Preston Levelling Up Fund Round 2 - Active Travel BCR Note

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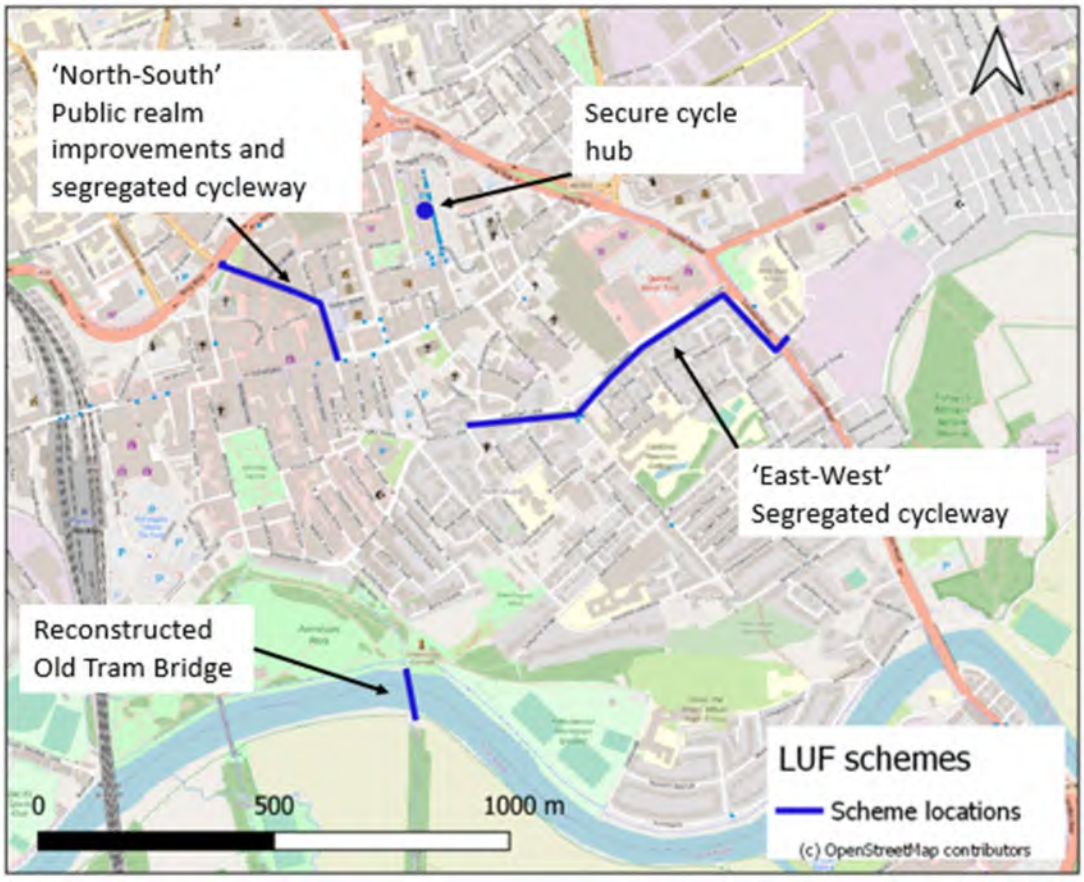
Introduction

This note presents the economic appraisal of the interventions making up the Active Travel project put forward in Preston City Council's bid for funding in the second round of the Levelling Up Fund (LUF) programme. The interventions that form the Active Travel project are:

- 'North-South walking and cycling corridor' - Friargate South public realm improvements and segregated cycleway provision between Ringway and Fishergate.
- 'East-West walking and cycling corridor' - Segregated cycleway along Queens Street and Avenham Lane, connecting the city centre into the A6 Ringway cycle route.
- Reconstruction of Old Tram Rail Bridge – For walking and cycling access between Preston City Centre and South Ribble.
- Secure cycle hub at Preston Bus station – Secure, covered storage for 20 bicycles.

Figure 0-1 shows the scheme locations.

Figure 0-1. Active travel scheme locations



Mode shift, physical health, and journey quality benefits of the Friargate South, East-West cycleways and the Old Tram Bridge schemes have been monetised using the DfT's Active Modes Appraisal Toolkit (AMAT).

The benefits of the secure cycle mobility hub have also been monetised using a bespoke method accounting for improved journey quality due to the new facilities to give an estimation of new bus users who use the cycle hub at the bus station to make multi-modal trips and the AMAT appraisal for new cycle users who would use the cycle hub.

Scheme costs have been obtained from detailed costings undertaken by Preston City Council.

Social impacts of the schemes have also been appraised. Though these cannot be monetised and included in the BCR, nevertheless social impacts are an important contributor to the overall value for money assessment.

This note sets out the data sources and assumptions, appraisal methodologies and outcomes of the economic appraisal.

Data

Data Sources

Scheme layouts were derived from the concept designs and information produced by Planit on behalf of Preston City Council.

Detailed scheme capital costs were produced by Preston City Council by year of expenditure as shown in the Levelling Up Fund Round 2 package costings and planning workbook. Maintenance costs were also provided, covering the future scenarios of Old Tram Rail Bridge demolition or 60-year maintenance of a reconstructed bridge.

Where possible, baseline estimates of cycling and walking trips for the 3 cycling corridors (North-South, East-West, and across the Old Tram Rail Bridge) were based on observed data collected in surveys during September/October 2019 for the previous Transforming Cities Fund scheme appraisal.

All walking and cycling trips were recorded in 15 minutes intervals, between the times of 07:00 – 19:00 from Monday 16th September until Sunday 22nd September 2019. Data was collected via high mast video units. The weather conditions were dry and clear for most of the recording time.

Additional pedestrian counts were collected at 15 different sites, mainly in the city centre of Preston, on Tuesday 1st of October 2019 between 07.00 and 19.00.

Additional analysis based on Census 2011 travel to work, the Propensity to Cycle Tool, NTEM 7.2 and National Travel Survey (NTS) was used to calculate without scheme 2019 cycling demand where counts were not suitable and for MSOA-Preston 017, in which the cycle hub will be situated.

Background growth for cyclists was taken as standard AMAT 0.75% pa, though a review of proposed developments within local policy (City Deal 2012, South Ribble Local Plan-2012-2026, Central Lancashire Local Plan) was accounted for on the 3 corridor schemes.

Uplifts in cycle and walking demand expected as a result of the 3 corridor schemes were derived from a review of comparable schemes.

Economic Appraisal Methodology

Scheme costs

Definitions and processes

Costs can be defined as the total amount of money spent on constructing and maintaining the scheme. Costs are categorised as capital costs, site maintenance costs, and service costs:

- Capital costs are construction costs, land costs, preparation costs (planning and designing the scheme) and supervision costs during the scheme construction.
- Maintenance costs are the costs of maintaining the scheme after opening.

The processes in DfT TAG, Units A1-1: Cost-benefit Analysis and A1-2: Scheme Costs, have been followed to calculate a Present Value of Cost (PVC) for the Active Travel project.

Adjustment of capital costs for risk and Optimism Bias.

The approach set out in the July 2021 TAG issue has been adopted to apply risk and optimism bias. Risk allowances or contingency included in the cost estimate should be excluded from the base cost estimate and replaced by the standard Optimism Bias figure of 23% if this is greater.

The capital cost estimate included a contingency figure equivalent to 22.6% of the combined costs of construction, design, and surveys. Since this value is slightly lower than the default Optimism Bias value of 23%, optimism bias at 23% has been included within the total scheme costs for the appraisal.

Maintenance costs

Maintenance and operational costs have been developed in conjunction with Preston Council and cover all new maintenance activities generated by the package components. New net maintenance costs account for the difference in costs between new maintenance activities generated by the package components and savings in maintenance costs that would otherwise be undertaken without the scheme.

Maintenance activities are considered to be those above and beyond activities which will be absorbed within existing maintenance regimes. New maintenance activities impact the Old Tram Rail Bridge and are identified below for the with scheme scenario and have been monetised over a 60-year appraisal period in line with TAG guidance for large infrastructure projects.

- Masonry repairs and pointing, assumed once every 10 years
- Minor maintenance and painting every 20 years
- Major maintenance and painting after 30 years
- Bearing refurbishment and joint replacement after 50 years
- Ground inspections every 2 years and Principal Inspection every 6 years

Other maintenance impacts are anticipated to be negligible, as the scheme is almost entirely on adopted highway which is subject to ongoing maintenance activities. Maintenance of the secure cycle hub provision will be covered as part of existing operational and maintenance costs for Preston Bus Station.

Maintenance costs in the without scheme scenario include the demolition of the Old Tram Rail Bridge, necessary on grounds of safety. Demolition costs were originally calculated in 2020 and have been upweighted to 2022 prices using the RICS prices index. Demolition is expected to take place in 2024 and 2025.

The net costs of demolition against maintenance of a reconstructed Old Tram Rail Bridge are accounted for in the capital costs calculation.

Scheme costs price base

Capital costs were prepared by Preston City Council and included base construction costs, design and survey costs, contingency and inflation and were profiled by year of spend. Inflation has been removed from costs so that these are expressed in a common price base year of 2022.

Construction and maintenance costs were prepared in common price base year of 2022.

Discounting

The scheme cost estimate has been discounted to DfT Base year present value, at 2022, using rates from TAG Databook (May 2022):

- 3.5% pa, from current year 1 to year 30;
- 3.0% pa from year 31 to year 75.

