

Greater Cambridge Partnership

Outline Business Case

Making Connections



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This version of the Outline Business Case is an interim document, as it is awaiting further analysis on traffic modelling outputs for some of the scenarios.

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Appendices – All separate documents

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Appendix D – Monitoring and Evaluation Scoping Report*
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Appendix T – Data and Information Security Policy Analysis*
Appendix U – Boundary Changes

*Appendix will be forthcoming

Executive summary

Making Connections

The Greater Cambridge Partnership (GCP) is the local delivery body for a “City Deal” with central government, bringing powers and investment worth up to £500 million to 2030 for infrastructure improvements to boost economic growth. Complemented by wider investment and policy interventions with other local authorities the GCP is now delivering a £1bn programme of public and private investment in, primarily in transport infrastructure, to support the growth vision set out by the current Local Plan.

Making Connections, part of the broader “City Access”¹ programme, comprises three elements, each targeting a different challenge and facilitating the delivery of the next:

- Transforming the bus network: Adding new routes, additional services, cheaper fares and longer operating hours. This bus network would be forward-funded by the City Deal during a ramp-up period so that public transport improvements were in place before any charge;
- Investing in sustainable travel schemes: Alongside bus improvements, it is proposed to set aside part of the scheme revenues to invest in new sustainable travel schemes, such as better walking and cycling links; and
- To facilitate the investment in sustainable transport and reduce traffic, the Sustainable Travel Zone (STZ) would introduce a daily charge to drive during certain hours of the day.

The aim is to improve the way that people and vehicles move around the city whilst reducing congestion and improving air quality. The STZ would reduce traffic to create more space for buses and people walking and cycling. Cars and goods that need to travel would do so more reliably, no longer having to add in extra time to allow for uncertain traffic conditions. The STZ would provide a sustainable, locally derived funding stream to allow for investment in the bus services and wider sustainable transport measures.

The combined impact of the three elements would allow more people to move around Cambridge, whilst supporting the transition to a net-zero carbon city.

Context: Transport

Congestion

Road congestion is bad for everyone. It makes journey longer, it results in more harmful emissions, it causes more collisions, hinders productivity and restricts growth. The average driver in the UK lost 80 hours due to traffic congestion in 2022², which can be valued at over

¹ [Greater Cambridge Partnership. City Access Programme](#)

² [INRIX \(2022\). Global Traffic Scorecard \(Accessed: Aug 2023\)](#)

£700 per driver. Furthermore, people and businesses allow additional time for their journeys, to allow for the variation in journey times. This means that there are even greater time savings offered by a network that allows more certain and reliable travelling conditions.

Car use and low income

A lack of viable and affordable public transport options, particularly in rural areas, mean households suffer from ‘transport poverty’ and have no practical alternative but to buy a car. For those on low incomes, this is known as ‘forced car ownership’ which, according to academic research³, may result in households foregoing expenditure on other important necessities and having to carry the burden of debt.

ONS data⁴ shows that those on lower incomes are much less likely to have access to a car. 35% of houses in the lowest income decile have access to at least one car or van, compared to 83% in the fifth (middle) income decile and 93% in the decile with the highest incomes. Whilst this dataset is not available at subnational level, it demonstrates a clear correlation between car ownership and income overall.

Declining bus services

Bus use has been in decline in Cambridge for over a decade⁵. The situation during and after the pandemic, has seen industry costs continue to rise and further services cut. Whilst some services have been temporarily saved through additional funding from the Cambridgeshire and Peterborough Combined Authority (CPCA), the medium-term outlook for the bus network is looking bleak, with the risk of a spiral of decline as less services lead to lower confidence and use, this in turn further undermines the financial stability of the commercial bus network.

Reversing the trend

Making connections provides a once in a generation opportunity to reverse this trend: it is an evidence-led approach that shows it is possible to transform public transport in Greater Cambridge so that buses run where people want, when they want and for fares that are affordable. The changes go beyond what any commercial organisation could be expected to provide, moving Cambridge to a more typical European city model where there is greater public sector funding for public transport.

Revenues generated by the STZ charge are committed to be spent on bus improvements that may predominantly benefit lower-income households that cannot afford a car, who rely more on public transport.

Through longer hours, new services, new destinations and cheaper fares, the bus network would be transformed to be the natural choice of travel, that people can depend upon for

³ Mattioli (2017). *Forced Car Ownership in the UK and Germany: Socio-Spatial Patterns and Potential Economic Stress Impacts*, Social Inclusion

⁴ [ONS \(January, 2019\). Percentage of households with cars by income group, tenure and household composition: Table A47](#)

⁵ Department for Transport (2023). *Bus Statistics Table BUS01e*

their day to day needs. For those without access to cars, it would widen opportunities to education, healthcare, employment, leisure, shopping or visiting family and friends.

For those visiting, living and working in Cambridge, the changes would provide a 'turn up and go' London-style bus network, enhanced walking, cycling and interchange opportunities, complemented by expanding car clubs, e-scooter and other new transport modes. This offers the opportunity to live without the significant costs and burden of owning a car, or could reduce the need for a second or third car.

Through this programme, the Cambridge City Region would show leadership to other cities that fairer, cleaner and more inclusive growth can be achieved if the powers available to local authorities are used.

Wider Context

Cambridge is not a typical UK city. It is consistently recognised as being a unique contributor to the UK economy and most recently as "one of the intellectual centres of the world for eight centuries...the birthplace of generations of innovation"⁶. In 2022, Gross Value Added (GVA) per head was £44k in Cambridge and £38k in Greater Cambridge, against an England average of £30k⁷. Unemployment is below the UK average and there are skill shortages in hi-tech industries. Cambridge has the highest number of patent applications per person in any UK city, twice as high as the next city⁸. Its innovative economy is crucial to the UK's strategy to 'Build Back Better'.

The population in Greater Cambridge increased 29% between 2001 and 2021 compared to 14% across the UK and is expected to continue to grow above the UK average⁹.

The flip side of this is that the growth trajectory is increasing the demand for affordable housing. Property prices in Cambridge were over 35% higher than the UK average in 2023¹⁰. It is also exacerbating traffic congestion: analysis presented in Section 2.6 of this business case shows the number of vehicles travelling into Cambridge and the amount of time lost due to traffic has been growing and is likely to increase significantly over the next 20 years.

In 2004, an Air Quality Management Area (AQMA) was established in the city centre due to high levels of Nitrogen Dioxide (NO₂). The 2023 Air Quality Annual Status Report published by Cambridge City Council says that air quality has continued to improve in Cambridge since the (AQMA) was established and Making Connections would support further air quality improvements and reduce other health implications of traffic and congestion.

⁶ Rt Hon Michael Gove MP (2023). [Long-term plan for housing: Secretary of State's speech](#)

⁷ ONS (Accessed March 2022). *Regional Gross Value Added per head*

⁸ Centre for Cities (2017). *Cities Outlook 2017*

⁹ ONS Census (2001, 2021).

¹⁰ Rightmove Website (Accessed August 2023).

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 car¹¹.

In addition, the population classed as obese is rising: nearly a third of children aged 2 to 15 are overweight or obese and younger generations are becoming obese at earlier ages and staying obese for longer. According to Public Health England, physical inactivity is a main risk factor for obesity¹².

Increasing car dependency and reducing levels of physical activity, the related rise in obesity, coupled with unequal access to car travel for those with lower personal mobility, means that investing in transport is a much broader public health and equity issue.

Scenarios in the Outline Business Case

Proposals for Making Connections were presented in September 2022 in a Strategic Outline Case (SOC) document suite, which informed a statutory public consultation in Autumn 2022. The findings from this and subsequent technical work, have informed the options (“scenarios”) set out in this Outline Business Case (OBC): the consultation scheme, plus four new scenarios to address concerns and issues raised in the consultation and identified in the impact assessments.

The scenarios assessed in the OBC are deliberately neither exhaustive nor final: the intention is that it includes a range of scenarios, sensitivity tests and ‘add-ons’ to help decision-makers understand the traffic, revenue and other wider impacts of further refinements that could be made, such as amending discounts or the scale of bus improvement measures. The OBC therefore provides a technical foundation and evidence base on the impacts of a range of weekday charging scenarios, allowing some flexibility to develop a consensus on a preferred option.

Table 1 – Scenarios for Outline Business Case

Scenario	Charge	Time	Implementation date	Additional Discounts (to those in consultation scheme)
Consultation Scheme	£5 for cars £10 LGV £50 HGV	7am-7pm weekdays	AM only 2026	
Scenario 1	£5 for cars £10 LGV £50 HGV	AM / PM weekdays	2027	Hospitals (patients and visitors) Vans as cars
Scenario 1A	£5 for cars £10 LGV £50 HGV	AM / PM weekdays	2027	SME business discount 50 Free days (Indefinitely)
Scenario 2	£5 for cars £10 LGV £50 HGV	7am-7pm weekdays	AM only 2026	180 Free days 2026, 2027 100 Free days 2028 50 Free days 2029

¹¹ ONS Census (2021). *Car or Van Availability by Long-Term Health Problem*

¹² Public Health England (2017). *Health Matters: obesity and the food environment*

Scenario 3	£3 for cars £10 LGV £50 HGV	AM / PM weekdays	2027	Hospitals (patients and visitors) 100 Free days 2027 100 Free days 2028
Do minimum	Ref Case			

A note on Scenario 1A

This Scenario was developed as a response to the conclusions emerging from the Business Impact Assessment and the desire to understand the impact of keeping free days indefinitely. Given the wide range of scenarios under consideration, this Scenario has only been financially assessed to keep the appraisal proportionate, in line with GCP's assurance framework.

OBC sensitivity tests

- Inflation (+/- 1%)
- Behaviour change:
 - Account take up (- 10% and +20%)
 - Use of free days
 - Trip volume (+/- 10%)
- Scheme capital costs (+/- 10%)

OBC 'add-ons'

Alongside the scenarios, a range of add-ons have been identified in response to the consultation. These are all in addition to the extensive range of discounts, exemptions and reimbursements consulted on in 2022 that included, disability; care workers; community transport vehicles; medical emergency; immunocompromised; chronic medical conditions; public & school bus services; emergency services; ZEV and wheelchair accessible taxis.

These add-ons are considered in more detail in the report; the most significant of which and their impacts are set out below.

- **Free days** – providing a number of days to charging scheme account holders on which they can travel without charge. This offers a relatively flexible and administratively simple way to address many of the concerns raised through the consultation but is not targeted to those most in need. We have tested time-limited free days as well as costs and benefits of extending this indefinitely in one scenario (1A). It is ultimately a trade-off in terms of the reduced revenue for buses and sustainable transport against the benefits that free days offer. Given the scale of concerns raised through the consultation, there is merit in including an ongoing level of free days to allow for free car travel for journeys which are difficult to make by alternative means. It is assumed free days would apply on a per household basis, with the allowance being able to be shared in the case of households in multiple occupation. Further consideration of the scale and duration, as

well as the administration ‘scheme rules’ of free days could continue to take place in developing a Full Business Case for Making Connections.

- **Freight charges** – lower charges for Light Goods Vehicles (£5) or Heavy Goods Vehicles (£25), either through a blanket reduction in the charge or via a more targeted discount applied to local Small and Medium-sized Enterprises (SMEs) has been considered in response to business concerns. The recommendation is that a **local SME discount** is a far more financially efficient way of targeting support to smaller businesses and offers a response to the concerns and potential impacts on local businesses that were identified in the consultation and Business Impact Assessment work.
- **Low-income discount** – this was proposed in the consultation, and respondents and stakeholders were asked for feedback on its design. Using that input, subsequent work proposes that those on certain low-income state benefits should get a 50% discount whilst they are in receipt of those benefits. If a recipient’s income increases to the point where they are no longer in receipt of benefits, the STZ charge discount would drop to 25% for two years subsequently. The low-income discount would apply to all scenarios.
- **Earlier finish at 6pm** – Moving the finish time from 7pm has been considered in the OBC and would bring the proposal in line with the current London scheme. This would be beneficial in terms of early evening travel for those needing to use a car and is effective at mitigating against some of the concerns raised during the consultation, for example, access to after-work clubs and societies or evening visits by carers. It is recommended that a 6pm finish is included within any proposals taken forward for either peak hour or all-day charging.
- **Access to hospitals and healthcare** – this was a key issue raised in the consultation and so there has been a lot of further consideration of what measures, additional to those included within the consultation, are required to support access to hospitals and healthcare. These would be in addition to those with 100% discount or reimbursement due to disability, medical emergency, immunocompromised or chronic medical conditions. They would also be in addition to the low-income discount.

Further refinement to the mix of discounts, exemptions and reimbursements is recommended beyond the Outline Business Case, particularly as there would be an interplay between them. For example: the addition of free days would assist access to health care; an earlier finish may help those working in the night-time economy who are more likely to be on low incomes or less able to use public transport.

Sensitivity Tests

Stress testing has been used to test the sensitivity of the scheme to variables including inflation and demand. These tests add confidence to the core analysis and demonstrate that Making Connections would be viable and affordable under a range of pessimistic and optimistic alternative future scenarios. This Treasury ‘Green Book’ and Department for Transport (DfT)-compliant work is reported in more detail in the Financial Dimension.

Bus Improvement and Sustainable Transport Measures

Given the degree in variability of the scenarios under consideration, and crucially the forecast revenues that each could generate, there needs to be a corresponding flexibility in the bus improvements and sustainable transport measures (STMs). To this end, illustrative packages have been put together to give decision-makers an indication of the type and scale of improvements that are possible under different scenarios.

Bus measures include cheaper fares, new routes, longer operating hours, integrated ticketing and better facilities for waiting and interchange. STMs include enhanced cycle parking, school travel initiatives, e-bike rental, car clubs and digital travel planning applications.

Timing of Implementation

A commitment was made that the STZ charging scheme would not ‘go live’ until bus and sustainable travel improvements are already in place. Hence, there is an initial period, assumed to start in 2024, where these improvements ramp up in scope and scale, which would need to be funded by a mix of GCP grant and loan. ‘Go live’ would occur no earlier than 2026 and is proposed to be simultaneous for all vehicles, i.e. not bringing in an early goods vehicle charge, which was an option proposed in the consultation.

OBC Findings

All Making Connections scenarios considered in this OBC are expected to deliver material behavioural changes that shift travel demand to sustainable transport modes and provide ongoing net revenue to invest.

Table 2 – Headline Figures for Making Connections Scenarios

Scenario	£ Net Revenue in Opening Year (2027)	£ Operating Income in Steady State (2031)	% Increase in PT / Active Travel Journeys	Average speed kmph in Cambridge (2026), 12.6 without scheme
Consultation Scheme	67.8m	82.5m	16%	17.4
Scenario 1	33.4m	43.5m	8%	16.2
Scenario 1A	24.1m	30.1m		
Scenario 2	39.5m	83.0m	16%	17.2
Scenario 3	17.9m	35.2m	6%	15.4

Consultation Scenario – Overview

This scenario achieved the most against stated objectives, but the consultation process identified a number of drawbacks that needed to be addressed. Hence, this scenario is considered unlikely to be publicly and politically acceptable but remains as part of the analysis to allow comparison of the new scenarios against the consultation proposition.

Scenario 1 – Overview

Scenario 1 (£5 peak charge) appears to offer a more balanced outcome compared with the other scenarios. The potential positive behaviour change is not as high as Scenario 2, but still very substantial. Compared with Scenario 3, it would generate higher ongoing net revenue to invest in public transport and other sustainable transport measures which would facilitate and safeguard the behaviour change. It is also able to offer the possibility of more DERs to address concerns from the consultation.

Scenario 1A – Overview

Scenario 1A, as a variant of this, provides 50 free days to support use of the car when needed. This is more flexible than the hospital discount which is confined to supporting one specific trip purpose. The addition of the SME discount would further address some of the concerns from local businesses about the impact of the STZ charge on their operations.

Scenario 2 – Overview

Technical evidence suggests that Scenario 2 (£5 all day charge) is the best performing against the established scheme objectives, particularly in terms of the desired behaviour change. However, the Business Impact Assessment work suggests that, of the four scenarios, this would have the highest negative impact on small businesses in particular. It is also recognised that this scenario does not fully address wider concerns from the Autumn 2022 consultation, particularly once the free days are phased out.

Scenario 3 – Overview

Scenario 3 (£3 peak charge) goes furthest in modifying the STZ proposition in response to the 58% of those who oppose the consultation version of the STZ. Due to the scale of changes, the scenario is weakest in terms of lowering traffic and raising revenue particularly in the early years. If free days and/or a business discount were to be continued indefinitely (as in scenario 1A) then there would be insufficient funding available to make transformational changes to the bus and wider sustainable transport offer, with available funding estimated to be less than £20m a year. Reductions in funding would be detrimental in terms of equalities impact and wider social and distributional impacts.

Similarly, the carbon and air quality impacts would be reduced. The forecast behavioural changes, although material, are also the lowest out of all scenarios assessed. This is the result of the lower charge proposed but is also constrained by the limited headroom in the net revenue available to fund more substantial improvements in public transport and active mode measures, which encourage higher modal shift.

Do-Minimum – Overview

This option is not recommended as it would not achieve the stated objectives of the programme nor the City Deal. As congestion and bus services are likely to worsen, this means other policy options, to achieve similar outcomes, would need to be rapidly

progressed. However, previous technical work has demonstrated that other policy approaches such as a workplace parking levy would deliver less against objectives than a STZ.

OBC Recommendations

The recommendation of this OBC is that two of the scenarios have the potential to balance concerns and issues raised during the consultation with the aspiration to achieve the stated objectives.

Scenario 2 would offer the highest performing option against the objectives. Further additions, such as ongoing free days and/or business discounts would strengthen acceptability, albeit this is likely to be lower than for a peak hour scheme. **Scenario 2 is recommended as a viable option to take forward beyond OBC.**

Scenario 1A addresses many of the issues raised in the consultation including reducing the STZ hours of operation to 6 hours a day from the 12 originally proposed. It goes yet further in terms of providing an ongoing allowance of 50 free days to households for trips they need to make by car and addresses business concerns through shorter charging hours and a targeted business discount. On this basis, **Scenario 1A is recommended as a viable option to take forward beyond OBC.**

Both options include the substantial package of discounts, exemptions and reimbursements as set out in the 2022 consultation including those with a disability; care workers; community transport vehicles; medical emergency; immunocompromised; chronic medical conditions; public & school bus services; emergency services; zero emission vehicles and accessible taxis. **For both options a 6pm finish is recommended.**

Conclusion

This business case demonstrates that significant outcomes can be achieved through two recommended options that consider different ways of addressing the concerns and issues raised during the consultation. This business case demonstrates that both options are viable to take forward.

The decision as to whether to pursue an all-day scheme or peak hour only scheme to develop into a full business case will need to balance considerations of the relative ability of each option to both address the consultation in terms of concerns, but also in terms of the strong support for providing a new bus network fit for the future.

OBC Five Dimensions: Summary

The following sections provide a short summary of each of the five dimensions of the business case.

Strategic Dimension

The Making Connections programme is pivotal to the GCP's plans for fostering sustainable growth. The planned transformation of the bus network and introduction of a Sustainable Travel Zone would enhance accessibility, alleviate traffic congestion, support planned growth, improve local air quality, and curtail greenhouse gas emissions.

Without Making Connections, highway network delay in Greater Cambridge is predicted to increase by 30% in the AM Peak and 75% in the PM peak by 2041. To counter this consequence of inaction, a significant modal shift is required.

The potential impact of Making Connections on travel choices is shown below.

The Strategic Dimension demonstrates that Making Connections has a compelling strategic fit with pertinent national, regional, and local policies and strategies, and highlights the existing and forthcoming challenges which Making Connections addresses.

Section 2.6 of the Strategic Dimension outlines the impact of doing nothing to address worsening congestion and poor local air quality, which are predicted to erode the quality of life of local people, whilst reducing Greater Cambridge's economic competitiveness. The Strategic Dimension lays out clear objectives for the scheme to rectify these issues in harmony with the broader strategic framework. The scheme's objectives inform a comprehensive evaluation of a diverse range of potential solutions, culminating in the identification of a preferred way forward.

Economic Dimension

The programme is forecast to bring significant benefits from time and operating cost savings for transport users, increased physical activities, enhanced reliability and would reduce collisions alongside reductions in noise, carbon and other emissions. These benefits were estimated to be of the same level of magnitude to the user costs attributed to the proposed charge. This shows that the balance is broadly right between the impact on transport users and the generation of revenue, which would be used to fund the bus, walking and cycling improvements: the programme of investment.

The combined impact of the transformed bus network, sustainable transport measures and Sustainable Travel Zone means that the Greater Cambridge area can continue to grow in a more sustainable manner. It is forecast that the economy can continue to grow, unconstrained by sub-standard transport networks and services.

Financial Dimension

The Financial Dimension outlines the expected costs, funding arrangements and overall affordability of the Making Connections programme.

It demonstrates that the proposed bus improvement and sustainable transport measures in all five scenarios can be funded from a combination of the GCP City Deal funding and the financial proceeds of the Sustainable Transport Zone (net of expenditure in respect of the Sustainable Charging Zone), whilst balancing the affordability challenges of road users, particularly during the early (implementation) years of the scheme.

A non-recoverable £50m would be invested in the programme of improvements upfront by GCP. Any additional money required to cover forward funding of upfront bus service improvements and fares reductions is proposed to be recovered via charging scheme net revenues by 2029, allowing the funding to be used for wider GCP City Deal commitments. The programme is considered to be affordable at this stage.

Commercial Dimension

Each element of the Making Connections programme has been assessed and is commercially viable.

An initial delivery model assessment for the charging scheme and sustainable transport measures has identified outsourcing as the most appropriate model to deliver the schemes. With outsourcing in mind, the case explores the procurement models, commercial delivery models, routes to market and work packaging strategies available to procure and commercialise these schemes. These would be explored further at the next stage of the project.

The options available for procurement of the bus improvement measures include bus service tendering; enhanced partnerships, and franchising, all of which are commercially feasible and would be explored at further detail at the next stage of work.

Management Dimension

The Management Dimension sets out that the GCP is responsible for the development of the Making Connections programme, and that Cambridgeshire County Council (CCC), as the local highway authority, would fulfil the role of programme delivery body.

CCC would thus be responsible for procuring and delivering the proposed charging element of the STZ, and the delivery of the proposed sustainable transport measures with the support of appointed contractors and partners where appropriate. The Management Dimension also acknowledges the CPCA, as the local transport authority, are responsible for overseeing the delivery of the proposed bus enhancements. Further detail pertaining to programme implementation is set out in Section 6.4.

The Management Dimension considers the governance structures, resources, programme management processes and assurance arrangements of GCP and CCC and concludes that they are sufficiently capable of delivering Making Connections on time, to budget and in accordance with the programme specifications. Detailed management and governance arrangements, across and between the three partner organisations, would be set out in the Full Business Case.

A final decision to proceed with the programme is expected in summer/autumn 2025 following submission of the Full Business Case in summer 2024. The STZ could be operational from 2026.

1 Introduction

- 1.1.1. This Outline Business Case is a continuation of the SOC which was submitted to the GCP board in September 2022. It predominantly focuses on the STZ element of the Making Connections proposals, examining four scenarios that have potential merit in terms of their strategic impact. The OBC presents the strengths and corresponding trade-offs for each scenario and compares against a do-minimum scenario.
- 1.1.2. This document and accompanying Appendices are intended to assist the GCP and its Local Authority Partners to assess the relative merits of a range of scenarios for an STZ in Cambridge. It would inform GCP's Joint Assembly and Executive Board and assist in making a recommendation to Cambridgeshire County Council's Highways and Transportation Committee and thereon to a meeting of the Full Council at which a decision would be taken on whether to proceed to the next level of design of the STZ.
- 1.1.3. If approval is gained, the next stage would be to proceed to detailed design of the charging scheme, and to determine how it would operate and interface with the bus and sustainable travel measures. There would need to be engagement with potential suppliers in the market to facilitate finalisation of a commercial structure and to obtain final quotes and agree a procurement route. This would be presented in a FBC to seek final investment approval.

1.2 Context and Overview of the Proposal

City Access Strategy and The Greater Cambridge Partnership

- 1.2.1. The Greater Cambridge Partnership (GCP) is the local delivery body for a City Deal with central Government, bringing powers and investment, worth up to £1bn 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.
- 1.2.2. The Greater Cambridge area is growing fast, between 2011 and 2021 the population increased by 13% to 307,000¹³. By 2031 it is expected to be 30% higher than in 2011. Even with more flexible working than pre-pandemic, pressure on the transport network would grow¹⁴.
- 1.2.3. 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 maximising the opportunities to influence travel demand. GCP is therefore developing a number of large-scale transformational projects, designed both to support the needs of existing residents and businesses and to accommodate growth through a substantial modal shift to public transport, cycling and walking.

¹³ ONS Census (2001, 2021). *Usual Resident Population*

¹⁴ [Cambridgeshire Insight \(2021\). Population Forecast](#)

1.2.4. The City Access Programme has explored ways to deliver better, more competitive sustainable transport, particularly within the constrained city environment including the narrow historic streets in the city centre. The Programme comprises the following:

- The Making Connections programme – focusing on transformational improvements to the bus network, improving the city’s active travel environment, and reducing congestion and pollution – which is the focus of this OBC;
- Development of an Integrated Parking Strategy, including Residents’ Parking Schemes;
- Making best use of the city’s road network, through a Road Network Hierarchy Review; and
- Exploring ways to reduce commercially-generated congestion through freight consolidation.

Key Challenges

1.2.5. An overview of some of the key challenges facing Greater Cambridge is provided below:

- **Continued growth of traffic and congestion**
 - The number of motor vehicles entering Cambridge each day increased by 8% between October 2011 and October 2019¹⁵.
 - Although the pandemic resulted in significant adjustments to travel behaviours, including traffic flow volumes, data from key roads within Cambridge shows that traffic levels are now approaching their pre-pandemic peak¹⁶.
 - Between 2026 and 2041 the Cambridge Sub-Regional Model (CSRM) forecasts that the number of vehicles travelling into Cambridge would increase by 4% in the AM peak, the number of vehicles leaving Cambridge would increase by 8% in the PM peak, and the number of vehicles entering or exiting Cambridge in the interpeak would increase by 18%.
 - The relatively small percentage increases in the peak hours is, in part, due to Cambridge’s local road network already operating near to its functional capacity¹⁷.
 - CSRM model data also suggests that by 2041 total network delay across Greater Cambridge could increase by 30% in the morning peak, 75% in the evening peak and 50% in the interpeak. This demonstrates that in a heavily congested network, a relatively small increase in traffic leads to a disproportionate increase in delays.
- **A shortage of available and affordable housing** within a reasonable journey time of where people work.
 - This is in part due to the imbalance in the demand for travel versus the supply, but also the quality of public transport provision and level of delay on the highway network.

¹⁵ Cambridgeshire County Council (2021). *Traffic Monitoring Report - Changes in daily movements crossing the Cambridge Radial Cordon*

¹⁶ Cambridgeshire County Council (2023). *Transport Update: COVID-19 transport impacts and recovery (April 2023)*

¹⁷ Cambridgeshire County Council (2020). *Greater Cambridge Local Plan Transport Existing Transport Conditions Report*

- This, in turn, prevents the ‘unlocking’ of the required strategic growth in the predominately rural areas of Greater Cambridge.
- **Limited public transport choices**
 - Greater Cambridge residents prioritise investment in public transport and active travel over cars. For example, a Sustrans Report showed that residents want more Government money spent on public transport (69%), cycling (62%), walking (49%) and driving (24%)¹⁸.
 - Greater Cambridge’s bus network provides less frequent and extensive services than it did prior to the COVID-19 pandemic. This has been influenced by falling patronage, a lack of funding, increasing congestion and a network that is not sufficiently tailored to Cambridge’s polycentric growth pattern¹⁹.
 - Both Whippet and Stagecoach have reduced the frequency of peak-time services due to “vastly increased congestion”²⁰ and Stagecoach withdrew from 18 predominately rural bus routes, stating they were not commercially viable²¹.
- **Poor local air quality in Cambridge**
 - In 2004 an Air Quality Management Area (AQMA) encompassing Cambridge’s inner ring road, and all the land within it, was established due to exceedances of Nitrogen Dioxide (NO₂)²².
 - The number of days Cambridge spent in poor air quality was 28 days in 2022. Only 3 other cities (London, Southend and Norwich) recorded more poor air quality days than Cambridge in 2022²³.
 - A study by the Committee on the Medical Effects of Air Pollution (COMEAP) sets out that there is “no clear evidence of a safe level of exposure below which there is no risk of adverse health effects”²⁴.
- **High levels of greenhouse gas emissions from road traffic**
 - Road transport emissions in Greater Cambridge equate to approximately 34% of all greenhouse gas emissions in the area²⁵; this is despite transport-related CO₂ emissions declining by 31% in Cambridge between 2010 and 2020²⁶.

¹⁸ [Sustrans \(2021\). Greater Cambridge Walking and Cycling Index Statistics](#)

¹⁹ Cambridgeshire & Peterborough Combined Authority (2021). *Bus Service Improvement Plan for Cambridgeshire and Peterborough*

²⁰ Whippet (2023). *Revised Weekday Universal Timetable. 13th February 2023*

²¹ Stagecoach (2023). *Routes updated across Cambridgeshire and Bedfordshire. 4th June Service Update.*

²² Department for Business, Energy and Industrial Strategy (2022). *UK local authority and regional greenhouse gas emissions*

²³ [Centre for Cities \(2023\). Cities Outlook Report](#)

²⁴ Committee on the Medical Effects of Air Pollutants/Public Health England (2018). *Heath matters: air pollution*

²⁵ Department for Transport (2022). *Transport and Environment Statistics*

²⁶ Department for Business, Energy and Industrial Strategy (2022). *UK local authority and regional greenhouse gas emissions*

- **A city environment dominated by the car**, which discourages some people from walking and cycling and makes public spaces less attractive:
 - 66% of Greater Cambridge residents think that their streets are dominated by moving or parked motor vehicles²⁷.
 - The reliance on private vehicles to carry out short-distance trips, which could be carried out by active modes, has contributed to the rising cost of ill health in the UK. Morbidities caused by physical inactivity are associated with 1 in 6 deaths in the UK and are estimated to cost the UK economy £7.4 billion annually²⁸.
- **High Levels of Road Traffic Collisions**
 - Despite a reduction in the number and severity of road traffic casualties in Greater Cambridge, due to collisions falling by 34%, casualties remain high. In 2022, there were 449 collisions, including 42 pedestrian casualties and 163 cyclist casualties²⁹.
 - Research shows that road traffic collisions typically respond proportionally to traffic flows. Therefore, further interventions are needed to meet the 'Vision Zero' strategy, supported by CCC, which aims to eliminate all traffic fatalities and severe injuries, whilst increasing safe, healthy and equitable mobility for all.
- **Difficulty accessing employment opportunities** for people who rely on public transport:
 - In 2021, 34% of households in Cambridge did not own a car³⁰ and 26% of semi-skilled / unskilled or unemployed people did not own cars³¹.

²⁷ Cambridge City Council (2022). *Air Quality Annual Status Report* based on data from Office for Health, Improvement and Disparities

²⁸ Office for Health Improvement and Disparities (2022). *Physical activity: applying All Our Health*

²⁹ Cambridgeshire Insight (2023). *Open Data Portal – Road Traffic Collision Data*

³⁰ ONS (2021). *Car or Van Availability*

³¹ ONS (2022). *Employment and Labour Market – Annual Survey of Hours and Earnings*

1.3 Background and Context

Evolution of Making Connections Prior to OBC

- 1.3.1. Figure 1-1 shows how the proposals in the 2022 Making Connections public consultation exercise were arrived at. It shows the evolution of technical proposals from 2015 - when GCP was created - that have been refined by five formal consultation exercises (denoted in light green in Figure 1-1).

Figure 1-1 – Timeline of consultation and engagement for Making Connections



- 1.3.2. The start of Making Connections dates to the commencement of the GCP in 2015, when it initiated option exploration to reduce congestion in Cambridge. Between 2016 and 2021 a series of technical work and wide-ranging public engagements have taken place. This led to the GCP Executive Board's agreement to develop a final package of options for improving bus services, expand the cycling-plus network and manage road space in Cambridge.
- 1.3.3. GCP Making Connections public consultation was launched in late 2021. It focused on the central proposition of a transformed bus network and wider sustainable transport measures, funded through either a Workplace Parking Levy / 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.

Updating the SOC

- 1.3.4. SYSTRA were commissioned by GCP to undertake a review of the SOC and provided a report in which they put forward recommendations for the OBC. These recommendations have been incorporated and SYSTRA have been retained by GCP and provided input and advise during this OBC development.

The Options Appraisal Report

- 1.3.5. Findings from the 2021 consultation and previous work informed the first iteration of the option assessment completed and documented in 2022. Version 1 of the Options Appraisal Report (OAR) informed the SOC and the subsequent recommendations to the GCP 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.
- 1.3.6. The chosen STZ option informed the subsequent Making Connections Consultation which was undertaken between October to December 2022. Nearly 24,000 responses were received to this consultation.
- 1.3.7. Further refinement of Making Connections options took place in the first half of 2023 incorporating insights from the consultation and new technical evidence developed from early 2023.
- 1.3.8. Multiple options remained under consideration for much of 2023. It was ultimately agreed that a further options appraisal process be undertaken and presented in an updated OAR with the intention of narrowing down options for more detailed analysis in the OBC.
- 1.3.9. Using a Multi Criteria Assessment Framework (MCAF), the updated OAR assessed three new scenarios, in addition to the consultation scenario. The analysis demonstrates that all the scenarios have positive impacts in terms of congestion and environmental benefits, and they all deliver funding to facilitate transformation of the bus network and sustainable travel

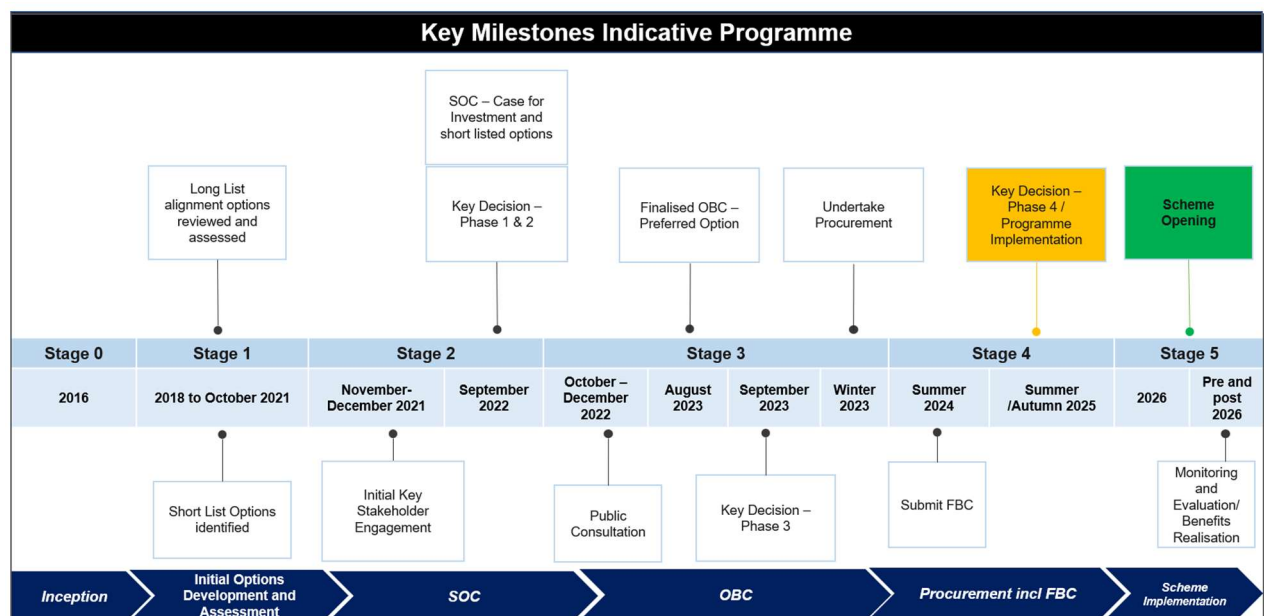
measures. On this basis, all the scenarios have potential merit in terms of their strategic impact and were taken forward for more detailed assessment in the OBC.

- 1.3.10. Option development in 2023 has refined the core option (road user charge of £5 applied 7am-7pm on weekdays) assessed in the SOC through the consideration of a range of scheme parameters based on findings from the new consultation and additional assessment undertaken. This includes values of charge at different times of day and further determination of those who may be eligible for discounts. Once the revised scheme options were established, qualitative assessments based on an MCA were carried out to assess the extent to which that the updated scheme options can meet the scheme objectives and address potential issues raised in the consultation.
- 1.3.11. Outcomes from the refinement are three formulated scenarios for Making Connections along with the consultation proposal and ‘do minimum’, which form the basis of further assessment in the development of the OBC. These were documented in the updated OAR (Version 2) and have been incorporated into the update of this report in August 2023.
- 1.3.12. A full record of the option assessment process outlined above can be found in OAR Version 2 (Appendix A).

Programme Timescales

- 1.3.13. An overview of the key Making Connections project milestones is presented in Figure 1-2.

Figure 1-2 – Key Project Milestones and Indicative Programme



2 Strategic Dimension

2.1 Introduction

- 2.1.1. This strategic dimension describes how the Making Connections programme would contribute to achieving the vision and objectives of the Greater Cambridge City Deal and how it aligns with wider UK Government objectives and policies. It also provides an evidence-based case that there is a need for intervention and that the proposed Making Connections scheme addresses this need.
- 2.1.2. Since the SOC, significant work has been undertaken to assess the expected impact of the proposed options on the transport network. An Options Appraisal Report (OAR) has been prepared in advance of this OBC which presents this analysis and is included as Appendix A. The options that are considered further in this OBC are described in Section 0 of this Strategic Dimension and their economic impacts are analysed further in the Economic Dimension.

2.2 Contents of the Strategic Dimension

- 2.2.1. The Department for Transport's '*Transport Business Case Guidance*'³² outlines topics that should be covered in the Strategic Dimension. The following table indicates where these requirements are met in this document.

Table 2-1 – Contents of the Strategic Dimension

Content	DfT Requirements	Section
Organisation overview	An outline of the strategic priorities and responsibilities of the organisation(s) responsible for the proposal (for example DfT, Highways England, or the Local Authority)	2.3
Business strategy and wider strategies	Determine the strategic fit of the proposal to the priorities of relevant organisations, the government and the regional, combined and local authorities in scope	2.4
Interdependencies	Set out the strategic portfolios, programmes and projects that the investment may interact with or link to: do they contribute towards achieving the same outcomes? Where does the intervention sit within this hierarchy?	2.5
Existing arrangements and the impacts of not changing	Provide a clear picture of the current service model that serves as the baseline from which to measure future improvements. If applicable, set out the geographical scope of the investment and the economic, social and environmental context of the area: what is the impact of not intervening?	2.7
Business needs and service gaps	Determine the organisation's business needs: these are internal and external factors that are needed for the transport intervention to fulfil its objectives	2.6
Problem identification	Describe the problem(s) identified to determine the rationale: what is the evidence base underpinning the problem? Does it justify the need for a transport intervention?	2.6

³² Department for Transport (2022). *Transport Business Case Guidance*

Content	DfT Requirements	Section
SMART spending objectives	Establish SMART objectives for what the investment sets out to achieve: these should be specific, measurable, achievable, relevant and time constrained. SMART objectives should align to the strategic priorities identified and provide clear measures of success	2.6
Scope	Explain the scope of the intervention: What would it deliver? What is out-of-scope?	2.7
Measures of success and planning for delivery	Set out what constitutes a successful delivery of the SMART spending objectives and determine the delivery arrangements. This can be conducted via workshops as per the HM Treasury business case guidance	2.8
Strategic benefits	Describe, using evidence, the strategic benefits this proposal would provide through achieving the SMART spending objectives. Identify a clear theory of change that provides a comprehensive description of how the transport investment would result in those outcomes and impacts	2.8
Strategic assessment of investment options	Evaluate the longlist and shortlist of options against the SMART objectives and assess their impact on wider strategic priorities: options that do not contribute to achieving these priorities should be discounted	2.9
Risks and constraints	Specify the main risks to achieving the SMART objectives: how would risks be mitigated and managed? Outline the constraints that could impact the successful delivery of the proposal including any relevant legislation and legal obligations that the investment engages with	2.10
Stakeholders' views and requirements	Outline the main stakeholder groups and their contribution to the development of the proposal, including their views and any conflicts between groups	2.11

2.3 Organisation Overview

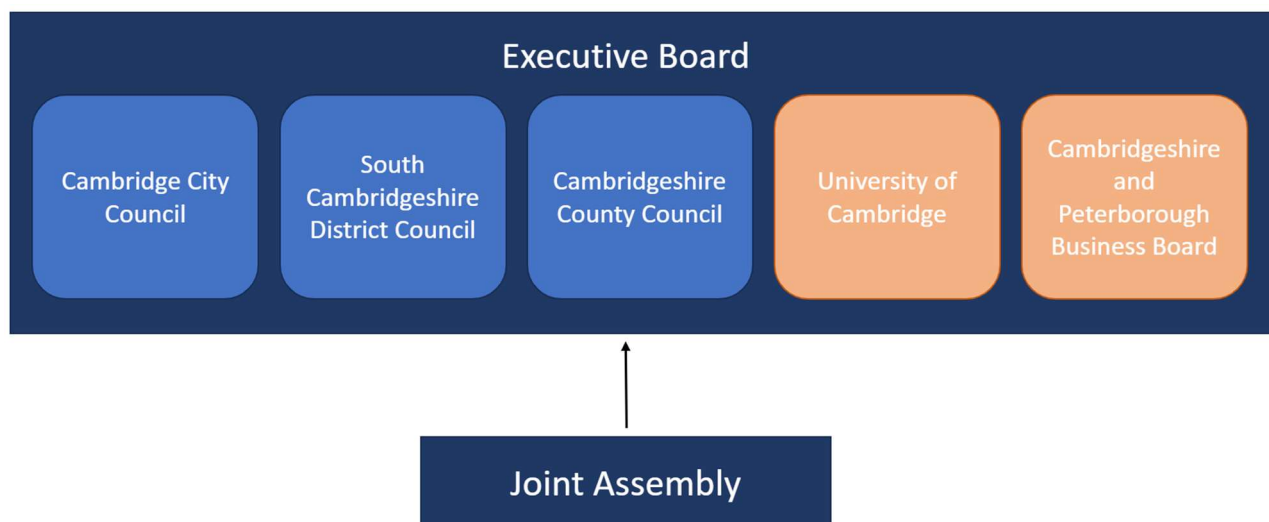
- 2.3.1. The following section sets out the strategic priorities and responsibilities of the GCP, as the organisation responsible for the Making Connections proposal.

The Greater Cambridge City Deal and the GCP

- 2.3.2. The GCP is the local delivery body for a City Deal with central Government, named the Greater Cambridge City Deal (henceforth, City Deal). The GCP was formed to deliver the aims and objectives of the City Deal negotiated with Central Government in 2014.
- 2.3.3. The City Deal, signed in June 2014, is an agreement between central government and the three local authorities (Cambridgeshire County Council, Cambridge City Council and South Cambridgeshire District Council) to invest in Greater Cambridge to encourage economic growth, benefiting the UK economy and wider society.³³
- 2.3.4. The City Deal aims to enable a new wave of innovation-led growth by investing in infrastructure, housing and skills in order to facilitate continued growth. It acknowledges the area's strong track record in delivering growth and seeks to support existing and new businesses in achieving their full potential. To achieve this, the City Deal creates:
- A governance arrangement for joint decision making between the local councils; and,
 - An infrastructure investment fund worth up to £500 million over 15 years up to 2030.

³³ [UK Gov \(2014\). Greater Cambridge City Deal Press Release](#)

Figure 2-1 – Structure and responsibilities of the GCP



- 2.3.5. The GCP is governed by an Executive Board with three voting members, supported by a Joint Assembly with 15 members. Further details are included in the Management Dimension of this OBC.

Statutory Responsibilities

- 2.3.6. The GCP has no statutory powers of its own; these are held by its local authority partners:
- Cambridgeshire and Peterborough Combined Authority (CPCA) is the local transport authority (LTA);
 - Cambridgeshire County Council (CCC) is the local highway and traffic authority; and,
 - South Cambridgeshire District Council (SCDC) and Cambridge City Council (CCC) are the local planning authorities (LPAs) for their respective areas.

GCP's Strategic Vision and Objectives

- 2.3.7. The GCP's strategic vision is 'Working together to create wider prosperity and improve quality of life now and into the future'. Its wider strategy is set out in its Future Investment Strategy (2019). The GCP has set four strategic objectives against which City Deal projects are prioritised:
- To nurture the conditions necessary to unlock the potential of Greater Cambridge to create and retain the international high-tech businesses of the future;
 - To better target investment to the needs of our economy by ensuring those decisions are informed by the needs of businesses and other key stakeholders such as the universities;
 - To markedly improve connectivity and networks between clusters and labour markets so that the right conditions are in place to drive further growth; and,
 - To ease the labour market by investing in transport and housing, in turn allowing a long-term increase in jobs emerging from our internationally competitive clusters and more university spin-offs.

How the Making Connections programme fits with the GCP's strategic vision and objectives.

The Making Connections programme is being developed to contribute to the GCP's strategic objectives by:

- Tackling the problems which inhibit growth: traffic congestion and poor access from rural areas.
- Improving connectivity between employment clusters and labour markets in order to drive further growth; and,
- Providing a sustainable source of revenue for supporting investment in public and sustainable transport measures to enhance accessibility and support a long-term increase in jobs.

2.4 Strategic Fit

2.4.1. This section demonstrates the extent to which the Making Connections programme provides synergy and fit with other projects and programmes. It also considers the strategic fit of the programme to the strategic priorities of relevant organisations and the Government.

2.4.2. The strategic fit of the following documents is summarised in Table 2-3 and is considered in detail in Appendix R. The following plans and policies have been reviewed as part of this exercise:

- Local Plan Framework
 - Cambridge Local Plan (adopted 2018).
 - South Cambridgeshire Local Plan (adopted 2018).
 - Emerging Greater Cambridge Local Plan (First Proposals, 2021).
- The Greater Cambridge Partnership
 - Strategic vision and objectives.
 - Transport vision and objectives.
 - Transport strategy.
- Cambridgeshire and Peterborough Combined Authority
 - Overarching ambitions.
 - Local Transport Plan (2020).
 - Emerging Local Transport and Connectivity Plan (consultation draft, 2022).
 - Strategic Spatial Framework.
 - Bus Service Improvement Plan (2021).
 - Net Zero Target for Carbon Emissions by 2030.
 - Local Industrial Strategy (2019).
 - Cambridgeshire Active Travel Strategy.
 - Cambridgeshire Local Cycling and Walking Infrastructure Plan.

- Cambridgeshire County Council
 - Local Transport Plan (2017).
- England's Economic Heartland: the sub-national transport body (STB)
 - EEH Transport Strategy (2021).
- The Government
 - DfT Outcome Delivery Plan (2022).
 - Net Zero Target for Greenhouse Gas Emissions by 2050 (2019).
 - Decarbonising Transport (2021).
 - National Infrastructure Strategy (2020).
 - Bus Back Better (2021).
 - Gear Change (2020).
 - Build Back Better: Our Plan for Growth (2021).
 - Levelling Up (2022).
 - Cambridge 2040 (2023).

Strategic Fit - Summary

- 2.4.3. Table 2-2 shows the scoring system used to assess how well the Making Connections programme strategically fits with the national, regional, and local policy documents listed above. The outcome of this assessment is shown visually in a simple RAG assessment, scored as in Table 2-3 below.

Table 2-2 – RAG Assessment Criteria

Indicator	Degree of Fit	Description
 Dark Green	Very strong fit	The programme is a key component or strong enabler of this policy/priority
 Green	Strong fit	The programme helps deliver important aspects of this policy/priority
 Yellow	Moderate fit	The programme supports some aspects of this policy/priority
 Grey	No fit	The programme does not contribute or negatively impact the fulfilment of this policy
 Red	Adverse fit	The programme could negatively impact the fulfilment of this policy/priority

- 2.4.4. The degree to which the Making Connections programme strategically fits with the listed policies and priorities has been determined by qualitative analysis and professional judgement. The Case for Change (Section 2.6) includes a logic map and causal chain analysis that contextualises how the Programme would contribute to the outcomes of these priorities and policies.

