West Northamptonshire Council

Local Transport Plan Carbon Assessment - Summary Report

CITY SCIENCE

delivering decarbonisation

Date issued:	19/07/24
Document status:	Final
Version number:	1.0

Prepared by:	
Aoife Dudley	Principal Transport Consultant
Rifat Foysal	Graduate Transport & Sustainability Consultant
Lucy Champ	Carbon Accountant
Reviewed by:	
Bob Hickish	Principal Transport & Sustainability Consultant
Approved by:	
Simon Lusby	Managing Director

Contents

1 Introduction

1.1 Project Overview

City Science has been commissioned by West Northamptonshire Council (WNC) to undertake a carbon assessment of the forthcoming West Northamptonshire Local Transport Plan (LTP) and its associated supporting documents. WNC has committed to resident and business activities being net zero by 2045, which includes transport carbon emissions.

The scope of this project is to use the Sub-National Transport Body (STB) Carbon Assessment Playbook (CAP) to deliver an assessment of the carbon impacts of the policies and interventions within the LTP and other strategies, including the:

- Bus Service Improvement Plan (BSIP)
- Local Cycling and Walking Infrastructure Plans (LCWIPs) for Daventry, Brackley, Towcester and Northampton
- Electric Vehicle (EV) Strategy

1.2 Quantified Carbon Reduction

In the Transport Decarbonisation Plan (DfT, 2021), the DfT made a commitment to driving decarbonisation at a local level by making Quantified Carbon Reduction (QCR) a fundamental part of local transport planning and funding. LTPs being refreshed by Local Transport Authorities (LTAs) would have to include a quantitative summary of the impact of the interventions they proposed, in order to understand how an LTA is performing compared to its baseline emissions scenario.

While guidance on both updating LTPs and delivering QCR has not been published by the DfT, it is widely accepted that this remains an important activity for LTAs to undertake. This is due to the fact that quantitatively assessing the impact of major policy commitments, such as those potentially delivered by schemes within an LTP, is essential to understanding an LTA's 'emissions gap' (the difference between the anticipated reduction in emissions from interventions, and the trajectory necessary to meet net zero by a given year).

1.3 Carbon Assessment Playbook

The STB CAP has been commissioned by the STBs to assist LTAs in quantifying the carbon impact of their LTPs and strategies in a data-led and robust way. The tool has a number of functions:

- Baseline Emissions: The tool produces reports and a dashboard for each local authority which provide the breakdown of its current (baseline) and future transport emissions, as well as a scaled decarbonisation pathway. It highlights the gaps between these two trajectories and the scale of activity which is required to meet net zero by 2050.
- Carbon Impacts of Interventions: The tool contains 29 different transport decarbonisation interventions (or levers), which are assessed as an impact against the local authority's baseline emissions.
- Option Generation and Assessment: Each intervention within the tool is associated with an Intervention Card, which can be used to develop bespoke intervention packages and measure their effectiveness.
- Quantification of Strategy Impact: The cumulative impact of a local transport strategy can be measured and visualised using the policy builder, and can be exported for further analysis and sharing.

The tool contains a policy builder, which allows the user to add different planned schemes and policies, indicate the area over which they are active, and the level of intensity with which they will be delivered. There are a total of 29 different intervention types which can be selected within the tool. The CAP has been used in this project to provide a high-level assessment of the impact of WNC's LTP interventions on the emissions within West Northamptonshire.

1.4 Definition of Net Zero

For the purposes of this this Report, we will be using the following definition of 'net zero': "net zero means cutting carbon emissions to a small amount of residual emissions that can be absorbed and durably stored by nature and other carbon dioxide removal measures, leaving zero in the atmosphere" (United Nations, 2024). In the context of WNC, the net zero target of 2045 refers to emissions from all sectors and therefore action to reduce emissions across all activities, including transport, is essential for WNC to meet its target.

1.5 Report Purpose & Structure

The purpose of this report is to summarise the methodology used for this assessment, and state the methodology, assumptions and limitations that sit behind the CAP tool. It will provide an overview of the results of the carbon reduction analysis under a range of potential future scenarios, and serve as an indicator of the actions that WNC could pursue in the future to further the delivery of net zero transport emissions within the authority.

After this Chapter, the report is structured as follows:

- Chapter 2: Baseline & Forecast Emissions Summary
- Chapter 3: Carbon Assessment Methodology
- Chapter 4: Carbon Assessment Results
- Chapter 5: Conclusion

2 Baseline & Forecast Emissions Summary

The baseline data in this Chapter has been generated using the CAP baseline reporting function. It provides an overview of transport emissions in West Northamptonshire using a baseline year of 2019, as well as a set of emissions forecasts under different EV uptake scenarios.

2.1 Total Emissions

Total user emissions for West Northamptonshire in 2019 are 1.365 MtCO2 per annum. These reflect all emissions bounded by the local transport authority area and comprise:

- 0.341 $MtCO_2$ from trips made wholly within West Northamptonshire.
- 0.550 $MtCO_2$ from trips starting or ending within West Northamptonshire that are destined to, or originating from, another local transport authority area.
- 0.424 $MtCO_2$ from trips wholly passing through West Northamptonshire, without an origin or destination locally.

The results are shown in Figure 2-1.

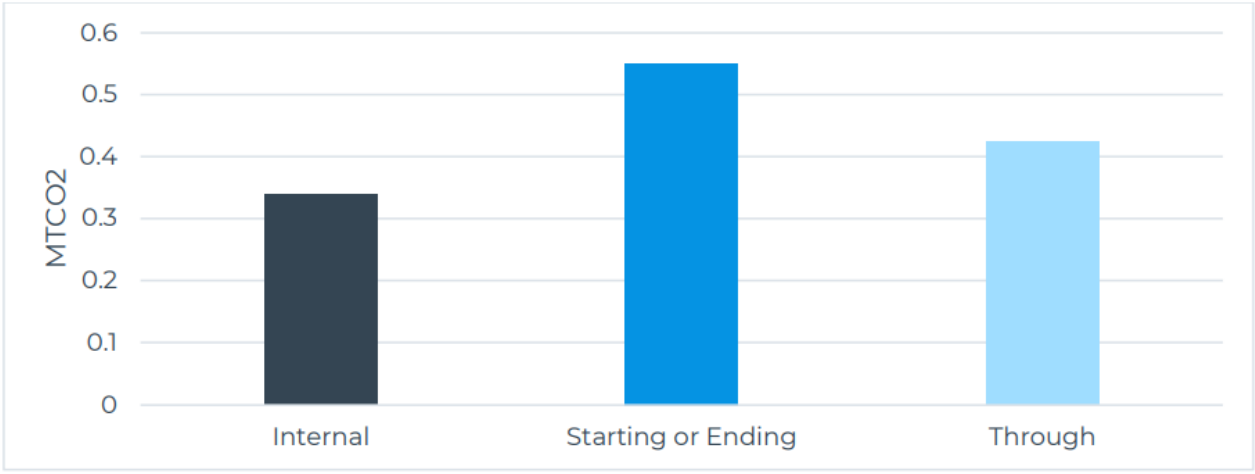

Figure 2-1: Total Emissions in West Northamptonshire by Trip Genesis (2019)

From this analysis it is clear that emissions from through trips comprise over 31% of total user emissions. These journeys are generally the most challenging to influence due to the fact that they do not start or end in the authority area, and are therefore outside of the sphere of influence of WNC's transport interventions. A further 40% of trips either start or end within West Northamptonshire, which means there is some potential for modal shift for all or part of the journey, but particularly for those which originate outside of the authority area, the impact of WNC's activities may be somewhat limited.

2.2 Emissions by Vehicle Type

User emissions in West Northamptonshire in 2019 derive from the following vehicle types:

- 0.760 MtCO2 from trips made by car
- 0.050 MtCO2 from trips made by bus or public transport
- 0.367 MtCO2 from movements made by heavy goods vehicles (HGVs)
- 0.188 MtCO2 from movements made by light goods vehicles (LGVs)

The results are shown proportionally in Figure 2-2.

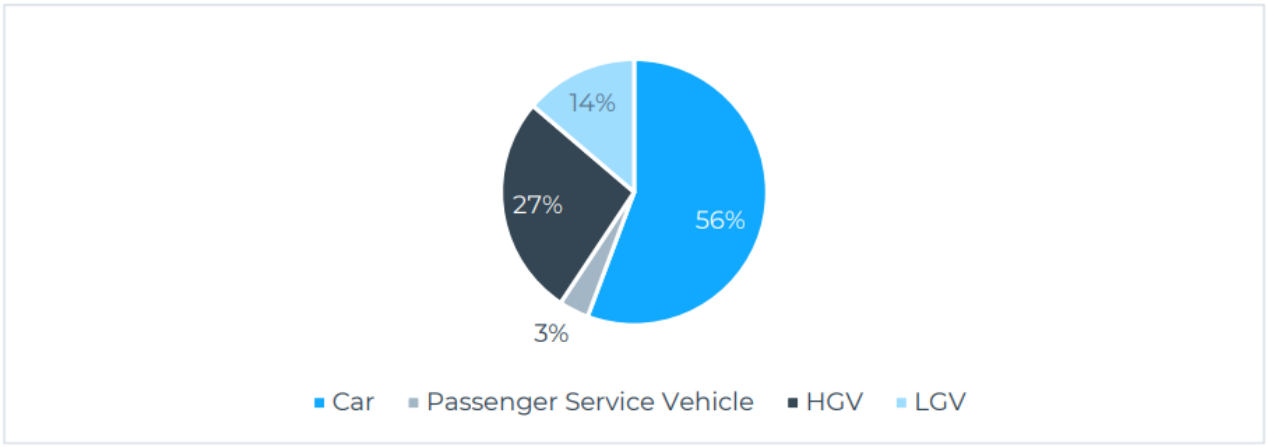

Figure 2-2: Proportion of Emissions in West Northamptonshire by Vehicle Type (2019)

2.3 Emissions by Journey Purpose

User emissions in West Northamptonshire in 2019 derive from the following journey purposes:

- 0.108 $MtCO_2$ from trips made for commuting
- 0.901 $MtCO_2$ from trips made for business
- 0.305 $MtCO_2$ from trips made for other purposes

The results are shown proportionally in Figure 2-3.