Market prices

Aggregate scheme costs have been converted from factor costs to market prices using the TAG indirect tax correction factor of 1.19.

Monetised benefits – Walking and Cycleway schemes

Active modes appraisal toolkit (AMAT)

Mode shift, physical health, and journey quality benefits of the North-South and East-West walking and cycling corridors and the Old Tram Bridge schemes have been monetised using the DfT's Active Modes Appraisal Toolkit (AMAT). The present value of benefits in 2010 prices and values (PVB) was evaluated using the latest available version of the AMAT, released by DfT in May 2022. Benefits were also calculated in 2022 prices and values, using a modified version of the same AMAT template.

This section of the report summarises the methodology used to appraise the cycling and walking. As agreed with DfT for previous Transforming Cities Fund (TCF) scheme assessments, the methodology followed the steps outlined below:

- Estimation of current cycling and walking demand on the identified corridors
- Estimation of the impact of the proposed interventions on the cycling and walking demand
- Benefits estimation using the Active Modes Appraisal Toolkit (AMAT).

East-West walking and cycling corridor

The East-West walking and cycling corridor was assessed using two AMATs, one for the section of the scheme where the change is from on-road to segregated (approx. 200m) and one where there is no change in infrastructure (from AMATs point of view) for cyclists and a decrease in crowding for pedestrians as it involves converting what is currently a shared path to a segregated path (approx. 500m). This difference only affects journey quality so to avoid double-counting, mode shift and physical health benefits should only be included once, and journey quality are included from both. This scheme is expected to open in 2025 and its benefits were assessed over a 20-year period.

North-South walking and cycling corridor

This scheme is split into two AMATs, one for the section of the scheme where the change is from on-road to segregated (approx. 125m) and one where there is no change in infrastructure (from AMATs point of view) for cyclists as it involves converting what is currently a shared pedestrian zone to a segregated path (approx. 210m).

This difference only affects journey quality so to avoid double-counting, mode shift and health benefits should only be included once, and journey quality are included from both.

The scheme is expected to be open in 2025 and its benefits were assessed over a 20-year period.

Old Tram Bridge

This scheme is split into two AMATs, one for the time from opening of the scheme until closure of the existing Avenham Bridge route to the west of Old Tram Rail Bridge (2025 to 2030) and one post-closure of Avenham Bridge which would result in a significant detour if no bridge was available.

Avenham Bridge is privately owned with negotiated public access allowed to walkers and cyclists between 2010 and 2030 in light of the closure of the Old Tram Rail Bridge. After 2030 access to Avenham Bridge is expected to end, in part due to the need for significant maintenance work on Avenham Bridge to maintain it as a safe Ribble crossing.

The scheme is expected to be open in 2025 and its benefits were assessed over a 20-year period. The use of a 20-year appraisal for the walking and cycling impacts of the bridge is to stay consistent with the other active travel corridors and TAG guidance. However, this is an underestimation of the benefits as the new bridge structure will be maintained and open for at least 60-years. Standard highways transport impacts would be assessed over 60-years which could be appropriate here.

Estimation of current demand

Cycling and walking surveys on key movement corridors and city centre sites in Preston had been undertaken in September 2019 for TCF scheme assessments. Where possible, observed data from these surveys was used as the basis for estimating current cycling and walking demand along the scheme corridors. Table 0.1 sets out the observed cycling and walking trips extracted from the 2019 survey data.

Table 0.1. Average weekday cycling and walking trips based on observed data from 2019

Scheme	2019 Survey site name	Average weekday 24h expanded cycling trips	Average weekday 24h expanded walking trips
East-West corridor	Site 8: Ringway Crossing West of North Rd	N/A - data not used for cycle trips along link	6,813
North-South corridor	Site 15: Ringway Crossings area north of Friargate	N/A - data not used for cycle trips along link	8,221
Old Tram Bridge	Site 1-c and Site 1-P: A13 intersection of Ringway/ Friargate	264	266

Where suitable observed data was not available, the Propensity to Cycle Tool was used to estimate cycle to work demand in 2011, which was then factored up to represent total daily demand in 2019 using factors representing:

- The ratio of all-purpose cycling trips to cycling journeys undertaken for commuting purposes, sourced from NTS.
- The growth in all-purpose cycling trips between 2011 and 2019, based on a growth rate of 0.75% in AMAT
- Difference in average daily flows on weekdays compared with the average daily flows across the whole week, derived from the surveys undertaken in 2019

Table 0.2 presents the average daily cycle trips along the East-West cycleway and North-South cycleway derived from Census 2011 Travel To Work data, National Trip Survey (NTS) trip rates and observed weekday and weekly trip counts.

Table 0.2. Average weekday cycling trips based on PCT

Location	Average weekday 24h cycling trips
East-West cycle link	83
North-South cycle link	193

For the North-South corridor, observed trip counts were only available for pedestrians and cyclists crossing at the Friargate/A59 junction, therefore the Propensity to Cycle Toolkit (PCT) was used in order to understand what demand might use this scheme. Links identified by the PCT as likely being used by commuting cyclists (fastest route) which might switch to Friargate/Market St were selected and the number of cyclists using each of these were extracted. These were then converted to average commuting trips and factored to a weekday using NTS proportions for commuter trips versus all other cycling trips. The AMAT growth rate of 0.75% per annum was applied to grow these 2011 trips through to the year of opening. Finally, a small increase for new housing was applied.

Housing uplifts were calculated to represent additional cycling demand expected to be generated by planned housing development sites. This calculation took into consideration the number of new dwellings and the distance of the new developments to the proposed corridors. The method is summarised briefly below:

1. All new housing developments and the number of associated new dwellings were identified through a review of proposed developments within local policy (City Deal 2012, South Ribble Local Plan-2012-2026, Central Lancashire Local Plan).
2. The number of additional inhabitants was estimated based on the average household size in Preston[1] .
3. The calculation was adjusted to include the population above 16 years old (as the AMAT only covers health benefits of >16yrs people).
4. The estimated number of new inhabitants was multiplied by the percentage of people cycling and walking to work in the Preston area[2].
5. The total uplift was scaled down to reflect the relative size of the immediate scheme impact area compared with the extent of locations of new housing developments

Table 0.3 presents the additional trips included in the baseline cycling and walking demand to represent the uplifts resulting from housing growth.

Table 0.3. Additional daily cycling and walking trips attributed to housing growth

Scheme	Additional daily cycling trips	Additional daily walking trips
East-West cycle link	20	115
North-South cycle link	7.75	36.25
Old Tram Bridge	46	78

Baseline cycling and walking demand for Old Tram Bridge 2030-2045 is based on the 2025-2030 demand but reduced by a 21.6% diversion factor to account for the closure of the bridge. This demand was grown from 2025 to 2030 using the AMAT growth rate of 0.75%.

Table 0.4 presents the baseline cycling and walking demand entered into AMAT for each scheme.

[1] QS406EW – Household size, Census 2011

[2] QS701EW – Method of travel to work, Census 2011

Table 0.4. Daily cycling and walking trips entered into AMAT – without scheme

Scheme	Daily cycling trips	Daily walking trips
East-West cycle link	103	6,928
North-South cycle link	200	8,257
Old Tram Bridge 2025-2030	310	343
Old Tram Bridge 2030-2045	252	279
Old Tram Bridge average	267	295
Total	570	15,480

Estimation of post-intervention demand

To estimate the post-intervention demand uplift in walking and cycling levels, desktop research was undertaken of walking and cycling schemes locally and across the UK where pre and post intervention data was available. A particular focus was given to identify local uplifts in Lancashire and the North West, as conditions and general behavioural patterns can be considered to have greater similarities to the contexts in which the proposed corridors are located.

As such, a library of schemes and observed uplifts has been created noting the source and context. From this library, applicable uplift figures have been identified from each category of infrastructure as summarised in Table 0.5. Some intervention types are used on different corridors and therefore they are reported in more than one row. More details on the sources used and on the justifications are reported in Appendix A.

Table 0.5. Demand uplift figures related to each intervention type and corridor

Corridor	Cycling infrastructure type	Cycling uplift	Walking infrastructure type	Walking uplift
East-West	Fully segregated cycleway (on road)	70%	Public realm	27%
North -South	Fully segregated cycleway (on road)	70%	Public realm	27%
Old Tram Bridge	General key improvements	33%	Walking improvements	25%

For the East-West corridor, the uplifted cycling demand is based on uplifting the without-scheme demand by the change from no provision to off-road. Although the segment which is converted from no provision to off-road segregated only forms 30% of the new corridor, this uplift is justified as the remainder of the corridor will also be improved from a shared cyclist-pedestrian path to segregated, and the section of the A59 to which it links at the eastern end will also be converted from no provision to segregated.

For the North-South corridor, the uplifted cycling demand is based on uplifting the without-scheme demand by the change from no provision to off-road. Although the segment along Market St which is converted from no provision to off-road segregated only forms 40% of the new corridor, this uplift is justified as the remainder of the corridor will also be improved from a shared pedestrian zone to segregated, and the section of the A59 to which it links at the northern end will also be converted from no provision to segregated.