Table 2-3 – Strategic Fit

Organisation	Strategy	How the Making Connections Programme Fits with the Policy	Strength of Strategic Fit	Indicator
GCP	Strategic Vision and Objectives	The programme would tackle congestion and improve connectivity between employment clusters and employees. Doing so would help to facilitate future growth in Greater Cambridge.	Very strong – The Programme's outcomes directly align with the GCP's vision and objectives.	● Dark Green
GCP	Transport Vision and Objectives	A faster, further reaching, more frequent and more reliable bus network would connect people living in rural towns and villages with centres of employment. Lower levels of congestion would facilitate the reallocation of road space to active travel modes to engender further modal shift.	Very strong – The Programme's SMART objectives all relate to the GCP's strategic objectives.	● Dark Green
GCP	Transport Strategy	The Making Connections programme should reduce congestion in Cambridge through road user charging. The revenue generated should, in turn, fund a significantly improved bus network, whilst reduced traffic flows should facilitate the future reallocation of road space in favour of walking and cycling.	Very strong – The Programme is a key component and enabler of the strategy.	● Dark Green
CPCA	Overarching ambitions	The Making Connections programme would significantly enhance the connectedness, in transport terms, of the Greater Cambridge area. The facilitation of flows of capital and labour should, in turn, support the CPCA's ambitious economic growth plans.	Strong – The Programme's improvements to the transport network would engender the economic growth targeted by the devolution deal.	● Green
CPCA	Local Transport Plan	The Making Connections programme contributes to all relevant LTP objectives; notably by reducing congestion, improving bus services, supporting growth, improving air quality, and reducing carbon emissions.	Very strong – The Programme would help to deliver key objectives of the LTP.	● Dark Green
CPCA	Emerging Local Transport and Connectivity Plan	The Making Connections programme aligns with the LTCP vision. It would connect contribute to the plan objectives by connecting rural communities to employment opportunities, reducing congestion, encouraging a shift to sustainable modes of transport, reducing GHG emissions and improving air quality	Very strong – The Programme is a key enabler of the vision.	● Dark Green
CPCA	Strategic Spatial Framework	The Making Connections programme tackles key transport challenges by improving accessibility to public transport, especially for rural communities; reducing congestion, to allow growth and development; cutting GHG emissions; and improving local air quality.	Strong – The Programme helps deliver important aspects of the spatial framework.	● Green

Organisation	Strategy	How the Making Connections Programme Fits with the Policy	Strength of Strategic Fit	Indicator
CPCA	Bus Service Improvement Plan and Bus Strategy	The Making Connections programme should provide better and more affordable services in rural areas; these improvements would increase the attractiveness of bus travel and facilitate modal shift, in turn reducing GHG emissions and improving air quality.	Very strong – The Programme would help to deliver key BSIP and Bus Strategy objectives.	● Dark Green
CPCA	Net zero target for 2030 (for CPCA's own operations)	The Programme would reduce car use and encourage sustainable travel. Hence, the Programme should reduce carbon emissions, including some related to CPCA's own operations.	Strong – the Programme strongly aligns with the principles of the policy.	● Green
CPCA	Local Industrial Strategy	The Programme supports the Strategy by reducing congestion and addressing disparities in public transport provision; these factors act as barriers to economic growth and development. Reducing congestion also complements the wider portfolio of public transport and active travel schemes delivered through the City Deal.	Strong – the Programme contributes to future growth and development by tackling congestion and enhancing connectivity.	● Green
Cambridge City Council	Cambridge Local Plan	The Programme could enable planned growth and development by reducing congestion, encouraging uptake of sustainable modes of transport and delivering improvements to public transport services.	Strong – the Programme supports key objectives and enables planned growth and development.	● Green
South Cambridgeshire District Council	South Cambridgeshire Local Plan	The Programme could enable planned growth and development by reducing congestion on radial routes that connect South Cambridgeshire with Cambridge. Access to services, employment and leisure opportunities in the District would also be improved by enhancing public transport connectivity between key employment clusters and service centres, and villages and market towns.	Strong – the Programme supports key objectives and enables planned growth and development.	● Green
Cambridge City Council and SCDC	Emerging Greater Cambridge Local Plan First Proposals	The programme is included as an assumed scheme in the transport evidence supporting the emerging Joint Local Plan. It complements the existing and proposed public transport infrastructure on which the emerging spatial strategy depends. It supports the proposed pattern of development in the emerging Joint Local Plan, reduces carbon emissions, and helps deliver the key aim of enabling sustainable development.	Very strong – the Programme is a key component and enabler of the strategy.	● Dark Green
England's Economic Heartland	EEH Transport Strategy	Making Connections makes a clear move away from “business as usual” by using a charging mechanism to reduce private car traffic and fund bus services. It would reduce congestion and carbon emissions, improve rural connectivity and support Cambridge as a regionally significant economic hub.	Strong – the Programme helps deliver important aspects of the strategy at a local level.	● Green

Organisation	Strategy	How the Making Connections Programme Fits with the Policy	Strength of Strategic Fit	Indicator
Government – Department for Transport	DfT Outcome Delivery Plan	The Programme would help deliver, at a local level, the DfT's priority outcomes, by improving connectivity, confidence in the network, lowering greenhouse gas emissions and improving local air quality.	Strong – the Programme helps deliver important aspects of the plan at a local level.	● Green
Government – Department for Transport	Transport Decarbonisation Plan	The Programme would significantly reduce car use and support and encourage sustainable transport modes, including walking, cycling and public transport. This would directly reduce carbon emissions and improve local air quality.	Very strong – the Programme acts as a key enabler of the 2050 target and strategy at a local level.	● Dark Green
Government – HM Treasury	National Infrastructure Strategy	The Programme would support a key element of the strategy by reducing carbon emissions from transport and providing sustainable funding for better public transport services. It would increase the share of journeys undertaken by public transport, cycling and walking in Greater Cambridge.	Strong – the Programme helps deliver important aspects of the Plan at a local level.	● Green
Government – Department for Transport	Bus Back Better	The programme directly tackles the question of how new and improved bus services should be funded. The sustainable travel zone would provide a sustainable source of revenue for public transport, enhancing the impacts of recent and ongoing capital investment. There would be fewer trips by car and more by bus.	Strong – the Programme helps deliver important aspects of the Plan at a local level.	● Green
Government – Department for Transport	Gear Change	The STZ would incentivise people to choose alternatives to the car, including cycling and walking, though its main purpose is to encourage bus use. Reductions in traffic and potential reallocation of road space would create more attractive conditions for pedestrians and cyclists. The programme also plans to deliver walking and cycling infrastructure improvements through road user charging.	Strong – the Programme supports the Government's vision for increasing walking and cycling trips.	● Green
Government – HM Treasury	Build Back Better	The Programme is designed to support Greater Cambridge's position as a globally competitive hub for knowledge intensive industries, by creating conditions in which growth can continue without placing unacceptable demands on transport systems and the environment. The Programme aims to effectively address the problem of congestion, which would otherwise constrain growth, and delivers a step change in the public transport connectivity, enabling more people, especially those in rural areas, to access jobs and opportunities. Hence, the programme would enable green growth and help achieve Government's Net Zero ambition.	Strong – the Programme enables future growth and development by tackling congestion and enhancing connectivity.	● Green

Organisation	Strategy	How the Making Connections Programme Fits with the Policy	Strength of Strategic Fit	Indicator
Government - Department for Levelling Up, Housing and Communities	Levelling Up White Paper	The Programme aims to distribute the benefits of growth and development more equitably in Greater Cambridge. It should deliver significant and sustainably funded improvements in public transport connectivity, especially for rural communities in South Cambridgeshire. It would deliver higher bus frequencies, lower fares, and provide better links to Cambridge and the area's high-tech employment clusters. Reducing the cost and improving the level of service of bus travel, would make it easier for people on lower incomes and those without cars to access jobs and services.	Strong – the Programme strongly supports the principles of Levelling Up by delivering a transport system that is affordable and accessible for all; this would help address transport poverty and inequalities of access.	● Green

2.5 Programme Interdependencies

- 2.5.1. The GCP is developing a number of large-scale transformational projects, designed both to support the needs of existing residents and businesses and to accommodate growth through a substantial modal shift to public transport, cycling and walking.
- 2.5.2. The Making Connections programme is part of a wider City Access Strategy which includes measures such as the development of an integrated parking strategy for Cambridge and a review of the city's road network classification. The delivery and success of the Programme is thus linked to this wider strategic portfolio.
- 2.5.3. This section summarises the strategic portfolios, programmes and projects with which Making Connections may interact and where it sits within this hierarchy of schemes and programmes. Furthermore the Management Dimension sets out a longlist of potential dependencies and the extent of their relationship with the Making Connections programme.

GCP's Transport Programme

- 2.5.4. The GCP's transport programme is a development of the Transport Strategy for Cambridge and South Cambridgeshire³⁴, which was adopted in 2014 and was prepared to accompany the now-adopted Local Plans for Cambridge and South Cambridgeshire.
- 2.5.5. To deliver its transport objectives, the GCP is seeking to implement an ambitious programme of strategic infrastructure improvements. The schemes below have been developed in accordance with the GCP's strategic objectives and therefore are considered to contribute towards achieving the same outcomes as the Making Connections programme:
 - Four new high-quality public transport corridors to the north, south, east and west of the Cambridge that link key growth areas with the city centre. These would include new dedicated bus routes bypassing traffic congestion, new interchanges and stops, and facilities for pedestrians and cyclists;
 - New travel hubs, linked to the above public transport corridors, 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 users, linking communities in South Cambridgeshire to Cambridge, plus the Chisholm Trail, a north-south route linking Cambridge North to Cambridge Station;
 - Key corridor schemes within Cambridge to improve active travel and public transport, including on (Milton Road and Histon Road) or with a particular focus on active travel (Hills Road, Madingley Road and Mill Road); and,
 - Waterbeach Railway Station.
- 2.5.6. For the Making Connections programme to succeed in helping to reducing traffic in Cambridge, a citywide approach to making sustainable transport the natural and easy

³⁴ Cambridgeshire County Council (2014). *Transport Strategy for Cambridge and South Cambridgeshire*

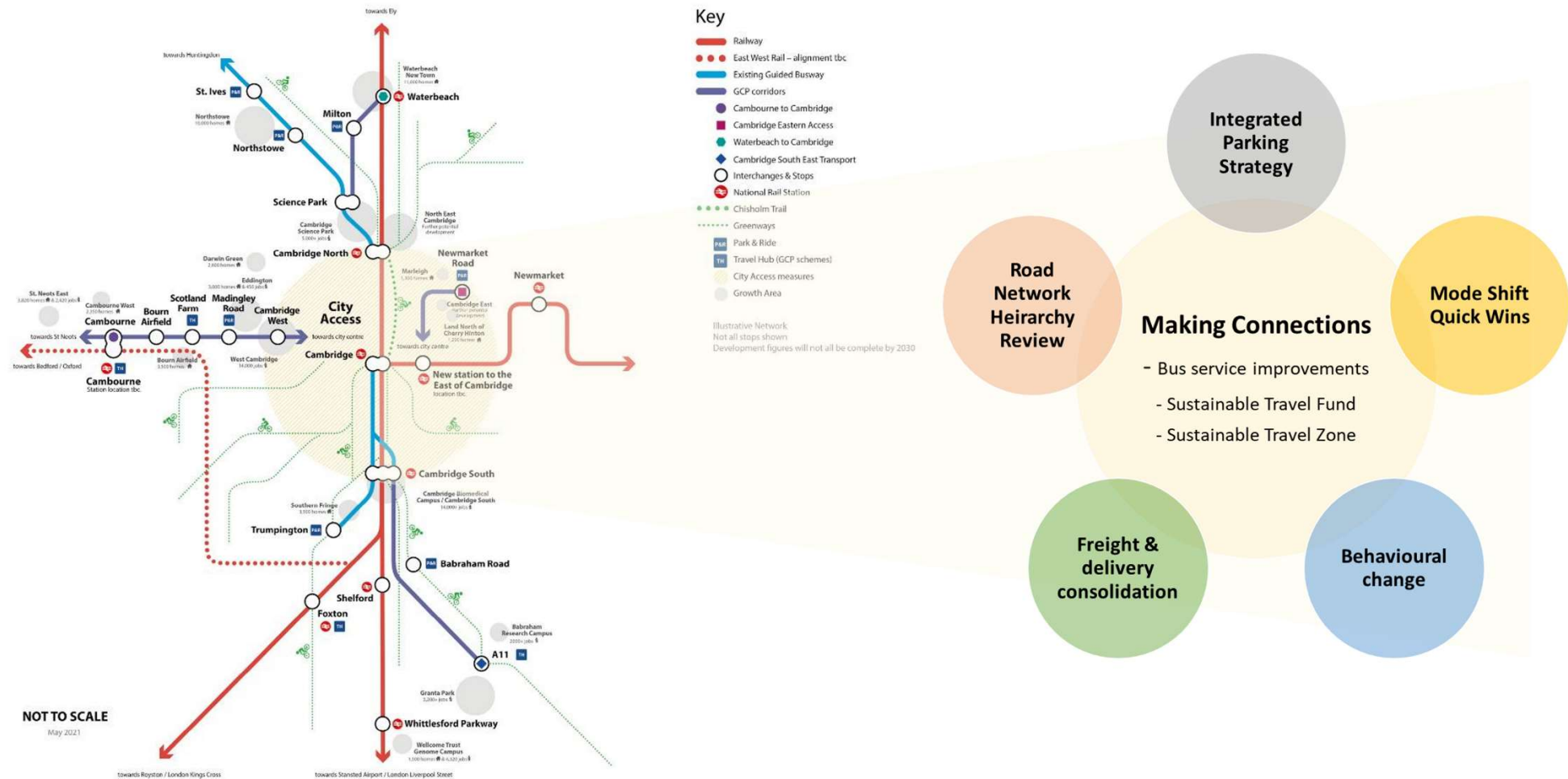
choice for journeys. The schemes listed above contribute to this by making interchange easier, providing buses with priority and enhancing active routes within Greater Cambridge.

2.5.7. Alongside the above strategic improvements, the GCP is aiming to tackle congestion and improve conditions for sustainable transport users through the 'City Access' project, which comprises:

- The 'Making Connections' scheme;
- Experimental traffic schemes comprising modal filters to help active travel;
- Addressing parking issues in Cambridge through residents parking zones;
- Cycling Plus (targeted cycling improvements, for example at Addenbrooke's roundabout as part of wider A1134 improvements); and,
- Developing a new road classification for Cambridge

2.5.8. The GCP's transport programme is illustrated diagrammatically in Figure 2-2.

Figure 2-2 – GCP Transport Programme - Future Network



City Access

- 2.5.9. City Access is a sustainable transport strategy that sits at the heart of the Greater Cambridge City Deal. Making Connections forms part of the 'City Access' element of the GCP's transport programme.
- 2.5.10. City Access aims to address some of the major pressures on the local economy by reducing congestion and pollution, and by providing people with better, healthier, more sustainable options for their journeys.
- 2.5.11. Specifically, the 'City Access' project³⁵ was conceived and developed to:
- 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; and,
 - Make Greater Cambridge a more pleasant place to live, work, travel or just be.
- 2.5.12. In addition to the GCP's transport programme, the investments included within Table 2-4 are being promoted by other organisations in the Greater Cambridge area.

³⁵ [Greater Cambridge Partnership \(2018\). Cambridge City Access](#)

Table 2-4 – The Alignment of the Making Connections Programmes with Potential Transport Schemes

Scheme (Delivery Body)	Description	Fit with the Making Connections Programme
Cambridge South (Network Rail)	A new railway station at the Cambridge Biomedical Campus	Enhanced Connectivity: Cambridge South Station would improve connectivity in the southern part of Cambridge by providing a direct rail connection to the Cambridge Biomedical Campus, Papworth Hospital and Addenbrooke's Hospital. As a new transport hub, the project would facilitate easier access to high quality public transport services for commuters, residents, and visitors. Sustainable Transportation: The project supports the promotion of sustainable transportation options over private vehicles, potentially reducing congestion and carbon emissions; this supports the vision of the Making Connections programme. Integrated Transport Network: Cambridge South Station would contribute to the development of an integrated transport network within Greater Cambridge. It would connect with existing rail infrastructure and bus services, allowing for seamless travel between different parts of Greater Cambridge. Economic Development: Cambridge South Station also supports the GCP's objective of promoting economic development in the area. The station could serve as a catalyst for growth, attracting investment, businesses, and employment opportunities to the area. It would enhance the accessibility of the Cambridge Biomedical Campus, a significant hub for medical research, and provide better connectivity to other commercial centres in the area.

Scheme (Delivery Body)	Description	Fit with the Making Connections Programme
East West Rail (Network Rail)	A new east-west rail route between Bedford and Cambridge	Enhanced Connectivity: The East West Rail project would improve transportation options for residents, students and businesses, allowing for easier travel and commuting via rail. It would also facilitate better access to employment, education, and leisure opportunities, supporting economic growth and improving overall connectivity within Greater Cambridge. Reduced Congestion: By providing an alternative mode of transportation, East West Rail has the potential to reduce road congestion. If more people opt for rail travel, especially for longer distances, it has the potential to alleviate the pressure on roads and highways within Greater Cambridge. This aligns with the objective of the Making Connections programme to address the transportation challenges and reduce congestion in the Greater Cambridge area. Sustainable Transport: The proposed high-speed connections between Oxford and Cambridge would likely lead to a modal shift away from private cars; thus supporting the GCP's objective of reducing carbon emissions and promoting sustainable transport options. Economic Growth: East West Rail would improve connectivity between the key economic hubs of Cambridge and Oxford; thus facilitating the movement of people, goods, and services. This enhanced connectivity has the potential to attract businesses investment and talent to Greater Cambridge, potentially fostering innovation, job creation, and economic development. The project aligns with the aim of Making Connection to support economic growth and ensure the area remains competitive and prosperous.
A428 (National Highways) and A10 Improvements (CPCA)	Major highway improvements to the A428 and the A10.	Enhancing Connectivity: The A10 and A428 improvement schemes would help facilitate smoother and more efficient travel for both commuters and businesses in Greater Cambridge. Hence, the schemes aligns with the GCP's objective of enhancing connectivity between key economic centres, residential areas, and transport hubs. Sustainable Transport: The Making Connections programme emphasises the promotion of sustainable transport options, such as cycling, walking, and public transportation. The A10 scheme could contribute to this objective by improving public transport provision and the incorporation of dedicated cycling and pedestrian infrastructure. Road Safety: The A10 and A428 schemes could improve road safety, by creating a more pleasant and safer environment for all road users at key junctions in particular. Transport Interchange: the proposed major highway improvements on the A428 and A10 could make the use of park and ride services at Maddingley Road and Milton more attractive to commuters.

The Making Connections programme fits with other strategic portfolios, programmes, and projects.

The Making Connections programme would complement the other elements of the GCP's transport programme, helping to enhance the value of the infrastructure investment they provide. The proposed charging scheme would generate a sustainable source of revenue to support a greatly improved bus network reaching out into rural areas and enhancing connectivity to key employment sites. At the same time, it would reduce congestion, enabling road space to be reallocated for cycling, walking and high-quality public space. Reducing congestion would also help to make bus journeys quicker and more reliable.

The development of Cambridge South station and the proposed East West Rail line would enhance public transport accessibility for people travelling to Cambridge and discourage the use of the private car.

Wider improvements to the Strategic and Local Road Network and Cambridge's forecast growth trajectory, may result in some increase in the demand to drive to Cambridge. This could further enhance the importance of bus-based Park and Ride. The proposed improvements to the bus network under Making Connections would help to make bus travel and park and ride services more attractive to potential users.

2.6 The Case for Change: Problem Identification

- 2.6.1. This section of this Strategic Dimension revisits the case for change for the proposed Making Connections programme presented previously in the Strategic Outline Case (SOC). The case for change forms the rationale for an investment. The Department for Transport's (DfT) Business Case Case Guidance³⁶ states that a robust case for change requires a clear understanding of:
 - What an organisation is seeking to achieve (the investment or spending objectives)
 - What is currently happening (existing arrangements); and,
 - What is required to close the gap between where we are now (existing arrangements) and where we need to be in the future (business needs).
- 2.6.2. Analysing a proposal in this way, helps to establish a compelling case for intervention based on real needs, rather than the contention that it is just 'a good thing to do'.
- 2.6.3. This case for change thus sets out how the existing and evolving problems and opportunities facing the Greater Cambridge area need to be addressed to bridge existing service gaps, limit negative socio-economic outcomes and, ultimately, help Greater Cambridge fulfil its growth potential in an equitable and sustainable way.

³⁶ Department for Transport (2022). *Transport Business Case Guidance*

2.6.4. To ensure the Making Connections case for change is robust, careful consideration has been given to the following factors:

- The Greater Cambridge context and the area's growth trajectory;
- The impact of COVID-19;
- Future context and external factors, dependencies, risks, and constraints; and
- The impact of doing nothing.

What is the GCP Seeking to Achieve: Strategy, Aims and Objectives

Vision

- 2.6.5. The GCP's vision for transport is: *"Creating better and greener transport networks, connecting people to homes, jobs, study and opportunity"*.
- 2.6.6. The GCP, therefore, 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 access Cambridge by public transport, cycle and on foot. 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.

Objectives

- 2.6.7. Making a robust case for change first involves setting out the rationale, drivers, and objectives for a spending proposal, which must be made SMART – Specific, Measurable, Achievable, Relevant and Time constrained – for the purposes of quantitatively appraising options and post-evaluation.
- 2.6.8. The SMART objectives for the Making Connections programme were developed through consideration of the following:
- GCP's initial concepts for the programme
 - National, Regional, and Local Policies and Plans (reviewed in Appendix R).
 - Current and Forecast Problems (see the Case for Change, Section 2.6); and,
 - Opportunities for Improvement (see the Case for Change, Section 2.6).

Strategic Objectives

- 2.6.9. The GCP's strategic objectives for the Making Connections programme were approved by the GCP Executive Board as part of their review, and subsequent approval of the Strategic Outline Case (SOC) for the Programme. These objectives are set out below:
- To contribute to the GCP target to reduce traffic by 15% from the 2011 baseline, freeing up road space for more public transport services, and other sustainable transport modes.
 - To ensure public transport is more affordable, accessible and connects to where people want to travel, both now and in the future.
 - To raise the money needed to fund the delivery of transformational bus network changes, fares reductions and improved walking and cycling routes.
 - To make it safe and attractive to walk and cycle for everyday journeys.

- To support the decarbonisation of transport and improvements to air quality.
- To make Greater Cambridge a more pleasant place to live, work travel or just be.

Specific Objectives

2.6.10. Specific SMART objectives for the Making Connections programme were developed in the SOC and further refined in the Options Appraisal Report (OAR). They are summarised as follows:

- 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 the GCP target to reduce traffic by 15% from the 2011 baseline.
- To reduce congestion in Cambridge.
- To reduce journey times and improve journey reliability.
- 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.

2.6.11. Section 2.9.3 of the Strategic Dimension sets out the Multicriteria Assessment Framework (MCAF) for Making Connections.

How the Making Connections programme fits with GCP's transport vision and objectives.

The programme would build upon planned capital investment in sustainable transport corridors by delivering a step change in the quality of bus services and by extending these services to connect more homes in Greater Cambridge with places of work, study and leisure. As well as generating revenue to support better bus services, the programme would reduce congestion and create opportunities to reallocate road space for pedestrians and cyclists.

Existing Arrangements and Why Change is Required?

2.6.12. The Making Connections case for change is driven by the issues with the current situation within Greater Cambridge outlined in the table below, which are explored and evidenced in the proceeding sections of this report.

Greater Cambridge

2.6.13. Greater Cambridge is formed of South Cambridgeshire District and the City of Cambridge; area profiles of Cambridge and South Cambridge are provided in Appendix R. The location

of Greater Cambridge, in the context of the county of Cambridgeshire, and adjacent Council areas, is shown in Figure 2-3.

Figure 2-3 – Greater Cambridge Location Plan with Surrounding Districts³⁷



- 2.6.14. 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. Although 2021 Census data was affected by COVID-19, Greater Cambridge was 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 work³⁸.
- 2.6.15. The resident population, number of households and number of jobs in the Greater Cambridge area has grown significantly in the past two decades. Data from a Centre for Cities³⁹ paper has shown that population growth in Cambridge of 18% between 2011 and 2021 was, proportionally, the highest of any city in the UK. The table below compares

³⁷ [Greater Cambridge Shared Planning \(2021\). *Emerging Greater Cambridge Local Plan*](#)

³⁸ ONS Census (2021). *Population Estimates*

³⁹ [Centre for Cities \(2023\). *City Outlook 2023*](#)

growth rates in Greater Cambridge with UK averages between 2001 and 2021. Table 2-5 shows the percentage growth in the number of people living and the number of jobs in Greater Cambridge are more than double the national average. Comparatively, the growth in the number of households is more in line with the national average.

- 2.6.16. This suggests a trend towards larger average household sizes including more shared accommodation which is a response to the housing supply and affordability challenges that the Local Plans are seeking to address. Making Connections is one of a number of transport measures being developed to support the Local Plans and so can, indirectly, contribute to addressing this.

Table 2-5 – Growth in Greater Cambridge’s Population, Households and Jobs⁴⁰

Metric	Absolute Growth Between 2001 & 2021 in Greater Cambridge	Greater Cambridge Percentage Growth	UK Percentage Growth
Population Growth	+68,821 people	29%	14%
Household Growth	+24,631 households	26%	29%
Job Growth	+53,000 jobs	33%	16%

- 2.6.17. The significant growth in population and employment in Greater Cambridge has contributed to rising traffic levels on an already struggling transport system. Between 2010 and 2019 the number of motor vehicles entering and leaving Cambridge’s radial cordon increased by 9%. The number of cars increased by 10% and the number of HGVs increased by 38%, whilst bus and coach trips in 2019 fell to 79% of 2010 levels⁴¹.
- 2.6.18. In terms of future population growth, Cambridgeshire Insight forecasts that the population of Greater Cambridge is expected to grow to 355,215 by 2031⁴². Population data from the 2021 Census shows that recent growth is ahead of this trajectory.
- 2.6.19. In terms of future job growth, the Greater Cambridge Employment and Housing Evidence Update forecast that there would be between 66,000 (central growth scenario) and 76,700 (high growth scenario) additional jobs in the area by 2041. This represented an increase of 8,000 jobs when compared to the 2020 forecasts. Hence, unless action is taken, congestion and car dependency would continue to threaten the area’s social, economic, and environmental wellbeing.
- 2.6.20. The Department for Levelling Up, Housing and Communities announced high-level proposals in July 2023 for Cambridge 2040 include a new urban quarter to the city and the delivery of up to 250,000 new homes to support Cambridge’s position in the technology and life sciences sector. The Programme is designed to support Greater Cambridge’s position in these industries, by creating conditions in which growth can continue without placing

⁴⁰ ONS Census (2001, 2021).

⁴¹ Cambridgeshire County Council (2020). *Traffic Monitoring Report*.

⁴² [Cambridgeshire Insight \(2021\). Population Forecast](#)

unacceptable demands on transport systems and the environment. The Programme aims to support growth.

- 2.6.21. The Greater Cambridge area has two adopted Local Plans (for Cambridge and South Cambridgeshire) which set out the growth in housing, employment and population within the Greater Cambridge area over the plan period, to 2031. An emerging joint Local Plan for Greater Cambridge is currently being developed, which would set out planned growth for the combined area up until 2041.
- 2.6.22. The adopted Cambridge and South Cambridgeshire Local Plans identify a need for 33,500 new homes and 44,100 new jobs by the end of the plan period (2031). The emerging Greater Cambridge Local Plan has objectively assessed the needs of Greater Cambridge and currently projects a need for 44,400 new homes and 58,500 new jobs between 2020 and 2041⁴³.

Context to the Success Story of Greater Cambridge

- 2.6.23. Greater Cambridge's economic success to date is the story of a networked and highly connected city region, characterised by world-leading innovation. Greater Cambridge has become one of the most successful and fastest growing economies in the UK, which is driven to a large extent by its knowledge intensive industries, including its thriving high-tech and biotech clusters.
- 2.6.24. Greater Cambridge has a diverse local economy with strengths across a broad base of sectors: professional, scientific, bio-medical, clean-tech, technology, and advanced manufacturing⁴⁴. It is host to some of the most productive and innovative parts of the UK economy, competing on a global stage, and attracting inward investment into its knowledge intensive industries.
- 2.6.25. Appendix R provides detailed context on the success story of Greater Cambridge, which includes the impact of the COVID-19 pandemic and the area's ongoing recovery from it.

Supercharging Cambridge 2040 – A Summary of the Government's Housing Plan for Greater Cambridge

- 2.6.26. On Monday 24th July 2023, Housing Secretary Michael Gove made an announcement on the Government's Housing Plan aim of "*supercharging Europe's science capital [Cambridge]*"⁴⁵ which could lead to significant new development in Greater Cambridge, in addition to that set out in the Cambridge and South Cambridgeshire Local Plans, by 2040.
- 2.6.27. The vision of the Housing Plan is to turn Cambridge into an area rivalling Silicon Valley, with the possibility of building 200,000 to 250,000 new homes by 2040. The government intends to create a new urban quarter in Cambridge with a significant proportion of affordable

⁴³ Greater Cambridge (2022). *Emerging Greater Cambridge Local Plan First Proposals*

⁴⁴ CPIER (2018). *The Cambridgeshire and Peterborough Independent Economic Review*

⁴⁵ [Rt Hon Michael Gove MP \(2023\). Long-term plan for housing: Secretary of State's speech](#)

homes, a sustainable transport network and substantial green spaces. Additionally, the Plan references an aim to establish new nature reserves and potentially a new National Park in the wider region.

- 2.6.28. The announcement highlighted the current limitations on Cambridge's growth due to a lack of new space for research and lab capacity, a lack of transport connectivity, housing constraints and difficulties in attracting talent.
- 2.6.29. The planned level of growth would likely put significant additional pressure on existing transportation infrastructure and exacerbate congestion issues in Greater Cambridge. However, the Housing Plan's emphasis on creating a sustainable transport network aligns with the Making Connections programme's goal of improving the bus and active travel network. This suggests that the government recognises the importance of enhancing transportation options to accommodate the expected increase in population and reduce congestion.

Key Drivers for Change

2.6.30. The Making Connections case for change is driven by the issues outlined in the table below, which are explored and evidenced in the proceeding sections of this report.

Table 2-6 – Making Connections Key Drivers

Key Driver Topic	Why is this a key driver?	Internal or External
High levels of traffic congestion	The number of motor vehicles entering Cambridge per day increased by 9% between October 2010 and October 2019⁴⁶. The impact of a greater number of motor vehicle trips is demonstrated by the significant extension of Cambridge's AM and PM peaks, by 60 and 90 minutes respectively, between 2000 and 2019. Data from Cambridgeshire demonstrates that local road traffic had recovered to 93% of 2019 levels in March 2023⁴⁶. Although the pandemic resulted in a significant reduction in vehicle use and traffic congestion, monitoring data suggests that traffic volumes and congestion are now recovering to close to pre-pandemic levels⁴⁶. The traffic modelling undertaken for Making Connections suggests there would be a significant deterioration in future highway conditions if nothing is done. The model forecasts that total peak period network delay would increase by between 30% and 75% by 2041 across Greater Cambridge. High levels of delay and congestion would lead to: • Further journey time delays, including impacts on bus travel times and reliability, as well as for drivers; • Reduced opportunities for people to access work, services, and social and leisure activities; • Consequent impacts on Greater Cambridge's high levels of productivity, which are essential to maintaining the area's position as a strategically important high-tech and bio-tech cluster; and, • Increased carbon emissions from transport, and impacts on local air quality. In terms of current perceptions, 66% of Greater Cambridge residents also think that their streets are dominated by moving or parked motor vehicles⁴⁷.	Internal and External

⁴⁶ Cambridgeshire County Council (2020). *Traffic Monitoring Report Changes in daily movements crossing the Cambridge Radial Cordon*

⁴⁷ Sustrans (2021). *Greater Cambridge Walking and Cycling Index Statistics*

Key Driver Topic	Why is this a key driver?	Internal or External
A bus network that is not sufficiently affordable, reliable or extensive	Bus reliability data demonstrates that delays to bus services have increased, and the proportion of buses arriving and departing on time has decreased, in the last decade. A bus network which is not sufficiently affordable, reliable or extensive, results in: • Reduced patronage, impacting viability and leading to routes being cut; • Communities and destinations becoming isolated and less integrated; • Higher levels of car dependency due to limited public transport connections, resulting in further reliance on private cars for those who can afford them; • More congestion; and, • Isolation for those without access to other modes.	Internal and External
An unbalanced road network that is dominated by the private car	Creates an imbalance in transport mobility, reducing access to jobs and services by excluding households who do not own a private car – totalling 21% of households in Greater Cambridge. Contributes to high levels of congestion, creating a circular problem through impacting the attractiveness of other modes. A more balanced transport network with high quality public transport and active travel provision, alongside demand management measures, would help to unlock required strategic growth in homes and jobs in Greater Cambridge.	Internal
Inequalities in car ownership and accessibility	Many Greater Cambridge residents, particularly in rural areas, have limited travel choices due to the absence of frequent, reliable and affordable public transport services. This particularly impacts those people who do not have access to a car. As a result, many lower income households are 'forced' into buying a car to access employment opportunities and services and escape potential social isolation. Forced car ownership is more prevalent in the rural areas of South Cambridgeshire where public transport and active travel connectivity is less extensive.	Internal
The commitment to make the Greater Cambridge area 'Net Zero' by 2030	Transport emissions are responsible for 35% of total emissions in Greater Cambridge. The commitment to make the Greater Cambridge area 'Net Zero' by 2030 thus requires significant reductions in greenhouse gas emissions from transport.	Internal
The need to reduce road traffic collisions and achieve Vision Zero	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. Therefore, further interventions are needed to meet 'Vision Zero, which is a strategy, supported by CCC, to eliminate all traffic fatalities and severe injuries, while increasing safe, healthy, equitable mobility for all.	Internal

Transport Issues and Opportunities

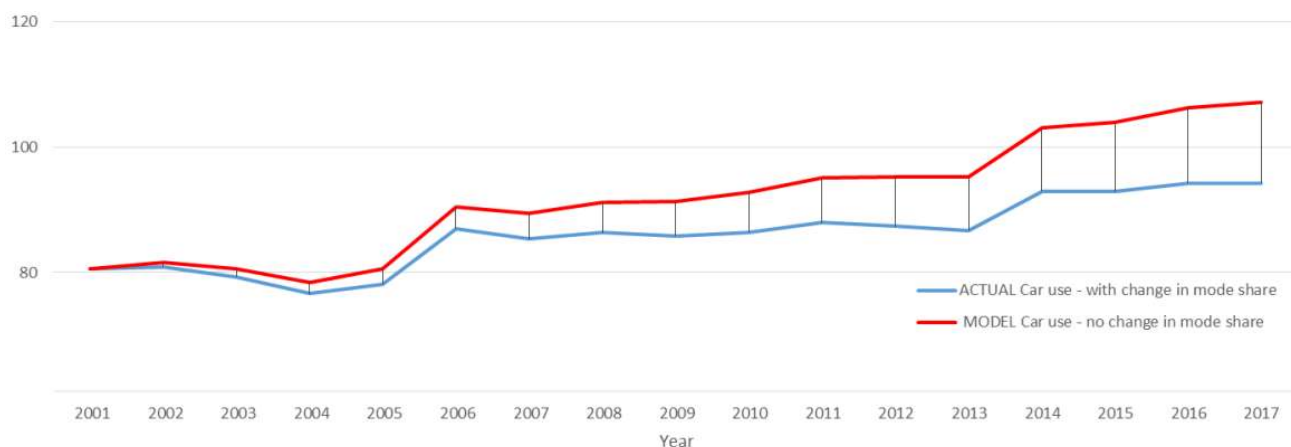
2.6.31. As required by DfT guidance, the following section provides a detailed analysis of the issues and opportunities that the Making Connections programme is seeking to address. Hence, the analysis considers the gaps between existing conditions and the programme objectives.

- 2.6.32. Please note that data collected after March 2020 has been affected by the COVID-19 pandemic. For example, the data derived from the 2021 Census was impacted by periods of national lockdown due to the COVID-19 pandemic and is not considered to be wholly representative of normal conditions.
- 2.6.33. The recovery from the effects of the COVID-19 pandemic on business and travel is ongoing and there is uncertainty about the long-term impacts. Therefore, the analysis presented in this section frequently uses data collected in 2019, or early 2020, as the latest available pre-pandemic baseline.
- 2.6.34. At the time of writing, in summer 2023, post-pandemic recovery coincides with war in the Ukraine, supply chain disruptions, a food and energy crisis and historically high levels of inflation. Therefore, the stable conditions required to define the ‘new normal’ are arguably not established; emerging datasets from 2022 and 2023 would be kept under review to strengthen the conclusion of the OBC.

Rising Transport Demand and Highway Congestion

- 2.6.35. In the last 20 years, the proportion of people who commute in private cars has decreased in Greater Cambridge; however, the impact of this positive modal shift has been offset by the net growth in car trips due to housing, job and population growth.
- 2.6.36. Figure 2-4 demonstrates that through modal switching, although actual car use for commuting has increased through time (blue line), this is at a significantly lower rate than might be expected given projections for employment growth in Greater Cambridge and assumption of no modal change (red line).
- 2.6.37. Despite this suggesting some decoupling between employment growth and car use, the trend demonstrates that a more comprehensive policy intervention would be required to provide viable alternatives to private cars and, ultimately, to more fully decouple the relationship between car travel and growth.

Figure 2-4 – Jobs (000s) in the Greater Cambridge Area Supported by Travel to Work by Car⁴⁸



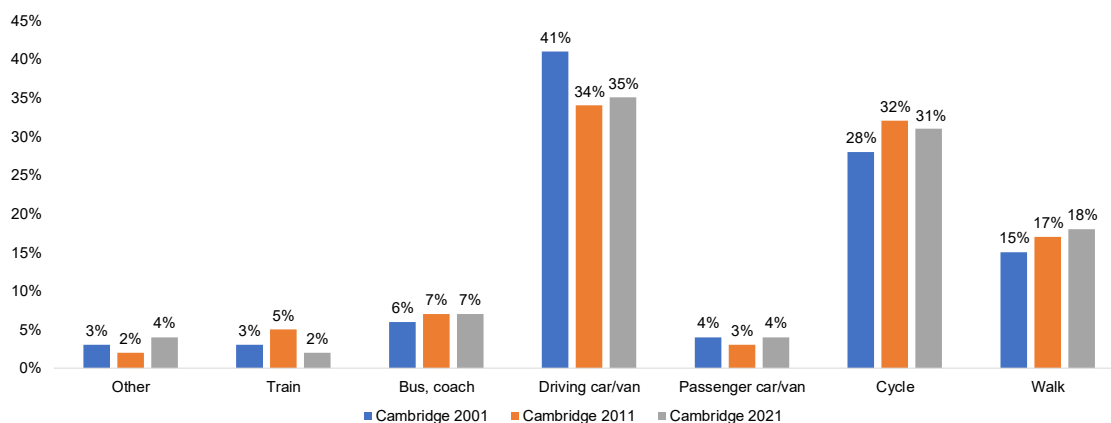
15.5% of commuters switched away from using the car between 2001 and 2017 (Source: travel for Cambridgeshire).

33% growth in jobs between 2001 and 2017 (Source: East of England Forecasting Model).

Actual growth of 14,000 two way car journeys against possible growth of 27,000 with no change in mode of transport.

2.6.38. Figure 2-5 and Figure 2-6 below provide a more detailed breakdown of how commuting mode share has changed since 2001 for residents of Cambridge and South Cambridgeshire⁴⁹.

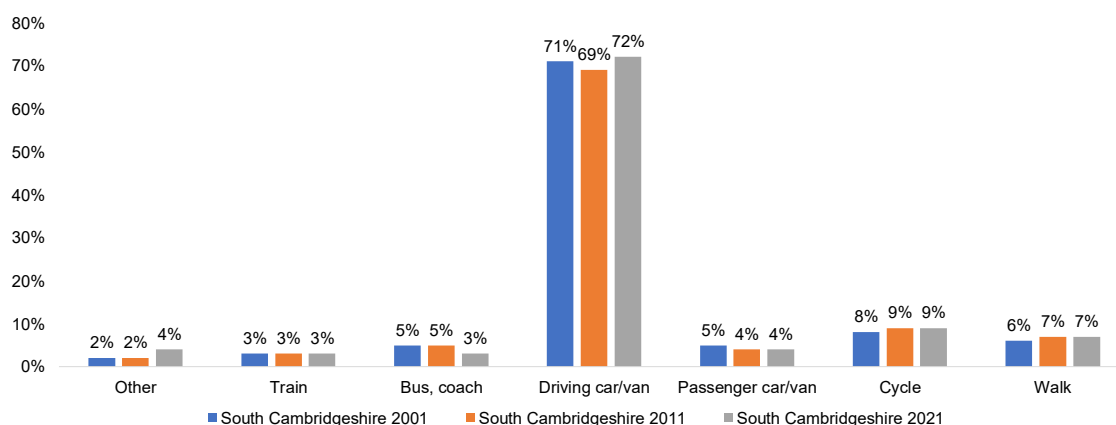
Figure 2-5 – Cambridge: Trends in Commuting Mode Choice⁴⁹



⁴⁸ [Greater Cambridge Partnership \(2019\). Technical Assessment of the impact of measures proposed as an alternative to fiscal options to address future congestion in Cambridge](#)

⁴⁹ ONS Census (2001, 2011, 2021). Method of Travel to Work

Figure 2-6 – South Cambridgeshire: Trends in Commuting Mode Choice⁴⁹



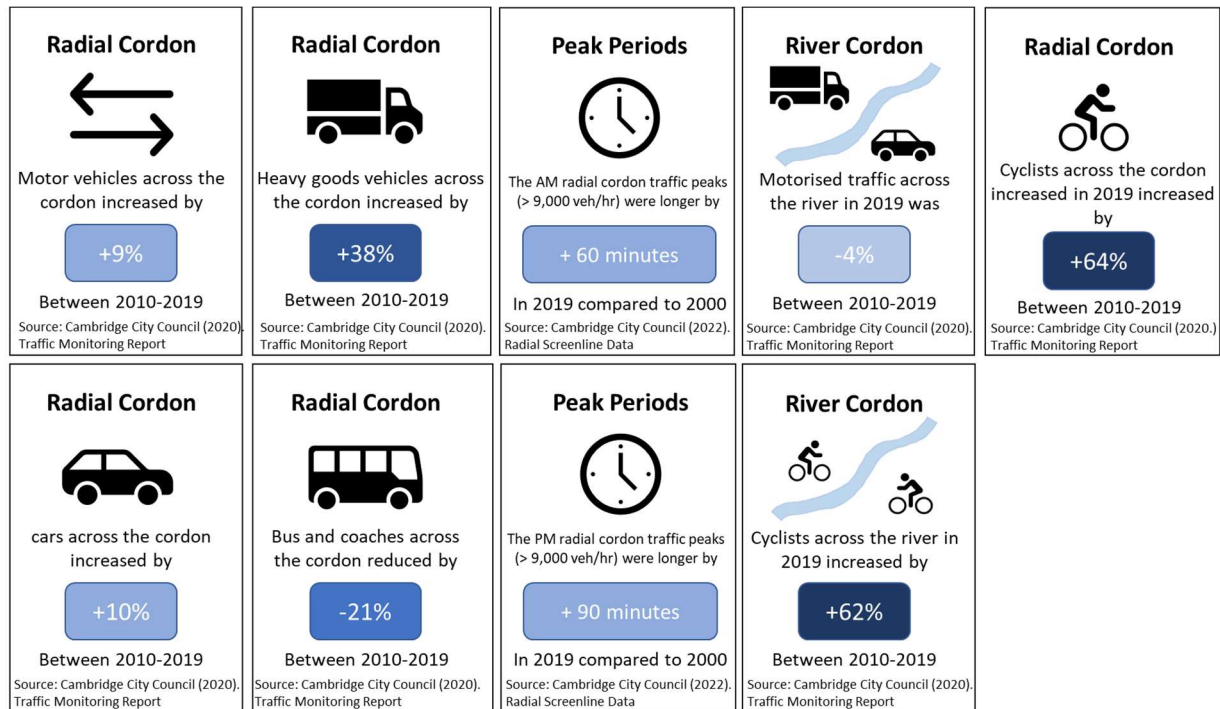
- 2.6.39. Figure 2-5 and Figure 2-6 show that the proportion of people driving to work in Greater Cambridge decreased from 54% to 51% between 2001 and 2011, despite overall increases in traffic volumes, and relatively small increases in the levels of cycling, walking and bus modal share. Bus trips increased marginally as a proportion of total commuting trips for both districts between 2001 and 2011, growing from 4% to 5%, but subsequently fell to 3% in 2021.
- 2.6.40. The 2021 commuting data is significantly different to 2001 and 2011 due to the impact of the COVID-19 pandemic and associated periods of national and local ‘lockdowns’, which advised or mandated people to work from home (WFH). As a result, there was a significant increase in WFH during 2021.
- 2.6.41. As noted above, the prevalence of WFH has reduced since the 2021 Census but is still significantly higher than in 2011. A recent ONS study into working from home, using data from September 2022 to January 2023, shows that in the East of England 45% of the population identified as home or hybrid workers (of which 14% indicated that they solely work from home) and 55% of the population do not work from home at all⁵⁰. Given the high variability in working from home trends over the last few years, it is difficult to predict the long-term balance, however it is likely that increased levels of hybrid working has been cemented.

Trends in Traffic Flows

- 2.6.42. Over the past 20 years, there has been significant vehicular traffic growth in Greater Cambridge; the consequences of which have been rising congestion and increased journey times. Figure 2-7 illustrates the severity and extent of growing congestion in and around Cambridge by comparing 2010 and 2019 data; this dataset provides the latest available longitudinal comparison that is undistorted by the impacts of the COVID-19 pandemic.

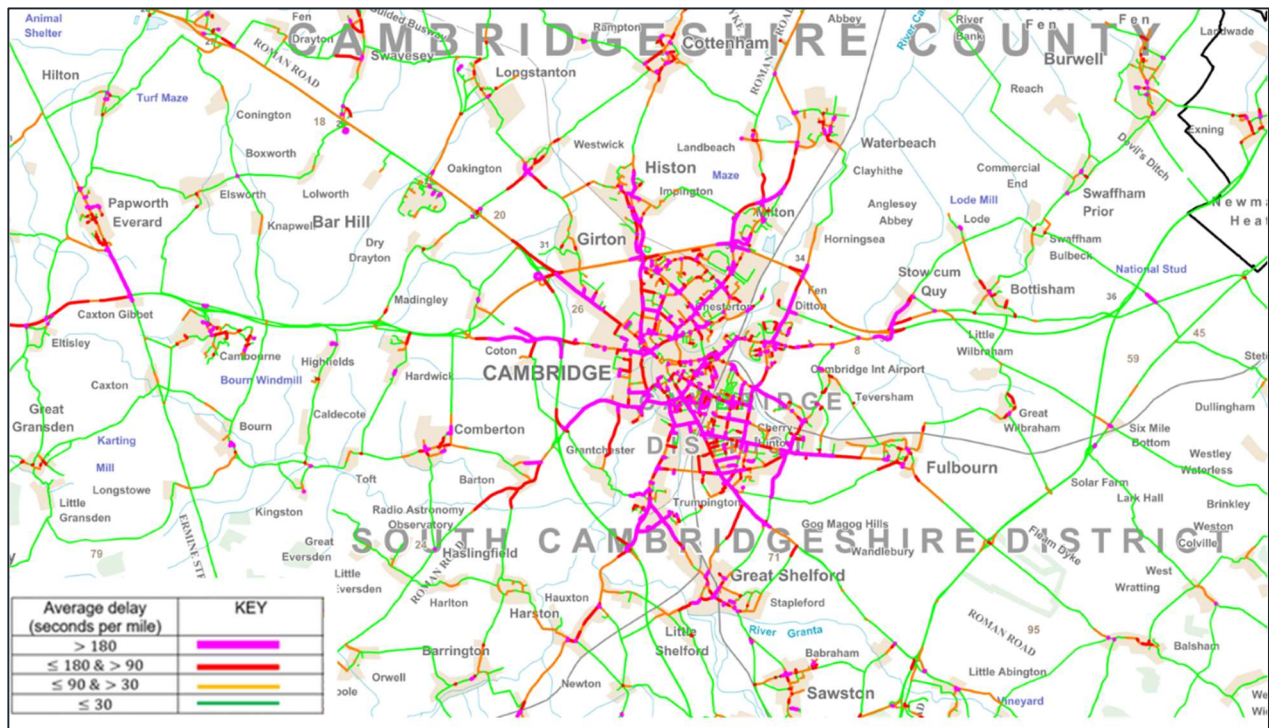
⁵⁰ ONS (2023). *Characteristics of homeworkers: September 2022 to January 2023*

Figure 2-7 – Key Traffic Flow Trends



2.6.43. The impact of increasing traffic flows is shown by the high levels of delay on the highway network in and around Cambridge. Figure 2-8 shows that, prior to the COVID-19 pandemic, delays of more than three minutes for every mile travelled are seen throughout Cambridge's built-up area and on a number of approach roads.

