Making Connections

Appendix A: Options Assessment Report (OAR)

Greater Cambridge Partnership

21/08/23

Version 5

Notice

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Document history

Document title: Appendix A: Options Assessment Report (OAR)

Revision	Purpose description	Originated	Checked	Reviewed	Authorised	Date
1.0	Final SOC Version	GB	MA	AC	AC	25/8/2022
2.0	Updated 2023 post consultation	SC/SP	SP	MA/PG	AC	9/6/2023
3.0	Updated based on client comment	SC/SP	SP	MA/PG	AC	06/07/2023
4.0	Updated to bring up to date	KB	SP	PG	AC	09/08/23
5.0	Updated based on client comments	SC	SP	PG	AC	23/08/2023

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Glossary of abbreviations

Abbreviation	Meaning
AM / PM	Morning / evening peak travel times
AQMA	Air Quality Management Area
BIA	Business Impact Assessment
CBC	Cambridge Biomedical Campus
CCTV	Closed-circuit television
CPCA	Cambridge and Peterborough Combined Authority
CSRM	Cambridge Sub Regional Model
DERs	Discounts, exemptions and reimbursements
DfT	Department for Transport
EAST	Early assessment and sifting tool
EqIA	Equality Impact Assessment
GCP	Greater Cambridge Partnership
GHG	Greenhouse gas emissions
HGV	Heavy goods vehicle
IMD	Indices of multiple deprivation
LGV	Light goods vehicle
MCA	Multi criteria assessment
MCAF	Multi criteria assessment framework
OAR	Option Assessment Report
OBC	Outline Business Case
ONS	Office of National Statistics
PCG	Protected characteristic groups
PCU	Passenger car units
SDIA	Social and distributional impacts assessment
SOC	Strategic Outline Case
SMART	Specific, measurable, achievable, relevant and time-constrained
STZ	Sustainable travel zone
TAG	Transport Appraisal Guidance

WHO	World Health Organisation
WPL	Workplace parking levy

1. Introduction

1.1. Purpose of this document

1.1.1. This Option Assessment Report (OAR) documents the option assessment process for the Making Connections scheme (the scheme) from the creation of the Greater Cambridge Partnership (GCP) in 2015 up to May 2023 and the preparation of options for the Outline Business Case (OBC).

1.1.2. The OAR fulfils the requirements in Step 8 of Department for Transport's (DfT) Transport Appraisal Guidance (TAG). As required in the TAG, the OAR sets out to document the process of identifying the need for intervention and the process of option development and selection. The structure of the OAR cover Steps 1 to 8 set out in this TAG Unit 1.

1.1.3. This is the second version of the OAR for Making Connections. The first was presented in 2022 in advance of the Strategic Outline Case (SOC). This updated version includes the options assessment covered in the first version and continues the story beyond the 2022 consultation so that the full options development process is covered in a single document.

1.1.4. The purpose is to identify the broad scenarios for taking forward for further consideration as part of the development of the Outline Business Case (OBC). Whilst there is initial consideration of Discounts, Exemptions and Reimbursements, these will continue to be refined and developed as part of the development of the OBC. Similarly, scheme parameters will continue to be refined in the development of the OBC.

1.2. Key updates to this Options Assessment Report

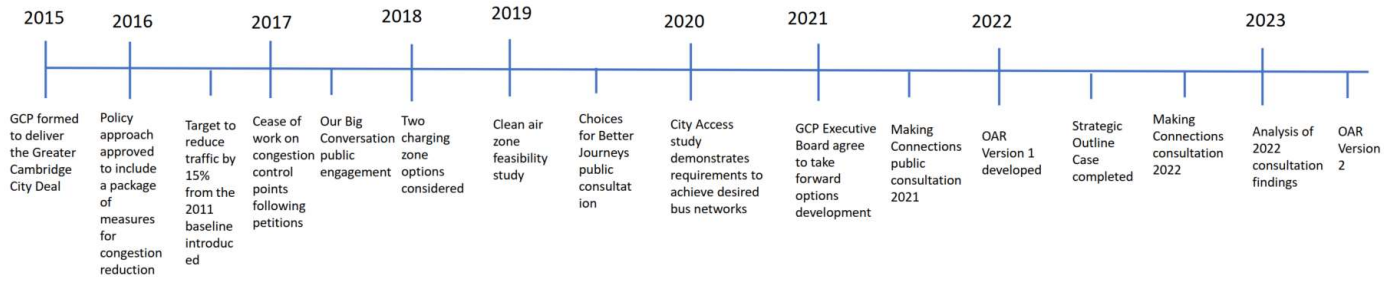
1.2.1. The updated OAR includes refreshment of information throughout the document where available. This includes adding in additional information that was considered at the time and included in Executive Board reports summarising the consultation and some of the previous work. The substantive update, however, in terms of further development of options, is included in Section 6.3 onwards of this report. This considers how the findings from the 2022 consultation were taken into account alongside initial evidence from Business Impacts Assessment (BIA) and further technical work undertaken on both the Sustainable Travel Zone (STZ) and the package of bus and sustainable transport measures. The report ultimately recommends which options should be taken forward to be analysed in more detail as part of the OBC.

1.2.2. The full content of the 2022 report has been retained with the refreshment of information where necessary to allow a holistic picture of the options assessment work. However, if the reader is most interested in how the options have been developed since the 2022 consultation, then Section 6.3 onwards contains the key information in relation to this.

1.3. Overview of the option assessment process

1.3.1. Following the formation of the GCP in 2015 a series of option explorations, policy decisions, public consultations and feasibility studies have been undertaken, developing towards the current position of the Making Connections scheme. An overview of the development of the scheme so far is shown in Figure 1-1.

Figure 1-1 – Timeline



1.3.2. This process led to the preparation of the first version of the OAR which was completed in 2022. This first version of the OAR confirmed the case for change for the scheme as well as its objectives and carried on through option generation and sifting. It included three demand management options: flexible area charge, pollution charge and workplace parking levy (WPL). These options had featured in the 2021 Making Connections consultation.

1.3.3. The aim of the sifting at that stage was to narrow down the options to allow the programme team to focus maximum efforts on the options with greatest potential. This approach allowed the team to gather information and collate evidence to refine individual options and enhance them with a series of proposals for transformational bus improvements and wider complementary measures that addressed the challenges identified by the project team at the start of the option assessment process. Outputs from version 1 of the OAR formed the 'packages' that were then assessed in the SOC, completed in Summer 2022, and informed the proposal subsequently presented in the Making Connections public consultation from October to December 2022.

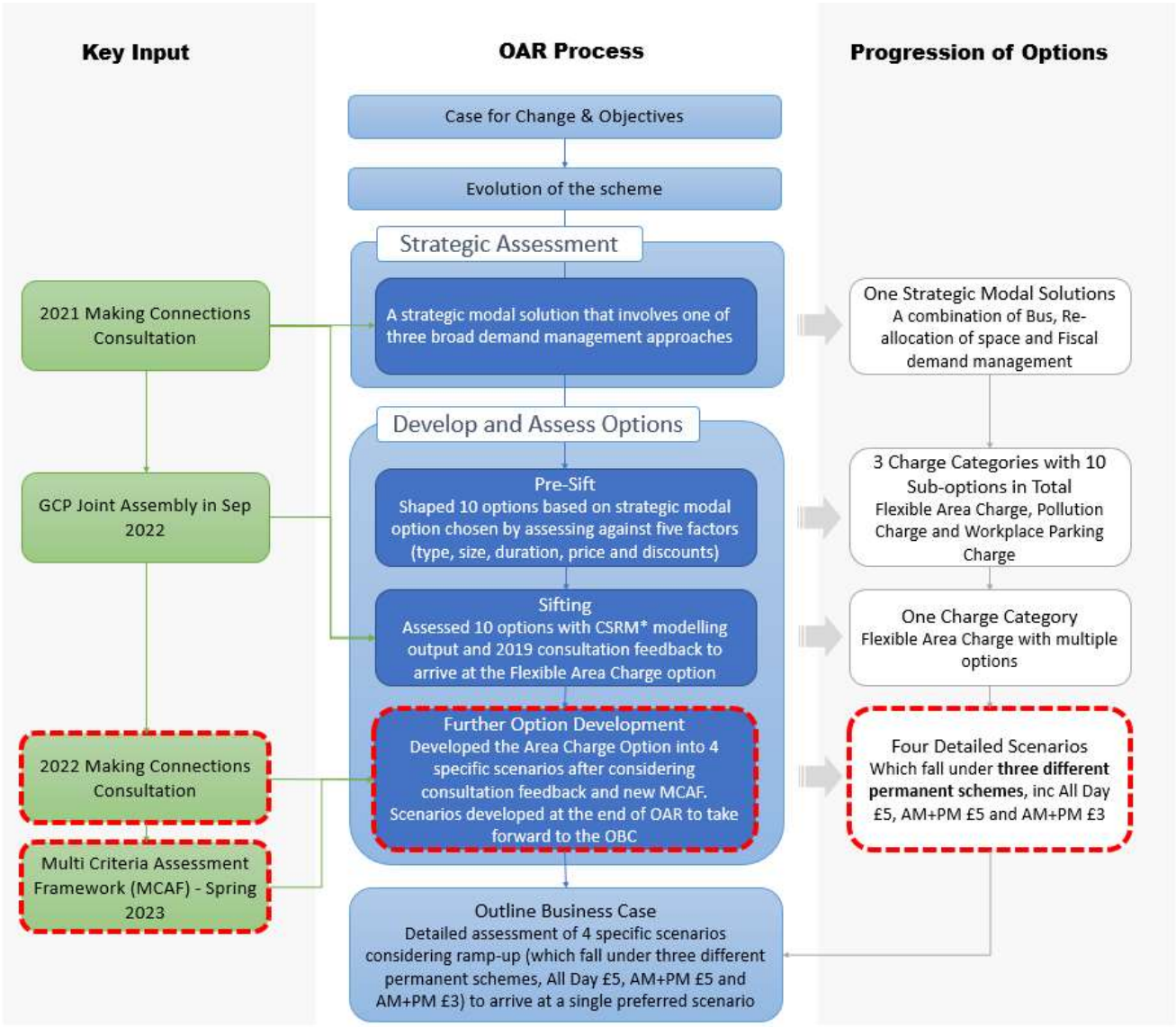
1.3.4. Figure 1-2 provides an overview of the overall option assessment including the process described above, as well as new evidence and additional option development documented in this updated OAR (Version 2). The new parts of the overall option development addressed in this OAR are the '2022 Making Connections Consultation' and 'the Multi-Criteria Assessment Framework (Spring 2023)' which led on to the 'Further Options Development' and ultimately the 'four detailed options'. These are highlighted in boxes with red-dashed borders in Figure 1-2. The figure illustrates both activities in the option assessment process and the evolution of scheme options at each step throughout the process.

1.3.5. Upon completion of the consultation in December 2022, responses and insights obtained from the public consultation, and the new technical evidence developed in Spring 2023, informed a subsequent refinement of the options for Making Connections. The technical work has included ongoing updates to the impacts assessments, including environmental, social distributional, equalities and business impacts. The additional work on option assessment since the completion of public consultation in December 2022 is illustrated in Figure 1-3.

1.3.6. Option development in 2023 (outlined in Section 6.3) has refined the identified alternatives through optimising the scheme parameters and rules to establish 4 scenarios for more detailed assessment in the OBC. This has included consideration of varying the charge

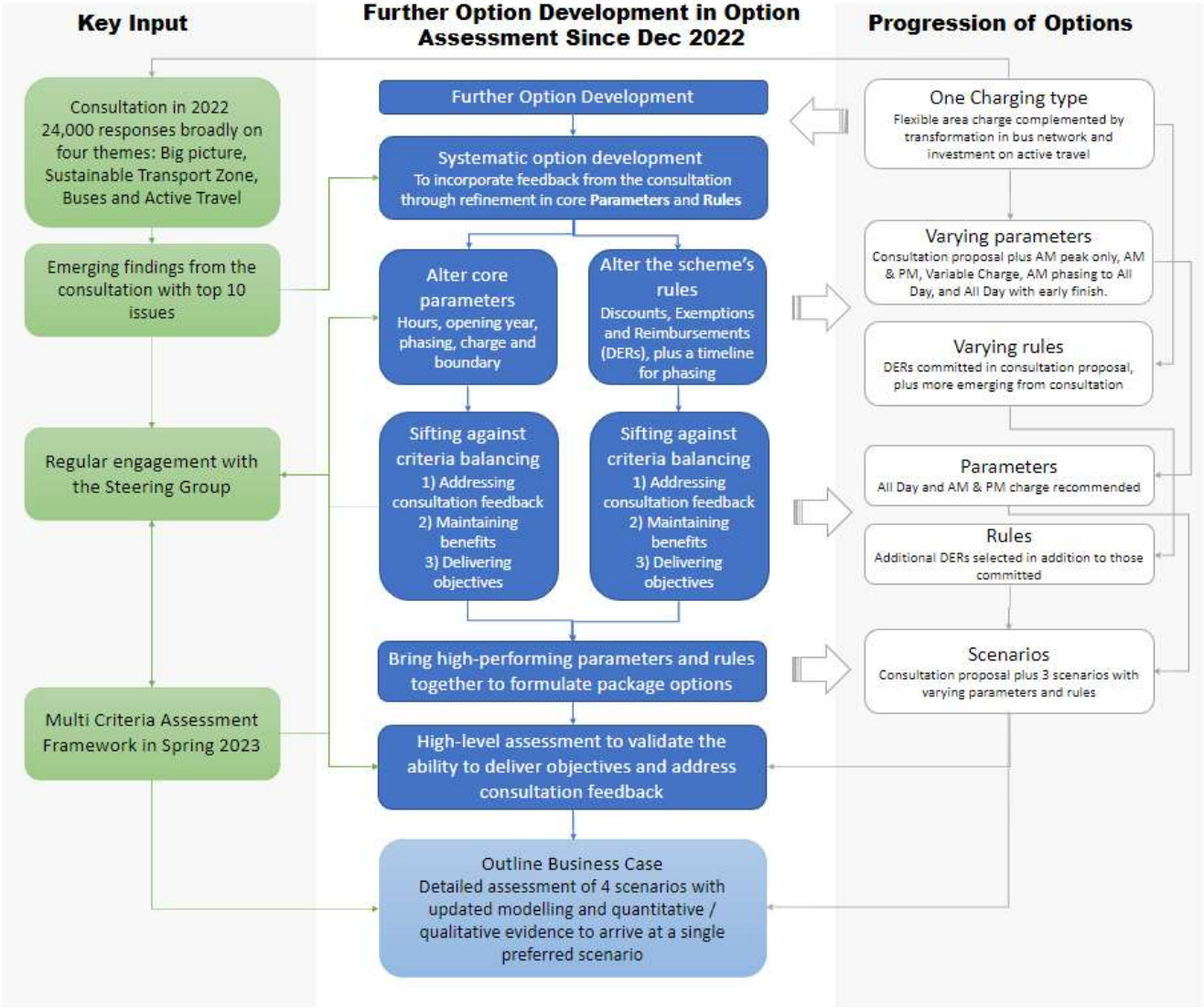
values at different times of day and the groups eligible for exemptions from the charge. These variations are intended to consider potential changes arising from the findings of the December 2022 consultation and additional assessments undertaken including, but not limited to, the BIA.

Figure 1-2 - An overview of the development of the Outline Business Case



*Cambridge Sub Regional Model

Figure 1-3 - Option development since 2022 consultation



1.3.7. Three new scenarios have been established. These are called scenarios as they are not fully developed at this stage but are intended to set out a wide range of possible options to the 2022 consultation. By considering the consultation scheme and the option of doing nothing, this provided the widest range of options.

1.3.8. These have undergone qualitative assessments based on a multi-criteria assessment (MCA) to assess the extent to which the updated scheme options can meet the strategic scheme objectives (see section 4.2) and address potential issues identified in the consultation. The three new scenarios have been validated through this high-level assessment and the consultation and will be taken forward for more detailed appraisal and assessment in the preparation of the OBC. This analysis will consider the new scenarios alongside the consultation scheme and doing nothing.

1.4. Context and location of Making Connections

1.4.1. The GCP is the local delivery body for a City Deal with central government, bringing powers and investment, worth up to £1 billion over 15 years, to vital improvements in infrastructure, supporting and accelerating the creation of 44,000 new jobs, 33,500 new homes and 420 additional apprenticeships.

1.4.2. The GCP has a vision: Working together to create wider prosperity and improve quality of life now and into the future. Within this is a transport vision: Creating better and greener transport networks, connecting people to homes, jobs, study and opportunity.

1.4.3. Underpinning the aspirations for the Greater Cambridge area is the need to reduce car trips to create space for public transport, walking and cycling and new forms of sustainable movement of both people and goods.

1.4.4. Making Connections is part of the wider City Access programme that includes measures such as road space reallocation (including a review of road network classification in Cambridge), an Integrated Parking strategy, and the development of further cycling infrastructure. Additionally, lower traffic levels open up the opportunity to create more people-centred spaces in the city and reduce the dominance of cars to create more pleasant environments in which people want to spend time.

1.4.5. Extensive technical work has been undertaken and set out in detail in earlier papers as well as the initial OAR (Version 1) and the SOC. In addition, wide ranging engagement on the issues considered in this paper has previously been undertaken and reported to the GCP Joint Assembly and Executive Board in earlier reports.

1.4.6. Engagement has included Our Big Conversation (2018), Choices for Better Journeys (2019) and the Greater Cambridge Citizens' Assembly (2019), as well as two recent Making Connections consultations (2021 and 2022).

1.4.7. The key messages from the Choices for Better Journeys consultation include:

- 82% of respondents backed the GCP's vision to improve public transport
- 81% of respondents chose a traffic reduction measure as their first choice for funding public transport and reducing congestion
- 44% of respondents favoured a pollution charge as their first or second option compared to 39% favouring a flexible charge.

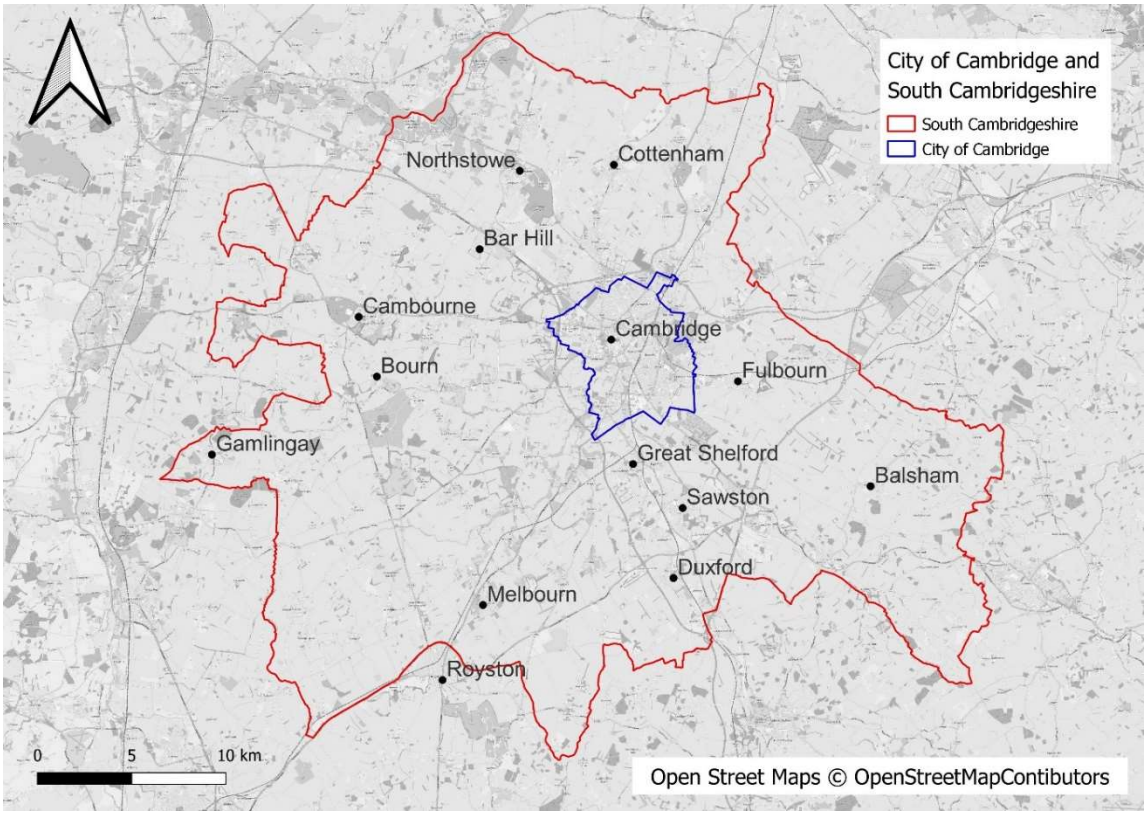
1.4.8. The 2021 Making Connections consultation built on the body of previous engagement and sought the views of consultees on three options to free up road space and raise money to invest in better bus services and wider sustainable travel investment. These were:

- Parking charge - Applying higher charges to more of the city's parking, and introducing a workplace parking levy: a yearly fee for organisations for parking spaces at workplaces
- Pollution charge - Charging vehicles to drive within an area unless they meet ultra-low emissions criteria; such criteria would be specific to the individual schemes, aimed at promoting newer and cleaner vehicles.

- Flexible charge (now referred to as a Sustainable Travel Zone (STZ) charge in work undertaken since 2022) - Charging private vehicles to drive within an area, potentially varied by time of day or day of week.

1.4.9. The core focus of the Making Connections programme covers the Cambridge city built up area in terms of the focus for traffic. However, the geography extends to the wider Greater Cambridge Area and key connections beyond into the travel to work area in terms of providing enhanced public transport access (see Figure 1-4). The travel to work area is considered to be South Cambridgeshire, the geographic area defined around Cambridge to represent the approximate labour market area in line with that assumed for the Office for National Statistics.

Figure 1-4 - Study area



1.5. Structure of the report

1.5.1. The remainder of the OAR is arranged in seven chapters following this introduction.

- **Chapter 2 - Understanding the current and future context** provides the background to the scheme, and how it aligns within the local policy context and GCP's transport programme
- **Chapter 3 - Establishing the need for intervention** summarises the transport conditions across the city and confirms case for the scheme and why it is needed
- **Chapter 4 - Objectives and the study area** provides an overview of the vision for transport across Greater Cambridgeshire along with associated strategic objectives, and the objectives for the scheme
- **Chapter 5 -Generating options**, summarises the previous work undertaken on the scheme prior to this OAR, including the initial strategic assessments and confirmation of the strategic option to be taken forward to this option development and assessment phase
- **Chapter 6 - Initial sifting**, discusses the process of formulating and sifting initial options that give effect to the confirmed strategic option, and which informed the SOC in the previous stage, in advance of this option develpoment and assessment stage

- **Chapter 7 - Developing and assessing options** sets out the work completed since the the 2022 public consultation alongside emerging evidence from the consultation itself, further technical work and research undertaken on both the STZ and package of bus and sustainable transport measures undertaken as part of this option assessment stage. In particular it identifies the scenarios to be taken forward to be assessed in detail as part of the OBC
- **Chaper 8 - Conclusions** presents the key findings of the option assessment and the scenarios to be taken forward to the OBC.

2. Understanding the current and future context

2.1. Living and working in Greater Cambridge

2.1.1. Greater Cambridge has a diverse economic base with strengths across a broad base of knowledge intensive sectors: professional, scientific, bio-medical, clean-tech, technology, and advanced manufacturing. It is host to some of the most productive and innovative parts of the UK economy, competing on a global stage, and attracting high-tech investment to the UK. The Centre for Cities has identified Cambridge to be the innovation capital of the country, with more patents per 100,000 population than the next six cities combined. Cambridge is home to two universities, Cambridge and Anglia Ruskin, and a world-class hospital. As a historic city, Cambridge has a strong visitor economy.

2.1.2. The resident population, number of households and number of jobs in the Greater Cambridge area has grown significantly in the past two decades. Between 2001 and 2021 the population has increased by 29% and jobs have grown by 33% which is double the UK average growth rate for the same time period. At the time of the 2021 Census, Greater Cambridge had a population of 307,700, made up of 145,700 people in Cambridge and 162,000 people in South Cambridgeshire[1]. Greater Cambridge is also a net 'importer' of employees with approximately 50,000 non-residents being employed in the area; approximately 26,000 people commute into Cambridge and 24,000 into South Cambridgeshire for work. The significant increase in population and growth in employment in Greater Cambridge has contributed to rising traffic levels. Between 2010 and 2019 the number of motor vehicles entering and leaving Cambridge's radial cordon increased by 9%. The increase in traffic flow has increased congestion.