For Old Tram Bridge 2025-2030 with-scheme cycle demand is based on a small uplift related to general key improvements (e.g. Tram Bridge is more easily accessed from the riverside paths) and with scheme pedestrian

demand is based on a small uplift related to general key improvements. With-scheme cycling and walking demand 2030-2045 is simply based on the 2025-2030 demand grown from 2025 to 2030 using the AMAT growth rate of 0.75%. Cycling infrastructure changes from No provision to Off-road segregated cycle track. Assumed walking infrastructure improvements include street lighting, kerb levelling and improvements to pavement evenness.

Table 0.6 presents the uplifted cycling and walking demand entered into AMAT for each scheme.

Table 0.6. Daily cycling and walking trips entered into AMAT – with scheme

Scheme	Daily cycling trips	Daily walking trips
East-West cycle link	175	8,799
North-South cycle link	340	10,486
Old Tram Bridge 2025-2030	412	429
Old Tram Bridge 2030-2045	437	455
Old Tram Bridge average	431	449
Total	946	19,734

Monetised benefits - Mobility Hub Scheme

A spreadsheet-based tool was developed for Lancashire County Council to assess the impact of the mobility hub on mode choice at multiple bus stations. This methodology has been applied to assess the impact of installation of a secure cycle storage hub at Preston Bus Station. The mode choice logit model methodology is explained in detail in Appendix B.

In this section, an outline of the methodology with key values used is presented. The mobility hub is expected to create mode shift at Preston Bus Station with impacts on bus users and impacts on walking and cycling trips into the area around the station.

Mode shift is based on change in generalised costs within a logit mode choice model.

Public transport user benefits

The change in generalised costs is applied to bus users because the mobility hub is situated at the Preston Bus Station. The Do Minimum scenario bus users were estimated using Census 2011 journey to work data to get the number of commuting trips from MSOAs into the Preston 017 MSOA where the bus station is located, noting that Preston 017 is a city centre location and acts as a net attractor of trips. The top 10 MSOA flows were included in the analysis.

The commuting trips were split by mode using National Travel Survey (NTS) mode share by distance band data for 2019 (NTS0308a) based on crow-fly distances between MSOAs. Trips were adjusted to 2025 and 2045 using NTEM 7.2 growth rates, though this was negative growth to 2025 and essentially zero growth for 2011-2045.

Business and Other trip purposes were calculated from the commuting totals using NTEM 7.2 purpose splits for the origin MSOA.

A high-level estimate of the benefits to public transport users has been calculated using the Rule of Half, which is expressed as follows:

$$Total\ change\ in\ generalised\ cost\ for\ bus\ users = \left(\frac{1}{2} * Existing\ PT\ users\right) * \Delta C + \left(\frac{1}{2} * New\ PT\ users\right) * \Delta C$$
$$= \frac{1}{2} * DS\ PT\ Users * \Delta C$$

Table 0.7 explains the inputs to the generalised cost calculation and how these have been derived.

Table 0.7. Inputs to generalised cost calculation for public transport users

Variable	Description	Source
Existing PT Users	Existing public transport users ('DM PT Users' By Origin-Destination (OD) pair	Derived from TEMPro Production-Attraction trip ends distributed based on Census 2011 journey to work data
ΔC	Change in generalised time	Estimated using the PEAT tool (see table x for intervention elements) and benefit values from the latest TAG Databook (May 2022)
DS PT Users	Public transport users after the introduction of the Mobility Hub	Derived from the spreadsheet-based mode choice model
New PT Users	New PT users By OD pair	Derived from the spreadsheet-based mode choice model

The change in generalised cost is based on generalised cost benefits from the PEAT[3] tool for the cycle mobility hub at Preston Bus Station as shown in Table 0.8.

Table 0.8: PEAT - Generalised Cost Savings per trip (2014 prices in pence and minutes)

Improvements at Preston Bus Station Mobility Hub	Value (pence/trip, 2014 prices)	Value (generalised minutes per trip, average of journey purpose values of time)
Cycling parking provision	20.22	1.169
Cycle racks	4.02	0.232
Cycling parking security	6.03	0.349
Lighting of cycle parking areas	9.12	0.527
Condition of cycle parking areas	56.54	3.268
Cycle signage	1.07	0.062

[3] The Programme Entry Appraisal Toolkit (PEAT) has been developed by Transport for Greater Manchester to support the development of quantified evidence in support of walking and cycling projects. PEAT brings together established tools and techniques, input data, spreadsheet calculators, and a reporting suite in one place.

Total	**97.00**	**5.546**

The change in weekday public transport trips is shown in Table 0.9.

Table 0.9: Weekday PT trips with and without the Mobility Hub

Scenario	Weekday PT trips - 2025	Weekday PT trips – 2045
DM	1837	1961
DS	2198	2346
Difference	361	385

The change in generalised minutes to PT users was monetised, by purpose, to give benefits to the new PT users with the Rule of Half applied.

Benefits were appraised over a 20-year appraisal period since the mobility hub contains cycling only improvements and this period is consistent with AMAT appraisal. The appraisal period starts from an opening year of 2025 with benefits calculated in 2010 prices and values and in 2022 prices and values. The mobility hub would, however, be in situ and maintained beyond the 20-year appraisal period, with benefits that are not captured here.

Cycle hub user benefits

Cycle hub user benefits were calculated using the AMAT, similar to the appraisal of the cycleway schemes as described in 0.

The numbers of walking and cycling trips before and after the introduction of the Mobility Hub was estimated relative to the new PT demand.

Walking and cycling access mode shares to Preston Bus Station were estimated based on an analysis of access mode shares to the Manchester Metrolink, rather than rail and bus services. However, in the absence of suitable data on access mode shares in Preston, we think it is reasonable to use the Metrolink analysis to provide approximate access mode share information, noting that the Preston Bus Station hub serves a relatively dense urban area located near to Manchester. The Metrolink survey results are presented in Appendix B.

Based on the Metrolink survey, two thirds of the PT demand have been assumed to access the hub by walk or cycle. Most users access the hub on foot, while the cycle access is low. In total, 98% of the two thirds of PT demand has been assumed to access by walk and only 2% by cycle.

AMAT benefits were only estimated for new cycle users as no pedestrian improvements are included at the mobility hub. With the above criteria applied to new bus station users, there are 5 new cycle trips in 2025 and in 2045.

Non monetised impacts

Overview of social impacts assessments

The overall value for money of the scheme is determined by both monetised and non-monetised benefits including social impacts.

Qualitative assessments of the physical activity, journey quality, severance and security impacts of the scheme have been undertaken in line with the guidance set out in TAG Unit A4.1 Social Impacts Assessment.

Physical activity

There is a strong evidence base that increased levels of physical activity have a positive impact on health[4].

The monetised health impacts arising from the increased levels of physical activity associated with the scheme have been calculated using the DfT's Active Modes Appraisal Toolkit and are reported in section 0.

A qualitative assessment of physical activity impacts has been undertaken based on the changes in numbers of people walking and cycling as a result of the schemes, derived using the methodologies set out in section 0.

Journey quality

Journey quality is defined in TAG Unit A4.1 as "a measure of the real and perceived physical and social environment experienced while travelling". The assessment of journey quality impacts considers impacts traveller care, travellers' views and traveller stress. The assessment was undertaken using the TAG journey quality worksheet.

Security

The security impact assessment concerns the level of transport users' vulnerability to crime. The key security indicators relevant to the LUF schemes are:

- Informal surveillance – considering use of materials, visibility from site surrounds and proximity of retailers and other activity
- Landscaping – use of landscaping features such as design and plants to contribute to visibility and deter intruders

The security impacts assessment has been undertaken using the TAG security impacts worksheet. The numbers of users affected was sourced from the baseline estimates calculated for input to the AMATs for the monetised benefit assessment. The assessment score reflects changes in security indicators and the numbers of users affected.