Figure 2-8 – Congestion (AM peak) Indicated by Delay (sec/mile)⁵¹



The Impact of the Pandemic

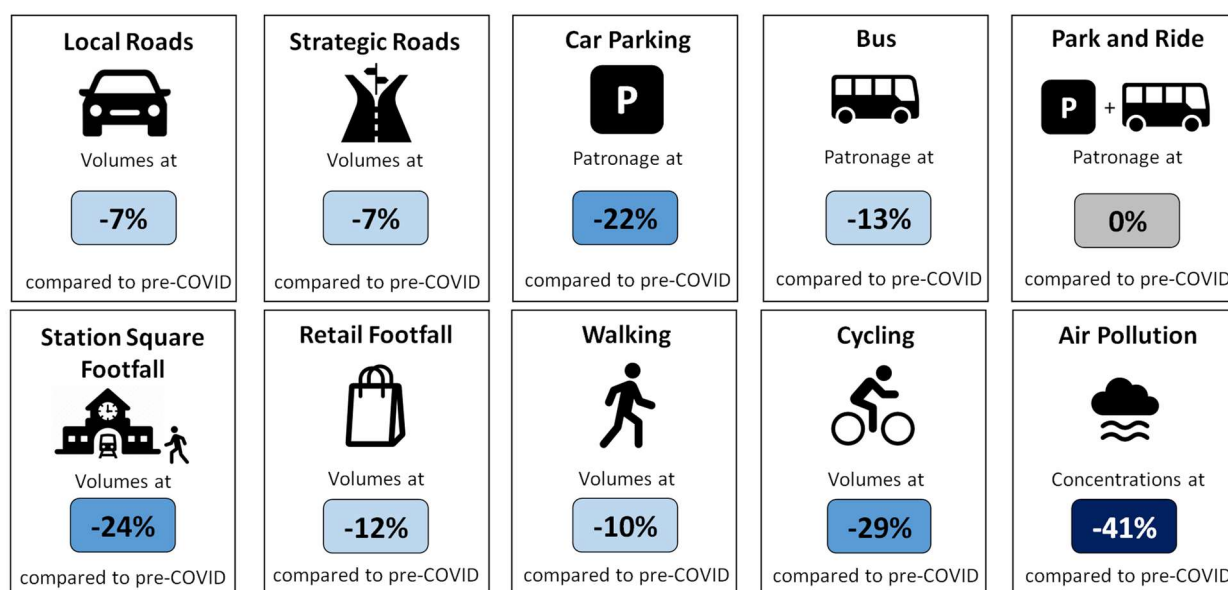
- 2.6.44. Despite the observed long-term increases in traffic flows in Greater Cambridge, the periods of national lockdowns and social distancing measures associated with the COVID-19 pandemic, and their legacy impact on travel behaviours, have had a significant impact on travel demand.
- 2.6.45. A GCP report⁵² on the transport impacts of COVID-19 showed that, during the first national lockdown (April to May 2020), when travel and personal contact restrictions were most stringent, daily traffic flows across monitored sites within Cambridge reduced by 56% compared to pre-pandemic levels⁵².
- 2.6.46. In terms of traffic volumes by mode, the monitored sites recorded a reduction in goods vehicle flows by 33% and an average reduction in bus flows of 41%. Trips by cycle and on foot also decreased by 39% and 26% respectively⁵².
- 2.6.47. Due to lower volumes of road traffic, bus and car journey times were shorter. For example, across all the monitored corridors in Cambridge, there was an estimated overall reduction in bus journey times of 27%. The reduction in general traffic across the city also meant that air quality improved by an average of 33% across all monitored locations⁵².

⁵¹ Cambridgeshire Insight (2014-15). *Congestion Map of Cambridgeshire*

⁵² Greater Cambridge Partnership (2020). *Initial COVID-19 Impact Report*

- 2.6.48. Although the long-term impact of the COVID-19 pandemic upon travel choices is still emerging, CCC's quarterly COVID-19 transport impacts: data and monitoring report⁵³ for the Greater Cambridge area provides a helpful insight into current travel behaviours.
- 2.6.49. The quarterly updates use data collected by the Council and local partner organisations to provide an indication of how travel has changed as a result of the COVID-19 pandemic and whether travel patterns are continuing to change. The latest publication highlights changes in key indicators by comparing March 2023 data with the pre-pandemic baseline (December 2019).
- 2.6.50. For walking and cycling, the analysis is based on traffic sensors, with comparable data for most months and years, at Coldham's Lane, Coleridge Road, Hills Road, Milton Road (North) and Tenison Road. Therefore, the observed data provides a useful 'snapshot' into active travel demand at key locations on the network. A broader view of active travel trip making, across the wider network, is considered in the proceeding sections.

Figure 2-9 – Headline Changes in Transport Related Metrics (Comparing data from the months prior to COVID-19 up until end of March 2023)⁵³



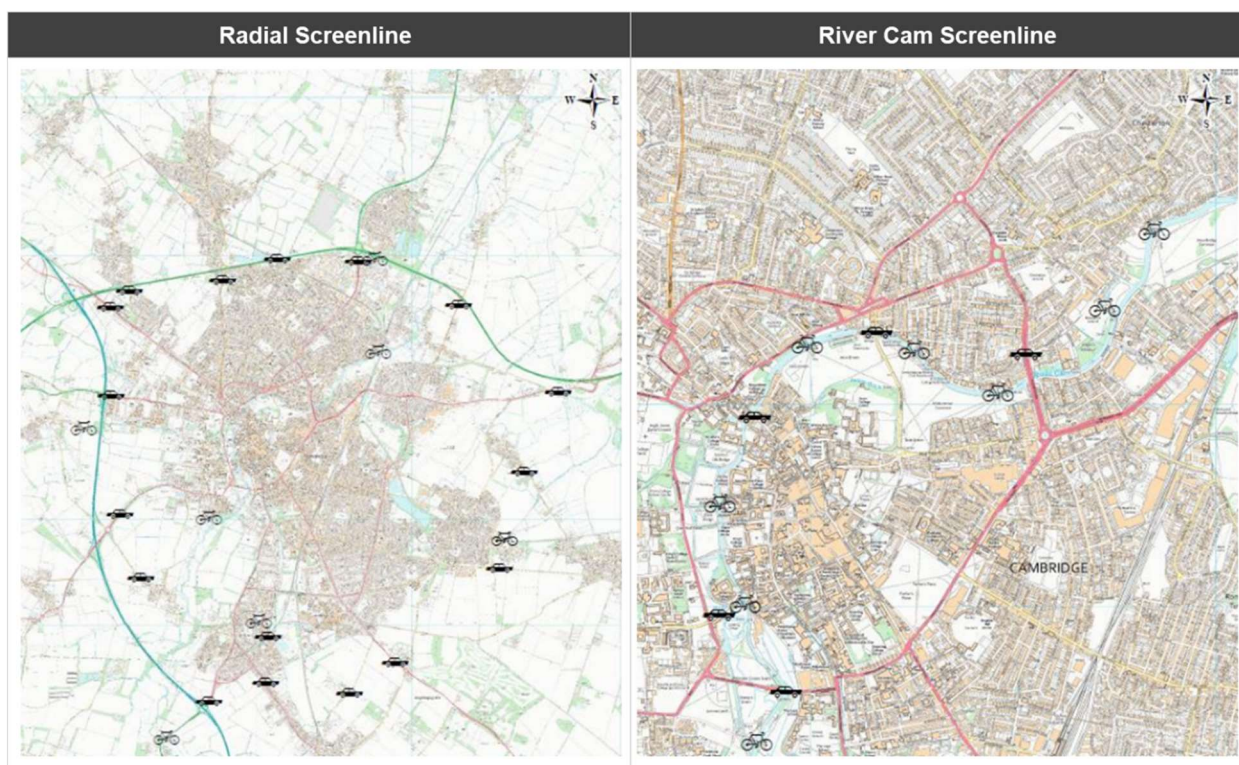
Recovering Vehicle Traffic Volumes

- 2.6.51. The level of traffic recovery varies by location in Cambridge, but, at a wider level, traffic volumes on the Strategic Road Network in Cambridgeshire and Peterborough were 27% lower than 2019 levels in 2020, 15% lower in 2021, 6% lower in 2022 and 7% lower in 2023.
- 2.6.52. Overall, traffic flows on local roads in Cambridge are also recovering. Traffic flows are monitored in Cambridge using two 'screenlines'. The first screenline runs along the River Cam where all vehicles, pedestrians and cyclists that cross bridges over the Cam in

⁵³ Cambridgeshire County Council (2023). *COVID-19 Transport Impacts: Data and Monitoring Report (April 2023)*

Cambridge are counted in the spring of each year. The second screenline is a radial cordon, with vehicles, pedestrians and cyclists on every access route into Cambridge (broadly based on the City boundary with South Cambridgeshire) being counted in the autumn. The most recently available data for the screenlines is from April/October 2021. The count points of both screenlines are shown in the figure below⁵⁴.

Figure 2-10 – Cambridge Screen line Count Points



- 2.6.53. Data from the first screenline (River Cam) showed that motorised vehicle crossings were 15% lower in April 2021 than April 2019.
- 2.6.54. The second screenline (radial cordon at the City boundary) showed that motorised vehicles were 16% lower in October 2021, in comparison to October 2019.
- 2.6.55. For context, the latest data for the local road network in Cambridge shows that in March 2023 flows were 7% lower than February 2020 levels⁵⁵.

Problem Identification: The Impact of Doing Nothing

- 2.6.56. A key reason for advocating for change, is a consideration of the consequences of doing nothing, in addition to those already committed actions to address the issues facing Greater Cambridge. The analysis in the following sections demonstrates the impact of doing nothing.

⁵⁴ Cambridgeshire County Council (2020). *Traffic Monitoring Report*

⁵⁵ [Cambridgeshire County Council \(March 2023\). Traffic Update](#)

Traffic Modelling Summary

- 2.6.57. The Cambridge Sub Regional Model (CSRM)⁵⁶ has been used to understand the future performance of the transport network in the absence of the proposed Making Connections programme for 2026 ('do minimum') and 2041 ('future baseline scenario').
- 2.6.58. CSRM is an established land use and transportation model, which incorporates housing, employment, transport demand and transport infrastructure. Testing with the model allows the outcomes of differing scenarios to be assessed, to identify which perform best across a range of criteria.
- 2.6.59. As noted above, model runs have been undertaken for a 2026 'do-minimum' scenario and for a 2041 future baseline scenario, which assumes First Proposals Local Plan growth and the implementation of a number of committed transport schemes, but not Making Connections.
- 2.6.60. The 2026 model run can be used as a proxy for present day conditions and, by comparing data from 2041 and 2026, it is possible to gain an understanding of how traffic conditions might change in the future in the absence of Making Connections. Alongside this, stress testing has been undertaken in the Financial Dimension to test the impact of alternative traffic growth assumptions on potential STZ revenues and spend on bus enhancements and sustainable transport initiatives. Uncertainties surrounding post-COVID recovery have also been recognised in the sensitivity test in the Economic Dimensions following the approach proposed in the accompanying ASR.

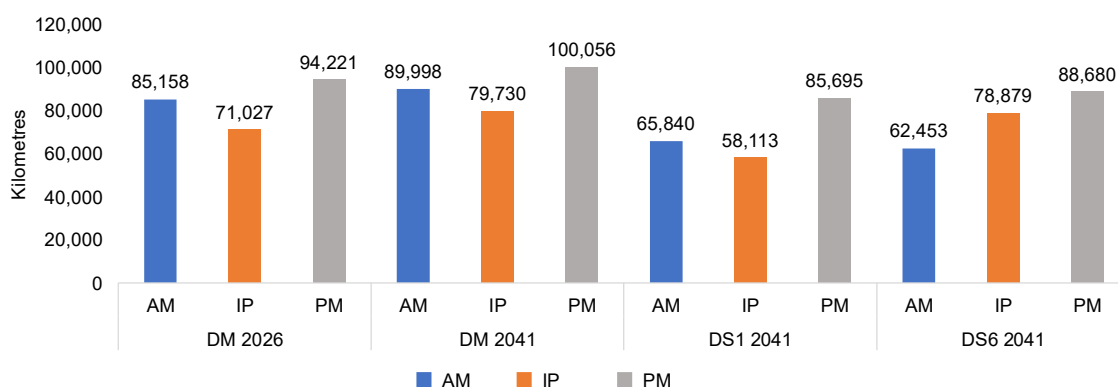
The Impact on Total Travel Distances

- 2.6.61. The modelling suggests that, for Greater Cambridge as a whole, total PCU-km ('passenger car unit kilometres') could increase by 12% and 14% during the AM and PM peak periods respectively to 2041. Total PCU-km is a measure of total aggregate travel demand on the highway network. This is due to a combination of factors including the general growth in population and employment, increases in journey lengths for some residents and employees as they are forced to live further from their workplace, and continued car use for many journeys.
- 2.6.62. During the interpeak, greater growth is forecast (+21%); this reflects so-called 'peak spreading' outside of the traditional 'rush hours'. Peak spreading is a behavioural response: some motorists may shift their travel departure times to slightly before or after the peak period in response to increasing traffic congestion. As a result, the length of the congested period may grow.
- 2.6.63. Within the area of the proposed STZ, lower levels of growth are forecast. A growth in travel distances of 6% is forecast in the AM and PM peaks, compared to around 12% in the interpeak period. This is due to a number of factors, including those summarised below:

⁵⁶ Cambridge Sub-Regional Model – Data provided by Atkins

- The largest Local Plan growth would take place outside of Cambridge;
- The highway network is already constrained in Cambridge, so there is less scope for traffic growth;
- Modal choice is greater in Cambridge, meaning the ‘threshold’ (in terms of delay) at which people shift modes is lower.

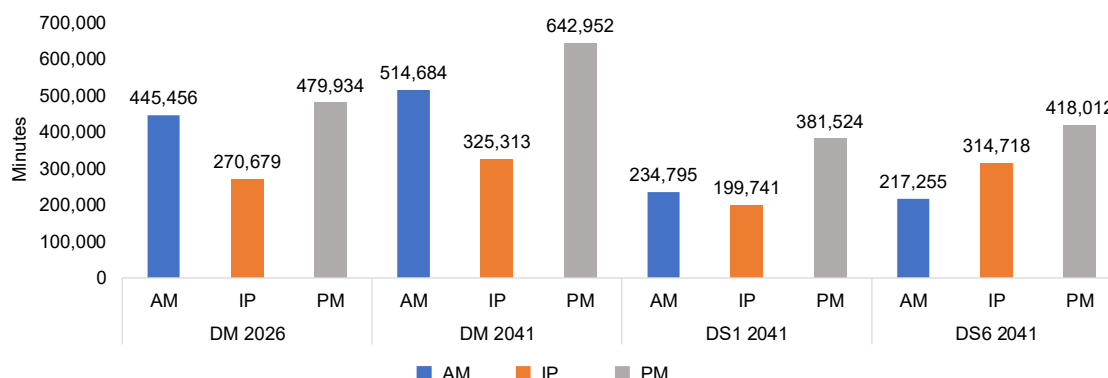
Figure 2-11 – Total Travel Distance (PCU Kms) in the Charge Area⁵⁶



The Impact on Total Travel Time

- 2.6.64. The data also tells us that travel times would increase. For Greater Cambridge as a whole, total PCU-minutes (‘passenger car unit minutes’) could increase by 19% and 39% during the AM and PM peak periods respectively to 2041. Total PCU-minutes is a measure of the total aggregate time spent travelling on the highway network.
- 2.6.65. Total travel times are predicted to increase at a faster rate than PCU-km, reflecting increased levels of congestion (see discussion below on average speeds and network delay). This is because, when a network is congested, any increase in demand leads to a disproportionately greater increase in delay and hence a decline in speeds.
- 2.6.66. Within the area of the proposed STZ, lesser levels of growth are forecast (16% and 34% growth in the AM and PM peak periods respectively). However, these rates of growth in total travel time in the STZ are significantly greater than those in total travel distance, when compared to Greater Cambridge as a whole. Here, speeds are already much slower than outside the STZ and the network is operating inefficiently. Significant further traffic growth is therefore constrained but, that growth which does occur, results in disproportionately bigger increases in delay and overall travel time. In effect, each additional vehicle travelling in the area of the proposed STZ contributes disproportionately to further delays.

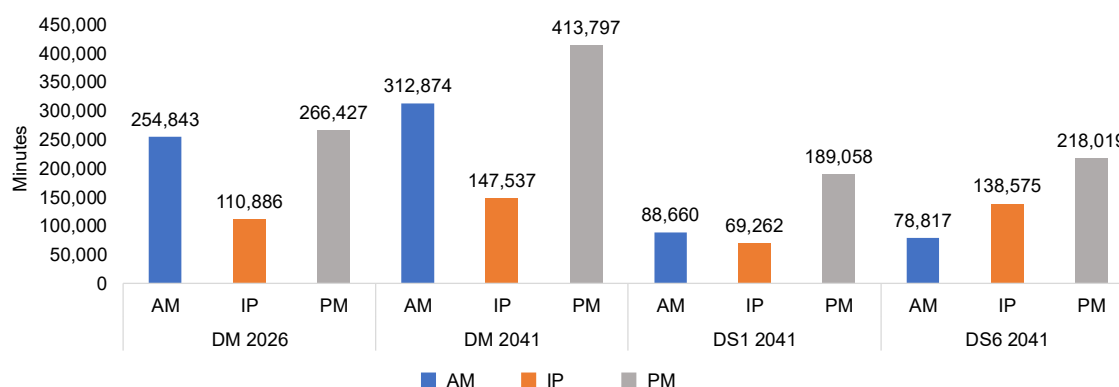
Figure 2-12 – Total Travel Time (PCU Minutes) in the Charge Area⁵⁶



The Impact on Network Delay and Average Travel Speeds

- 2.6.67. Network delay is a measure of the excess travel time incurred on the network when compared to uncongested travel times.
- 2.6.68. Here, model data suggests that total network delay across Greater Cambridge as a whole, could increase by 30% in the morning peak, and 75% in the evening peak, by 2041. Comparatively, interpeak network delay is predicted to increase by almost 50%.
- 2.6.69. The impact of increasing network delay is likely to exacerbate the existing the observed patterns of ‘peak-spreading’ between 2000 and 2019, which is evidenced in Figure 2-7.

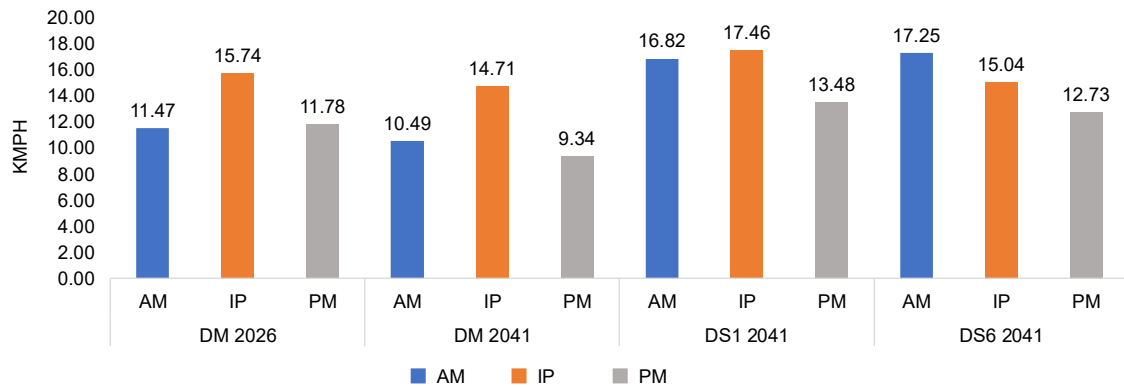
Figure 2-13 – Network Delay (PCU Minutes) in the Charge Area⁵⁶



- 2.6.70. Average network speed is an indicator of the overall level of service provided by a highway network. It represents the interaction between demand and supply such that, under high levels of demand, average speeds decline indicating a prevalence of congestion.
- 2.6.71. Model data suggests that, across Greater Cambridge as a whole, average speeds in the AM peak period could decline from around 32km/h to around 30km/h (i.e. a reduction of 6%) with PM peak period speeds declining from around 33km/h to 27km/h (i.e. a reduction of 18%).
- 2.6.72. Within the area of the proposed STZ, average speeds are much lower than those across Greater Cambridge as a whole. The model suggests that AM peak period average speeds

in the STZ area could decline from around 11.5km/h in 2026 to around 10.5km/h by 2041 (i.e. a reduction of 9%), with PM peak period speeds declining from around 11.8km/h to 9.3km/h (i.e. a reduction of more than 20%).

Figure 2-14 – Journey Speed (kmph) in the Charge Area⁵⁶



Summary

- 2.6.73. Demand for travel on the highway network is forecast to increase across Greater Cambridge. With rising demand, the model suggests a further deterioration in highway conditions, with total peak period network delay forecast to increase by between 30% and 75% by 2041 across Greater Cambridge as a whole.

What is the potential traffic impact of not implementing Making Connections?

The number of motorised vehicles that enter and exit Cambridge increased by 9% between 2010 and 2019, whilst the capacity of the highway network remained largely unchanged. This growth in traffic flows resulted in increased congestion and longer journey times for both car drivers and bus users.

Although COVID-19, and the associated periods of national lockdowns, resulted in significantly reduced traffic flows in 2020 and 2021, observed traffic flows are increasing and had recovered to only 7% lower than 2019 levels as of March 2023. Comparatively, bus trips have recovered more slowly, with bus patronage in March 2023 being 13% lower than in 2019.

The CSRM model forecasts significant increases in network delay and journey times and significant decreases in journey average speeds up to 2041 if nothing is done to address the causes; namely:

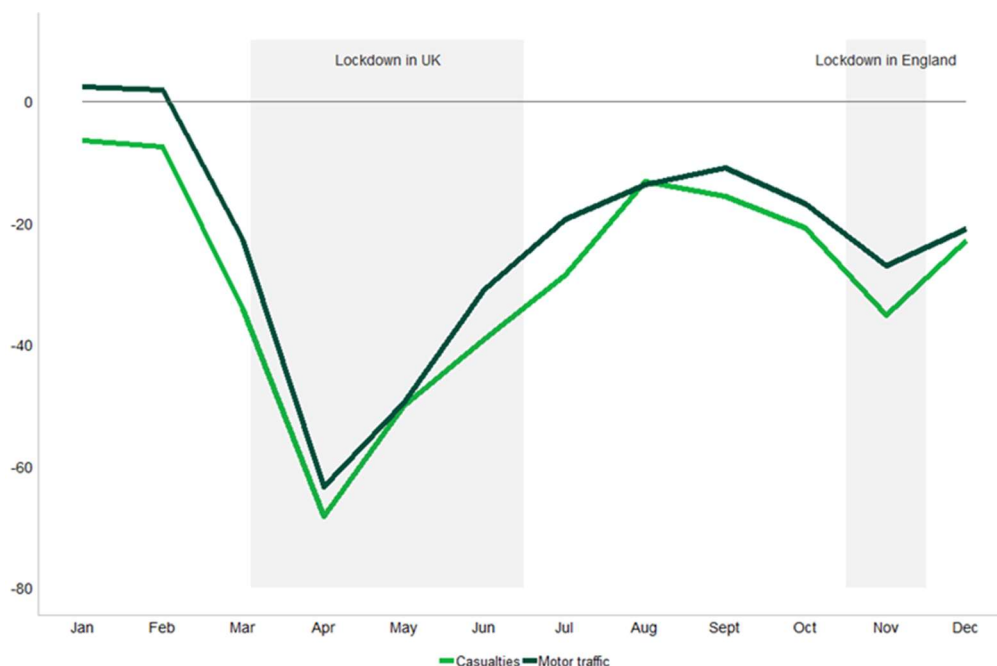
- Journey times would increase by 19% (AM Peak) and 39% (PM peak) in Greater Cambridge;
- Network delay would increase by 30% (AM Peak) and 75% (PM peak) in Greater Cambridge; and,
- Average speeds would decrease by 9% (AM Peak) and 20% (PM peak) in the STZ area.

High Levels of Road Traffic Collisions

- 2.6.74. Research shows that road traffic collisions typically respond proportionally to traffic flows; this was evidenced by DfT analysis⁵⁷ 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 2-15.

⁵⁷ Department for Transport (2021). *The impact of lockdown on reported road casualties Great Britain*

Figure 2-15 – Percentage change of casualties of all severities and motor traffic, compared to 3-year average for 2017 to 2019, Great Britain, 2020



- 2.6.75. 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 Cambridge⁵⁸. In order to be included in the recorded dataset, collisions must result in injury to a person on a sliding scale from slight injury – serious injury – fatal injury.
- 2.6.76. In Greater Cambridge, in 2022, there was one collision which resulted in a pedestrian fatality and two which resulted in cyclist fatalities. Over the last five years, there have been eight collisions which resulted in a pedestrian fatality and nine which resulted in a cyclist fatality. The DfT estimate that, in addition to human loss and suffering, the average societal cost of collisions which result in fatalities is approximately £1.65 million⁵⁹; hence, based on DfT estimates, the 17 pedestrian and cyclist fatalities that occurred in Greater Cambridge would have cost the UK economy approximately £28m⁶⁰.

⁵⁸ Cambridgeshire Insight (2023). *Open Data Portal – Road Traffic Collision Data*

⁵⁹ Department for Transport (2023). *TAG Databook – Average Value of Prevention Pre-Casualty*

⁶⁰ Values are presented in Department for Transport's Base Year of 2010

What impact could Making Connections have on road traffic collisions?

The traffic modelling work undertaken for Making Connections suggests that, under all options, overall traffic flows are forecast to decline within the Sustainable Travel Zone 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 and hence further reduce casualties related to those modes.

Unattractive Bus Services with Decreasing Commercial Viability

- 2.6.77. 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.
- 2.6.78. The local bus network comprises a range of different types of service, including city, park and ride, local provision and a pilot demand responsive transport (DRT) service. Although the current bus network provides a base on which to build, for those without a car the combination of high cost and poor-quality public transport reduces access to opportunities.
- 2.6.79. Overall, Greater Cambridge's bus network now provides less frequent and extensive services than it did prior to the COVID-19 pandemic. This has had the effect of increasing isolation and reducing transport connectivity for those without access to a car, particularly impacting rural communities with fewer transport options. Analysis of daytime bus frequencies, on those routes with an hourly or more frequent service to Cambridge, indicates that total buses per hour declined by around 19% over the period from immediately prior to the pandemic to August 2023. CPCA have also indicated that the bus network is now around 20% smaller than prior to the pandemic.
- 2.6.80. Congestion in Cambridge has also impacted bus operations. For example, a news release from the Whippet website from February 2023⁶¹ stated that to accommodate for "vastly increased congestion in Cambridge", it has had to scale down frequency of its Universal bus services from 10 to 8 buses during peak hours. Similarly, on 4th June 2023, Stagecoach announced service changes to the Cambridge Citi 1 and Citi 2 services due to the impact of congestion on the highway network; the Citi 1 now runs according to a 12-minute peak frequency, instead of 10 minutes, from Monday to Saturday "to combat [the effects] of congestion"⁶².
- 2.6.81. Additionally, in October 2022, Stagecoach withdrew 18 predominantly rural bus routes in Cambridgeshire. Stagecoach stated that the services were no longer financially viable due to a drop in passenger numbers to around 75% of pre-pandemic levels.

⁶¹ Whippet (2023). *Revised Weekday Universal Timetable*. 13th February 2023

⁶² Stagecoach (2023). *Routes updated across Cambridgeshire and Bedfordshire*. 4th June Service Update.

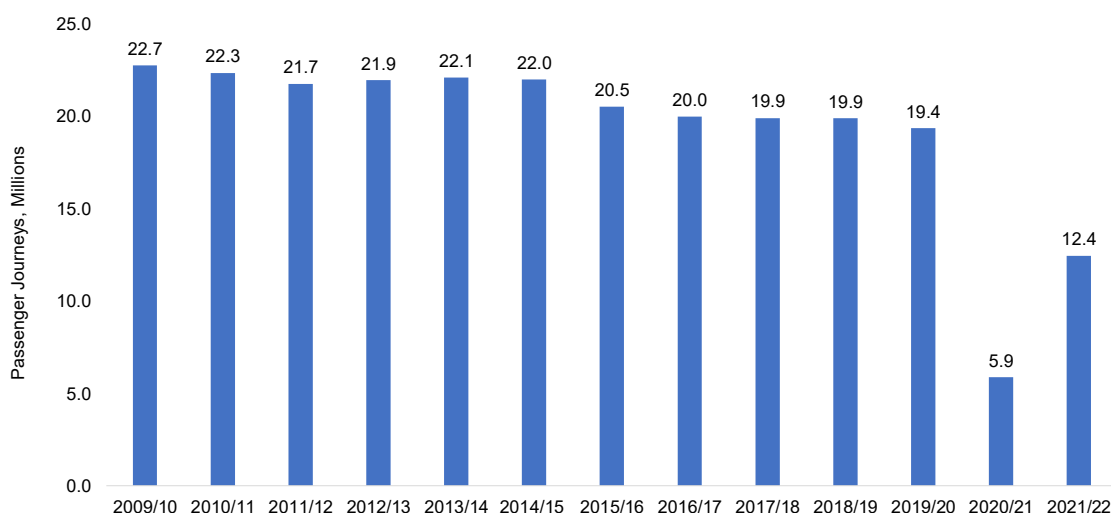
- 2.6.82. The low levels of observed patronage provide evidence that rural bus services in the County are not attractive in their current form and demonstrate the need for the frequent, faster, cheaper and more reliable bus network proposed under Making Connections.
- 2.6.83. A lack of affordable, reliable public transport also encourages car use, which can increase congestion and, in turn, makes services slower and less attractive.
- 2.6.84. The issues with the current bus network can be summarised as follows:
- Bus patronage has been falling⁶³, 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;
 - Journey time reliability is a key issue, particularly for services that connect into Cambridge;
 - The frequency and connectivity of bus services is a significant issue, particularly to people living in rural areas of South Cambridgeshire; and,
 - Fares and the cost of travelling by public transport are also a barrier to increased bus use.
- 2.6.85. These issues were borne out 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.
- 2.6.86. Overall bus patronage levels have been falling in Greater Cambridge in the past decade. The exceptions to this trend are the Cambridgeshire Guided Busway (CGB) and Cambridge Park and Ride services. The CPCA Bus Service Improvement Plan (BSIP) states that these services are notably less impacted by congestion due to the use of existing infrastructure to segregate buses.
- 2.6.87. Evidence of the impact of fast and reliable bus services is shown by an analysis of bus modal share for commuters. In the GCP's 'Our Big Conversation' (2017) survey, findings revealed that bus use as a method of travel to work in most postcode districts around Cambridge was 5-8%. By comparison, for St. Ives, which is located at the northern end of the CGB track, it was 35%; this demonstrates the impact of the CGB on local travel choices.
- 2.6.88. With regard to the perceived value for money of bus services, initial evidence collated by passenger watchdog Transport Focus, suggests that, in the UK, 11% of people are now using the bus more as a result of the UK Government scheme that caps the price of single bus journeys at £2.

⁶³ Department for Transport (2023). *Bus Statistics Table BUS01e*

Falling Patronage⁶³

- 2.6.89. Data from the Department for Transport showed that Patronage decreased in Cambridgeshire by 12% between 2009 and 2019;
- 2.6.90. In September 2021, due to the impact of COVID-19 on travel behaviours, bus patronage in Cambridge was 62% of the patronage level recorded in September 2019:
- By December 2022, bus patronage in Cambridge had recovered, but was still 27% lower than in 2019.
 - The latest available data from March 2023 demonstrates that bus patronage has recovered more quickly since December 2022; it was only 13% lower than 2019 levels. This increase in bus patronage coincides with the introduction of the UK Government scheme that caps the price of a single bus fare to £2 until 31st October 2023.

Figure 2-16 – Passenger Journeys on Local Bus Services – Cambridge⁶³



- 2.6.91. In summary, bus travel, as a modal choice, is significantly less attractive than it was a decade ago. Moreover, the recovery of bus patronage, between the end of Government imposed lockdowns and December 2022 was lower than any other mode of transport in Greater Cambridge. The introduction of the £2 bus fare cap has seen patronage recover, but, as of March 2023, is still 13% lower than 2019 levels.
- 2.6.92. The net reduction in patronage, despite the aforementioned population growth, may be attributable to the relative dissatisfaction of passengers with the punctuality and value for money of bus services. Here, 2019 customer satisfaction surveys showed that, for the wider CPCA area, 26% of people were not satisfied with the punctuality of bus services and 40% of people did not think the services provided value for money, which increased to 44% for 16-34 year olds. A wider consideration of customer satisfaction is considered below.

2.6.93. Research undertaken by the DfT in 2021⁶⁴ also showed that anxiety about catching COVID-19, of journeys being disrupted due to changing timetables or vehicles being at full capacity amid social distancing, has had a significant influence on public transport patronage. However, this research took place whilst social distancing measures were in place.

2.6.94. Notably the research showed that the perceived threat of confrontation between those who were coughing or sneezing, non-mask wearers, and those most worried about catching the virus, was a common reason people gave for avoiding public transport. Given social distancing measures have now been withdrawn, and that mask wearing is not commonplace in public spaces, it is likely that the impact of COVID-19 anxiety on travel behaviours would have reduced.

Journey Times and Reliability

2.6.95. The GCP undertook an extensive travel behaviour study within Greater Cambridge in 2017 as part of its 'Big Conversation'⁶⁵. The outcomes of this study acted as a catalyst for the City Access programme.

2.6.96. 40% of respondents to the study identified the lack of public transport services and the reliability of existing services as a 'big challenge' that impacted their modal choice. Furthermore, 40% of respondents from Cambridge and 56% of respondents from South Cambridgeshire indicated that 'significantly improving the public transport network in terms of availability, capacity, reliability and, as far as possible, affordability would be of great benefit to them'⁶⁵.

2.6.97. There are a number of potential causal factors that explain the punctuality and reliability issues of bus services in Greater Cambridge. One significant factor is the lack of bus priority. For example, within Cambridge city, buses primarily share the carriageway with general traffic (with the exception of bus lanes on some radial routes and in the city centre, which are not feasible to implement on all routes). As a result, traffic congestion affects bus journey times, with these delays then being factored into timetables.

2.6.98. Vehicle tracking data on routes accessing Cambridge City Centre indicates that only 79% of buses departed from their origin stop on time in 2019⁶⁶. Subsequent delays and uncertainty around the bus timetables thus affects the popularity and potentially viability of bus routes. Data is also available on a longer timescale which demonstrates that the average excess waiting time for frequent services in Cambridgeshire (excluding Peterborough) has been steadily rising in the decade preceding 2020 with 0.7 minutes of excess waiting time in 2008/2009, rising to 2.1 minutes of excess waiting time in 2018/2019⁶⁷.

2.6.99. With regard to the perceived value for money of bus services, initial evidence collated by passenger watchdog Transport Focus suggests that, in the UK, 11% of people are now

⁶⁴ DfT (2022). *Confidence in Public Transport*

⁶⁵ Greater Cambridge Partnership (2017). *Our Big Conversation: Key Findings*

⁶⁶ Cambridgeshire and Peterborough Combined Authority (2021). *Bus Service Improvement Plan*

⁶⁷ Department for Transport (2023). *Bus reliability and punctuality (BUS09b)*

using the bus more as a result of the UK Government scheme that caps the price of a single bus fare to £2 until June 2023. The emerging evidence on the impact of the national fare cap provides 'real life' behavioural evidence of the potential impact that the proposed Making Connections bus fare cap could have on modal shift.

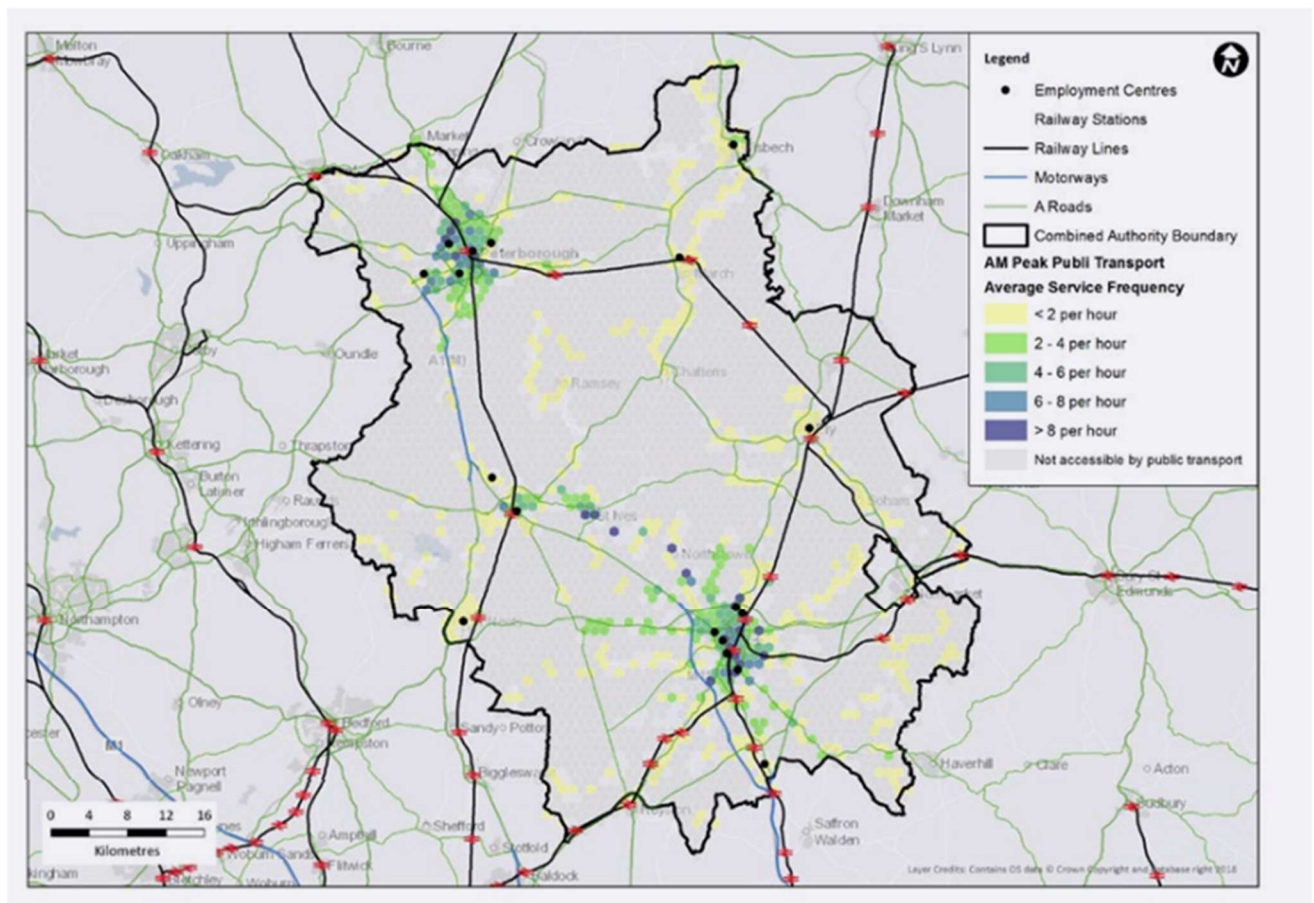
Rural Urban Divide

- 2.6.100. A key objective of the Programme is to ensure public transport is more accessible and connects to where people want to travel. At present, people in the more rural areas of Greater Cambridge typically experience a relatively poor level of public transport service. The stark difference in public transport frequency and accessibility between rural and urban areas is illustrated in Figure 2-17, Figure 2-18, and Figure 2-19, which show (for the CPCA area) the frequency of bus services and the accessibility by public transport to major employment sites in 2018.
- 2.6.101. The figures also demonstrate that the evolution of the bus network in Greater Cambridge has not kept pace with the polycentric growth of Cambridge. Consequently, many jobs at Cambridge fringe employment sites, such as the Biomedical Campus, Science Park and West Cambridge are, relatively speaking, not as well served by public transport links. For example, the CPCA's BSIP identified a lack of connectivity, and in particular a lack of direct services, between the aforementioned sites and residential areas, leading to a reliance on private car.
- 2.6.102. Whilst the city centre and most of the City of Cambridge is relatively well served, levels of service (and hence accessibility) reduce significantly in villages and rural areas, with many rural areas having little or no access to public transport. For example, in South Cambridgeshire, only 22% of residents are within 30 minutes public transport or walking access of a town centre⁶⁸; this results in high levels of car dependency⁶⁹.

⁶⁸ Cambridgeshire and Peterborough Combined Authority (2021). *Bus Service Improvement Plan – using data from Department for Transport (2023) Bus Statistics Table BUS01e*

⁶⁹ Arup (2018). *City Access Price-based Demand Management Options Assessment Report*

Figure 2-17 – Public Transport Frequency (CPCA, 2018)⁷⁰



⁷⁰ Cambridgeshire and Peterborough Combined Authority (2018). *Local Transport Plan*

Figure 2-18 – Public Transport Accessibility to Major Employment Sites (CPCA, 2018)⁷⁰

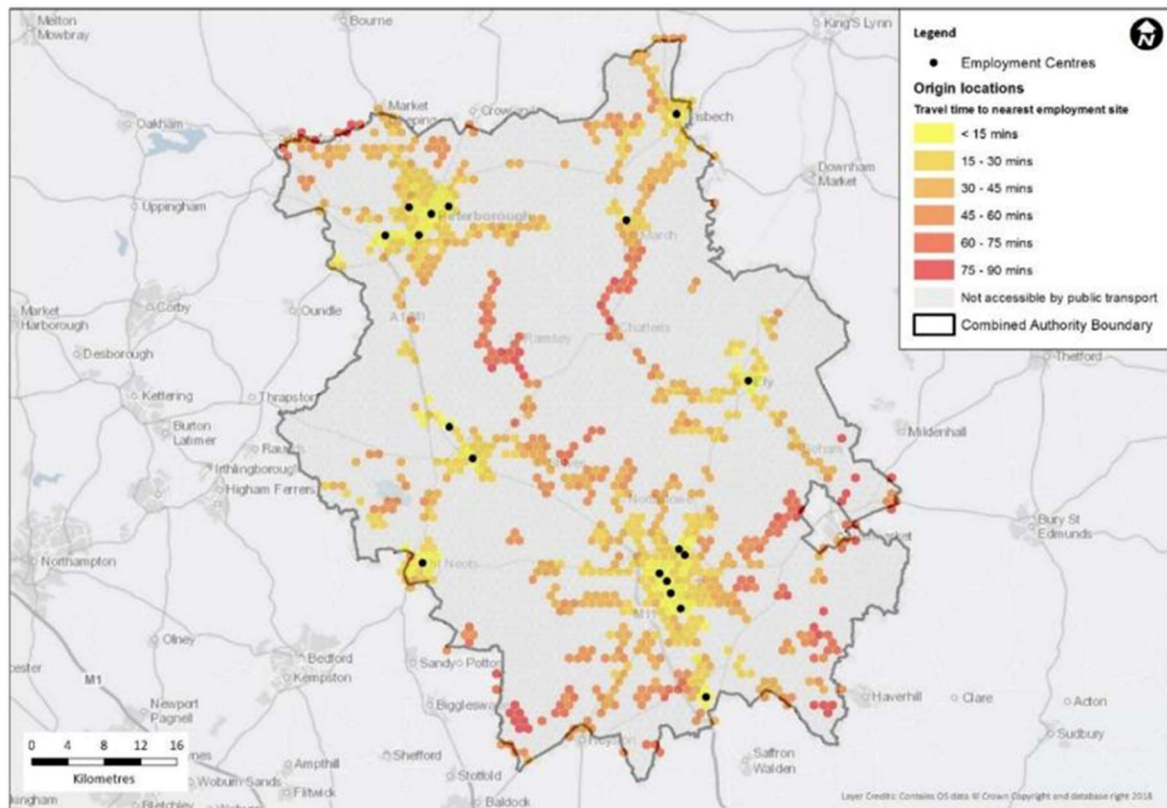
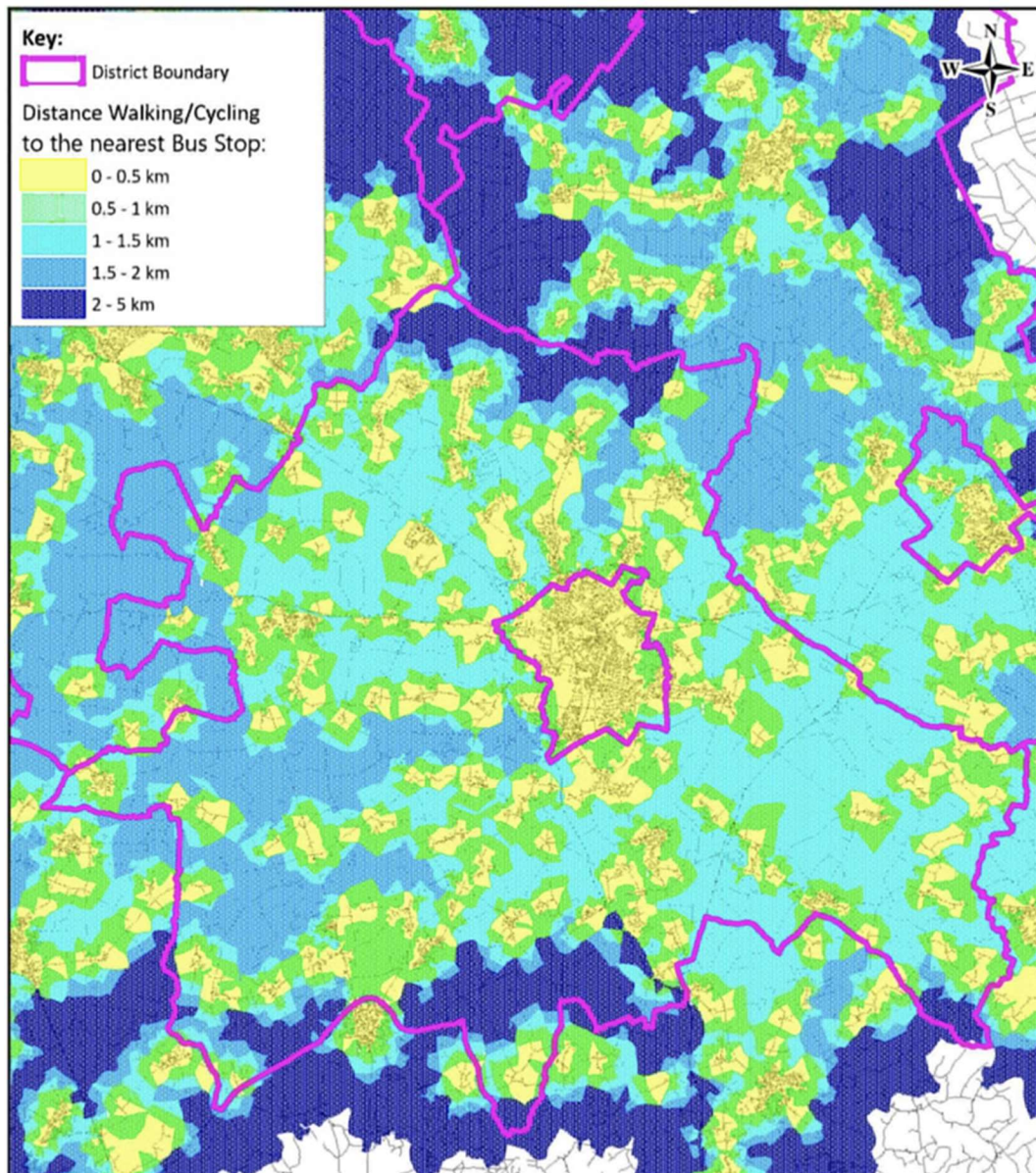


Figure 2-19 – Bus Accessibility in Greater Cambridge⁷¹



2.6.103. The figures above show that most settlements in Greater Cambridge are within 500m of a bus stop; however, the frequency of services provided in rural areas makes bus travel relatively inflexible and, as a result, unattractive. Furthermore, the majority of routes connect to central Cambridge, so to access major employment areas on the edge of the city, some passengers would require at least one change – unnecessarily going into and out of the city centre – which typically increases journey time⁷¹.

⁷¹ Greater Cambridge Shared Planning (2020). *Local Plan: Transport Existing Conditions Report*

How would Making Connections help to address existing issues with bus services?

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 wider provisions such as increased reliability and fare reduction. 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.

The net impact would be to make buses a more feasible, reliable and ultimately, attractive option for people in rural areas, villages, and market towns, especially for those who do not have exclusive access to a car. It could also make bus transport more affordable, benefiting people on low incomes.

High, but Unequal, Levels of Car Ownership

Trends Over Time

- 2.6.104. Between 2011 and 2021 there have been increases in the number of households across all car ownership groups (those without a car or van (+14%), with one car/van (+13%), two cars/vans (+8%) and three or more cars/vans (+19%)⁷² in Greater Cambridge. However, due to the general increase in the number of households in Greater Cambridge, the levels of car ownership, in relative terms, has remained largely the same. Here, there have been small increases in the proportion of no-car households and those who own one car or van (+0.2%), and a small reduction in the proportion of households who own two cars or vans (-1.1%).
- 2.6.105. Within Cambridge, there are stark differences in the numbers of cars owned by households between wards. The wards with the highest proportion of households with no cars are Petersfield (47%), Newnham/Market (42%), Castle (40%) and Romsey (38%). Compared to Cherry Hinton (24%) and Queen Ediths (27%) with the lowest proportion of households with no cars. In absolute terms, this means that there are between 1,000 and 1,500 households in most wards who do not own a car. On the other end of the spectrum, the wards with the highest proportion of two or more cars are Queen Edith's (27%), Cherry Hinton (26%), Abbey (20%), Coleridge (20%) and Kings Hedges (20%). In absolute terms, each of these wards has around 800-1,000 households with two more or more cars.