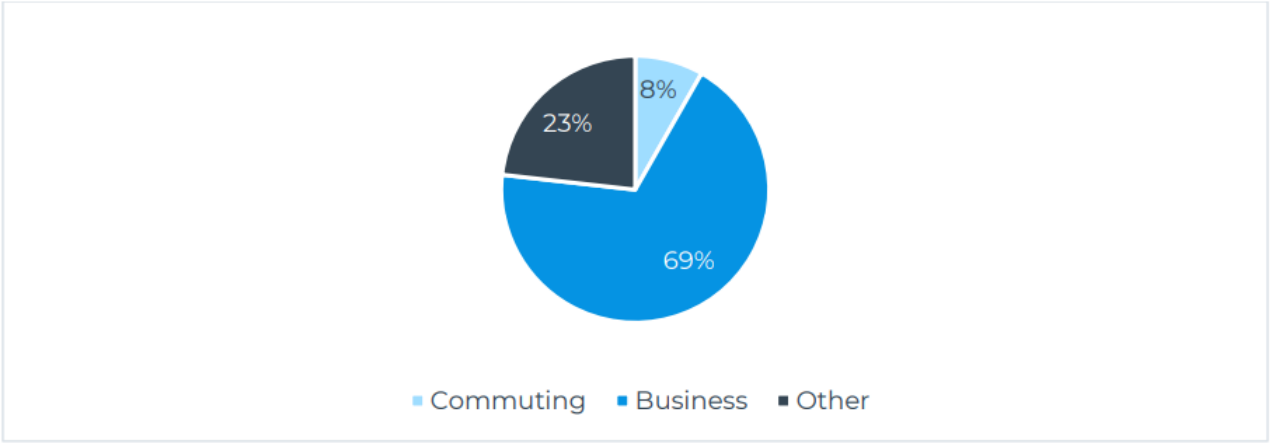

Figure 2-3: Proportion of Emissions in West Northamptonshire by Journey Purpose (2019)

The majority of emissions result from business trips, which indicates that interventions that tackle fleet emissions and encourage travel plans for businesses (to encourage employees to use sustainable modes when travelling for work) would be most effective in reducing emissions. Similarly, tackling emissions from freight vehicles (LGVs and HGVs) would also reduce business emissions.

2.4 Emissions by Trip Length

Trip length is an important consideration when determining the source of emissions and suitability of interventions to address them, with longer distance trips that generate higher emissions often some of the hardest to decarbonise. For trips that originate in West Northamptonshire in 2019, the resulting user emissions derive from the following trip lengths:

- 0.003 $MtCO_2$ from trips of less than 1 mile
- 0.124 $MtCO_2$ from trips of between 1 mile and 5 miles
- 0.112 $MtCO_2$ from trips of between 5 miles and 10 miles
- 0.188 $MtCO_2$ from trips of between 10 miles and 25 miles
- 0.129 $MtCO_2$ from trips of between 25 miles and 50 miles
- 0.255 $MtCO_2$ from trips of over 50 miles

The results are shown proportionally in Figure 2-4.

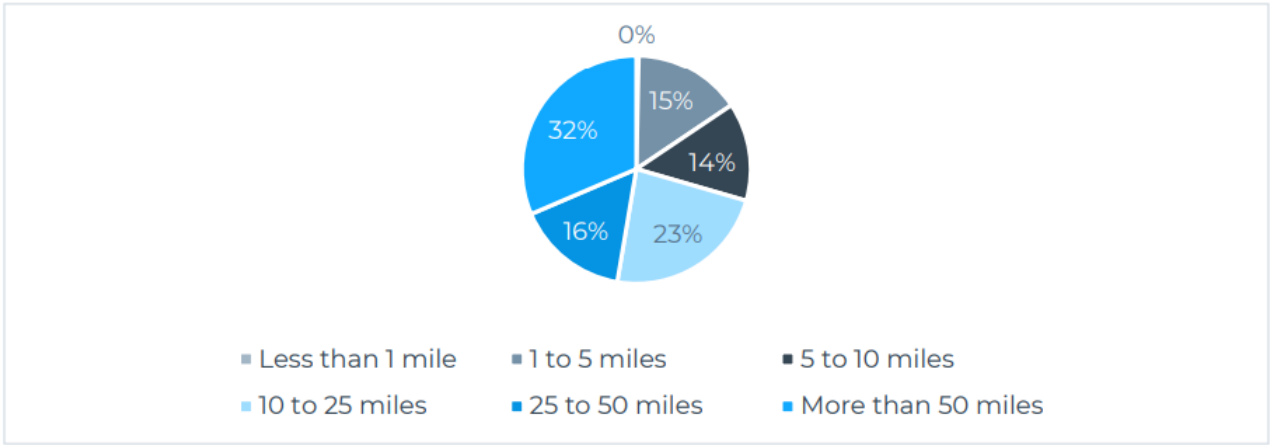

Figure 2-4: Proportion of Emissions in West Northamptonshire Trip Length (2019)

These emissions include the full length of trip, including where trips extend beyond the local transport authority boundary (to a maximum range defined by the boundary of the STB). The results are aligned with the findings in Section 2.1 that allocate the greatest proportion of emissions to trips starting or ending in West Northamptonshire.

2.5 Emissions by Place Type

To help identify the most appropriate interventions in different areas, West Northamptonshire has been categorised into nine different place types based on a variant of categories used in the National Trip End Model (NTEM). These place types are consistent with those used in the CAP when presenting the impact of interventions in different place type areas. Four of the place types are present within West Northamptonshire; Urban Large, Urban Medium, Rural Town & Fringe, and Rural Village & Dispersed, as shown in Figure 2-5.

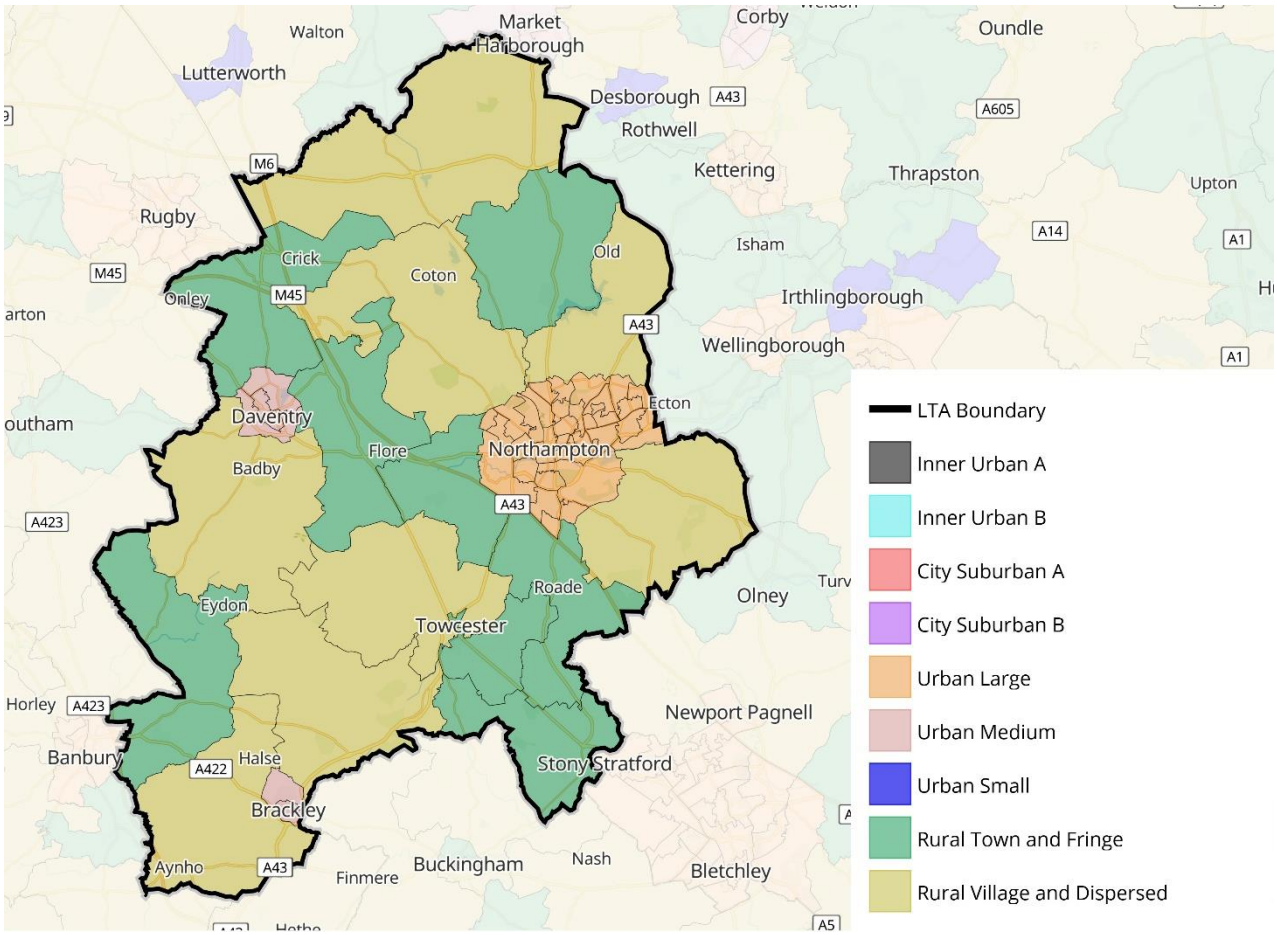

Figure 2-5: Map of Place Types in West Northamptonshire

The proportion of trips in 2019 originating in each place type area is as follows:

- 62.2% of trips originate in Urban Large
- 6.5% of trips originate in Urban Medium
- 17.1% of trips originate in Rural Town & Fringe
- 14.2% of trips originate in Rural Village & Dispersed

This includes emissions beyond the boundary from trips originating in West Northamptonshire that travel into other local transport authority areas. The prevalence of trips from different place types in West Northamptonshire will influence the suitability and impact of interventions introduced.

2.6 Estimated Future User Emissions

Transition to Zero Emission Vehicles (ZEVs) will provide a significant contribution towards decarbonising the transport network, although there remains uncertainty around the rate at which this transition will occur. The scenarios within the CAP tool are based on three different potential futures – Business as Usual (BaU) based on firm and funded policies at a national level, Accelerated ZEV which is a national scenario of ambitious ZEV uptake, and Local ZEV which is a more realistic future based on expected policy interventions and specific to local characteristics affecting likely ZEV uptake.