Severance

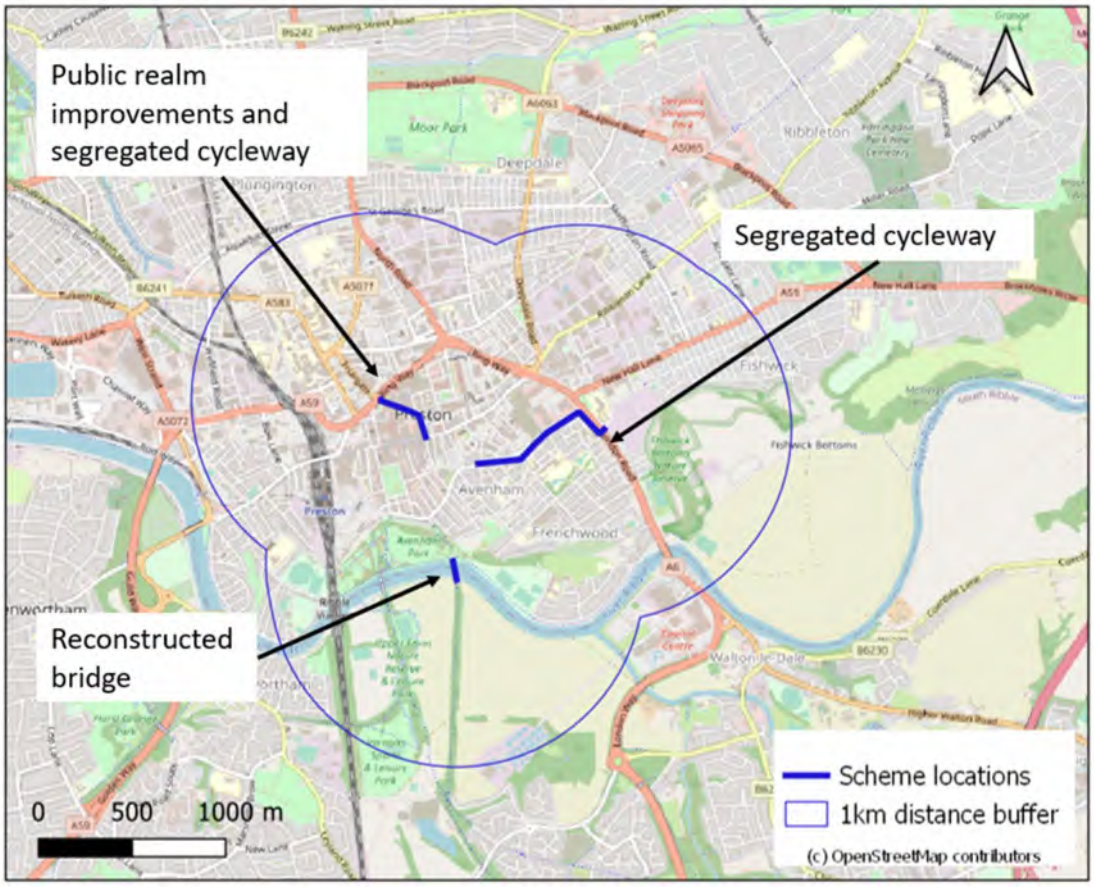
Community severance is defined in TAG Unit A4.1 as "the separation of residents from facilities and services they use within their community caused by substantial changes in transport infrastructure or by changes in traffic flows". Severance is caused where vehicle flows "significantly impede pedestrian movement or where infrastructure presents a physical barrier to movement".

The active travel and public realm improvement measures have been assessed qualitatively for their impacts on severance levels. The assessment focuses mainly on the impact for pedestrians but also considers impacts on cyclists.

Figure 0-1 shows a 1km buffer around the public realm improvement, segregated cycleway and bridge reconstruction schemes, approximating the extent of a catchment area within10 minutes walking time from the scheme locations. Within this area the main sources of severance are the A59 Ringway to the north and east, railway line serving Preston station to the west and River Ribble to the south.

[4] Lee et al (2012): Impact of Physical Inactivity on the World's Major Non-Communicable Diseases, available at: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3645500/.

Figure 0-1. Severance assessment area



The severance impacts assessment has been undertaken using the TAG severance impacts worksheet. The numbers of users affected was sourced from the baseline estimates calculated for input to the AMATs for the monetised benefit assessment. The assessment score reflects changes in severance levels and the numbers of users affected.

Appraisal results

Scheme costs

Table x presents the capital costs, net maintenance costs and total scheme costs in 2022 market prices and values.

Table 0.1. Scheme costs in 2022 market prices and values

Item	PVC, 2022 market prices and values
Capital Costs: Construction, design, and surveys	£10,469,789
Net Maintenance costs	-£509,755
Total Scheme costs	**£9,960,034**

Monetised benefits – cycleway schemes

Table 0.2 presents the present value of monetised benefits for the North-South, East-West and Old Tram Bridge cycleway schemes in 2010 prices and values.

Table 0.2. Walking and Cycling Corridor benefits in 2010 prices and values

Scheme	Appraisal period	Mode shift benefit	Health benefit	Journey quality benefit	Total
City Centre - East West Cycle Link	2025-2044	£165,708	£5,610,227	£412,514	£6,188,449
City Centre - North South Cycle Link	2025-2044	£215,485	£7,025,198	£30,234	£7,270,918
Old Tram Rail Bridge	2025-2044	£64,488	£1,296,379	£134,888	£1,495,755
Total		**£445,682**	**£13,931,804**	**£577,636**	**£14,955,122**

Table 0.3 presents the present value of monetised benefits for the North-South, East-West and Old Tram Rail Bridge cycleway schemes in 2022 prices and values.

Table 0.3. Walking and Cycling Corridor benefits in 2022 prices and values

Scheme	Appraisal period	Mode shift benefit	Health benefit	Journey quality benefit	Total
City Centre - East West Cycle Link	2025-2044	£317,743	£8,681,566	£701,084	£9,700,393
City Centre - North South Cycle Link	2025-2044	£413,183	£10,867,481	£62,063	£11,342,727
Old Tram Rail Bridge	2025-2045	£123,644	£1,999,111	£229,268	£2,352,023

Scheme	Appraisal period	Mode shift benefit	Health benefit	Journey quality benefit	Total
Total		£854,570	£21,548,159	£992,414	£23,395,143

Monetised benefits – Mobility Hub

Table 0.4 presents the new public transport user benefits at the Preston Bus Station mobility hub in 2010 and 2022 prices and values.

Table 0.4: Mobility Hub new public transport user benefits

	Commute	Business	Other	Total
PT benefits (2010 prices and values)	£108,402	£12,101	£170,348	£290,851
PT benefits (2022 prices and values)	£207,887	£23,205	£326,682	£557,775

Table 0.5 presents the walking and cycling benefits calculated by AMAT for each hub in 2010 prices and values.

Table 0.5: Active Travel benefits to new cyclists

	Appraisal period	Mode shift benefit	Health benefit	Total
Active Travel benefits to new cyclists (2010 prices and values)	2025-2044	£1,666	£31,490	£33,157
Active Travel benefits to new cyclists (2022 prices and values)	2025-2044	£3,196	£60,390	£63,585

Social impacts

Physical activity

The cycleways, public realm improvements and secure cycle hub at the bus station would be expected to lead to more cycling and walking trips, an increase in physical activity and therefore positive health impacts. Table 0.6 shows the increases in cycling and walking trips associated with the schemes.

Table 0.6. Increases in daily cycling and walking trips

	Increase in daily cycling trips	Increase in daily walking trips
City Centre - East West Cycle Link	72	1,871
City Centre - North South Cycle Link	140	2,229
Old Tram Rail Bridge	164	154
Total	**376**	**4,254**

The schemes are expected to lead to an increase of 376 daily cycle trips and 4,254 daily walking trips, plus 5 daily cycle trips from the mobility hub, therefore the physical activity impacts have been assessed as **Moderate Beneficial**.

Journey quality

The scheme would have positive impacts on journey quality for pedestrians and cyclists through reducing traveller stress and frustration and improving traveller care. The segregated cycle lanes would reduce traveller stress for cyclists primarily through reducing the fear of potential accidents as well as potentially reducing frustration through improving the ability for cyclists to make good progress along the route. Public realm improvements on Friargate South would be expected to improve the traveller care factor particularly for pedestrians.

As demonstrated in Table 0.6 the changes would affect moderate numbers of users, therefore the journey quality impacts have been scored as **Moderate Beneficial.**

Security

The secure cycle hub at Preston bus station would be expected to have a positive impact on security for users of Preston bus station. The security impacts of the public realm improvements and other facilities would be determined when the designs are further developed but these could be expected to address improvements to informal surveillance, lighting and visibility that could reduce users' vulnerability to crime.

As demonstrated in Table 0.6, moderate numbers of travellers would be affected by the improvements to the security, so the impact has been assessed as M**oderate Beneficial**.

Severance

Friargate South already has shared space provision and there appears to be little or no hindrance to pedestrian movements so that location would be considered to have no severance at present. The public realm improvements would not have any impact on pedestrian severance although they may make pedestrian journeys more attractive. The installation of a bi-directional segregated cycleway along Ringway would reduce severance for cyclists using the cycleway as part of a longer journey.

The East-West segregated cycleway along Queens Street and Avenham Lane does not specifically include additional pedestrian crossing facilities and therefore would not be considered to have an impact on local severance levels for pedestrians, however it would reduce severance for cyclists using the route as part of a longer journey.

The reconstruction of the Old Tram Rail Bridge would provide an additional connection between the areas to the north and south of River Ribble and unsever the cycleways NCR6, NCR622 and NCR55. Within a 1km catchment area of the bridge, there are homes, facilities and services located only on the north side of the river. For

pedestrians the intervention would therefore have less impact on separation of residents from facilities and services. The project therefore has a neutral impact on severance for pedestrians and a positive impact for cyclists.

The severance impacts are assessed as **Slight Beneficial** based on the relatively small numbers of users that would experience improvements.

Value for Money Assessment

The results of the Active Travel project economic assessment are shown in Table 0.7.

Table 0.7: Benefit to Cost Ratio, 2022 prices and values

2022 prices and values – 20 years	
Present Value of Benefits	
City Centre - East West Cycle Link	£9,700,393
City Centre - North South Cycle Link	£11,342,727
Old Tram Rail Bridge	£2,352,023
Preston Bus Station Mobility Hub	£621,360
Total Present Value of Benefits (PVB)	**£24,016,503**
Present Value of Costs (PVC)	**£9,960,034**
Net Present Value (NPV)	**£14,056,469**
Benefit to Cost Ratio (BCR)	**2.41**

The Active Travel project represents high value for money with a BCR of 2.41.