Inequalities in Car Ownership

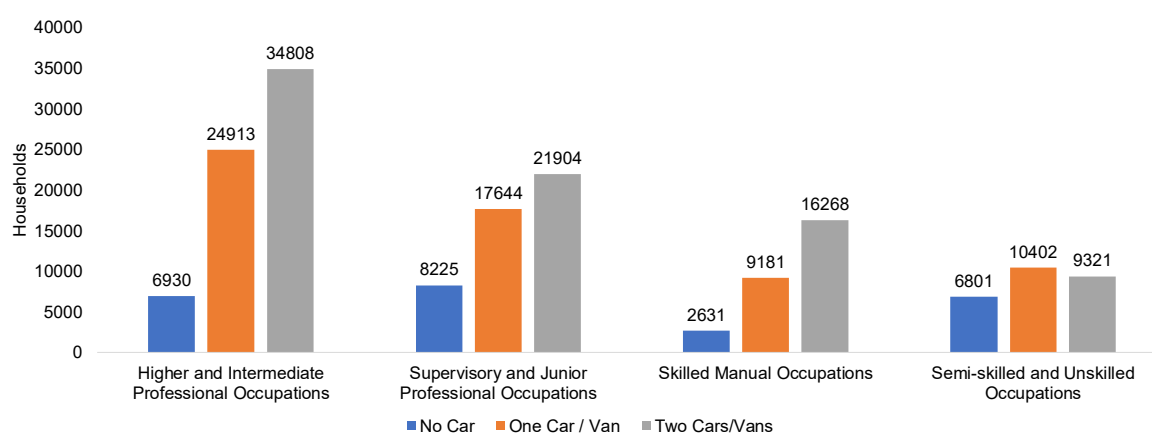
- 2.6.106. A large proportion of Greater Cambridge residents have limited travel choices due to the relative absence of frequent, reliable and affordable public transport services. This

⁷² ONS Census (2011, 2021). *Car or Van Availability*

particularly impacts those people who do not own or have access to a car. In Greater Cambridge, 21% of households do not own a car⁷².

- 2.6.107. 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 workers⁷³, are less likely to own a car. In Greater Cambridge, 26% of semi-skilled / unskilled 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 car⁷⁴. The following graph summarises car ownership by employment type.

Figure 2-20 – Car Ownership by Employment Type⁷⁴



- 2.6.108. Owning and using a car is a significant financial challenge for many low-income households, but evidence suggests that many households are ‘forced’ into buying a car due to poor public transport connections and lack of proximity to core destinations⁷⁵. Forced car ownership is a term that defines people who are forced to purchase a car at the expense of other necessities.
- 2.6.109. An ONS study⁷⁶ demonstrated that in the UK’s most densely populated areas, 7% of households experience ‘forced car ownership’ and 13% are ‘car deprived’ (cannot afford a car at all). In terms of demographics, ‘forced car ownership’ is more prevalent among those with children, people in the bottom 40% of income distributions and households with mobility difficulties.
- 2.6.110. 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

⁷³ ONS (2022). *Employment and Labour Market – Annual Survey of Hours and Earnings*

⁷⁴ ONS Census (2011). *Car or Van Availability by Job Occupation*

⁷⁵ Mattioli (2017). *Forced Car Ownership in the UK and Germany: Socio-Spatial Patterns and Potential Economic Stress Impacts, Social Inclusion*

⁷⁶ [ONS \(2021\). Housing – number of cars or vans](#)

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 car⁷⁷.

How would Making Connections help to address the consequences of inequalities in car ownership?

In Greater Cambridge, there is a relatively poor level of public transport accessibility overall, which particularly affects those in rural areas, and induces car dependency as people seek to access employment opportunities and services in a convenient and reliable way. Access to private cars is, however, lowest for those in lower paid occupations. Therefore, the delivery of a public transport network that is affordable, accessible and connects to where people want to travel is essential to levelling up the equality of opportunity in the area.

How the Making Connections programme fits with the GCP's strategic vision and objectives.

The Making Connections programme is being developed to contribute to the GCP's strategic objectives by:

- Tackling the problems which inhibit growth: traffic congestion and poor access from rural areas.
- Improving connectivity between employment clusters and labour markets in order to drive further growth; and,
- Providing a sustainable source of revenue for supporting investment in public and sustainable transport measures to enhance accessibility and support a long-term increase in jobs.

The Need for Radical Change to Meet the Net Zero Agenda

The Existing Situation

- 2.6.111. In June 2019, the UK Parliament passed its Net Zero legislation. The legislation forms a commitment to decarbonise all sectors of the UK economy to net zero by 2050⁷⁸.
- 2.6.112. All three of the GCP partners have declared a climate emergency. Cambridge City Council's Climate Change Strategy aims⁷⁹ for "*Cambridge to be net zero carbon by 2030*" and South

⁷⁷ ONS Census (2021). *Car or Van Availability by Long-Term Health Problem*

⁷⁸ Department for Transport (2021). *Decarbonising Transport – A better, Greener Britain*

⁷⁹ Cambridge City Council (2021). *Climate Change Strategy 2021 to 2026*

Cambridgeshire's Zero Carbon Strategy⁸⁰ aims to “*halve carbon emissions by 2030 and reduce them to zero by 2050*”. Similarly, in May 2019, Cambridgeshire County Council also declared a climate emergency and has published a ‘Climate Change and Environment Strategy’ for the County of Cambridgeshire to be net-zero by 2045.

- 2.6.113. The emerging Greater Cambridge Local Plan – Net Zero Carbon Plan Evidence Base (2021) 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 scale of this ambition is illustrated in Figure 2-21, which shows how an overall 82% reduction could be achieved across all sectors, including transport. The forecast 2050 emissions are based on an optimistic scenario where carbon reduction is also prioritised by businesses and by national government.
- 2.6.114. Overall greenhouse gas (GHG) emissions in Greater Cambridge were estimated to be 1.51MtCO₂eq⁸¹ in 2018. It is estimated that 35% of these emissions are from transport⁸², as illustrated below in Figure 2-21 and Figure 2-22.
- 2.6.115. All of the partner authorities’ strategies recognise the importance of addressing transport-related emission in meeting their net zero ambitions:
- Cambridge City Council’s Climate Change Strategy notes the importance of partnership-working with transport bodies, including GCP, to ensure that transport schemes in Cambridge contribute to a reduction in carbon emissions. It discusses the role of GCP’s City Access project in promoting measures to encourage commuters away from cars, reduce city centre congestion, and improve access by sustainable transport to the city centre and key employment sites;
 - South Cambridgeshire District Council’s Zero Carbon Strategy notes the importance of addressing their own travel behaviours, alongside the role of planning policy via the adopted and emerging Local Plan and working with delivery partners, including the GGP, to enhance sustainable transport in the District;
 - Cambridgeshire County Council’s Climate Change and Environment Strategy includes a low carbon transport theme and notes the importance of working with partners, including GCP, to deliver a sustainable transport system.
- 2.6.116. Given the above, and in line with Business Case guidance, a Carbon Management Plan (CMP) is being prepared as part of the Making Connections programme. The emerging headlines have been summarised in the Management Dimension and indicate that Making Connections would be a significant contributor to Cambridge’s goals for transport decarbonisation. The CMP would be presented in the updated OBC for September.

⁸⁰ South Cambridgeshire District Council (2020). *Zero Carbon Strategy*

⁸¹ Metric tons of carbon dioxide equivalent

⁸² [Greater Cambridge Shared Planning \(2018\). *Emerging Greater Cambridge Local Plan Net Zero Carbon Plan Evidence Base*](#)

Figure 2-21 – GHG emissions in Greater Cambridge, 2018⁸²

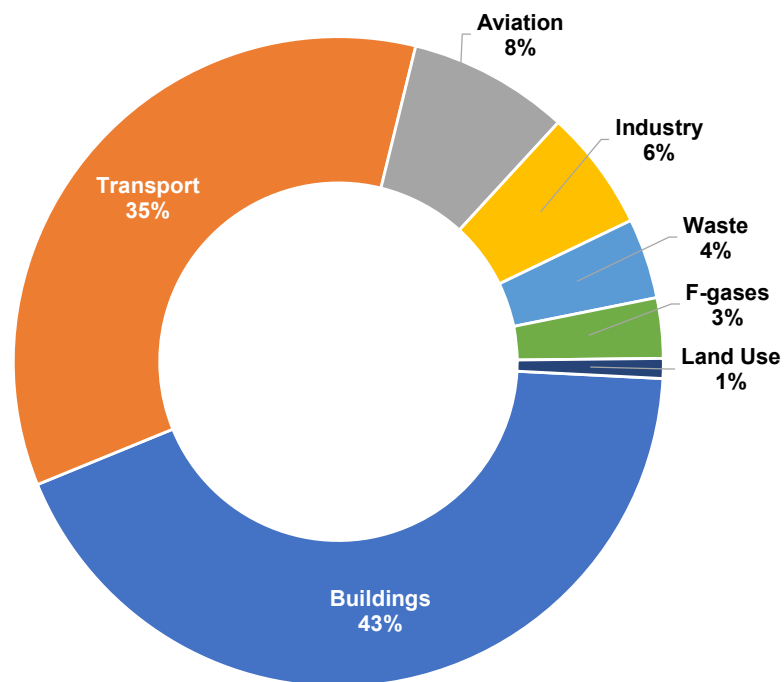
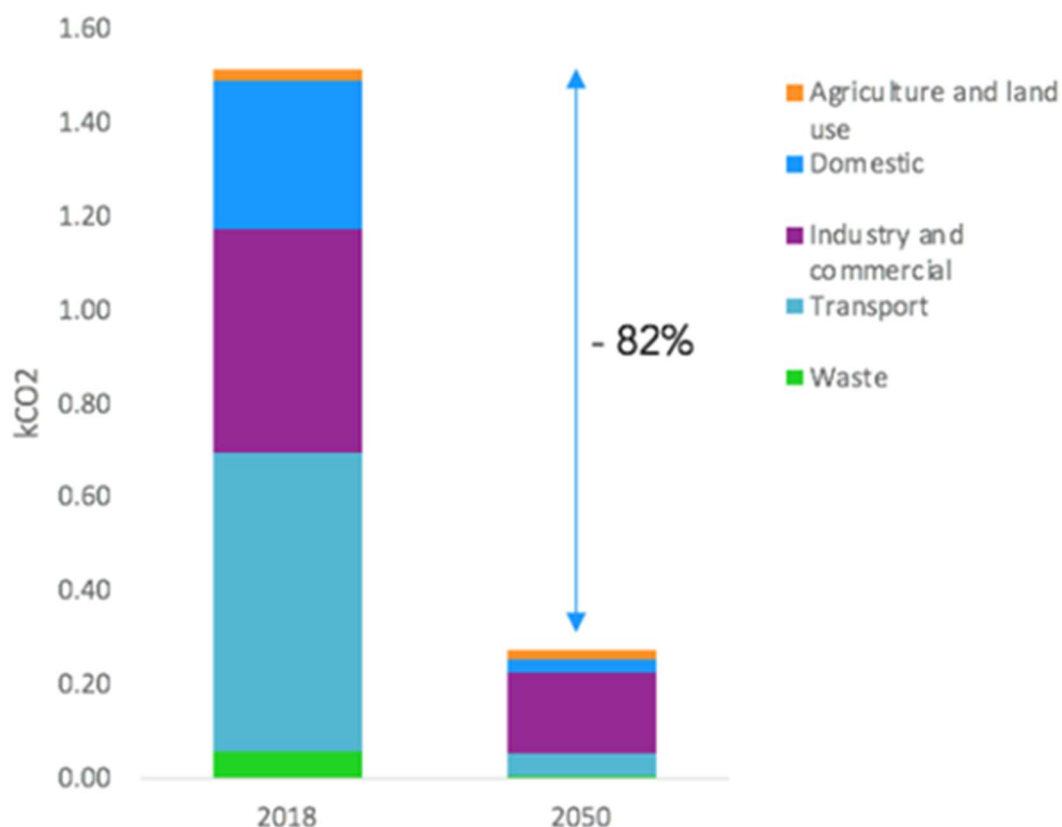


Figure 2-22 – Potential Reductions in GHG Emissions in Greater Cambridge⁸²



- 2.6.117. 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 area⁸³.
- 2.6.118. Given that road traffic accounts for over a third of total GHG emissions in Greater Cambridge, there is a clear need to significantly reduce transport-derived emissions in order to comply with national, and locally adopted, Net Zero targets⁸³.
- 2.6.119. Whilst it is accepted that there would be reductions in emissions due to the transition to electric vehicles, the movement away from internal combustion engine vehicles (ICE) would not completely offset emissions from personal vehicles. For example, in the past year, only 34.5% of National Grid energy generation was from renewable sources⁸⁴ with 44.1% still derived from fossil fuels.
- 2.6.120. Moreover, despite the ban on the sale of new petrol and diesel cars and vans from 2030, these vehicles are predicted to continue to account for a significant proportion of vehicle kilometres driven in 2030. For example, a report by the Greater London Authority (GLA) estimates that, in London, petrol and diesel cars account for between 19% and 43% of vehicle kilometres driven in 2030, depending on the forecast uptake of non-ICE vehicles.

⁸³ Department for Transport (2020). *Transport and Environment Statistics*

⁸⁴ National Grid ESO (2023). *Monthly Domestic Energy Statistics, March 2023*

Although this report is London-based, it provides an indication of the potential trajectory that might also be experienced in Greater Cambridge. Therefore, as stated in Policy 4 Place Based Solutions of the DfT's Decarbonising Transport report⁸⁵, reducing the impact of congestion, which can significantly increase relative greenhouse gas emissions per kilometre driven, is essential to achieving Net Zero.

- 2.6.121. The need to reduce traffic and congestion, alongside decarbonising the transport fleet, is evidenced in a report published by Greener Transport Solutions. The not-for-profit organization concluded that the government's anticipated roll-out of EVs would be insufficient to keep us on the 'balanced pathway' to its net zero target, and that a reduction in car-kms of 20-27% by 2030 would be needed to achieve this.

How would Making Connections contribute to achieving the Net Zero Agenda?

The proposed Sustainable Travel Zone and bus network improvements would encourage a proportion of road users to switch from car to more sustainable modes such as walking and cycling (with net zero carbon emissions) and would accelerate the electrification of the bus network. The CPCA aim to have an entirely electric bus network by 2030.

The Need to Improve Local Air Quality

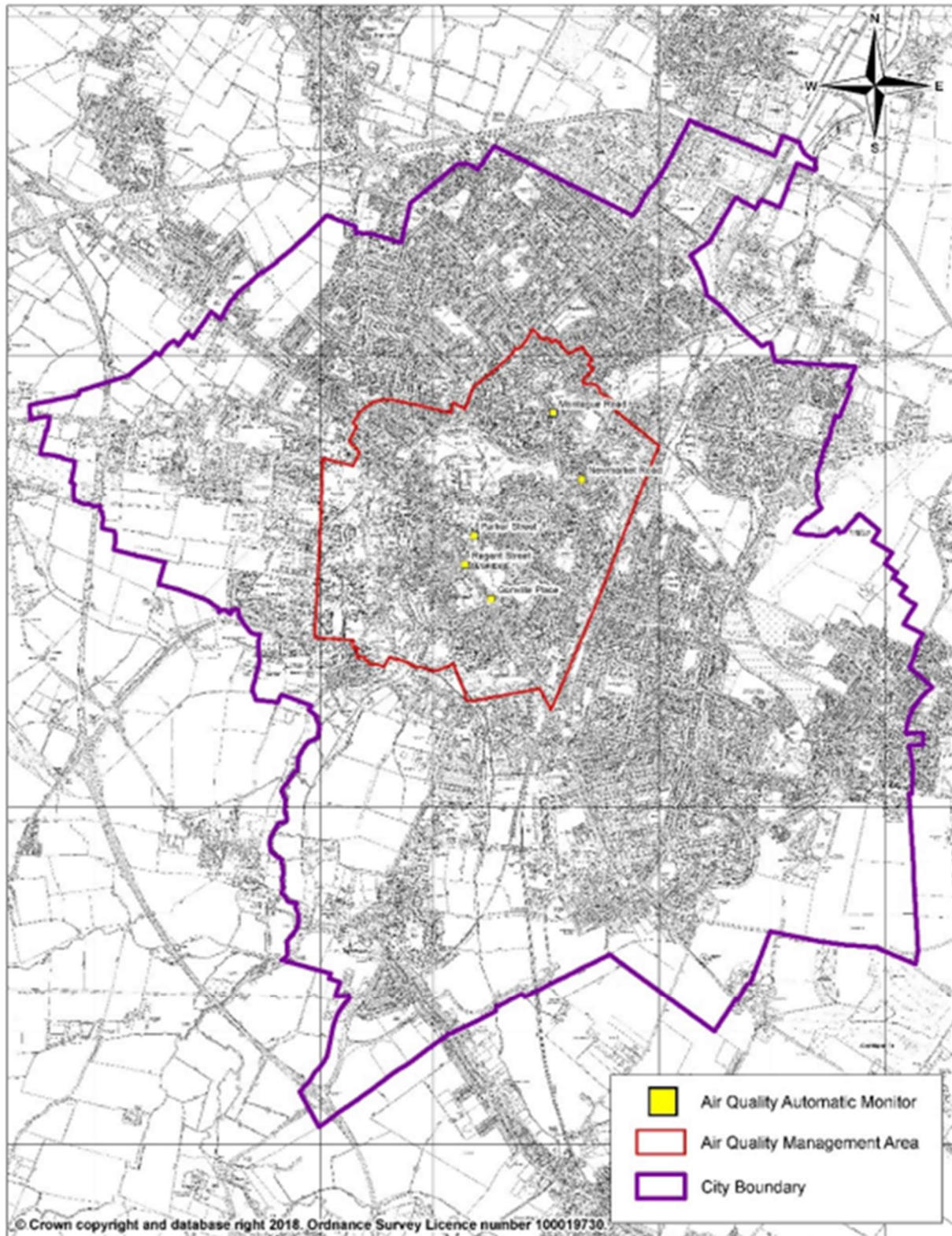
- 2.6.122. Air pollution is a serious issue, which has "a more significant detrimental impact on the world's health than passive smoking, obesity and water pollution put together"⁸⁶.
- 2.6.123. In 2004 Cambridge City Council designated an Air Quality Management Area (AQMA)⁸⁷ in the area encompassing the inner ring road and all the land within it (including a buffer zone around the ring road and its junctions with main feeder roads) due to high average levels of Nitrogen dioxide (NO₂). The AQMA is shown in Figure 2-23.

⁸⁵ Department for Transport (2022). *Decarbonising Transport*

⁸⁶ Broomfield, M (2019). *Every Breath you Take – A User's Guide to the Atmosphere*

⁸⁷ Cambridge City Council (2023). *Open data: Air Quality Continuous Monitor Results*

Figure 2-23 – Air Quality Management Area, Cambridge⁸⁸



⁸⁸ Cambridge City Council (2004). Air Quality Management Area 2004

- 2.6.124. To assist with the monitoring of local air pollution, Cambridge City Council implemented a number of permanent air quality sensors in 2001, which provide a longer-term view of air quality. The sensors measure PM10, PM2.5 and NO₂⁸⁹. PM10 and PM2.5 are measures of harmful Particulate Matter (PM) which, when airborne, are called aerosols. PM10 includes particles less than 10 µm in diameter and PM2.5 includes those less than 2.5 µm.
- 2.6.125. As aerosols, larger PM10 particles can irritate people's eyes, nose, and throat (e.g., dust from roads and brake and tyre wear). Smaller PM2.5 particles (from emissions and brake wear) are more dangerous because they can enter people's lungs and bloodstream, causing respiratory problems⁹⁰. Likewise, NO₂ can cause inflammation of the airways and increase the likelihood of respiratory infections⁹⁰. It is worth noting that this particulate matter from brake and tyre wear occurs for all vehicles (including EVs), not just internal combustion engine (petrol/diesel) vehicles.
- 2.6.126. Collated air quality data for Cambridge shows that annual average NO₂, PM10 and PM2.5 readings have reduced across all sensors in Cambridge over the last 15 years⁹¹. NO₂ pollution has reduced more significantly than PM10 and PM2.5 due, in part, to the modernisation of the transport fleet in accordance with stricter emissions standards⁹². In contrast, PM from surface transport has reduced at slower rates as gains from stricter emission standards have been offset by an increase in PM emissions from brake and tyre wear as vehicles have become larger and heavier⁹³. However, it should be acknowledged that PM emissions from brake and tyre wear account for a relatively small proportion of PM emissions overall⁹⁴.
- 2.6.127. The current levels of monitored pollutant concentrations at monitored sites within Cambridge for the latest year (up until March 2023) do not currently exceed UK objectives for monitored concentrations on an annual or 24- hour mean basis. However, the World Health Organisation (WHO), indicates that Governments' should create more stringent objectives in line with those published by WHO, which have been compiled based on epidemiological studies which analyse the risks of exposure to air pollution⁹⁵. The latest update from the UK government has set out a timeline for updating the objectives for PM2.5

⁸⁹ It is worth noting that only certain pollutants are able to be detected by sensors and thus able to be quantified. In addition, not all pollutants are measured at all active monitors.

⁹⁰ Department for Environment Food and Rural Affairs (DEFRA) (2023). *Emissions of air pollutants in the UK – Particulate matter (PM10 and PM2.5)*

⁹¹ Cambridge City Council (2023). *Open data: Air Quality Continuous Monitor Results*

⁹² Department for Transport (2021). *Transport and environment statistics: Autumn 2021*

⁹³ Oroumiyeh, F. and Zhu, Y. (2021). *Brake and tire particles measured from on-road vehicles: Effects of vehicle mass and braking intensity. Atmospheric Environment: X*, 12, p.100121

⁹⁴ Department for Environment, Food and Rural Affairs (2019). *Clean Air Strategy*

⁹⁵ World Health Organisation (2022). *Ambient (outdoor) air pollution guidelines*

incrementally up until 2040, reducing the level of monitored concentrations which is considered acceptable⁹⁶.

- 2.6.128. 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 Council's Air Quality Annual Status report, reported 2021, and has now been accepted by DEFRA. The Cambridge AQMA is now the only designated area within Greater Cambridge⁹⁷.

How would Making Connections help to improve local air quality?

The Making Connections programme would lead to a net reduction in harmful air pollutants, as a result of the significant reduction expected in motorised traffic.

The Programme would also contribute to Cambridge City Council's priority measure of reducing emissions from buses, by helping to fund the delivery of a zero, and lower, emissions fleet.

A Culture of Walking and Cycling

- 2.6.129. 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, which compares to the national average of 47%. South Cambridgeshire has higher rates of both walking and cycling than the other non-city districts of Cambridgeshire for short commuting trips, but, despite this, 40% of people travel to work by car (as a driver or passenger) for trips under 2km.
- 2.6.130. To further contextualise the analysis above, the latest available Census dataset (2011)⁹⁸, undistorted by the impacts of the pandemic, showed that 16% of Cambridge (2,589) and 35% of South Cambridgeshire (2,671) residents drive less than 2km to work.

Pedestrian Trips

- 2.6.131. 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 pedestrian footfall in the city centre has largely recovered since the COVID-19 pandemic; the datasets show that for the available months in 2023, average net footfall is now approximately 3% lower than the same months in 2019. The datasets also show that, in some months, 2023 footfall exceeded the levels seen in 2019; here, footfall in February

⁹⁶ HM Government (2023). *Environmental Improvement Plan 2023*

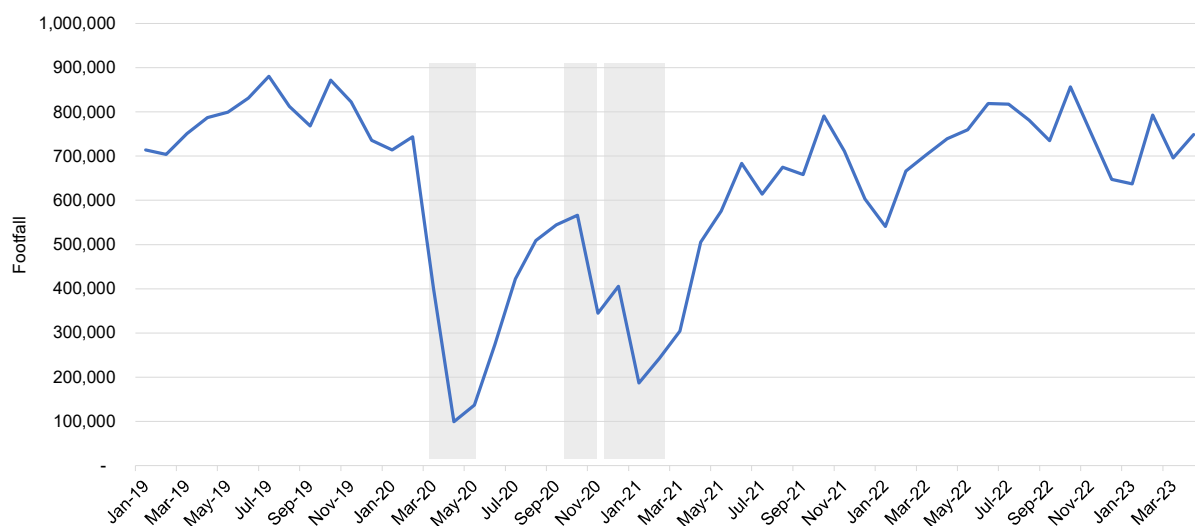
⁹⁷ Cambridge City Council (2022). *Air Quality Annual Status Report 2022*

⁹⁸ 2021 data for this exact dataset is not comparable as ONS have not released data which demonstrates method of travel to work by distance travelled to work for under 2km.

2023 was 11% higher than in February 2019 and June 2023 was 2% higher than in June 2019.

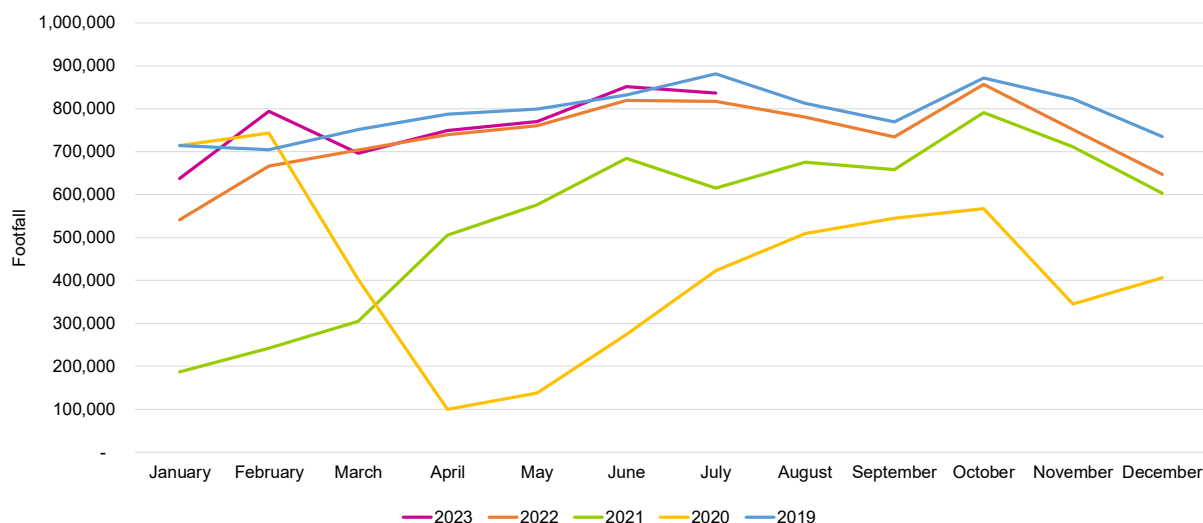
- 2.6.132. The footfall sensors used within this analysis are located on streets with high levels of footfall within or proximate to the city centre, comprising of Bridge Street, Fitzroy Street, Market Hill, Regent Street, Sidney Street and Rose Crescent. Other sensors are present within the city including on Kings Parade, One Station Square, Silver Street and Burleigh Street, but these sensors were not in place in 2019; thus preventing a longitudinal comparison.
- 2.6.133. The data demonstrates that footfall has largely recovered following COVID-19 lockdowns in 2020 and 2021. This shows that despite concerns about engagement with high streets and the city centre ‘post COVID-19’, people are still choosing to engage with the city centre on foot.
- 2.6.134. It is worth noting that the counters are largely located in pedestrianised areas that provide more comfortable pedestrian environments; these spaces typically provide more space for social distancing, which may have contributed to footfall recoveries post-COVID-19.
- 2.6.135. The following graphs demonstrate the average trend in footfall at the locations listed above over the past four years. The greyed-out sections represent the three national lockdown periods in the UK.

Figure 2-24 – Cambridge Footfall: Trends 2019-2023⁹⁹



⁹⁹ Cambridge BID (2023). *Open data source: Monthly Footfall Reports*

Figure 2-25 – Cambridge Footfall: Month by Month Comparison⁹⁹



Cycling

- 2.6.136. Cambridge has seen a significant increase in the absolute and relative number of cycling trips since 2001. According to data from the 2011 census, the proportion of Cambridge residents who cycled to work increased from 26% in 2001 to 30% in 2011¹⁰⁰. Whilst the overall number of cyclists commuting to work is lower in the 2021 census, the proportion of people choosing to cycle to work increased to 31%.
- 2.6.137. In South Cambridgeshire, the percentage of people cycling to work in the district increased from 10.7% in 2011 to 14.5% in 2018¹⁰¹.
- 2.6.138. In comparison to motorised vehicles, walking and cycling trips at key count points in Cambridge were only 1% lower in 2022 than in 2019, with some corridors experiencing significant increases in active travel flows.
- 2.6.139. Within Greater Cambridge, the number of cycling trips for all purposes has also increased, with 28.1 million cycle trips in total in 2021, made up of commuting (34%), leisure (12%), shopping and personal business (38%) and travelling to education (17%)¹⁰².
- 2.6.140. In terms of cycling across all journey purposes, Cambridgeshire County Council has recorded traffic flow data across two 'screenlines' (the city boundary and the River Cam) for the last two decades. In 2019, the numbers of cyclists entering Cambridge from South Cambridgeshire increased by 64% to (over 12,000 cyclists) over a 12-hour period since 2010. Likewise, the number of cyclists crossing the River Cam in Cambridge increased by 62% since 2010, with 35,000 cyclists crossing the Cam over a 12-hour period¹⁰³.

¹⁰⁰ ONS Census (2001, 2011, 2021). *Travel to Work data*

¹⁰¹ South Cambridgeshire District Council (2020). *Annual Monitoring Report*

¹⁰² Sustrans (2021). *Walking and Cycling Index for Greater Cambridge*

¹⁰³ Cambridgeshire County Council (2020). *Traffic Monitoring Report*

- 2.6.141. 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. CCC has also implemented measures to promote cycling, such as offering cycling lessons for beginners and promoting the use of electric bikes.

The Growth of Micro Mobility

- 2.6.142. The use of micro modes of transport, which include personal vehicles that can carry one or two passengers, is growing in the Greater Cambridge area. Micro modes of transport are significant in that they can support an enhanced bus network by providing a solution to the first/last mile problem.
- 2.6.143. Cambridge is currently taking part in a trial scheme for electric e-bikes and e-scooters. The e-bikes and e-scooters are operated by Voi and are available for hire and use around the city. E-scooter use has steadily grown since the Voi trial began in late 2020, peaking at approximately 15,000 unique monthly users and covering in excess of 200,000km by March 2023. The average distance ridden is approximately 2.4km and the average trip duration is approximately 11 minutes¹⁰⁴. Rental e-scooters can fill a valuable role in facilitating the 'first' and 'last'-mile element of a multi-modal journey that is beyond typical walking distances¹⁰⁵. Voi also operates rental e-bikes as part of the same trial, but the growth in e-bike use is primarily driven by the personal ownership market.

¹⁰⁴ Cambridgeshire County Council (2023). *COVID-19 Transport Impacts: Data and Monitoring Report (April 2023)*

¹⁰⁵ Voi (2021). *One year in the UK Report*

How would Making Connections build on the local culture of active travel?

The Greater Cambridge area has a very high active travel modal share when compared to regional and national averages. Notably, the number and proportion of people cycling in the Greater Cambridge area significantly increased between 2001 and 2019. Despite the initial fall in cycle flows during the COVID-19 pandemic, observed cycling flows in March 2023 have recovered strongly, which demonstrates a strong culture and appetite for active travel in the area.

Similarly, the growing trends in observed footfall in Cambridge city centre demonstrates that despite concerns about city centre footfall 'post COVID-19', people are still choosing to engage with the city centre on foot. Many of the footways in Cambridge's historic city centre are, however, constrained and narrow; this results in some streets being uncomfortable for pedestrians to access, move around or rest without undesirable interactions with other pedestrians or modes of transport.

Making Connections has the potential to capitalise on this culture of active travel, and help to address the constraints of the streetscape, by reducing traffic flows; in turn this has the potential to facilitate 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 latent potential for further walking, cycling and scooting, particularly for those people who currently drive less than 2km to work.

A Successful Park and Ride Network

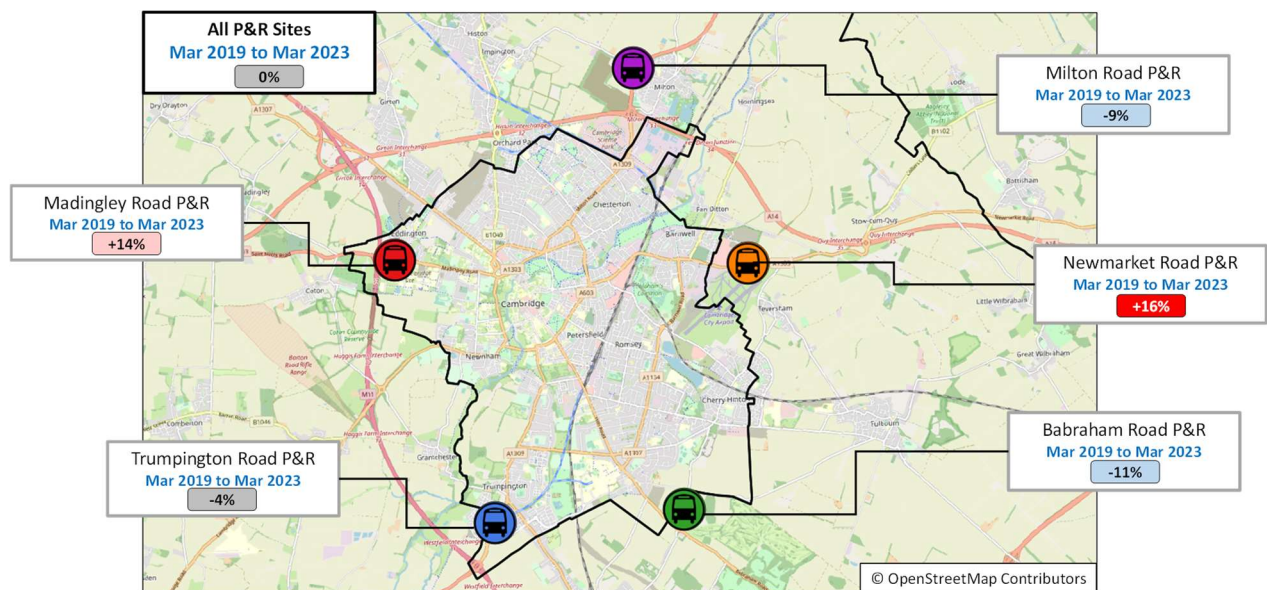
- 2.6.144. Five 'inner' bus-based park & ride sites serve Cambridge: Babraham Road, Madingley Road, Milton, Newmarket Road and Trumpington, which provide 5,653 spaces in total¹⁰⁶. Two additional park & ride sites are located to the north of Cambridge on the Cambridgeshire Guided Busway (CGB) alignment. The two sites are located at St. Ives and Longstanton and provide 1,000 and 350 car parking spaces respectively; hence, across all park & ride sites 7,003 spaces are currently provided. In recent years, parking capacity at both the Trumpington and Babraham Road sites has been expanded in response to the growth in demand.
- 2.6.145. In total in 2019, there were over 3.6 million park & ride passenger journeys, an increase of 11% since 2018¹⁰⁷. Following the COVID-19 lockdowns and the associated increase in working from home, there was a substantial reduction in park & ride journeys, with only 1.4 million being recorded in 2021. However, data from March 2023 demonstrates that overall park & ride patronage has recovered significantly up to 2019 levels. This is shown in the figure below which demonstrates that some sites have higher levels of usage compared to 2019, whilst others are still operating at lower occupancy than 2019.

¹⁰⁶ [Cambridge Park and Ride open data \[online\]](#)

¹⁰⁷ Comparisons to previous years not possible as data collection was not in place

- 2.6.146. In response to Cambridge's existing network of park and ride sites operating at or near capacity prior to the COVID-19 pandemic, the wider GCP programme includes the provision of up to 10,000 additional Park and Ride spaces around in Greater Cambridge. Amongst others, the GCP has proposals for additional capacity at the Cambridge South West Travel Hub (CSWTH) and the Foxton Travel Hub, as well as new/relocated hubs proposed via the Cambourne to Cambridge, Cambridge Eastern Access and Waterbeach to Cambridge schemes.
- 2.6.147. The GCP is proposing the development of an Integrated Parking Strategy that would comprehensively manage on-street, off-street and Park & Ride provision and how this can support users and encourage modal shift.

Figure 2-26 – Park and Ride Usage per Site¹⁰⁸



Would Making Connections impact on park and ride services?

The sustained growth in the number of spaces and levels of patronage at Cambridge's park & ride sites over the past 20 years, provides an indirect demonstration of the impact that congestion has on vehicle journey times in the city. The consistent upward trend in park & ride patronage following the end of social distancing guidance, also potentially demonstrates that park & ride is becoming more attractive as traffic levels in Cambridge recover and increase.

The introduction of a potential congestion charge as part of the STZ is forecast to reduce traffic flows within the zone and, correspondingly, increase park & ride patronage in Cambridge. Under Making Connections, all park & ride sites would fall outside of the STZ zone, parking would remain free of charge at all sites and fares into the city would reduce to £1 for a single ticket. Hence, the Programme seeks to ensure that park & 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.

Growing Rail Patronage and Improving Connections

- 2.6.148. Entries and exits at Cambridge Station have steadily increased over the last decade, with a 51% increase between 2009/2010 and 2019/2020¹⁰⁹. In 2019/20 11.6 million passengers entered and exited Cambridge station and 0.556 million passengers interchanged there.
- 2.6.149. The latest available data, for April 2021 to March 2022, shows there were 6.95 million entries and exits at Cambridge station, which increased from 2.3 million between April 2020 and March 2021. This comparison demonstrates that rail patronage is recovering following the impact of the UK Government-implemented COVID-19 lockdowns.
- 2.6.150. In terms of additional rail capacity, Cambridge North Station opened in May 2017 to accommodate growth in the local resident population and further development of the Cambridge Northern Fringe area; the station also serves the established Cambridge Science Park and other employment sites in the area. Station usage increased from 812,972 in 2018/19 to 949,550 in 2019/20. Despite station use reducing to 220,958 in 2020/21 (the year impacted by Government-imposed COVID-19 lockdowns), station usage recovered to 733,612 in 2021/22.
- 2.6.151. In November 2022, the UK Government approved a Transport and Works Act Order (TWAO) to construct a new station to serve the Cambridge Biomedical Campus (CBC). The station, Cambridge South, would connect the CBC directly to international airports including London Stansted and London Gatwick, and is being designed to integrate with and complement the Thameslink and proposed East West Rail schemes. The current programme states that the station would open by 2025¹¹⁰.

¹⁰⁹ Calculated using Office of Road and Rail (2013, 2023). *Passenger Entries and Exits Dataset*

¹¹⁰ [Network Rail \(2022\). Cambridge South Station – Progress Update](#)

- 2.6.152. In June 2023, the UK Government confirmed the preferred alignment of East West Rail between Bedford and Cambridge with new stations serving Tempsford (Bedfordshire) and Cambourne (Cambridgeshire) before following the southern alignment into Cambridge via Cambridge South Station. The East West Rail Company would be consulting on the next stage of proposals in 2024 ahead of an application for a development consent order.
- 2.6.153. Another rail development within the Greater Cambridge area is the proposal to relocate the existing Waterbeach Railway Station to the north of the village to better serve the major Waterbeach New Town development. South Cambridgeshire District Council approved the outline proposals in 2018, alongside an approval for part of the proposed 10,000 home development. The current programme states that the station should open in late 2025.
- 2.6.154. Rail improvements have the potential to contribute to the GCP's aim of reducing congestion in Greater Cambridge but are limited in their coverage and cannot reach all areas. An enhanced and complementary bus network is thus needed to offer a more comprehensive solution to congestion issues that is both readily adaptable, easier to expand and suitable for areas with fluctuating demand.

How would changes to the local rail network impact Making Connections?

The capacity and connectivity of Cambridge's rail network has improved significantly in the past decade with the opening of Cambridge North station, platform extensions at Cambridge station and the wider Cambridge resignalling programme. In the next two years, the proposed Cambridge South station, programmed to open in 2025, would also significantly enhance the public transport connectivity to the south of the city.

The opening of Cambridge South would mean that Cambridge is served by stations in the northern, southern and central areas of the city, where Cambridge's key employment clusters are located. The Making Connections programme would enhance the potential for, and convenience of interchange at these stations, by improving the level of service and affordability of connecting bus services. It is also important to note that large parts of Greater Cambridge are not served by a rail station and thus bus travel remains an important public transport option.

The combination of wider improvements to the rail network and transformational changes to the bus network, should, therefore, increase the seamlessness of public transport journeys into, out of and through Greater Cambridge.

A Decline in the Utilisation of Public Car Parks

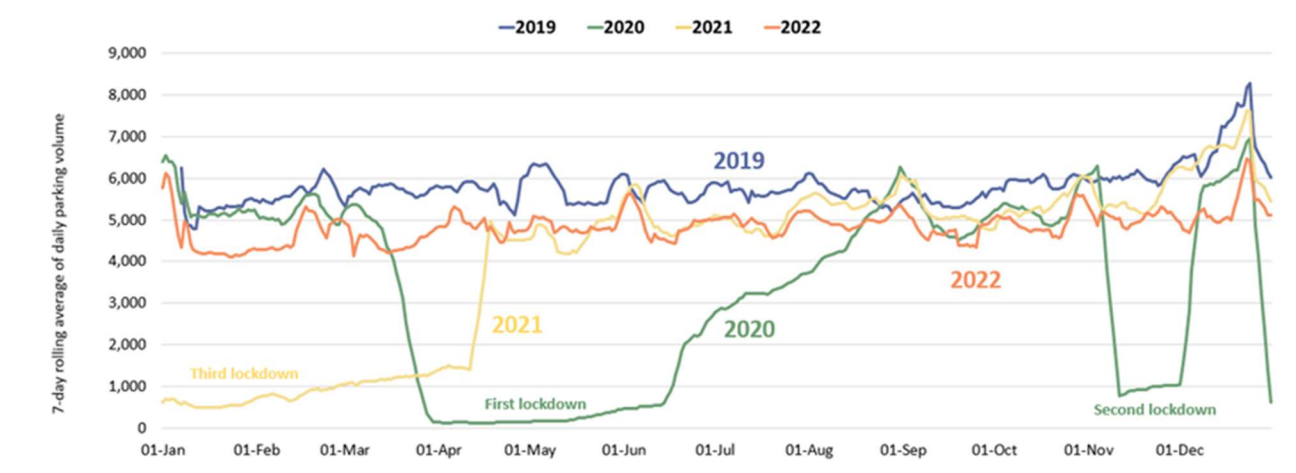
- 2.6.155. According to Cambridge City Council data¹¹¹, the number of publicly available off-street car parking spaces in Cambridge increased from 6,960 to 7,822 between 2010 and 2020, which is an increase of around 12%. In contrast, the number of publicly available on-street parking

¹¹¹ [Cambridge City Council open parking data \[online\]](#)

spaces in Cambridge decreased from 1,763 to 1,332 over the same period, a decrease of around 24%. Hence, overall, there was an increase of 431 public parking spaces. In January 2022, however, Park Street Car Park closed for refurbishment until Summer 2024, reducing available car parking spaces in the city centre by approximately 400 spaces and thereby effectively offsetting the aforementioned increase in spaces. The proposed redevelopment, which is due to open in 2024, would incorporate circa 225 spaces, resulting in the net reduction of approximately 175 spaces.

- 2.6.156. Data from March 2023 shows that car parking ticket sales were 22% lower than pre-COVID-19 levels in March 2019. Here, tickets sales were 17% down on weekends and 21% down on weekdays. Based on car park ticket sales at the publicly operated car parks in Cambridge, the number of users had also been declining prior to the COVID-19 pandemic. In 2017/2018 car park ticket sales were £2.44 million, in 2018/2019 ticket sales were £2.3 million and in 2019/2020 ticket sales were £2.15 million; this is despite additional revenue from tickets sales at Lammas Land Car Park, which was free prior to 2019, and small increases in the per hour price of parking.
- 2.6.157. Research undertaken by CCC, shows that, outside of national lockdown periods, multi-storey car park use in Cambridge has been broadly consistent since the start of the COVID-19 pandemic. Notably, since the start of the school year in September 2022, ticket sales at the multi-storey car parks has been consistently lower than over the same period in 2021; this trend may reflect the impact of recovering traffic levels on the perceived attractiveness of driving into Cambridge.

Figure 2-27 – Multi-Storey Car Park Utilisation in Cambridge Between 2019 and 2022¹¹²



How do changes in car parking behaviours relate to Making Connections?

Outside of national lockdown periods, utilisation at multi-storey car parks in Cambridge has remained relatively consistent; however, in both 2020 and 2021, utilisation levels were consistently higher than in 2022 between September and December.

A Growing Appetite for Electric and Hybrid Cars

- 2.6.158. Since 2018, the number of licenced low emission and plug-in hybrid cars in Cambridge has grown by between 28-67% each year. The overall number of electric/plug-in hybrid cars owned by Cambridge households has more than quadrupled from 415 in 2018 to 1,798 cars in Q3 2022¹¹³; this demonstrates a growing local appetite for the uptake of low emission vehicles.
- 2.6.159. Correspondingly, the number of public electric vehicle charging points has increased in Cambridge. There were 76 charging points available by the end of Q3 2022, close to a three-fold increase on 2019. Relative to the number of EV vehicles, the incidence of charging points is 51% higher in Cambridge than the national city average, with five charging points for every 100 EV's in the City¹¹⁴. There is also a push within Cambridge to

¹¹² Cambridgeshire County Council (2023). *COVID-19 Transport Impacts: Data and Monitoring Report (April 2023)*

¹¹³ Department for Transport (2023). *Licensed Vehicle Numbers Dataset*

¹¹⁴ [ZapMap \(2023\). \[online\]](#)

speed up the electrification of the private hire vehicle (PHV) fleet through EV charge points for taxis¹¹⁵.

- 2.6.160. Despite the growth in low emission and plug-in hybrid vehicles, these vehicles only account for 1.4% of all licensed vehicles in Cambridge, which is in line with the national average. Therefore, even though the growth in electric cars is accelerating each year, the current number of electric cars is still minimal compared those which use internal combustion engines¹¹⁶.

What does the uptake of electric and hybrid cars mean for Making Connections?

Whilst the wider transition to low emissions private vehicles would contribute to the Programme's objectives of reducing local air pollution and GHG emissions, it would not address the impact of traffic congestion on economic growth, productivity and journey ambience¹¹⁶. Moreover, the conversion of the private vehicle fleet from Internal Combustion Engine (ICE) vehicles to low emissions vehicles is progressing relatively slowly, prior to the ban on sales of diesel and petrol cars in 2030, accounting for only 16.6% of all new car registrations in 2022¹¹⁶.

The Programme's proposed improvements to bus services and other sustainable travel modes, which would broaden the quality of Greater Cambridge's transport offer and help to enable future growth, are thus dependent on the reduction of traffic and the subsequent ability to free up road space for pedestrians, cyclists and buses.

Greater Workplace Flexibility and Working from Home

Working from Home

- 2.6.161. The COVID-19 pandemic and the associated lockdown restrictions led to a significant rise in the number of people working from home in the UK, which in turn impacted reported and observed travel behaviours.
- 2.6.162. Surveys undertaken by the Office for National Statistics (ONS) show that, prior to the pandemic, one in eight (12%) working adults in the UK reported working from home in the week prior to their interview¹¹⁷. In Greater Cambridge, 7% of people stated that they worked from home in the 2011 Census. In comparison, data from the 2021 census, showed that, in the Greater Cambridge area, 45% of people were recorded as working from home; the 2021 Census was undertaken as the UK was emerging from a period of national lockdown, but still had work from home guidelines in place.

¹¹⁵ Cambridge City Council (2019). *Electric Vehicle and Infrastructure Strategy*

¹¹⁶ [Department for Transport \(2022\). *Licensed Vehicle Numbers Dataset*](#)

¹¹⁷ Office of National Statistics (2022). *Is hybrid working here to stay?*

- 2.6.163. The latest statistical release by the ONS¹¹⁸ shows that, in the East of England, only 14% of people now identify as being homeworkers only, with up to 45% of people indicating that they are now home/hybrid workers. This evidence suggests that employees are returning to office space in some capacity.
- 2.6.164. Despite the prevalence of people working from home, the latest statistics on commercial floorspace use in Cambridge, indicates that demand for commercial space is high and increasing. Since 2012, commercial (i.e. non-industrial) floorspace – including office, retail and other uses – increased by 4.1% across Cambridge, the 4th largest increase of 58 cities nationwide. This was in contrast to national (-1.6%) and national city (-0.5%) benchmarks, which both declined over this period.