It should be noted that the analysis of EV uptake used in the CAP was produced when UK Government policy had set a ban for petrol and diesel vehicles from 2030. In September 2023, this was delayed until 2035. It has not been possible to update the analysis to account for this change, and while it is possible that the future ZEV scenarios in the CAP tool slightly overestimate the uptake of ZEVs (and therefore the reduction in emissions) it is not considered to be a significant change, and the ZEV scenarios remain a realistic future based on expected policies.

Figure 2-6 shows the variation in future emissions in West Northamptonshire that result from different scenarios of ZEV uptake.

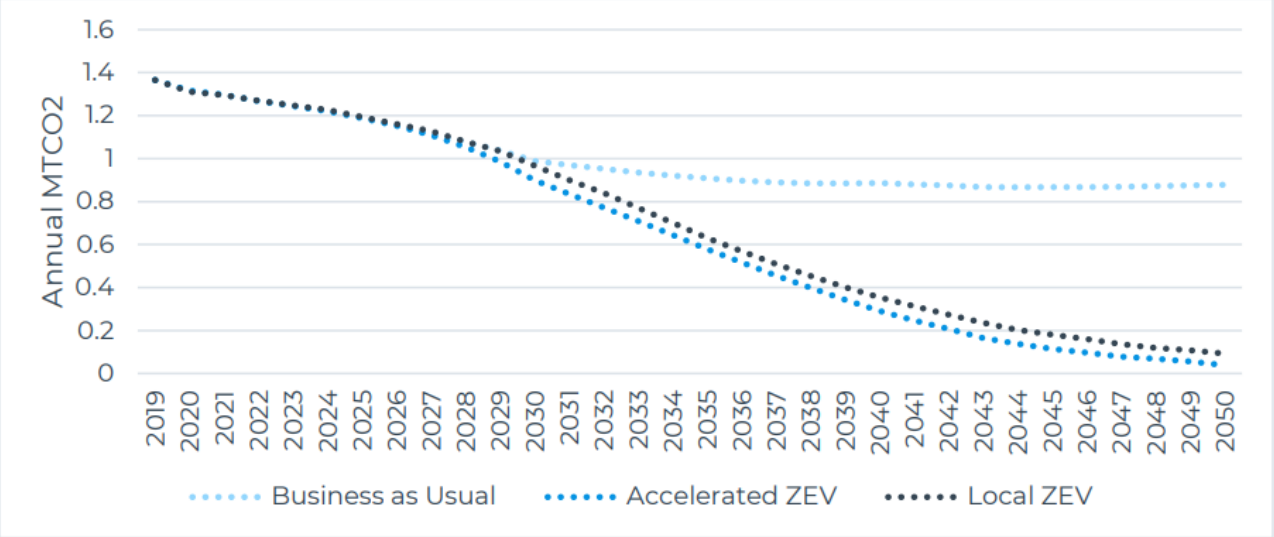

Figure 2-6: Total Emissions in West Northamptonshire Over Time Assuming Different Scenarios of ZEV uptake

3 Carbon Assessment Methodology

This chapter sets out the methodology, assumptions and limitations which have been used to develop the LTP policy package in the CAP tool, and estimate its carbon impact.

3.1 LTP Scenario Development

3.1.1 Policy Review

A thorough review of WNC's relevant policies provided the necessary inputs for the carbon assessment. The following policies were analysed and interventions summarised:

- Draft LTP
- BSIP
- Draft LCWIPs for Daventry, Brackley, Towcester and Northampton
- EV Strategy

A workshop was also held with WNC officers to ensure that the full range of interventions had been captured. The schemes assessed within this project are detailed in Appendix A.

3.1.2 CAP Equivalency

Once a full list of interventions had been developed, it was necessary to match WNC's schemes with their most relevant CAP intervention type, in order to be able to enter them into the tool. The full list of 29 CAP interventions is provided in Appendix B.

It was not possible to achieve a direct match for every WNC scheme, so the nearest most relevant intervention was chosen in each case. For example, there were several schemes which were intended to improve frequency on the passenger and freight rail networks. The CAP tool does not have an intervention for frequency improvements on the heavy rail network, so PT2 (improved bus/LRT frequency) was chosen as the best reflection of the likely scheme outcomes.

3.1.3 Spatial Mapping

Every scheme was mapped and overlayed with the 2011 MSOA layer for West Northamptonshire (to match the MSOAs used in the CAP tool). This was used as an indication of the areas in which trips are likely to be affected by the scheme, and therefore have an impact on carbon emissions. Where relevant, a buffer was applied around the scheme to reflect the fact that people's travel choices are often drawn from a wider area than the immediate scheme boundary. More details about the assumptions made regarding the buffer sizes are set out in Section 3.2.1. The purpose of the buffer was to estimate the proportion of each MSOA in which trips would be affected, which is expressed as a percentage in the tool.

3.1.4 Input into the CAP Tool

The final list of schemes across West Northamptonshire was grouped by CAP intervention type. The majority of schemes were combined according to their matched CAP (e.g. all walking schemes were added to the tool under a single 'AT1 - Improved pedestrian infrastructure' intervention). This was to streamline the process and make the adjustment of the interventions more efficient. Each intervention accounted for the combined area impacted by the LTP schemes, and the timescale for the rollout of the intervention was calculated by taking the earliest construction start date and the latest construction end date provided by WNC officers.

There were five instances where schemes were entered separately to the combined interventions. This was to reflect either a very different build out time period, intensity, or scheme type. These schemes were as follows:

- All high intensity cycle infrastructure improvement schemes
- Northampton bus and coach station upgrade
- Bus performance programme
- Extension of bus operating hours
- All high intensity strategic mobility hubs

3.2 Assumptions

3.2.1 Scope

Inputting interventions into the CAP tool requires setting a scope for each intervention which defines the in-scope trips (trips which are likely to be affected by the intervention) within each MSOA in West Northamptonshire.

The characteristics of the CAP interventions are recorded within the CAP Intervention Cards[1]. The cards were used to establish the appropriate boundary of in-scope trips. Where no specific buffer was recommended in the cards, other sources were used to establish an evidence-based boundary.

The details of the buffers for different intervention types, as well as any additional sources used to inform the development of a buffer are provided in Table 3-1.

Intervention Type	GIS buffer (m)	Additional Sources
Active travel improvement measures	1000	N/A
Bus improvement measures	800	(DfT, 2021)
Mobility hubs	400	(Chelmsford Garden Community Consortium, 2023)
EV charging (on street)	400	(DfT, 2022)
EV charging (car park)	800	N/A
Rail stations	1000	(Wakenshaw & Bunn, 2015)

Table 3-1: Buffers and Data Sources for Different Intervention Types

3.2.2 Intensity

The intensity of an intervention is used to determine the level or scale of impact. The factors which affect the intensity of the delivery of each intervention are indicated in the Intervention Cards, but the final intensity has also been determined in discussion with WNC officers. The majority of interventions are retained at their 'base' level of intensity, due to the fact that the majority of schemes are at a very early stage and therefore final design has not been established. There are a handful of cases where individual schemes are likely to have a higher than normal impact or are intended to be more ambitious than a standard roll out

3.2.3 Build Profile

As described above the timescale for the rollout of each intervention was calculated by taking the earliest construction start date and the latest construction end date for the schemes summarised within it. A linear build out rate from construction to completion was assumed.

The majority of interventions were assumed to continue having an impact on trips until the end of the assessment period, which is 2050. There were a few cases where WNC officers indicated that the funding for a particular scheme was likely to be temporary, and therefore the scheme impacts were limited to a shorter period than 2050.

3.3 Limitations

3.3.1 Highway Schemes

A number of highways schemes are included in the LTP, with the intention of relieving congestion, improving safety or improving journey times. Highway schemes are not included in the CAP since their carbon impact is influenced by a range of different factors that are unique to each scheme, preventing development of a consistent benchmark from which to inform any assessment.

[1] STB CAP Intervention Cards

A reduction in user emissions may result where highway schemes reduce congestion, reroute trips to a shorter distance route, lower average speeds or reduce the frequency of vehicle acceleration. Conversely, an increase in user emissions may be expected where highway schemes result in an increase in these factors. Moreover, improved efficiency of the highway network can often induce new demand by making travel by private vehicle more attractive, resulting in more vehicle kilometres being travelled.

Given that the factors are so varied and specific to each scheme, quantification of the carbon impact of highway schemes is very challenging, and a more detailed assessment would be required to deliver a more accurate picture of the overall impact of a scheme. The highway schemes within WNC's LTP were therefore not assessed as part of this commission.

3.3.2 Infrastructure Carbon

The CAP tool considers user emissions, and the impact of different transport policy interventions on trips and their associated emissions. It does not take into account the capital carbon costs of scheme construction, maintenance and decommissioning. Whole life carbon impacts are important, and therefore should be considered within WNC's wider carbon management strategy.

All manufacturing, materials and use of energy to construct or maintain a scheme have an associated carbon impact. Carbon emitted during scheme development should be proportional to the expected carbon savings of that scheme in order to deliver an overall emissions benefit across the life of the scheme.

3.3.3 Intervention Matching

As stated in Section 3.1.2, the CAP has a limited number of interventions pre-loaded into the policy builder tool. It was therefore not possible to provide an exact match for each of the LTP schemes, and the closest match was therefore used. The overall analysis from the carbon assessment, however, gives a high-level indication of the likely impact of the LTP policy package, and the specific differences between the interventions and their CAP equivalent is unlikely to have a significant overall impact on West Northamptonshire's net zero trajectory.

3.3.4 Unmodelled Interventions

There were a small number of schemes noted within the LTP and associated documents which could not be assessed as there was no remotely equivalent CAP intervention to match. Generally, these were options assessments or studies which in themselves would not have a carbon impact. There were also some schemes such as bus driver training and bus stop improvements which could not be modelled using the tool but are unlikely to have a significant overall impact on emissions.

4 Carbon Assessment Results

This chapter presents the carbon assessment results of the LTP schemes from the CAP. The results are presented for the three different scenarios, which are described further in the following subsections.

It also provides a comparison of emissions projections and reductions considering the selected LTP schemes, and gives a breakdown of the emissions reductions by vehicle type, trip purpose and trip length.