2.1.3. The City of Cambridge is a densely populated city, and many residents travel to work by bicycle, or on public transport. 52% of people cycle at least once a week, more than any other local authority area in the country[2]. Historically, employment and economic activity was focused on the city centre. However, because of the lack of available land in the centre, development has increasingly occurred on the city fringes, beginning with the construction of the Cambridge Science Park in 1971.

2.1.4. Employment is focused on six main areas of the city:

- Cambridge City Centre
- Cambridge Station, CB1 and Hills Road
- Cambridge Biomedical Campus and the 'Southern Fringe'

[1] ONS Census (2021). Population Estimates

[2] Your Local Transport Plan – Cambridgeshire & Peterborough Combined Authority, Draft-Greater-Cambridge-Section.pdf (yourltcp.co.uk), (Accessed: 02 June 2023)

- Cambridge Science Park and the area around Cambridge North Station (the Northern Fringe) which straddles the Cambridge / South Cambridgeshire Boundary
- West Cambridge
- East Cambridge.

2.1.5. The area surrounding Cambridge is home to a cluster of biotechnology and science parks, including:

- Cambridge Science Park
- Wellcome Genome Campus
- Babraham Research Campus
- Granta Park.

2.1.6. Collectively these areas account for 63% of all jobs in the Cambridge urban area and 40% of all jobs in Greater Cambridge3.

2.1.7. South Cambridgeshire is mainly rural, comprising villages and small towns, with no settlement larger than 10,000 people. Cambourne, a new settlement located ten miles west of Cambridge, is the largest town and is home to the District Council offices. Northstowe, a new town located five miles north-east of Cambridge, will eventually accommodate approximately 10,000 homes.

2.1.8. Planning for, and accommodating the needs of both existing and future residents and businesses requires a greater focus on making better use of the transport network, whilst reducing the number of journeys made and reliance on car use, encouraging active travel and making journeys at less busy times of the day and on less busy routes. GCP is therefore developing a programme of transformational projects known as the City Access programme, designed to support the needs of existing residents and businesses and to accommodate growth through a substantial modal shift to public transport, cycling and walking.

2.1.9. Alongside these projects, the Making Connections programme is being developed to facilitate a transformational change in travel behaviour, which would complement these larger scale investments. Making Connections is part of the wider City Access Strategy that includes other measures such as the development of an Integrated Parking strategy for the city, and a review of the city's road network classification (Network Hierarchy Review). All elements are complementary to Making Connections and aim to support an increase in the use of public and active transport modes.

2.2. Reasons for the scheme

2.2.1. Greater Cambridge is a thriving location and home to both new and long-established companies and organisations with a reputation for research and innovation that makes it one

[3] Your Local Transport Plan – Cambridgeshire & Peterborough Combined Authority, Draft-Greater-Cambridge-Section.pdf (yourltcp.co.uk), (Accessed: 02 June 2023)

of the most successful areas in the country. The adopted Local Plans[4] for Cambridge and South Cambridgeshire set out plans for further growth for the period to 2031 of:

- 33,500 new homes
- 44,000 new jobs
- a 28% increase in population.

2.2.2. Poor air quality, to which transport is a major contributor, accounted for 48 deaths in Cambridge in 2020, representing 5.5% of all mortalities in the City; this number is up from 43 in 2019, but down from 64 in 20185.

2.2.3. The COVID-19 pandemic had a significant economic impact across the UK. In Greater Cambridge specifically, many industries in the service sector suffered from reduced demand as a result of national lockdowns and people's behavioural responses to COVID-19. Despite this corporate employment grew as businesses began to adapt to a new way of working in a post-pandemic world. Greater Cambridge's innovation clusters were particularly well positioned to respond to new market opportunities; this was demonstrated by the performance of knowledge intensive sectors, where growth accelerated from 6.8% in 2019-20 to 9.7% in 2020-216. The observed and forecast levels of economic growth have and will continue to bring benefits to the people who live and work in the area, as well as being of national significance due to the growth of Greater Cambridge's hi-tech and biotechnology clusters.

2.2.4. COVID-19 also resulted in a shift in the number of people hybrid-working. The shift in working patterns in many sectors has resulted in some adjustment to travel patterns. However, in Greater Cambridge, traffic levels have been growing and are approaching pre-pandemic levels. The latest data for the local road network in Cambridge, showed that, as of March 2023 traffic flows on local roads had returned to 93% of 2019 levels. Similarly, traffic flows on the strategic road network in Cambridgeshire were also at 93% of 2019 levels[7].

2.2.5. Although impacted by COVID-19, data from the Office for National Statistics (ONS) collected as part of the 2021 Census showed that 55% of people who work in Greater Cambridge drove to work; with this figure comprising 35% for people who work in Cambridge and 72% for people who work in South Cambridgeshire[8]. Given that 68% of people who work in Cambridge also live there, this evidence suggests that a significant proportion of people who work in Cambridge may be able to walk, cycle or scoot to work. However, the statistic also suggests that over a fifth of Cambridge employees would likely need to access the city via public transport or car given their longer trip distances. The relatively high car or van commuting modal share in South Cambridgeshire also demonstrates the significant potential

[4] Greater Cambridge, Greater Cambridge Local Plan First Proposals, (2022)
[5] Cambridge City Council, *Air Quality Annual Status Report* based on data from Office for Health, Improvement and Disparities, (2022).
[6] Greater Cambridge Share Planning Service, Greater Cambridge Employment and Housing Evidence Update, (2022).
[7] Cambridge Insights, Cambridgeshire Insight – Roads, Transport and Active Travel – Transport Data Insights, Accessed 05 June 2023.
[8] Office of National Statistics, https://www.ons.gov.uk/datasets/TS061/editions/2021/versions/1, (08 December 2022)

for modal shift from cars to public transport and active travel with the right investment to make these sustainable transport offerings more attractive options.

2.3. The Greater Cambridge City Deal

2.3.1. The City Deal[9] was signed on 19 June 2014[10]. It is an agreement between central government and the three local authorities[11] to invest in Greater Cambridge to encourage economic growth, benefiting the UK economy and wider society.

2.3.2. The City Deal recognises that the Greater Cambridge city region has achieved growth and success on an international scale, with an enviable status as a global hub of technology and innovation. With the University of Cambridge at its heart, Greater Cambridge is a world-leading centre for research, innovation and technology which has led to the 'Cambridge Phenomenon' – a unique ecosystem of bright minds, commerce and local investment. The inward investment, brought by the 'Cambridge Phenomenon', has created jobs and prosperity in Greater Cambridge. The lives of millions of people around the world have been transformed through innovations originating from Cambridge, from cancer treating drugs to smartphones. Greater Cambridge is one of only a handful of city regions that contribute to the UK economy. Its success brings jobs and opportunities for the whole region and beyond and when it succeeds, so does the whole of the UK. Add to this the city's prominent position as a global tourist destination, steeped in history, and the area is seen as one of the most attractive to live in the UK.

2.3.3. To deliver and sustain this position, the Greater Cambridge City Deal must tackle current and future transport problems by offering people better ways to travel by public transport, cycling and walking. To do this the GCP was formed to deliver the aims and objectives of the Greater Cambridge City Deal.

2.3.4. The GCP's vision for transport is:

"Creating better and greener transport networks, connecting people to homes, jobs, study and opportunity"

2.3.5. GCP aims to develop a sustainable transport network for Greater Cambridge that keeps people, businesses and ideas connected as the area continues to grow, making it easier to get into, out of, and around Cambridge by public transport, by bike and on foot.

2.3.6. Through a range of projects, it would create a transport network fit for a small, compact city served by a growing network of rural towns and villages.

2.3.7. The GCP's transport objectives are:

- To ease congestion and prioritise greener and active travel, making it easier for people to travel by bus, rail, cycle or on foot to improve the average journey time

[9] The Greater Cambridge City Deal: https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/321722/Greater_Cambridge_City_Deal_Document.pdf
[10] Government press release: https://www.gov.uk/government/news/greater-cambridge-city-deal-signed
[11] Cambridgeshire County Council, Cambridge City Council and South Cambridgeshire District Council

- To keep the Greater Cambridge area well connected to the regional and national transport network, opening up opportunities by working closely with strategic partners
- To reallocate limited road space in the city centre and invest in public transport, including Park and Ride, to make bus travel quicker and more reliable
- To build an extensive network of new cycleways, directly connecting people to homes, jobs, study and opportunity across the city and neighbouring villages
- To help make people's journeys and lives easier by making extensive use of research and investing in cutting-edge technology
- To connect Cambridge with strategically important towns and cities by improving rail stations, supporting the creation of new ones and financing new rail links.

2.3.8. To deliver its transport objectives, the GCP is seeking to implement an ambitious programme of strategic infrastructure improvements comprising:

- Four new, high-quality public transport corridors, north, south, east and west, linking growth areas on the periphery, and outside, of Cambridge with the city centre. These would include new dedicated routes bypassing traffic congestion, new interchanges and stops, and facilities for pedestrians and cyclists
- New travel hubs, where people can park outside the city and continue their journey by public transport
- Twelve new "Greenways" for walkers, cyclists, horse riders and other non-motorised vehicles, feeding into Cambridge from the surrounding area
- Improvements for buses, cyclists and pedestrians on key routes in the city
- Traffic management schemes to reduce congestion and improve conditions for pedestrians, cyclists and buses.

2.3.9. The Making Connections programme is part of the GCP City Access transport programme, and comprises:

- An improved bus network, offering more frequent services, lower fares, longer operating hours, more rural connections, and new routes into growing employment sites
- Reallocating road space to provide better cycling and walking routes and high-quality public spaces
- A charging scheme designed to reduce traffic and congestion in the city centre and generate revenue to invest in better bus services and more walking and cycling infrastructure.

3. Establishing the need for intervention

3.1. Traffic Congestion

3.1.1. The road network lacks resilience, particularly on radial routes into Cambridge and in the city centre, where it is constrained by the urban environment.

3.1.2. Overall transport demand has increased in Greater Cambridge over the past 20 years, predominately due to growth in the number of people living and working in the area; this growth has, however, not been consistent between modes. The success to date of the Cambridge phenomenon has been widely celebrated, but transport congestion is now threatening to impact on its future success.

3.1.3. Key headlines of traffic flow changes include:

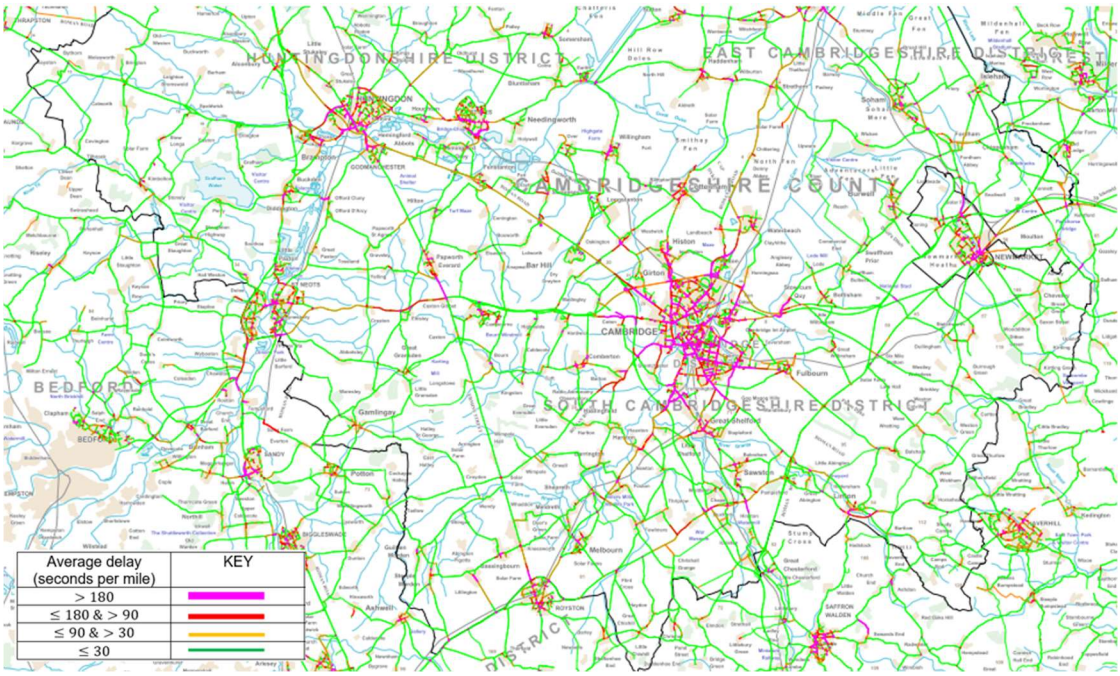
- Between 2010 and 2019 the number of motor vehicles entering and leaving Cambridge's radial cordon increased by 9%[12]
- The length of the morning and evening peaks has extended in recent years
- Traffic flows have increased across all hours of the day since 2000
- Overall motorised vehicular traffic flows entering Cambridge from South Cambridgeshire peaked in 2016 at 111% of 2010 values, before decreasing slightly and plateauing at 109% in 2017, 2018 and 2019.

3.1.4. The COVID-19 pandemic resulted in an adjustment to these trends, and significant reductions in travel demand due to the national lockdowns and the move, in some economic sectors, to hybrid-working. However, recent data for the local road network in Cambridge and strategic road network in Cambridgeshire suggests that traffic flows are back on an upward trend and have now returned to 93% of their pre-pandemic levels[13].

3.1.5. The consequences of unaddressed rising traffic flows include increased congestion and high levels of journey time delay. Figure 3-1[14] clearly illustrates the severity and extent of peak hour congestion on roads in and around Cambridge. The figure shows that the problem is not confined to the city centre. Delays of more than 3 minutes for every mile travelled are seen throughout Cambridge's built-up area and approach roads.

[12] Cambridge City Council (2020). *Traffic Monitoring Report*
[13] Cambridgeshire Insight, https://cambridgeshireinsight.org.uk/roads-transport-and-active-travel/transport-data-i, Accessed 02 June 2023
[14] Congestion map of Cambridgeshire

Figure 3-1 - Congestion (AM. peak) indicated by delay[15]



Impact of COVID-19

3.1.6. Despite the observed long-term increases in traffic flows in Greater Cambridge, the periods of national lockdowns and social distancing measures associated with the COVID-19 pandemic, and their legacy impact on travel behaviours, have had a significant impact on travel demand.

3.1.7. Although the long-term impact of the COVID-19 pandemic upon travel choices is still emerging, Cambridgeshire County Council's quarterly COVID-19 transport impacts: data and monitoring report[16] for the Greater Cambridge area provides a helpful insight into current travel behaviours.

3.1.8. Figure 3-2 shows that overall traffic volumes on both the local and strategic road network are recovering at higher rates than other modes, and that public transport patronage is recovering at the slowest rate of all modes. The metrics indicate arguably that, as with other locations across the country, Greater Cambridge is experiencing a car-led recovery.

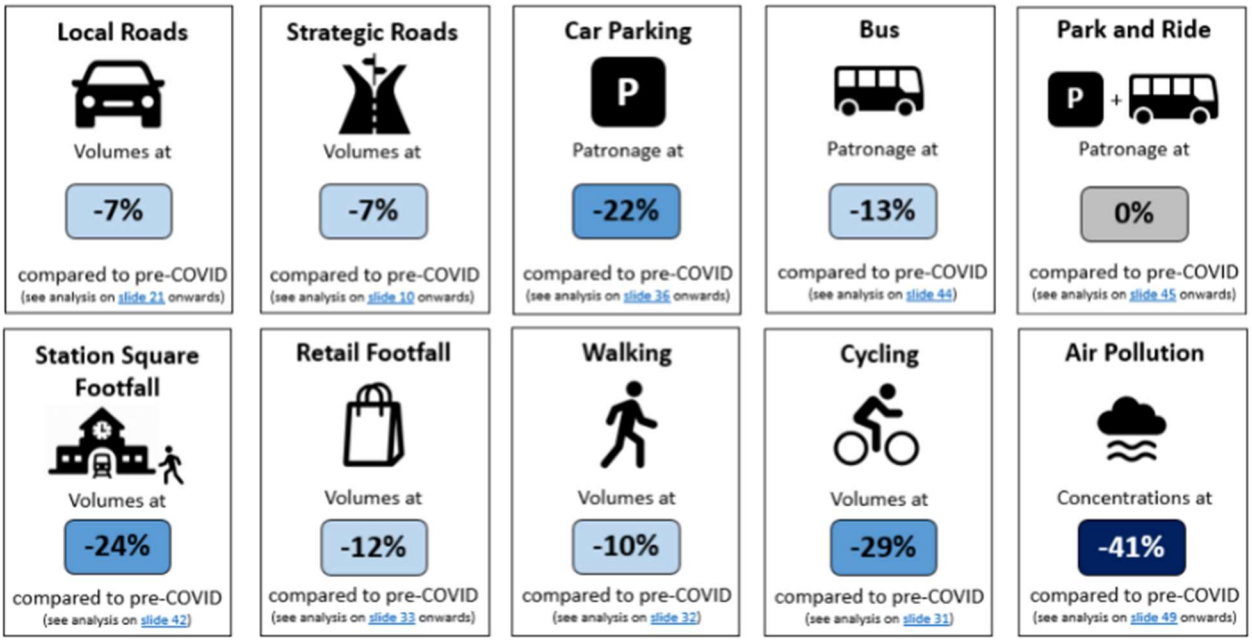
3.1.9. Latest data published by DfT[17] for national road travel variations since the start of the pandemic is largely consistent with the figures above for up to December 2022. It also indicates that by May 2023 motorised travel has risen to above pre-COVID-19 levels (Figure 3-3), which suggests that nationally the recovery of highway traffic is even higher than the local trend in Cambridge.

3.1.10. Travel demand, and therefore congestion continues to recover post-pandemic, as returning to the workplace, and hybrid patterns of working continue to replace working from home, and

[15] Cambridgeshire Insight. Congestion Map of Cambridgeshire, September 2014 – August 2015
[16] Cambridge Insight. Cambridgeshire Insight – Roads, Transport and Active Travel – Transport Data Insights
[17] Domestic Transport Usage by Mode - GOV.UK (www.gov.uk)

population and economic activity continues to expand. Any congestion relief from the impacts of COVID therefore appears to have already been lost. The Making Connections Programme is therefore needed to better manage future traffic flows, reduce delays and provide a bus network that is attractive to people living and working in Greater Cambridge.

Figure 3-2 - Headlines changes in transport related metrics (Comparing pre-COVID to March 2023)[18]



[18] Cambridgeshire Insight, https://cambridgeshireinsight.org.uk/roads-transport-and-active-travel/transport-data-insights/ [Slide 6], Accessed 02 June 2023

Figure 3-3 – National motor vehicle use relative to pre-COVID baseline[19]

3.2. Traffic collisions

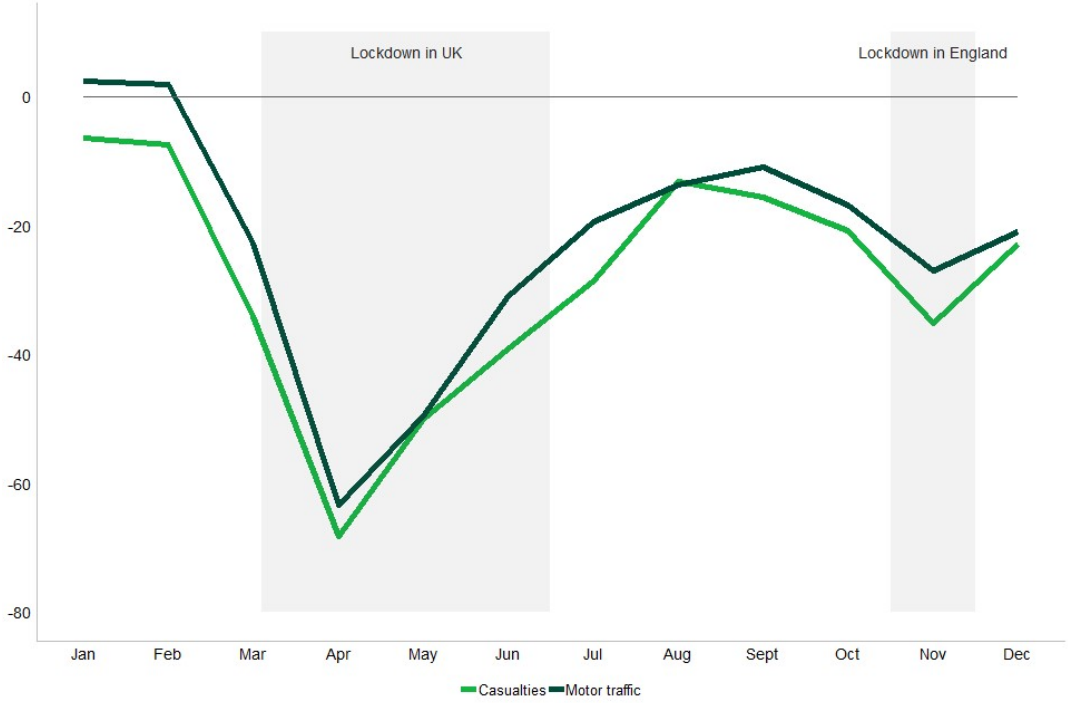
3.2.1. Research shows that road traffic collisions tend to occur in proportion to traffic levels; this was evidenced by DfT analysis[20] on how traffic volumes impacted the number of reported traffic collisions in 2020, during which the COVID-19 pandemic began. The relationship between motor traffic volumes and road traffic casualties is shown in Figure 3-4.

3.2.2. Road safety data for Greater Cambridge shows that the number and severity of casualties arising from collisions on the highway network has reduced by 34% over the last six years. Despite this, the number of casualties remains high. In 2022, there were 449 collisions which resulted in casualties, including 42 pedestrian casualties and 163 cyclist casualties in Greater Cambridge[21].

3.2.3. The traffic modelling work undertaken for Making Connections suggests that traffic flows would decline within the area of the proposed STZ following introduction of a charging scheme and, therefore, traffic collisions are also anticipated to decline. These traffic reductions provide an opportunity to reallocate road space to the benefit of active travel, and public transport modes and hence further reduce casualties related to those modes.

[19] DfT, Domestic Transport Usage by Mode, Domestic Transport Usage by Mode - GOV.UK (www.gov.uk), (10 May 2023)
[20] Department for Transport, The impact of lockdown on reported road casualties Great Britain, (2021).
[21] Cambridgeshire Insight, Open Data Portal – Road Traffic Collision Data, (2023).

Figure 3-4 - The relationship between traffic volumes and road casualties in England, 2020[22]



3.3. Bus services

3.3.1. The majority of bus routes within Greater Cambridge are provided on a commercial basis by two operators: Stagecoach East and Whippet. A number of smaller operators provide other supported services.

3.3.2. Bus passenger numbers and revenue fell sharply during the pandemic and have yet to recover fully. At the same time, staff recruitment and retention became more difficult, and coupled with supply chain issues, bus operating costs have increased. Whilst government has made revenue support available to the bus operating industry, this has been on a short-term emerging basis. As a result, Stagecoach East announced that it would withdraw some services and reduce frequencies on others from 31st October 2022. These were primarily low-frequency interurban and rural services. As part of this move to a network which was felt to be commercially sustainable, Stagecoach identified opportunities to increase frequencies on some city and Park and Ride services.

3.3.3. The CPCA tendered replacement services for the remainder of the 2022/23 financial year. CPCA then introduced a Mayoral General Precept to be collected by the Cambridgeshire district councils and Peterborough City Council in order to provide a more robust funding stream for bus services from 2023/24 onwards. There is clearly a risk that further services

[22] DfT, The impact of lockdown on reported road casualties Great Britain, final results:2020, The impact of lockdown on reported road casualties Great Britain, final results: 2020 - GOV.UK (www.gov.uk), 30 September 2021

may be reduced or withdrawn in response to increased costs and reduced ridership and revenue.