How do changes in working patterns relate to Making Connections?

The pandemic undoubtedly led to an adjustment in working patterns, and hybrid working appears to be becoming the norm for a number of employees. However, traffic data continues to show an upward trend, and is now approaching pre-pandemic levels. This suggests that, with the continued growth in jobs and population in Greater Cambridge, the change in working patterns alone might not be sufficient to reduce congestion to the levels required for the growth in jobs and population to occur sustainably.

Inequality in Greater Cambridge

- 2.6.165. The Indices of Multiple Deprivation (IMD) shows that, overall, Greater Cambridge has a higher-than-average quality of life, and the ONS Labour Force Survey shows that employment rates are higher.
- 2.6.166. Relatively low levels of deprivation in Greater Cambridge as a whole do, however, mask pockets of deprivation. A more detailed analysis of IMD data in Greater Cambridge is provided in Appendix R.
- 2.6.167. The problem is not that health and the quality of life in Greater Cambridge is uniformly poor at an aggregate level, but that the area has high levels of inequality. Indeed, in 2020, Cambridge was ranked as “the most unequal city in the UK”¹¹⁹. Here, 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 total¹¹⁹.
- 2.6.168. In terms of housing, Cambridge is also one of the least affordable cities to live. For example, in 2018 house prices were 13 times higher than the city’s median annual salary of £34,400. Despite this relatively high median salary, in 2017, one in 10 households in Cambridge earned less than £16,518 a year¹²⁰.

¹¹⁸ ONS (2023) Characteristics of Homeworkers: September 2022 to January 2023

¹¹⁹ Centre for Cities (2018). *Cities Outlook Report*

¹²⁰ The Equality Trust (2017). *Tackling poverty in Cambridge - The most unequal city in the UK*

- 2.6.169. The cost of housing and the relatively poor levels of accessibility to services means that both Cambridge and South Cambridgeshire score relatively poorly in the IMD 'Barrier to Housing & Services' domain.
- 2.6.170. The Barriers to Housing and Services domain measures the physical and financial accessibility of housing and local services. The indicators fall into two subdomains: 'geographical barriers', which relate to the physical proximity of local services, and 'wider barriers' which includes issues relating to access to housing, such as affordability.
- 2.6.171. The Barriers to Housing & Services domain is South Cambridgeshire's lowest (most deprived) domain and Cambridge's third lowest when ranked against all other local authorities nationally. Both districts were in the most deprived 100 local authorities for this domain in 2019.

How can Making Connections help to address existing socioeconomic inequalities?

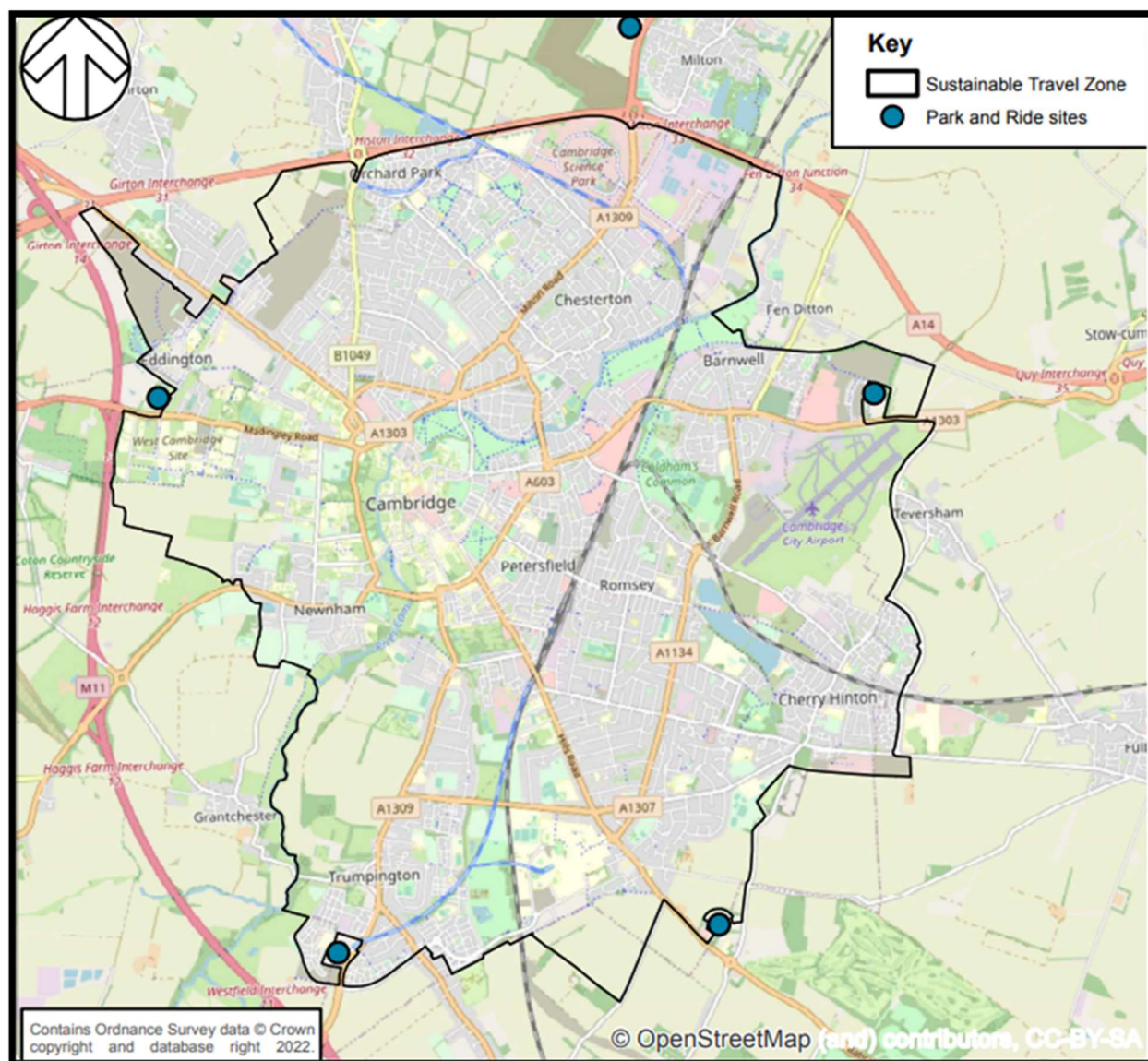
The Programme has the potential to significantly increase accessibility to employment opportunities and services for the more deprived communities of Greater Cambridge, and particularly for the 21% of households that do not own a car, by delivering a more affordable, reliable, and comprehensive public transport network.

2.7 Scope of the Programme

- 2.7.1. The Making Connections programme 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; and,
 - Congestion relief and support for active modes in the urban area of Cambridge.
- 2.7.2. The programme consists of the following potential transport interventions, designed to deliver the SMART objectives set out in Section 2.6:
- Improvements to bus services, which could include:
 - 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 £2 bus fare; and,
 - Zero-emission buses.
 - Wider improvements to sustainable travel, including:

- Reallocation of road space within appropriate locations on the network’;
- Improvements to walking and cycling routes, to extend the existing active travel network; and
- Improvement to public spaces.
- The introduction of smarter travel initiatives that would be common to all options and would include measures with a greater focus on making better use of the network, and maximising opportunities to influence travel demand, including:
 - Electric car clubs
 - e-Cargo bike clubs
 - e-Bike leasing schemes
- A Sustainable Travel Zone (STZ) including a charging scheme designed to reduce traffic and congestion in Cambridge city centre and generate revenue to invest in better bus services and more walking and cycling infrastructure; this would be formed of:
 - A road user charging zone - a flexible charge for road use by private vehicles within a defined area (see Figure 2-28 below).

Figure 2-28 – Proposed Sustainable Transport Zone Boundary



2.8 Strategic Benefits

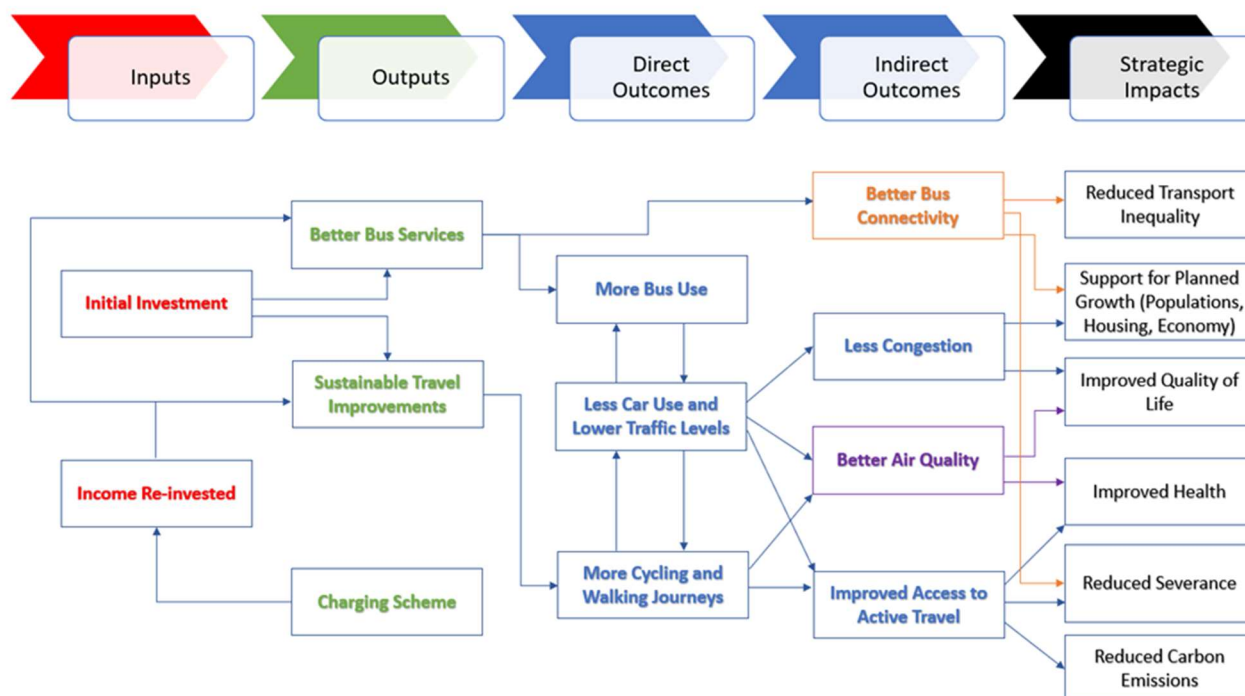
- 2.8.1. This section describes how the strategic benefits of the Making Connections programme would be achieved and how these align with the drivers for change identified in Section 2.6.

Measures of Success

- 2.8.2. To ensure the successful implementation of the Making Connections programme, it is crucial to establish clear measures of success and an effective plan for delivery. This section outlines the key considerations for measuring success and provides guidance on planning for the scheme's implementation, following the DfT's Business Case Guidance.
- 2.8.3. Logic mapping is a way of checking that there are logical connections between the inputs to a scheme or programme (e.g., the investment made) and its expected strategic impacts.

- 2.8.4. At the very simplest level, the Making Connections programme would involve:
- Investment in better bus services
- 2.8.5. Followed by:
- Charges for using private vehicles in Cambridge
 - Use of the charging income to fund ongoing investment in bus services and sustainable transport measures
- 2.8.6. The combination of better bus services and higher costs for private vehicle use should lead to:
- More bus use
 - Less car use and lower traffic levels
- 2.8.7. The improved bus services and switch from car to bus for some journeys would lead to:
- Better connectivity by bus
 - Less congestion
 - Better air quality
 - Improved access to active travel
- 2.8.8. As a result, there would be:
- Less transport inequality
 - Fewer constraints on economic growth
 - Improved quality of life
 - Improved health
 - Reduced carbon emissions
- 2.8.9. The relationships between these inputs, outputs, outcomes, and strategic impacts are illustrated in a simple logic map in Figure 2-29. The logic map shows why it is reasonable to expect the Making Connections programme to deliver the strategic impacts.

Figure 2-29 – Simple Logic Map

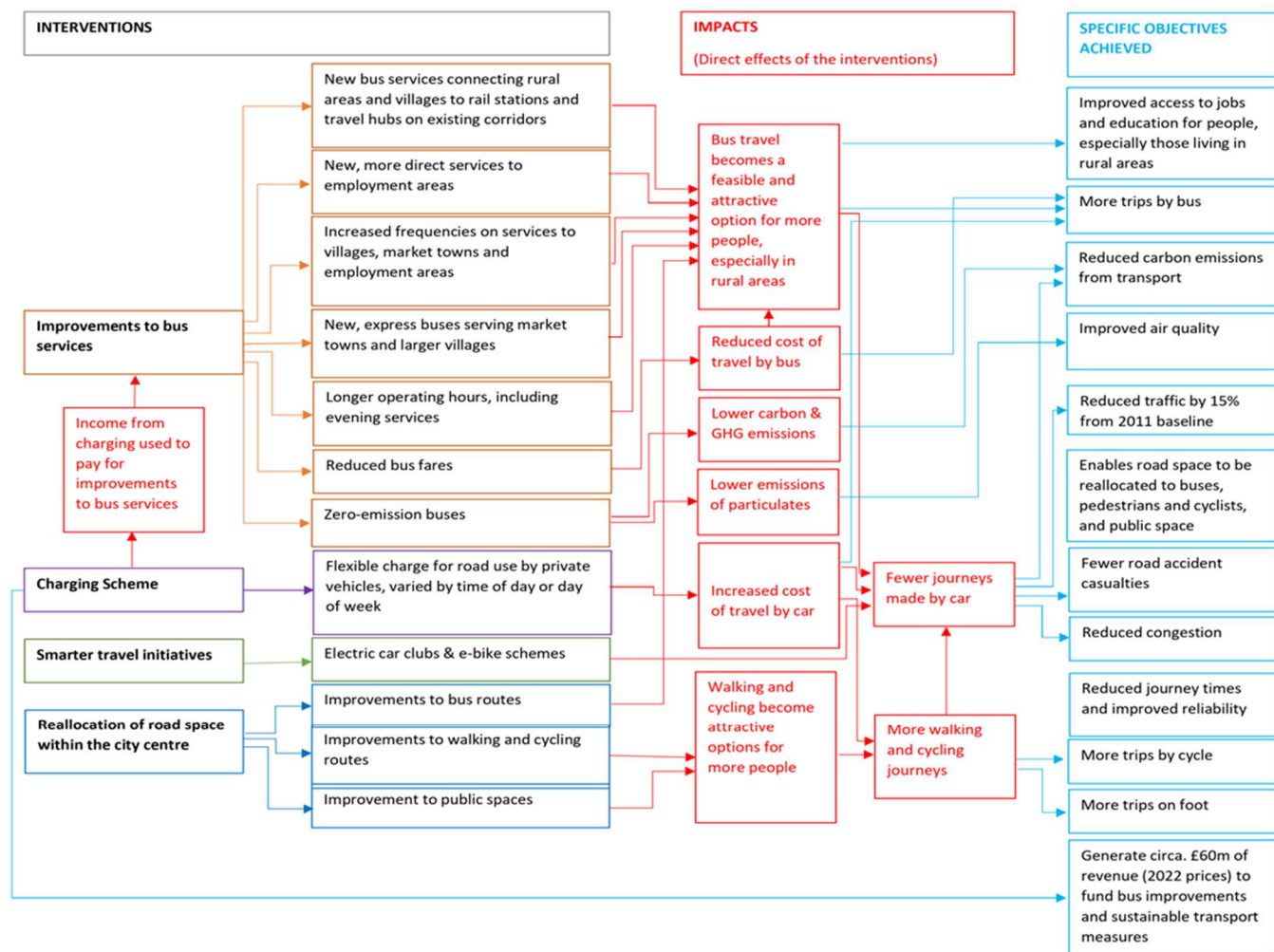


Cause and Effect

- 2.8.10. This section explains in more detail why the Making Connections programme is expected to achieve its objectives. It identifies all the elements of the programme and considers the most likely chains of cause and effect that should, eventually, lead to achievement of the objectives.
- 2.8.11. The results are set out in Figure 2-30 in the form of a causal chain diagram. Whilst it may appear complicated, each of the individual links is simple and logical. For example, “providing more direct bus services to villages, market towns and employment areas” is very likely to “make bus travel a more attractive option for people living in rural areas”. This, in turn, is likely to lead to “more trips by bus” and “improved access to jobs and education for people living in rural areas”. It would also lead to “fewer trips by car”, and therefore contribute towards the other benefits that depend on traffic reduction.
- 2.8.12. At the heart of the Making Connections programme is a simple feedback loop. The charges for road use are re-invested into better bus services and other sustainable transport improvements. As already seen, this creates a dis-incentive to drive in the city and an incentive to travel by bus and active modes, all of which help achieve the programme’s objectives. However, a reduction in car use would also mean less income from charging, so the success of the programme would depend on choosing a charge level and charging regime which would optimise the net benefits.
- 2.8.13. The same principle applies to investment in better bus services and other elements of the Making Connections programme. In most cases, the resulting increase in bus trips should produce more revenue from fares, reducing the overall cost. However, a reduction in fares

on some services could reduce fares income unless balanced by an increase in bus trips. Again, the success of the programme would depend on finding the level, and pattern, of support which optimises the benefits.

Figure 2-30 – Causal Chains



- 2.8.14. As the causal chain diagram shows, all the elements of the Making Connections programme would work together to help achieve the programme's defined objectives.
- 2.8.15. By tracing the lines of cause and effect through the diagram, it is possible to see which elements of the programme are likely to contribute to the achievement of any given objective. Similarly, it is possible to see how any given programme element contributes to the achievement of one or more objective.
- 2.8.16. It can be difficult to directly measure the achievement of strategic objectives, and even more difficult to directly attribute this to a specific project or programme. This is because numerous external factors would also have impacts on such issues as economic growth, CO2 levels or health. However, almost everything else in the causal chain diagram is quantifiable and measurable, especially the achievement of the "specific objectives" which, as explained in Section 2.6.8, have been designed to be SMART. This would give confidence that the programme is contributing towards achievement of the strategic and specific objectives.

Forecasting the Impacts of the Programme

- 2.8.17. Forecasts of key indicators such as traffic volumes, journey times, mode choice, costs, revenues, economic benefits, carbon emissions, air quality and accidents, have been used to:
- Identify the best performing options
 - Show that the preferred programme would achieve its strategic and specific objectives
 - Show that the preferred programme offers value for money
 - All these indicators can be forecast using the traffic and economic models
- 2.8.18. The project OAR, which can be found in Appendix A and is summarised in Section 0, defines measures appropriate for evaluating the effectiveness and impact of the Making Connections programme. The following measures have been considered and details pertaining to their measurement can be found in the Monitoring and Evaluation Scoping Report (see Appendix D):
- **Increased Public Transport Usage:** Monitoring the number of passengers using public transport services within the Programme coverage area. Compare this data to the baseline figures to assess the scheme's ability to encourage modal shift from private vehicles to public transportation.
 - **Reduced Congestion:** Measure the impact of the scheme on traffic congestion by evaluating changes in average travel times and delays along key routes. This data would help assess the effectiveness of the scheme in improving overall traffic flow.
 - **Improved Air Quality:** Monitor air quality indicators, including levels of nitrogen dioxide (NO₂) and particulate matter (PM), in the scheme area. Comparing these measurements with baseline data would determine the extent to which the scheme contributes to improved air quality.

- **Enhanced Accessibility:** Evaluate the scheme's impact on improving accessibility for different user groups, including people with disabilities and those from disadvantaged communities. Assess changes in accessibility indicators through a mix of quantitative outputs and attitudinal surveys, such as the number of accessible transport options and the reduction of barriers to travel.
- **Increased Active Travel:** Monitor the number of pedestrians and cyclists within the scheme's coverage area. Assess changes in mode share for active travel to evaluate the programme's effectiveness in promoting sustainable modes of transportation.
- **Incidence of Road Traffic Collisions:** Obtain data from Cambridgeshire County Council for the Programme's coverage area and identify trends, including changes in the frequency and severity of collisions over time, before and after the implementation of the scheme to assess its impact.

2.9 Strategic Assessment of Options

- 2.9.1. This section provides an overview of the options development and sifting processes that have taken place as part of the Making Connections programme; detail of these processes are set out in the OAR in Appendix A.
- 2.9.2. The OAR fulfils the requirements set out in Steps 1 to 8 of the DfT's Transport Appraisal Guidance (TAG) - The Transport Appraisal Process. An initial OAR was published in 2022 in advance of the SOC. The updated version continues the story beyond the 2022 consultation so that the full options development process is covered in a single document.

Multi-Criteria Analysis Assessment Framework

- 2.9.3. To ensure that the potential Making Connections options address the programme objectives adequately, and that the success of the programme could be monitored effectively in the future, a Multi-Criteria Analysis Assessment Framework (MCAF) has been developed. The MCAF development process involved adding assessment criteria to the specific objectives, set out above, to make them SMART.
- 2.9.4. The MCAF has been developed using information gathered from the initial BIA, EqIA and other impact assessments; this comprised baseline data updates, high-level analyses based on qualitative information, and quantitative outputs where available. Feedback gathered from the autumn 2022 Making Connections public consultation has also fed into several impact assessments. The MCAF is set out in the table below and the methodology for the options analysis is outlined in the Appraisal Specification Report (ASR) and presented in the Options Appraisal Report (OAR).

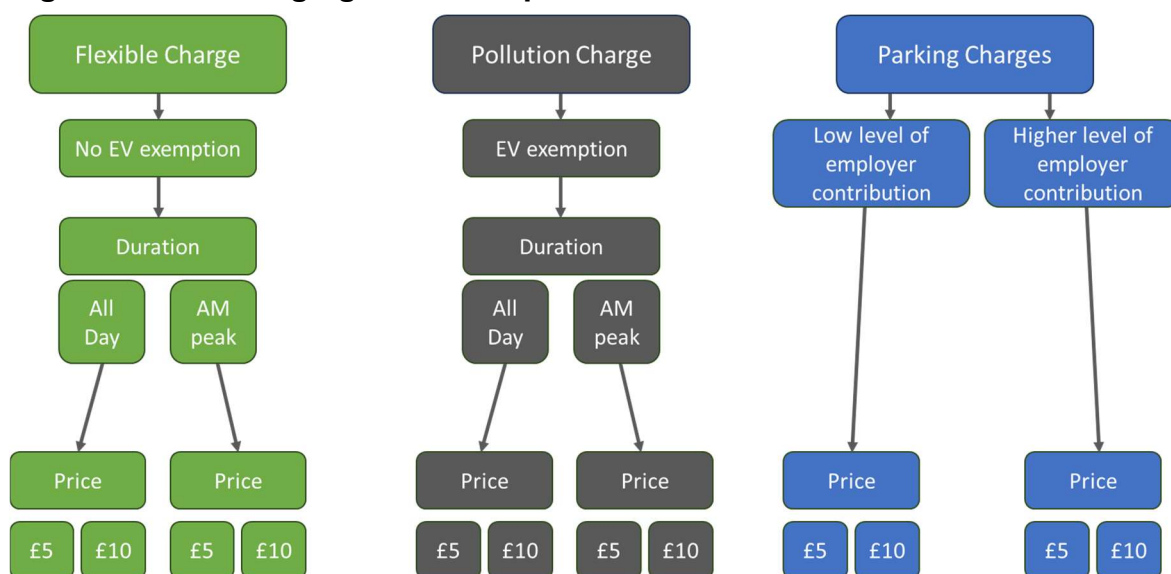
Table 2-7 – MCAF Criteria Based on Strategic Objectives

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
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
		Sustainable transport measures
To make it safe and attractive to walk and cycle for everyday journeys	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	EqlA impacts
		Social and distributional impacts
		Impact on road traffic collisions
		Business impacts
To make it safe and attractive to walk and cycle for everyday journeys		

Pre-Sift

- 2.9.5. A pre-sift took place to establish three charging scheme options, namely, a flexible charge, a pollution charge and a parking charge. Each type of charge had associated sub-options shown in Figure 2-31.

Figure 2-31 – Charging Scheme Options



Sifting in 2022

2.9.6. The purpose of the sift was to assess the ten selected charging options, using outputs from the CSRM, against the Making Connections strategic aims and objectives. The OAR provides a detailed assessment of the following ten options:

- Sustainable Travel Zone 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
- Pollution 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
- Parking Charge
 - High level of Workplace Parking Levy passed on; and
 - Lower level of Workplace Parking Levy passed on.

2.9.7. The analysis demonstrated that the higher the charge and the longer its hours of operation, the greater the level of traffic reduction and revenue generation. This, however, needed to be balanced against the wider policy objectives and outcomes of Making Connections.

- 2.9.8. Findings from the analysis on the three road user charging options were considered and incorporated into the recommendations to the Greater Cambridge Partnership Joint Assembly held in September 2022. The outcome built on sifting undertaken against the strategic objectives of Making Connections and feedback from the 2021 consultation.
- 2.9.9. A core option of a £5 road user charge applied 7am-7pm on weekdays, was recommended to, and accepted by, the Joint Assembly and Executive Board in 2022; this option was subsequently taken forward in the SOC alongside the proposed improvements to bus services and sustainable transport measures. This core option of a base £5 road user charge was also the basis of the consultation held in Autumn 2022, the response to which has informed the development of this OBC.

Sifting in 2023 – Developing Options

- 2.9.10. The recommended core option from the 2022 sifting exercise went 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.
- 2.9.11. More detail on the consultation responses, and how they informed the options development process, is provided in the OAR in Appendix A.

Further Option Development

- 2.9.12. The options development work undertaken in 2023 approached the optimisation of the consulted proposal in a logical order, and categorised findings from the consultation into the following two groups for separate assessment:
- **Changes to the scheme parameters**, such as (but not limited to) changes to the hours, opening year, phasing, charge rate and boundary location of the STZ; and
 - **Changes to the scheme rules**, such as changes to discounts, exemptions, reimbursements, and users accounts.
- 2.9.13. Consideration of potential changes to the parameters or rules was mainly based on the potential of individual changes to balance their ability to:
- Address consultation feedback and learnings from other early-stage assessments; and,
 - Maintain benefits and deliver objectives.
- 2.9.14. At this stage the following changes to scheme parameters were considered:
- **Reducing the hours of operation**: many respondents felt the proposed STZ charging hours would not allow people to move around at times of lower congestion;
 - **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;
 - Making minor alterations to the hours of operation, such as finishing the charge earlier to enable a number of social, leisure, shopping and caring trips to happen outside of the hours of charging; and

- **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.

- 2.9.15. The following changes suggested during the consultation were also considered in the options assessment, but were not taken forward due to a lack of alignment with the programme objectives:
- Reducing the size of the STZ zone to the city centre only; and
 - Removing Cambridge University Hospitals site from the zone.
- 2.9.16. The analysis supporting the decision for not taking these changes forward is provided in Section 7 of the OAR. In summary, the OAR notes that the city centre accounts for only approximately 15% of traffic on the city network so a STZ zone of that scale would not address the congestion problem. The OAR also notes that the Cambridge Biomedical Campus (CBC), on which the hospitals are located, is a large and growing traffic generator. Removing the CBC from the STZ area would raise several practical and policy issues but 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 scenarios discussion below).
- 2.9.17. In addition to these wider, area-based, considerations as part of the next phase of scheme development, consideration would also be given to localised amendments to the boundary of the STZ to reflect specific local issues such as farm accesses. Appendix U outlines boundary issues that were raised during the public consultation and proposed approaches to address these concerns.
- 2.9.18. Changes to scheme rules were also explored, which mainly related to changes to discounts, exemptions, and reimbursements (DERs). The potential DERs identified and considered since the 2022 public consultation are shown in Table 2-8. Additionally, several areas are recommended for further consideration as part of the next stage of works, as set out in the OAR:
- 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; and,
 - To further consider the impact on residents near the edge of the STZ boundary.

Table 2-8 – Discounts, Exemptions and Reimbursements (DERs)

When DERs were Considered	DER
Identified for consideration at consultation	• Emergency vehicles • Military vehicles • Disabled tax class vehicles • Dial-a-ride services • Breakdown services • Blue badge holders • Certain local authority operational vehicles • Car club vehicles (official providers) • People on low incomes • NHS staff • NHS patients • Other essential emergency trips • Other emergency services staff • Minibuses and LGVs used by charities and not-for-profit groups • Social care, community health workers and Care Quality Commission registered care home workers • Registered bus services • Hackney Carriageway (Taxis) and private hire vehicles
Additional groups considered for DER's post consultation	• Small Medium Business Enterprises (SME) • Access to hospitals and healthcare (patients and visitors, and eligible staff parking) • Free days • Residents living near to the boundary travelling outbound • Unpaid carers • Goods vehicles • Residents • Groups that can't use public transport for specific reasons

Formulating Scenarios

- 2.9.19. The sifted potential alterations to the charge scheme parameters and rules were combined to formulate new scenarios for the STZ of Making Connections. The scenarios are set out in Table 2-9. The new options were created with the aim of balancing the consultation feedback against the programme's ability to achieve its defined objectives.
- 2.9.20. Including the consultation proposal, the new scenarios represent the culmination of all options development since 2015. The options are intended to offer a new baseline for further assessment going forward.

Table 2-9 – Four Refined Scenarios along with the Consultation Proposal and 'Do Minimum'

Options	Charge	Time	Implementation Date	Additional Discounts (to those consulted on)
Consultation Scheme	£5 for cars £10 LGV £50 HGV	7am-7pm weekdays	AM only 2026	
Scenario 1	£5 for cars £10 LGV £50 HGV	AM/ PM weekdays	No – starts 2027	Hospitals (patients and visitors) Small vans as cars
Scenario 1A*	£5 for cars £10 LGV £50 HGV	AM/ PM weekdays	No – starts 2027	SME business discount 50 free days indefinitely
Scenario 2	£5 for cars £10 LGV £50 HGV	7am-7pm weekdays	AM only 2026	180 Free days 2026, 2027 100 Free days 2028 50 Free days 2029
Scenario 3	£3 for cars £10 LGV £50 HGV	AM / PM weekdays	No – starts in 2027	Hospitals (patients and visitors) 100 Free days 2027 100 free days 2028
Do Minimum	Ref Case			

* Scenario 1A was developed as a response to the conclusions emerging from the Business Impact Assessment and the desire to understand the impact of keeping free days indefinitely. It has only been financially assessed to keep the appraisal proportionate.

- 2.9.21. All scenarios in the table above additionally include the full range of discounts, exemptions and reimbursements (DERs), which are shown in Table 2-8. Full details of the tested DERs are included in Section 7 of the OAR in Appendix A.
- 2.9.22. The scenarios presented in Table 2-9 would generate different levels of revenue and therefore support different levels of bus and STM improvements. Illustrative bus scenarios have been developed to complement these scenarios.

- 2.9.23. The scenarios were assessed using a MCAF to measure how well they addressed the scheme objectives. A summary of the MCAF scores is provided in Table 2-10 – Summary of Assessment and a full version of the detailed scoring evidence is provided in the OAR.

Table 2-10 – Summary of Assessment

Scenario	Environmental	Congestion	Sustainable Travel	Deliverability	Quality of Life	Revenue*	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 Minimum	Reference case used to compare scenarios against in OBC						

*Note: 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.

- 2.9.24. The analysis demonstrates that all the scenarios have positive impacts in terms of congestion and environmental benefits. All scenarios also deliver the funding necessary to facilitate a transformation of the bus network and the introduction of sustainable travel measures.
- 2.9.25. The level of funding generated, and scheme benefits delivered is, however, dependent on whether a scenario has peak hour or all day STZ charges, and the extent of any additional DERs.
- 2.9.26. The results of the MCAF appraisal suggest that all three new scenarios, alongside the consultation scheme, have potential merit in terms of their strategic impact. Therefore, all scenarios have been taken forward for more detailed assessment in the Economic Dimension of this OBC.
- 2.9.27. In response to the emerging work on the BIA, a variant of Scenario 1 was developed. Post-MCAF, Scenario 1A was built upon Scenario 1 to include a targeted discount for locally-owned SMEs.

2.10 Risks and constraints

- 2.10.1. The management of risk and uncertainty is key to the successful delivery of the Making Connections programme, as it identifies threats to project delivery and enables effective risk management actions to be assigned. The approach to the management of programme risks, including details of the GCP's Risk Management Framework, is set out within the Management Dimension.
- 2.10.2. The key risks to achieving the Programme's objectives, as identified as part of the Outline Business Case, are associated with social acceptance, economic and human resources, traffic and congestion impacts and wider dependencies on other projects and programmes. The risks include, but are not limited to:
- **Legal challenges** to the scheme (e.g. Judicial Review) result in delays or cancellations to the scheme.
 - **Inadequate bus network improvements:** the bus network improvements are not sufficiently attractive and/or believed to be deliverable, there are delays to the delivery of bus network improvements, or the improvements are not deliverable due to funding constraints. This could result in a disproportionate penalisation of vulnerable groups in society.
 - **The impact of the Sustainable Travel Zone on traffic flows is too low or high.** The STZ either fails to generate enough revenue to fund the wider Making Connections package or does not reduce traffic enough to alleviate congestion to the desired level.
 - **Unintended traffic consequences:** the potential impacts on the network due to the displacement of traffic, displacing negative outcomes to other areas of Greater Cambridge.
 - **Lack of public acceptance:** the scheme is perceived as having too negative an impact, particularly in current cost of living crisis, resulting in significant objections.
 - **Economic resources and delivery teams constraints:** the potential lack of adequate economic and people power to fund and run the implementation of the Programme.
- 2.10.3. A programme risk register has been developed and is being updated throughout the life cycle of the Programme; the Management Dimensions explores, in further detail, the potential consequences and mitigations of the programme risks.
- 2.10.4. Whilst it is considered that each option broadly faces the same risks to programme delivery and operation, the likelihood and impact of each risk varies between each option. The primary driver for this variation is differences in the proposed STZ charge and hours of operation.

2.11 Stakeholders' Views and Requirements

Consultation on Making Connections Proposal

2.11.1. Stakeholder Engagement for the Making Connections programme is managed by the project's Communications and Engagement Team; details of these arrangements are set out in the Management Dimension.

2.11.2. The engagement process is summarised in the following subsections and documented within the latest Consultation Report.

Summary of Previous Consultations

2.11.3. In 2017 the GCP hosted 'Our Big Conversation', a public consultation designed to help shape its Future Investment Strategy. The consultation found that respondents wanted affordable, clean and practical transport solutions that offer alternatives to private vehicles and that there was a need to reduce or discourage car use, particularly within the city centre.

2.11.4. Our Big Conversation was followed in 2019 by the Choices for Better Journeys consultation and the Greater Cambridge Citizens' Assembly, which considered public transport, congestion and air quality issues. Notably, in the Choices for Better Journeys consultation, 82% of respondents supported GCP's vision to significantly improve public transport and 81% chose a 'traffic-reducing measure' as their first choice for both funding public transport and reducing congestion.

2.11.5. In September 2021, the GCP Executive Board agreed to develop a final package of options for improving bus services, expanding the cycling-plus network and managing road space in Cambridge. The Board agreed on a roadmap commencing with a public consultation (8 November to 20 December 2021) setting out proposals for improvements to the bus network and measures to prioritise road space for sustainable transport.

2.11.6. The public was also invited to suggest options to fund ongoing sustainable transport improvements, either via increased parking charges and a Workplace Parking Levy, a pollution charge or a road user charge.

2.11.7. The consultation survey received 2,369 responses and a further 72 responses were received by email. The key findings were as follows:

- 78% of respondents supported proposals to create a bus network with cheaper, faster, more frequent, and reliable services;
- 71% supported the overall aims of reducing carbon emissions, tackling pollution and congestion;
- 68% supported reducing traffic to improve walking and cycling options; and
- 52% supported reducing traffic to improve public spaces.

2.11.8. The consultation included focus groups, and workshops with Citizens Assembly members, which shadowed the strong support for delivering a transformation of bus services, as

envisaged in the 'Better buses for all' package, as well as taking action to tackle congestion and pollution and improve active travel.

Public Consultation 2022

- 2.11.9. Between 17th October 2022 and 23rd December 2022, GCP sought views on the Making Connections proposals to make public transport, cycling and walking more attractive. The consultation also considered ways to reduce traffic and raise the additional revenue needed to support sustainable transport solutions. The full findings of this public consultation are reported in detail in the 'Making Connections 2022 – Consultation Report' which was published on 26th May 2023.
- 2.11.10. The consultation sought views on the following measures:
- Transforming the bus network
 - Investing in other sustainable travel schemes
 - Creating a Sustainable Travel Zone
- 2.11.11. The consultation proposal package also sought a view on a list of proposed discounts, exemptions, and reimbursements, which were informed by the previous consultation and engagement with key stakeholders in Autumn 2021.

Response Demographics and Stakeholder Groups

- 2.11.12. In total, there were 24,071 responses to the consultation, which was supplemented by 894 emails, 10 letters, 149 organisation responses and 2,176 comments on GCP social media posts related to Making Connections.
- 2.11.13. In addition, stakeholders provided feedback in a range of ways including meetings, workshops, focus groups and other relevant events on the GCP 'Making Connections' proposals.
- 2.11.14. The stakeholders included people from the Greater Cambridge Citizens' Assembly which first took place pre consultation in 2019.
- 2.11.15. The other stakeholders have been categorised into six categories. The full list of stakeholders is shown below in Table 2-11.

Table 2-11 – Stakeholder Groups

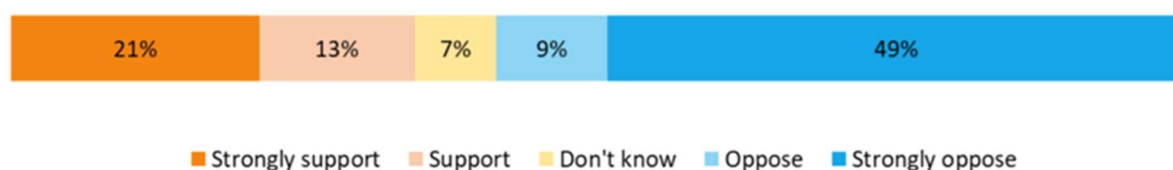
Category	Groups
Transport & Environment	Cycling UK Campaign for Better Transport Living Streets Transport for All Sustrans
Businesses	Logistics UK Federation of Small Businesses Cambridge Chamber of Commerce Cambridge Taxi Trade Cambridge Market Traders AICES International Express
Education & Young People	Anglia Ruskin University & Students Union Centre 33

	Cambridge Youth Panel Cambridge Secondary Heads Assoc University of Cambridge Student Union Cambridge Regional College Long Road Sixth Form College Hills Road Sixth Form College University of Cambridge Staff
Health Care, Social Care & Informal Care	NHS Comms Cell (Cambridgeshire and Peterborough Combined Care) Caring Together Community Transport Cambridge Biomedical Campus: Workforce, Travel and Transport Briefing Community Transport Providers – Dial-a-ride and Car Schemes Healthwatch Cambridgeshire and Peterborough – Older People's Partnership Board Asthma and Lung UK Cambridge Biomedical Campus Exemptions Workshop East of England Ambulance Service Cambridgeshire Search and Rescue Rosie Maternity Hospital (Addenbrooke's CUH) SERV Suffolk and Cambridgeshire Age UK Cambs and Peterborough Taxi Forum
Community Sector	Cambridge City Council Community Services Citizens Advice Bureau Cambridge & District Cambridge Women's Resource Centre Cambridge Council for Voluntary Services Rape Crisis
Disability Groups	Transport for All

Creating a Sustainable Travel Zone

2.11.16. In total, 58% of respondents to the consultation were opposed (9%) or strongly opposed (49%) to the introduction of a Sustainable Travel Zone to fund improvements for bus services, walking and cycling. In contrast, the consultation revealed that 34% of people supported (13%) or strongly supported (21%) the introduction of a STZ to fund in contrast, 58% of people were opposed (9%) or strongly opposed (49%) to the STZ.

Figure 2-32 – To what extent do you support or oppose the introduction of an STZ to fund improvements to bus services, walking and cycling?¹²¹



- Support by age:
 - The greatest support for the STZ was among younger age groups, with 61% of those in the 16-24 age bracket and 45% in the 25–34 age bracket either supporting or strongly supporting the STZ.

¹²¹ Greater Cambridge Partnership (2023). *Making Connections 2022 Consultation Report, May 2023*

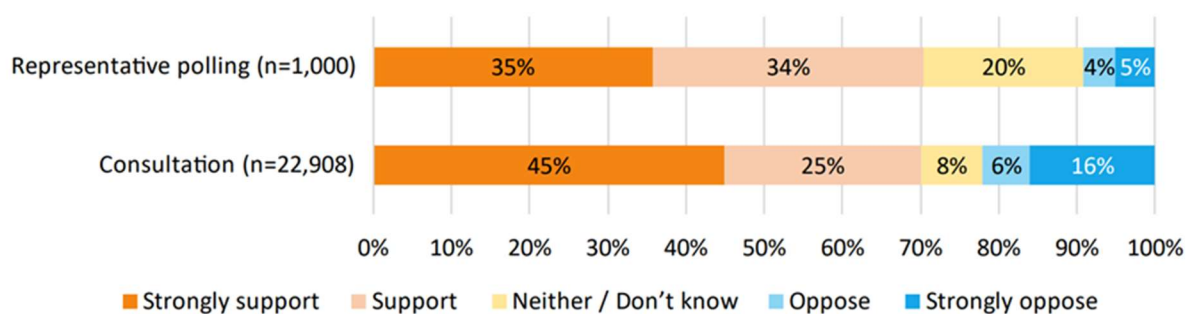
- Levels of support generally decreased in older age categories; for example, 28% of people supported, and 64% opposed the STZ in the 55-64 age bracket.
- Support by location:
 - 46% of Cambridge residents support (15%) or strongly support (31%) the STZ;
 - 31% of South Cambridgeshire residents support (14%) or strongly support (17%) the STZ;
 - Overall, the support for the STZ in Cambridgeshire stood at 40% (25% 'strongly support' and 15% 'support'), whilst 54% opposed the proposals (44% 'strongly oppose' and 10% 'oppose').
- Hours of operation:
 - The most common response was that the proposed operating hours (0700-1900 Monday to Friday) of the Sustainable Travel Zone were too long;
 - 3,913 respondents said that the operating hours should be reduced, whilst 740 respondents supported the proposed operating hours (0700-1900, Monday-Friday).
 - 2,614 comments expressed general opposition to the STZ;
 - 1,438 respondents said that the STZ should apply to peak hours only; and,
 - 895 respondents stated that the STZ should operate 7 days per week.
- STZ Boundary:
 - 4,581 respondents to the questionnaire suggested that the area of the STZ is too large and should be reduced;
 - 2,850 respondents said that certain locations should be excluded from the zone; and,
 - 1,418 respondents argued that it was unacceptable to pay to access essential services that were located inside the zone; Addenbrooke's Hospital was mentioned frequently.
- Discounts, exemptions and reimbursements
 - 1,836 people stated that the exemptions did not go far enough;
 - 1,446 respondents commented that public sector employees should be exempt from the charge;
 - 1,213 respondents argued that discounts should not be offered to anyone; and,
 - 1,117 stated that residents should exempt from the charge.

Transforming the Bus Network – Bus Improvements

- 2.11.17. The majority of responses across the consultation survey, the opinion polling, stakeholder responses and the targeted meetings were in agreement that the bus network across Greater Cambridge is in need of improvement and were supportive of the vision set out.
- 2.11.18. The responses received from the questionnaire indicated strong support for bus improvements from respondents: 45% strongly supported the plans, and 25% supported the plans. The results in the demographically representative poll indicated that overall support

was broadly similar, however, the poll had fewer opposing responses when compared to the consultation questionnaire responses.

Figure 2-33 – To what extent do you support or oppose the proposals for bus improvements and fare reductions?¹²¹



Sustainable Travel Measures

- 2.11.19. There was strong support for the proposed sustainable transport improvements with an average of 75% of people, across all the proposed measures, being either 'strongly supportive' or 'supportive' of the proposals. The exception to this was car clubs where 40% of respondents said they do not know whether they support proposals.
- 2.11.20. The most popular measure was making the city more accessible for disabled people and those with additional mobility requirements. When asked what additional measures they would most like to see funded, the most common comment received in the consultation questionnaire was to improve cycling infrastructure.

Refined Scenarios

- 2.11.21. In summary, although there was general support for the bus-based and other sustainable transport measures, the greatest number of comments received related to the STZ; these focused on its operation, level of charge, geographic extent, time of day, and potential exemptions. As noted in the Strategic Assessment of options section above, a number of refined options have now been developed. These options consider the impact of lower levels of charge, shorter hours of operation, and various discounts and exemptions. The impact of these potential changes is set out in the OAR that accompanies this OBC.

What are the key outcomes of the 2022 public consultation and what does this mean for Making Connections?

The majority of responses across the consultation survey, the opinion polling, stakeholder responses and the targeted meetings, were in agreement that the bus network in Greater Cambridge is in need of improvement and were supportive of the vision set out in Making Connections. The responses received from the questionnaire indicated strong support for bus improvements: 45% strongly supported the plans, and a further 25% supported them.

There was also strong support for the sustainable transport improvements, with an average of 75% of respondents, across all the proposed measures, being either 'strongly supportive' or 'supportive' of the proposals.

Overall, respondents did not support the Sustainable Travel Zone (STZ) element of Making Connections. Here, 34% of survey respondents were supportive of the STZ as the means of delivering the vision set out in Making Connections, whilst 58% opposed it.

Support for bus service improvements was comparatively higher than opposition to the STZ. There was also a clear relationship between those who were supportive of the STZ and bus improvements, at a rate of 98%. High levels of support for bus improvements continued with respondents who were 'unsure' of whether they supported the STZ (81% supportive) and even those who opposed the STZ (76% supportive). Support for the bus improvements only fell below 50% when looking at respondents who 'strongly opposed' the STZ (46% supportive).

The results of the 2022 Public Consultation show that the public is supportive of the vision for improved public and sustainable transport provision set out as part of the Making Connections programme. Whilst there is some support for the STZ, the majority of respondents opposed the road user charge proposed as part of the consultation option. These concerns have been reflected in the options development process that form part of this OBC with a number of refined scenarios now defined to assess these.

3 Economic Dimension

3.1 Purpose

- 3.1.1. This chapter covers the Economic Dimension. As required by the GCP City Deal Assurance Framework (2021), it was prepared in accordance with the Transport Business Case Guidance published by the Department for Transport (DfT) in August 2021 (updated February 2022) and with the DfT's Transport Appraisal Guidance (TAG) and Value for Money Framework¹²² published in July 2017 (and then updated in July 2021).
- 3.1.2. The purpose of the Economic Dimension is to set out:
- The technical approach, specifications, and assumptions upon which the tests and appraisals were undertaken.
 - The scenarios tested and appraised.
 - The sensitivity tests to show the economic performance of the scheme under a range of assumptions.
 - An overall Appraisal Summary Table (AST), along with Transport Economic Efficiency (TEE) table.
 - Public Accounts (PA) and Analysis of Monetised Costs and Benefits (AMCB) tables, which includes an assessment of economic, environmental, and social impacts.
 - A 'value for money' assessment setting out findings of the Economic Dimension.
- 3.1.3. The remainder of this chapter gives a summary of VfM findings before providing further details to the following questions:
- What Scenarios were assessed and how they were identified?
 - What the economic impacts were captured and how?
 - How were the wider range of impacts assessed?
 - What are the central forecasts and how their robustness was demonstrated through sensitivity tests?
- 3.1.4. A Value for Money (VfM) statement is presented at the end to conclude the Economic Dimension.
- 3.1.5. The Department for Transport's 'Transport Business Case Guidance' outlines elements that should be covered in the Economic Dimension (by the end of OBC stage). The following table indicates where these requirements are met in this document.