4.1 Scenario Overviews

4.1.1 BaU Scenario

BaU scenario is based on firm and funded policies, and the least ambitious central Government electrification targets. The projections within BaU are based on:

- Taking growth assumptions from the National Transport Model (NTM).
- Fuel consumption from TAG A1.3.11 (DfT TAG Unit A1.3, 2022).
- Proportion of vehicle kilometres by fuel type from TAG A1.3.9 (DfT TAG Unit A1.3, 2022).

Table 4-1 shows the proportion of miles driven by ZEVs under this scenario.

Scenario	2025	2030	2040	2050
BaU	15%	36%	62%	67%

Table 4-1: Proportion of Miles Driven By ZEVs in a BaU Scenario

BaU is not a likely future scenario, given the emphasis being given to decarbonisation of transport through changes to land use planning, shifting to sustainable modes and introduction of ZEVs. Due to the lack of intervention within the assumptions for the BaU scenario, the LTP policy package has the greatest relative impact. BaU should therefore be used for comparison only, and not as a viable trajectory for decarbonisation.

4.1.2 Accelerated ZEV Uptake Scenarios

Both of the accelerated ZEV scenarios (UE-ZEV and UE-ZEV-LA) are used to present possible futures of accelerated ZEV uptake driven primarily by bans on the sale of petrol and diesel vehicles. Table 4-2 shows the proportion of miles driven by ZEVs under these scenarios.

Scenario	2025	2030	2040	2050
UE-ZEV	13%	40%	88%	99%
UE-ZEV-LA	5-38%	20-67%	74-94%	95-97%

Table 4-2: Proportion of Miles Driven By ZEVs in a UE-ZEV and UE-ZEV-LA Scenario

Both of these scenarios of accelerated EV uptake should be used to inform the potential contribution that accelerated ZEV uptake driven by national policy could have. These scenarios, however, must be enabled by local delivery of charging infrastructure and may fail to materialise if charging provision and other factors (e.g. grid supply) are not overcome.

UE-ZEV-LA represents a more realistic future based on expected policy and local mileage splits by fuel type which are derived from WSP's EV:Ready analysis. This uses National Grid Future Energy Scenarios to establish uptake and create the forecasts to 2050, and then accounts for local factors such as baseline EV ownership and sales trends, reliance on on-street parking, vehicle ownership, wider fleet and vehicle turnover, and overall propensity to switch to an EV.

UE-ZEV is based on two of the DfT's Common Analytical Scenarios released in August 2022; Mode Balanced and Vehicle Led decarbonisation. These two scenarios include the same mileage split dataset that represents a potential future of ambitious ZEV uptake. Both are national datasets (not

reflecting local differences) and are only scenarios intended to support planning for uncertainty – they are not forecasts. UE-ZEV would require a significant increase in ambition and support for the ZEV transition at both the national and local level, and is therefore not seen as a likely future trajectory.

4.2 BaU Scenario (UE-BaU)

Under this scenario, the CAP provides an estimate of the emissions reduction in West Northamptonshire for the LTP policy package.

Figure 4-1 illustrates a notable contrast between the BaU scenario and the LTP policy package in terms of emissions reduction over time. While both trajectories show a reduction in emissions, the selected interventions demonstrate more pronounced decrease in emissions. By 2050, the BaU scenario projects emissions of 878 $ktCO_2e$, whereas the selected interventions are expected to reduce emissions to 797 $ktCO_2e$. This represents a reduction of approximately 9.3% compared to the BaU scenario. The size of this reduction is due to the fact that BaU is the least ambitious decarbonisation scenario, and therefore activity associated with the LTP has a greater overall impact.

However, it is important to note that even with these interventions, the projected emissions fall significantly short of the Climate Change Committee (CCC) pathway, which targets emissions of just 10 $ktCO_2e$ by 2050, and therefore also undermines the WNC 2045 net zero target. The gap between the selected interventions and the CCC pathway remains substantial at about 787 $ktCO_2e$ in 2050.

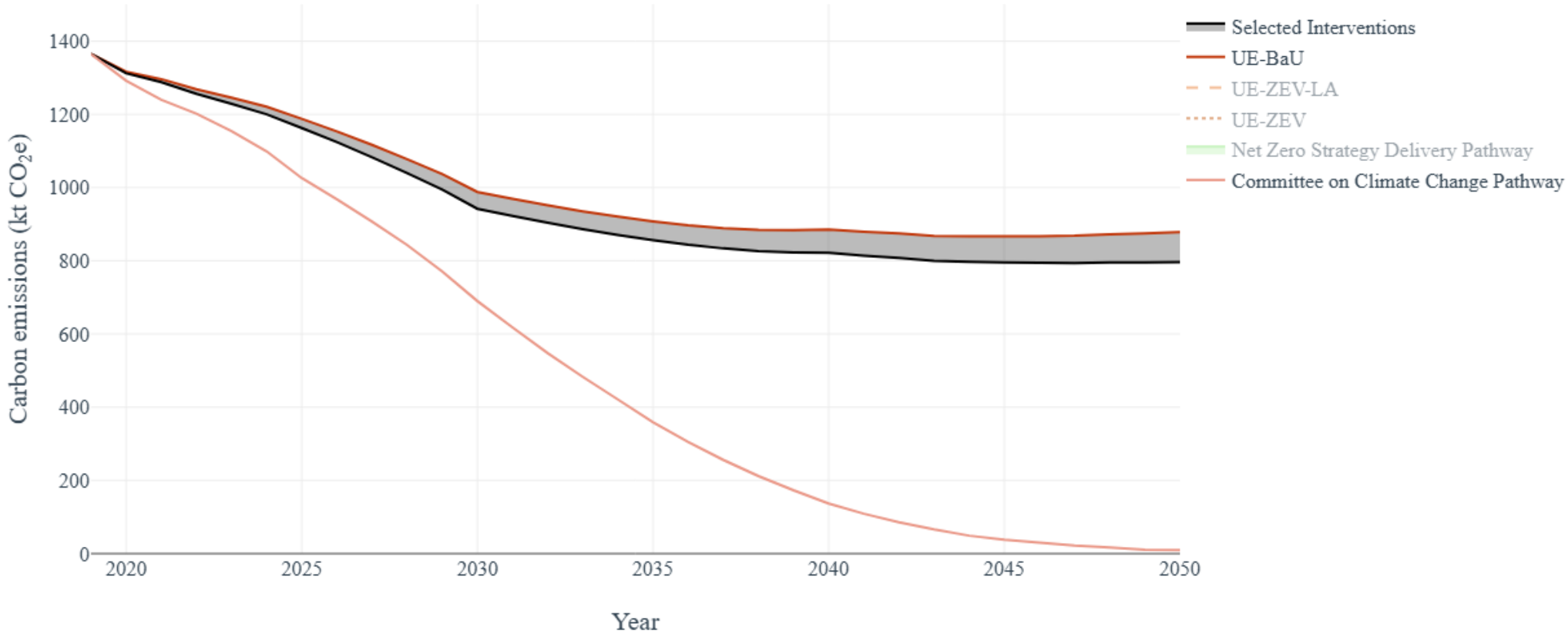

Figure 4-1: Projected Emissions for the Selected Interventions Compared to UE-BaU Emission and CCC Pathway

4.3 Accelerated ZEV uptake (UE-ZEV)

The UE-ZEV scenario considers the most ambitious scenario for ZEV uptake, which would require additional national policies beyond the current ZEV mandate and phase-out dates. All other assumptions remain as per the Business-as-Usual scenario.

Considering this scenario and the LTP policy package, the CAP provides the carbon reduction estimates illustrated in Figure 4-2. It shows a gradual decrease in emissions over time, with the impact of the LTP policy package showing a slight increase in the rate of decarbonisation compared to the baseline.

In this scenario, the baseline projection for 2050 is 37.8 $ktCO_2e$, while the LTP policy package yields a reduction to 34.8 $ktCO_2e$, representing a 97.4% reduction in emissions compared to 2019. This results in LTP policy pathway being much closer to the CCC pathway, and delivers a much greater contribution to WNC's overall net zero target, but still requires additional activity to tackle the residual 100.8 $ktCO_2e$ of emissions.

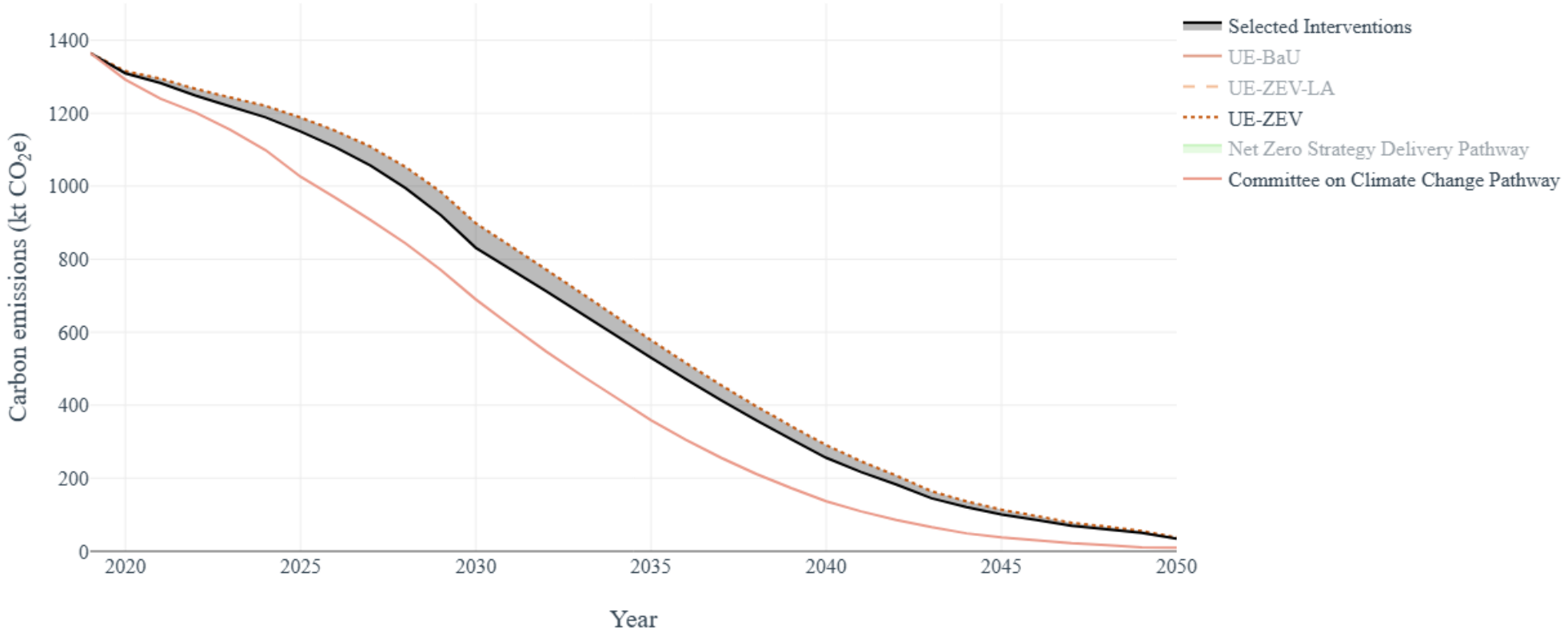

Figure 4-2: Projected Emissions for the Selected Interventions Compared to UE-ZEV Emission and CCC Pathway