3.3.4. The issues with the current bus network can be summarised as follows:

- Bus patronage has been falling, despite some successful services such as the Cambridgeshire Guided Busway, for the past decade
- Congestion is the main issue that impacts bus services, making bus operations inefficient, services unreliable and journey times slow for passengers[23]
- Journey time reliability is a key issue, particularly for services that connect into Cambridge[23]
- The frequency and connectivity of bus services is a significant issue, particularly to people living in rural areas of South Cambridgeshire.

3.3.5. Fares and the cost of travelling by public transport are also a barrier to increased bus use – recognised by HM Government's £2 capped single fare scheme introduced in January 2023, subsequently extended and to move to a cap of £2.50 in October 2023 until November 2024

3.3.6. These issues were recorded during the 2021 Making Connections consultation in which respondents shared their priorities for spending on the bus network. The most popular priorities were more frequent bus services (27%), cheaper fares (19%), longer operating hours (16%), and more direct services to locations across the city (15%). Introducing flat-fares (32%) or lower fares for everyone across the region (31%) were the most popular choices if money was spent on reducing fares. In summary, bus travel, as a modal choice, is significantly less attractive than it was a decade ago. Moreover, the recovery of bus patronage, since the end of Government imposed lockdowns, is lower than any other mode of transport in Greater Cambridge.

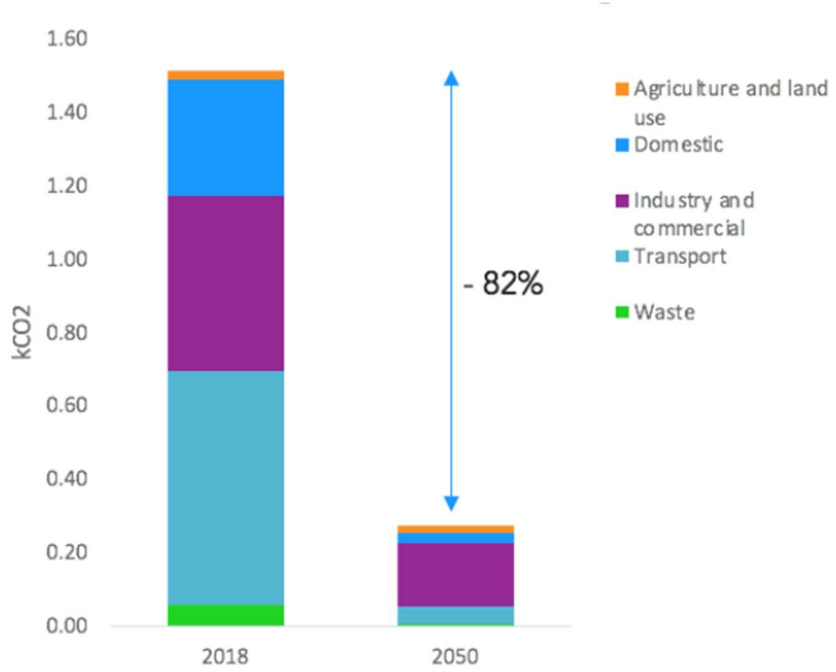
3.3.7. The Programme would use revenues raised from the proposed Sustainable Travel Zone to invest in transforming the bus network serving rural areas, villages, market towns, the city, and employment areas. It would enable improved frequencies on some existing routes as well as fare reductions. It would also enable longer hours as well as fare reductions, improving the bus as an option for shift workers and people on low incomes. Traffic reductions in the city and the potential for reallocation of road space would also improve bus journey times and their reliability.

[23] Cambridgeshire and Peterborough Combined Authority, *Bus Service Improvement Plan,* (2021)

3.4. Change to meet the Net Zero agenda

3.4.1. In June 2019, the UK Parliament passed legislation setting a new target of Net Zero by 2050. The legislation forms a commitment to decarbonise all sectors of the UK economy to net zero by 2050[24]. The Net Zero Carbon Plan Evidence Base[25] for the emerging Greater Cambridge Local Plan demonstrates that a reduction to near zero net emissions by 2050 across the wider Greater Cambridge area is possible, but only if the highest possible priority is given to the task. The potential reductions in greenhouse gas (GHG) emissions in Greater Cambridge is illustrated in Figure 3-5.

Figure 3-5 - Potential reductions in GHG emissions in Greater Cambridge



3.4.2. The latest locally available data on GHG emissions from 2020 indicates that road transport emissions, as a proportion of total emissions, have remained largely unchanged in Greater Cambridge since 2018, equating to approximately 34% of all GHG emissions in the area[26].

3.4.3. The proposed STZ, bus network improvements and sustainable travel investment would encourage a proportion of road users to switch mode, from car to more sustainable modes such as walking and cycling (with net zero carbon emissions) and a predominately electrified (and thereby low emissions) bus network.

[24] Department for Transport, Decarbonising Transport – A better, Greener Britain, (2021).
[25] Greater Cambridge Local Plan Net Zero Carbon Evidence Base 2021 - https://consultations.greatercambridgeplanning.org/greater-cambridge-local-plan-preferred-options/supporting-documents
[26] Department for Transport, Transport and Environment Statistics, (2020).

3.5. Air quality

3.5.1. Since the City Deal was signed, GCP has recognised the significance of air quality as a driver for transport improvements. In 2018 the GCP funded a Clean Air Zone Feasibility Study looking at how to improve air quality in the City Centre. The aims of the study were to look at how a range of interventions would affect air quality in Cambridge and consider feasibility of implementation. Whilst pollutant levels in most of the city are legally compliant or just above legal limits, growth of the City presents a significant challenge to long-term compliance. The study found that 106 deaths per year in Greater Cambridge can be attributed to air pollution[27].

3.5.2. Furthermore, it is worth noting that although actions and policies to reduce air pollution are often framed in terms of meeting legal limits, these limits should not be perceived, or presented as 'safe' threshold. There is no evidence to identify a threshold where exposure to pollutants does no harm to human health[28], and therefore all cities should prioritise improving air quality whether or not the pollutant levels are within legal limits.

3.5.3. Cambridge City Council has designated an Air Quality Management Area (AQMA)[29] in the City Centre because of the high average levels of NO2. The AQMA is shown in Figure 3-6.

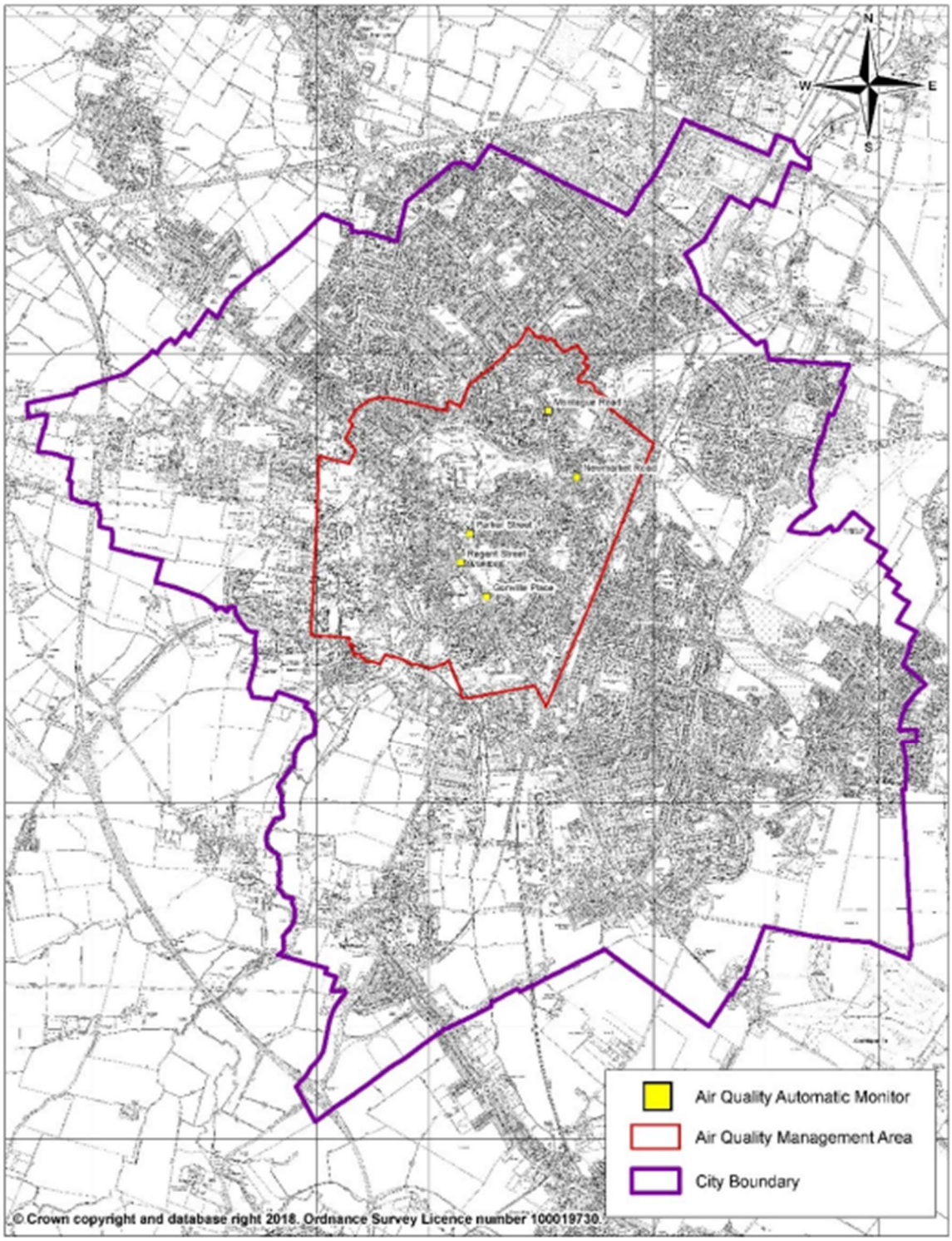
3.5.4. The current levels of emissions at monitored sites within Cambridge for the latest year (up until March 2023) do not currently exceed UK objectives for emissions on an annual or 24-hour mean basis. However, the UK government has set out a timeline for part-updating the objectives incrementally up until 2040, particularly for PM2.5; these changes could significantly reduce what level of air pollution is deemed acceptable. The update is partly in response to guidance from the World Health Organisation (WHO), that states Governments should create more stringent objectives in line with those published by WHO.

3.5.5. Until January 2022, there was a second AQMA in Greater Cambridge; the A14 AQMA between Bar Hill and Milton. A trend of decreasing monitored concentrations was recorded within the AQMA, with no exceedances above the objective levels for any pollutant, since 2014. Revocation of the AQMA was proposed in the Councils' Air Quality Annual Status Report (2021), and has now been accepted by the Department for Environment, Foods & Rural Affairs (DEFRA). The Cambridge City Centre AQMA is now the only designated area within Greater Cambridge. The 2022 Annual Status report on Air Quality has been submitted to DEFRA.

3.5.6. The Making Connections programme may lead to a net reduction in harmful air pollutants, as a result of the significant reduction expected in motorised traffic; in Cambridge approximately 81% of NO2 emissions are attributable to road traffic[30].

[27] Greater Cambridge Partnership Executive Board 4:00 pm Thursday 27th June 2019 Document.ashx (cmis.uk.com)
[28] Impacts of Air Pollution across the Life Course – Evidence Highlight Note, Environmental Research Group, Imperial College London, April 2023
[29] Cambridge City Council website – air quality
[30] Cambridge City Council (2019). Air Quality Action Plan 2018 – 2023 v2

Figure 3-6 - Air Quality Management Area, Cambridge[31]



[31] https://www.cambridge.gov.uk/media/8533/air-quality-management-area-map.pdf

3.6. Walking and cycling trips

3.6.1. According to 2011 Census data, Cambridge has the highest active transport modal share for residents within Cambridgeshire, with nearly 80% of short commuting trips (under 2km) being walked or cycled. South Cambridgeshire has higher rates of both walking and cycling than East Cambridgeshire, Fenland and Huntingdonshire districts for short commuting trips, but, despite this, 40% of people travel to work by car (as a driver or passenger) for trips under 2km.

3.6.2. Cambridge experiences high levels of pedestrian footfall, particularly in its historic core, retail areas and near Cambridge Station. The latest available footfall data demonstrates that, despite some adjustment during the pandemic, pedestrian footfall in the city centre was 15% higher in February 2023 compared to February 2019. Here, 4.3 million people were recorded at the sensor locations within the city compared to 3.7 million in 2019[32].

3.6.3. According to data from the 2011 census, the proportion of Cambridge residents who cycle to work increased from 26% in 2001 to 30% in 2011. Whilst the overall number of cyclists commuting to work is lower in the 2021 census, due to the significant increase in home working, the proportion of people cycling to work increased to 31%.

3.6.4. The overall increase in cycle mode share in Greater Cambridge has been attributed to various factors, including investment in cycling infrastructure and cycle parking, the introduction of cycle-sharing schemes, and increased awareness of the benefits of cycling for both personal health and the environment. Cambridgeshire County Council has also implemented measures to promote cycling, such as offering cycling lessons for beginners and promoting the use of electric bikes.

3.6.5. Making Connections has the potential to capitalise on this culture of active travel, and help to address the constraints of the streetscape, by reducing motorised traffic and, in turn, facilitating the reallocation of road space in favour of active modes. Here, creating a more attractive environment for active travel should help Greater Cambridge to fulfil its potential for walking, cycling and scooting, particularly for those people who currently drive short distances to work.

3.7. Park and Ride network

3.7.1. Five bus-based Park and Ride sites serve Cambridge: Babraham Road, Madingley Road, Milton, Newmarket Road and Trumpington, which provide 5,653 car park spaces in total. Two additional Park and Ride sites are located to the north of Cambridge on the Cambridgeshire Guided Busway alignment. The two sites are located at St. Ives and Longstanton and provide 1,000 and 350 car parking spaces respectively; hence, across all Park and Ride sites 3 over 7,000 spaces are currently provided. In recent years, parking capacity at both Trumpington and Babraham Road Park and Ride facilities has been expanded in response to the growth in demand.

3.7.2. The sustained growth in the number of car park spaces and levels of patronage at Cambridge's Park and Ride sites over the past 20 years, provides a strong indication of the impact that congestion has on vehicle journey times in the city. The consistent upward trend

[32] Cambridge BID (2023). Open data source: Monthly Footfall Reports

in Park and Ride patronage following the end of social distancing guidance, also potentially demonstrates that Park and Ride is becoming more attractive as traffic levels in Cambridge recover and increase.

3.7.3. The introduction of a potential STZ charge as part of the STZ is forecast to reduce traffic flows within the zone and, correspondingly, increase Park and Ride patronage in Cambridge. The wider GCP programme would deliver an additional 10,000 parking spaces at these Park and Ride sites.

3.7.4. Under Making Connections, all Park and Ride sites would fall outside of the STZ and fares into the city would be reduced. Hence, as part of the wider programme GCP seeks to ensure that Park and Ride remains convenient and accessible, and becomes more affordable and attractive, to further reduce traffic congestion and improve air quality in the Cambridge's city centre AQMA.

3.8. Quality of life

3.8.1. The Making Connections scheme has the potential to significantly increase accessibility to employment opportunities and services for lower income areas within Greater Cambridge (particularly for the 21% of households that do not own a car45). It could help to deliver a more affordable, reliable and comprehensive public transport network.

3.8.2. Whilst appreciating the benefits of living in Greater Cambridge that many residents enjoy, the relatively low levels of deprivation can mask pockets of deprivation.

3.8.3. People's personal health and their relative quality of life are complex issues that do not lend themselves to generalisation or over-simplification. With this important caveat, it is clear from published statistics[33] that the general health of people in Greater Cambridge is better than the average for the UK – life expectancy is significantly greater, the mortality rate from all causes is lower and obesity levels are below average.

3.8.4. The Indices of Multiple Deprivation (IMD) shows that, overall, Greater Cambridge has a higher-than-average quality of life, and employment rates are higher than the regional and national average[34]. The percentage of children in low-income families in Cambridge and South Cambridgeshire is lower than the regional and national average[35]. The percentage of residents with no qualifications in Cambridge (10%) and South Cambridgeshire (12%) is lower than the regional (18%) and national average (18%). The percentage of residents with educational attainment is higher whereby 56% of residents in Cambridge have a Level 4 qualification and 48% of residents in South Cambridgeshire; this is considerably higher than the regional average (32%) and national average (34%).

3.8.5. Relatively low levels of deprivation exist in Greater Cambridge as a whole, which do act to mask pockets of deprivation. In South Cambridgeshire, Lower Super Output Areas (LSOA) 091A (Melbourn) and 007B (Milton & Waterbeach) have the highest overall levels of relative deprivation, being categorised in the second and third most deprived IMD deciles nationally. In Cambridge, LSOAs 006D and 006F (Abbey) and 001C (King's Hedges) have the highest overall levels of relative deprivation in the city, with scores in the most and second most

[33] Public Health England (2019). *Local Authority Health Profiles* (for Cambridge and South Cambridgeshire)
[34] Cambridgeshire Insight (2022). Economic activity by gender (2022)
[35] Department for Work and Pensions (2023). Children in low income families: local area statistics 2014 to 2022

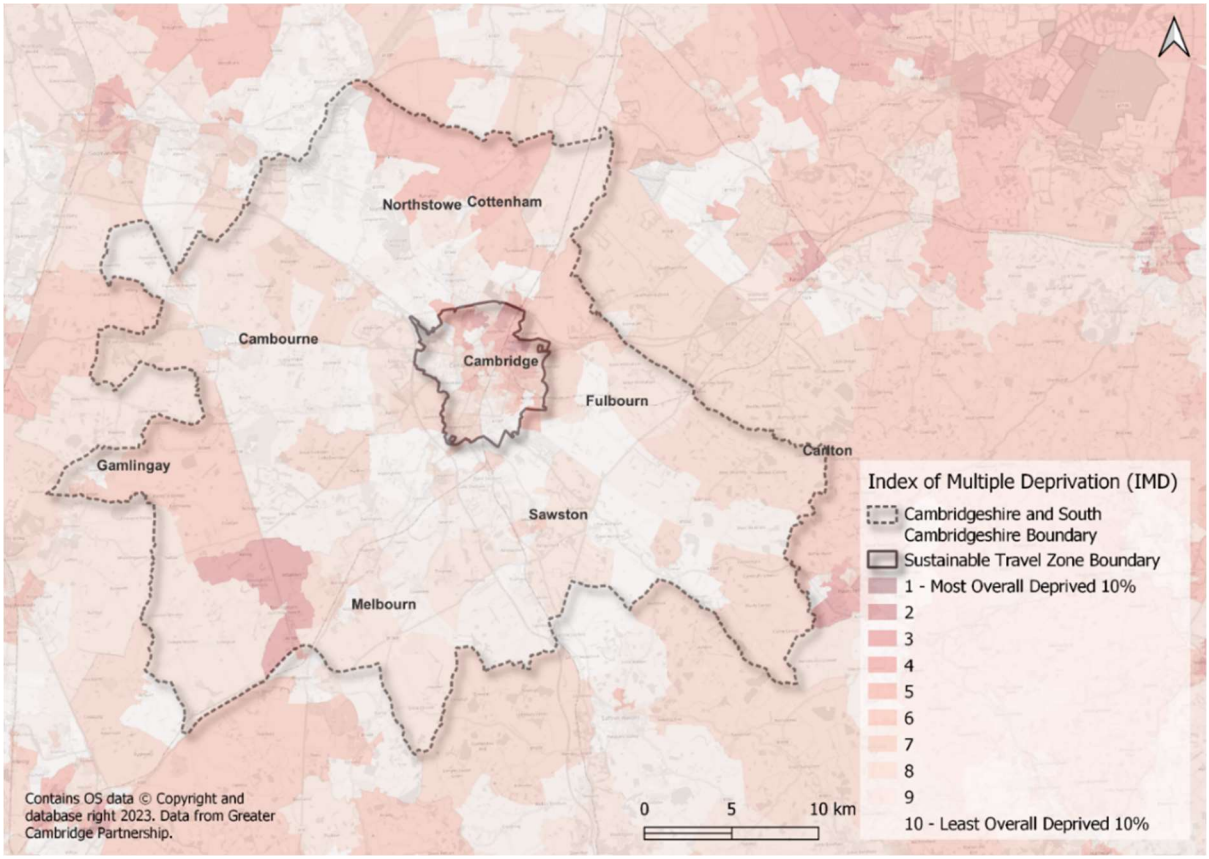
deprived IMD deciles nationally. There are also pockets of deprivation in other towns in the surrounding area including Haverhill, Bury St Edmunds, Huntingdon, Chatteris, Royston and Newmarket (See Figure 3-7).

3.8.6. In 2020, Centre for Cities has described Cambridge as "the most unequal city in the UK"[36]. The top 6% of earners earned 19% of total income generated in the area, while the bottom 20% of the population accounted for just 2% of that total.

3.8.7. In 2022, the average gross weekly pay in Cambridge was £748.60 and in South Cambridgeshire it was £767.70 for full time workers, which is higher than both the regional and national averages. Data from the ONS in 2022 suggests that on average in Cambridge women earn less than men; for men who work full time their gross weekly pay is £784.80, whilst women's is £678.10. This gap is even larger in South Cambridgeshire where the average weekly gross male pay is £824.60, in comparison to an average of £639.60 for women[37].

[36] Centre for Cities (2018). *Cities Outlook Report*
[37] ONS (2022). Annual survey of hours and earnings - resident analysis

Figure 3-7 - Overall IMD ranking by LSOA



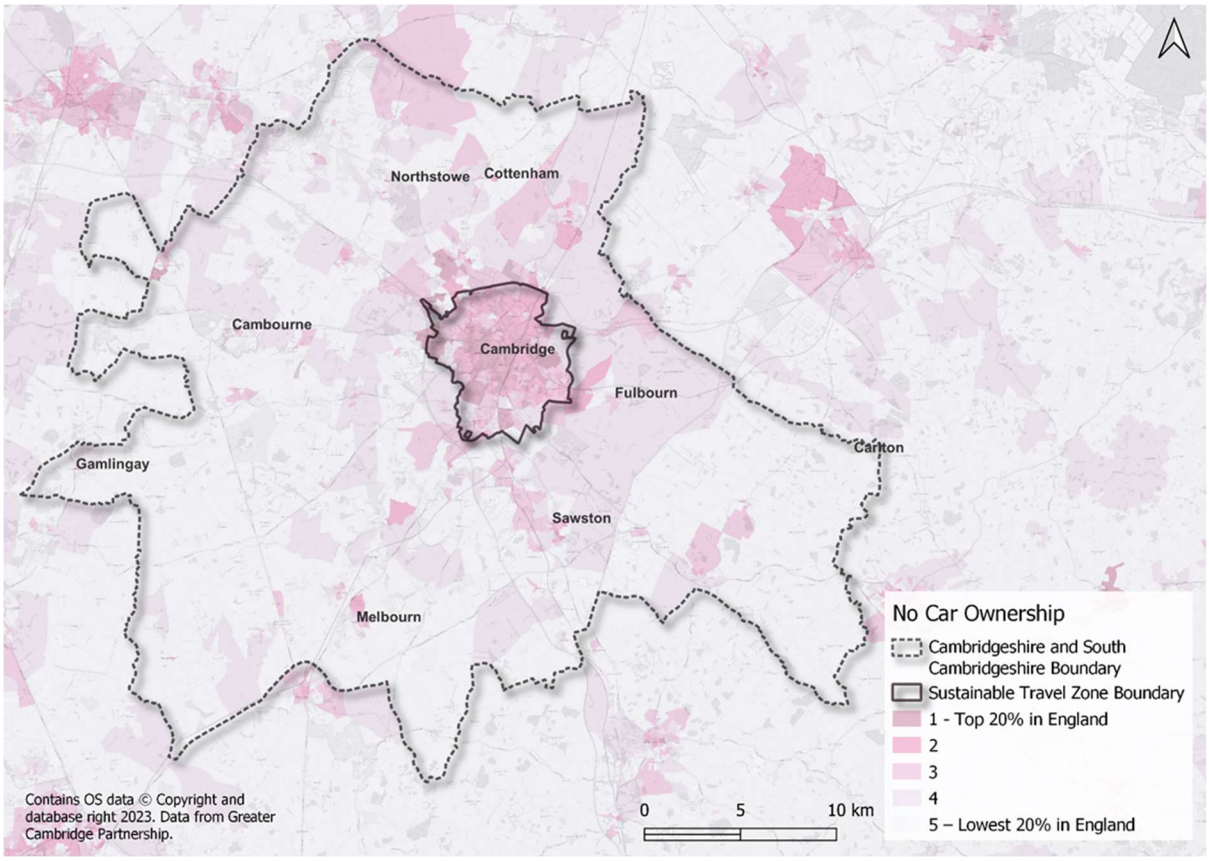
3.8.8. In terms of housing, Cambridge is also one of the least affordable cities to live. For example, the housing affordability ratio (the ratio of median house price to median gross annual residence-based earnings) for Cambridge was 12.3 in 2022[38]. This is the ratio between the median house price and the median earnings for a Cambridge resident. This is far higher than the 2022 national affordability ratio of 8.3, demonstrating how relatively unaffordable housing in Cambridge is compared to the rest of the country. Housing affordability in South Cambridgeshire also follows similar patterns with median house prices 9.3 times the median income of those working in the area, this ratio is close to 11 for low quartile house prices to lower quartile earnings in South Cambridgeshire[39].