AST, AMCB and Public Accounts

Public Accounts (PA)

Public Accounts (PA) Table

	ALL MODES		ROAD	BUS and COACH	RAIL	OTHER
Local Government Funding	TOTAL		INFRASTRUCTURE			
Revenue	£1,323,068		£1,323,068			
Operating Costs	£0					
Investment Costs	£0					
Developer and Other Contributions	£0					
Grant/Subsidy Payments	£0					
NET IMPACT	**£1,323,068**	*(7)*				
Central Government Funding: Transport						
Revenue	£0		£0			
Operating costs	-£509,755		-£509,755			
Investment Costs	£9,146,722		£9,146,722			
Developer and Other Contributions	£0					
Grant/Subsidy Payments	£0					
NET IMPACT	**£8,636,967**	*(8)*				
Central Government Funding: Non-Transport						
Indirect Tax Revenues	£62,339	*(9)*	£62,339			
TOTALS						
Broad Transport Budget	£9,960,034	*(10) = (7) + (8)*				
Wider Public Finances	£62,339	*(11) = (9)*				

Notes: Costs appear as positive numbers, while revenues and 'Developer and Other Contributions' appear as negative numbers.
All entries are discounted present values in 2022 prices and values.

Analysis of Monetised Costs and Benefits (AMCB)

Analysis of Monetised Costs and Benefits

	2022 prices and values	
Noise	8.11	*(12)*
Local Air Quality	16.36	*(13)*
Greenhouse Gases	52.93	*(14)*
Journey Quality	1,550.37	*(15)*
Physical Activity	21,612.18	*(16)*
Accidents	121.68	*(17)*
Congestion	717.20	*(1)*
	0.00	
	0.00	
Wider Public Finances (Indirect Taxation Revenues)	-62.34	*- (11) - sign changed from PA table, as PA table represents costs, not benefits*
Present Value of Benefits (see notes) (PVB)	24,017	*(PVB) = (12) + (13) + (14) + (15) + (16) + (17) + (1) - (11)*
Broad Transport Budget	£9,960	*(10)*
Present Value of Costs (see notes) (PVC)	£9,960	*(PVC) = (10)*
OVERALL IMPACTS		
Net Present Value (NPV)	£14,056.47	NPV=PVB-PVC
Benefit to Cost Ratio (BCR)	2.41	BCR=PVB/PVC

Note : This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.

Appraisal Summary Table

Appraisal Summary Table		Date produced:	29	June	22	Contact:	
Name of scheme:	Preston LUF2 bid					Name	
Description of scheme:	East-West walking and cycling corridor, North-South walking and cycling corridor, Old Tram Bridge replacement and Mobility Hub at Preston Bus Station					Organisation	Preston City Council
						Role	Promoter/Official

Impacts		Summary of key impacts	Assessment			
			Quantitative	Qualitative	Monetary £(NPV)	Distributional 7-pt scale/ vulnerable grp
Economy	Business users & transport providers	Congestion and journey time impacts of active travel are allocated to Commuting and Social users	Value of journey time changes(£) Net journey time changes (£) 0 to 2min / 2 to 5min / > 5min		£0	
	Reliability impact on Business users	Not assessed			N/A	
	Regeneration	Not assessed			N/A	
	Wider Impacts	Not assessed			N/A	
Environmental	Noise	Minor noise benefits connected with traffic flow reductions from mode shift associated with active travel corridor schemes		Slight beneficial	£8,112	Slight beneficial reduction in noise in and around central Preston, predominantly areas in IMD income quintiles 1 and 2.
	Air Quality	Minor air quality benefits connected with traffic flow reductions from mode shift associated with active travel corridor schemes		Slight beneficial	£16,364	Slight beneficial improvement to air quality in and around central Preston, predominantly areas in IMD income quintiles 1 and 2.
	Greenhouse gases	Reductions in greenhouse gases expected consistent with traffic flow reductions from mode shift associated with active travel corridor schemes	Change in non-traded carbon over 60y (CO_2e) Change in traded carbon over 60y (CO_2e)	Slight beneficial	£52,935	
	Landscape	Not assessed			N/A	
	Townscape	Not assessed			N/A	
	Historic Environment	Not assessed			N/A	
	Biodiversity	Not assessed			N/A	
	Water Environment	Not assessed			N/A	
Social	Commuting and Other users	Active travel corridor schemes would lead to some congestion reduction benefits due to mode shift - these have been allocated to Commuting and Other users.	Value of journey time changes(£) Net journey time changes (£) 0 to 2min / 2 to 5min / > 5min		£717,202	Slight beneficial impact to commuters and other users due to congestion reduction affecting all trips into central Preston.
	Reliability impact on Commuting and Other users	Not assessed				
	Physical activity	The active travel corridors, public realm improvements and secure cycle hub at the bus station would be expected to lead to more cycling and walking trips, an increase in physical activity and therefore positive health impacts.	Increases of 276 daily cycle trips and 4,254 walking trips.	Moderate beneficial	£21,612,180	
	Journey quality	The segregated cycle lanes would reduce traveller stress for cyclists primarily through reducing the fear of potential accidents as well as potentially reducing frustration through improving the ability for cyclists to make good progress along the route. Public realm improvements on Friargate South would be expected to improve the traveller care factor particularly for pedestrians. Secure cycle storage at Preston Bus Station provides a safe comfortable environment for cyclists and multi-modal cycle-bus users.	20,680 daily users affected	Moderate beneficial	£1,550,374	
	Accidents	AMATs indicate reductions in accidents consistent with traffic flow reductions from mode shift associated with active travel corridor schemes		Slight beneficial	£121,676	Slight beneficial impact to children, older people, pedestrians, cyclists and motorcyclists due to segregation of walking and cycling facilities from other highways users.
	Security	The mobility hub would have positive security impacts for users at Preston bus station. Public realm improvements on active travel corridor schemes could provide improvements to informal surveillance.		Slight beneficial	N/A	Slight beneficial impact to pedestrians and cyclists due to improved lighting and addition of CCTV at the mobility hub.
	Access to services	Not assessed			N/A	
	Affordability	Not assessed			N/A	
	Severance	The active travel corridor schemes would reduce severance for pedestrians over short distances and cyclists using the routes as part of a longer journey.	946 daily cycling users affected	Moderate beneficial	N/A	Slight beneficial impact to pedestrians and cyclists and including all vulnerable groups due to additonal road crossing facility on Queen Street and the reconstructed Ribble bridge.
	Option and non-use values	Not assessed			N/A	
Public Accounts	Cost to Broad Transport Budget				£9,960,034	
	Indirect Tax Revenues	AMATs indicate small reduction in tax gains consistent with traffic flow reductions from mode shift associated with active travel corridor schemes			-£62,104	