4.3.1 Vehicle Type Analysis

Figure 4-3 illustrates that under the UE-ZEV scenario, the emissions reduction for cars is 889 $ktCO_2e$ whereas for bus it is 154.5 $ktCO_2e$. As demonstrated in Chapter 2, cars produce the greatest proportion of West Northamptonshire's emissions (56%) and therefore an ambitious target for ZEVs will have a significant impact. The impact is much smaller for buses as they produce only 3% of West Northamptonshire's emissions.

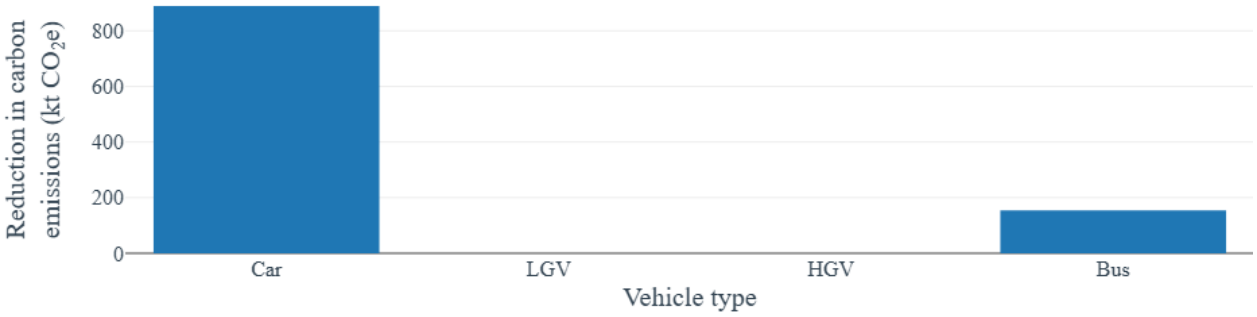

Figure 4-3: Reduction in Carbon Emissions for Vehicle Types by 2050

4.3.2 Journey Purpose Analysis

Figure 4-4 illustrates that the 'Other' category dominates the most reduction in emissions (359 $ktCO_2e$). 'Commuting' and 'Business' travel emerges as next major contributors to emissions reduction, with 228 $ktCO_2e$ and 196 $ktCO_2e$ respectively. The 'Education & education escort' and 'Personal business' shows low reduction in emissions with 49 $ktCO_2e$ and 56 $ktCO_2e$.

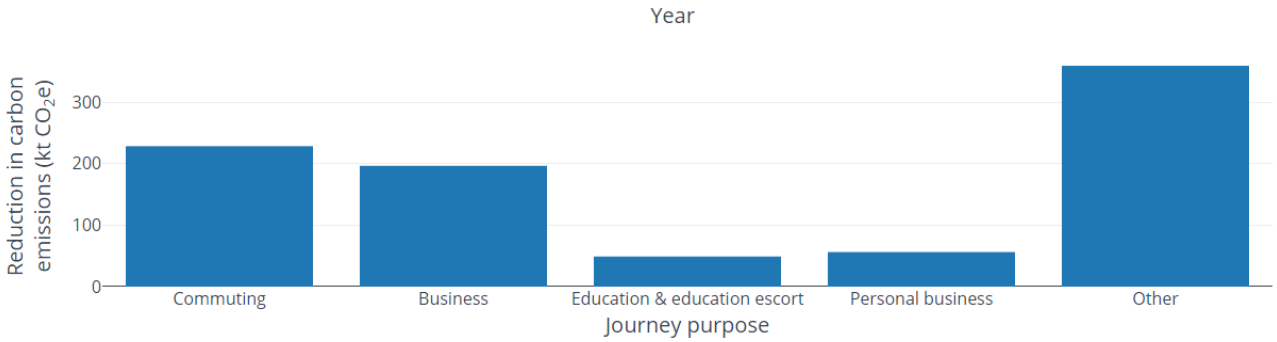

Figure 4-4: Reduction in Carbon Emissions for Different Journey Purposes by 2050

4.3.3 Trip Length Analysis

Figure 4-5 shows that greatest reduction based on trip length (including the through trips) is observed for trips of more than 50km (597 $ktCO_2e$). For intermediate trip lengths (25 to 50km and 10 to 25km), the UE-ZEV scenario maintains the decreasing trend of emission reductions with reductions at 99 $ktCO_2e$ and 67 $ktCO_2e$., The UE-ZEV scenario appears to show a more pronounced reduction for trips in the 5 to 10km range compared to the 10 to 25km category with 85 $ktCO_2e$.

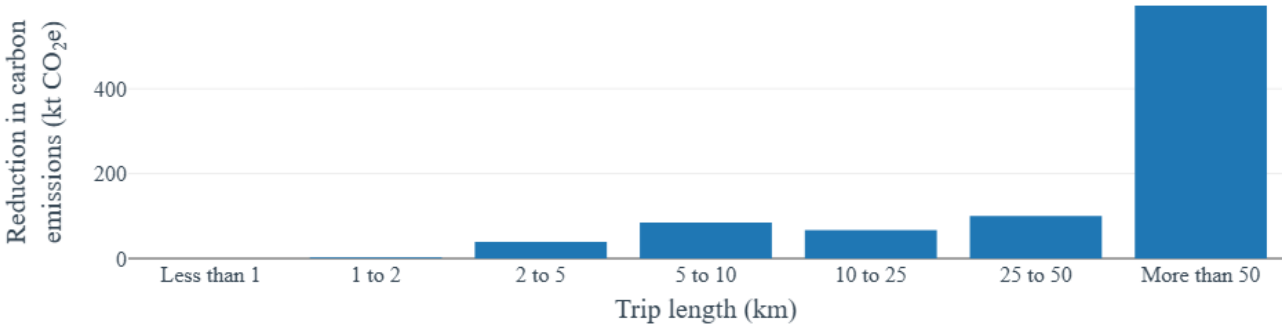

Figure 4-5: Reduction in Carbon Emissions for different Trip Lengths by 2050

4.4 Localised Scenario of Accelerated ZEV Uptake (UE-ZEV-LA)

The UE-ZEV-LA scenario considers a more realistic future based on expected policy (e.g. the ZEV mandate) and an assumption that charging provision continues in line with demand while other variables remain as per BaU. This scenario is specific to each local authority; reflecting how ZEV uptake might differ based on the characteristics of each place.

Considering this scenario, the CAP provides an estimate of the emissions reduction in West Northamptonshire for the LTP policy package as illustrated in Figure 4-6. It shows that under the UE-ZEV-LA scenario, whilst the baseline emissions are projected to reach 139.6 $ktCO_2e$ in 2050, with the LTP policy package this falls to 131.5 $ktCO_2e$, a difference of 5.8%. Under this scenario there is 231 $ktCO_2e$ remaining in 2045 with the LTP policy package, compared to 254.1 $ktCO_2e$ without.

This scenario demonstrates the importance of local action on encouraging a shift to ZEVs, but also shows that this will not deliver net zero in totality.

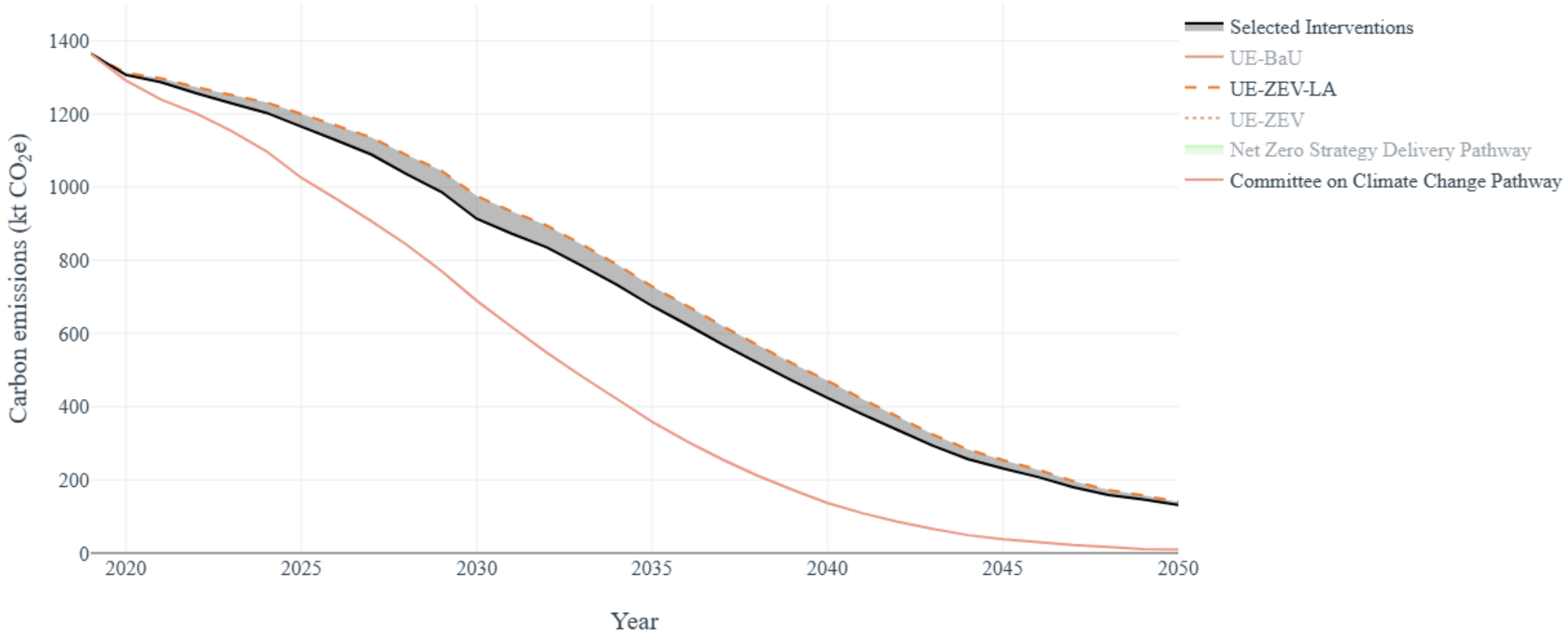

Figure 4-6: Projected Emissions for the Selected Interventions Compared to UE-ZEV-LA Emission and CCC Pathway

4.4.1 Vehicle Type Analysis

Figure 4-7 shows that for UE-ZEV-LA scenario, the emissions reduction for cars is projected to be 971 $ktCO_2e$ and 183 $ktCO_2e$ for buses.