3.8.9. It is also noted that given the rural nature of the areas surrounding Cambridge, that there is an increased presence of rural deprivation and isolation in some communities. A large proportion of Greater Cambridge residents have limited travel choices due to the relative absence of frequent, reliable, and affordable public transport services. This particularly impacts those people who do not 'own' or have access to a car. In Greater Cambridge, 21%

[38] ONS (2022). House price to residence-based earnings ratio
[39] Savills (2017). Detailed affordability analysis

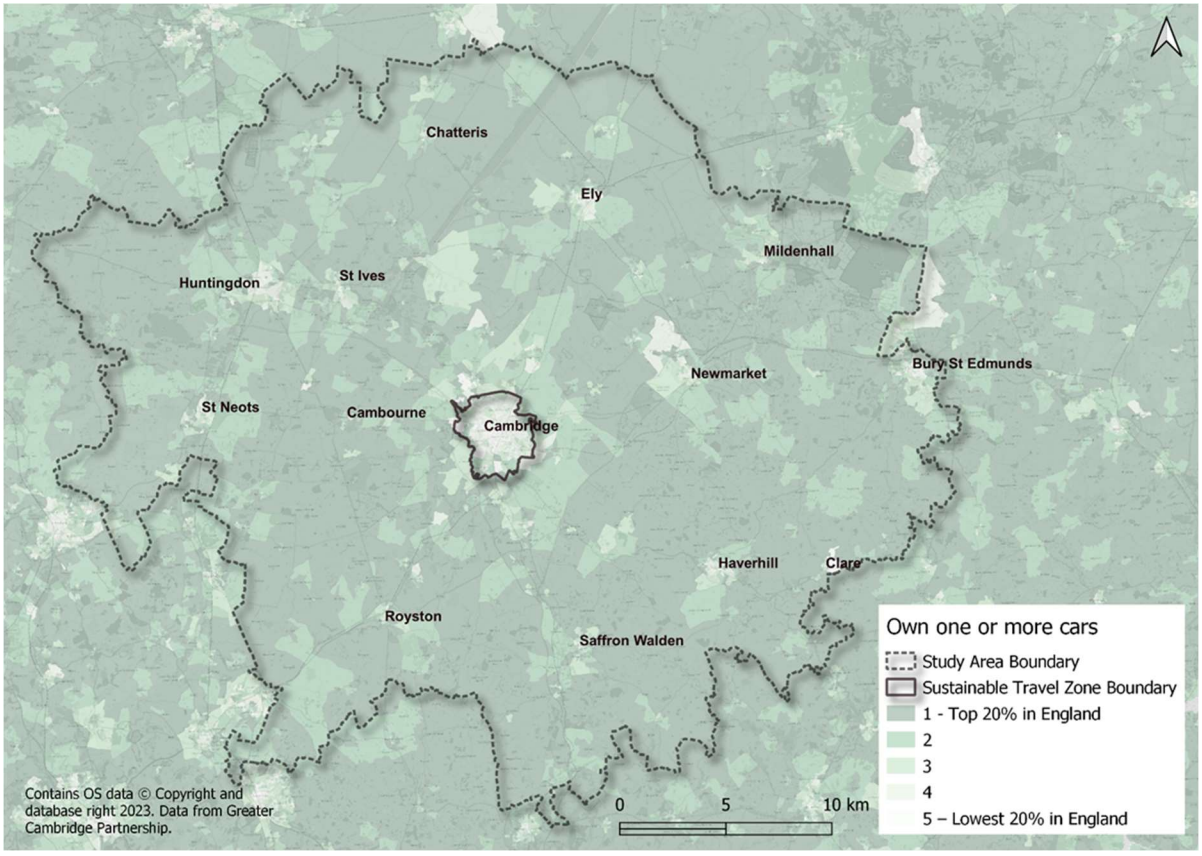
of households do not own a car[40] (see Figure 3-8). Figure 3-9 shows the approximate levels of car ownership.

Figure 3-8 – Proportion of people who do not own a car in Cambridgeshire



[40] ONS Census (2021). Car or Van Availability

Figure 3-9 - Levels of car ownership[41]



3.8.10. A more detailed examination of car ownership data shows that, overall, those in unskilled or semi-skilled jobs, who typically earn less than more highly skilled workers[42], are less likely to own a car. In Greater Cambridge, 26% of unskilled / semi-skilled or unemployed people do not own cars, with a higher proportion living in Cambridge (37%) compared to South Cambridgeshire (14%). In addition, 9% of skilled workers, 17% of supervisors/junior managers and 10% of senior managers/professionals do not own a car[43]. Figure 3-10 summarises car ownership by employment type.

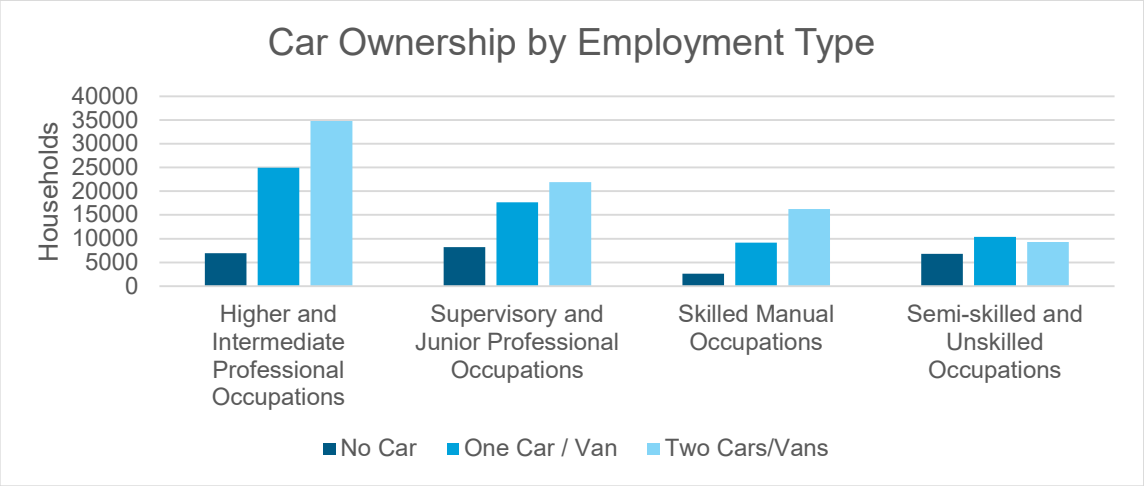
[41] Note that the EQIA assessment areas can be slightly different to the OAR study area. The EqIA assessment areas can be different depending on the nature of the assessment, the expected impacts for each topic, and how localised/widespread these impacts are likely to be felt; hence the EqIA impact assessments are not all based on identical study areas, so long as each chosen area can be justified as fit for the purpose of the respective assessment. These assessments may include Cambridge City, South Cambridgeshire, and the Greater Cambridge area, which is a largely rural area made up of smaller towns and villages and encompasses the wider travel to work areas. The EqIAstudy area includes towns located outside of the Greater Cambridge area including Newmarket, Haverhill, St Ives and Chatteris, as it is considered that those who live in these areas may require access to the city of Cambridge for employment opportunities and access to services.

[42] ONS (2022). Employment and Labour Market – Annual Survey of Hours and Earnings

[43] ONS Census (2021). Car or Van Availability by Job Occupation

3.8.11. Alongside the relationship between income and employment type, people facing relative health and mobility issues are also less likely to own a car. For example, in Greater Cambridge 38% of people with lower levels of personal mobility, whose day-to-day activity is limited by a long-term illness or health problem, do not own a car[44]

Figure 3-10 - Car ownership by employment type



Source: ONS Census (2021)

[44] ONS Census (2021). Car or Van Availability by Long-Term Health Problem

4. Objectives

4.1. Vision

4.1.1. The vision for the scheme is:

A world-class, sustainable transport network for Greater Cambridge that connects people to jobs, study and opportunity as the area continues to grow.

4.2. Strategic objectives

4.2.1. The strategic objectives (desired outcomes) of the scheme build on the aims developed from the body of work carried out to date, as set out on the GCP website[45]:

- Reduce traffic by 15% from the 2011 baseline, freeing up road space for more public transport services, and other sustainable transport modes
- Ensure public transport is more affordable, accessible and connects to where people want to travel, both now and in the future
- Raise the money needed to fund the delivery of transformational bus network changes, fares reductions and improved walking and cycling routes
- Make it safe and attractive to walk and cycle for everyday journeys
- Support decarbonisation of transport and improvements to air quality
- Make Greater Cambridge a more pleasant place to live, work travel or just be.

4.3. Objectives

4.3.1. The **specific** objectives of the scheme are:

- To reduce carbon emissions from transport
- To improve access to jobs and education for people, especially those living in rural areas
- To improve air quality in the city centre
- To contribute to GCP overall objective to reduce traffic by 15% from the 2011 baseline, freeing up road space for more public transport services, and other sustainable transport modes.
- To reduce congestion in Cambridge
- To reduce journey times and improve journey reliability

[45] https://www.greatercambridge.org.uk/sustainable-transport-programme/city-access-programme/making-connections

- To enable the re-allocation of road space to buses, pedestrians and cyclists
- To increase the number of trips by bus
- To increase the number of trips by cycle
- To increase the number of trips on foot
- To reduce the number of road accident casualties
- To raise sufficient net revenue to fund the transformation of the bus network and wider Sustainable Transport Measures.

5. Generating options

5.1. Evolution of 'Making Connections'

5.1.1. The evolution of Making Connections started from the commencement of the GCP in 2015. The GCP is the delivery body for one of a number of 'City Deals' between central government and cities and is worth up to £1 billion in funding to 2030 for transport infrastructure, and other interventions, to boost economic growth.

5.1.2. In 2015, GCP approved the commencement of option exploration to reduce congestion in Cambridge. Measures explored subsequently included priced demand management and physical demand management. By June 2016, GCP Executive Board agreed the policy approach for a congestion reduction package, incorporating:

- Better bus services and expanded usage of Park and Ride facilities
- Better pedestrian and cycling infrastructure
- Better streetscape and public realm
- Peak congestion control points in the weekday morning and evening peak periods
- A workplace parking levy (WPL)
- On-street parking controls (including residents' parking)
- Smart technology
- Travel planning.

5.1.3. Since then, a series of technical work and wide-ranging public engagement have taken place between 2016 and 2021, considering how to significantly improve public transport and active travel and hence tackle congestion, GHG emissions and pollution in Greater Cambridge. An overview of key milestones during this period is given below:

- Early 2017 – following petitions, cease of work on peak time congestion control points in the weekday morning and evening peak periods. Work to develop options for other elements, including WPL and Clean Air Zone continued
- Sep to Nov 2017 – GCP's public engagement and surveys (Our Big Conversation) were carried out. It drew strong support for PT improvements and reducing congestion
- 2018 – two options for charging zones were considered: an outer zone (just inside Park and Ride sites) and an inner zone (inside the inner ring road). The advantages and disadvantages of physical measures, parking controls, WPL, pollution charge and intelligent charge were considered. Development of a Transport Strategy focused on public transport issues and the need for modal shift
- 2019 – a feasibility study with regard to one or more clean air zones in Cambridge was undertaken. It was forecast to result in an 80% reduction in annual mean NO2

concentrations across the whole city[46], but would not tackle the congestion or deliver the level of traffic reduction needed

- 2019 – the Choices for Better Journeys public consultation (formerly referred to as the "Second Big Conversation") was undertaken, followed by Greater Cambridge Citizen's Assembly in the Autumn. Feedback from consultation supported demand management within the city, called for bold action to reduce / restrict traffic and supported the principle of road charging to fund sustainable transport
- 2020 – a comprehensive evidence base[47] for the City Access Programme was reported. It demonstrated a case for change and highlighted that the desired future bus network cannot be delivered to a standard that will enable users to shift to a more sustainable mode without (i) freeing up space on the roads to allow bus priority, and (ii) an ongoing funding source
- 2021 – a paper was presented at Joint Assembly to set out the need for bolder vision and faster implementation. The Joint Assembly delivered the following key message to the Executive Board "*The Joint Assembly asks the Board to apply a bolder vision and to speed implementation, to get in place actions that can make a difference in relation to the 21st June trigger point and in particular focussing on alternatives to this becoming a car-based recovery*."
- 2021 – the GCP Executive Board agreed to take forward the options development (towards a final package) and start public consultation on the Making Connections Package.

Overview of the development of the project up to 2022

5.1.4. The series of activities between 2016 and 2021 as outlined above led to the GCP Executive Board's agreement to develop a final package of options for improving bus services, expanding the cycling-plus network and managing road space in Cambridge. The consultation launched in late 2021 and was based on a wide range of technical evidence developed through the series of activities during the preceding five years. The consultation focused on the central proposition of a transformed bus network and wider sustainable transport measures, funded through either a WPL/increased parking charges, a pollution charge or a flexible area charge. These priced demand management options were also the potential mechanisms for reducing traffic, reducing congestion, and creating the space for more walking, cycling and reliable public transport that is necessary if the outcomes are to be achieved.

5.1.5. The journey described above set the starting point for option assessment as documented in this OAR and the subsequent SOC development. The options assessment documented in this report is therefore focused on the Making Connections package comprising:

- Transformational public transport improvements (higher frequencies, new routes, longer hours and lower fares)

[46] Clean air zone - Cambridge City Council
[47] Evidence base

- Wider sustainable transport measures
- The above in combination with three remaining priced demand management options for both reducing traffic and raising the funding required to fund the transformation of travel choices.

5.1.6. The first iteration of the option assessment for Making Connections was completed in 2022 and documented in Version 1 of the OAR. It established the case for change for the scheme as well as its objectives, and documented the processes for option generation and sifting, including the three demand management options (flexible area charge, pollution charge and WPL) featured in the 2021 Making Connections consultation. Analysis on these three demand management options has been undertaken, and the findings appear to broadly align with outcomes from the Making Connections consultation carried out in November and December 2021, indicating a preference for the flexible charging zone option. This was incorporated into the recommendations to the Greater Cambridge Partnership Joint Assembly held in September 2022. A core option of road user charge of £5 applied 7am-7pm on weekdays was recommended to and accepted by the Joint Assembly and Executive Board in 2022. This is a Sustainable Travel Zone (STZ) comprising network wide public transport improvements, complementary measures and a road user charge, which is based on the STZ charge consulted on in 2021.

5.1.7. The chosen STZ option informed the assessments in the SOC completed in 2022 and informed a subsequent Making Connections Consultation October to December 2022.

5.1.8. Upon completion of the consultation in December 2022, insights collected from the consultation and new technical evidence developed in spring 2023 have informed the subsequent refinement of the Making Connections options which is documented in this OAR (Version 2). The technical work has included updates to the impacts assessments, including environmental, distributional, equalities and business impacts. Option development in 2023 has refined the identified options through the consideration of scheme parameters such as values of charge at different times of day and those who may be eligible for exemptions, based on findings from the new consultation and additional assessment undertaken. Once the revised scheme options have been established, qualitative assessments based on a MCA were carried out to assess the extent to which that the updated scheme options can meet the scheme objectives and address potential issues revealed in the consultation.

5.1.9. The refinement and optimisation of the Making Connections options, subsequent to the completion of the 2022 consultation, is documented in the updated OAR (this report), along with a description of option assessment activities prior to this point.

5.1.10. The evolution of the Making Connections programme described above is illustrated in Figure 5-1, with key public engagement activities since 2017 highlighted in green. The illustration of the option assessment, including both the original iteration up to the end of 2022 and subsequent update in 2023, is already presented in Figure 1-2.

Figure 5-1 - Evolution of Making Connections

5.2. Strategic assessment (prior to 2022)

5.2.1. This section of the OAR has been updated to better capture the background work and history of the scheme, including explicitly referencing the September 2021 Executive Board, The September 2021 meeting was the decision point for the 2021 consultation to commence on the three options of the Pollution Charge, Flexible Charge and Parking charges options.

5.2.2. We have also strengthened the evidence from the analysis of the 2021 consultation that was considered within the OAR process but was reported separately to GCP board. This analysis also formed part of the Executive Board paper September 2022 that presented the Strategic Outline Case, including the OAR.

5.2.3. Making Connections is part of the wider City Access programme that includes measures such as road space reallocation (including a review of road network classification in Cambridge), an integrated parking strategy and development of further cycling infrastructure. Additionally, lower traffic levels open up the opportunity to create more people-centred spaces in the city and reduce the dominance of cars to create more pleasant environments in which people want to spend time.

A strategic choice backed by five years of engagement and consultation

5.2.4. The consideration of strategic options and the chosen combination of a charging scheme combined with bus service improvements, road space reallocation and improvements for walking, cycling and smarter transport was built on the outcomes from a series of consultation activities since 2017:

- 2017 – Our Big Conversation
  Traffic and congestion slowing journeys said to be the biggest challenge, improvements to buses, walking and cycling identified as a potential solution
- 2019 – Choices for Better Journeys
  Supported the principle of demand management with the city
- 2019 – Citizens' Assembly
  Called for bold action to reduce/restrict traffic and supported principle of road charging to fund public transport improvements
- 2021 – Making Connections
  Supported the proposals for the bus network and mechanisms to deliver improved services, including road user charging.

5.2.5. Findings from the 2021 Making Connections consultation provide further insight for validating and shaping the proposals during the option assessment.

5.2.6. In terms of the proposal for improving bus network and walking and cycling provisions:

- 78% supported the bus network proposals
- 71% supported the overall aims of the proposals
- 68% supported the idea of reducing traffic to improve walking and cycling
- 52% supported the idea of reducing traffic to improve public spaces.

5.2.7. With regard to demand management with a charge scheme:

- Preference for options involving charging cars to drive in an area over options involving new or additional parking charges
- Preference for a lower charge covering a larger area
- A small majority in favour of peak-time charging compared to other charge-based proposals.

5.2.8. About reinvesting the revenue income from the charging scheme:

- 27% prioritised spending on more frequent bus services, 19% on cheaper fares, 16% on longer operating hours and 15% on more direct services

- Introducing flat-fares (32%) or lower fares for everyone across the region (31%) were the most popular choices if money was spent on reducing fares.

Strategic options taken forward

5.2.9. The GCP Executive Board on 30th September 2021 endorsed the recommendation to take forward a consultation based on Making Connections have three main components:

- Improvements to public transport services
- Alternative charging options:
  - A flexible road user charge
  - A "pollution charge"
  - Parking charge (including but not limited to a WPL)
- A package of complementary measures.

5.3. Scope of the strategic intervention

5.3.1. The scope of the proposed intervention covers the whole of Greater Cambridge, with two main geographical foci:

- Public transport connectivity between villages and market towns, employment areas and Cambridge city centre
- Congestion relief and support for active modes in the urban area of Cambridge.

5.3.2. The scheme consists of the following potential transport interventions, designed to deliver the objectives:

- Improvements to bus services will be common to all options:
  - New bus services connecting rural areas and villages to rail stations and travel hubs on existing public transport corridors
  - New, more direct bus services to employment areas
  - Increased frequencies on bus services to villages, market towns and employment areas
  - New, express bus services serving market towns and larger villages
  - Longer operating hours, including evening services
  - Reduced bus fares
  - Zero-emission buses
  - Reallocation of road space within the city centre
  - Improvements to walking and cycling routes, extending the existing active travel network
  - Improvement to public spaces.
- Smarter travel initiatives will be common to all options:
  - Electric car clubs
  - e-Cargo bike clubs
  - e-Bike leasing schemes.

- A charging scheme based on one of the following three options:
    - A road user charging zone - a flexible charge for road use by private vehicles within a defined area, potentially varied by time of day or day of week
    - A pollution-based charge for road use - vehicles which do meet defined emission standards would not be charged to enter a defined area
    - Parking charges - increasing existing charges for parking on-street and in car parks, introducing parking charges on more streets, WPL, largely paid by employers.

5.3.3. The revenue generated from a charging scheme would be used to create a funding stream for the bus service improvements and other complementary interventions within scope.

6. Initial sifting

6.1. Overview

6.1.1. The three broad concepts that formed the basis of the 2021 consultation (as outlined in Chapter 5 above), were then taken forward for more detailed option development and assessment. This process follows the guidance outlined in Stage 1 (Option Development) of the transport appraisal process set out in DfT's Transport Analysis Guidance[48]. Output from this stage are specific and tangible options that can inform Stage 2 (Further Appraisal) of the appraisal process. This will be incorporated into the OBC for the proposed interventions.

6.1.2. The processes of sifting and development, and assessment of options, have been linked using an intermediate stage, whereby a 'pre-sift' performs the task of discarding those options which are unlikely to meet objectives, provide a poor fit with policy or fail to meet certain viability or acceptability criteria.

6.1.3. Due to the complexity of the proposals, a secondary stage of sifting has been used to further filter the remaining options prior to moving on to further option development and assessment.

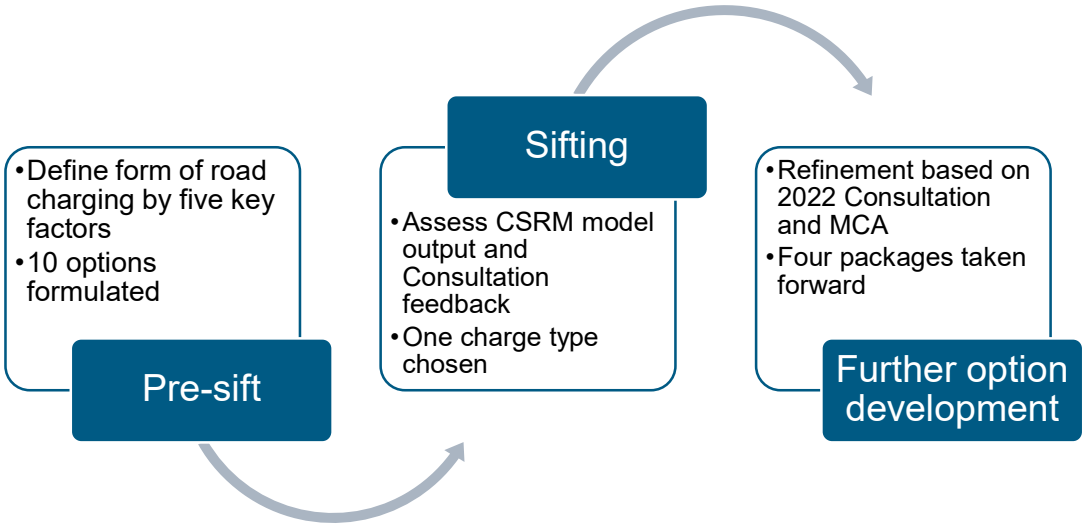
6.1.4. This process builds on the findings from the strategic assessment documented in the previous chapter and the strategic intervention that was chosen. The three stages in the option development and assessment process, and their relationship to stages of reporting in the development of the Making Connections scheme, are summarised in the following bullets and illustrated in Figure 6-1:

- Pre-sift: formulate options surrounding different forms of road charging and key parameters. Completed in 2022
- Sifting: assess potential charging options surrounding the structure above to inform the SOC. Completed in 2022
- Further option development: refine scheme parameters and rules to identify package options for the OBC. Undertaken in 2023 post completion of the Making Connections public consultation in 2022.

6.1.5. The pre-sift and sifting stages are described in this section and further option development is described in Chapter 7.

[48] TAG TPM - The Transport Appraisal Process (publishing.service.gov.uk)

Figure 6-1 - Detailed option development and assessment following the choice of strategic option



6.2. Pre-sift (2022)

Purpose

6.2.1. The 2021 Making Connections consultation only provided three broad demand management approaches, but the definition of these was intentionally high-level. Whilst a range of demand management options (priced and non-priced) had been considered and discounted in previous work, further analysis on the potential demand management options was included in the 2022 OAR. This provided validation to previous work and captured all the decisions on priced demand management options up to this point in time.

