication of usage increase that is likely to be expected from construction of the route. This is the estimate of annual usage once the scheme has been constructed, accounting for mode shift and growth in cycling usage that is encouraged through the route development. To account for potential uncertainty and the possibility that usage change may be higher or lower than what was observed in the past, a range of three post-usage scenarios are used.

The three scenarios for cycling uplift are shown in Table 3. The three scenarios are as follows. The upper scenario is set above the IIT percentage increase and the lower scenario is set below the IIT percentage increase scenario. The IIT scenario is represented in green.

Table 6 Post-scenario cycling AUE scenarios

Baseline AUE	Percentage increase in cyclist usage	Post-scenario AUE
9,022	153%	22,825
9,022	173%	24,630
9,022	193%	26,434

In order to formulate the post-usage scenarios for pedestrians, the pedestrian Infrastructure Impact Tool (IIT) has been used (Table 4).

Table 4: Post-scenario pedestrian AUEs

Baseline AUE	Percentage increase in pedestrian usage	Post-scenario AUE
59,674	141%	143,814
59,674	161%	155,748
59,674	181%	167,683

Together, the post-scenario cycling and pedestrian usage calculations represent the three scenarios that are appraised.

5.3 WelTAG and monetised economic benefits

The BCR tool provides an appraisal of the economic benefits of an infrastructure development and requires specific inputs in order to provide a monetised value for the expected benefits under the three post-construction usage scenarios.

For this route, the BCR appraisal tool has been used to calculate the expected economic benefits based on the post-scenarios for both pedestrians and cyclists. All economic benefits presented have been calculated using the WelTAG appraisal tool over a 20-year time period.

In addition to the baseline and post-scenario AUEs, all necessary BCR tool inputs were taken from the commissioned RUIS data.

No variation in these additional inputs has been made between the baseline and post-scenario cases as it is not possible to predict how these might change as a result of the development.

Depending on what occurs in practice and how these variables change in reality, the valuations obtained through WelTAG using these fixed inputs may reflect an economic value that is either higher or lower than the reality.

5.4 Health-related economic benefits

The health-related economic benefits of the Garw Valley cycle path have been estimated using the World Health Organisation's (WHO's) Health Economic Appraisal Tool (HEAT)[4]. All health-related economic benefits are calculated over a 20 year appraisal period.

The BCR tool includes health-related economic benefits that have been generated using HEAT. The HEAT outputs that have been calculated are outlined in Table 5.

***Table 5**: HEAT outputs*

	Post-scenario cycling AUE	Post-scenario pedestrian AUE	HEAT output (cyclists)	HEAT output (pedestrians)	HEAT output (combined)
Post-scenario 1: Low cyclist and Low pedestrian usage	22,825	143,814	£148,396	£978,028	£1,126,424
Post-scenario 2: Middle cyclist and middle pedestrian usage	24,630	155,748	£170,666	£1,139,342	£1,310,008
Post-scenario 3:	26,434	167,683	£192,932	£1,300,630	£1,493,562

[4] The WHO HEAT tool is available at: http://old.heatwalkingcycling.org/

High cyclist and high pedestrian usage					

The combined HEAT output for both pedestrian and cyclist usage is used as the health economic benefit input in the BCR tool.

5.5 Overall economic benefits

The overall economic benefits of the proposed route include both the BCR tool and HEAT outputs.

Table 6 displays the range of economic benefits that could be expected under all possible combinations of the three cycling and pedestrian usage scenarios that have been examined. All of these economic benefits include the HEAT outputs displayed in Table 6. This table is intended to show how the estimated economic benefits vary according to the level of walking and cycling usage that is realised – this could be either a low, medium or high usage change compared to the baseline.

Table 6: *WelTAG and HEAT – Economic benefit*

		Walking AUE increase		
		Low	Medium	High
Cycling AUE increase	Low	£1,480,309	£1,672,799	£1,865,250
	Medium	£1,514,397	£1,706,886	£1,899,331
	High	£1,548,468	£1,740,951	£1,933,403

The economic benefits can be displayed as three scenarios: a low usage change scenario, a middle usage change scenario and a high usage change scenario. The low usage change scenario is based on the lowest post-construction levels of both pedestrian and cyclist usage. The middle usage scenario is based on the middle usage levels for both modes, and the high scenario is based on the highest usage of both modes.

The three scenarios are outlined in Table 7 below.

Table 7: *WelTAG and HEAT – Multi-scenario economic benefits*

	Cycling AUE increase	Pedestrian AUE increase	Post-scenario AUE (cycling)	Post-scenario AUE (pedestrian)	Economic benefits
1: Low usage change	153%	141%	22,825	143,814	£1,480,309
2: Medium usage change	173%	161%	24,630	155,748	£1,706,886
3: High usage change	193%	181%	26,434	167,683	£1,933,403

These three scenarios will be input into the LCEM and LWEM.

5.6 Benefit-Cost Ratios

The total construction cost of the proposed Garw Valley route is estimated at £394,312. These costs include construction of the path, all crossings and a new bridge, as well as indicative design and management fees.

Annual (routine) maintenance costs for the route length of 1km are estimated to be £781 per year. Over the 20 year appraisal time period, the total scheme costs (construction and maintenance) are estimated at £490,151[5].