¹²² [Department for Transport \(2021\). Value for money framework](#)

Table 3-1 – Contents of the Economic Dimension

Content	DfT Requirements	Section
Longlist appraisal	assess the longlist of options (outlined in the strategic dimension) to a shortlist of options and identify the preferred way forward	3.3
Methodologies, assumptions and data	set out the methodologies, assumptions and data that have been used to underpin any transport modelling and appraisal	3.4
Social cost-benefit analysis of shortlist	present and explore the main economic impacts associated with the intervention from a UK social welfare perspective	3.6
Distributional analysis	provide distributional analysis to understand the impacts on different social groups	3.6
Place-based analysis	conduct place-based analysis where the proposal has geographically focused objectives or where impacts of national-level interventions may differ spatially (where this is proportionate)	3.6
Wider analysis	any extra analysis which provides useful insight to inform the decision-making process: this could include analysis of the various options' performance against the SMART objectives at the shortlist stage. This analysis should be proportionate and consistent with the strategic dimension	3.5
Value for Money	As per DfT Value for Money guidance	3.2 3.8
Uncertainty analysis	Analysis to understand how changes in different factors affect the value for money of the investment	3.7
Appraisal summary tables	TEE, PA, AMCB and ASTs as per TAG guidance	Appendix S

3.2 Summary of Value for Money

- 3.2.1. All Making Connections scenarios considered are expected to deliver material behavioural changes that shift travel demand to sustainable transport modes and provide ongoing net revenue to invest.
- 3.2.2. Technical evidence suggests that Scenario 2 (£5 all day charge) is best performing against the established scheme objectives, particularly in terms of the aspired behavioural changes. It is also recognised that this scenario does not fully address concerns recognised in the Autumn 2022 consultation and financial impacts on business, particularly after the free days offered in the early years phase out.
- 3.2.3. On the other hand, scenario 3 (£3 peak charge) is the most challenging due to the lower level of revenue forecast in the early years, and therefore has less headroom to offer further discounts such as free days to the public. The forecast behavioural changes, although material, are also the lowest out of all scenarios assessed. This is the result of relatively lower charge proposed, but is also constrained by the limited headroom in the net revenue available to fund more substantial improvements in public transport and active mode measures in order to encourage higher modal shift.
- 3.2.4. Scenario 1 (£5 peak charge) appears to offer a balanced outcome compared with the other scenarios. The potential positive behavioural changes are not as high as Scenario 1 but still very substantial. Meanwhile, it is able to offer more DERs to address concerns from the

consultation (compared with Scenario 3) and would generate higher net ongoing revenue (than Scenario 3) to invest on public transport and other sustainable transport measures in order to facilitate and safeguard the behavioural changes driven by the proposed area charge.

- 3.2.5. These findings are underpinned by a cost-benefit analysis based on several distinct, but related, streams of assessment:
- Costs to the public sector – associated with setting up and operating a sustainable travel zone;
 - Costs and subsidies associated with transport providers for the improved bus services;
 - Costs associated with other sustainable transport measures in the Making Connections programme.
 - Whole life costs for all interventions in the scope.
 - Transport economic efficiency impacts such as time savings, active mode user impacts, cost savings, area charge user impacts and bus fare user impacts.
 - Transport network impacts such as collisions and reliability.
 - Environmental impacts.
 - Wider economic impacts, focused on quantitative and qualitative evidence; and
 - Social and distributional impacts as well as equality impacts.
 - Place-based analysis.
- 3.2.6. In present value terms¹²³, Making Connections programme was forecast to bring the following impacts over a 60-year period under different scenarios explored in the business case. Each scenario was forecast to generate sufficient revenue income to cover the investment proposed. Further details on the forecast revenue are documented in the Financial Dimension.

¹²³ Present value term means presenting the financial impacts in 2010 prices and values as per the requirements in DfT's TAG.

60-Year Forecast Costs in Present Value (£5 All Day)



60-Year Forecast Costs in Present Value (£5 Peak)

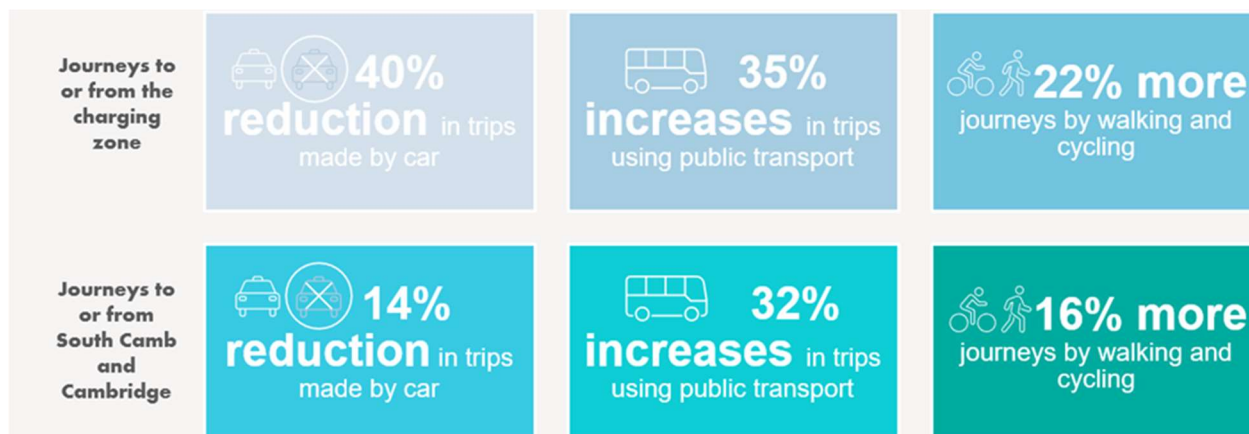


60-Year Forecast Costs in Present Value (£3 Peak)

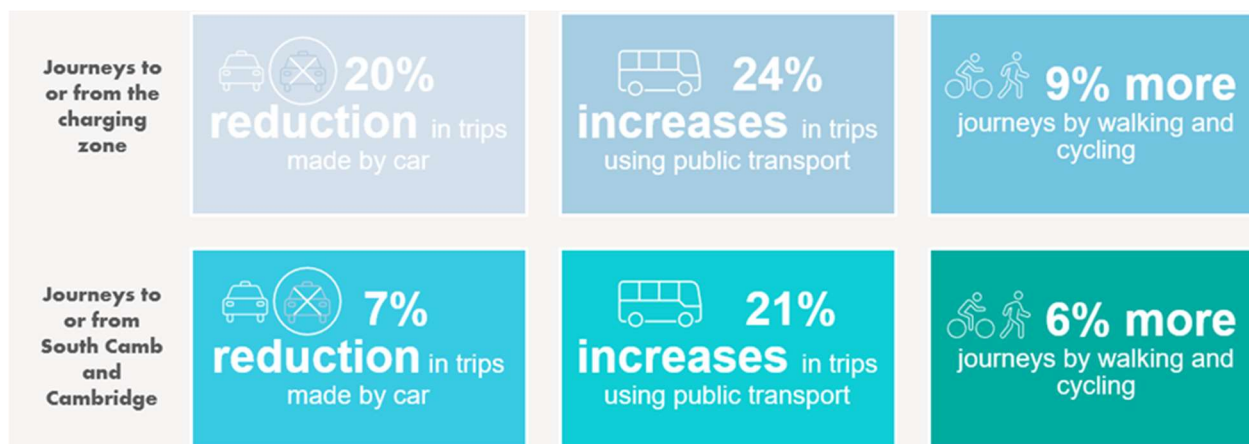


- 3.2.7. A transformational change to the bus network would be achieved along with other sustainable transport measures aimed at delivering the aspired modal shift¹²⁴ to sustainable modes and enabling increased levels of economic growth in the region.
- 3.2.8. The forecast reduction in car trips would free up significant network capacity for the existing residents, employees, and future growth, but also generate journey time savings for other car and bus users, reduce emissions and lower risks of collisions. Bus users would also benefit from reduced fare, higher frequency in services. Consequently, the increase in bus trips would lead to higher revenues. Increases in active mode trips would also result in benefits from improved health.
- 3.2.9. The £5 All Day charge scenario was forecast to lead to significant behavioural changes for journeys to or from the charge zone. Widening the geography to also include all Greater Cambridge (i.e., with South Cambridgeshire also included), a similar trend in travel behaviour changes was forecast. Figures represent all-day trip variations.

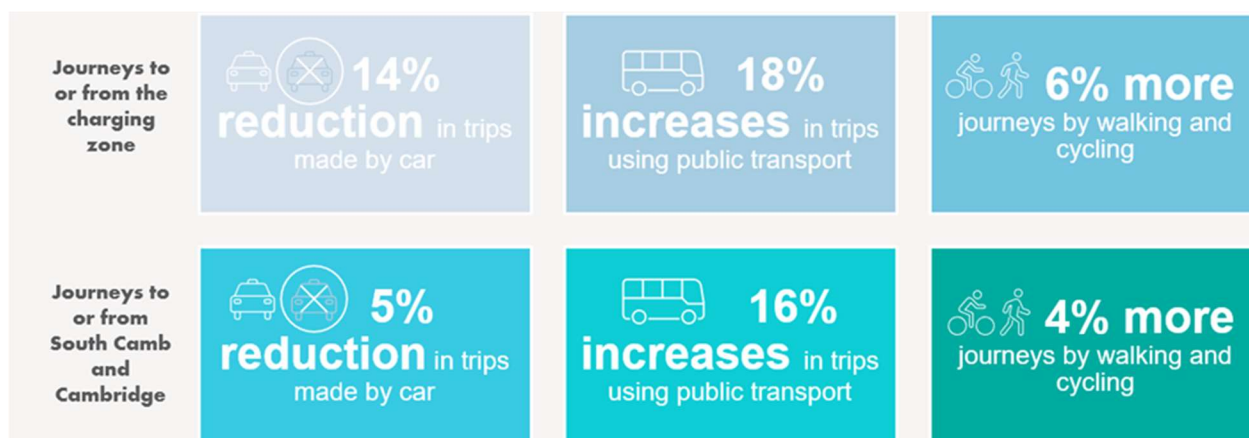
¹²⁴ Trips to, from or within the city of Cambridge



3.2.10. The forecast behavioural changes for the £5 Peak charge scenario are slightly less as expected but still substantial.



3.2.11. The £3 Peak charge scenario would bring a lower level of changes but its impacts are still material.



3.2.12. Over the appraisal period, the Making Connections programme is forecast to generate significant benefits to transport users and wider society.

60-Year Forecast Impacts (£5 All Day)

 **£1bn**
time savings for
car users as a result of
decongestion after modal shift

 **£236m**
time savings for
public transport passengers
due to improvements to bus
services

 **£152m**
savings in vehicle
operating costs for transport
users.

 **£393m**
health benefits
due to increase in physical
activities through the use of
active modes

 **£150m**
saving from the reduction
in accidents

 **£52m**
saved from the reduced
Greenhouse Gas emission

60-Year Forecast Impacts (£5 Peak Only)

 **£800m**
time savings for
car users as a result of
decongestion after modal shift

 **£118m time**
savings for public
transport passengers due to
improvements to bus services

 **£90m**
savings in vehicle
operating costs for transport
users.

 **£163m**
health benefits
due to increase in physical
activities through the use of
active modes

 **£54m**
saving from the reduction
in accidents

 **£38m**
saved from the reduced
Greenhouse Gas emission

60-Year Forecast Impacts (£3 Peak Only)

 **£600m**
time savings for
car users as a result of
decongestion after modal shift

 **£65m time**
savings for public
transport passengers due to
improvements to bus services

 **£65m**
savings in vehicle
operating costs for transport
users.

 **£121m**
health benefits
due to increase in physical
activities through the use of
active modes

 **£35m***
saving from the reduction
in accidents

 **£25m***
saved from the reduced
Greenhouse Gas emission

* Approximated values to be updated upon completion of analysis

- 3.2.13. In addition to the above monetised benefits, other benefits have been assessed quantitatively or qualitatively. These include the positive impacts from journey time reliability improvements, social and distributional impacts, equality impacts, wider economic impacts, and other environmental impacts.

3.3 Scenario Development and Assessment

- 3.3.1. The process of scenario identification is described in the Introduction and the Strategic Dimension. Table 3-2 summarises the five scenarios under consideration in the OBC.

Table 3-2 – Scenarios identified in the OAR for further assessment in the OBC

Scenario	Headline Description
Consultation Scheme	7am 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) Hospital visitors and patients free 100 free days 2027 and 2028
Do Minimum	Reference case without Making Connections to compare the performance of the above four against

*Note: Scenario 1A is a variant of Scenario 1 with the addition of free days indefinitely and an SME discount is assessed in the Financial Dimension.

- 3.3.2. In each scenario, with the exception of Do Minimum, the specifications also include a £10 charge for LGVs and £50 for HGVs (per day). These are the same as the proposal consulted in December 2022.
- 3.3.3. As explained in the OAR, information in Table 3-2 is termed scenarios instead of options as they are not fully developed at this stage but are intended to set out a range of possible options to incorporate insights gained from the 2022 consultation. By considering the consultation scheme and the option of Do Minimum in the mix, this provides the widest range of options.
- 3.3.4. These broad scenarios were taken forward for consideration as part of the development of the OBC. Further refinement or alternatives to the parameters were considered in the OBC about scenarios outlined in Table 3-2, such as variations to the ramp-up period during implementation, the distinctions in charges between different vehicle types (higher charges for LGVs and OGVs as an example) or other parameters. Whilst there is initial consideration of Discounts, Exemptions and Reimbursements (DERs) in the scenarios tabulated, these

were refined and developed as part of the OBC development and may continue to evolve beyond as details are finalised for the Full Business Case (FBC).

- 3.3.5. It is noted that the consideration of many variations or parameters as described above were incorporated through analysis outside of the transport model. These considerations were captured in the Financial Dimension.
- 3.3.6. The proposed **public transport improvements** have focused on the following areas building on the work in the SOC and OAR:
- Improved services to planned growth and development areas on radial routes into the city.
 - Faster and more frequent rural services to villages and market towns.
 - Longer operating hours, including evening services.
 - Reductions in fare prices to set a flat £1 fare for all trips within Cambridge or £2 for all trips within Cambridgeshire.
- 3.3.7. These measures are aimed at enabling sustainable development while minimising emissions related to car use.
- 3.3.8. Three primary public transport scenarios were modelled in OBC development using Cambridge Sub-Regional Model (CSRM2), including the full 'Making Connections' service specification including reduced fare and two reduced specifications (for Scenarios 1 and 3 in Table 3-2 which are expected to provide lower levels of improvement commensurate with the lower net revenue expected).
- 3.3.9. **Active mode measures**, such as reallocation of road space for active travel, away from car where demand no longer requires existing levels of capacity, aim to make best use of existing infrastructure, and so deliver benefits while minimising costs. Such measures were proposed to complement the planned public transport upgrades and provide more attractive and accessible access/egress between services and key destinations in the city. Provision of measures for active modes were considered largely qualitatively or based on simplified modelling prepared externally to the strategic model, as CSRM2 model captures only the demand side of active mode travel, without any representation of the supply side.
- 3.3.10. In addition to transport interventions the release of highway space for other purposes and generation of revenue for reinvestment would enable a wider range of measures to be pursued. These may include liveable neighbourhoods, future transport measures such as mobility hubs, e-scooters, e-cargo bikes, freight consolidation, and micro-consolidation. These complementary measures are not suited to representation within CSRM2 and so would be considered qualitatively.

Modelling the Identified Options in OBC

- 3.3.11. CSRM2 is the primary modelling tool used in the OBC. Details of this model suite and its suitability for this purpose are covered in detail in the ASR.

3.3.12. A Do Minimum (DM) scenario was used as a baseline for transport provision, against which the Making Connections programme was assessed in the OBC. The DM scenario was specified as including Cambridge South Station in addition to a range of GCP's proposed public transport corridor schemes, details of which are set out in the CSRM2 F-Series Forecasting Report. This is a model scenario that has been updated from that used in the SOC. More details of the DM scenario and its associated documentation are presented in the ASR.

3.3.13. Identification of the Do-Something (DS) modelling scenarios was an iterative process, which was described in the ASR. Eight model runs (DS1 to DS8) were proposed but ultimately only a selection was used to represent the consultation scheme and three broad scenarios outlined in Table 3-2 of this report. These include DM, DS1, DS6, DS7 and DS8 as shown in Table 3-3.

Table 3-3 – OBC Model runs for Scenarios Identified

Spec \ Scenario		No Scheme	Consultation Scheme	Scenario 1	Scenario 2	Scenario 3
		DM	DS1	DS6/7	DS1	DS8
		Ref Case	All day £5	AM and PM peaks £5	All day £5	AM and PM peaks £3
Model Years	2026	Y	Y	Y	Y	Y
	2041	Y	Y	Y	Y	Y
Charge period	All Day		Y		Y	
	AM & PM			Y		Y
Charge value*	£5		Y	Y	Y	
	£3					Y
PT Fare	Full	Y				
	Reduced		Y	Y	Y	Y
PT Upgrade	None	Y				
	Reduced			Y (DS6)		
	Reduced v2			Y (DS7)		
	Reduced v3					Y
	Full		Y		Y	

*Note: In each of the above scenarios, except for Do Minimum, the specifications also include a £10 charge for LGVs and £50 for OGVs (per day)

3.3.14. Model runs in the table above aim to represent the permanent state of the proposed interventions as closely as possible, so any interim schemes for early years (such as 2026, 2027 or 2028) that may be required are not captured by model runs presented in this table. Where necessary for the assessment undertaken, these interim schemes were approximated by other model runs or adjustment outside of the transport model, which are introduced subsequently in this report.

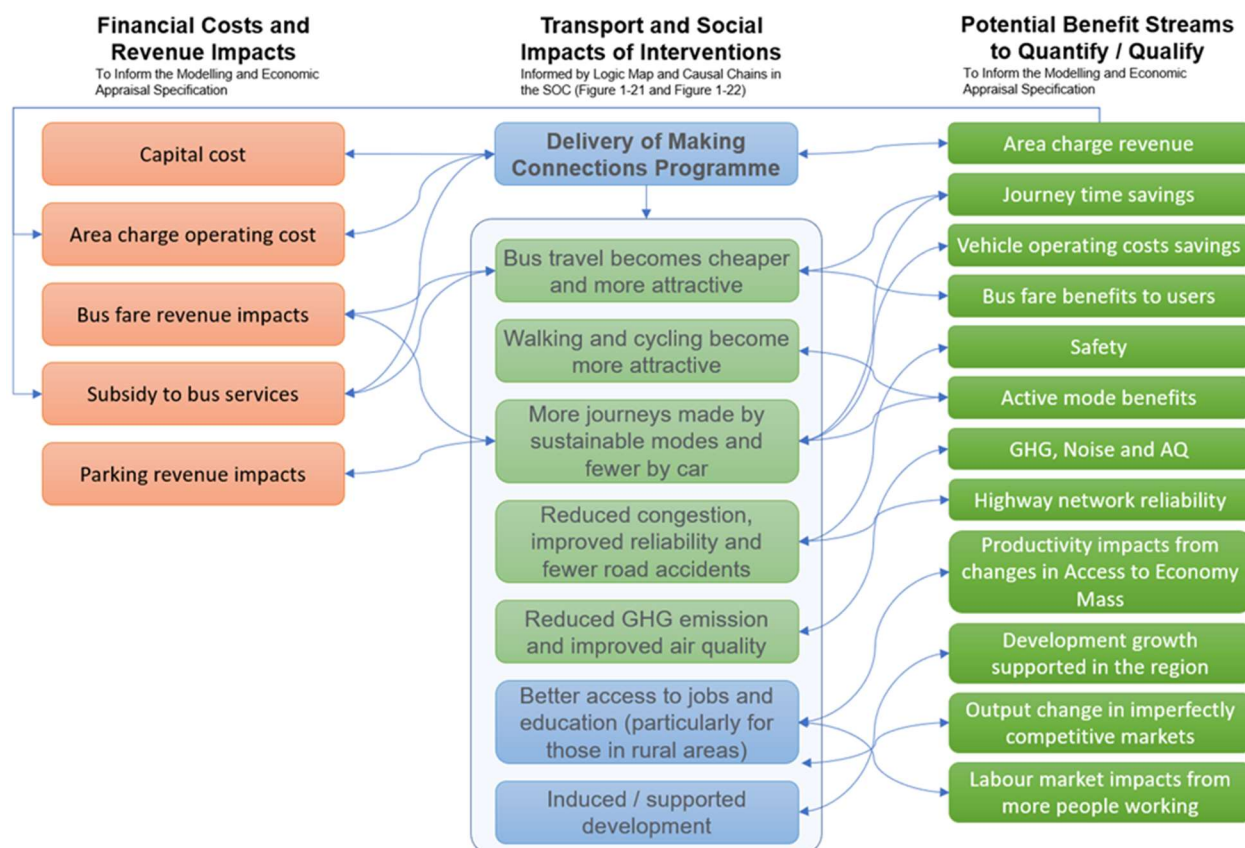
- 3.3.15. Similarly, the designated model runs in Table 3-3 do not fully capture some subtle difference between the broad scenarios in Table 3-2, such as the discrepancies in DERs. These have been accounted for outside of the transport model and their cost and revenue implications were captured in the Financial Dimension.
- 3.3.16. In the process of OBC development, two model runs (DS6 and DS7) were defined for Scenario 1 in Table 3-3. DS6 is the first run with an approximated public transport specification whilst DS7 is an update with a refined public transport specification deemed more in line with the likely scale of revenue that could be generated by the charging scheme. Therefore, the assessment of Scenario 1 in the current draft OBC was based on DS7 wherever it was possible to do so (such as user impacts assessment with TUBA), but some assessments were based on DS6 output (such as collision impact and wider impact assessment). These would be updated in a subsequent draft when relevant outputs become available. Revisions incorporating inputs from DS7 are not expected to significantly change results relative to those produced using DS6 inputs.

3.4 Economic Appraisal Methodology

Economic Impacts Assessment

- 3.4.1. Key components of the Making Connections programme are outlined in Section 3.3, which fall into the following three categories:
- Charging scheme
 - Provision for public transport
 - Provision for active modes and other complementary measures
- 3.4.2. A full range of outcomes and impacts from the Making Connections programme are outlined in the middle column of Figure 3-1. These expected impacts reflect the Logic Map and Causal Chains established in the Strategic Dimension. This ensured the alignment between both dimensions to maintain a common thread between the strategic narrative for the programme and the range of technical evidence that was prepared in the OBC.
- 3.4.3. The cost and revenue impacts from delivering Making Connections programme and its subsequent impacts are listed in the left column of Figure 3-1, whilst the potential benefit streams are outlined to the right.
- 3.4.4. Collectively, the range of impacts in the left-hand and right-hand side of Figure 3-1 determined the analytical requirements of the technical evidence developed in the OBC. They shaped these requirements by influencing the scope of technical activities, key assumptions in the process, the fitness-for-purpose of techniques and tools employed in order to ensure the robustness of the findings.
- 3.4.5. This appraisal considered the potential comparative impacts between the DM scenario and each of the future situation (Do Something scenarios as per Table 3-2), capturing each of the potential impacts covered in the logic chain outlined Figure 3-1.

Figure 3-1 – The Scope of output and impacts from Making Connections



3.4.6. The scope of economic impacts quantified as part of this assessment is summarised below:

- Journey time and cost (for vehicle operating or fare) savings for highway and public transport users, due to decongestion from reduction in car use, bus service improvement and fare reduction. This was assessed in TUBA v1.9.17 in accordance with TAG A1-3. Owing to the structure of the CSRM2 transport model, a bespoke approach has been developed for TUBA assessment to avoid double counting. Details of the approach adopted have been presented in the ASR.
- Active mode user impacts – of those trips choosing not to drive, a large proportion are expected to either walk or cycle, especially for shorter distance trips. Potential impacts such as health benefits and reduced absenteeism from increased physical activities as a result of the forecast changes were assessed with DfT's Active Mode Appraisal Toolkit (AMAT). An appraisal period of 60 years was adopted within the AMAT assessment as the appraisal has accounted for the operational and renewal costs over the entire appraisal period for a scheme that is expected to bring significant behavioural changes.
- STZ charge user impacts and revenues – the charge would provide a financial stimulus for shift towards more sustainable modes, but for those who continue driving this would generate a user disbenefit, which has been considered in the appraisal. This impact is covered as part of the TUBA assessment;

- **Safety** – A reduction in car use would reduce the number of collisions and their associated economic costs to the society. Benefits arising from the reduced collisions are assessed with the latest version of COBALT following the methodology presented in the ASR.
- **Indirect Tax Revenues** – As levels of expenditure on tax-free items including the area charge and bus fares are increased, while car operating costs which incur high rates of tax are reduced, tax revenues would change. This is covered in TUBA assessment;
- **Greenhouse gases** – Reduced fuel consumption would directly lead to a reduction in the emission of CO₂ and other greenhouse gases. Methodology for GHG assessment is outlined in the next sub section.
- **Noise** – A reduction in car travel would reduce noise from traffic, particularly when those trips are instead made by active modes. Methodology for noise assessment is outlined in the next sub section.
- **Air Quality** – Reduced car travel and congestion in the city would reduce harmful emissions and lead to better air quality and improved health. Methodology for air quality assessment is outlined in the next sub section.
- **Reliability** – Reduction in congestion would improve journey time reliability for both car and bus users. Increased frequencies of service and service options and better services outside of peak periods would all add further to journey time reliability for bus users. At this stage of assessment only the reliability benefits to car users have been monetised in accordance with the guidance in TAG A1.3 for urban roads. Improvements in reliability of public transport services would be significant but would require a greater level of detail of modelling to quantify these impacts accurately.

- 3.4.7. The introduction of the area charge increases the cost of travel for car users leading to fewer car trips being made. However, this impact is offset to a degree by the decongestion impacts which make car travel faster.
- 3.4.8. Improvements in provision of bus services and reduced fare prices also provide stronger competition for the choice of mode of travel.
- 3.4.9. Increases in park and ride services result in higher levels of car use on specific routes outside of the city but help to further reduce car trips within the area charge cordon.

Revenue

- 3.4.10. Revenue forecasts were available from the TUBA assessment based on CSRM2 model forecasts. It is noted that these were high-level forecasts for the purpose of VfM assessment and only represent the likely impacts from models runs representing the broad scenarios defined in Table 3-2, focused on the permanent state of the proposed interventions. More detailed assessment of revenue income from different charging options and particularly impacts from the DER offers proposed has been carried out as part of the financial modelling. These findings are presented in the Financial Dimension. They capture impacts from more nuanced analysis of difference between different options and variations in DERs and phasing of the scheme during delivery.

Capital Costs

- 3.4.11. For appraisal purpose, adjustments for inflation were applied to the estimated base costs based on the consumer price index (CPI) in line with assumptions set out in the Financial Dimension. This nominal inflation has been converted to real growth by removal of background inflation, based on the GDP deflator set out in the TAG Data Book. As expenditure would be primarily on equipment, rather than construction works, CPI provides a reasonable representation of likely cost increases in the future.
- 3.4.12. Following the consideration of real cost changes over time, all future year scheme costs were rebased to 2010 prices using the GDP deflator. These were then adjusted from factor costs to market prices (a factor of 1.19) and discounted to 2010 present values, in line with TAG A1-2 guidance.
- 3.4.13. More detailed assessment of capital costs for different Scenarios has been carried out as part of the financial modelling and is presented in the Financial Dimension.

Operating Costs

- 3.4.14. Operating costs for the area charge equipment and services were estimated on an annual basis, reflecting changes in numbers of trips by vehicle type subject to the charge and changing methods of payment as users become more accustomed to the systems. These costs were prepared from the opening date up to 2036 and assumed to remain stable thereafter, varying only in line with inflation.
- 3.4.15. The estimated bus operating costs reflect the change in services specified, and ongoing costs for maintenance of bus shelters and operation of CCTV.
- 3.4.16. As for capital costs, operating costs have been inflated in real terms, converted to 2010 prices, discounted to 2010 and then converted to market prices before being taken into account in the VfM assessment.

Whole Life Costs

- 3.4.17. In addition to the initial implementation of the proposed interventions and day-to-day operation, regular maintenance and renewal are also required on a regular cycle. These costs were captured, aligned to the operational lifespan of those assets in the VfM assessment.
- 3.4.18. The application of inflation, discounting, optimism bias and conversion of units for whole life costs has been applied consistently with the treatment applied to operational costs.

Optimism, Risk and Contingency

- 3.4.19. In addition to the cost adjustments to convert to present values, as outlined above, this appraisal included optimism bias for the Area Charging capital costs. An optimism bias of 23% was used in line with the default value for schemes that fall under the Roads category in Table 8 of TAG Unit A1-2.

- 3.4.20. Due to the limited infrastructure requirement of the Making Connections programme, the evidence which informed the recommended optimism bias uplift rates for road schemes provided in TAG may not be directly comparable to this investment. Therefore, the default value of 23% was compared against the contingency from a Quantified Risk Assessment (QRA). Guidance in Section 4 of TAG A1-2 was considered to interpret and reconcile the divergence between QRA and optimism bias estimates. The higher value from the optimism bias and the P(mean) from the QRA was applied as an uplift to the base cost forecast in the OBC. In accordance with the guidance, the optimism bias and QRA estimate were not used cumulatively in the VfM assessment.
- 3.4.21. The QRA indicated an uplift of 7% on the central cost forecasts. As this is the lower of the rates the optimism bias uplift has been used for the central forecast and a sensitivity test has been performed replacing the optimism bias uplift with the QRA forecast.
- 3.4.22. There are no specific recommended optimism bias uplifts for operating costs in TAG due to insufficient evidence. However, given the high proportion of the costs of the Making Connections scheme which relate to operating costs it has been considered prudent to include an allowance. The study which informed the TAG optimism bias guidance¹²⁵ has indicated an average rate of optimism bias in operational costs across a wide pool of case studies of 23%. This uplift has therefore been prudently applied to the operational elements of the PVC for the STZ.
- 3.4.23. It is noted however that in the longer-term there would be substantial flexibility in ongoing annual investment which can be tailored to align with changes in generated revenue. This would provide substantial mitigation against risks related to changing costs, with available funding determining how much would be spent. Therefore, no optimism bias adjustment has been applied to the costs of bus improvement or sustainable travel measures.

Sensitivity Testing

- 3.4.24. Assessment of costs, particularly over an extended period of time, always contains an element of uncertainty. A range of sensitivity testing of the impacts of cost variations on the VfM findings has been undertaken, details of which are set out following the central forecast of VfM within the Economic Dimension.
- 3.4.25. More detailed assessment of the operating costs for different Scenarios has been carried out as part of the financial modelling and is presented in the Financial Dimension.

Bus Operator Subsidy

- 3.4.26. For the purpose of the VfM assessment, it was assumed that the bus operator would experience no positive or negative net impact on operating margins as a result of this scheme. Over the length of the appraisal period, it was therefore assumed that commercial contracts would be renegotiated to adjust for changing revenues and costs.

¹²⁵ Oxford Global Projects report (2020).

- 3.4.27. As set out in the Commercial Dimension a number of different means of delivery of bus service improvements are available. Therefore, rather than representing these in detail a simplified presentation of bus operating and revenue impacts has been provided.
- 3.4.28. This approach indicates that all changes to costs and revenue related to bus service and fare changes would be borne by Greater Cambridge Partnership (GCP) and / or Cambridgeshire & Peterborough Combined Authority (CPCA) and so appear as a cost in the Public Accounts, adding to the total Present Value of Cost (PVC) of the proposed scheme.
- 3.4.29. Different commercial arrangements would result in variations to profit margins for the bus operators, which would cause a shift of value from the PVC to the PVB. However, this would affect the Net Present Value (NPV) of the scheme.

Limitations

- 3.4.30. Certain limitations exist within the economic appraisal in relation to the assessment of the proposed scenarios and variations in assumptions between the Economic Dimension and the Financial Dimension should be understood for clarity of what each represents.
- 3.4.31. Each of the scenarios assessed in the economic analysis is based upon a transport model that is strategic in nature. These model runs reflect the core user charge assumption for the proposed times of day and the range of public transport improvements, but the assessment presented in the Economic Dimension does not capture:
- Interim arrangements during the early years of operation. The focus is on the Do Minimum scenario without Making Connections and the final state of each scenario.
 - Temporary measures during the early years of operation. The focus is on the difference between the Do Minimum scenario without Making Connections and the final state of each scenario;
 - Free days are not represented;
 - Discounts for visitors and patients to Addenbrookes or other hospitals are not captured;
 - Other DERs and failures to capture license plates are not reflected.
- 3.4.32. All of the above have been included within the assessment set out in the Financial Dimension and results in that part of the document should be viewed to understand the impact of these measures.
- 3.4.33. As the transport model does not reflect the more detailed scheme specifications and operational features set out above, these details did not influence the demand forecasting or assignment of trips to the network.
- 3.4.34. Factors such as inclusion of free days for users would lead to variations in demand from that forecast by CSRM2 which would affect revenue and user disbenefit related to the trips making those free trips, but in turn would also affect the level of congestion on the roads for other traffic, the amount of greenhouse gas emissions, noise and air quality impacts and impacts on other parties such as pedestrians, local businesses and employees.

- 3.4.35. While it is possible to broadly represent the impacts of the additional scheme specifications on revenue alone in the Financial Dimension, providing an accurate measure of these impacts across all these areas captured within the Economic Dimension could only reasonably be achieved through inclusion of the measures within the transport model. Therefore, for internal consistency, the Economic Dimension excludes these impacts throughout.
- 3.4.36. It is important to recognise the impacts of this exclusion, however.
- Journey time benefits would be slightly over-estimated, as DERs result in lower levels of traffic suppression and mode shift than are represented in the model;
 - Vehicle operating cost benefits would similarly be slightly over-estimated. This benefit relates to fuel savings from decongestion, not to fuel savings for trips which change mode or otherwise choose not to travel by car, so the loss of precision is likely to be low;
 - User charge disbenefits would be more significantly over-estimated. Whereas changes in costs lead to a demand response with fewer trips made once a charge is introduced this suppression of trips does not directly influence journey time saving benefits or vehicle operating cost benefits. Only those trips still using car would be affected by the changes in congestion. However, trips choosing to change mode or not travel at all as a result of the introduction of the area charge would receive a charge disbenefit, as would those which chose to travel and pay the area charge;
 - As a result, this benefit type is more significantly over-estimated than others;
 - Public transport fare benefits relate to the change in bus fare prices. If fare prices were kept constant, then the increased in bus patronage would not generate any fare benefits. These benefits are over-estimated but to a much lower degree than the area charge disbenefits. The reduced bus fare prices mostly affect trips which already use public transport in the do-minimum scenario and so inaccuracies in the demand model have a lesser influence;
 - Bus fare revenue is affected in two different ways with their own limitations related to the modelling. There is an over-estimate in bus fare revenue increases related to the higher mode shift from car in the demand model. However, the reduction in fare prices means that operators would see this increased in revenue partially or entirely offset depending on the balance between changes in fare price per trip and the change in number of trips. While the change in fare price per trip is accurately reflected in the model, the fares and demand are inter-related. It is likely that fare revenue growth would be over-estimated (or revenue loss under-estimated);
 - Revenues from the area charge are over-estimated for the same reasons that the user charge disbenefits are over-estimated and at a similar proportional scale, being related directly to the difference in assumptions used in the demand model and those identified in the scenario specifications; and
 - Indirect tax impacts are driven by a number of factors related to changes in fuel consumption and other operating costs for drivers which incur high rates of tax and changes in spend on public transport fares and the area charge which are untaxed. The

most significant factor is the loss of tax from reduced car use. This disbenefit would be over-estimated due to the limitations described above.

- 3.4.37. As all scenarios are affected similarly by the limitations described above the results of the analysis set out in this Economic Dimension provide a reliable representation of comparative performance of the scenarios. However, the balance between different benefit and revenue contributions should be taken into account when applying such a comparison based on the scale of impacts of the limitations set out above.
- 3.4.38. The absolute values of benefits and revenues should be treated with greater caution.

3.5 Wider Impact Assessments

Wider Economic Impacts Assessment

- 3.5.1. In addition to the impacts covered in Section 3.4, several wider economic impacts recognised in DfT's TAG A2 series have also been assessed. These include:
- Productivity gains from enhanced agglomeration (i.e., better access to economic mass) as individuals and firms derive productivity benefits from locating in close proximity to other individuals and firms;
 - Labour supply impacts due to individuals moving into the labour market from economic inactivity and the tax wedge from these impacts; and
 - Output change in imperfectly competitive markets – changes in the level of output as a result of a transport investment are not unique to imperfectly competitive markets, but the presence of market failures in such markets means that there are additional sources of welfare which should be captured (i.e., the value of the output is greater than the costs of production).
- 3.5.2. All these have been identified in the scope of potential economic impacts from the Making Connections programme, as illustrated in Figure 3-1.
- 3.5.3. Productivity uplift usually arises from improved labour market interactions, knowledge spillovers and linkages between intermediate and final suppliers. For a place of significant economic mass like Cambridge, these may occur within an industry (localisation economies) and across industries (urbanisation economies) when significant changes in transport connectivity (to economic mass and opportunities) occur.
- 3.5.4. Findings from the SOC suggest that the Making Connection programme is expected to bring significant changes in the transport network and travel demand / behaviours, with material changes to the cost of travel in different modes and significant modal shift expected. Significant improvement in the public transport connectivity and reduction in fare is expected, along with decongestion in the highway network as a result of modal shift.
- 3.5.5. These are expected to enhance the access to economic mass through the local transport network. On the other hand, application of an area charge would also increase the cost of travel by private vehicles. Therefore, an increase in travel cost (i.e., reduced access by car) is expected. Furthermore, the pattern of travel / distribution of journeys would also change,

and the impacts of these changes would influence different types of journeys / activities in different ways. The collective and net impact of these potential changes on the access to economic mass (i.e. a key measure of agglomeration) was quantified in the OBC.

- 3.5.6. Labour supply impacts were also included in the scope of assessment set out in the ASR. This was included based on the assumptions that the programme may bring material impacts to the following outcomes:
- Better job matching as travel to work areas expand.
 - Potential changes to the number of working hours.
 - Reduction in labour inactivity as more people enter the labour market.
- 3.5.7. The assessment undertaken in the OBC only captures the labour supply side response from the Making Connection programme. The proposed programme would improve and expand the travel to work areas, particularly for the public transport and some rural settlements in the region, along with clear decongestion in the highway. The proposed area charge on the other hand would increase the cost of travel to work by car to or from the city. The collective impacts of these different changes along with their welfare effects (i.e., tax wedge) were assessed in the OBC. It is noted that this assessment was based on fixed land use assumptions so potential new jobs from investment facilitated by Making Connections were not considered.
- 3.5.8. Both the productivity uplift (from changes in urban agglomeration) and labour supply impacts were assessed in the OBC with WITA v2.2, which is a standard tool for this purpose as recommended by DfT. This assessment undertaken strictly followed the guidance in TAG with travel demand and cost data covering the entire country. Masking of benefits was be applied to focus on the most reliable forecasts.
- 3.5.9. The potential for output change in imperfectly competitive markets is informed by the evidence showing that transport acts as a barrier to investment. This benefit stream was estimated with a proxy that is equivalent to 10% of the business user transport economic efficiency impact in accordance with the guidance in TAG.

Environmental Impacts Assessment

- 3.5.10. Assessment of environmental impacts was based on both quantitative and qualitative evidence, following the approach set out in the ASR.

Noise

- 3.5.11. A reduction in car travel would reduce noise from traffic, particularly when those trips are instead made by active modes. The reduced noise impact was assessed following the guidance in the Design Manual for Roads and Bridges (DMRB) LA111 Noise and Vibration. The investigation was focused on the difference or change in noise level as a result of different scheme scenarios. It was used as the primary differentiator to determine the relative performance of individual scenarios from an acoustics perspective.

- 3.5.12. In order to determine the change in road traffic noise levels along each road link, firstly an 18-hour Basic Noise Level (BNL)¹²⁶ was calculated for each road link in accordance with the Calculation of Road Traffic Noise (CRTN)¹²⁷ and based on the CSRM2 2026 forecast traffic flows. The change in noise level was then calculated by comparing each of the proposed scenario against the DM, to predict the change in noise level as a result of each scheme option.
- 3.5.13. The DMRB criteria for assessing the magnitude of the predicted change in road traffic noise are set out in Table 3-4 below. Details of the methodology are documented in the Acoustics Report¹²⁸.

Table 3-4 – DMRB Criteria for Assessing the Magnitude of Changes in Road Traffic Noise

Magnitude	Noise level change, dB L _{A10, 1h}	Significance
Major beneficial	<= -5.0	Likely to be significant (beneficial)
Moderate beneficial	-4.9 to -3.0	
Minor beneficial	-2.9 to -1.0	Unlikely to be significant
Negligible	-0.9 to 0.9	
Minor adverse	1.0 to 2.9	
Moderate adverse	3.0 to 4.9	Likely to be significant (adverse)
Major adverse	>= 5	

Air Quality and Emissions

- 3.5.14. The assessment was built upon the quantified evidence from the previous stage of environmental assessment, enhanced by a review of changes in the forecast traffic from new model runs for the OBC.
- 3.5.15. The outputs of the previous air quality assessment have been reviewed to identify those areas that experienced the greatest changes (both decreases and increases) in pollutant concentrations in each of the scenarios assessed, including the 'hot spots' where air quality was predicted to worsen (based on the previous assessment). These include:
- Some of the roads just outside the STZ, where traffic is predicted to increase, such as the road from Hauxton to Shelford;
 - Roads such as Regent Street and Station Road and those inside the Biomedical Campus, where there would be a significant increase in the number of buses; and
 - Some roads close to the Park and Ride sites, such as Newmarket Road.
- 3.5.16. The new traffic forecasts from model runs at the OBC stage have also been reviewed and the change in total vehicle flows for each of the scenarios, when compared to the relevant baseline year, were calculated. Using the CERC modelling as a base, a comparison was

¹²⁶ The Basic Noise Level (BNL) is described in the Calculation of Road Traffic Noise (CRTN). It does not relate to any specific receptor, but rather is a measure of source noise, at a reference distance of 10 m from the nearside carriageway edge of a specific length of highway. It is determined by obtaining the estimated noise level from the 18-hour traffic flow and then applying corrections for vehicle speed and percentage of heavy vehicles as described in CRTN.

¹²⁷ Department of Transport, (1988). *Calculation of Road Traffic Noise*. HMSO

¹²⁸ Making Connections Acoustics Report, Aug 2023

made between the traffic data provided for the previous stage and new data at the OBC stage.

Greenhouse Gases

- 3.5.17. This impact was assessed in line with the latest guidance from DfT in TAG Unit A3.
- 3.5.18. In accordance with the latest guidance from DfT in TAG Unit A3, this assessment of Greenhouse Gases sought to consider carbon emissions over the whole lifecycle of the proposed interventions, including user carbon (emissions associated with scheme users, such as changes in emissions due to modal-shift), capital carbon (emissions associated with scheme construction) and operational carbon (emissions associated with scheme operation and maintenance).
- 3.5.19. Due to limitation in the information available at this stage, assessment reported in this draft does not include the embodied carbon. This would be covered in the whole-life carbon assessment as part of the full Carbon Management Plan submission.
- 3.5.20. The quantification of carbon impacts predominantly used appraisal, modelling and cost estimation outputs. It applied industry standard methodologies to calculate carbon impacts. Several tools bespoke to different impacts were used in these carbon calculations, but the workings and results were collated within WSP's Carbon Zero Appraisal Framework for the purpose of bringing individual calculations and the supporting qualitative assessment together in a consistent, transparent format.

Other Environmental Impacts

- 3.5.21. Based on initial findings from the SOC, the proposed interventions were not found to have significant impacts on other aspects of the environmental assessment such as landscape, townscape, historic environment, biodiversity and water environment. Therefore, these were assessed qualitatively in the OBC.

Social and Distributional Impact Assessment (SDIA)

- 3.5.22. Social and distributional impacts have been assessed qualitatively, supplemented by sociodemographic analysis, to consider the extent to which the programme would impact sensitive groups. Sensitive groups include vulnerable and disadvantaged groups, in particular people with reduced mobility, older people, and people experiencing higher levels of deprivation.
- 3.5.23. The Social Impacts Assessment (SIA) has considered the effects of the scheme on road traffic accidents, physical activity, security, severance, journey quality, accessibility, option and non-use values and personal affordability. The assessment for the SIA was structured around each of the impacts outlined above. The assessment is presented using a 7-point scale, which is outlined below.

Table 3-5 – Assessment Categories

Impact	Assessment
Beneficial and the population impacted is significantly greater than the proportion of the group in the total population	Large Beneficial
Beneficial and the population impacted is broadly in line with the proportion of the group in the total population	Moderate Beneficial
Beneficial and the population impacted is smaller than the proportion of the group in the total population	Slight Beneficial
There are no significant benefits or disbenefits experienced by the group for the specified impact	Neutral
Adverse and the population impacted is smaller than the proportion of the population of the group in the total population	Slight Adverse
Adverse and the population impacted is broadly in line with the proportion of the population of the group in the total population	Moderate Adverse
Adverse and the population impacted is significantly greater than the proportion of the group in the total population	Large Adverse

- 3.5.24. The Distributional Impact Assessment (DIA) considers the variance of impacts from the transport intervention across different social group has considered user benefits, noise, air quality, accidents, security, severance, accessibility, and affordability. The assessment has been carried out in line with TAG Unit A4.2 (May 2023) using the same seven-point grading scale used for the SIA.
- 3.5.25. Details about the SIA and DIA methodology and findings can be found in Appendix E. The assessment reported in this draft only covers Scenario 1 but would extend to all other scenarios in the next draft of the OBC upon completion.

Place-based Analysis

- 3.5.26. In addition to the SIA and DIA, place-based analysis was undertaken in accordance with TAG A4.3. This analysis aimed to evaluate the spatial distribution of scheme impacts across the study area. This analysis is closely linked with the DIA and uses the same traffic modelling inputs as that assessment. However, the place-based analysis examines the ways in which impacts are distributed spatially, whereas the DIA primarily examines the ways in which impacts are distributed across different groups. Place-based analysis was undertaken by assessing the GIS (Geographic Information System) maps which were produced as part of the DIA to assess spatial distribution of expected impacts. Details about the methodology and findings are presented in Appendix E of this document.

Equality Impact Assessment (EqIA)

- 3.5.27. Whilst there are overlaps between the EqIA and the SDIA, the SDIA is based on DfT TAG for the purpose of the business case and a constituent part of the Appraisal Summary Table. The EqIA sits in a wider space across the Making Connections Programme
- 3.5.28. An EqIA update was undertaken for Making Connections OBC. It considered the Protected Characteristic Groups (PCGs) in the Equality Act 2010, plus a number of other categories and additional characteristics not covered by the Equality Act 2010. It draws on the local knowledge of the councils' equalities officers, findings from the EqIA in 2022 (and baseline data updates) plus feedback from the consultation in autumn 2022.

- 3.5.29. The PCGs and other categories (such as characteristics not covered by the Equality Act 2010) examined within this EqlA include:
- Age (children and young people and older people)
 - Disability
 - Gender re-assignment
 - Low-income
 - Pregnancy and maternity
 - Race
 - Religion and belief
 - Sex
 - Sexual orientation
 - Additional characteristics: care leavers, carers and armed forces veterans
- 3.5.30. As the marriage and civil partnership PCG concerns impacts within the workplace, they were screened out of the PCG screening in the EqlA 2022. This PCG has therefore been scoped out of the Making Connections EqlA. Whilst not one of the nine PCGs from the Equality Act 2010, low-income has been included as an additional PCG given the impact the STZ charge could have upon this group.
- 3.5.31. From further engagement with stakeholders, consultation responses and project development, further socio-demographic groups have been highlighted where their vulnerability to be disproportionality impacted crosses over with one or more of the Equality Act PCGs. These groups, include care leavers, carers and Armed Forces veterans.
- 3.5.32. It is also noted that given the rural nature of the areas surrounding the STZ, there are likely to be an increased presence of rural deprivation and isolation in some communities. Consideration of these impacts on these communities has been incorporated across all PCG assessments.

Impacts during Construction and Maintenance

- 3.5.33. Overall, the impacts during construction and maintenance were deemed small. Works required to implement the area charging element of the Making Connections programme would be generally off-line and should have limited impact on existing travel. The core component of the Area Charge scheme is the installation of ANPR cameras in the proposed charging zone. Installation may have some short-term adverse impact on existing travel. Any work to the bus fleet or stops (such as maintenance) can be carried out while vehicles are not in operation or when there are relatively low levels of demand at stops.
- 3.5.34. Some traffic management would likely be required while implementing any reallocation of road space for buses and to support the proposed sustainable transport interventions.
- 3.5.35. In light of the above, no quantitative assessment was carried out to measure the impacts during construction and maintenance.

3.6 Central Case Results

- 3.6.1. Economic analysis is set out below indicating the comparative performances of the four proposed Making Connections scenarios outlined above. These analyses provide a single point forecast based on what are considered the most likely set of assumptions.
- 3.6.2. However, as for any forecast uncertainties exist and it is likely that circumstances would change before the forecast benefits and costs are fully realised. These forecasts should therefore be considered alongside the next section which sets out details of uncertainty analysis and how the performance of each scenario is likely to be affected by different circumstances.
- 3.6.3. All economic impacts presented in this section are based on an assessment over a period of 60 years from the date of opening and are in units of 2010 Present Value Market Prices.