6.2.2. Therefore, the purpose of the pre-sift stage in 2022 is primarily to better define the demand management element of the scheme and turn the three broad concepts into tangible and manageable variants of demand management options that are most likely to meet the objectives, following a logical order. The focus of the pre-sift is to narrow down the road user charging options as these have the greatest number of variants.

6.2.3. These charging variants are required to generate a reduction in traffic and contribute to delivering the behavioural change, decongestion and carbon reduction outcomes sought. They must also provide sufficient net revenue to fund the transformational change to the bus network, walking and cycling.

6.2.4. Options established at this stage were taken to the next sifting stage along with the parking charge, WPL, and pollution charge options.

Pre-sift results

6.2.5. A road user charging scheme typically has five key components: type of scheme, size, duration of charging period, cost of charge and discounts or incentives. The review of relevant options for individual charging components, and reasons for rejecting some of them, is presented in Table 6.1.

6.2.6. In summary, the assessment of road user charging scheme:

- Rejects cordon and link charges in favour of an area charge
- Favours a city-wide charge rather than something smaller or larger
- Needs to investigate the hours of operation of the charge: morning peak only, morning and afternoon peak, or all-day?
- Needs to investigate the level of charge
- Considers discounts for electric vehicles only.

6.2.7. Following the pre-sift, the three remaining demand management mechanisms that meet the Making Connections objectives are:

- A flexible area charge - a charge for road use by private vehicles within a defined area, potentially varied by time of day or day of week
- A pollution-based charge for road use - vehicles which meet defined emission standards would not be charged to enter a defined area
- Parking charges - increasing existing charges for parking on-street and in car parks, introducing parking charges on more streets, WPL.

6.2.8. This result draws findings from transport modelling as previously undertaken and reported in the City Access 2022 modelling report[49]. Included in all the modelled tests were public transport enhancements that broadly represent the aspirations of the corridor based GCP schemes as follows:

- Cambourne to Cambridge (C2C)
- Cambridge Eastern Access Phase 1
- Waterbeach to Cambridge
- Cambridge South East Transport (CSETS)
- Cambridge South West Travel Hub (CSWTH).

6.2.9. In addition, schemes specifically associated with Making Connections have been included as described in the Making Connections consultation leaflet (November 2021)[50], which is based on the Future Bus Network Concept report (January 2020)[51]. The Making Connections consultation leaflet specifies a series of services that run 12 hours per day (07:00-19:00) along six corridors into the city:

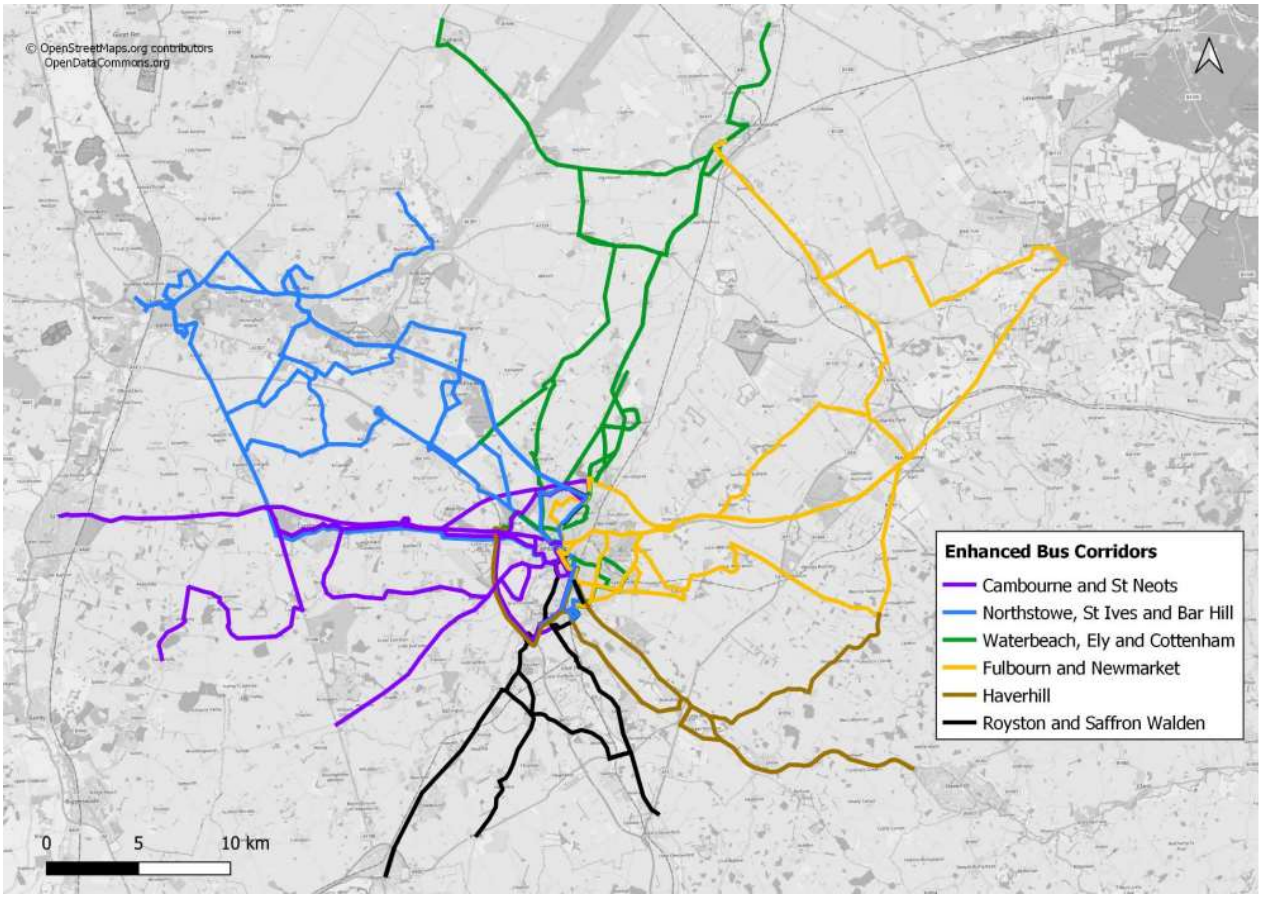
- Cambourne and St Neots
- Northstowe, St Ives and Bar Hill

[49] GCP Making Connections 2022 | Consult Cambridgeshire (engagementhq.com)
[50] Making Connections – have your say on greener travel in Greater Cambridge' 2021, retrieved on 19/04/2022 https://consultcambs.uk.engagementhq.com/11236/widgets/35548/documents/19137
[51] Future Bus Network Concept' 2020, retrieved on 19/04/2022
Greater Cambridge Partnership Media Assets Library (filecamp.com)

- Waterbeach, Ely and Cottenham
- Fulbourn and Newmarket
- Haverhill
- Royston and Saffron Walden.

6.2.10. An overview of bus corridor enhancements represented within the 2022 City Access modelling is illustrated in Figure 6-2, with full details provided in the City Access 2022 modelling report.

Figure 6-2 - Overview of enhanced bus services in Cambridgeshire



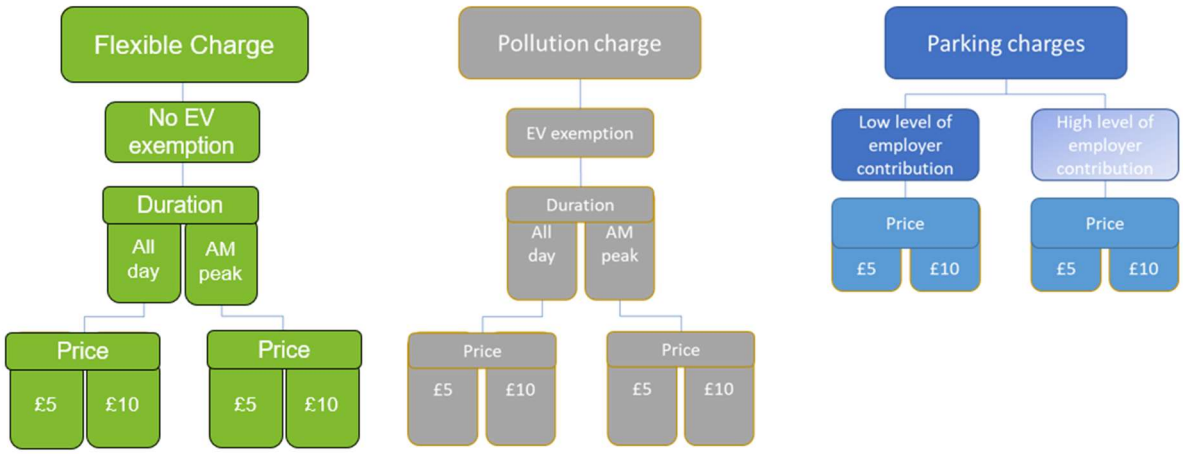
6.2.11. As the study has progressed, minor revisions have been made to these service specifications. This is in part because, as noted in Section 2.2, existing services have been fluctuating in response to the impact of the pandemic on ridership and therefore revenue generation. These changes to existing routes and frequencies have affected the optimal range of service changes proposed as part of the Making Connections scheme.

6.2.12. Following the pre-sift, the charging scheme options were developed to form ten discrete options (Figure 6-3). These include the high-level options, i.e., flexible, pollution and parking charge as described above, and their associated sub-options reflecting:

- Price (£5 or £10)

- Duration of charge (morning peak or all-day)
- High and low levels of employer payment for the parking charges test.

Figure 6-3 - Charging scheme options



6.2.13. The parking charges options in the figure above are defined as an increase to all parking charges across the same geographical area (broadly the Cambridge urban area) as the area charge. This incorporates a WPL (which employers may or may not pass on to their employees) as well as increases to all on-street and off-street car parking charges (excluding residents at their own homes).

6.2.14. A single parking charge scenario was defined as an additional £10 on top of any existing charges. It was assumed that this would be implemented in two ways (captured in two different options in the figure above):

- A core test which, based on data from a study in Nottingham where a WPL was introduced in 2012, indicates approximately 40% of levy paying workplaces pass on the cost of the WPL to their employees[52].
- A sensitivity test which alters the proportion of employers passing on the WPL to their employees. The WPL sensitivity test assumes that a greater proportion of employers would absorb the full cost of the WPL, and therefore the percentage of employees who would not incur an increase to their parking charges rises to 60% of commuters.

6.2.15. Note that in both scenarios, for the WPL element of the programme, if an approach similar to Nottingham is taken then some employers would be exempt from the charge, if they have

[52] Demand management options assessment report, GCP: 'City Access Demand Management Options Assessment Report.pdf', dated January 2019

fewer than 10 parking spaces. Research provided by GCP suggests that 22% of employees would be exempt from charges on this basis (as their employers' car parks are less than 10 spaces)[53].

6.2.16. The ten options established from the pre-sift were taken forward to the sifting stage for subsequent assessment Table 6-3.

[53] Source: "Cambridge Private Non-Residential Parking Study.pdf", page 7City Access - CSRM2

Table 6-1 – Review of charging elements

Category	Option	Comments and reasons for accepting / rejecting	Taken forward?
Type of scheme	Area charge	Enables all vehicles driving within a defined area to be charged	● Yes
	Cordon charge	Only charges drivers entering city from outside of the city and would be unlikely to meet the objectives given that over 50% of peak hour journeys are within the city	● No
	Link charge	A particularly nuanced response to specific problems rather than a solution to a larger area and would be unlikely to meet the objectives	● No
Size of scheme	Inner (city centre only)	Congestion is not only an issue for the city centre. Limited generation of funds to support wider measures. Will not meet traffic reduction objectives within Cambridge given that less than 15% of traffic is within the inner ring road	● No
	Outer (city wide)	Tackles congestion throughout built-up area and enables a funding target from the charge to be spread over more drivers	● Yes
	Wider	Harder to justify the boundary once beyond the Cambridge built-up area as the city is the focus of employment and services	● No
Duration of charging period	Morning only	Tackles worst congestion issues but could cause peak spreading and with population growth traffic will continue to worsen in the off-peak and PM peak	● Yes
	All-day	Tackles congestion and carbon / AQ issues. Spreads charging costs over more drivers	● Yes
Price	Under £5	Unlikely to generate sufficient income to support investment in public transport*	● No*
	£5	Generates significant income	● Yes
	£10	Generates significant income, but potentially less acceptable to drivers compared to £5	● Yes

	More than £10	MCAF	● No
Discounts / exemptions	Goods vehicles	Goods vehicles contribute to congestion and pollution and should not be exempt	● No
	Specific vehicles / trips	Discounts could be considered for defined users or vehicle types	● Yes
	Electric vehicles	A discount or exemption for EVs could be part of a “pollution charging” scheme but would not meet traffic objectives as ownership of EVs expands over the next decade. Any EV discount would only work if tapered off over time.	● Yes

* Although not taken forward after this intial sifting, this charging option has been re-considered as an option following feedback from the 2022 public consultation and concerns over cost of living issues.

6.3. Sifting in 2022

Purpose and approach

6.3.1. The purpose of the second sift is to assess the selected charging options, using Cambridge Sub Regional Model[54] (CSRM) results, and assess these against the Making Connections objectives. The assessment is based on the DfT's Early Assessment and Sifting Tool (EAST) for the five core dimensions in appraisal: Strategic, Economic, Managerial, Financial and Commercial. The scores (high, strong, red, amber, green etc) are a direct result of the EAST assessment. Details can be found in the EAST guidance[55].

6.3.2. A description of the metrics used is presented in Table 6-2.

Table 6-2 – Objectives and metrics

Objective	Metric
Contribute to the GCP objective to reduce traffic by 15% from the 2011 baseline, freeing up road space for more public transport services, and other sustainable transport modes	The model will respond to the charge as well as changes in public transport affordability and connectivity by decreasing demand for car travel and increasing demand for travel by other modes. GCP have made it a target that car travel should fall by 15%.
Ensure public transport is more affordable, accessible and connects to where people want to travel, both now and in the future	The model will respond to changes in public transport affordability and connectivity by increasing demand for public transport. The differing charge levels will make driving less competitive relative to public transport. Changes in public transport demand are therefore both a response to the charge and a response to the improve service levels and prices. The metric is change in the number of bus, guided bus, Park and Ride and active trips to, from and within the charged area in 2026 compared to the 2026 baseline.
Raise the money needed to fund the delivery of transformational bus network changes, fares reductions and improved walking and cycling routes	To raise sufficient net revenues to fund the transformation of the bus network and wider Sustainable Transport Measures

[54] CSRM is an established dynamic land use and transportation model, which incorporates housing, employment, transport demand and transport infrastructure. Testing with the model allows the outcomes of differing interventions / options to be independently assessed, to identify which perform best across a range of selected criteria.

[55] Early Assessment and Sifting Tool (EAST) Guidance.pdf (publishing.service.gov.uk)

Objective	Metric
Make it safe and attractive to walk and cycle for everyday journeys	The model will respond to differing charge levels that will make driving less competitive relative to active modes. Changes in active mode demand is therefore a response to the charge although the reduced traffic levels associated with the charge would make walking and cycling safer and more attractive. The metric is change in the number of active travel trips to, from and within the charged area in 2026 compared to the 2026 baseline
Support decarbonisation of transport and improvements to air quality	At OAR stage the transport model is used as a proxy to reflect the impact of the options on air quality and decarbonisation. Regarding decarbonisation, comparisons of the options against the 2026 baseline are used for the whole modelled area. In terms of air quality, the comparisons should be made against the charged area (as this is where the impacts on air quality will be felt the most) and the information reported for the traffic objective applies. The metric is, as a proxy, the change in levels of traffic (PCU KM) in the charged area in 2026 compared to the 2026 baseline
Make Greater Cambridge a more pleasant place to live, work travel or just be	The model will respond to the charge as well as changes in public transport affordability and connectivity by decreasing demand for car travel and increasing demand for travel by other modes. In this context, fewer cars would make Greater Cambridge a more pleasant place to live and work. The metric is change in the number of car trips to, from and within the charged area in 2026 compared to the 2026 baseline

Second sift results

6.3.3. The forecast impacts of the ten different options can be found in Table 6-3. It is evident that, of the options modelled, the greater the charge and longer its hours of operation, the greater the level of traffic reduction and revenue generation. This, however, needs to be considered against the policy objectives and outcomes that Making Connections is seeking to achieve.

6.3.4. In summary the STZ charge options (previously known as the flexible charge in work undertaken before 2022) appear to perform better against the objectives. The parking charge required to achieve traffic reduction represents a higher increase in costs to users and businesses compared to the £5 STZ charge. A £10 per day WPL would be approximately £2,500 a year based on 250 working days. This is about five times of the current charge in Nottingham[56]. A £10 a day increase in parking charges could also be

[56] The cost per workplace parking place for the licensing year for 2023 - 2024 is £522 for employers who provide 11 or more liable places.

problematic in terms of acceptability, particularly if applied to all current publicly available parking.

6.3.5. As shown in Table 6-2, Table 6-3 and Table 6-4, the parking charges also require a far higher level of trip reduction to achieve the traffic reduction target.

6.3.6. The forecast traffic impacts of the three categories of priced demand management options covered in the sifting stage were also explored based on CSRM data for the 12-hour period from 7AM to 7PM.

Table 6-3 – Sifting results

		STZ Charge				Pollution Charge				Parking Charge	
		2026 City access A £5	2026 City access A £10	2026 City access A £5 AM Only	2026 City access A £10 AM Only	2026 City access A £5	2026 City access A £10	2026 City access A £5 AM Only	2026 City access A £10 AM Only	High level of WPL passed on	Lower level of WPL passed on
Strategic	Scale of impact	High	High	Medium	Medium	High	High	Medium	Medium	High	Med/High
	Fit with wider objectives	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong	Strong
	Contribute to the GCP objective to reduce traffic by 15% from the 2011 baseline, freeing up road space for more public transport services, and other sustainable transport modes	-27%	-44%	-3%	-9%	-24%	-42%	-2%	-12%	-18%	-12%
	Ensure public transport is more affordable, accessible and connects to where people want to travel, both now and in the future	65%	87%	44%	53%	62%	84%	42%	52%	82%	69%
	Raise the money needed to fund the delivery of transformational bus network changes, fares reductions and improved walking and cycling routes	Yes	Yes	No	No	Yes	Yes	No	No	No	No
	Make it safe and attractive to walk and cycle for everyday journeys	27%	42%	8%	10%	26%	40%	8%	10%	15%	12%
	Support decarbonisation of transport and improvements to air quality	-2.1%	-3.2%	-0.9%	-1.2%	-1.9%	-3.1%	-0.8%	-1.1%	-0.5%	-0.1%

		STZ Charge				Pollution Charge				Parking Charge	
		2026 City access A £5	2026 City access A £10	2026 City access A £5 AM Only	2026 City access A £10 AM Only	2026 City access A £5	2026 City access A £10	2026 City access A £5 AM Only	2026 City access A £10 AM Only	High level of WPL passed on	Lower level of WPL passed on
	Make Greater Cambridge a more pleasant place to live, work travel or just be	-50%	-69%	-21%	-26%	-48%	-67%	-20%	-25%	-44%	-39%
Economic	Economic growth	Green	Green	Amber / green	Amber / green	Green	Green	Amber / green	Amber / green	Amber / green	Amber / green
	Carbon emissions	Green	Green	Amber / green	Amber / green	Green	Green	Amber / green	Amber / green	Amber / green	Amber / green
	Socio-distributional impacts	Green	Amber / green	Amber / green	Amber / green	Green	Amber / green	Amber / green	Amber / green	Amber / green	Amber / green
	Local environment	Green	Green	Amber / green	Amber / green	Green	Green	Amber / green	Amber / green	Amber / green	Amber / green
	Wellbeing	Green	Green	Amber / green	Amber / green	Green	Green	Amber / green	Amber / green	Amber / green	Amber / green
Management	Public acceptability	Medium / high	Medium / high	Medium / high	Medium / high	Medium / high	Medium / high	Medium / high	Medium / high	Medium / low	Medium / low
	Practical feasibility	Medium / high	Medium / high	Medium / high	Medium / high	Medium / high	Medium / high	Medium / high	Medium / high	Medium / high	Medium / high
Financial	Generate sufficient net revenues to fund transformation of the bus service	Yes	Yes	No	No	Yes	Yes	No	No	No	No
Commercial	Flexibility	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

6.3.7. Table 6-4 assesses how the STZ charge options perform against the overall programme aims and strategic objectives.

Table 6-4 – STZ charge: sifting results against the programme aims

Strategic Objectives	Narrative
Contribute to the GCP objective to reduce traffic by 15% from the 2011 baseline, freeing up road space for more public transport services, and other sustainable transport modes	The £5 all-day option would decrease traffic in the charged area by 27% whilst the £10 all-day charge would decrease traffic in the charged area by 44%. The options that include the all-day charge both perform better than the morning peak only options.
Ensure public transport is more affordable, accessible and connects to where people want to travel, both now and in the future	The £5 all-day option would increase public transport passengers to, from and within the charged area by 65% whilst the £10 all-day charge would increase public transport passengers by 87%. The options that include the all-day charge both perform better than the morning peak only options.
Raise the money needed to fund the delivery of transformational bus network changes, fares reductions and improved walking and cycling routes	The all-day charges would meet revenue requirements whilst the morning only charges would not.
Make it safe and attractive to walk and cycle for everyday journeys	The £5 all-day option would increase active mode demand to, from and within the charged area by 27% whilst the £10 all-day charge would increase active mode demand by 42%. The options that include the all-day charge both perform better than the morning peak only options.
Support decarbonisation of transport and improvements to air quality	The £5 all-day option would result in traffic across the modelled area decreasing by 2.1% and thus there would be less carbon as a result. The £10 all-day charge would result in traffic across the modelled area decreasing by 3.2% The options that include the all-day charge both perform better than the morning peak only options.
Make Greater Cambridge a more pleasant place to live, work travel or just be	The £5 all-day option would decrease car demand to, from and within the charged area by 50% whilst the £10 all-day charge would decrease car demand by 69%. The options that include the all-day charge both perform better than the morning peak only options.

6.3.8. Interpreting the forecast results against the programme aims, for the pollution charge options:

Table 6-5 – Pollution charge: sifting results against the programme aims

Strategic Objectives	Narrative
Contribute to GCP objective to reduce traffic by 15% from the 2011 baseline, freeing up road space for more public transport services, and other sustainable transport modes	The £5 all-day option would decrease traffic in the charged area by 24% whilst the £10 all-day charge would decrease traffic in the charged area by 42%. The options that include the all-day charge both perform better than the morning peak only options.
Ensure public transport is more affordable, accessible and connects to where people want to travel, both now and in the future	The £5 all-day option would increase public transport passengers to, from and within the charged area by 62% whilst the £10 all-day charge would increase public transport passengers by 84%. The options that include the all-day charge both perform better than the morning peak only options.
Raise the money needed to fund the delivery of transformational bus network changes, fares reductions and improved walking and cycling routes	The all-day charges would meet revenue requirements whilst the morning only charges would not. As vehicles switch to lower polluting vehicles, the net revenue would fall.
Make it safe and attractive to walk and cycle for everyday journeys	The £5 all-day option would increase active mode demand to, from and within the charged area by 26% whilst the £10 all-day charge would increase active mode demand by 40%. The options that include the all-day charge both perform better than the morning peak only options.
Support decarbonisation of transport and improvements to air quality	The £5 all-day option would result in traffic across the modelled area decreasing by 1.9% and thus there would be less carbon as a result. The £10 all-day charge would result in traffic across the modelled area decreasing by 3.1% The options that include the all-day charge both perform better than the morning peak only options.
Make Greater Cambridge a more pleasant place to live, work travel or just be	The £5 all-day option would decrease car demand to, from and within the charged area by 48% whilst the £10 all-day charge would decrease car demand by 67%. The options that include the all-day charge both perform better than the morning peak only options.