Appendix A. Comparative schemes data

Type of scheme	Scheme	Uplift Previous	Uplift Updated	Note	Data Source	Details	Context
On-road segregated cycle lane	Wilmslow Road / Oxford Road cycleway	117%	70%	Document states that scheme related uplift is 36%-70% (page 18) - take upper end as scheme includes mixture of infrastructure of which segregated is the best Previous uplift maybe related to manual counts - can't find 117% in document.	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/738307/170912-cycle-city-ambition-stage-2-baseline-report-final.pdf	Cycle lanes were built over a distance of 5km along the Wilmslow Road / Oxford Road corridor. This is Greater Manchester's busiest cycle corridor, partly because it passes through the university area, including the University of Manchester, Manchester Metropolitan University and the Royal Northern College of Music. The scheme is on both sides of the road, and is a mix of full physical segregation from traffic (63%); 'light segregation' (1%); on-road cycle lane not physically segregated (28%) and shared-use path (8%)	Provides a connection between densely populated residential areas (Rusholme, Fallowfield), and a number of university areas including University of Manchester, Manchester Metropolitan University, and Northern College of Music
General Key improvements (resurfacing etc)	East-West Quietway CCA	37%	40%	Okay using this document instead: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/1007473/summary-and-synthesis-of-evidence-cycle-city-ambition-programme-2013-to-2018.pdf	https://gallery.mailchimp.com/a48e5036bdadd8d6146783324/files/cbebe4c4-db5d-4090-8492-4ea36dc91be8/ANNEX_B_CCA_Interim_Report_FINAL_002_.pdf	Fully completed in April 2018, CCA investment on the (what was partly pre-existing) East-West Quietway now completes the link from the city centre to the Bristol Bath Railway Path. The segregated Baldwin Street cycle path now extends westwards to the bottom of Baldwin Street (the first phase completed in December 2014 and the second phase by April 2018), linking it with the city centre's Metrobus works. There is also an improved crossing at Bristol Bridge linking Baldwin Street with Castle Park. Within the park, treatment of the historic cobbles, footpath-widening and improvements to route legibility were also completed in July 2016. Old Market's stairway structure has been removed, and a new cycle route along Bond Street South is in place, linking the existing Castle Park route to St. Matthias Park. Beyond St. Matthias Park, a shared use path alongside Trinity Street, linking to the Bristol Bath Railway Path, is also in place.	Connects to transport hubs, addresses gaps in the wider network to create direct connections to Bristol, links leisure areas and residential areas
	Lancaster Cycling Demonstration Town	29%	29%	Link doesn't seem to contain info about this scheme but seems plausible?	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/416797/finding-the-balance-sustainable-travel.pdf	Resurfacing of Lancaster canal towpath from the north of Lancashire, over the Line Aqueduct, and into the city centre. Cycle links created or improved on the Lancaster & Morecambe Greenway Signage, cycle parking, links to education facilities and ASL also introduced	Improving connections between towns in the Lancashire region, with overall general improvements to an existing cycleway
Remodelled major junction	The Plain Roundabout	8%	25%	Link doesn't exist, updated using: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/738307/170912-cycle-city-ambition-stage-2-baseline-report-final.pdf	https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/738307/170912-cycle-city-ambition-stage-2-baseline-report-final.pdf Page 62	Plain Roundabout, Oxford is a roundabout which was upgraded through the removal of one of the main barriers to cycling as it was a difficult junction for cyclists entering Oxford from the east. It was remodelled during phase 1 to make cycling safer where construction was completed 2015. Following completion, there were positive improvements with increases in between 2015-2016 at Horspath, Oxford Road and Barracks Lane that could be attributable to the scheme completed at The Plain roundabout. City-wide percentage increase of 13% between 2012 and 2016 was also recorded.	The intervention aims to overcome one of the main barriers to cycling into and out of Oxford city centre from the residential area to the east. The Plain is a busy five-arm roundabout with high bus flows and a history of cyclist casualties. The junction is in close proximity to educational areas, the University of Oxford and associated student areas, and leisure areas (i.e. parks and recreational areas).
20mph zones	Bristol Inner East Zone (2012)	18%	18%	OK? Some average of provided numbers? Within range of 4-23% increase in cycling activity stated in report	http://councillors.herefordshire.gov.uk/documents/s50065030/Appendix%201%20for%20South%20Wye%20Transport%20Package%20-%20Active%20Travel%20Measures.pdf PAGE 5	The 20mph speed limit implementation was completed in September 2015 and included a comprehensive monitoring programme. It was found that 94% of surveyed roads have slower speeds, active travel levels have increased and there was a significant reduction in the number of fatal, serious and slight injuries and commensurate significant financial savings for the NHS far in excess of the implementation costs	The inner east zone incorporates a number of significant residential areas within Redland and Bishopston and a number of commuter rail station. The residential areas are on the edge of Bristol city centre and in close proximity to the University of Bristol and Bristol Royal Infirmary.
Walking route enhancement	Altrincham, Greater Manchester	25%	25%	OK	https://www.livingstreets.org.uk/media/3890/pedestrian-pound-2018.pdf Page 29	Better streets, pavements and crossing points are also credited with increasing footfall by 25% between 2010 and 2017, with further year-on-year increases in footfall predic	High street redevelopment of a commuter town on the London Underground and Overground network, surrounded by residential areas and a high density of retail units
Public realm	Sheffield, Heart of the City	35%	35%	OK	https://www.livingstreets.org.uk/media/3890/pedestrian-pound-2018.pdf	An evaluation of the public realm improvements to the Peace Gardens reported a 35% increase in footfall in the City Centre (Genecon, 2010). The authors estimated an attribution rate of 20% – 44%	
	Coventry	25%	25%	OK		a range of improvements to Coventry City Centre – new pedestrian areas, a new civic square, clearer signs and better placement of street furniture – were credited with a 25% rise in footfall in the town centre on Saturdays (NWDA/RENEW Northwest, 2007). page 27	
	Preston, Fishergate	22%	22%	OK (can't check but seems reasonable)	LCC data.	North and south pavements. North pavement - Pedestrians crossing Fox Street in both directions. Pedestrians crossing Lune Street in both directions. South Pavement - Pedestrians crossing Chapel Street in both directions. Pedestrians crossing Chapel Street in both directions	

Appendix B. Mobility hub mode choice model methodology

Appendix B contains the mobility hub modelling and economics approach designed for Lancashire County Council appraisal of cycle mobility hubs at bus stations, used for Preston Bus Station mobility hub. This method is similar to assessments undertaken for Transport for Greater Manchester at Metrolink stations.

Methodology and Assumptions

This section documents the development of a spreadsheet-based tool to assess the impact of the Lancashire Mobility Hubs on mode choice.

Representation of Hubs

The spreadsheet has been designed to assess the changes in mode share that are realised when the Mobility Hubs are opened. For illustrative purposes it is assumed that the Hubs can be assessed by looking at demand between the hub and three principle stops along the same rail or bus route, and between the hub and other three Hubs. This approach is illustrated in Figure 0-1.

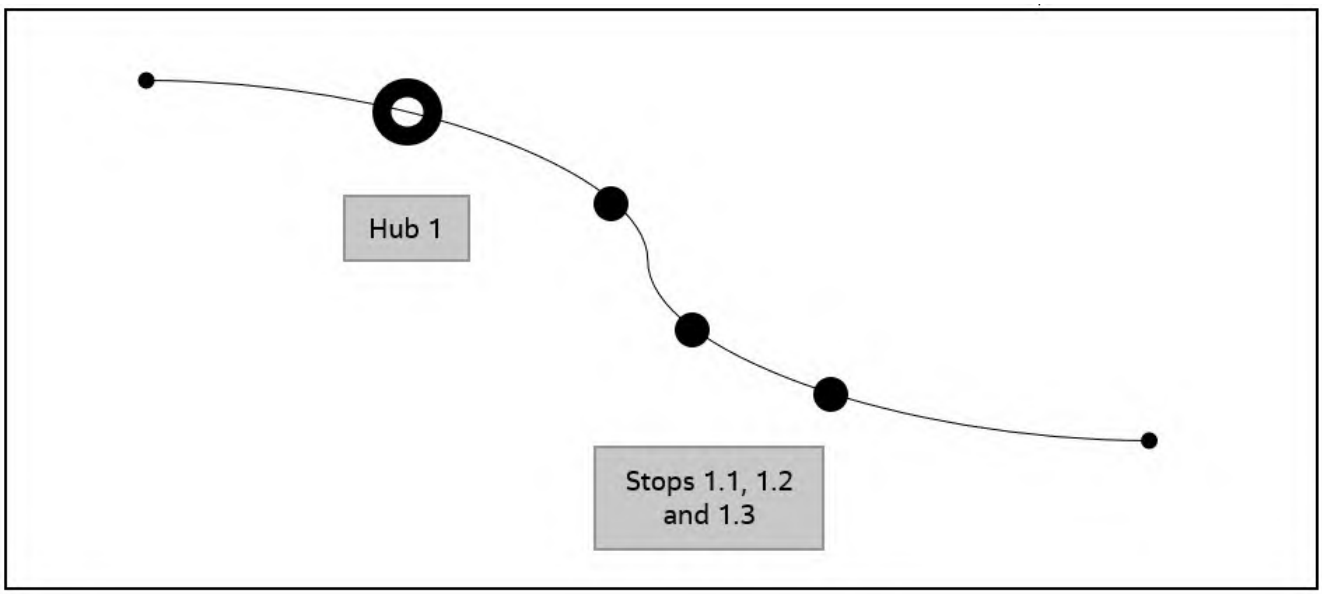


Figure 0-1: Representation of Mobility Hubs on PT demand between key stops

For this rail or bus route, the impact of improvements to Hub1 is assessed by looking at changes in demand to/from stops 1.1, 1.2 and 1.3. These are three principle stops along the route but as illustrated in Figure 0-1 there are also other lower demand stops along the alignment that are not included in the analysis.

Hub 2 is assessed using principle stops 2.1, 2.2 and 2.3, Hub 3 with principal stops 3.1, 3.2 and 3.3 and so on.

Setting out the demand changes in more detail:

- The improvements to Hub 1 result in easier access to Hub 1, and this will result in increased PT demand (and therefore reduced demand by car and active modes) to stops 1.1, 1.2 and 1.3.
- Similarly, the improvements to Hub 1 will result in easier egress from Hub 1 and this will result in increased PT demand from stops 1.1, 1.2 and 1.3 to Hub 1.

- The improvement to Hub 1 and each of the other Hubs will result in increased PT demand between each hub.

For the Lancashire Hubs between 10 and 14 stops are represented for each hub, for a given hub these 10-14 stops include the other three Hubs as stops. We expect these 10-14 stops to represent a significant proportion of the total demand that uses the Hubs.

Six 'modes' have been identified to best capture changes in demand between modes of interest and to assess the strategic objectives of the Hubs. Modes in this context are combinations of access or egress mode at the travel hub end of the journey and the main mode:

- Walk access/egress, PT main mode
- Cycle access/egress, PT main mode
- Cycle main mode
- PT access/egress[5], PT main mode
- PT not via Hub
- Car access/egress, PT main mode
- Car main mode.

The extent to which the desired mode combinations can be represented is discussed below.

Modelling Approach

To determine the impact of the Hubs on demand for RT it is necessary to establish base levels of demand in the 'without Hubs' case that defines the Do Minimum (DM). This has been done by using a combination of trip end data from TEMPro and 2011 Census journey to work data to provide distribution information by mode.

The first step was to conduct GIS analysis to identify the MSOAs that form the four Mobility Hubs and their stops. A wider catchment area has been assumed for the Hubs, roughly the MSOA in which the hub lies and each surrounding MSOA, while a single MSOA has been assigned to the stops. Effectively the wider catchment definition of the Hubs implies people travel into the hub to travel on to destinations by PT.

Then, Production-Attraction (PA) trip ends have been extracted from TEMPro for the 2025 and 2045 forecast years by trip purpose and by mode for the following time periods:

- AM peak (07:00-09:59)
- IP peak (10:00-15:59)
- PM peak (16:00-18:59), and
- Off peak (00:00-6:59 and 17:00-23:59).