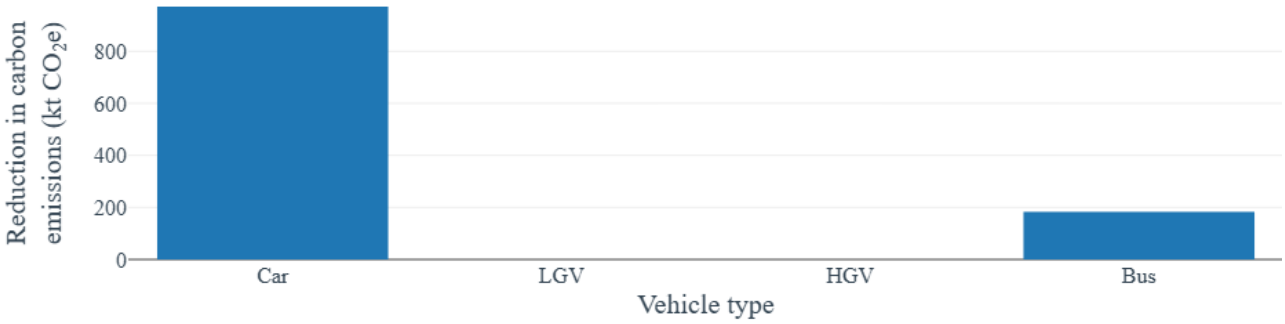

Figure 4-7: Reduction in Carbon Emissions for Vehicle Types by 2050

4.4.2 Journey Purpose Analysis

Figure 4-8 illustrates the reduction in emissions follow similar trends as UE-BaU and UE-ZEV for different journey purposes. The 'Other' category dominates the reduction at 394 $ktCO_2e$, while 'Commuting' and 'Business' exhibit similar reductions (252 $ktCO_2e$ and 210 $ktCO_2e$ respectively). 'Education & education escort' and 'Personal business' both show less reduction at 54 and 62 $ktCO_2e$.

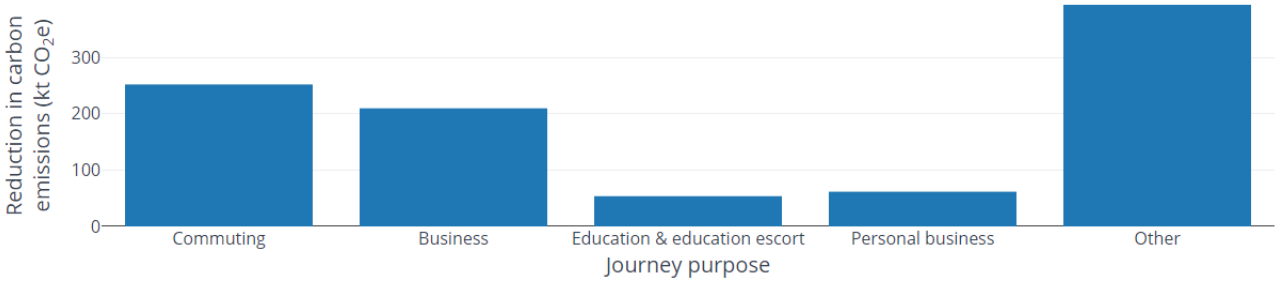

Figure 4-8: Reduction in Carbon Emissions for Different Journey Purposes by 2050

4.4.3 Trip Length Analysis

Figure 4-9 shows that the highest reduction in emissions occurring in the more than 50km category at 652 $ktCO_2e$. Emissions reduction is notably less in smaller ranges, with the 25 to 50km category at 111 $ktCO_2e$, 10 to 25km at 72.5 $ktCO_2e$ and 2 to 5km at 42.7 $ktCO_2e$. Trips between 5 and 10km show a greater emissions reduction at 91.5 $ktCO_2e$ than 10 to 25km.

This suggests that the reduction in larger trips contribute disproportionately to overall emissions reduction, highlighting the need for targeted interventions in these high-emission categories to achieve significant reductions.

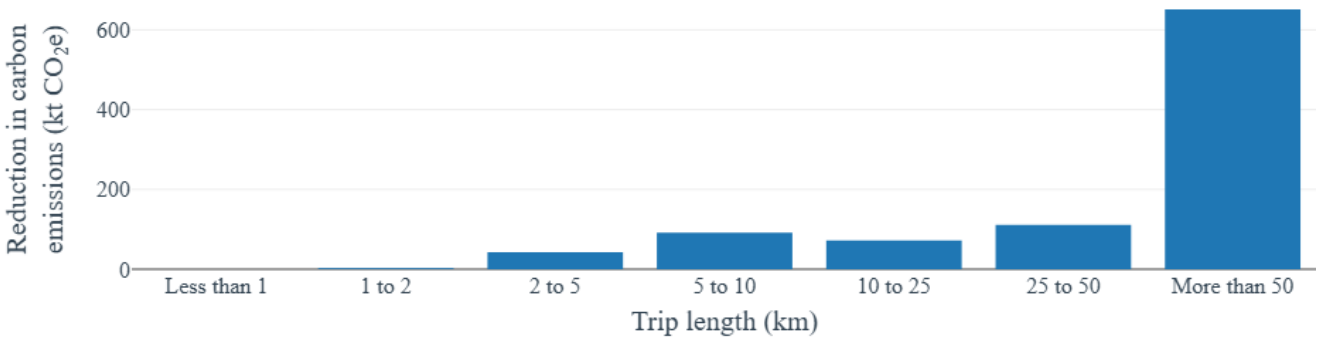

Figure 4-9: Reduction in Carbon Emissions for Different Trip Lengths by 2050

4.5 Key Findings

It is important to note that the schemes to be delivered by the LTP are largely focused on improvements to journeys within West Northamptonshire, and will have the greatest impact on emissions from local journeys. As stated in Chapter 2, 31% of WNC's emissions are accounted for by through trips, and therefore collaboration with STB, National Highways, Network Rail and the freight industry is essential to address this emissions gap.

The key findings from the QCR analysis for each scenario are as follows:

- UE-BaU: Under this scenario, the LTP package delivers a very small contribution to WNC's overall net zero target in 2045, and would put significant pressure on other areas within WNC to make up the shortfall in emissions. WNC should work towards other, more ambitious, future scenarios (such as ZEV/ZEV-LA). The LTP policy package represents a relatively small overall reduction in emissions compared to BaU, with an overall reduction of 81 $ktCO_2e$ in 2050, or 9.3%. This leaves residual emissions of 787 $ktCO_2e$ at the end of the assessment period. Emissions from cars are impacted slightly more than for buses, and 'other' trips have the greatest impact in terms of journey purpose. Analysis of trip length impacts shows that trips over 50km have the greatest reduction in emissions, over around 552 $ktCO_2e$.
- UE-ZEV: The LTP policy package results in a 97.4% reduction in emissions compared to the 2019 baseline, with 34.8 $ktCO_2e$ of emissions remaining in 2050, compared to 37.8 $ktCO_2e$ with no LTP impacts. This is a significant reduction, demonstrating the importance of encouraging EV uptake and electrification of public transport to support other measures to reduce transport carbon emissions. In this scenario, car emissions see the greatest reduction by far, 'other' trips have the greatest impact in terms of journey purpose, and analysis of trip lengths show that trips over 50km have the greatest reduction in emissions.
- UE-ZEV-LA: Baseline emissions are projected to reach 139.6 $ktCO_2e$ in 2050, and with the LTP policy package this falls to 131.5 $ktCO_2e$. However, the overall impact is still much greater than the BaU scenario. Under this scenario there is 231 $ktCO_2e$ remaining in 2045 with the LTP policy package. Car emissions see the greatest overall reduction in emissions, 'other' trips have the greatest impact in terms of journey purpose, and analysis of trip lengths show that trips over 50km have the greatest reduction in emissions.

5 Conclusion

5.1 Overview

We have provided a summary of the likely impact of WNC's LTP5 on the transport carbon emissions within West Northamptonshire. The CAP policy builder tool was used to calculate the impacts of the policies in WNC's LTP, BSIP, EV Strategy and Draft LCWIPs on transport carbon emissions according to three different scenarios.

Assuming that WNC adopts the UE-ZEV-LA scenario as its target pathway, this assessment has found that under current plans, 231 $ktCO_2e$ will remain in West Northamptonshire in 2045, and 131.5 $ktCO_2e$ in 2050. Compared to the 2019 baseline value of 1365.3 $ktCO_2e$, this is a reduction of 90.4%.

5.2 Emissions Offsetting & Insetting

We always advise that emissions reduction should be prioritised prior to considering offsets, however in circumstances where residual emissions are hard to abate, offsets can be considered. Offsets are a complicated subject and require detailed consideration to avoid investing in low quality projects that are likely to be subject to public criticism and deliver minimal climate benefits. We would always recommend that proposed offsetting strategies are evaluated internally or an offsetting study is commissioned so that the co-benefits, transparency, quality and feasibility of offsets can be considered prior to their purchase or creation. The following suggestions are made at a high level, with the purpose of indicating the scale of offsetting or insetting activity required to tackle remaining emissions from transport within West Northamptonshire in 2045 (231 $ktCO_2e$).