Economic Benefits

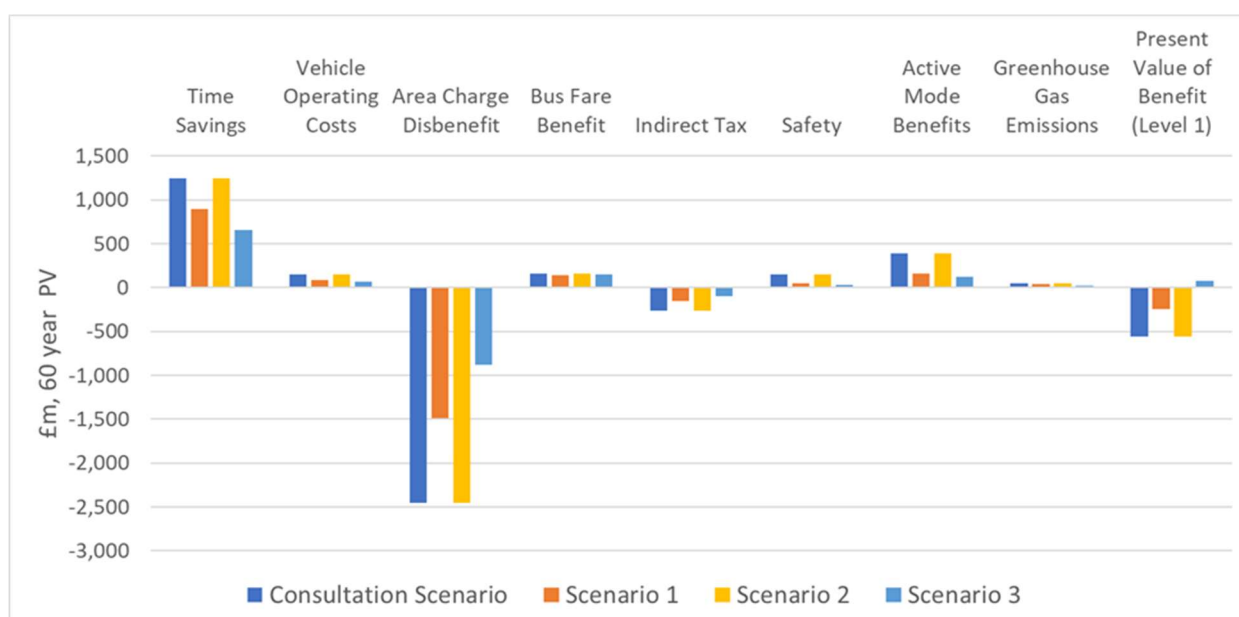
- 3.6.4. This section sets out the forecast impacts of the Making Connection scenarios on transport users, the private sector and wider society including impacts on bus operators, local residents, the environment and affected businesses.
- 3.6.5. Set out in Table 3-5 and Figure 3-2 is a summary of economic benefits generated by each option, considering impacts on transport users and wider society. These summaries include what are defined in TAG as Level 1 benefits, i.e. those derived using techniques with the highest level of analytical maturity. Wider economic impacts and reliability impacts are not included in these summaries and are covered separately below. Impacts on bus operators are also covered separately.
- 3.6.6. The Consultation Scheme and Scenario 2 differ in specification only in the details of implementation over the opening years. As the economic analysis is focussed on the end-state of each scenario results for these scenarios are the same.
- 3.6.7. The values presented in these results should be viewed with consideration for the limitations in the appraisal set out in Section 3.4. In particular it should be recognised that the omission of DERs from the transport modelling results in an over-estimate of area charge disbenefits as trips for which DERs apply would not experience this disbenefit. Other positive benefits would also be over-estimated for the same reason, but to a lesser extent.
- 3.6.8. Similarly, the exclusion of DERs means that the analysis does not reflect the progressive nature of the charging scheme. DERs such as discounts for those on lower incomes, mean that the costs of the scheme to transport users do not disproportionately affect those who are less able to afford the charges. Those on lower incomes also have lower rates of car ownership and so would receive a greater benefit from the improved public transport and sustainable travel improvements.

Table 3-5 – Summary of Economic Benefits (£m, 2010 PV, market prices)

	Consultation Scenario	Scenario 1	Scenario 2	Scenario 3
Time Savings	1,242	897	1,242	660
Vehicle Operating Costs	152	90	152	65
Area Charge Disbenefit*	-2,452	-1,472	-2,452	-878
Bus Fare Benefit	162	146	162	153
Indirect Tax	-259	-150	-259	-102
Safety	150	54	150	35
Active Mode Benefits	393	163	393	121
Greenhouse Gas Emissions	52	38	52	25
Present Value of Benefit (Level 1)	-560	-234	-560	78

*Note: Includes a marginal parking charge benefit

Figure 3-2 – Summary of Economic Benefits (£m, 2010 PV, market prices)



- 3.6.9. Breakdowns and additional details of the most significant of these impacts are provided below.
- 3.6.10. Time saving benefits are mostly attributable to highway decongestion with car users gaining the greatest journey time benefit and significant benefits also being generated for freight trips. A combination of decongestion and increased bus services, including higher service frequencies, results in substantial journey time saving benefits for public transport users despite the number of trips being much lower than the number of trips by car.
- 3.6.11. A summary of these benefits is set out in Table 3-6.

Table 3-6 – Summary of Journey Time Benefits (£m, 2010 PV, market prices)

	Consultation Scenario	Scenario 1	Scenario 2	Scenario 3
Car	782	621	782	475
LGV	174	122	174	93
OGV	49	36	49	26

	Consultation Scenario	Scenario 1	Scenario 2	Scenario 3
Bus & Rail	236	118	236	65
Total	1,242	897	1,242	660

3.6.12. User charge benefits and disbenefits for highway and public transport modes contribute a large value to the overall benefit assessment. Reductions in bus fares generate benefits to users of up to £162 million, but this value is substantially lower than the £1,492 million disbenefit attributable to the area charge for car users and a further £960 million for freight trips. These values are calculated excluding the impacts of DERs which would help to mitigate the disbenefits.

3.6.13. A summary of these benefits is set out in Table 3-7.

Table 3-7 – Summary of Charge Benefits and Disbenefits (£m, 2010 PV, market prices)

	Consultation Scenario	Scenario 1	Scenario 2	Scenario 3
Car	-1,492	-986	-1,492	-587
LGV	-614	-329	-614	-189
OGV	-346	-168	-346	-102
Bus	162	157	162	160
Total	-2,290	-1,326	-2,290	-718

3.6.14. While safety benefits appear low relative to some of the other benefit groups, the prevention of collisions leading to serious and fatal injuries is an important objective of the scheme. Reductions in road traffic are directly related to reduced numbers of collisions. A summary of the forecast reduction in collisions which would otherwise lead to personal injury accidents (PIAs) are set out below. In addition to the value of preventing these PIAs the economic value of preventing the much higher numbers of accident which result only in damage to property are captured within the monetised assessment above.

Table 3-8 – Summary of Prevention of Highway Collisions (Number of Collisions)

	Consultation Scenario	Scenario 1	Scenario 2	Scenario 3*
PIA Collisions Prevented	3,830	1,462	3,830	958
Casualties Prevented				
Fatal	28	10	28	7
Serious	477	185	477	121
Slight	4,581	1733	4,581	1,136

*Note: Values estimated based on Scenario 1 impacts and relative change in vehicle-kms pending completion of modelling.

3.6.15. Building on the Level 1 economic impacts, set out in Table 3-9 are the additional elements of benefits which have been monetised. These follow elements of TAG methodology which have less mature methods of assessment and so are classed as Level 2 impacts. This includes reliability benefits and wider economic impacts. Reliability benefits have been monetised only for highway trips. Benefits of improved reliability for public transport users are currently considered qualitatively.

- 3.6.16. Assessment of wider economic impacts shows a small combined positive impact from productivity gains and labour supply impacts and small disbenefits from output change under imperfect competition. As noted elsewhere, the economic assessment is based on transport modelling which does not reflect DERs and so the forecast negative impacts are likely to be over-stated.

Table 3-9 – Level 1 and Level 2 Economic Benefits (£m, 2010 PV, market prices)

	Consultation Scenario	Scenario 1	Scenario 2	Scenario 3
Present Value of Benefit (Level 1)	-560	-245	-560	78
Reliability	146	110	146	87
Wider Economic Impacts				
Productivity gains and labour supply impacts from WITA	20	13	20	27
Output change under imperfect competition	-67	-28	-67	-11
Present Value of Benefit (Level 2)	-461	-462	-461	182

Costs and Revenue

- 3.6.17. This section presents details of capital costs required to implement the scheme, operational and maintenance costs to run the area charging facilities and direct costs in operating the additional public transport services. It also captures the revenue streams from both area charging and increased public transport patronage and any losses of revenue through reduced payment of parking charges¹²⁹.
- 3.6.18. The capital cost of installing the STZ has been calculated in current prices, inflated in real terms and optimism bias has been applied.
- 3.6.19. Operational costs, including those for the STZ and the re-investment of revenue in bus services and sustainable measures have been considered over a 60-year appraisal period in line with the assessment of scheme benefits.

Table 3-10 – Capital and Operating Costs (£m, 2010 PV, market prices)

	Consultation Scenario	Scenario 1	Scenario 2	Scenario 3
STZ Costs				
Capital Investment	42.3	40.6	42.3	40.6
Optimism Bias	9.7	9.3	9.7	9.3
Subtotal	52.1	50.0	52.1	49.9
Operating and Lifecycle Cost	124.3	99.2	124.3	99.1
Optimism Bias	28.6	22.8	28.6	22.8
Subtotal	152.9	122.1	152.9	121.9
Bus Improvement Measures	742	395	742	299
Sustainable Travel Measures	172	78	172	66
Present Value of Cost	1,119	644	1,119	536

¹²⁹ No change to parking charges themselves is assumed, only the number of trips paying for parking

- 3.6.20. A summary of revenue impacts is set out in Table 3-11. This indicates the high level of area charge collection associated with the 3-hour AM peak period. The 6-hour interpeak period generates a similar level of revenue, having a lower number of trips per hour and a higher proportion of those trips being uncharged due to vehicles having already been charged earlier in the day. The PM peak period generates the lowest revenue as a high proportion of trips in this time period are repeat trips.
- 3.6.21. In Scenario 1, vehicles travelling in the city during both the interpeak and PM peak periods are not charged during interpeak and so the proportion of repeat trips during the PM peak is lower. Therefore, while the number of trips during the PM peak in Scenario 1 is similar to the Consultation Scenario, the PM peak revenue in Scenario 1 is notably higher.
- 3.6.22. Bus fare revenues are affected by two factors. The increase in bus patronage results in an increase in revenue while the reductions to bus fares causes reductions in revenue. In the consultation scenario the increase demand outweighs the impact of lower revenue per trip. However, in Scenario 1 the impact on demand is much reduced during the interpeak period and so the lower prices lead to a negative overall impact on public transport revenues.
- 3.6.23. Reducing car trips in the city results in a loss of parking revenue. This loss is not insubstantial but is considerably lower than the gains from the area charge.
- 3.6.24. As noted in Section 3.4, there are certain limitations in this assessment of revenue, in particular with respect to DERs and results should be considered comparative across options rather than indicative of revenue available to spend.
- 3.6.25. The Financial Dimension has followed a different approach to revenue assessment with greater focus on the introductory periods of each scenario and on the operational specifications which would affect the actual revenue collected.

Table 3-11 – Summary of Revenue Impacts (£m, 2010 PV, market prices)

		Consultation Scenario	Scenario 1	Scenario 2	Scenario 3
Area Charge Revenue	AM	861	847	861	584
	IP	984	-	984	0
	PM	422	551	422	296
	Total	2,266	1,397	2,266	880
Bus Fare Revenue	AM	38	15	38	-1
	IP	34	-18	34	-28
	PM	37	8	37	-6
	Total	108	5	108	-35
Parking Revenue*	AM	-29	-30	-29	-18
	IP	-50	2	-50	-2
	PM	-13	-11	-13	-8
	Total	-92	-42	-92	-28
Total Revenue	AM	869	832	869	565
	IP	968	-20	968	-30
	PM	445	547	445	282
	Total	2,282	1,360	2,282	817

* This change in parking revenue is a consequence only of mode-shift away from car as a result of the Making Connections scheme. It bears no relation to impacts of other investments such as the Integrated Parking Strategy.

Level 1 Cost Benefit Analysis

- 3.6.26. This section presents an overview of the findings of the Cost Benefit Analysis. Detailed CBA tables including Appraisal Summary Tables (AST), Transport Economic Efficiency (TEE), Public Accounts (PA) and Analysis of Monetised Costs and Benefits (AMCB) are presented in Appendix S.
- 3.6.27. Table 3-12 provides an overview of the Level 1 benefits of the scheme. These are the impacts which TAG considers having the highest level of maturity in methods of assessment.
- 3.6.28. For car and freight users the higher charging scenarios lead to the greatest disbenefits. The gain in decongestion from higher charges is lower than the disbenefit of the charges themselves. However, the higher charging scenarios generate larger levels of revenue for reinvestment.
- 3.6.29. The greatest benefit for public transport users in Scenarios 1 and 3 comes from the reduction in fare prices, but with the charge applied throughout the day the revenue raised

is sufficient to provide greater service improvements resulting in time saving benefits which exceed the fares benefit.

3.6.30. All options result in indirect tax losses, proportionate to the level of mode shift, as car costs are taxed at a high rate while public transport trips are untaxed, as is the area charge.

3.6.31. Safety, active modes and greenhouse gas benefits are all derived from reductions in car use resulting from mode shift away from car and other changes in travel behaviour.

Table 3-12 – Summary of Level 1 Benefits (£m, 2010 PV, market prices)

		Consultation Scenario	Scenario 1	Scenario 2	Scenario 3
Car Users	Time Savings	782	621	782	475
	VOC Benefits	115	63	115	45
	Charge Benefits	-1492	-975	-1492	-580
	Subtotal	-595	-291	-595	-60
Freight	Time Savings	224	158	224	119
	VOC Benefits	37	27	37	20
	Charge Benefits	-960	-497	-960	-291
	Subtotal	-699	-312	-699	-151
Public Transport	Time Savings	236	118	236	65
	Fare Benefits	162	146	162	153
	Subtotal	398	264	398	218
Non-User Benefits	Indirect Tax	-259	-150	-259	-102
	Safety	150	54	150	35
	Active Mode Benefits	393	163	393	121
	Greenhouse Gases	52	38	52	25
Level 1 PVB		-560	-237	-560	86

3.6.32. Table 3-13 summarises the breakdown of impacts on transport users by trip purpose. This indicates that business trips would be most affected, with freight experiencing a proportionally large disbenefit due to the high value of charge applied to those trips. Elements of this disbenefit to freight trips would be offset by the DERs set out in the

scenario specifications which are not represented in this modelling. Opportunities would also exist for businesses to re-optimize their transport strategies to reflect the impacts of the STZ. Business trips made by car are less likely to change to bus use than other trip purposes and would be more willing to pay the charges to continue driving due to their higher value of time.

- 3.6.33. Commuting trips are forecast to experience a largely neutral impact. As these trips are mostly made during the busiest periods, they would experience the largest time savings from reduced levels of congestion. Commuters would also enjoy a large portion of the benefits from the improved public transport and sustainable travel measures.
- 3.6.34. Trips made for other purposes, including education, shopping and leisure trips are more variably affected by the different scenarios, with higher charges resulting in a disbenefit while the lowest charging scenario generates a modest benefit. These trips are more likely to change mode as a result of the charges on car trips and experience the largest benefit from reductions in bus fares due to the large proportion of existing bus users.

Table 3-13 – Level 1 User Benefits by Trip Purpose (£m, 2010 PV, market prices)

	Consultation Scenario	Scenario 1	Scenario 2	Scenario 3
Business	-738	-320	-738	-141
Commute	7	-14	7	68
Other	-165	-5	-165	79
Total	-896	-339	-896	7

- 3.6.35. Table 3-14 sets out the Present Value of Cost of the scheme over the 60-year appraisal period. Positive values in this table represent increases in cost or reductions in revenue relative to the do-minimum, while negative values represent increases in revenue.
- 3.6.36. The negative PVCs for all Scenarios indicate that the revenue generated would exceed the planned expenditure. However, these revenue forecasts do not include reductions resulting from DERs which have been excluded in this Economic Dimension to maintain consistency across the assessment of benefit, revenue and cost groups aligned with the transport modelling which has informed those assessments. The Financial Dimension provides a more detailed representation of revenue impacts and how these relate to the costs of investment. With these elements taken into account a more neutral PVC would be expected.

Table 3-14 – Present Value of Costs (£m, 2010 PV, market prices)

	Consultation Scenario	Scenario 1	Scenario 2	Scenario 3
Capital Investment	52	50	52	50
Opex and WLC	153	122	153	122
Bus Improvement Measures	742	395	742	299
Sustainable Travel Measures	172	78	172	66
Total Cost	1,119	644	1,119	536
Area Charge Revenue	-2,266	-1,397	-2,266	-880
Bus Fare Revenue	-108	-5	-108	35
Parking Revenue	92	42	92	28
Total Revenue	-2,282	-1,360	-2,282	-817
Present Value of Cost	-1,163	-715	-1,163	-281

- 3.6.37. Table 3-15 sets out the Level 1 Cost Benefit Analysis, bringing together the cost and benefit components described above to generate a Net Present Value (NPV) and Benefit to Cost Ratio (BCR).
- 3.6.38. The BCRs in this case should be treated with caution, as is the case whenever a scheme has negative values in the PVC. DfT provide specific guidance on interpreting scheme performance in the event of PVCs indicating that a scheme is financially positive as is seen here. This guidance is summarised in Section 3.8. BCRs are therefore excluded from the table at this point to avoid confusion.
- 3.6.39. To best understand the impacts, it is helpful to focus on the NPV rather than the BCR. These NPVs indicate that the Consultation Scenario, Scenario 1, and Scenario 2 all generate disbenefits but also generate an income. The NPVs show that the incomes exceed the disbenefit, resulting in a positive net outcome. Scenario 3 generates less income, but produces a positive benefit to society and therefore also results in a positive NPV, though slightly lower than the other scenarios.
- 3.6.40. In all cases the consideration of DERs would result in improvements to benefits for users and reductions in revenue. The details of these elements within the scenario specifications can be configured to determine the extent to which revenue generation is maximised and how this is used to achieve an optimised balance between social and financial impacts on users. An increased level of modelling detail would be required at FBC to capture these impacts accurately.

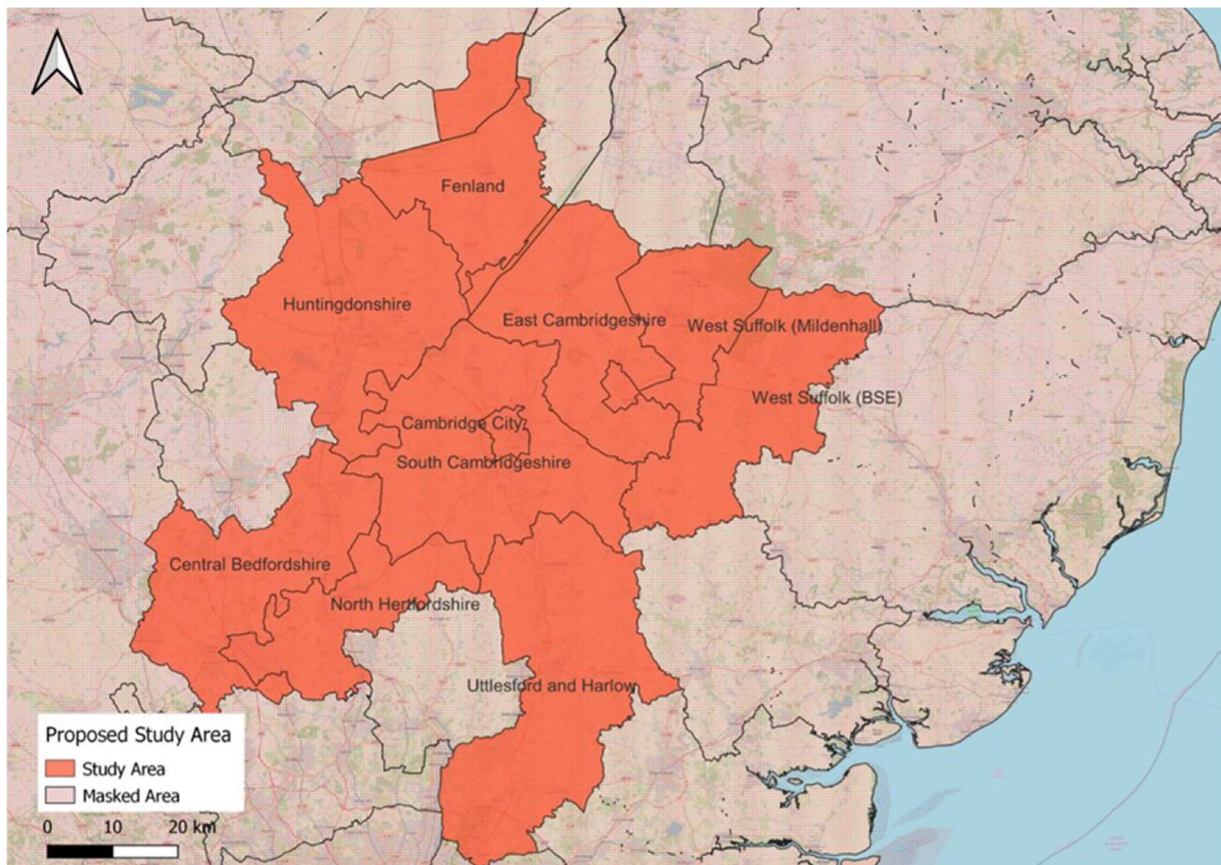
Table 3-15 – Summary of Level 1 Cost Benefit Analysis (£m, 2010 PV, market prices)

	Consultation Scenario	Scenario 1	Scenario 2	Scenario 3
Present Value of Benefit	-560	-234	-560	86
Present Value of Cost	-1,163	-715	-1,163	-281
Net Present Value	603	482	603	366
Benefit to Cost Ratio	See Section 3.8			

Wider Economic Impacts Assessment

- 3.6.41. This Assessment was carried out following the methodology outlined in Section 3.5. The wider economic impacts assessed include productivity gains from enhanced agglomeration, labour supply impacts and output change in imperfectly competitive markets.
- 3.6.42. The former two out of the three wider economic impacts were directly estimated using DfT's WITA, whilst the last one was estimated with 10% of forecast business user conventional user impact.
- 3.6.43. The wider impact assessment was undertaken on a nationwide basis following the guidance in TAG but the benefits were only claimed in an area deemed relevant to the impact of the proposed interventions as illustrated in Figure 3-3.

Figure 3-3 – Indicative Study Area for Wider Economic Impacts Assessment



- 3.6.44. Quantified impacts from the assessment are presented in Table 3-16.

Table 3-16 – Summary of Forecast Wider Economic Impacts (£m, 2010 PV, market prices)

	Consultation Scenario	Scenario 1	Scenario 2	Scenario 3
Productivity gains and labour supply impacts from WITA	20	13	20	27
Output change under imperfect competition based on 10% of business user transport impacts	-67	-28	-67	-11

3.6.45. Overall, the forecast productivity gains and labour supply impacts from WITA are modest but positive. This is likely due to two reasons:

- The significant connectivity gains from decongestion of the highway network and improvements in the public transport network is partly offset by the cost to users for the proposed charge so although the forecast behavioural changes are substantial, the net combined impact is relatively small. The overall positive impact suggests the proposed interventions are likely to enhance the connectivity with economic mass despite the proposed charge.
- Current assessment is based on fixed land use assumptions so no short-term or long-term interaction between land use changes and transport investment has been considered. This potentially make the current forecast conservative as the proposed programme would facilitate more development which would increase the number (density) of jobs in the local area and hence enhance the access to employment.

3.6.46. The forecast output change under imperfect competition are small negative values. This is mainly driven by the forecast business user impacts (10%) as the average overall cost for driving has increased due to the charge despite the time savings from decongestion.

Reliability Assessment

3.6.47. Reduction in congestion would improve journey time reliability for both car and bus users. Increased frequencies of service and service options and better services outside of peak periods would all add further to journey time reliability for bus users. At this point, only the reliability benefits to car users have been monetised in accordance with the guidance in TAG A1.3 for urban roads.

3.6.48. Table 3-17 sets out the calculated benefits for car and freight trips of congestion relief enabling more predictable travel times. These benefits are additional to the savings in average journey times which are included in the Level 1 benefits.

3.6.49. Commuters and businesses using LGVs to transport goods are forecast to receive the largest journey time reliability benefits.

Table 3-17 – Highway Journey Time Reliability (£m, 2010 PV, market prices)

	Consultation Scenario	Scenario 1	Scenario 2	Scenario 3
Car Commute	65	57	65	45
Car Other	10	9	10	8
Car Business	12	9	12	7
LGV	56	34	56	26
OGV	2	1	2	1
Total	146	110	146	87

3.6.50. Assessment of improvements in reliability for public transport users would be introduced in the next iteration of the OBC.

Level 2 Cost Benefit Analysis

- 3.6.51. The Level 2 Cost Benefit Analysis builds on the Level 1 assessment, introducing the additional categories of benefit for which assessment techniques are considered by DfT to be less mature.
- 3.6.52. Across all options the inclusion of these benefit groups improves the PVB and NPV. As noted for the Level 1 CBA, BCRs are not presented as the negative PVCs make BCRs misleading.

Table 3-18 – Summary of Level 2 Cost Benefit Analysis (£m, 2010 PV, market prices)

	Consultation Scenario	Scenario 1	Scenario 2	Scenario 3
Level 1 PVB	-560	-234	-560	86
Wider Economic Impacts				
Productivity gains and labour supply impacts	20	13	20	27
Output change under imperfect competition	-67	-28	-67	-11
Reliability	146	110	146	87
Level 2 PVB	-461	-138	-461	189
Present Value of Cost	-1,163	-715	-1,163	-281
Net Present Value	703	577	703	470

Environmental Impacts Assessment

- 3.6.53. Quantified impacts from the assessment of Greenhouse gases have already been included in the cost benefit analysis reported earlier. Qualitative findings from the noise, air quality and other environmental assessments are reported in this sub section.
- 3.6.54. Findings from the noise assessment suggest that Scenario 2 (£5 all day charge) is forecast to result in the greatest number of road links predicted to experience a reduction in noise level compared to the Consultation proposal or Scenario 1 (£5 peak charge). However, there are also potential material increases in noise with Scenario 2 in operation on certain roads, likely due to rerouting of traffic. Detailed list of road links that were predicted to experience a potentially significant moderate or major increase or decrease in noise level is presented in the Acoustics Report.

- 3.6.55. Based on numerical analysis and visual representation of the likely noise changes in different scenarios as presented in the Acoustics Report, Scenario 2 (£5 all day charge) is considered preferable from an acoustics perspective.
- 3.6.56. Conclusions from the air quality assessment suggest that the findings have not changed since the previous iteration of the assessment. Initial review of changes in overall total traffic flows forecasts at the OBC stage indicates that a £5 all day charge (consultation proposal and scenario 2) results in greater change in traffic flows compared with other scenarios. It should be noted however, that this is based on overall traffic flows and does not take into account individual vehicle types, e.g. buses. It is also noted that the introduction of a zero-emission bus fleet would lead to reductions (improvements) in NO2 concentrations. However, the same level of improvement is not likely to be observed in relation to particulate matter due to the non-exhaust emissions associated with electric vehicles. Although this provides an indication of air quality impacts, it is only through detailed dispersion modelling that these impacts can be fully determined.
- 3.6.57. Qualitative assessment of other aspects of the environmental matters such as landscape, townscape, historic environment, biodiversity and water environment was also carried out. These were found to be neutral, and no material difference is expected across different Making Connections scenarios. A summary of the qualitative findings is presented in Table 3-19.

Table 3-19 – Findings from Other Qualitative Environmental Assessment

Assessment	Findings	Narratives
Landscape	Neutral	The Making Connections programme would not directly affect Landscape and so this impact has been considered as neutral for the purposes of this appraisal.
Townscape	Neutral	The Making Connections programme would have limited direct effect on Townscape and so this impact has been considered as neutral for the purposes of this appraisal. However, the potential reinvestment it enables, including in public realm measures to support increased active travel, may allow schemes to be progressed which may in turn bring townscape benefits.
Historic Environment	Neutral	The Making Connections programme would not directly affect Historic Heritage and so this impact has been considered as neutral for the purposes of this appraisal.
Biodiversity	Neutral	The Making Connections programme is unlikely to have a significant direct impact on biodiversity and so this impact has been considered as neutral for the purposes of this appraisal.
Water Environment	Neutral	With limited infrastructure requirements, impacts on the water environment have not been assessed at this stage. A neutral impact is therefore assumed.

Social Impact Assessment

- 3.6.58. Summary of findings from the SIA is presented in Table 3-20 below with full details of the assessment documented in Appendix E.

Table 3-20 – Summary of Findings from Social Impact Assessment

Impact	Assessment	7-point score
Accidents	A reduction in accidents of all severity levels is forecast as a result of reduced car use. The biggest reduction was in slight accidents, with a 1.89% reduction in the in Scenario 1. There was a similar reduction in serious accidents and a smaller reduction in fatal accidents. This assessment provides evidence that the scheme is effective in reducing the number of accidents in the study area and results in a moderate beneficial effect.	Moderate Beneficial
Physical Activity	There are several plans in place as part of this programme that aim to encourage active travel by methods such as improving active travel networks and infrastructure. The measures of the programme would have a beneficial impact on physical activity within the study area. Greater rates of active travel and use of public transport would likely lead to more physical activity and subsequently better health and environmental outcomes.	Moderate Beneficial
Security	A wide range of impacts have been assessed across all modes, ranging from neutral to moderate beneficial. No adverse impacts have been forecast for any user group.	Slight Beneficial
Severance	The Making Connections Programme is expected to generate slight beneficial effects due to improvements to footways and cycles and reductions in car traffic which would decrease the impact of severance.	Slight Beneficial
Journey Quality	As outlined within TAG Unit A4.1 should more than 10,000 travellers experience benefits of improved journey quality then the programme would result in beneficial effects. It is considered that the programme would lead to benefits for over 10,000 people across the study area. However, as the details of public transport interventions are yet to be finalised a conservative assessment has been made, therefore the programme is expected to result in moderate beneficial effects as some level of revenue is expected to be generated which could be available to invest in interventions that improve journey quality both on public and active travel.	Moderate Beneficial
Accessibility	Overall, the programme is considered to have a moderate to large beneficial effect in terms of accessibility due to the significant improvements coming forward to the public transport and active travel network. The scale of the effect is likely to vary depending upon the amount of revenue which is available to fund improvements to public transport and active travel. Care should be taken when interpreting these scores as this is the result of a high-level assessment which needs to be revisited once scheme details have been developed further.	Moderate to Large Beneficial
Option and non-use values	Networks improvement would be made across the Cambridge travel-to-work area extending to Newmarket, Bury St Edmunds and Haverhill in Suffolk, Royston in Hertfordshire, and St Neots, Huntingdon, Alconbury, Ramsey Chatteris, March and Littleport in Cambridgeshire. These areas are currently under served by public transport. Where there is already public transport, the provision of it would be greatly improved, including increased frequencies and reduced fares. This would create a step change in the services that are provided, and more households would have access to the bus network.	Moderate Beneficial

Impact	Assessment	7-point score
	Improvements to the active travel network and wider measures are being considered to aide behaviour changes to create more opportunities for travel on these routes.	
Personal Affordability	Whilst a road user charge is being proposed that could potentially increase the cost of personal travel, revenues from this element of the scheme would be reinvested into the public and active transport network. The improved availability and connectivity of public and active transport would improve access to services and employment opportunities and offer a low-cost travel option. For those individuals who are reliant on a car to access key services and employment opportunities i.e., those with limited mobility or those from a low-income household a series of discounts and exemptions are being put in place which would mitigate any increases to journey costs and still make car journeys affordable.	Slight Beneficial

Distributional Impact Assessment

3.6.59. Summary of findings from the DIA is presented in Table 3-21 below with full details of the assessment documented in Appendix E.

Table 3-21 – Summary of Findings from Distributional Impact Assessment

Impact	Assessment	7-point score
User Benefits	User benefits are experienced in specific areas by specific groups of people. The proposed scheme is projected to deliver benefits to public transport users across the study area. Overall the assessment focusses on user benefits from the charge and non-charge (public and active transport improvements) elements of the programme. For charge elements of the programme, analysis shows that adverse effects would be experienced across all income quintiles. It should be noted however, that detailed modelling does not make allowances for the proposed discounts and exemptions, which would mitigate against some of the adverse effects identified as part of the quantitative assessment. Assessment of user benefits as part of the non-charge elements has been undertaken separately and considers time and vehicle operating costs. Journey times have improved due to people shifting to public and/or active travel resulting in fewer vehicles and therefore less delays. Revenue raised from the STZ would be re-invested into improvements to public and active travel, which would improve accessibility, journey times and reliability and offer a lower cost travel option for those travelling by these modes. Overall, Scenario 1 would lead to moderate beneficial effects.	Moderate Beneficial (Non-charge elements) Moderate Adverse (Charge elements)
Noise	Across all scenarios there would be a reduction in traffic, this would result in an overall beneficial outcome especially for children and the older population.	Slight Beneficial

Impact	Assessment	7-point score
Air Quality	It is expected that there would be beneficial impacts in terms of air quality, particularly for vulnerable users including children and older people, as air quality levels should improve because of the reduction of traffic flows within the city centre.	Large Beneficial
Accidents	Analysis shows that the majority of links are expected to experience a decrease in accident rates (benefit). Accidents involving all vulnerable groups are more likely to occur on links forecast to experience a decrease in accident levels. In addition, for all vulnerable groups (apart from cyclists), the proportion that experience benefits and disbenefits is in line to the number of accidents across the impact area. For cyclists, the expected change is larger than their proportion of accidents.	Moderate Beneficial
Security	Some level of revenue would be generated which can be used to fund some wider measures to enable people to shift to sustainable modes. Transport users including women, younger and older people would experience improved levels of personal security due to investment on Sustainable Transport measures such as potential improvements to lighting and CCTV, which would increase the amount of formal surveillance as well as improved lighting/visibility in the study area.	Slight to Moderate Beneficial
Severance	Traffic modelling indicates that on average, most routes would experience a decrease or increase of traffic of less than 10% which does not constitute a significant change in line with guidance set out in TAG Unit 4.2.	Neutral
Accessibility	The scheme would improve accessibility due to the improvements to the bus network including increased bus frequencies, an expanded bus network, extended operating hours, and improved access to bus stops which makes access to public transport significantly easier and more accessible as a result of the scheme, especially for young people, those with disabilities and older people within Cambridge City, South Cambridgeshire and the wider study area.	Moderate to Large Beneficial
Affordability	The proposed charge zone would potentially lead to disbenefits across all income quintiles as the programme includes road user charging. Whilst a road user charge is being proposed that could potentially increase the cost of personal travel, revenues from this element of the scheme would be reinvested into the public and active transport network. The improved availability and connectivity of public and active transport would improve access to services and employment opportunities and offer a low-cost travel option. For those individuals who are reliant on a car to access key services and employment opportunities i.e., those with limited mobility or those from a low-income household a series of discounts and exemptions are being put in place which would mitigate any increases to journey costs and still make car journeys affordable. Reducing fares on public transport would benefit those who are from lower income households and do not have access to a car for example those in the northeast of Cambridge City as well as to wider areas within the study area. With the scale of improvements set to come forward, public transport and active travel would offer a lower cost option compared to driving.	Slight beneficial

Place-based Analysis

- 3.6.2. In accordance with TAG unit A4.3, place-based analysis is defined by the HMT Green Book as *“Place Based Analysis concerns appraisal applied to geographically defined areas within the UK. This definition includes a wide range of obvious categories such as villages, towns, cities, counties and regions and the home countries that make up the UK, it also includes other geographically based definitions such as “rural areas” or “areas of urban deprivation.”*
- 3.6.3. Place-based analysis is closely linked with Distributional Impact Analysis, with TAG noting that DIA considers how impacts are dispersed across population groups, whereas Place-Based Analysis considers dispersion across spatial groups.
- 3.6.4. This analysis therefore built upon the findings of the DIA and examined how the impacts identified in that assessment were distributed spatially across the study area. Details on the findings are presented in Appendix E.
- 3.6.5. Examining the spatial implications of user benefits analysis across the study area indicates that the greatest degree of benefits would be felt to the northwest of Cambridge, in particular in Huntingdonshire and East Cambridge. Areas which show greater concentrations of disbenefits are largely within Cambridge and South Cambridgeshire.
- 3.6.6. The analysis for severance indicates that the greatest concentration of severance benefits is expected to be experienced in Cambridge, largely due to reduced traffic volumes within the city which are anticipated to be delivered by the scheme. There are also pockets of anticipated benefits concentrated in the centres of Neots, Huntingdon and Ely.
- 3.6.7. The proposed charge zone would potentially lead to disbenefits across all income quintiles as the programme includes road user charging. Reducing fares on public transport would benefit those who are from lower income households and do not have access to a car for example those in the northeast of Cambridge City as well as to wider areas within the study area.
- 3.6.8. It should be noted that the DIA which has informed the place-based analysis has been derived from the transport model which excludes the impacts of DERs. This means that the analysis does not reflect the progressive nature of the charging scheme. DERs such as discounts for those on lower incomes, mean that the costs of the scheme to transport users do not disproportionately affect those who are less able to afford the charges. Those in lower quintiles also have lower rates of car ownership and so would receive a greater benefit from the improved public transport and sustainable travel improvements.

3.7 Sensitivity Analysis

- 3.7.1. Consideration has been given in the OBC to a range of factors that reflect the uncertainties in the future. These cover uncertainties associated with the proposed programme as well as long-term uncertainties set out in DfT’s Common Analytical Scenarios (CAS) in the TAG Uncertainty Toolkit.

- 3.7.2. Sensitivity tests in the Economic Dimension are focused on the level of uncertainty in the forecast scheme impacts and Value for Money findings. These were formulated in the context of Value for Money assessment. They also complement (but do not take over the role of) the 'stress tests' presented in the Financial Dimension, which are more focused on the uncertainty surrounding impacts on public finances.
- 3.7.3. These tests seek to cover both uncertainties to do with certain aspects of the proposed interventions (such as forecast responses and choices of transport users impacted by the scheme) and long-term evolutions in the transport system in the future (such as trends in behaviour, technology and decarbonisation that may drive significant change over time). These were categorised into the following three:
- Uncertainties covered in DfT's CAS in Uncertainty Toolkit.
 - Uncertainties specific to the proposed programme.
 - Uncertainties surrounding costs.
- 3.7.4. Sensitivity surrounding the above two defined categories was explored in the OBC through quantitative and qualitative evidence.

CAS In Uncertainty Toolkit

- 3.7.5. All CASs have been considered individually in the ASR to identify the level of relevance of each scenario to Making Connections in order to establish an appropriate method of assessment.
- 3.7.6. **High and Low Economy scenarios (CAS1 and CAS2)** potentially have large impacts on the economic and financial performance, as these represent different rates of growth in the economy, affecting GDP, population, and employment, which subsequently influence the travel demand, a key driver to the level of congestion and the potential revenue from the proposed interventions. The implication of this is that the Low Economy scenario (CAS2) may result in reduced revenue and journey time savings, but with lower user charge disbenefits, while the High Economy scenario (CAS1) would have the reverse effect. Both scenarios are considered valuable to inform the longer-term impacts and should ideally be quantified.
- 3.7.7. **Regional (CAS3)** refers to varying level of growth (population, households and employment) in different parts of the country so can manifest itself through impacts on travel demand in Cambridge in a similar way to CAS1 and CAS2. For the same reason as above, it is also deemed relevant and quantifiable using the databook from DfT.
- 3.7.8. A common feature among the three CAS scenarios introduced is that their impacts can all be reflected in changes to travel demand. The current CAS databook provides indices to account for such changes in travel demand driven by factors described above. These factors were used (as relative changes in % terms) to estimate potential changes in the forecast economic impacts (pivoting off the central forecasts).

- 3.7.9. **Behavioural Change (CAS4)** scenario reflects important behavioural trends because of new ways of working, shopping and travelling in the future. These result in changes in trip rates, vehicle ownership and use of LGVs (less shopping trips but more deliveries due to increased online shopping). This scenario represents a future in which changes to these travel patterns which emerged post-COVID continue and increase into the future. The result of such a change is for trip numbers to considerably reduce in the future, rather than simply slowing down growth as is represented in CAS2.
- 3.7.10. Changes to travel since the introduction of this scenario suggest that the continued growth of working from home is already beginning to reverse, with many companies requiring office attendance for at least part of the week. The CAS4 scenario may therefore be considered a highly unlikely case, which would likely require additional future extreme events to occur to reverse this trend of returning to office-based work.
- 3.7.11. Based on the mix of trip purposes represented in the CSRM2 model this scenario would suggest that traffic would decline from 2023 levels by 10% by 2029, by 20% by 2037, reaching a 26% reduction by 2041. The result would be a world in which demands on the transport network are substantially different to those which have been forecast. In the event of such an extreme change to travel, the flexibility of the scheme would mean that the initial scenario specifications would be adapted. It is therefore not considered informative to represent the impacts of this CAS within the context of the existing scenarios.
- 3.7.12. With regard to the **Technology Scenario (CAS5)**, this scenario considers the potential impact on travel behaviour as road travel becomes far more attractive and accessible to road users because of a high take-up of connected autonomous vehicles (CAVs), which enter the fleet in the 2020s and make up to 50% of it by 2047. These could lead to changes in travel demand (such as trip rates and vehicle ownership change) as well as changes in travel behaviours (such as reduction in the perceived Value of Time and car occupancy). The changes in the former (trip rates) are essentially reflected in uplifts in travel demand. These impacts are not dissimilar to what have already been explored in CAS1 to CAS4. Whilst for the travel behaviour related changes, these would primarily be reflected in two areas of travel costs:
- Perceived Value of Time (VoT) - Low VoT savings per hour of travel are associated with CAVs because users would be able to make more effective use of their travel time. Shortening their travel time therefore adds less value than would otherwise be the case. The Making Connections programme would increase the cost of car travel through application of the area charge. Therefore, the reduced VoT is likely to affect demand less than what would be the case for trips where VoT forms a larger proportion of the cost of travel. Modelling would be required in order to robustly capture impacts from this change. However, any tests with changes in VoT are basically varying the proportions of costs attributed to travel time and the proposed charge in the total travel costs. It is argued that similar insights can be gained from tests that are already covered by the range of model runs with varying charges, i.e., how transport users would respond if the cost attributed to

travel time is a higher or lower proportion of the total generalised travel cost. It was therefore decided not to model the potential falls in VoT in CAS5 separately at this stage of the business case for the reason of proportionality when similar impacts are already covered in model runs planned; and

- Vehicle Operating Costs (VOCs) – The Technology scenario also assumes a much higher take-up of electric vehicles, bringing down VOCs. User benefits derived from VOC savings as a result of decongestion would therefore be reduced. However, the impact of VOCs as a proportion of the scheme impacts is not large enough for modelling to be proportionate. It was therefore decided to assess the impacts of this scenario qualitatively.

3.7.13. **Decarbonisation scenario (CAS6)** refers to two plausible futures where there is either vehicle-led or mode-balanced decarbonisation. The difference between these two is mainly whether there would be an unspecified government intervention to equalise electric vehicle costs with costs for petrol and diesel vehicles. Its implication on travel demand forecast is through the PPK (pence per kilometre) parameter in the transport model, which would be reflected in changes in the proportion of vehicle related cost in the total travel cost. For the same reasons as those for CAS5 (that VOCs impacts from the proposed interventions is marginal and there are already a range of tests with varying total travel costs), it was decided not to model this separately.

3.7.14. The adopted approach for all the six CAS scenarios is outlined in the table below, based on the rationale described above.

Table 3-22 – Summary of technical approach for CAS

CAS Scenarios	Quantification in the OBC?
1 - High Economy	Yes
2 - Low Economy	Yes
3 - Regional	Yes
4 - Behavioural change	No but can be assessed qualitatively
5 - Technology	No but can be assessed qualitatively
6 - Decarbonisation	No but can be assessed qualitatively

3.7.15. CAS1 to CAS3 have been assessed based on an approach of identifying the extent to which each scenario affects demand growth relative to the central CSRM2 forecasts and then adapting the interpretation of the modelled forecast years to represent alternative forecast years. Details of this approach are set out in

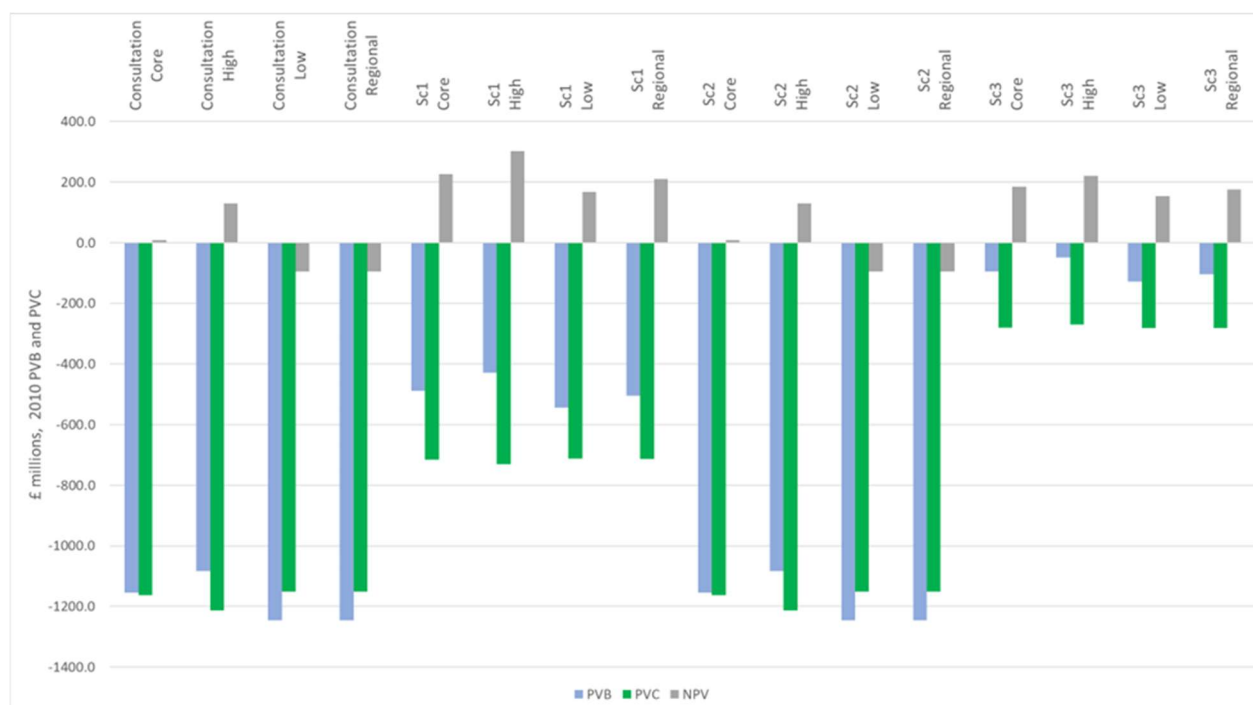
- 3.7.16. Figure 3-6 and the methodology is the same as has been used for the sensitivity of COVID impacts described below.
- 3.7.17. The sensitivity testing of these CASs has focussed on impacts captured through the TUBA software, which encompasses journey time savings, vehicle operating costs, user charges, indirect taxes and revenue generation. Other benefit groups are excluded in this analysis and so the tables below are not fully consistent with the details of the Level 1 PVB presented above. To provide a measure for comparison the same group of benefits have been presented for the core set of demand growth assumptions.
- 3.7.18. Table 3-23 presents the PVB, PVC and NPV based on this select group of benefits, revenues and costs for the Core Growth, CAS1: High Economy, CAS2: Low Economy, and CAS3: Regional across each of the four scenarios. The results are summarised in Figure 3-4.

Table 3-23 – Economic Impacts of CAS Sensitivity Tests (£m, 2010 PV, market prices)

	Consultation Scenario	Scenario 1	Scenario 2	Scenario 3
Core PVB	-1154.9	-488.6	-1154.9	-95.4
Core PVC	-1163.4	-715.2	-1163.4	-280.8
Core NPV	8.4	226.6	8.4	185.4
CAS1 PVB	-1084.2	-428.7	-1084.2	-49.0
CAS1 PVC	-1213.0	-730.7	-1213.0	-270.5
CAS1 NPV	128.8	302.0	128.8	221.5
CAS2 PVB	-1246.1	-544.3	-1246.1	-128.4
CAS2 PVC	-1151.1	-711.5	-1151.1	-282.6
CAS2 NPV	-95.0	167.2	-95.0	154.2
CAS3 PVB	-1180.1	-503.8	-1246.1	-104.5
CAS3 PVC	-1151.1	-714.3	-1151.1	-280.9
CAS3 NPV	-29.0	210.5	-95.0	176.5

- 3.7.19. These results indicate relatively low levels of sensitivity in either the PVB or the PVC based on the use of the alternative CASs, but as there is a relatively fine balance between benefits and costs the potential impacts on NPVs are more significant.