In addition, the 2011 Census journey to work data by mode have been extracted and used for the distribution of trips.

The mode definitions used in TEMPRO allow us to distinguish the following modes:

[5] This could be by bus or by another PT line that interchanges at the Hub.

- Bus main mode
- Rail main mode
- Car main mode
- Walk main mode
- Cycle main mode.

The TEMPro PT modes are not segmented by access mode, as such it is not possible to directly represent the access modes combinations listed in the previous section. Similarly, it is not possible to distinguish PT trips that do and do not use the hub from the TEMPro data. Accepting the limitations associated with moving to these five modes we have used the hub-stop trips by mode that have been determined from a combination of TEMPro and Census data.

To model the changes in demand by mode resulting from the opening of the Hubs an incremental logit mode choice model can be used. This model form predicts changes in demand relative to an established base case based on *changes* in generalised times alone. In this case we only need to represent the changes in generalised time minutes associated with the improvements to the Hubs. This allows us to predict changes in demand as follows:

The improvements in the Hubs will allow us to represent an overall change in accessibility for RT trips/tours. This gives us a change in generalised time of ΔC, for example ΔC=-10 minutes which is negative because generalised time reduces from the DM to the Do Something (DS).

The incremental logit model then allows us to predict the demand changes as follows:

$$p_{DS}^{m} = \frac{D_{DM}^{m} * e^{\lambda \Delta C}}{\sum_{M} D_{DM}^{m} * e^{\lambda \Delta C}}$$

$$D_{DS}^{m} = p_{DS}^{m} * \sum_{M} D_{DM}^{m}$$

where: m is the mode - rail, bus, car, walk or cycle with M=5 modes in total

p_{DS} is the predicted probability of choosing mode m with the Hub open

D_{DS} is the predicted DS demand by mode m with the Hub open

λ is a negative sensitivity parameter to changes in generalised time minutes

Note that in this application ΔC=0 for car and active modes. The Burnley, Brierfield and Nelson hubs improve accessibility to both rail and bus so generalised cost changes have been applied to both of the PT modes, however the Rawtenstall hub serves only bus services and so the generalised cost change has only been applied to bus.

We have used lambda values for mode choice based on the median values available in TAG M2.1. Note that the lack of normalisation used in the TAG logit models means that the implied mode choice lambdas are different for car and PT. Therefore, average mode choice lambdas have been calculated for the Mobility Hubs mode choice model by using data on the relative share of car and PT trips.

Table 0.1: Mode choice sensitivity parameters

Purpose	Car distribution lambda	PT distribution lambda	Mode choice theta	Car MC lambda	PT MC lambda	Average lambda
Commute	-0.065	-0.033	0.68	-0.044	-0.022	-0.040
Business	-0.067	-0.036	0.45	-0.030	-0.016	-0.028
Other	-0.074	-0.036	0.53	-0.039	-0.019	-0.035

Under this approach it is assumed that the demand responses to the opening of each Hub are restricted to mode choice along the PT corridor. This means that no re-distribution responses are modelled, for example individuals switching into the corridor due to the enhanced attractiveness of PT offered by the Hubs. It also assumes that no additional trips are generated due to the opening of the Hubs, this seems reasonable given that the Hubs are not going to deliver large changes in accessibility. In VDM terminology this means that we are adopting a 'fixed matrix' approach at the all-mode demand level.

Access Mode Shares

As noted above, the PT information available from TEMPro does not distinguish between different access modes. However, other PT data is available which provides insight into the use of different access modes, and this can be used to split total PT demand at a hub into PT demand arriving at the hub using different access modes (or egressing from the hub for return home journeys).

A 2018 survey of over 7,000 Manchester Metrolink passengers was undertaken and is available for analysis. The surveys were distributed to passengers throughout the working day, however a high proportion of the interviews were distributed in the morning peak as illustrated in Figure 0-2.

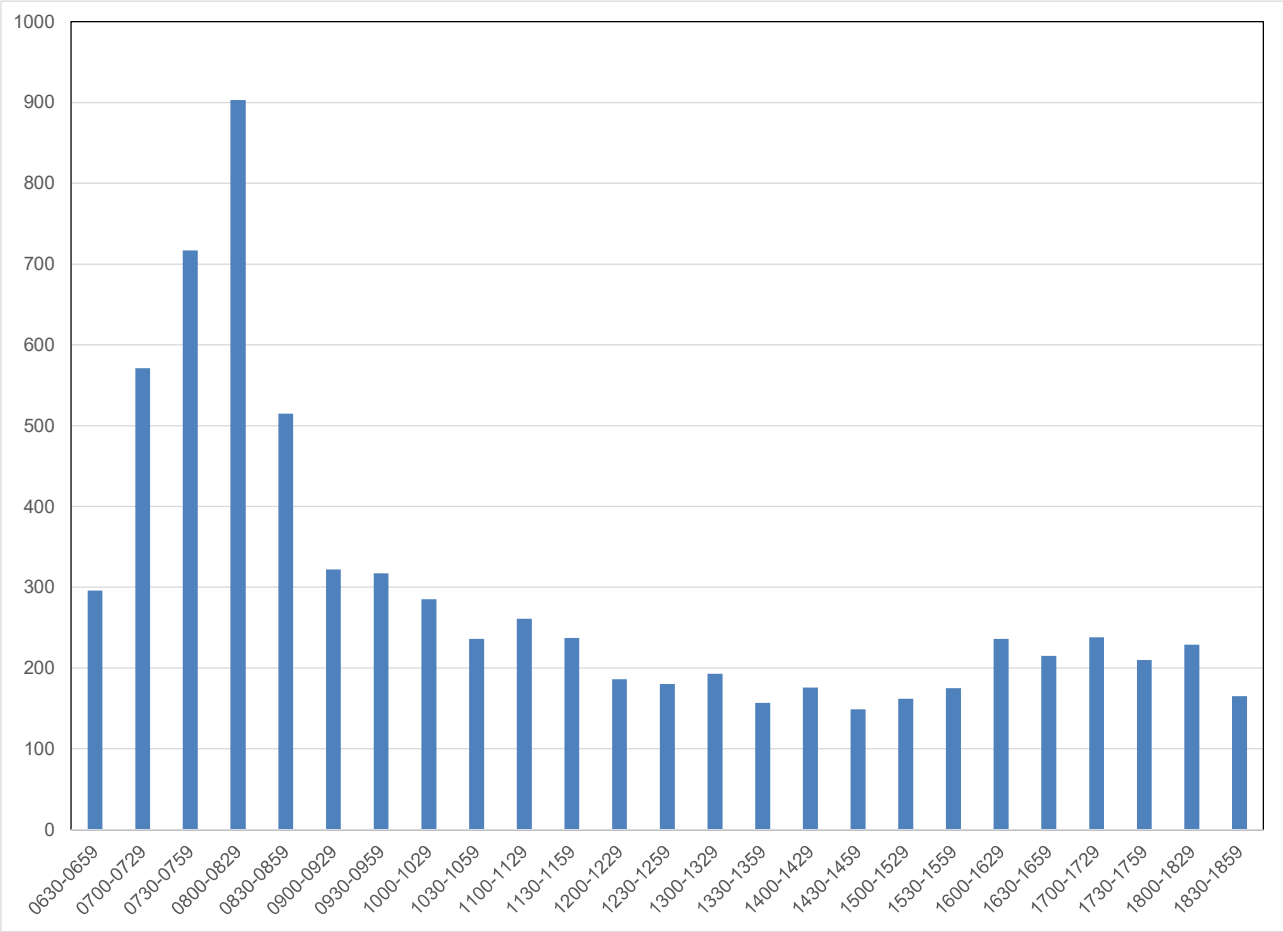


Figure 0-2: Metrolink survey time of day distribution

As a result of this high fraction of AM-peak survey, far more from-home journeys (P to A movements) were surveyed than to-home journeys (A to P movements) giving samples of 5,581 from-home access modes and 1,332 to-home egress modes. Furthermore, as no surveys were distributed after 19:00 then return legs of certain journeys such as evening leisure journeys or late returning commuters will not be surveyed. Therefore, it was decided to examine the access mode shares for from-home journeys only, and then assume that the outward access and return egress journeys are symmetrical in terms of mode usage.

Table 0.2 summarises the number of trips by access mode for the four Metrolink Hubs and for all from-home trips in the survey.

Table 0.2: Access modes used for from-home Metrolink trips

Hub	Walk	Bus	Train	Bicycle	Taxi	Car/Van (as driver)	Car/Van (as passenger)	Other	Total
Derker	18	0	0	0	0	54	18	1	91
Prestwich	101	3	0	0	0	27	6	0	137
Audenshaw	34	0	0	0	0	0	0	0	34

Rochdale Railway Station	7	3	3	0	0	2	5	0	20
All four hubs	**160**	**6**	**3**	**0**	**0**	**83**	**29**	**1**	**282**
All data	**3,806**	**344**	**17**	**25**	**34**	**925**	**372**	**58**	**5,581**

These trip totals are expressed as access mode shares in Table 0.3.