- Purchasing Offsets: One Woodland Carbon Credit (WCC) costs approximately £20 (from the most recent Woodland Carbon guarantee price (Forestry Commission, 2023)). This would amount to approximately £4.6 million of credits needing to be purchased and retired annually to offset the remaining 231 $ktCO_2e$.
- Tree Planting: Tree planting could be considered as an alternative, however to abate the quantity of emissions remaining would require a large number of hectares, especially considering the lifecycle of a tree. Trees do not reach their full carbon sequestration potential until 20+ years of life. As a benchmark for the number of hectares that could be required, using the small project calculator from WCC (WCC, 2019) 100 hectares of broadleaf trees (using mineral soil, with medium soil disruption) would only amount to 38,087 tonnes of CO_2e being sequestered over the 100 year lifecycle of the tree. Therefore, to sequester 231 $ktCO_2e$ you would need a significant amount of tree planting, which would need to be delivered immediately as tree carbon sequestration would be realised primarily two decades from now.

There are several other options that could be considered as offsets, however we would recommend that further analysis is carried out to consider the scope and local context within West Northamptonshire.

5.3 Residual Emissions

The carbon assessment was carried out for the specific LTP schemes that best matches the CAP equivalent. However, one noticeable gap is none of the LTP schemes address freight movements (HGVs and LGVs). The trip length analysis reveals that trips over 50km (including through trips) produce the greatest reduction in all three scenarios. Therefore, schemes focusing on decarbonising freight vehicles can have a substantial impact on reducing overall emissions.

The LTP schemes also do not capture measures such as:

- Workplace parking levy
- On-street and off-street parking measures
- Road user charging/tolls
- Cordon based charges and restrictions
- Support of EV uptake in corporate fleets

The inclusion of one or more of these measures can potentially result in more pronounced reduction in carbon emissions than revealed in the carbon assessment for the selected LTP schemes.

5.4 Next Steps

Understanding the emissions impact of the LTP policy-on scenario is a significant first step to understanding whether WNC is on track to meet its transport carbon emissions targets by 2050. As discussed in the preceding chapters, the accuracy of this assessment will improve as schemes are planned in more detail. Inclusion of whole carbon emissions is a crucial consideration which will give a more holistic picture of the impact that these schemes will have on WNC's overall carbon budget.

6 References

Chelmsford Garden Community Consortium, 2023. Development Framework Document. [Online]

Available at: https://www.chelmsford.gov.uk/media/vsxh3m1i/chelmsford-garden-community-development-framework-document-january-2023.pdf

[Accessed 15 07 2024].

DfT TAG Unit A1.3, 2022. https://assets.publishing.service.gov.uk/media/63174538d3bf7f792bcfb1a6/tag-unit-a1.3-user-and-provider-impacts.pdf. [Online]

Available at: https://assets.publishing.service.gov.uk/media/63174538d3bf7f792bcfb1a6/tag-unit-a1.3-user-and-provider-impacts.pdf

DfT, 2021. Inclusive Mobility: A guide to best practice on access to pedestrian and transport infrastructure. [Online]

Available at: https://assets.publishing.service.gov.uk/media/61d32bb7d3bf7f1f72b5ffd2/inclusive-mobility-a-guide-to-best-practice-on-access-to-pedestrian-and-transport-infrastructure.pdf

[Accessed 15 07 2024].

DfT, 2021. Transport Decarbonisation Plan: A Better, Greener Britain. [Online]

Available at: https://assets.publishing.service.gov.uk/media/610d63ffe90e0706d92fa282/decarbonising-transport-a-better-greener-britain.pdf

[Accessed 10 07 2024].

DfT, 2022. Public Electric Vehicle Charging Infrastructure: Deliberative and quantitative research with drivers without access to off-street parking. [Online]

Available at: https://assets.publishing.service.gov.uk/media/6234a51f8fa8f540edba36f1/public-ev-charging-infrastructure-research-report.pdf

[Accessed 15 07 2024].

Forestry Commission, 2023. Woodland Carbon Guarantee. [Online] Available at: https://www.gov.uk/guidance/woodland-carbon-guarantee [Accessed 19 07 2024]

United Nations, 2024, For a liveable climate: Net zero commitments must be backed by credible action. [Online] Available at: https://www.un.org/en/climatechange/net-zero-coalition [Accessed 19 07 2024]

Wakenshaw, G. & Bunn, N., 2015. How Far Do People Walk?. London, PTRC Transport Practitioners' Meeting.

Woodland Carbon Code, 2019. Project Carbon Sequestration [Online] Available at https://woodlandcarboncode.org.uk/standard-and-guidance/3-carbon-sequestration/3-3-project-carbon-sequestration?highlight=WyJjYWxjdWxhdG9yIiwiY2FsY3VsYXRvciciLCJjYWxjdWxhdG9yJy4iXQ== [Accessed 19 07 2024]

7 Appendix A: Scheme Details and CAP Equivalency

Scheme	Source	Equivalent CAP Intervention
Abington Park Crescent – a new segregated 2-way cycleway that meets a new upgraded crossing at the junction with Park Avenue South	LTP	AT2 – Improved cycling infrastructure
Bridgewater Drive - a new 2-way cycleway towards the school and new road crossings	LTP	AT2 – Improved cycling infrastructure
Park Avenue South - new cycleways that merge into existing cycling facilities	LTP	AT2 – Improved cycling infrastructure
Billing Road / Rushmere Road junction – significant pedestrian crossing facilities, enabling 'all direction crossing', along with improved traffic signal technology to better manage all movements	LTP	AT1 – Improved pedestrian infrastructure
Additional Northampton Loop services from Post-HS2 timetable	LTP	PT2 – Improved bus/LRT frequency
Bicycle Libraries Support Programme	LTP	AT3 – (e-) Mobility hire schemes
Car club assistance programme	LTP	BC2 – EV car clubs
Demand responsive and Community Transport assistance programme	LTP	PT5 – Demand responsive transport
Electric bus fleet and infrastructure expansion	LTP	LE1 – Low emission public transport fleets
Electric vehicle assistance programme and charging in car parks	LTP	LE2 – EV charging infrastructure
Extend East West Rail Services between Oxford and Milton Keynes to Northampton via upgraded West Coast Main Line	LTP	PT7 – New rail stations/line opening
Extension of bus operating hours	LTP	PT2 – Improved bus/LRT frequency
Guided walk and cycle tour support programme	LTP	BC3 – Incentive-based apps
Hydrogen vehicle assistance programme	LTP	LE1 – Low emission public transport fleets
Integrated bus and rail ticketing and timetables	LTP	TE1 – Integrated ticketing, information and mobility as a service
Long Buckby Railway Station access improvements and platform lengthening	LTP	PT2 – Improved bus/LRT frequency
New active travel route between Wellingborough and Northampton	LTP	AT2 – Improved cycling infrastructure
New National Cycle Route alongside HS2	LTP	AT2 – Improved cycling infrastructure
New railway station serving South Northampton	LTP	PT7 – New rail stations/line opening
New railway station serving Weedon Bec and Daventry	LTP	PT7 – New rail stations/line opening
New Rugby Parkway railway station	LTP	PT7 – New rail stations/line opening
New strategic mobility hub and coach interchange at M1 J15	LTP	PT3 – Mobility hubs
New strategic mobility hub at Northampton East Park and Ride	LTP	PT3 – Mobility hubs
Northampton bus and coach station upgrade	LTP	PT1 – Bus priority measures
Northampton loop speed and capacity improvements	LTP	PT2 – Improved bus/LRT frequency
Northampton strategic bus, coach and rail integration	LTP	PT2 – Improved bus/LRT frequency
Northamptonshire mass rapid transport scheme	LTP	PT2 – Improved bus/LRT frequency

Rail capacity enhancement between Bletchley and Milton Keynes	LTP	PT7 – New rail stations/line opening
Reduced local bus fares	LTP	PT4 – Reduced public transport fares
St Giles Street public realm	LTP	AT1 – Improved pedestrian infrastructure
Weedon fast line freight loops on West Coast Main Line	LTP	PT7 – New rail stations/line opening
Exceed the forecasted 101,480 EVs by achieving 120,000 EV registrations by 2030	EV Strategy	LE2 – EV charging infrastructure
Achieve a minimum of 50 EV charge points per 100,000 population by 2030.	EV Strategy	LE2 – EV charging infrastructure
Maintain a ratio of fewer than 30 registered EVs per charge point by 2030	EV Strategy	LE2 – EV charging infrastructure
Achieve a ratio of 1 fast charger per 20 registered EVs by 2030.	EV Strategy	LE2 – EV charging infrastructure
Bus Network Enhancement Plan	BSIP	PT6 – Extended public transport network
Promoting the network	BSIP	TE1 – Integrated ticketing, information and mobility as a service
Zero emission buses (ZEBRA routes)	BSIP	LE1 – Low emission public transport fleets
Bus performance programme	BSIP	PT1 – Bus priority measures
Single fare capping	BSIP	PT4 – reduced public transport fares
One network ticketing programme	BSIP	TE1 – Integrated ticketing, information and mobility as a service
Mobility hubs	BSIP	PT3 – Mobility hubs
One network passenger information programme	BSIP	TE1 – Integrated ticketing, information and mobility as a service
On-street information uplift	BSIP	TE1 – Integrated ticketing, information and mobility as a service
Zero emission buses (non-ZEBRA routes)	BSIP	LE1 – Low emission public transport fleets
Convert community transport sector to zero emission	BSIP	LE1 – Low emission public transport fleets
EEH regional inter-urban network	BSIP	PT6 – Extended public transport network
High Street/ Northampton Road - character of the corridor is changed to provide a better balance between the needs of users, with introduction of shared use footway/cycleway along north side of corridor, lighting of junctions and crossings on key desire lines.	LCWIP	AT2 – Improved cycling infrastructure
Manor Road – A one-way on Manor Road or a school street approach should be considered to create a high-quality walking and cycling environment along this key link.	LCWIP	PC5 – Low Traffic Neighbourhoods
Improve traffic-free routes and links within the town, e.g. remove barriers and widen links between cul-de-sacs	LCWIP	AT2 – Improved cycling infrastructure
High Street/Market Place - Narrowing the carriageway and removing right turn pockets to discourage through traffic and create safer space for walking and cycling through low speeds and volumes of motor traffic. Public realm improvements.	LCWIP	AT2 – Improved cycling infrastructure