Table 8 below shows the estimated benefit to cost ratios for each of the nine usage scenarios. The nine scenarios illustrate the sensitivity of the BCR to the level of walking and cycling usage that arises.

Table 8: Estimated economic benefits

		Walking AUE increase		
		Low	Medium	High
Cycling AUE increase	Low	3.0	3.3	3.7
	Medium	3.0	3.4	3.8
	High	3.1	3.5	3.9

Any BCR above 1 signifies that the economic benefits of constructing the route are equal or greater than the provided cost. All the usage scenarios have positive BCRs, signifying strongly that under these levels of estimated post-construction usage, the economic benefits are such that they outweigh the costs. It is not possible to select any one scenario as the most likely to materialise. The range of scenarios is intended to provide an indication of potential outcomes.

5.7 Tourism-related economic benefits

The Leisure Cycling Expenditure Model (LCEM) and Leisure Walking Expenditure Model (LWEM) tools have been used to generate an estimate of the combined tourism-related economic benefits of the proposed Garw Valley route.

The LCEM and LWEM tools have been run using the recreational usage inputs from the Garw Valley RUIS conducted in August and September 2017. The economic benefits captured are additional to those benefits outlined in Table 6. These tourism-related economic benefits are derived from a different approach to the economic benefits generated through the RMU BCR tool and therefore, should not be combined.

The LCEM and LWEM tools provide an estimate of the annual recreational spend by both home-based and tourist leisure cyclists on accommodation, food and drink, retail, car costs, cycle costs and public transport. This provides an estimate of the direct contribution that leisure cycling and

[5] This is an average of the estimated present value of costs (PVC) from across the nine scenarios that have been appraised. The present value costs range from a low of £490,108 to a maximum value of £490,194.

walking generated through the proposed route developments will make on the local economy on a yearly basis.

The tools also provide an estimate of the annual social value of recreational trips made by home-based or tourist leisure users on the Garw Valley cycle path. This is a measure of the 'public good' or value placed on the route by leisure users that is not captured in their expenditure.

Table 9 and Table 10 display the outputs of the LCEM and LWEM tools.

Table 9: *Combined Leisure Cycling Expenditure Model (LCEM) outputs*

	Annual recreational spend - HOME	Annual recreational spend - HOLIDAY	Overall tourism economic benefits
1: Low usage change	£13,856	N/A	£13,856
2: Medium usage change	£14,953	N/A	£14,953
3: High usage change	£16,048	N/A	£16,048

Table 10*: Combined Leisure Walking Expenditure Model (LWEM) outputs*

	Annual recreational spend - HOME	Annual recreational spend - HOLIDAY	Overall tourism economic benefits
1: Low usage change	£733,437	£193,149	£926,585
2: Medium usage change	£794,303	£209,178	£1,003,480
3: High usage change	£855,169	£225,207	£1,080,375

The LCEM and LWEM tools also provide an estimate of the direct and indirect full-time equivalent (FTE) jobs supported in the local economy through recreational cycling and walking. Details of this are provided in Table 11 and Table 12.

Table 11*: Leisure cycling usage and employment support*

	Direct employment (FTEs)	Indirect employment (FTEs)	Total employment (FTEs)
1: Low usage change	0.20	0.11	0.31
2: Medium usage change	0.21	0.12	0.33
3: High usage change	0.23	0.13	0.35

Table 12: Leisure walking usage and employment support

	Direct employment (FTEs)	Indirect employment (FTEs)	Total employment (FTEs)
1: Low usage change	13.1	7.5	20.6
2: Medium usage change	14.2	8.1	22.3
3: High usage change	15.2	8.8	24

6 Considerations

There are a number of considerations relevant to the assessment of economic benefits that has been carried out for Garw Valley.

Pedestrian and cyclist usage scenarios

- The high and low usage scenarios were calculated as +/- 20% of the mid usage scenario, determined by the IIT output for both modes. The 20% increase and decrease were calculated around the 173% increase calculated by the cyclist IIT and a 161% increase calculated by the pedestrian IIT. 20% was used as there is no other evidence to suggest you should vary substantially from the IIT output but there is a need to illustrate that a range of scenarios is possible.

BCR and LCEM tool inputs

- The inputs for the Leisure Cycling Expenditure Model were based on a sample of six recreational cyclists surveyed at the Garw Valley RUIS. This is a small sample and may not represent the post-construction sample of users in terms of their journey purpose and travel behaviour.
- All of the surveyed cyclists started their trip from a home base and not a holiday base therefore the overall tourism economic benefits outlined in Table 8 are based only on home-based expenditure. The Leisure Cycling Expenditure Model assigns a greater recreational spend per head to holiday-based trips than to home-based trips, therefore the economic benefits of the route may have been underestimated.
- For the proxy sites, the responses to the trip frequency categories 'daily' to 'monthly' were used only in the BCR tool. Responses to the other trip frequency categories were excluded as the BCR tool does not support other trip frequency categories.
- The same proportions of trip frequency and trip purpose in the pre and post scenarios in the BCR tool were used as in the absence of any evidence to suggest otherwise i.e. actual data we have to assume the trip purpose and frequency would not change.