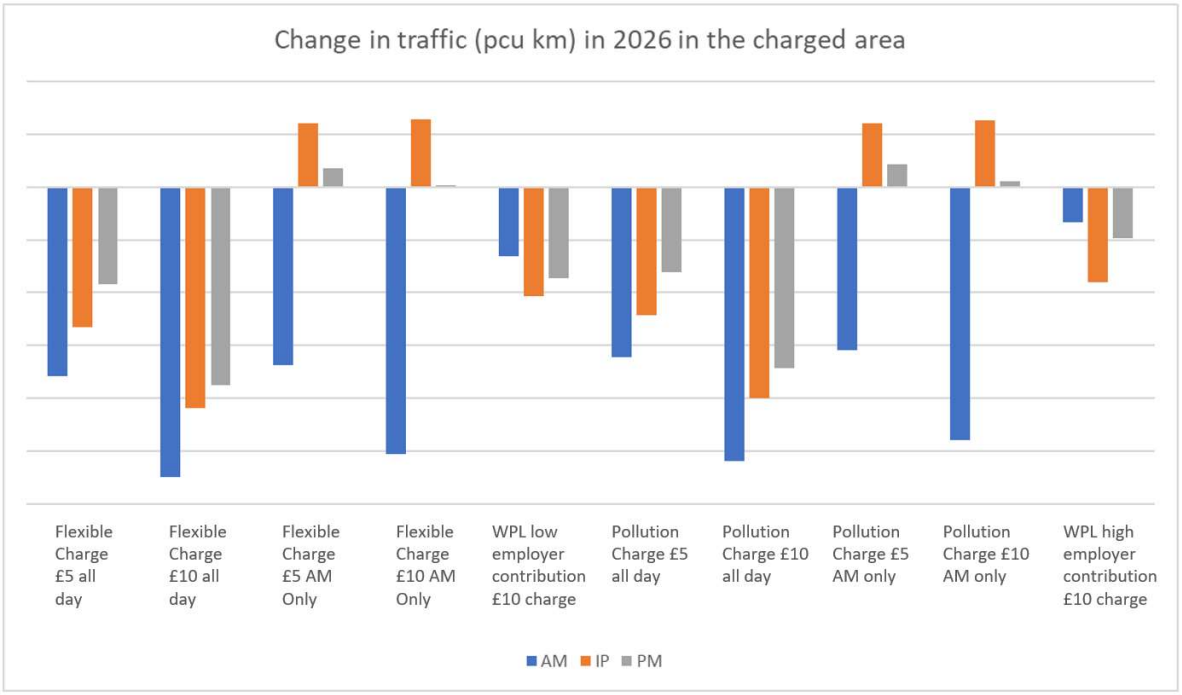
6.3.9. Interpreting the forecast results against the programme aims, for the parking charge options:

Table 6-6 – Parking charge: sifting results against the programme aims

Strategic Objectives	Narrative
Contribute to GCP objective to reduce traffic by 15% from the 2011 baseline, freeing up road space for more public transport services, and other sustainable transport modes	The core test would decrease traffic in the charged area by 18% whilst employers paying more of the levy would decrease traffic in the charged area by 12%.
Ensure public transport is more affordable, accessible and connects to where people want to travel, both now and in the future	The core test would increase public transport passengers to, from and within the charged area by 82% whilst employers paying more of the levy would increase public transport passengers by 69%.
Raise the money needed to fund the delivery of transformational bus network changes, fares reductions and improved walking and cycling routes	The £10 charge, which has been modelled to include WPL as well as all public car parking spaces and retail spaces, could raise sufficient revenue. However, the WPL charge at £10/day would be an annual charge of £2500, which is nearly five times the rate in Nottingham.
Make it safe and attractive to walk and cycle for everyday journeys	The core test would increase active mode demand to, from and within the charged area by 15% whilst employers paying more of the levy would increase active mode demand by 12%.
Support decarbonisation of transport and improvements to air quality	The core test would result in traffic across the modelled area decreasing by 0.5% and thus there would be less carbon as a result. Employers paying more of the levy would result in traffic across the modelled area decreasing by 0.1%.
Make Greater Cambridge a more pleasant place to live, work travel or just be	The core test would decrease car demand to, from and within the charged area by 44% whilst employers paying more of the levy would decrease car demand by 39%. (doesn't seem correct and contradicts traffic impacts)

6.3.10. Overall, both parking charge options are forecast to have a smaller effect on reducing traffic in the charge area, with the smallest impact in the morning peak (AM) period (see Figure 6-4). It is evident that in the AM period the impact of the all-day STZ charge and AM only charge is very similar. However, outside the AM peak period, traffic returns to non-charging levels or above for the rest of the day although a slight reduction in evening peak traffic can be observed – reflecting the impact an AM only charge would have on commuting trips compared to the all-day charge. This indicates that the all-day charge will deliver traffic reduction benefits throughout the day and would allow the reallocation of road space to buses and active modes.

Figure 6-4 - Reduction in traffic across the day - compared to the Do Nothing scenario in 2026



6.3.11. Figure 6-5 and Figure 6-6 show the impact from different options on trips both into and within the charging area across all modes of transport, instead of just highway traffic presented in Figure 6-4.

6.3.12. These suggest that the parking charge regime appears to be a less targeted tool for reducing highway traffic, and in doing so is having greater level of reduction in travel demand into and within Cambridge city. Conversely, the flexible charging scheme is achieving higher levels of highway traffic reduction (as shown in Figure 6-4) whilst having a lower impact on overall travel demand (as shown in Figure 6-5), including increasing total trips across all modes within the charging area (as shown in Figure 6-6).

6.3.13. From the perspective of supporting economic growth, options that reduce total travel demand are arguably more likely to reduce economic activities within Cambridge. The all-day charge has a lesser impact on trips into the zone (by all modes) and increases levels of active modes in terms of trips within the zone. In addition to its wider health and well-being benefits, this shift in travel behaviour (i.e., increase in active modes) could have a positive economic impact, given the wider evidence in terms of economic spending by active mode users as captured in the Pedestrian Pound report by Living Streets[57].

[57] pedestrian-pound-2018.pdf (livingstreets.org.uk)

Figure 6-5 - Change in total trips to the charge area (All modes, 7AM-7PM weekday, 2026 & 2031)

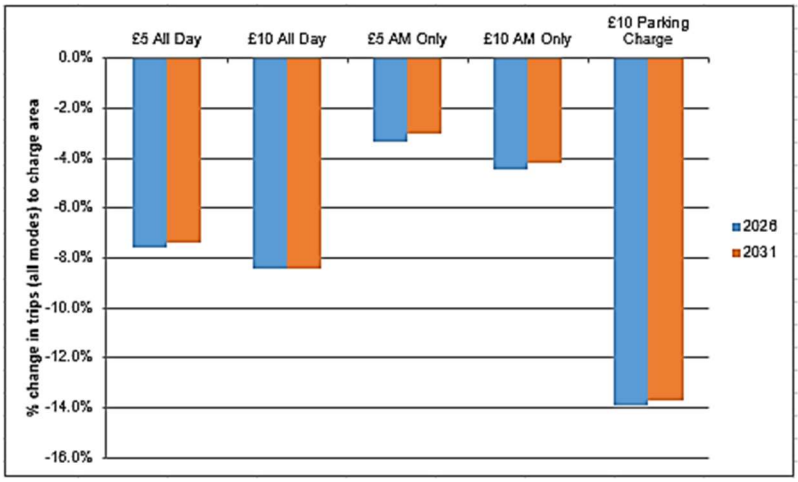


Figure 6-6 - Change in total trips within the charge area (All modes, 7AM-7PM weekday, 2026 & 2031)

6.3.14. The parking charge option reduces more trips both into the zone and within the zone. The all-day charge options increase trips within the zone across all modes, with a significant increase in walking and cycling as the main reason behind this growth.

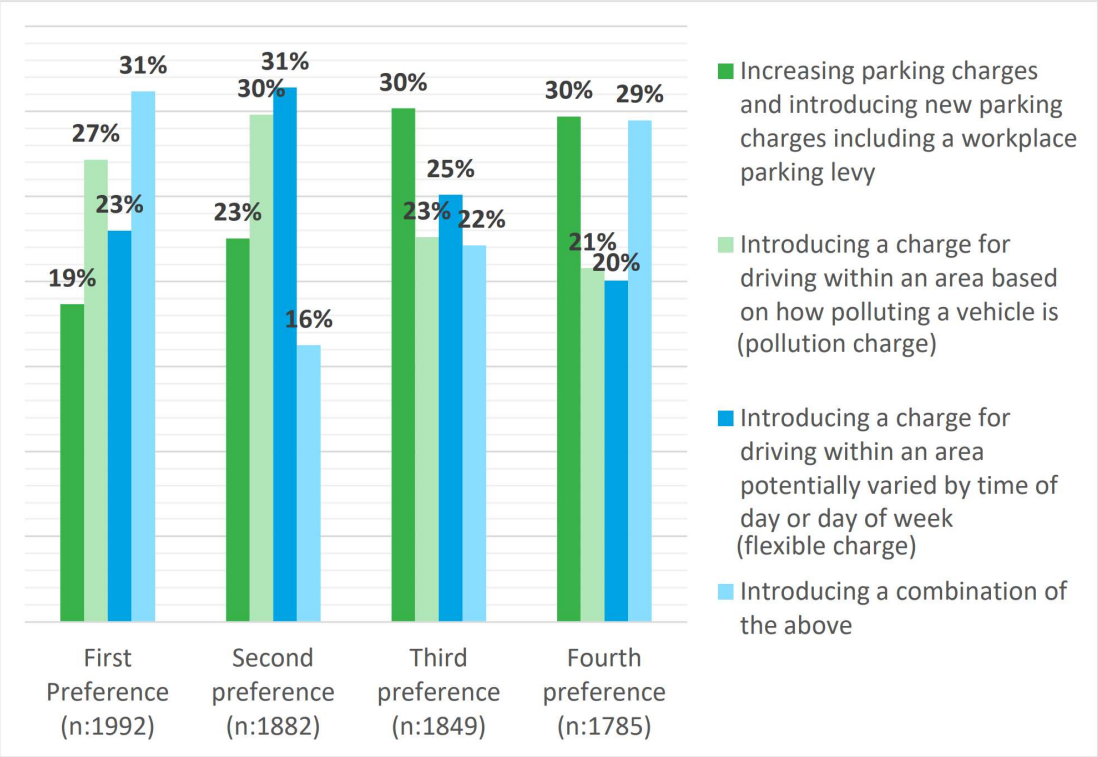
Alignment with 2021 consultation findings

6.3.15. Findings from the sifting also appear to broadly align with findings from the Making Connections consultation carried out in November and December 2021, which sought views on proposals for improvements to the bus network and measures to prioritise road space for sustainable transport and provide an ongoing funding source for improvements.

6.3.16. Outcome from this consultation also indicates a preference, across the charging options considered, for the flexible charging zone options[58].

6.3.17. Figure 6-7 sets out respondents' preferences to each of the three individual charging options, which are also featured in all options sifted in the option development process. It is clear from this figure that options that involved charging cars for driving in an area, such as a flexible charge or pollution charge, were preferred to options involving additional or new parking charges.

Figure 6-7 - Preferences for charging options to fund and deliver sustainable transport improvements[59]



Emerging road user charge option

6.3.18. Findings from the aforementioned analysis on the three road user charging options have been considered and incorporated into the recommendations to the Greater Cambridge Partnership Joint Assembly held in September 2022. This builds on sifting undertaken against the strategic objectives of Making Connections and feedback from the 2021 consultation, as summarised so far in this sub section. It was concluded that:

- **Parking charges are less targeted or effective** – Of the three options consulted in 2021, the parking charges option (higher parking charges and introduction of a WPL)

[58] Source: GCP Making Connections Project Summary: https://www.greatercambridge.org.uk/sustainable-transport-programme/city-access-programme/making-connections

[59] Council and committee meetings - Cambridgeshire County Council > Meetings (cmis.uk.com)

targets only a limited number of travellers. Therefore the overall impact of this option is typically less than the all-day charges in the flexible and pollution charge options, even with a higher level of charge at £10 (compared with areas with existing WPL arrangement). The parking charges options received the least support as part of the consultation

- **Business impacts of parking charge option** – the parking charges option, particularly its WPL element, has adverse impact on businesses that have a large workforce, e.g. staff on Cambridge Biomedical Campus, University of Cambridge. Smaller businesses may be disproportionately negatively affected because they may not have access to large car parks compared to larger businesses. This could, however, be mitigated against through exempting small businesses with less than 10 space as they do in Nottingham

- **Area charge options are effective and do not constrain multimodal travel demand** – Both a pollution-based and a congestion-based road user charge would provide a greater reduction in traffic levels than parking charges and would also lead to congestion reductions and reliable journey times, which will benefit bus passengers. These options achieve this with a lower impact on overall travel demand (across all modes of transport) than the parking charges and achieve higher levels of increases in active travel in the proposed charge zone

- **Pollution charge may not provide long term benefits or financial sustainability** – A congestion-based road user charge achieves a stronger strategic fit with the scheme objectives than the pollution charge, as the former applies to all users contributing to traffic congestion. In the case of pollution charge, in the shorter term it would place the greatest cost on those with low incomes who are less able to afford electric vehicles, whilst in the medium to long-term, the impact of electric vehicle fleet (exempted from pollution charge) uptake would also rapidly erode the traffic benefits and net income. As such a pollution charge is likely to have shorter term benefits and may not provide the ongoing revenue to fund the public transport and sustainable transport measures

- **Business impacts of pollution charge option** – Businesses that rely on using light goods vehicles (LGVs) and HGVs may be negatively impacted if they have older vehicles that need to be upgraded / replaced – possible disproportionate impact on independent traders versus larger businesses, and older, smaller businesses if they have to bear the cost of replacing vehicles

- **STZ charge remains flexible and adaptable** – With a charge within the STZ, it is still possible to design the charging regime for different vehicle types that may have high vehicle mileage in the zone, such as freight, taxis and buses to influence and speed up the transition to low carbon propulsion

- **AM charge only is likely to be inadequate** – Options that include an all-day (7AM-7PM) charge perform better than those that only charge morning peak hours (7AM-10AM). An AM peak only charge is unlikely to meet the objectives for the scheme

- **High charge may be disproportionate –** Regarding the level of charge, a £5 charge applied all-day would achieve both the required level of traffic reduction and funding for the transformational bus package. A £10 charge applied all-day would reduce traffic and

raise funding beyond the policy need. A higher charge would, therefore, be disproportionate to the policy need, placing a higher financial burden than necessary on road users.

6.3.19. Taking together the findings above, a core option of road user charge of £5 applied 7AM-7PM on weekdays was recommended to and accepted by the Joint Assembly and Executive Board in 2022. This is a Sustainable Travel Zone (STZ) comprising network wide public transport improvements, complementary measures and a road user charge, which is based on the STZ charge consulted on in 2021. This emerging option was taken forward into the SOC. A further consultation was carried out in late 2022 to support the more detailed development of the proposals and to formulate more specific options for appraisal beyond the SOC stage. At this stage the wider issues regarding the impacts of the global cost of living crisis were noted, and together with feedback from the public consultation it was decided to reconsider the “under £5” charge option alongside the alternative charge options for the purposes of preparing the OBC. This is discussed further in Chapter 7which details the analysis that has been undertaken in 2023 to consider the consultation responses and further develop the scheme.

7. Developing and assessing options

7.1. Context and purpose

7.1.1. The purpose of this section is to consider the key issues and themes that were identified in the 2022 consultation on Making Connections and sets out how changes have been considered to the Sustainable Travel Zone to develop three scenarios to take forward for further consideration as development of the Outline Business Case.

7.1.2. The purpose of this further option development is to progress the Making Connections programme from the sifting stage and the SOC to more specific options, to refine scheme parameters and rules by taking onboard feedback from the latest consultation and findings from the technical assessments, and to confirm the scenarios for more detailed and robust appraisal at the OBC stage.

7.1.3. Findings from the sifting stage, as documented in Section 6.3, demonstrate that a STZ including a flexible area charge would be the best option to achieve the strategic objectives (compared with the other two charging options). This recommendation was discussed at the GCP Joint Assembly and endorsed at the GCP Executive Board in September 2022. It was agreed that the identified package should go to public consultation in late 2022 to seek feedback on the proposed enhancements to public transport services, wider sustainable transport investment, and the STZ charging parameters and rules (see Section 7.2 for charging parameters and rules).

7.1.4. The consultation was carried out from October to December 2022 therefore covered the introduction of a STZ in the form of road user charging. Under this proposal, vehicles would be charged for driving within the zone between 7AM and 7PM on weekdays, and money raised would fund improvements to the bus network and sustainable travel schemes. The STZ would be gradually introduced starting from 2026 and is intended to be fully operational in 2027/28. The timings are still subject to further discussions as part of the development of the OBC.

7.1.5. The charge would apply to all motorised vehicles, unless they are exempt, that move into, out of or within the zone, not just those crossing the boundary. Exemptions would include emergency vehicles, disabled tax class vehicles and breakdown services, dial a ride services and local authority operational vehicles. Blue badge holders would also get 100% discount for two vehicles and a taper discount was offered for people on low incomes.

7.1.6. A reimbursement scheme was considered for certain journeys that cannot be made by another form of transport, such as NHS patients accessing A&E, or NHS patients clinically assessed as being too weak, ill or disabled to reasonably travel to an appointment using public transport. Staff working for the NHS carrying specialist equipment or times as well as social care and community health workers and registered charity vehicles would also be able to apply for reimbursement to refund the STZ charge.

7.1.7. A total of 24,071 respondents answered the feedback questionnaire. Detailed analysis of the consultation can be found in the published consultation report[60].

[60] https://www.greatercambridge.org.uk/sustainable-transport-programme/city-access-programme/making-connections/making-connections-2022

7.1.8. A range of potential areas for improvement or to address emerged from the consultation feedback. The key themes are outlined in Table 7-1.

Table 7-1 – Consideration in the OAR of the key responses from the 2022 consultation

Top consultation response themes	How this is taken forward as part of this OAR
Residents should be exempt	As set out in the 2022 consultation, residents make up about half of the car trips in the morning peak and most car trips within Cambridge across the proposed 7AM to 7PM period. For this reason, exemptions or discounts for residents are not being considered as it would have a significant impact on traffic reduction and reduce the ability to fund the public transport, walking and cycling improvements. Long term exemptions for residents who do not quality for any of the discounts exemptions and reimbursements (DERs) are not being considered as this would not deliver the scale of traffic reduction required to deliver the scheme objectives. However, the inclusion of 'free days' (where some account holders are entitled to a number of days where they are exempt from the charge) during the initial phasing in of the scheme could enable people to adapt their travel behaviours over time and once confidence in the public transport offer is reached. This would have the impact of essentially delaying some of the benefits of the scheme, and depending on account take-up may lessen the benefits of the scheme initially.
Unfair or discriminatory / proposed exemptions don't go far enough	Impact on older people, those with mobility impairments or who find using public transport difficult. In addition to the existing discounts, exemptions and reimbursements, further possible measures have been considered as part of this OAR.
STZ area too large	As set out in the September 2022 Executive Board papers, the previous consultation in 2020 showed a preference for a lower charge over a larger area. However, a key theme coming out of the consultation from 2022 was that the proposed zone was too large, and should just cover the City Centre area. Any alternative smaller zone would also need to be defined to ensure that cars have a safe opportunity to avoid the charge by taking an alternative route. Given the layout of the road network in the city the likely only alternative would be a charge that applied within (but not including) the inner ring road. At present that area accounts for approximately 15% of traffic on the city networks, so a zone of that scale would not address the congestion problem and would likely cause substantial displacement and worsening of congestion on key other city routes such as Coldhams Lane. In this report, however, options have been considered for accessing the NHS services at Addenbrooke's/Royal Papworth

Top consultation response themes	How this is taken forward as part of this OAR
	as a major edge of city location that people need to visit. As part of the OBC consideration should be given as to whether other locations should benefit from a similar discount scheme.
Concern about accessing essential services / hospital. Should Addenbrooke's (and other hospitals) be in the zone	Options have been considered for accessing NHS services at Addenbrooke's/Royal Papworth within this report (via the Discounts, Exemptions, Reimbursements route). It is not considered feasible to remove the site from the zone without excluding the wider Cambridge Biomedical Campus (CBC) site. As part of the OBC consideration should be given as to whether other locations should be benefit from a similar discount scheme.
Concern for low-income	A lower income discount was proposed to as part of the 2022 consultation. It is further considered in this report at Section 7.2.
Hours should be reduced	Reductions in STZ operating hours to peak hours only are considered in this report. Other changes such as phasing in the STZ over a longer period of time, or finishing the charging zone earlier, are not specifically considered in the options appraisal but could be considered as part of the decision-making process.
Bus services must be reliable / punctual	The potential impact of changes bus services is considered in this report.
Concerns about the impact on businesses / self employed	Options have been considered to mitigate the impact of an all-day charging scheme on businesses (these are discussed Section 7.2).
Charge for cars and vans is too high, whether motorbikes should be liable to pay	Options for reduced charges are considered within the report, including not charging motorbikes.
Concern about impact of scheme on informal and unpaid careers	Exemptions for unpaid careers are included in the DER considerations contained within this report.
Should electric vehicles be exempt or receive a discount	Not considered as this scheme has the primary objective of reducing congestion and this would potentially undermine the objective of the scheme to reduce congestion, to which all vehicles contribute.
Concerns about long linked journeys on public transport	Noted but not specifically addressed in this report.
Alternative means of funding should be considered	Noted but not specifically addressed in this report.

7.1.9. Alongside the public consultation exercise, GCP commissioned a representative study of residents in the Cambridge travel to work area to understand better the views of local

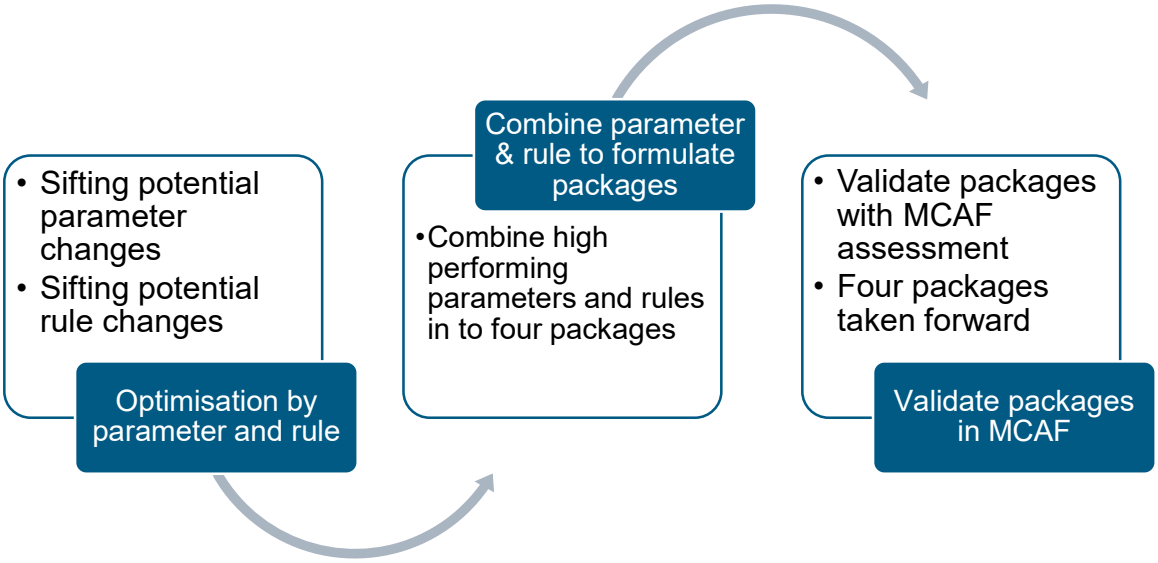
residents, rather than just those who chose to respond to the consultation. This used the same questions as the consultation document. Within this separate study, the respondents who were opposed or unsure about the introduction of an STZ were asked views on how they could be persuaded to alter their views if changes to the scheme were made. The top proposed changes (in order of support) included reduced charge rates for car, smaller charging boundary, more discounts and exemptions, shorter hours of operation, and lower charge rate for HGVs and LGVs. These broadly align with the top themes from the wider consultation analysis.

7.1.10. To develop the scenarios recommended in the OAR, firstly changes to scheme parameters have been considered (see Section 7.2 for the scheme parameters and rules). Secondly, additional changes to the scheme rules have also been considered to further address concerns, principally through additional discounts, exemptions or reimbursements.

7.1.11. It should be noted that there are a significant range of permutations of combinations of changes to scheme rules and parameters. The aim of this update of the OAR is not to recommend fixed packages, but to ensure a range of scenarios covering a range of potential interventions are taken forward to the OBC stage.