Banbury Road/Market Place - right turn pockets are removed and the carriageway narrowed to discourage through traffic and create safer space for walking and cycling through low speeds and volumes of motor traffic.	LCWIP	PC5 – Low Traffic Neighbourhoods
Hill Street – The junction with Manor Road should be converted to a standard T-junction to enable larger area of public realm and improve safety.	LCWIP	AT2 – Improved cycling infrastructure
Introducing modal filters (including bus gates where needed) at key points to prevent rat running through the town, e.g. Banbury Road, Pavillions Way, Humphries Drive	LCWIP	PC5 – Low Traffic Neighbourhoods
Inter-urban cycle corridor - Brackley to Turweston via A43 underpass	LCWIP	AT2 – Improved cycling infrastructure
Inter-urban cycle corridor - Brackley to Westbury	LCWIP	AT2 – Improved cycling infrastructure
Inter-urban cycle corridor - A43 Brackley to Silverstone via Whitfield and Syresham and Crowfield	LCWIP	AT2 – Improved cycling infrastructure
Inter-urban cycle corridor - Brackley to Croughton via Hinton in the Hedges and Evenley	LCWIP	AT2 – Improved cycling infrastructure
Inter-urban cycle corridor - Brackley to Radstone and Helmdon	LCWIP	AT2 – Improved cycling infrastructure
Cycle corridor (main road) - Drayton Way	LCWIP	AT2 – Improved cycling infrastructure
Cycle corridor (industrial road) - Royal Oak Way North and South	LCWIP	AT2 – Improved cycling infrastructure
Cycle corridor (quietways) - Shackleton Drive and Speke Drive	LCWIP	AT2 – Improved cycling infrastructure
Cycle corridor (quietways) - Tennyson Road, Wordsworth Road, Hemans Road, Burns Road	LCWIP	AT2 – Improved cycling infrastructure
Cycle corridor (quietways) - Yeomanry Way	LCWIP	AT2 – Improved cycling infrastructure
Cycle corridor (quietways) - North Street	LCWIP	AT2 – Improved cycling infrastructure
Cycle corridor (quietways) - St Augustin Way, The Dingle	LCWIP	AT2 – Improved cycling infrastructure
Cycle corridor (traffic free routes) - various	LCWIP	AT2 – Improved cycling infrastructure
Core walking zone enhancements - including zebra crossings, improved street furniture, wayfinding, traffic calming, widening of footways and public realm improvements on High Street to reduce through traffic.	LCWIP	
Cycle corridor (main road) - Ashby Road	LCWIP	AT2 – Improved cycling infrastructure
Cycle corridor (main road) - Northern Way	LCWIP	AT2 – Improved cycling infrastructure
Cycle corridor (main road) - Braunston Road	LCWIP	AT2 – Improved cycling infrastructure
Cycle corridor (main road) - Eastern Road	LCWIP	AT2 – Improved cycling infrastructure
Cycle corridor (industrial road) - Long Marsh	LCWIP	AT2 – Improved cycling infrastructure
Inter-urban cycle corridor Daventry to Braunston	LCWIP	AT2 – Improved cycling infrastructure
Inter-urban cycle corridor Daventry to Staverton	LCWIP	AT2 – Improved cycling infrastructure
Inter-urban cycle corridor Daventry to Long Buckby	LCWIP	AT2 – Improved cycling infrastructure
Inter-urban cycle corridor Daventry to Weedon Bec	LCWIP	AT2 – Improved cycling infrastructure
Pedestrian and cycling enhancements - Town Centre North - mix of shared use along Northampton Road, Old Tiffield Road and A5 north of A43, new ped/cycle/equestrian bridge over A43 and enhanced ped crossing at Brackley Road crossroads	LCWIP	AT1 – Improved pedestrian infrastructure AT2 – Improved cycling infrastructure

Pedestrian and cycling enhancements - Town Centre Central - segregated cycle tracks on Brackley Road, junction tightening south of Brackley Road, greenway enhancements and school street on Islington Road.	LCWIP	AT1 – Improved pedestrian infrastructure AT2 – Improved cycling infrastructure
Pedestrian and cycling enhancements - Town Centre South/ Burcote - modal filter on Burcote Road/ Vernon Road, school link between Marie Weller Primary and Sponne Schools	LCWIP	AT1 – Improved pedestrian infrastructure AT2 – Improved cycling infrastructure
Pedestrian and cycling enhancements - Enhancement to National Highways proposals - protected cycle track on A5 up to Towcester Roundabout and shared use on eastern side of Old Tiffield Road, connection between cycle track on Brackley Road and shared use on eastern side of Northampton Road, sparrow crossings on A5/ Epson Avenue roundabout.	LCWIP	AT1 – Improved pedestrian infrastructure AT2 – Improved cycling infrastructure
Inter-urban route - Towcester to Greens Norton	LCWIP	AT2 – Improved cycling infrastructure
Inter-urban route - Towcester to Blisworth	LCWIP	AT2 – Improved cycling infrastructure
Inter-urban route - Towcester to Tiffield	LCWIP	AT2 – Improved cycling infrastructure
Inter-urban route - Towcester to Silverstone	LCWIP	AT2 – Improved cycling infrastructure
Cycling corridor - Kettering Road (Town centre to Moulton)	LCWIP	AT2 – Improved cycling infrastructure
Core walking zone - Weston Favell	LCWIP	AT1 – Improved pedestrian infrastructure
Key walking routes to CWZ - Weston Favell	LCWIP	AT1 – Improved pedestrian infrastructure
Core walking zone - Town Centre	LCWIP	AT1 – Improved pedestrian infrastructure
Core walking zone - Kingsthorpe	LCWIP	AT1 – Improved pedestrian infrastructure
Key walking routes to CWZ - Kingsthorpe	LCWIP	AT1 – Improved pedestrian infrastructure
Cycling corridor - Barrack Road (Town Centre to Kingsthorpe)	LCWIP	AT2 – Improved cycling infrastructure
Cycling corridor - London Road (Town Centre to Wootton)	LCWIP	AT2 – Improved cycling infrastructure
Cycling corridor - Brackmills -UoN - Town Centre	LCWIP	AT2 – Improved cycling infrastructure
Cycling corridor - Delapre to Upton	LCWIP	AT2 – Improved cycling infrastructure
Inter-urban route - Weedon Bec to Northampton via Upton	LCWIP	AT2 – Improved cycling infrastructure
Inter-urban route - Northampton to Bugbrooke	LCWIP	AT2 – Improved cycling infrastructure
Inter-urban route - Northampton to Blisworth via East Hunsbury	LCWIP	AT2 – Improved cycling infrastructure
Inter-urban route - Wootton to Roade	LCWIP	AT2 – Improved cycling infrastructure
Inter-urban route - Northampton to Little Houghton (via Brackmills disused railway)	LCWIP	AT2 – Improved cycling infrastructure
Inter-urban route - Northampton to Ecton (Wellingborough Road/ Billing Road)	LCWIP	AT2 – Improved cycling infrastructure
Inter-urban route - Northampton to Brixworth	LCWIP	AT2 – Improved cycling infrastructure
Abington area traffic calming scheme as part of healthy streets plan	LCWIP	PC5 – Low Traffic Neighbourhoods

8 Appendix B: CAP Intervention List

CAP Intervention	Category
Business Travel Plans	Behavioural change
Support for car sharing	Behavioural change
20-minute neighbourhoods	Integrated planning policy
High density developments	Integrated planning policy
Improved pedestrian infrastructure	Active travel
Improved cycling infrastructure	Active travel
(e-)mobility hire schemes	Active travel
Area-wide travel planning/mobility management	Behavioural change
School travel plans	Behavioural change
EV car clubs	Behavioural change
Incentive-based apps	Behavioural change
Road user charging/tolls	Parking, charging & traffic management
Cordon-based charges and restrictions	Parking, charging & traffic management
Off-street parking measures	Parking, charging & traffic management
On-street parking measures	Parking, charging & traffic management
Workplace parking levy	Parking, charging & traffic management
Low Traffic Neighbourhoods	Parking, charging & traffic management
Bus priority measures	Public transport
Improved bus/LRT frequency	Public transport
Mobility hubs	Public transport
Reduced public transport fares	Public transport
Demand responsive transport	Public transport
Extended public transport network	Public transport
New rail stations/line-reopening	Public transport
Integrated ticketing, information and Mobility as a Service	Technology
Campaigns for switch to LEV fleets	Low emission vehicles
Low emission public transport fleets	Low emission vehicles
EV charging infrastructure	Low emission vehicles
Support EV uptake in corporate fleets	Low emission vehicles

9 Appendix C: Summary of Carbon Assessment Results

Scenario	Total Emissions by 2050 (ktCO2e)	Reduction Compared to Baseline (without LTP interventions)
UE-BaU	878 (without LTP interventions) 797 (with LTP interventions)	9.30%
UE-ZEV	37.8 (without LTP interventions) 34.8 (with LTP interventions)	7.90%
UE-ZEV-LA	139.6 (without LTP interventions) 131.5 (with LTP interventions)	5.80%

Table 9-1: Summary of Emissions Under Different Scenarios With and Without Interventions

Scenario	Car Emissions Reduction ($ktCO_2e$)	Bus Emissions Reduction ($ktCO_2e$)
UE-BaU	841	721
UE-ZEV	889	154.5
UE-ZEV-LA	971	183

Table 9-2: Summary of Emissions Reduction by Vehicle Type by 2050

Scenario	Other	Commuting	Business	Education & Escort	Education	Personal Business
UE-BaU	345	240	154	47		54
UE-ZEV	359	228	196	49		56
UE-ZEV-LA	394	252	210	54		62

Table 9-3: Summary of Emissions Reduction by Journey Purposes by 2050 ($ktCO_2e$)

Scenario	>50 km	25-50 km	10-25 km	5-10 km	2-5 km	1-2 km
UE-BaU	552.7	108	60.6	78	39	2.5
UE-ZEV	597	99	67	85	39.4	-
UE-ZEV-LA	652	111	72.5	91.5	42.7	-

Table 9-4: Summary of Emissions Reduction by Trip Length by 2050 ($ktCO_2e$)