Table 0.3: Access mode shares for from-home Metrolink trips

Hub	Walk	Bus	Train	Bicycle	Taxi	Car/Van (as driver)	Car/Van (as passenger)	Other	Total
Derker	19.8%	0.0%	0.0%	0.0%	0.0%	59.3%	19.8%	1.1%	100.00%
Prestwich	73.7%	2.2%	0.0%	0.0%	0.0%	19.7%	4.4%	0.0%	100.00%
Audenshaw	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	100.00%
Rochdale Railway Station	35.0%	15.0%	15.0%	0.0%	0.0%	10.0%	25.0%	0.0%	100.00%
All four hubs	**56.7%**	**2.1%**	**1.1%**	0.0%	0.0%	**29.4%**	**10.3%**	**0.4%**	100.00%
All data	**68.2%**	**6.2%**	**0.3%**	**0.4%**	**0.6%**	**16.6%**	**6.7%**	**1.0%**	100.00%

It is noted that the access modes shares for Audenshaw and Rochdale are calculated from relatively small samples of 34 and 20 trips respectively.

The Derker sample has a significantly higher car access mode share than the sample as a whole, and that also impacts on the car access mode shares calculated using the data for the four Hubs.

Given the sample size issues, and the need to generate access mode share information for non-Metrolink Hubs, it is proposed to use the all-day access modes shares for all Hubs including those in Table 0.3. These shares indicate that:

- Around two-thirds of individuals access by walk
- About one-quarter access by car or taxi
- Just 6% access by bus
- Train and bicycle access is low, together comprising less than 1% of trips combined.

This analysis is based on access to Metrolink rather than rail and bus services and is from Manchester rather than Lancashire. However, in the absence of suitable data on access mode shares in Lancashire we think it is

reasonable to use the Metrolink analysis to provide approximate access mode share information for Lancashire noting that the Lancashire Hubs serve relatively dense urban areas located near to Manchester.

Change in generalised time (ΔC)

As it has been mentioned in section 0, the improvements at the Hubs will allow us to represent an overall change in accessibility for RT trips/tours. This gives us a change in generalised time of ΔC. In order to estimate this change, the benefit values of walking and cycling improvements that are included in the PEAT[6] tool and benefit values of PT improvements from the latest TAG databook (May 2022) have been used. Table 0.4 presents the walking, cycling and PT improvements for each Mobility Hub, along with the level of improvement that is expected for each site.

[6] The Programme Entry Appraisal Toolkit (PEAT) has been developed by Transport for Greater Manchester to support the development of quantified evidence in support of walking and cycling projects. PEAT brings together established tools and techniques, input data, spreadsheet calculators, and a reporting suite in one place.

Table 0.4: Walking, Cycling and PT Improvements and Benefit Values

		Rawtenstall	Burnley MR	Burnley bus station	Brierfield	Nelson	Multiplier per trip	A	B	C	A	
Walking												
CROSSINGS	Directness of 'green man' crossing				B to C		pence	0.00	4.30	7.10	There is no green man pedestrian crossing on your route	T g c w th
STREET SSECURITY	Number of people in daylight				B		pence	0.00	2.20	-10.40	The street is largely deserted during the day, with very few others using the same route	T o th b n
STREET SIGNS	Signs to public transport and attraction	B to C	B	B to C	B	B to C	pence	0.00	10.90	12.50	No signs to public transport, no maps or information boards	S
PAVEMENTS	Pavement condition				B		minutes	0.00	0.50		There are a lot of broken and missing pavement slabs, resulting in an uneven surface	T c th
FACILITIES AND VISUAL ATTRACTIONS	Seating				B		pence	0.00	3.80		There are no seating areas on your route	T p lo
	Plants and Public Art				B to C		pence	0.00	5.90	7.90	No plants or public art	P
BUS STATION AND STOP FACILITIES	CCTV	B to C	B to C	B to C	B to C	B to C	pence	0.00	6.70	7.30	No CCTV	C
	Waiting Facilities				B to C		pence	0.00	1.20	2.80	Basic shelter	L
Cycling												
CYCLE PARKING	Cycle Parking Provision	B	B	B	B	B	pence	0.00	20.22		No cycle parking provided	C
	Cycle parking security	B	B	B	B	B	pence	0.00	6.03		No surveillance cameras or other security	D c c
CYCLE SURFACE	Cycle signage	B	B	B	B	B	pence	0.00	1.07		No specific cycle signs: navigation by existing road signage	C r
PT												
								Bus Users	**Car Users**	**Overall**		
PT FACILITIES	New Bus Shelters				✓		minutes	1.08				
	New Interchange Facilities	✓	✓	✓	✓	✓	minutes	1.27				
	RTPI (at bus stops)				✓		minutes	1.47	1.74	1.69		

As it can be seen in the table above, some values are in pence. The mode choice model requires the change in generalised time. Values of time (Table 0.5) from TAG data book (May 2022) have been used to convert the change in generalised cost to time. For simplicity the average of commuting and other trip purposes has been used.

Table 0.5: Values of Time, TAG Databook 2022

	£/hr	pence/min
Average of all working persons	18.306	30.510
Commuting	11.253	18.755
Other	5.136	8.560
Average (Commuting & Other)	8.195	13.658

Table 0.6 presents the change in generalised time (ΔC) that has been calculated for each hub. In the mode choice model only the ΔC from the walking improvements has been included since as it has been explained in section 0, based on the Metrolink survey around two-thirds of individuals access the hubs by walk, while PT and bicycle access is very low.

Table 0.6: Change in generalised time (ΔC) for each hub (minutes)

		Rawtenstall	Burnley MR	Burnley bus station	Brierfield	Nelson
Walking						
		0.16	**0.84**	**0.16**	**2.25**	**0.16**
CROSSINGS	Directness of 'green man' crossing				0.21	
STREET SSECURITY	Number of people in daylight				0.16	
STREET SIGNS	Signs to public transport and attraction	0.12	0.80	0.12	0.80	0.12
PAVEMENTS	Pavement condition				0.50	
FACILITIES AND VISUAL ATTRACTIONS	Seating				0.28	
	Plants and Public Art				0.15	
BUS STATION AND STOP FACILITIES	CCTV	0.04	0.04	0.04	0.04	0.04
	Waiting Facilities				0.12	
Cycling						
		2.00	**2.00**	**2.00**	**2.00**	**2.00**
CYCLE PARKING	Cycle Parking Provision	1.48	1.48	1.48	1.48	1.48
	Cycle parking security	0.44	0.44	0.44	0.44	0.44
CYCLE SURFACE	Cycle signage	0.08	0.08	0.08	0.08	0.08
PT						

		1.27	1.27	1.27	4.04	1.27
PT FACILITIES	New Bus Shelters	1.27	1.27	1.27	1.08	1.27
	New Interchange Facilities				1.27	
	RTPI (at bus stops)				1.69	

Quantified Impacts

Public Transport Users

High-level benefits to public transport users have been quantified based on a spreadsheet-based tool that has been developed. The benefit to PT users resulting from their relative decrease in journey time is calculated using the rule of a half as described in TAG Unit A1.3 User and Provider Impacts. The rule of a half is expressed as follows with the inputs to the calculation described in Table 0.7.

$$Total\ change\ in\ generalised\ cost\ for\ bus\ users = \left(\frac{1}{2} * Existing\ PT\ users\right) * \Delta C + \left(\frac{1}{2} * New\ PT\ PT\ users\right) * \Delta C = \frac{1}{2} * DS\ PT\ Users * \Delta C$$

Table 0.7: Inputs and sources for calculating PT user benefits

Input	Source
Existing PT users (DM PT users) **By OD pair**	Derived from TEMPro PA trip ends combined with Census 2011 journey to work data for distribution
PT users after the introduction of Mobility Hubs (DS PT users) **By OD**	Derived from the mode choice model
New PT users **By OD pair**	Derived from the spreadsheet-based mode choice model (DS PT users – DM PT users)
Change in generalised time (ΔC)	As explained in section 0

Walking and Cycling

For assessing the walking and cycling benefits due to the Mobility Hubs, the Active Mode Appraisal Toolkit (AMAT), a spreadsheet-based tool published by the Department for Transport (DfT), has been used.

AMAT quantifies a wide range of potential benefits of cycling and walking interventions including:

- Health improvements from increased levels of physical activity in terms of reduced mortality risk and lower work absenteeism;
- Improvements to journey quality as a result of providing the perception of a safer or pleasant journey whilst using walking and cycling infrastructure; and

- Impacts associated with modal shift away from cars and taxis including improvements in traffic congestion, greenhouse gas emissions, air quality, noise, accidents, infrastructure maintenance, and changes to indirect tax revenues as a result of a reduction in distance travelled by these modes.

Although largescale infrastructure schemes for other modes typically assume a 60-year appraisal period, this is generally not recommended for active modes interventions as they are more likely to have more finite project lives and increased uncertainty around the longevity of their impacts. Therefore, most appraisals of cycling and walking infrastructure schemes assume an appraisal period of 20 years.

To estimate the number of walking and cycling trips before and after the introduction of the Mobility Hubs, the PT demand was used. Two thirds of the PT demand have been assumed to access the hub by walk or cycle. Based on the Metrolink survey presented in section 0, the majority of trips access the hub on foot, while the cycle access is very low. Therefore, 98% of the two thirds of PT demand has been assumed to access by walk and only 2% by cycle.

In addition, a very high-level analysis has been conducted to quantify the benefits of bicycle users due to provision of parking cycling facilities at the hubs. To calculate these benefits for each hub, the cycling demand after the introduction of the Mobility Hubs have been multiplied with the values of cycling parking provision, cycle parking security and cycle signage.