7.1.12. It is recognised that there may be a need for further work on considering any ‘fine tuning’ of both the parameters and scheme rules throughout the development of an OBC, the detailed assessments involved in preparing the Full Business Case, and the implementation of the scheme. Figure 7-1 illustrates the overall approach to further option development in 2023 after the sifting stage (Section 6.3) and completion of the Making Connections consultation in 2022.

Figure 7-1 - An overview of further option development post 2022 consultation



7.2. Optimisation by parameter and rule

7.2.1. The further option development undertaken in 2023 firstly approached optimisation of the consulted proposal in a logical order, and categorised findings from the consultation (Table 7-1) into the following two groups for separate assessment:

- **Changes to the scheme parameters**, such as (but not limited to) changes to the hours, opening years, phasing, charge rate, boundary location. These are the changes that feed primarily into option development, setting the foundations of the potential charging scheme
- **Changes to the scheme rules**, such as changes to discounts, exemptions, reimbursements and users accounts. These are considered secondly as the nature of any changes could be added onto any of the main options under consideration.

7.2.2. Consideration of potential changes to the parameters or rules is mainly based on the potential of individual changes to balance their ability in:

- Addressing consultation feedback and learnings from other early-stage assessments
- Maintaining benefits and delivering objectives.

7.2.3. It is noted that these two aspects (parameters vs rules) are not mutually exclusive and have been considered together in order to create scenarios that addresses the concerns raised in the consultation.

7.2.4. Changes to scheme parameters were firstly considered:

a. **Reducing the hours of operation**: many respondents feel the proposed STZ charging hours do not allow for people to move around at times of lower congestion. Consideration of reducing the chargeable hours was therefore revisited (potentially to morning peak only, or morning and evening peaks).
b. There is also an option to **phase in the STZ over a longer period.** The consultation proposed beginning to gradually phase in the STZ by introducing peak hour charging ahead of all-day charging over a period of two years. This phasing in period could be extended either for a fixed number of years, or by analysing whether or not traffic begins to rise to unsustainable levels during the inter-peak hours.
c. It would also be possible to make smaller tweaks to the hours of operation, such as **finishing the charge earlier**, say at 6PM rather than 7PM. This would enable a number of social, leisure, shopping and caring trips to happen outside of the hours of charging.
d. **Reduced charge rates**: reducing the charge rate for all types of vehicles was raised as one of the issues that has the potential to change people's opposition to the zone. A reduction in the charge to £3 (as part of an AM and PM peak only option) was therefore considered, and ongoing consideration of charges for LGVs and HGVs will continue as the development of the Outline Business Case progresses in the next stage.

7.2.5. A small number of other changes suggested by consultation feedback have also been considered in the option assessment. It was concluded that these cannot be taken forward as explained below.

a. **Reduce the size of the zone to the city centre only** – Any alternative smaller zone would need to be defined to ensure that cars have a safe opportunity to avoid the charge by taking an alternative route. Given the layout of the road network in the city the likely only alternative would be a charge that applied within (but not including) the inner ring road. At present that area accounts for approximately 15% of traffic on the city network so a zone of that scale would not address the congestion problem and would likely cause substantial displacement and worsening of congestion on other key city routes such as Coldhams Lane.

   The June 2021 report on the 2020 consultation[61] also showed stronger support for a lower charge over a larger area.

   For these reasons, reducing the size of the zone has not been taken forward.

b. **Remove the Cambridge University Hospital site from the zone** – removing the hospitals from the STZ area would raise several practical and policy issues that may not be possible to resolve. However, the possibility of exempting all hospital patients and their visitors as an alternative – a 'virtual' removal – could be explored further as a potential additional discount or exemption (see below).

   The Cambridge Biomedical Campus (CBC) on which the hospitals are located is a large traffic generator in the south of the city and on the wider road network, and the site of significant future job (and travel) growth. It is not likely to be possible to remove the hospitals from the zone without also excluding the wider CBC and main approaching

[61] https://www.greatercambridge.org.uk/asset-library/Sustainable-Transport/Sustainable-Travel-Programme/City-Access/Making-Connections/GCP-Making-Connections-report-13June22.pdf

roads. Removing the CBC would therefore mean taking a large 'wedge' out of the proposed STZ with significant traffic implications for surrounding residential areas. Or reverting to an inner ring road boundary as discussed above. Moreover, taking the CBC out of the zone would not fully address the consultation concern about paying to access the hospitals. Whilst it would mean that those living outside the zone (in Cambridgeshire and beyond) could drive to the hospitals without incurring a charge, residents of the zone (in the City of Cambridge) would still to pay to access the hospital, because their start point would be within the STZ.

For these reasons, removing the Cambridge University Hospitals from the scheme has not been taken forward.

7.2.6. Taking these options into consideration, in addition to the original proposal of all-day charge in the consultation, five alterations to scheme parameters have been identified.

7.2.7. In addition to the original proposal of all-day charge in the consultation, six alterations to scheme parameters have been identified. These were assessed against a range of criteria as shown in Table 7-2.

7.2.8. After considering the findings presented in Table 7-2 it was considered that the AM peak only scheme would fall too short of delivering the objectives of reducing traffic and transform the bus network. The variable charge option is likely to be too complex to communicate to users and could lead to enforcement challenges, and the longer AM phase option and the 6pm finish option were not considered to significantly address the concerns raised during the consultation. Nonetheless, it is recognised the refinement of charging scheme hours could be further considered at the next stage of the project through the development of the OBC.

7.2.9. Therefore, the AM and PM peak charge options (including the lower charge variant) were taken forward, along with the original consultation proposal for comparison purpose.

7.2.10. Although the lower charge had initially been excluded at the pre-sifting stage, based on it's likely inability to provide sufficient funding for the investment in public transport services, concerns about affordability of the charge during the cost of living crisis raised through consultation have led to further consideration of whether a lower charge could be supported. A lower level of public transport intervention which the lower charge could fund has therefore been identified as an intermediate option for further consideration.

7.2.11. The do-nothing scenario will also be considered as part of the OBC so all the scenarios for change are considered against taking no action.

7.2.12. Changes to scheme rules were also explored, which mainly relate to changes to discounts, exemptions, and reimbursements (DERs). Table 7-3 list DERs that were included in the 2022 consultation. Additional potential DERs identified and considered since the 2022 public consultation are shown in Table 7-4.

7.2.13. Table 7-5 outlines a high-level assessment of the potential impacts from the potential DERs on:

- The extent to which it addresses consultation
- The complexity of scheme
- The enforceability

- Social and distributional impacts
- Preliminary delivery assessment.

7.2.14. **Low-income discount**: The proposals as set out in the consultation already included a discount for those on a lower income to be considered further on the basis of consultation feedback. Many of the consultation responses to the survey and through stakeholder meetings or organisational responses nevertheless flagged the impact on those on lower incomes as a key concern. If the decision was taken to progress the STZ, further work would consider how a low-income discount could be best designed and administered. This would incorporate feedback, suggestions and evidence from the consultation.

7.2.15. Groups which were applicable for reimbursements in the consultation proposal included:

- NHS patients clinically assessed as too ill, weak, or disabled to travel to an appointment on public transport, including those who:
  - Have a compromised immune system
  - Require regular therapy or assessments
  - Need regular surgical intervention.
- NHS patients accessing Accident and Emergency Services
- NHS staff using a vehicle to carry certain items (such as equipment, controlled drugs, patient notes or clinical specimens), or responding to an emergency when on call
- NHS and other emergency services staff responding to an emergency when on call
- Other essential emergency service trips made in business vehicles that are not specifically listed above for exemptions, e.g., fire safety inspections
- Social care, peripatetic health workers and Care Quality Commission (CQC) registered care home workers
- Minibuses and LGVs used by charities and not-for-profit groups.

Table 7-2 – Changes to scheme parameters considered against the consultation proposal

Options	Reduces Traffic	Public Transport: a) Accessible and affordable b) Raises funds needed	Safe and attractive to walk and cycle	Extent to which it addresses consultation feedback	Complexity of scheme to user / Enforceability	Social and distributional impacts
Consultation proposal	Up to 50% less traffic than otherwise	Delivers full bus package with £50m spend	Reduces traffic and provides £15m a year for sustainable transport	NA	NA	NA
AM peak only	Up to 50% less in AM peak	Would require a different and reduced bus package	Reduces traffic but unlikely to provide funding for sustainable transport	Charging scheme – improvement Benefits – peak mainly Bus package – revised; still transformational	No change	Mixed
AM and PM peaks	Up to 50% less in peak periods, potentially higher in-between	Will require reductions in bus package	Reduces traffic, potentially somewhat less funding available for sustainable transport	Charging scheme – improvement Benefits – high traffic between peaks Bus package – reduced; still transformational	More complex	Mixed
AM and PM peaks & lower charge	Less reduction than the above but still significant	Require further reductions in bus package	Reduces traffic, potentially somewhat less funding available for sustainable transport	Charging scheme – improvement Benefits – high traffic between peaks Bus package – further reduced	More complex	Mixed

Options	Reduces Traffic	Public Transport: a) Accessible and affordable b) Raises funds needed	Safe and attractive to walk and cycle	Extent to which it addresses consultation feedback	Complexity of scheme to user / Enforceability	Social and distributional impacts
Variable charge (lower in off peak)	Up to 50% less in peaks, slightly lower in-between	Potential to deliver the full bus package	Reduces traffic, slightly less funding available for sustainable transport	Charging scheme – improvement Benefits – slightly higher traffic Bus package – reduced; still transformational	More complex	Neutral
All-day 2030 – Longer AM phase	Up to 50% less traffic	Potential to deliver the full bus package	Reduces traffic, same funding as base	Charging scheme – slight improvement with time to adjust	No change	Neutral
6PM Finish (All-day scheme)	Up to 50% less traffic	Potential to deliver the full bus package	Reduces traffic, less funding available for sustainable transport	Charging scheme – slight improvement with earlier finish	No change	Positive
Do-nothing	Congestion not tackled	Transformation of bus network not achievable	Traffic not reduced and no additional funding	Does not deliver against the strong support for improvements to buses and sustainable transport.	N/A	Negative

Table 7-3 – Discounts, exemptions and reimbursements (DERs) included in the consultation documents

DERs by vehicle	DERs by individual or organisation
Emergency services & military	Blue badge holders (2 nominated vehicles)
Breakdown vehicles	Registered care workers
Local authority operational vehicles (e.g. refuse lorries)	Charity workers
Buses	NHS hospital visitors (A&E, chronically ill, immunocompromised, giving birth)
Disabled tax class	People on low incomes
Dial-a-ride services	
Car clubs	
Vehicles used by charities and not for profit groups	

Table 7-4 – Additional proposed DERs in response to consultation

DERs	DERs
Goods vehicles	Healthcare visits (beyond what's already proposed
Small businesses	Unpaid carers
Traveller sites	Charity volunteers
Groups that can't use PT for specific reasons	Community transport groups[62]
Residents living near to the boundary travelling outbound	Free travel for all patients and visitors to hospitals

7.2.16. A broad set of proposals for discounts, exemptions and reimbursements (DERs) was set out in the consultation document. If work to develop a STZ were to progress, more detailed design of these would be required taking into account consultation feedback and outputs from technical work including the BIA, EqIA and social distributional impact assessment (SDIA). This includes how the DERs could be administered and the revenue implications of applying any exemptions.

7.2.17. Concerns about the suite of DERs proposed was a common theme in the consultation, and respondents to the demographically representative polling raised changes to the DERs as a top issue that could bring them to change their mind about their opposition to the STZ.

[62] Not for profit groups providing community transport responding to unmet local transport needs

7.2.18. Some key thematic issues that could be addressed in future work relating to DERs are set out in this section. It would not be affordable to do everything set out here at once so there would need to be decisions taken about relative prioritisation. The intention is to set out the broad (but non-exhaustive) scope of options.

7.2.19. A range of potential options for strengthening DERs to address the concerns above have been considered based on an initial high-level qualitative assessment of their implications, as set out in Table 7-5, taking into account local knowledge and existing information available.

7.2.20. It should be noted it would be expected that ongoing refinement to the suite of DERs would continue as part the development of the OBC, right through to finalising the Full Business Case. Ongoing monitoring and evaluation of the impacts would also continue once the scheme is 'live'.

Table 7-5 – Potential changes to scheme rules considered

	Extent it addresses consultation	**Complexity of scheme (administration)**	**Enforceability**	**Social and distributional impacts**	**Preliminary Delivery Assessment**
Free access to hospitals (patients and visitors)*	Positive	Low	Medium**	Positive	Viable
Unpaid carers	Positive	Bespoke/high admin	Difficult	Positive	May not be viable
Charity volunteers	Positive	Bespoke/high admin	Medium	Positive	Viable
Community transport groups	Positive	Medium	Medium	Positive	Viable
Goods vehicles (HGV discounts)	Mixed	Low	Straight forward	Neutral	Viable
Goods vehicles (Emissions discounts)	Mixed	Low	Straight forward	Neutral	Viable
Small businesses	Mixed	Uncertain	Medium	Neutral	Viable
Groups that can't use PT (various)	Positive	Bespoke/high admin	Difficult	Positive	Uncertain
No charges for mopeds/motorbikes	Mixed	Low	N/A	Neutral	Viable
Accounts – free days or discounts Domestic and/or commercial	Positive	Low/Medium	Low	Positive	Viable
Residents near boundary	Mixed	Bespoke/high admin	Difficult	Neutral	May not be viable

* Assume some time limit before and after visit, otherwise daily charge payable e.g.1 hour before entry, 1 hour after departure

** Straight forward for Addenbrooke's/ Royal Papworth but difficult to enforce wider car use on that day so larger a time limit for travel for free travel may be needed (e.g. 1 hour before and 1 hour after). As part of the OBC consideration should be given as to whether other locations should benefit from a similar discount scheme.

7.2.21. The additional requests for DERs that came through strongly in the consultation included:

- **Free access for all hospital patients and their visitors**: This would be in addition to the reimbursements proposed as part of the consultation for accessing health care. It would also be in addition to low-income discounts that were a put forward in the 2022 consultation. The cost of this in terms of lost revenue would be relatively substantial, and the main drawback would be that, as the hospitals are already a significant contributor to congestion, exempting trips would dilute the congestion-reducing impacts of the STZ. Whilst it would have positive social and distributional impacts, the universal applicability of such an exemption or discount means that it is not targeted at the groups that need it most, some of which may already qualify for one of the discounts, exemptions or reimbursements at the consultation stage

- **Exemptions for unpaid carers**: The consultation already included proposals that registered care workers who spend their days going between multiple clients' homes would be exempt. Through the consultation there were concerns from those giving informal and/or unpaid care and whether the STZ charge would prevent or deter them supporting elderly relatives, friends or neighbours. Consideration could be given to whether it is possible to offer an additional discount or exemption. The challenge, which could be considered in a future stage, would be establishing how to define informal caring, reliably identifying those carers, and distinguishing between a 'caring trip' and when it is personal business (that would otherwise be chargeable)

  Eligibility for Carers Allowance would be one such option. Aiming for anything more bespoke may be prohibitively difficult to define, administer and enforce. This would need further careful consideration. An alternative approach might be to issue general account holder free days, but this may be insufficient for those with more frequent responsibilities. Additionally, or alternatively, if the hours of the charge were to be reduced then people who care for others would have more times during the day when they can do so by car without incurring a charge.

- **Charity volunteers and community transport groups:** the consultation already suggested that there would be a discount or exemption for charity vehicles such as minibuses and vans used for trips, transport or deliveries. It would be possible to consider how a charity might also have some allowance for volunteers to use their personal vehicles to support the work of the charity. Again, future work would need to consider whether and how this could be defined, administered and enforced

- **Good vehicles:** Feedback through the consultation and from the Business Impacts Assessment has identified various concerns around the affordability to businesses of these additional charges. Whilst these charges are broadly comparable with several of the clean air zones elsewhere in the UK recognising the size of the Cambridge proposal is far larger than mainly city centre focussed clean air zones it is recommended that options for further refinement of charges for goods vehicles options of free days for business account holders are further considered

- **Groups that cannot use public transport (various reasons):** Through the development of the Equality Impact Assessment, the consultations and ongoing engagement and wider representations there will continue to be specific cases where a bespoke solution may need to be developed. It is acknowledged that ongoing will be

needed to consider the issues and potential solutions for specific groups should a decision be made for a full business case to be developed for the scheme

- **Mopeds and Motorbikes:** Various representations were made around these being charged. Whilst the case for inclusion is still valid, there are significant complexities involved in the detection of motorcycles with rear facing registration plates only, and the weaving of motorbikes between stationary/slow moving traffic. This would increase the scale of the roadside equipment and back office analysis required. Given the relatively low levels of use of powered two wheelers in the Cambridge area it would have relatively limited impact on traffic levels to exclude these groups from the proposals. Should this be decided, it would be recommended that ongoing monitoring and reviewing takes place. Should numbers significantly increase and impact on the realisation of the scheme objectives, this position could be reviewed

- **Free days for account holders**: Allocating 'free' days of car travel to account holders, or a percentage discount on all days, to allow for the many individual circumstances people have raised in which they feel they have no option but to use a car but do not otherwise qualify for an exemption. This might include trips as diverse as taking an elderly parent to a medical appointment; evening leisure activities; carrying bulky parcels to the post office; visiting a DIY shop; volunteering at a food bank; taking a child across town for a sports club; teachers carrying books home for marking; or simply doing a big grocery shop. Giving account holders a budget of free (non-charged) days could achieve a level of flexibility to people's real-life circumstances and reflect a broader range of needs than can be defined through a series of specific individual exemptions. There would be options as to how many free days, whether they were all-day or off peak, whether they should be entirely free or just discounted, and whether they should apply just to residents of the CPCA area, or to all account holders. There would also be choices about whether and how quickly they should taper off over time, as the scheme and the travel infrastructure improvements it enables ramp up. The principle could also be extended to business and charity accounts where, again, there would be potential to target the proportion of free days, for example based on size or location of business, or the nature of the charity. The cost and impact of this would be highly scalable depending how it was defined

  It should be noted that the general approach recommended for the charging scheme is to encourage the uptake of accounts for those regularly using the network. This makes using the scheme easier for individuals and enhance the operational efficiency. Regardless of any decisions on free days or discounted days, consideration should be given to how account take up could be incentivised in work post-OBC.

  Unless an explicit decision were taken to the contrary, this would be in addition to the suite of DERs proposed in the consultation, not instead.

- **Residents near the STZ boundary** – this has been raised as an issue in broader public discourse since the consultation, but was not a theme heard strongly in response to the public survey: out of a total of c.145,000 comments, c.1,500 comments were received saying the STZ charge shouldn't apply to people leaving the zone. There are some who live towards the edge of the proposed zone and work outside of it who feel it unfair that they would be liable for a charge for driving a relatively short distance out of the zone. The counter argument would be that all vehicles on the road contribute to traffic, and

congestion with car trips taking up capacity irrespective of direction. Just as investment in public transport services and infrastructure would give those travelling into the zone a viable alternative, those services would run in two directions, and improve journey opportunities for outbound journeys. Further work would consider this in more detail, but it is likely to be challenging to define an exemption or discount that is fair and enforceable without being administratively costly and complex.

7.3. Wider considerations as part of the development of the OBC

7.3.1. It should be noted that there are potentially wider measures, including public transport and sustainable travel interventions that could provide mitigation to specific groups of people. One such example might be targeted reductions to bus travel (over and the general reduction) where it could be used to address specific concerns or group, e.g., retention of key worker staff.

7.3.2. As part of the development of the OBC, consideration should be given to what wider changes could be made to public transport and sustainable transport measures to further mitigate any potential negative impacts from the introduction of the STZ.

7.4. Formulating scenarios

7.4.1. The sifted potential alterations to the charge scheme parameters and rules were combined to formulate three full new scenarios for the STZ of Making Connections, as shown in Table 7-6. All charges in the proposed scenarios are once per day whether travelling in one or both peaks. These options were created with the aim of balancing the consultation feedback with the benefits and ability to deliver the scheme. Including the consultation proposal, these four scenarios represent the culmination of all option development since 2015. The four options (including the consultation option) are intended to offer a foundation for further assessment going forward. Alongside the Do nothing scenario, the scenarios ensure a wide range of possible interventions are being considered.

7.4.2. The most prominent issues raised in the consultation have been considered in the preparation of these scenarios, and details of the extent to which each scenario addresses these is set in Table 7-6.

7.4.3. As well as the ‘Additional elements’ all scenarios in the table below includes the full range of DERs as set out in the consultation proposal.

7.4.4. Additionally, several areas are recommended for further consideration as part of the next stage:

- Removing charges for mopeds/motorbikes
- Consider business impacts research and consultation feedback around HGV and LGV charge levels and how these could be refined
- To consider if there is a mechanism for giving discounts to unpaid carers in receipt of benefits
- To continue to consider discounts for charity volunteers and community groups
- To further consider the impact on residents near the edge of the STZ boundary.

7.4.5. It is considered that these scenarios, alongside the 'bookends' of the consultation and the 'do-nothing' scenario, will provide a wide range of scenarios, impacts and benefits to support a deeper understanding as part of the development of the OBC.

7.4.6. These scenarios will generate different levels of revenue and will therefore support different levels of improvement to the public transport network.

7.4.7. A reduced set of service alterations has also been assumed to complement these scenarios, including Scenario 3 which includes a substantially lower level of charge.

7.4.8. A high-level indication of potential net revenue that could be spent on buses and sustainable transport is shown in Table 7-7. This is based on adjusting the strategic outline case revenues down by the proportionate changes in daily charged traffic based on high-level assessments of the scenarios. Further work on the net income for all the scenarios, including updating the consultation scheme will take place at OBC stage.

7.4.9. Full details of service specifications will be set out in the modelling report which accompanies the OBC.

Table 7-6 – Three refined scenarios along with the consultation proposal and 'do-nothing'

Scenario	Hours	Charge **	Additional elements
Consultation Proposal	7AM-7PM	£5 (cars)	
Scenario 1 Peak only proposal	AM and PM peaks only[63]	£5 (cars and small vans)	Smaller vans charged as cars 100% discount for hospital visitors and patients*
Scenario 2 Consultation proposal + free days	7AM-7PM AM phased in 2026 All-day 2027 or 28	£5 (cars)	180 free days for account holders 2026 (AM only scheme) 180 free days for account holders 2027 100 free days for account holders 2028 50 free days for account holders 2029
Scenario 3 Minimalist option	AM and PM peaks only Monday – Friday	£3 (cars)	100% discount for hospital visitors and patients* 100 free days in 2027 and 2028
Do Nothing scenario	n/a	n/a	n/a

* As part of the OBC consideration should be given as to whether other locations should benefit from a similar discount scheme.

** All charges in the proposed scenarios are once per day whether travelling in one or both peaks.

[63] Different peak hours could be considered

Table 7-7 – Potential income available that could be spent on buses or sustainable transport measures

Scenario	Potential spend on buses and sustainable travel	
	2028	2031
Consultation Proposal	Circa £50M to £55M	Circa £73M to £78M
Scenario 1 Peak only proposal	Circa £25M to £30M	Circa £39M to £44M
Scenario 2 Consultation proposal + free days	Circa £19M to £24M	Circa £73M to £78M
Scenario 3 Minimalist option	Circa £13M to £18M	Circa £30M to £35M

7.5. Validating scenarios against the consultation feedback

7.5.1. Having developed these three new scenarios to address the issues identified in the consultation each has been assessed to identify the extent to which they can successfully address the issues raised. The assessment was undertaken qualitatively using RAG ticks and crosses as shown in Table 7-8. Green shows where an issue is directly addressed by a change to the consultation proposal, whereas amber is where there is a positive change that helps but does not directly or fully address the issue. There are a few red crosses where individual scenarios do not explicitly address issues raised. It is recognised that option development must seek a balance between addressing concerns whilst maintaining the desired benefits and outcomes, as well as the deliverability and viability of the proposal.

7.5.2. Further issues raised through the consultation, as set out in Table 7-8, have been considered while maintaining the schemes ability to best meet its objectives.

7.5.3. Changes to the size or specific areas covered by the STZ have been examined. A city centre only zone would not meet traffic reduction objectives within Cambridge given that less than 15% of traffic is within the inner ring road and congestion is not only an issue for the city centre. This has already been considered inappropriate for the objectives of Making Connections programme at the pre-sift stage documented in Section 6.2.

7.5.4. Exclusion of Addenbrooke's from the STZ entirely has been considered to likely result in substantial adverse network impacts, and so exemptions for certain trips to the hospital have been considered a more effective way to address these concerns.

7.5.5. Concerns over impacts on those with low incomes are currently being further investigated. Retaining exemptions for those in receipt of benefits in all of the above scenarios will partially address this concern. However, for those on low incomes who are not in receipt of benefits there are challenges of practicalities in how exemptions could be administered.

7.5.6. A number of respondents have suggested that residents should be exempt from charges. However, analysis has identified that such an exemption would not reduce congestion and would result in a reduction in revenue too significant to support a sufficient level of public

transport improvements. To address some of these concerns scenarios have been prepared which allow residents to enjoy up to 180 free days per year over a transition period by registering for an account. These free days will then be reduced and phased out to give time for residents to adapt their travel behaviour while the benefits they experience from the reductions in traffic and improved public transport begin to materialise. Scenarios 2 and 3 provide a phasing in of the charges over the early years to enable residents to become accustomed to the impact on their travel, while Scenario 1 allows for free travel outside of peak hours to improve flexibility for residents.

7.5.7. The allowance of free days available for account holders only will also encourage users to register for accounts, which will result in reduced operational costs. Potential impacts of costs to businesses are also addressed through the transitional period by allowing account holders to have up to 180 free days per year, or by applying reduced charges to smaller vans.

7.5.8. The importance of punctuality of bus services has been highlighted through the consultation. As evidenced in the CPCA Bus Improvement Plan, the main cause of poor reliability in bus services in the region is traffic congestion. By reducing this congestion, the proposed scenarios for the Making Connections scheme will not only enable a high level of reliability in the newly funded bus services, but will also improve reliability for all existing bus services in Cambridge.

7.5.9. It is important to recognise that achieving high levels of reliability is dependent on increasing frequencies of bus services, which is dependent on generating revenue to pay for those services, and on reducing levels of highway congestion. Other issues raised in the consultation, such as exempting residents from the area charge, increasing the number of exemptions, reducing the size of the charging zone or reducing the hours of charging, would all have an adverse impact on reliability of bus services, as well as journey time reliability for car trips. It has therefore been necessary to balance these considerations to form scenarios of measures which will deliver against all aspects of user requirement and optimise the investment of generated revenue in improved services which will be well used.

7.5.10. In addition to the validation against the top issues from the consultation, the new scenarios were further assessed using a Multi Criteria Assessment Framework (MCAF) to ensure they addressed the scheme objectives adequately before they are deemed suitable for the next stage of business case development. For this purpose, the strategic objectives set out at Chapter 4 were expanded to create assessment criteria as shown in Table 7-9. Each assessment criterion was linked with a theme and strategic objective. Most criteria were scored on a 7-point scale ranging from ‘large beneficial’ to ‘large adverse’ which translated to scoring a maximum of 3 or a minimum of -3.

7.5.11. A summary of the MCAF scores is provided in Table 7-10. Detailed scoring evidence is available in Appendix B of this document. Output from the MCAF suggests that all three scenarios and the consultation proposal meet the strategic objectives to varying degrees, with some scenarios appearing to meet the objectives better than others.

7.5.12. The MCAF has been used to assess the performance of the scenarios in line with the scheme objectives, and has been informed by the finding of the other technical assessments undertaken for he OBC. This has comprised baseline data updates and high-level analyses based on qualitative information, and where available quantitative outputs. Feedback gathered from the autumn 2022 Making Connections public consultation has also fed into

several impact assessments. An update on the Business Impact Assessment and Equalities Impact Assessment is appended to the OAR.

7.5.13. As part of the OBC stage further detailed assessments will be undertaken to determine the likely impacts of the scenarios across all impact workstreams, alongside considering against the Consultation Scheme and do-nothing.

Table 7-8 – How do the scenarios address the top issues from the consultation?

Issues \ Scenarios	Scenario 1 (Peak hours, Addenbrooke's, Van reduced charge)	Scenario 2 (All-day, free days)	Scenario 3 (Charged reduced to £3, peak hours, Addenbrooke's, free days)
Residents should be exempt	✓ Residents can drive without charge outside of peak hours	✓ Free days	✓ Residents can drive without charge outside of peak hours plus free days
Unfair or discriminatory / proposed exemptions don't go far enough	✓ Ability to drive without charge outside of peak hours; added discount/ reimbursements for hospital	✓ Free days	✓ Ability to drive without charge outside of peak hours; added discount/reimbursement for hospital plus free days
STZ area too large	✓ Not directly addressed but indirectly via reducing hours	✓ Not directly addressed but indirectly with free days	✓ Not directly addressed but indirectly by reducing charge and hours
Concerns about business / self employed	✓ Reduced hours and charge for vans aimed at mitigating impact on small business and self-employed	✓ Free days to apply to business account holders	✓ Reduced hours of scheme operation and scheme charge. Free days to apply to business account holders
Concern about accessing essential services / hospital	✓ Additional exemptions to cover all hospital patients and their visitors. Ability to drive without charge outside of peak hours.	✓ Free days provide for all account for fixed period	✓ Ability to drive without charge outside of peak hours plus free days and ability to drive without charge to hospitals for patients and visitors
Concern for low-income	✓ Ability to drive in off peak. Free travel for hospital visitors and patients. Bus offer will be lesser than all-day scheme.	✓ Phase in free days for first four years provide additional period of adjustment	✓ Ability to drive in off peak. Bus offer will be lesser than all-day scheme and £5 AM/PM peak scheme
Hours should be reduced	✓ Addresses this point	✗ No change to hours (but free days)	✓ Addresses this point

Issues \ Scenarios	Scenario 1 (Peak hours, Addenbrooke's, Van reduced charge)	Scenario 2 (All-day, free days)	Scenario 3 (Charged reduced to £3, peak hours, Addenbrooke's, free days)
Bus services must be reliable / punctual	✓ Could be issues in off peak, particularly the "shoulder" period	✓ All-day scheme provides highest level of reliability for buses	✗ Reduced impact in the peak from lower charge. Could be issues in off peak, particularly "shoulder" period
Negative impact on access to employment	✓ Ability to drive in off peak and bus offer remains focussed on key employment sites	✓ Full bus package as per the consultation scheme and four years phasing of free days	✓ Ability to drive off peak, limited bus improvements as alternative
Make people not want to visit Cambridge	✓ Off peak access without a charge on weekdays, high level PT services	✗ No change from consultation package for non-account holders	✓ Off peak access without a charge on weekdays
Charge for cars and vans is too high, should motorbikes pay	✓ Reduced hours and charge for small vans reduced to cars aimed at mitigating impact on small business and self-employed. Consideration of no charge for motorbikes	✓ Not directly addressed but indirectly with free days	✓ Reduced hours of scheme operation and scheme charge. Free days to apply to business account holders
Concern about impact on informal carers	✓ Ability to drive without charge outside of peak hours; additional exemptions could apply for registered carers	✓ Not directly addressed but indirectly with free days	✓ Reduced hours of scheme operation and scheme charge. Free days

Table 7-9 – MCAF criteria based on strategic objectives

Link to Strategic Objectives	Themes	Assessment Criteria
To support decarbonisation of transport and improvements to air quality	Environmental	Impact on net GHG emissions
		Local air quality impacts
		Noise impacts[1]
To contribute to the GCP objective to reduce traffic by 15% from the 2011 baseline, freeing up road space for more public transport services, and other sustainable transport modes	Congestion	Impact on traffic flows
To support decarbonisation of transport and improvements to air quality		Journey time impacts
To ensure public transport is more affordable, accessible and connects to where people want to travel, both now and in the future	Sustainable Travel	Public transport
		Connectivity to key employment areas
To make it safe and attractive to walk and cycle for everyday journeys		Sustainable transport measures
To raise the money needed to fund the delivery of transformational bus network changes, fares reductions and improved walking and cycling routes	Deliverability	Scheme complexity
		Scheme enforceability
		Timescale (programme) impact
		Deliverability
		Revenue generation
To make Greater Cambridge a more pleasant place to live, work travel or just be	Quality of Life	EqIA impacts
		Social and distributional impacts
To make it safe and attractive to walk and cycle for everyday journeys		Impact on road traffic collisions
		Business impacts

1. Noise does not specifically feature in the strategic objectives, however, it has been considered a relevant topic under the environmental theme.

Table 7-10 – MCAF summary

Scenario	Environmental	Congestion	Sustainable travel	Deliverability	Quality of life	Revenue[64]	Total
Consultation proposal	6	6	11	-1	5	3	30
Scenario 1 Peak only proposal	3	6	5	-2	3	2	17
Scenario 2 Consultation proposal + free days	6	6	11	0	5	3	31
Scenario 3 Minimalist option	3	5	4	-2	1	1	12
Do Nothing	Reference case used to compare scenarios against in OBC						

7.5.14. Comparing the findings presented in Tables 7-8 to Table 7-10, the scenarios that scored best in the MCAF tend to address the top issues in the consultation to a lesser extent (when compared with other scenarios formulated). This indicates how these scenarios may perform differently when assessed against different mix of criteria and perspectives in the two assessments, and helps understand the performance of each scenario and how this is balanced across the different objectives.

7.5.15. The analysis demonstrates that all the scenarios have positive impacts in terms of congestion and environmental benefits, and they all deliver funding to facilitate improvements to the bus network and implement sustainable travel measures. The duration of benefits throughout the day is dependent on whether the scenario has peak hour or all day STZ charges and the level of funding available also varies depending on the hours of charging, but also the extent to which additional discounts are given.

7.5.16. This finding suggests all three new scenarios, alongside the consultation scheme, have potential merit in terms of the ability of each to deliver balanced outcomes across the different objectives. Therefore, it is recommended that all scenarios are taken forward for more detailed assessment during the OBC stage.

[64] Revenue is part of deliverability but had been presented in its own column as it is an important aspect to consider. Deliverability has been adjusted to exclude revenue here to ensure there is no double counting.

8. Conclusions of the transport appraisal

8.1.1. The option development process started from five strategic options covering all modes of transport, and took them through a logical order of Strategic assessment (following two stages as documented in Chapter 5), Option development and assessment including pre-sift, sift (Chapter 6), and the further development as documented in Chapter 7. It assesses a package of improvements to public transport services and wider sustainable transport measures combined with one of the following charge-based demand management schemes aimed at reducing traffic and raising the necessary funding required:

- A STZ charge (where there is a charge to drive)
- A “pollution charge” (where there is a charge to drive but electric vehicles are given 100% discount)
- Workplace parking charges combined with higher public car park charges.

8.1.2. In addition to the type of charge the option development process has considered what value these charges should take. The assessment undertaken has considered not only the revenue that the priced demand management will generate, but also the financial cost to users, impact on traffic levels, congestion, and the reliability of journeys in relation to the objectives and outcomes.

8.1.3. The evidence presented shows that increased parking charges (including WPL) are not as effective at meeting the objectives of the programme, even with a higher level of charge at £10 per space per day. The scale of parking charge required to achieve the desired traffic reduction would have significant delivery challenges.

8.1.4. Overall, the STZ charge is likely to provide a greater reduction in traffic levels and congestion than the parking charges. It is forecast to achieve this with a lower impact on overall travel demand (across all modes) than the parking charges, along with higher increases in active travel in Cambridge.

8.1.5. The STZ charge option also achieves a stronger strategic fit than the pollution charge. In the shorter term this type of pollution-based charge would place the greatest cost on those with low incomes who are less able to afford electric vehicles. In the medium term, the impact of electric vehicle fleet (which will be exempted from the pollution charge) uptake could rapidly erode the traffic benefits and net income, therefore, a pollution charge would potentially only have shorter term benefits and may not provide the ongoing revenue to fund the public transport and sustainable transport measures. Instead, a STZ charge can avoid such limitations and has the ability of tackling traffic related pollution and congestion issues.

8.1.6. Results from the option development up to 2022 (Section 6-3) recommended that a STZ charge of £5 all-day should form the basis of the SOC. The SOC was completed in Summer 2022 and this option was subsequently presented in the Making Connections consultation in late 2022.

8.1.7. Feedback from the consultation in 2022 informed the more recent stage of option development (Chapter 7) where three scenarios were formulated by altering scheme parameters and rules through consideration of the findings from the consultation alongside engagement and discussion with stakeholders.

8.1.8. The three scenarios were selected by assessing the extent to which they address the concerns in the consultation. Their ability in achieving the strategic objectives of Making Connections was also explored with MCAF analysis. This range of scenarios allows, alongside the scheme identified in the SOC and 'do-nothing', a wide range of alternative options for consideration within the OBC.

8.1.9. This report recommends that all three formulated scenarios along with the consultation proposal and do-nothing, should form the basis of further assessment in the development of the Outline Business Case.

8.1.10. These scenarios are summarised in Table 8-1.

Table 8-1 – Recommended scenarios to take forward for further consideration

Scenario	Headline description
Consultation Scheme	AM to 7PM weekdays £5 for cars (per day) AM Peak 2026 All-day scheme from 2027 or 2028
Scenario 1	AM and PM peaks on weekdays £5 for cars (per day) Hospital* visitors and patients free Small vans charged the same as cars
Scenario 2	As consultation scheme 180 free days for first two years of STZ 100 free days for 2028 50 free days for 2029
Scenario 3	AM and PM peaks on weekdays £3 for cars (per day) Hospitals* visitors and patients free 100 free days 2027 and 2028
Do Nothing	Reference case to compare the performance of the above four against.

*As part of the OBC consideration should be given as to whether other locations should benefit from a similar discount scheme.

Appendix A – Business and equality impact assessments

Sections A.1 and A.2 present the interim assessments of the Business Impact Assessment and Equality Impact Assessments, respectively. As part of the OBC stage further detailed assessments will be undertaken.

A.1. Business Impact Assessment (BIA) *interim update*

The BIA commenced in February 2023 and is ongoing at the time of writing. The BIA comprises three parts:

i. undertaking a desk-based precedents analysis of business impacts experienced by other similar demand management schemes in the UK and internationally

ii. conducting a baseline analysis of high-level business characteristics in the Sustainable Travel Zone (STZ) and the travel to work area

iii. conducting a business impacts analysis that draws on insights from the precedents and baseline analyses to assess quantitatively and qualitatively the potential business impacts that may be experienced by key industry sectors within Cambridge.

The core of the BIA is found in Part (iii).

The BIA draws on quantitative and qualitative data to shortlist business sectors as categorised according to ONS Standard Industrial Classification (SIC) codes. Quantitative business sector data for Cambridge is analysed at the local authority, regional and national levels. Regional- and national-level analysis rely on strong assumptions that trends are representative of the Cambridge context. Where applicable, this is stated as a limitation of the analysis. Throughout the analysis, ONS SIC code data is used to differentiate between business sectors. Most available data is at the 2-digit level. Therefore, the majority of the quantitative analysis is conducted at the industry level (rather than the more disaggregated 5-digit, or 'business sector' level). The study complements quantitative analysis with qualitative insights relating to key industries in Cambridge. Qualitative insights are derived from analogous case studies, studies and reports that focus on sectors and industries that are pertinent to the Cambridge economy.

The BIA adopts a four-stage approach to analysing the sectors that may potentially be impacted by the proposed Making Connections. These are detailed in the table below:

Stage	Aim	Method
1	Identifying business dependencies	Three main dependencies that businesses need to account for in relation to Making Connections are: Employees travelling to work Customers travelling to the business Reliance on the supply/distribution of goods and/or services The ability of the business sector to absorb the costs of the STZ charge to employees/ suppliers/ customers cuts across all three key dependencies.
2	Analysing sectoral concentration and employment	Using ONS data covering the Cambridgeshire County Council area business sectors are ranked according to: • Size of business sector operations within the STZ (by employee count) • Specialist business sectors for Cambridge (by location quotient for employee counts) Average size of the business (by business count data) and what sectors of retail/manufacturing are exposed.
3	Assessing key sectors potentially impacted by the STZ	Assess business dependencies outlined in Stage 1 using quantitative and qualitative data to gain insight into key sectors' ability to absorb the cost of the STZ charge. Data sources include capital intensity, propensity to work from home, GHG emissions, median wages, insights from public consultation.
4	Assessing exposure of key sectors potentially impacted by STZ	The analysis conducted in Stages 2 and 3 is used to give a Red/Amber/Green rating of the business sectors. Key sectors are ranked as Red, Amber or Green according to their perceived level of exposure to the STZ charge. Levels of exposure are also assessed according to each charging structure scenario (all-day charge, AM and PM peak only, consultation proposal plus Free Days).

The BIA yields several insights regarding the potential impacts to businesses in Cambridge. First, it should be noted that the STZ charge has the potential to impact all industries in Cambridge. A red-amber-green (RAG) rating of industries is carried out using a combination of quantitative and qualitative data. However, a 'green' classification is not intended to suggest these industries are not exposed.

The results of the BIA suggest that several sectors relating to retail and wholesale trade, health, hospitality, construction, and manufacturing may potentially be more negatively impacted by the

introduction of the STZ charge (rated 'red'). The logistics sector is integral to the supply chain of the above sectors and is therefore also assessed to be potentially more negatively impacted by the STZ charge in the short term. Sectors classified as 'red' tend to:

i. be heavily reliant on the sale, distribution and/or leasing of material goods in a context where there are no alternatives than to use light and/or heavy goods vehicles

ii. require employees to work on-site

iii. rely on customer footfall.

The education sector is assessed to be relatively less negatively impacted by the STZ charge ('amber'). However, education sub-sectors are likely to be differently impacted by the proposed STZ charge, with higher-paid university employees potentially being able to absorb the cost of the STZ charge more easily than those employed in schools or early years provision.

The scientific research and technology sector is assessed to be relatively less impacted by the charge ('green'). This sector is crucial to the Cambridge economy, with numerous firms and employees generating significant revenue. While the scientific research sector relies on supplies, it is more likely that science-oriented businesses may be able to absorb the cost of the STZ charge. Furthermore, while the data suggests this is a sector where employees tend to work onsite, higher-paid employees in this sector may be able to absorb the cost of the charge.

Overall, the ongoing analysis suggests that the STZ may impact sectors differently, and furthermore may impact different-sized businesses within those sectors differently. Small business owners are potentially more likely to be negatively impacted by the STZ charge compared to larger businesses. They may require more support, as may businesses that rely more on supplies onto their business premises and on employees travelling to work onsite.

It is also likely that any potential negative impacts may be more pronounced in the early stages of the congestion charging scheme compared to the medium- and long-term, by which point it is anticipated that any negative business impacts will be mitigated by other proposals within the Making Connections Programme, such as improved transport networks, bus services and consolidation centres. Options have been created for peak only charging hours which would allow deliveries and customers (who travel by car) to visit out of hours without charge. There is also a suggested reduction in charge for vans to the same level as cars, which should benefit small businesses. HGV and LGV costs can be reviewed up to Full Business Case stage and even ongoing once the scheme is in place. Staff who travel by public transport will benefit from improved journeys to and from work, and some drivers will also benefit from the proposed improvements to Park and Rides and connecting bus and cycle links. For some of the options the inclusion of free days for residents (or account holders) may also further mitigate the impact of the charge.

The wider City Access programme may also include consideration of complementary measures such as supported consolidation centres, last mile delivery hubs that will make deliveries in the STZ area more efficient.

A.2. Equality Impact Assessment (EqIA) *interim update*

EqIA guidance is limited and there is no specific statutory guidance for the EqIA process. However, there is technical guidance set out by the Equalities and Human Rights Commission, which has been used to inform our assessment.

An initial EqIA was undertaken in August 2022 to understand the distribution of Protected Characteristic Groups (PCGs) within the study area. This was done using publicly available data including the ONS, Public Health England Health Profiles, IMD and Ordnance Survey AddressBase. The assessment considered:

- Policy/Legislation
- Differential and disproportionate impacts on PCGs across a range of topic areas
- A rating system with the residual impacts on each PCG assessed on a three-point scale; Beneficial, Neutral or Adverse.
- The most recent EqIA undertaken in May 2023 considered the PCGs in the Equality Act 2010, plus a number of other categories and inter-sectionalities. The PCGs and other categories and inter-sectionalities examined within the EqIA included:
  - Age (children and young people and older people)
  - Disability
  - Gender re-assignment
  - Low-income
  - Pregnancy and maternity
  - Race
  - Religion and belief
  - Sex
  - Sexual orientation
  - Other inter-sectionalities: care leavers, carers and armed forces veterans.

The assumptions in the EqIA were drawn upon using the local knowledge of the councils' equalities officers, the findings from the initial EqIA, plus consultation feedback from the autumn 2022 Making Connections public consultation.

The EqIA found that Cambridge serves as a focal point for many people in the area, who access employment, health services (Addenbrooke's Hospital and The Rosie maternity hospital, etc) and education (including sixth form colleges, Cambridge Regional College and Cambridge University). All of the options considered for the Making Connections scheme will improve bus services for most people across the different PCGs, however, some people may benefit more

than others. This may depend on where they live, where they need to travel to and from, how this relates to the proposed bus service improvements and when these bus service improvements would be introduced.

Higher frequency bus services could benefit people who travel by public transport, as it is likely to improve their journeys to and from work, as well as improve access to leisure facilities and services. Improvements may also help people to access employment, as it would possibly open more opportunities to commute for shift-work and early or night-time work. Improvements to bus services, as well as modern new facilities, could help elderly people and those with disabilities, and also those travelling with small children, pushchairs and strollers. Improvements to bus and waiting areas (lighting, CCTV and vegetation clearance) could lessen the risk and perceived safety risk of LGBTQ+ being a target for hate crime. Women could also benefit from improvements to buses and waiting areas, as they are less likely to feel safe at night as are more likely to experience sexual abuse or harassment than men, therefore may not feel safe waiting for a bus at night. Meanwhile, young men may be at greater risk of physical violence while waiting for a bus/travelling by bus, therefore they too may experience a benefit of improved waiting facilities.

Furthermore, more frequent bus services could mean shorter waiting times at bus stops and, hopefully, less fear of being isolated and vulnerable and at risk of hate crime or harassment. Similarly, if there are more passengers on board a bus then this might help to reduce the risk of abuse and/or make it more likely that fellow passengers would act as natural surveillance. However, a concern is should the bus service improvements not extend beyond Greater Cambridge or there are reductions to the frequency of bus services, this could mean longer waits at bus stops and less people around to offer greater assurance of natural surveillance to help people stay safe. As a result of this, people from PCG groups most likely to be subjected to hate crime and/or harassment may be more reluctant to travel by bus.

The EqIA raised concerns that Gypsies and Travellers living on the Blackwell and Fen Road Traveller sites could be particularly disadvantaged (unless appropriate mitigations are put in place) because although those sites are outside the STZ, the only road access to the site involves travelling across the STZ boundary (and incurring a charge). Romany Gypsy and Travellers of Irish descent are less likely to realise the benefits of the bus service improvements due to cultural barriers and personal safety concerns in using public transport. Further work into the effect of the Programme on the Gypsy and Traveller community is required, to understand the potential impacts.

The EqIA also highlighted some groups may find it difficult to use bus services, such as neuro diverse people, people with mental health problems, people from ethnic minority communities for whom English is not their first language and people with visual impairments, who may struggle to catch the right bus service. The extent to which bus service improvements help people from these particular PCGs get used to bus travel may depend on the amount of funding available for clear signage, real-time bus updates at bus stops and on-board ‘next stop’ announcements etc.

Improvements in the accessibility of services will benefit elderly people and most disabled people. However, there may be some elderly people with mobility issues and disabled people who do not qualify for a DER, and may not be able to afford the charge, which could increase the likelihood of them experiencing isolation and loneliness. Carers (particularly unpaid carers) may be discouraged visiting as often, if it would mean incurring STZ charge, therefore contributing to isolation.

Concerns were also raised about the impact of the charge on low-income residents; however, this may be mitigated in part through DERs and potential free STZ days for residents (or account holders). Drivers coming into Cambridge could park at Park and Ride sites located outside the STZ to avoid the STZ charge.

People travelling to a place of worship may be discouraged from travelling as a result of the STZ charge, which could increase the likelihood of religious people experiencing isolation and loneliness. For some, not being able to partake in their religious prayers or gatherings may adversely impact their wellbeing and sense of community. Different faiths have varying times or prayer and worship.

The EqIA proposes recommendations and potential mitigations to some of the likely adverse impacts. These will be reviewed and updated as the Programme progresses and details are refined, to reduce or eliminate adverse impacts where possible.