Figure 3-4 – Economic Impacts of Sensitivity Tests (£m, 2010 PV, market prices)



Uncertainties specific to the proposed interventions

- 3.7.20. In addition to uncertainties surrounding CAS above, other potential variations to demand response that are specific to the proposed interventions have also been assessed in the OBC, either qualitatively or quantitatively. Findings from these assessments are summarised below:

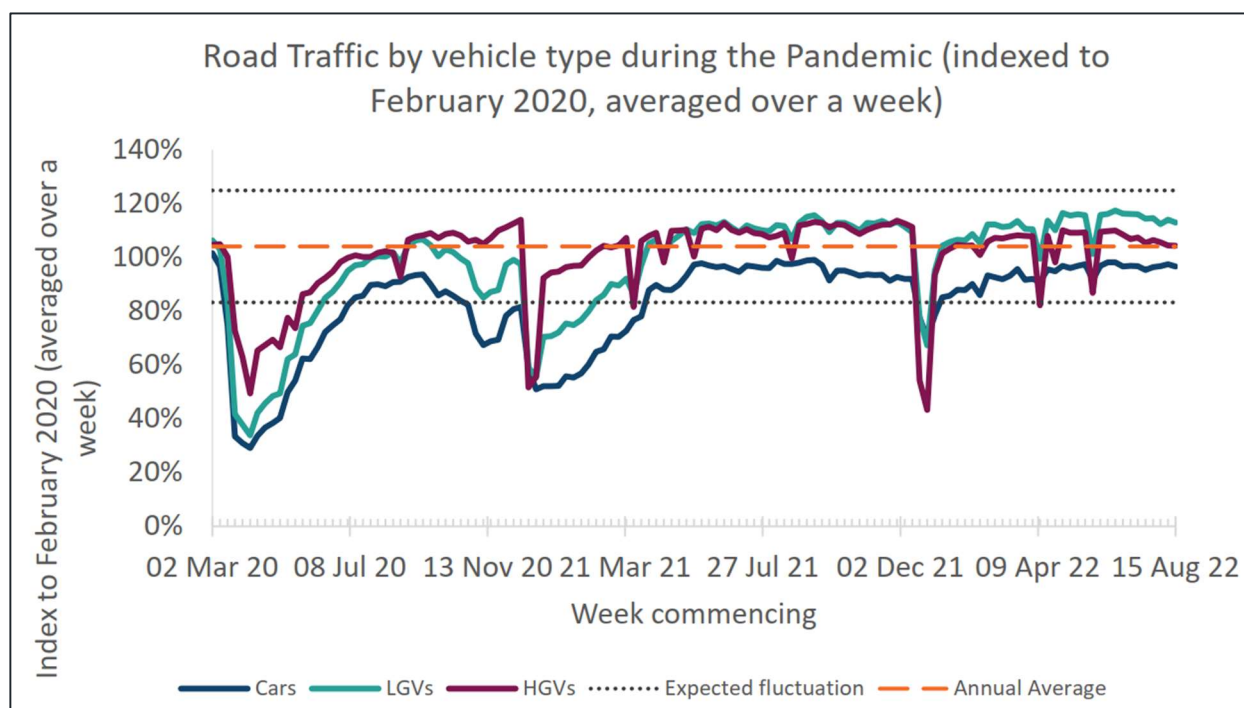
Table 3-24 – Summary of Qualitative Assessment of Scheme Specific Uncertainties

Source of Uncertainties	Findings
Impacts of working from home	This is already covered by the Behavioural Change CAS so no additional assessment is required in addition to what is outlined in the previous section.
Seasonality of active mode demand	The impact of the Making Connections Programme is in part dependent on the level of mode shift of trips from car to active modes. The extent of this mode shift would be influenced by the varying willingness of people to walk and cycle at different times of year in different weather conditions. These impacts are not well suited to modelling. Overall, the aggregated forecast annual or 60-year impacts are still deemed reasonable to represent the average condition throughout the year. At present, more disaggregated forecasts, such as forecasts for specific months, are not required, which is likely subject to more seasonal variations. No additional assessment is therefore planned

Source of Uncertainties	Findings
Freight demand / behaviour response	it is likely that freight companies would seek to minimise their costs by reducing the number of vehicles required to pay the area charge and that the number of vehicles currently moving in and out of the cordon area may over-represent the number which would eventually be charged. Fleets may be redistributed to ensure smaller numbers of vehicles operate within Cambridge, making a larger number of trips each within the city, or alternative vehicle types such as bike couriers may be used for smaller deliveries. Adjustments to address these potential changes are best dealt with in the financial analysis informing the Financial Dimension, which would cover the financial viability of the proposed interventions
Weekend and off-peak demand	traffic impacts during the non-charging period (as a result of the charge scheme during the weekday) would be qualitatively assessed as CSRM2 does not cover weekend or off-peak periods. The potential displacement of demand to non-charging periods would vary by time period and journey purpose. For time periods where congestion charge is proposed in all options (such as AM and PM peak periods), the scope for displacement is limited as the majority of journeys are for commuting, business or education purposes, which are less flexible than other purposes.
Recovery of travel demand post the COVID pandemic	This is assessed quantitatively and reported in the remainder of this subsection

- 3.7.21. The last but also potentially the most significant uncertainty is to do with recovery of travel demand in the baseline scenario post the COVID pandemic. CSRM2 has a pre-COVID base year and then the first forecast year is from 2026, so the decline in travel demand during the pandemic has not been explicitly captured in the transport model. Therefore, the risk associated with travel demand recovery post COVID is that the real-world travel demand in the selected forecast years (2026 and 2041) may be materially lower than what was represented in the forecast models. This potential discrepancy would have implications on the forecast behavioural changes and demand (and revenue) related to the proposed STZ.
- 3.7.22. National Road Traffic Projections 2022 (NRTP2022) reported the road traffic level by different vehicle types from the start of the pandemic to August 2022 as seen in the figure below, where car traffic has remained lower than pre-pandemic levels while particularly LGV traffic has overpassed it.
- 3.7.23. The report mentioned that in February 2022, traffic (not freight traffic) was 8% lower than 2019 level. Since a 3% background growth would have been expected for all vehicle types over two years, February 2022 traffic was approximately 11% lower than what would have been expected to be without the pandemic.

Figure 3-5 – Changes in Road Traffic During the Pandemic (National)

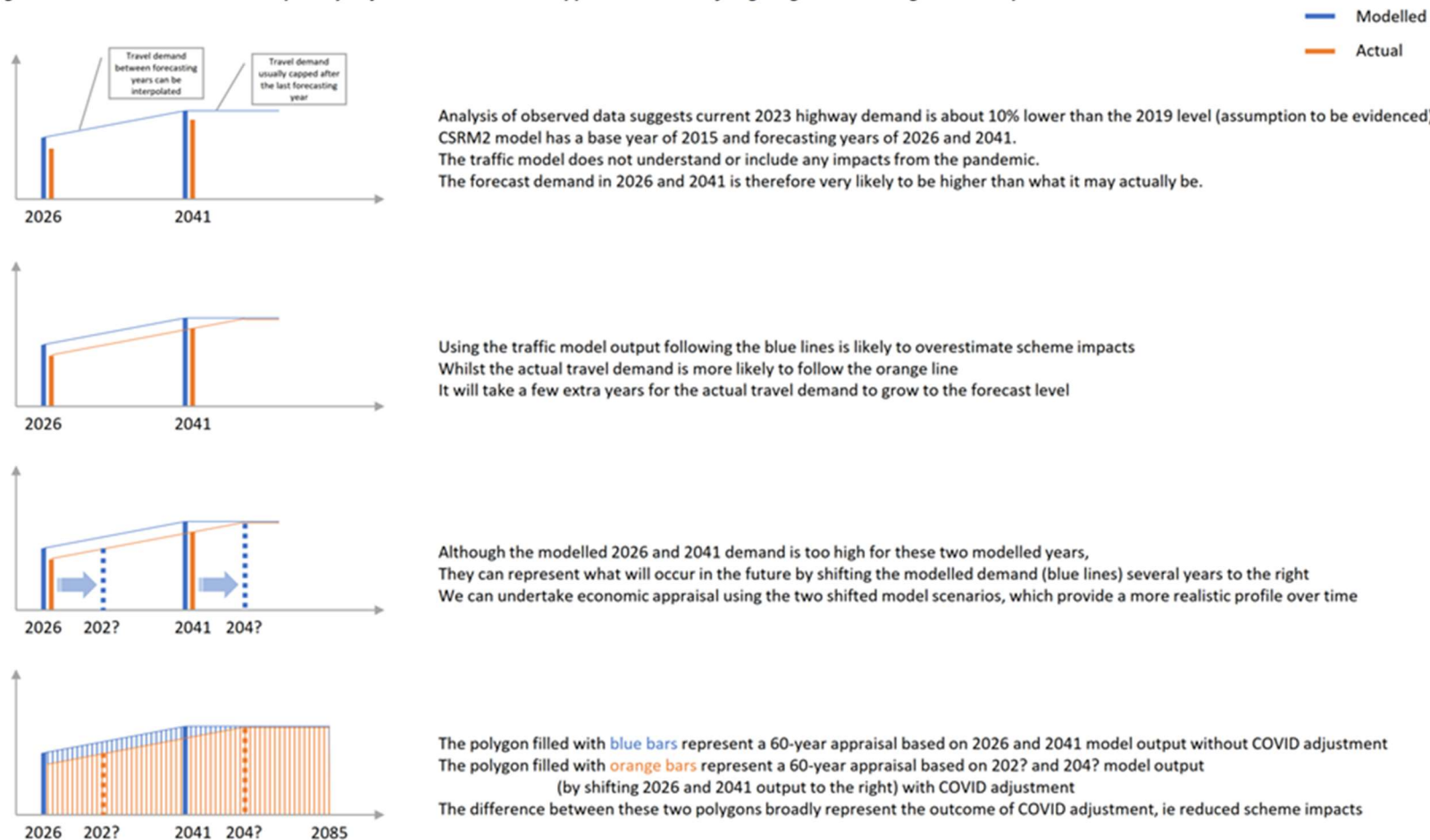


- 3.7.24. In addition to the national evidence, local data in Cambridge city has also been assessed using monitored traffic counts on sites within the local road network in 2019, 2020, 2022 and 2023. It is clear from the assessment that local traffic has decreased and that there is clearly 'lost growth' during the pandemic. However, there is no clear pattern of changes by time of day, direction, or routes.
- 3.7.25. Across the sites with observed data, the reduction in car traffic to or from city centre varies between 5% to 9% in the AM and PM periods in October 2022, in comparison with October 2019. The corresponding reduction during the IP period is about 2% to 3%.
- 3.7.26. Over the same period, the reduction in goods vehicle traffic is over 20% towards the city centre in the PM peak and away from the city centre in the AM peak. The reduction during the IP period is between 4% and 9%.
- 3.7.27. The findings summarised above are based on limited local data available for comparison of pre- and post-pandemic conditions in Cambridge. It is also recognised that information is missing for some key routes and there were also major disruptions or roadworks that might have contributed to the data observed. Overall, a potential gap of 10% in car traffic was assumed, i.e., the current actual travel demand could be up to 10% lower than what it was before the COVID-19 pandemic. This assumption was discussed with the CSRM2 team and informed similar sensitivity tests in several investment cases for transport schemes in Cambridge.

- 3.7.28. The finding from the assessment summarised above suggests that the forecast demand in 2026 and 2041 from CSRM2 is potentially higher than what it might actually be, as travel demand may have not fully recovered to pre-COVID level.
- 3.7.29. A sensitivity test was therefore carried out to capture potential impacts from this potential gap in the VfM assessment. To improve efficiency in this analysis, a simplified approach was adopted to infer the forecast economic impacts with adjustment for COVID impacts through interpolating or extrapolating based on model runs that are already prepared (i.e., what would have been expected to be without the pandemic). This approach is similar to what was adopted for CAS1 to CAS3 in the previous section. A graphical illustration of the adopted approach is presented in Figure 3-6.

Figure 3-6 – Illustration of Capturing COVID Impacts on TUBA Assessment Through Interpolation and Extrapolation

Making Connection – Consider COVID Impact by Adjustment to Economic Appraisal at the Profiling Stage with Existing Model Output



- 3.7.30. Following the approach outlined in Figure 3-6, analysis of forecast car travel demand was undertaken to ascertain how many years' growth was approximately equal to 10% increase in car traffic. This provided a basis to explore which future year(s) that the modelled demand in 2026 and 2041 forecast years were likely to represent if the current forecasts were deemed to overstate traffic in the highway network due to reduced demand post COVID-19 , i.e., what is the gap measured in the number of years between the blue and orange bars in Table 3-6.
- 3.7.31. Findings from the analysis of CSRM2 future car demand forecasts in the Do Minimum scenarios suggest that a 15-year gap between 2026 and 2041 provides about 13% increase in car travel demand (to, from or within Cambridge) on an average weekday, as shown in Table 3-25. Assuming a constant growth rate between 2026 and 2041, interpolation between these two years suggested by 2037 the car traffic would be 10% higher (on an average day). Therefore, for the purpose of this sensitivity test, it was assumed that the current 2026 and 2041 forecasts potentially better represented what would happen in 2037 and 2052, if the model forecasts were about 10% higher than what the real-world demand would be at the same forecast year.

Table 3-25 – Illustration of 10% Difference in Forecast Growth in Car Traffic Based on CSRM2 Model

	Total modelled car demand to, from or within the charge area in Do Minimum			
Year	AM	IP	PM	All Day
2026	73,793	143,848	91,071	308,713
2041	81,269	166,543	101,293	349,105
Difference in %	10.1%	15.7%	11.2%	13.1%

- 3.7.32. Following the assumption above, the sensitivity test about the COVID impact on travel demand was undertaken by re-profiling the forecast impacts over the 60-year appraisal period. Instead of using the 2026 and 2041 forecasts in the designated forecast years, they were shifted to the right by 11 years in the profiling process, i.e., representing 2037 and 2052 forecast years, in the sensitivity test.
- 3.7.33. To maintain the 60-year appraisal period starting at 2026, benefits and revenues have been extrapolated back from 2041 using the rate of growth between the two forecast years.
- 3.7.34. As in the case of the CAS sensitivity tests the impacts of COVID have been assessed through TUBA but not across all other areas of economic analysis.
- 3.7.35. Table 3-26 presents the outcome of this analysis showing the PVB, PVC and NPV under the Core growth assumptions and the COVID adjusted assumptions.

Table 3-26 – Economic Impacts of COVID Sensitivity Tests Based on Conventional User Impacts Only (£m, 2010 PV, market prices)

	Consultation Scenario	Scenario 1	Scenario 2	Scenario 3
Core PVB	-1,155	-489	-1,155	-95
Core PVC	-1,163	-715	-1,163	-281
Core NPV	8	227	8	185
COVID PVB	-1,399	-644	-1,399	-191
COVID PVC	-1,111	-699	-1,111	-290
COVID NPV	-288	55	-288	99

- 3.7.36. These results indicate a higher level of disbenefit in the COVID adjusted scenario. This arises because the lower traffic levels post-COVID result in lower levels of existing highway congestion and therefore the decongestion impacts of the STZ would generate lower levels of time saving benefits.
- 3.7.37. As a result of this change the all-day charge scenarios move from being broadly neutral (based on this limited range of benefits) to having an adverse impact of nearly £300 million.
- 3.7.38. However, the sensitivity tests presented in Table 3-26 did not cover additional benefits, which amount to approximately £600 million benefit at Level 1 (such as positive impacts on safety and health) and another £100 million benefit at Level 2 (such as reliability impacts). Therefore, the results in Table 3-26 do not suggest that benefits after allowing for COVID impacts on traffic would be negative, only that they would be less positive than would be the case based on demand levels in the CSRM2 transport model.

Uncertainties Surrounding Costs

- 3.7.39. Forecasts of costs have been developed to include optimism bias uplifts to represent what are currently considered the most likely eventual spend. However, this only represents a central point within a possible range of costs.
- 3.7.40. Sensitivity testing has been applied to consider the impacts of a 10% increase or decrease in either capital investments or operational costs. A test is also set out to indicate the impact of applying the uplift on capital costs forecast by the QRA of 7% in place of optimism bias.
- 3.7.41. Results of this testing in Table 3-27 indicate a low level of sensitivity to variations in capital costs as costs form a relatively small part of the total PVC. The tested variations to operating costs have an impact of up to +/-£100m on the NPV in the All Day charge scenario, with lower impacts in other scenarios.

Table 3-27 – Present Value of Costs (£m, 2010 PV, market prices)

	Consultation Scenario	Scenario 1	Scenario 2	Scenario 3
Capital Investment	52	50	52	50
Opex and WLC	153	122	153	122
Bus Improvement Measures	742	395	742	299
Sustainable Travel Measures	172	78	172	66
Total Cost	1,119	644	1,119	536

	Consultation Scenario	Scenario 1	Scenario 2	Scenario 3
Total Revenue	-2,282	-1,360	-2,282	-817
Present Value of Cost	-1,163	-715	-1,163	-281
Level 2 PVB	-461	-138	-461	189
Net Present Value	703	577	703	470
+10% Capital Cost				
Present Value of Cost	-1,158	-710	-1,158	-276
Net Present Value	697	572	697	465
-10% Capital Cost				
Present Value of Cost	-1,169	-720	-1,169	-286
Net Present Value	708	582	708	475
+10% Operating Cost				
Present Value of Cost	-1,057	-656	-1,057	-232
Net Present Value	596	518	596	422
-10% Operating Cost				
Present Value of Cost	-1,270	-775	-1,270	-329
Net Present Value	809	636	809	519
Replace Optimism Bias on CAPEX with QRA at 7%				
Present Value of Cost	-1170	-722	-1170	-287
Net Present Value	709	584	709	477

3.8 Value for Money Statement

- 3.8.1. VfM assessment was undertaken in accordance with the DfT Value for Money Framework. It included consideration of all monetised and non-monetised impacts, and sensitivity analyses to determine the level of confidence in the central assessment. Important areas of uncertainty that could affect the VfM categorisation were also explored.
- 3.8.2. As has been identified in development of the OBC, it is forecast that options considered are likely to return negative costs and benefits. This is a result of the revenue from the area charging element of the scheme offsetting the relatively low implementation and operating cost. Furthermore, the impact of the area charge on users is also in a similar level of magnitude to decongestion benefits.

It is therefore necessary to consider the VfM categories which may occur when revenues exceed costs, as set out in the VfM Framework, and as illustrated in Table 3-28.

Table 3-28 – VfM categories when cost savings are generated

VfM Category	Description
Very High (and Financially Positive)	Proposal generates benefits to wider society and ‘pays for itself’ in the long-run since outlays are less than revenues and cost-savings combined.
Economically Efficient Cost Savings	Cost savings outweigh benefit losses and thus overall public value is increased, implying value for money.
Potentially Efficient Cost Savings	Benefit losses outweigh cost savings, but only to a limited extent. As a result, if the money returned to the budget were spent on proposals representing at least Medium value for money, public value would increase overall. The ultimate outcome is therefore likely to represent value for money.
Poor (but Financially Positive)	Proposal results in benefit losses that outweigh cost savings to a greater extent. In these cases, even if the money returned was spent on a Medium value for money proposal, it would not lead to an overall increase in public value. Whilst there may be strong strategic, financial, management or commercial reasons for proceeding with these proposals, they are not considered to have a strong economic case.

- 3.8.3. Assessment in the OBC to date suggests that all scenarios (as listed in Table 3-2) generate material behavioural changes that shift travel demand to sustainable transport modes. The forecast outlays in the appraisal period are less than the forecast revenue generated, so all scenarios deliver ongoing net revenue to invest.
- 3.8.4. Technical evidence suggests that Scenario 2 (£5 all day charge) is best performing against the established scheme objectives, particularly in terms of the aspired behavioural changes. It is also recognised that this scenario does not fully address concerns recognised in the Autumn 2022 consultation and financial impacts on business, particularly after the free days offered in the early years phase out.
- 3.8.5. On the other hand, Scenario 3 (£3 peak charge) is the most challenging due to the lower level of revenue forecast in the early years, and therefore has less headroom to offer further discounts such as free days to the public. The forecast behavioural changes, although material, are also the lowest out of all scenarios assessed. This is the result of relatively lower charge proposed, but is also constrained by the limited headroom in the net revenue available to fund more substantial improvements in public transport and active mode measures in order to encourage higher modal shift.
- 3.8.6. Scenario 1 (£5 peak charge) appears to offer a balanced outcome compared with the other scenarios. The potential positive behavioural changes are not as high as Scenario 1 but still very substantial. Meanwhile, it is able to offer more DERs to address concerns from the

consultation (compared with Scenario 1) and would generate higher net ongoing revenue (than Scenario 3) to invest in public transport and other sustainable transport measures in order to facilitate and safeguard the behavioural changes driven by the proposed area charge.

- 3.8.7. Based on DfT's categorisation of VfM, as set out in Table 3-28, the Consultation Scenario, Scenario 1 and Scenario 2 would all be classed as demonstrating "Economically Efficient Cost Savings", in that while each results in benefit losses they generate a larger cost saving leading to a positive NPV. The VfM of Scenario 3 would be considered "Very High (and Financially Positive)" as it generates a positive benefit while also returning a cost saving. Each of these ratings should be considered within the context of the limitations of this economic assessment however.
- 3.8.8. Further to this monetised impact the Business Impact Assessment (Appendix F) has considered the likely impact on different business sectors and in particular has examined the impacts of different DERs on businesses to identify how the proposed scenarios perform in this respect. This analysis has suggested that the peak period £5 charge is most likely to minimise adverse impacts of the charge on local businesses, with provision of free days to users reducing the risk of loss of custom, while discounts to small and medium sized enterprises would help to mitigate costs.
- 3.8.9. Retail and logistics sectors have been identified as being most at risk if no mitigating measures are put in place. In particular smaller businesses would be most disadvantaged during the early years of operation and so measures to reduce these impacts are recommended.

4 Commercial Dimension

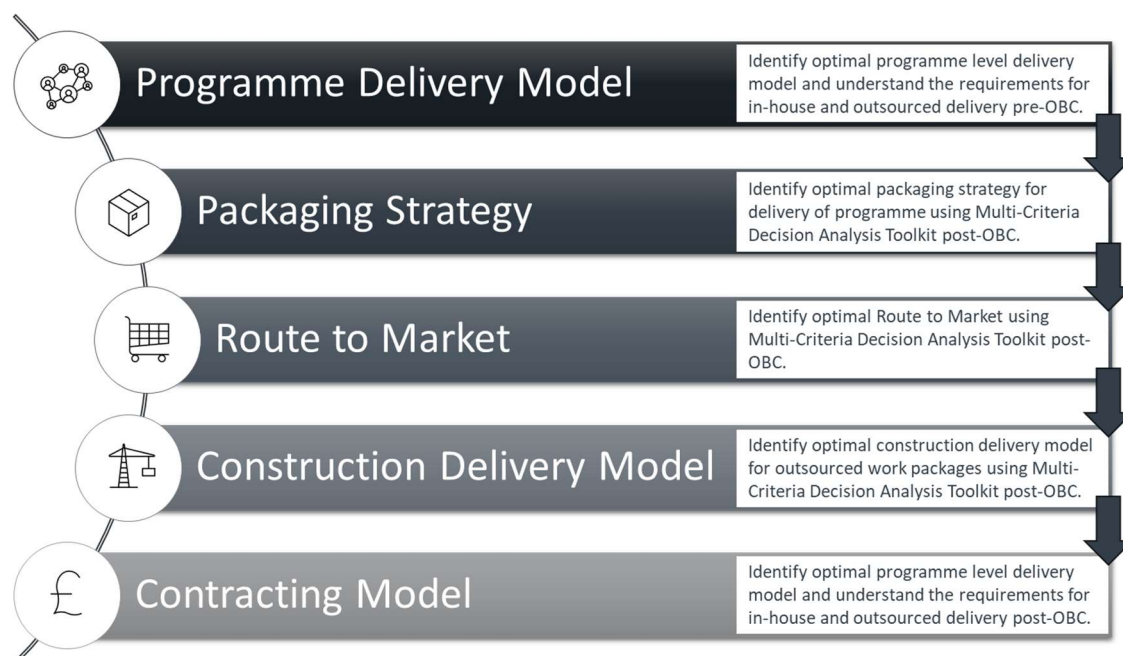
4.1 Purpose

- 4.1.1. The Commercial Dimension provides evidence of the commercial viability of Making Connections and describes the delivery model, commercial strategy and procurement strategy that would be used to engage the market. It provides evidence on the appropriateness of the selected delivery model and the approach to risk allocation and transfer, contract and implementation timescales and the approach to managing the contract.

4.2 Introduction

- 4.2.1. This Commercial Dimension is developed through the iterative consideration of a number of key decisions which direct CCC's approach to developing a suitable delivery model, packaging strategy, most appropriate route to market and contracting model.
- 4.2.2. These individual and successive decisions hinge on several permutations and a balanced approach to these complex decisions. Figure 4-1 introduces the Making Connections commercial approach and key decisions which are needed to inform the Making Connections programme commercial strategy.

Figure 4-1 – Making Connections Commercial Approach



- 4.2.3. Progress against these decisions and subsequent key considerations would be discussed throughout this Commercial Dimension. Ultimately, each step in this approach would support CCC to deliver their procurement objectives and align the programme with best practice, and key organisational and national policies.

- 4.2.4. The Commercial Dimension is primarily focused on the procurement and commercial strategy for the STZ and Sustainable Travel Measures (STM). CPCA are separately developing an independent Commercial Dimension as part of its Bus Reform Outline Business Case which is solely focused on the development of an appropriate commercial strategy for the Bus Network Improvements and its selected delivery model.
- 4.2.5. CPCA's Bus Reform Outline Business Case would support the development of the bus network improvements throughout CPCA's region. Whilst acknowledging this interface, this Commercial Dimension summarises the current commercial status of the Cambridge bus network in Section 4.12, and likely areas for improvement in Section 4.13, but does not cover the procurement and commercialisation of the bus network improvements.

Structure of the Commercial Dimension

- 4.2.6. The Commercial Dimension has been developed in line with the structure highlighted in Table 4-1. This approach builds on current industry best practice provided in the Construction and Sourcing Playbooks recently published by UK Government.

Table 4-1 – Commercial Dimension Structure

Content	Description	Section
Procurement Timelines	Consideration to the key procurement milestones in the Making Connections programme	4.3
Programme Component Architecture	The component architecture provides a systems view of the varying elements within the programme organised as a framework. This section of the case introduces the component architecture which needs to be delivered for the programme	4.4
Output Specification	The outputs of the Making Connections programme are captured from the design, development, and operational phases for the STZ and STM	4.5
Outline Procurement Strategy	In this section how national, local and regional policy, CCC's procurement objectives and developments in procurement policy would align as part of the outline procurement strategy for the Making Connections programme	4.6
Programme Delivery Model	Introducing the programme delivery model - the form of structural and commercial arrangements to be deployed to meet the Sponsor's requirements.	4.7
Assumptions, constraints & dependencies	Identification of the key programme assumptions, constraints and dependencies for consideration as part of the Commercial Dimension of the programme.	4.8
Programme Contracting Model	The contracting model considers how the programme would contract the supply chain to deliver the programme. This section discusses the contracting options available to CCC.	4.9
Works Packaging Strategy	The Making Connections programme packaging strategy considers how the programme components would be grouped into manageable work packages or units to facilitate planning, scheduling, procurement, and execution of the programme.	4.10
Routes to Market	A discussion on the potential routes to market for the sourcing of consultancy and construction services to deliver the output-based specification.	4.11
Summary of Current Bus Commercial Structure	The section considers the bus commercial structure	4.12

Content	Description	Section
Scope for Bus Commercial Improvements	The section considers the bus commercial improvements	4.13
Contracting Strategy	The contracting strategy would consider the role the supply chain would play, how it would be paid and the proposed risk allocation between the contract parties in the delivery of the Making Connections programme.	4.14
Human Resources Issues	Introducing any human resource issues which are anticipated implementing the delivery and contracting models.	4.15
Contract Management	This section considers the contract management arrangements associated with the delivery of the STZ and STM.	4.16
Summary	This section would summarise the content of this Commercial Dimension	4.17

4.3 Procurement Timescales

- 4.3.1. Table 4-2 summarises the programmes procurement timelines. Post OBC the delivery models would be refined further, and a strategy developed. Following this, the delivery models would need to be market tested to get feedback.
- 4.3.2. There are likely to be multiple procurements on the programme, timescales for which will be informed by market testing. Procurement would likely need to start in Q1/Q2 2024 with an end date to be confirmed.

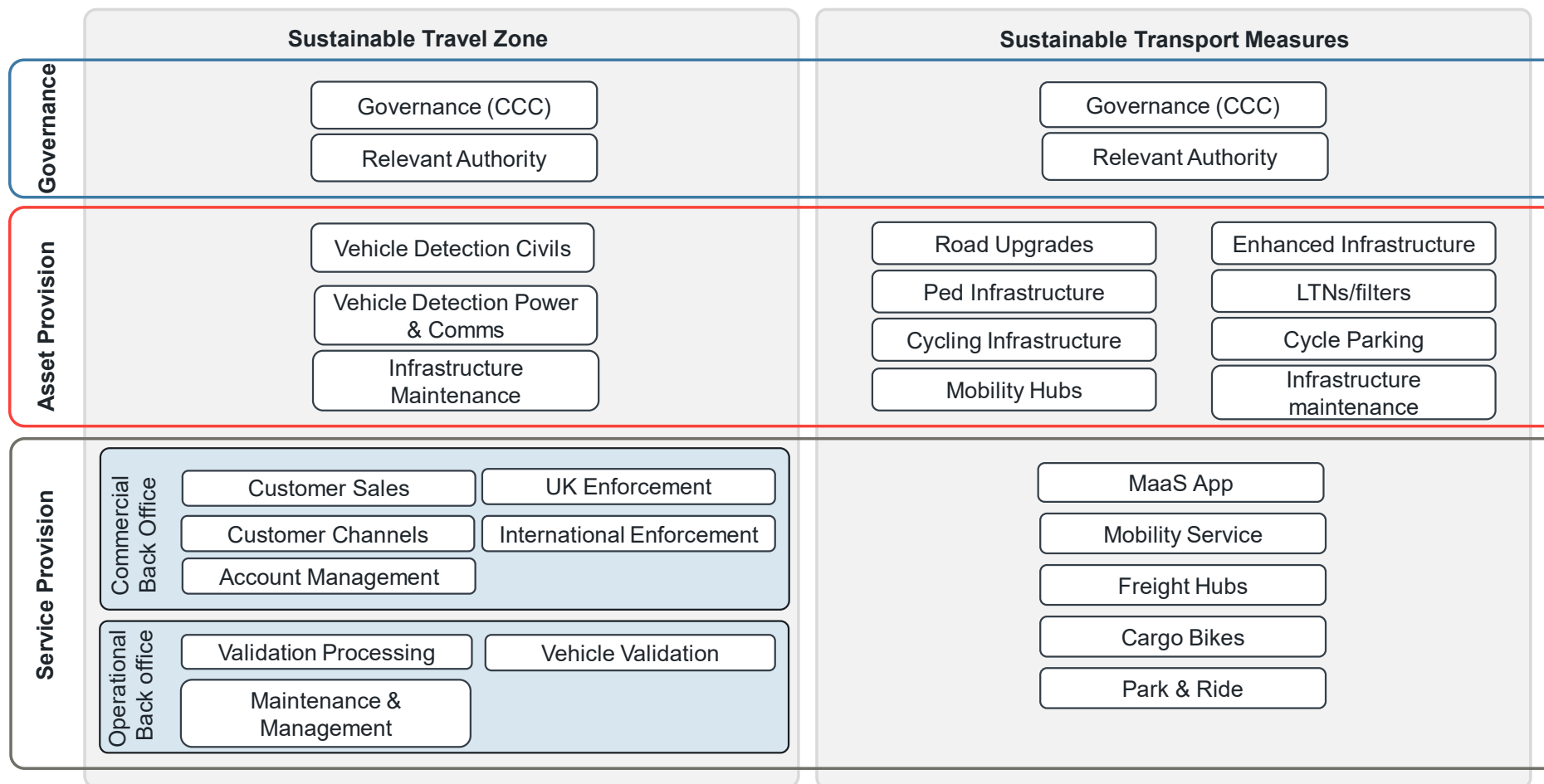
Table 4-2 – Procurement Timescales

Milestone	Date
Delivery model refinement & delivery strategy development	Q3/Q4 2023
Market testing	Q4 2023
Procurement start	Q1/Q2 2024

4.4 Programme Component Architecture

- 4.4.1. The component architecture provides a systems view of the varying elements within the programme organised as a framework. This framework enables a greater level of detail when considering potential delivery model approaches for the programme by considering whether specific components can be delivered using an in-house, under a hybrid model or through an outsourced model.
- 4.4.2. The STZ and STM component architectures are broken down into three thematic category groups of governance components, asset provision and service provision. Grouping the components by these three thematic category groups allows the architecture to be made consistent, supports the development of the work package strategy and supports a deeper understanding of the complexity of the delivery environment. The programme component architecture is captured in Figure 4-2 below.

Figure 4-2 – STZ and STM Component Architecture



4.5 Output-Based Specification

- 4.5.1. This section summarises the requirement in terms of outcomes and outputs. The Commercial Dimension is based on the delivery of strategic outcomes and outputs, against which alternative procurement and contractual options are assessed. It outlines how the proposed scheme would be procured and its commercial strategy.
- 4.5.2. The output-based specification summarises the scheme's functional requirements in terms of outputs. These outputs have been developed considering the component architecture of the delivery model assessment and are presented in Table 4-3 and Table 4-4.

Table 4-3 – Sustainable Travel Zone (STZ) – Output-based Specification

Phase	Outputs
Design and planning	• Design of the civil infrastructure for the vehicle detection assets • Design of the power and communications for the vehicle detection asset • Development of the business case for the STZ • Advanced works, including site investigations and any associated utility diversions • All associated planning applications
Construction	Construction of the vehicle detection infrastructure which includes: • Installation of the vehicle detection assets • Power assets to energise and run the detection infrastructure
Operation and maintenance services	Maintenance and operation of the vehicle detection infrastructure and associated back-office services: • Operation of account management and customer sales channels • UK enforcement and international enforcement services • Vehicle detection and validation processing infrastructure • Maintenance of vehicle detection infrastructure

Table 4-4 – Sustainable Transport Measures – Output-based Specification

Phase	Outputs
Design and planning	• Design of the civil infrastructure for the STM • Development of business cases for each element of the STM • Advanced works, including site investigations and any associated utility diversions • Design of the MaaS app • All associated planning applications
Construction	Construction of the STM infrastructure which includes: • Installation of infrastructure e.g. Low Traffic Neighbourhoods • New cycle hub infrastructure • Development of the MaaS app

Phase	Outputs
Operation and maintenance services	Maintenance and operation of the STM infrastructure, and all associated back-office services: • Maintenance of the new infrastructure • Maintenance of the new services

4.6 Outline Procurement Strategy

- 4.6.1. CCC's capital investments and sustainable procurement strategy aims to deliver CCC's vision to create a "greener, fairer and more caring Cambridgeshire". The sustainable procurement strategy outlines how the Council would align to local, regional, and national policy requirements in a sustainable manner, committing CCC to:
- Support local businesses and the third sector;
 - Increasing delivery of social value;
 - Contributing to the Council's Net Zero targets;
 - Delivering best value outcomes; and
 - Having robust, compliant, and transparent procurement processes.
- 4.6.2. The Making Connection programme's vision for procurement seeks to achieve the best possible social value outcomes, support the climate ambitions of the partnering organisations, give value for money targets and legal compliance for the stakeholder organisations involved.
- 4.6.3. CCC's procurement vision aligns to the Commercial Playbooks published by the Cabinet Office. The four different Commercial Playbooks, which apply to Central Government Departments and their Arm's Length Bodies, set out principles, rules and guidelines with the aim of maximising the value-added potential while supporting the growth and capability of internal organisations.
- 4.6.4. In June, the Cabinet Office published Procurement Policy Note (PPN) 06/23. This PPN provides guidance on the application of the Commercial Playbooks to Central Government departments and Arm's Length Bodies. It presents an advancement in the government's procurement policy while consolidating the findings from previous PPNs. It brings together lessons learned from the past and aims to systematically change the government's approach to risk, sustainability, and innovation.
- 4.6.5. The PPN further clarifies the policies and guidance published as part of the Playbooks. It places emphasis on the in scope organisations to adopt the policies driven by the Playbooks to support better outcomes and value for money in the delivery of interventions for the public and advises that the playbooks are considered best practice for the Local Government sector.

Procurement Objectives

- 4.6.6. The procurement objectives for the programme are identified in Table 4-5. These would support the selection and definition of an optimal procurement strategy – including route to market – and later considerations to the commercial strategy.
- 4.6.7. These objectives have been ranked to support further analysis of the most appropriate option, in line with the programme’s key procurement considerations.

Table 4-5 – Procurement Objectives

Rank	Procurement Objective	Considerations
1	Deliver social value outcomes in line with local and national policies	Ensure the scheme is developed with social value at the centre of decision-making considerations, including involvement of local and regional supply chain, diversity and inclusion and other elements of community engagement.
2	Deliver environmental outcomes in line with local and national policies	Ensure the scheme is developed in a sustainable way that minimises the impact on the environment i.e. carbon reduction, social value, local supply chain involvement etc.
3	Deliver value for money for the programme	Ensure appropriate Value for Money while allowing innovation and consideration of whole-life costs.
4	Appropriately allocate risks to the organisation best place to manage the uncertainties	Ensure risk is allocated fairly based on who is best able to manage risk, appetite to retain risk or incentivise a contractor to manage project risk.

Outcome-Based Approach

- 4.6.8. An outcome-based approach is a transformational shift in the delivery of projects in the construction industry, focussing on the whole life value, performance, sustainability and cost of the service delivered.
- 4.6.9. The Construction Playbook sets out best practice guidance to support the delivery of projects with an outcome-based approach. It sets out a clear methodology, focussing on clear and measurable outcomes at the outset of a project that contribute to the Government’s social, economic and environmental policies. Delivering projects in line with this guidance would drive continuous best practice in the industry, unlocking innovation across the supply chain whilst understanding the ambitions of the contracting authority.
- 4.6.10. CCC would develop outcomes for the Making Connections programme which align to the organisation’s procurement strategy. These outcomes would be measured through the construction and operation of the programme, supporting better outcomes. An outcome-based delivery strategy would be considered in further detail in parallel with the construction delivery model, contracting model and work packaging strategies post OBC.

4.7 Programme Delivery Model

- 4.7.1. A Delivery Model Assessment (DMA) is the process of identification the optimal delivery model for a project or programme. For this programme, the DMA included a series of steps. These were to develop an understanding of the delivery environment complexity, compile a long list of delivery model options based on the component architecture, capture and prioritise CCC's delivery model strategic and operational evaluation criteria. The outcome of this exercise was an initial delivery model recommendation for the STZ and STM.

Delivery Environment Complexity Analytic (DECA)

- 4.7.2. The DECA is a project management tool that is designed to help identify and manage the complex environments that exist within large-scale projects. It was created by the National Audit Office (NAO) in 2013 to help define the level of complexity in the delivery environment and support the identification of the Making Connections strategic risks profile.
- 4.7.3. The strategic risk outputs of the DECA have been incorporated into the risk management process for the programme. Capturing the complexities and strategic risks as part of the DECA supports the development of a delivery model which addresses or mitigates some of these key challenges.

Delivery Model Long List

- 4.7.4. A long list of potential delivery model approaches was developed based on the component architectures for the STZ and STM. The long lists are captured in Figure 4-3 and Figure 4-4. These figures capture the long lists developed with shortlisted delivery models highlighted with a yellow outline. The shortlisting was achieved by assessing the delivery model long list against a list of critical success factors. Non-compliance to this list resulted in the elimination of the delivery model from further assessment. This process prevented any non-deliverable delivery models passing through to the final evaluation assessment.

Figure 4-3 – STZ Delivery Model Long List

Component	Sub-component	In-house	Hybrid 1	Hybrid 2	Hybrid 3	Hybrid 4	Hybrid 5	Hybrid 6	Hybrid 7	Outsourced	Capability	Capacity	Preferable delivery approach
Governance		I	I	I	I	I	I	I	I	I			In-house delivery
Governance	N/A										✓	✓	CCC as both Client and Local Transport and Highway Authority will be responsible for governance and assurance.
Relevant Authority	N/A										✓	✓	
Asset Provision (Construction and Maintenance)		I	H	H	I	I	H	H	O	O			Hybrid/Outsourced delivery
Vehicle Detection Civils	N/A										✗	✗	CCC do not have direct labour capability and capacity to construct and deliver infrastructure assets. CCC regularly outsource the construction and maintenance of their assets.
Power & Comms	N/A										✗	✗	
Civils Maintenance	N/A										✗	✗	
Service Provision		I	H	H	H	H	H	O	H	O			Hybrid/Outsourced delivery
Operational Back Office	Validation Processing										✓	✗	International enforcement outsourced CCC have capability for UK Enforcement, Customer sales and payments, and channels. Validation Processing, Vehicle Detection, Maintenance & management outsourced – no in-house capability
	Vehicle Detection										✓	✗	
	Maintenance & Management										✗	✗	
Commercial Back Office	Customer Sales and Payment										✗	✗	
	Customer Channels										✗	✗	
	Account Management										✗	✗	
	UK Enforcement										✓	✓	
	International Enforcement										✗	✗	

Figure 4-4 – STM Delivery Model Long List

Component	Sub-component	In house	Hybrid 1	Hybrid 2	Hybrid 3	Hybrid 4	Hybrid 5	Hybrid 6	Hybrid 7	Outsourced	CCC Capacity	CCC Capacity	Preferable delivery approach
Governance		I	I	I	I	I	I	I	I	I			In-house delivery
Governance	N/A										✓	✓	CCC as Client and Local Highways and Transport authorities are responsible for governance
Relevant Authority	CCC										✓	✓	
Asset Provision (Construction and Maintenance)		I	O	I	H	H	H	H	H	O			Outsourced Delivery
Infrastructure Delivery	Road Upgrades										✗	✗	CCC do not have a direct labour organisation which has capability and capacity to construct and deliver infrastructure assets. CCC regularly use outsourced construction services to deliver new assets. CCC also currently use outsourced contractors to maintain infrastructure assets across the county due to limited in-house capability and capacity.
	Ped Infrastructure										✗	✗	
	Cycling Infrastructure										✗	✗	
	Enhanced Infrastructure										✗	✗	
	LTNs/filters										✗	✗	
	Cycle Parking										✗	✗	
	Mobility Hubs										✗	✗	
Infrastructure Maintenance	N/A										✗	✗	
Service Provision		I	I	O	I	O	O	H	O	O			Outsourced delivery
MaaS App	N/A										✗	✗	CCC as the local Transport authority will take on the Client Role outsource the delivery of these services to the market.
Mobility Service	N/A										✗	✗	
Freight Hubs	N/A										✗	✗	
Cargo Bikes	N/A										✗	✗	
Park & Ride	N/A										✗	✗	

Strategic and Operational Evaluation Criteria

- 4.7.5. Evaluating and selecting an optimal delivery model requires assessing potential delivery model approaches against a set of strategic and operational evaluation criteria for the delivery model. This approach enables the objective assessment of which delivery model would be considered optimal for the Making Connections programme. It adopts an analytical, evidence-based approach which ensures the selection of an optimal delivery model is aligned with an organisation's outcomes.
- 4.7.6. These criteria were discussed and agreed with the CCC Working and Steering groups to enable an objective assessment and comparison of the shortlisted delivery model approaches. The criteria also align best practice guidance in the Sourcing Playbook. The strategic and operational criteria are captured in Table 4-6.

Table 4-6 – Making Connections Strategic and Operational Evaluation Criteria

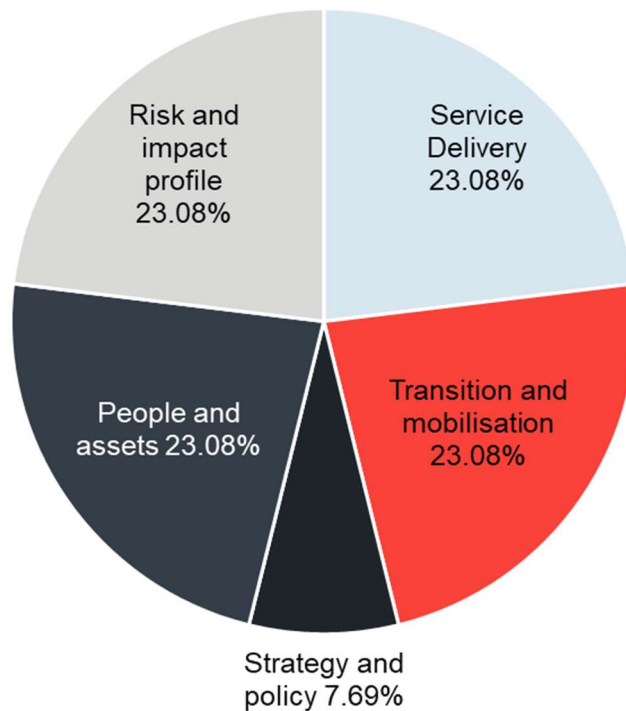
Criteria	Description
C1 – Service Delivery	How well would the delivery model guarantee ongoing service quality, innovation and continuous improvement? How complex would the management structures be? How difficult would it be to manage any SLAs and KPIs?
Criteria C2 – Transition & Mobilisation	How easy would it be to transfer existing services into the new model? If this is a new service, what challenges would you face setting up and mobilising the service? Consider issues such as recruitment (or TUPE implications), timescales and systems developments.
Criteria C3 – Strategy & Policy	How well does the delivery model aligns with departmental and government strategies and policies? How would it ensure delivery of strategic objectives, such as SME engagement, equalities or social value?
Criteria C4 – People & Assets	Would the capabilities and skillsets needed, and existing capacity (internal or in the external market) be available? What flexibility would you need (e.g., if volumes change) and how well can the delivery option meet these needs? What would the training and recruitment impact be? What other investments may be required and who would own any assets (including intellectual property)?
Criteria C5 – Risk & Impact Profile	Identify the commercial and operational risks that may impact the delivery of services. Who is best placed to manage these risks and which delivery model best mitigates these risks? Identify the risks that may impact the value profile. Who is best placed to manage these risks and what impact would this have on where activities sit?

Evaluation Criteria Prioritisation

- 4.7.7. A workshop was held with senior decision-makers to debate which operational and strategic criteria would have the greatest influence on the delivery model decision and their relative importance. This prioritisation allowed the organisational priorities to be reflected in the emerging delivery model recommendation.
- 4.7.8. Undertaking a pairwise comparison exercise for the criteria, the outcome of this ranking exercise is captured in Figure 4-5. This figure highlights that a number of the criteria –

Service Delivery, People & Assets, Transition & Mobilisation and Risk & Impact Profile all have equally rate.

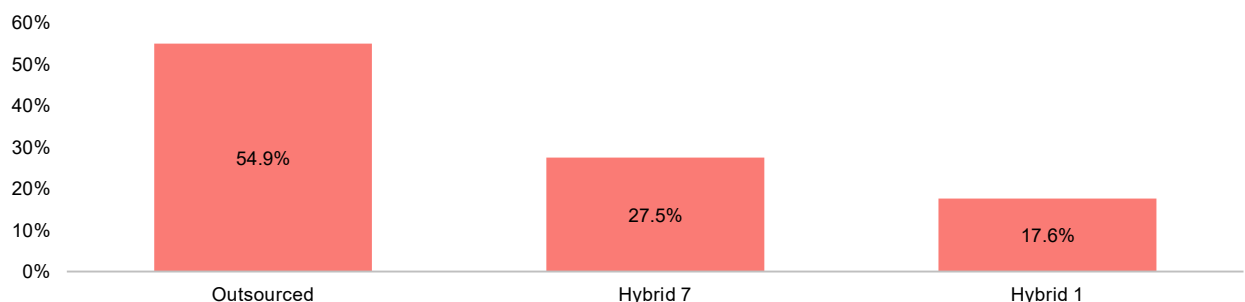
Figure 4-5 – Output of the Evaluation Criteria Prioritisation



Optimal Delivery Model Selection

- 4.7.9. In summary, this initial assessment highlights a strong weighting towards an outsourcing model for the delivery of the STZ and STMs (see Figure 4-6). This initial conclusion is based on industry best practice commercial advisory work that supported the series of workshops held with senior officers. An outsourcing approach mitigates the concern regarding limited capability and capacity within CCC to in-house the provision of many of the components.

Figure 4-6 – Results of the STZ Delivery Model Multi-Criteria Analysis



- 4.7.10. This initial recommendation is likely driven by the outsourced model's performance in meeting the Transition & Mobilisation, People & Assets and Risk & Impact Profile criteria – all of which are highly important criteria to CCC.

- 4.7.11. From the STM perspective, the outsourced model continues the business-as-usual approach which CCC have used to deliver similar interventions throughout the County.

4.8 Assumptions, Constraints and Dependencies

- 4.8.1. In developing the initial delivery models for the STM and STZ, several assumptions and constraints have been captured. Each of these would be tracked and managed throughout the development of the procurement and commercial strategies. No dependencies of note have been captured while developing the commercial and procurement strategy.

Assumptions

- 4.8.2. Table 4-7 captures the assumptions considered while developing the commercial and procurement strategy for STZ and STM. These assumptions feed into the risk and assumptions management process for the programme.

Table 4-7 – Commercial and Delivery Model Assumptions

Assumption ref	Assumption	Justification
A1	There would be market appetite to implement the proposed delivery model	Without market testing, it is assumed that there would be the market appetite to implement the delivery model proposed. If untrue, the delivery model would need to be re-visited or altered as the programme develops, potentially slowing the FBC programme. The Delivery Model would be market tested post-OBC.
A2	There would be market appetite to develop and deliver the proposed work packaging strategy proposed	Without market testing, it is assumed that there would be the market appetite to implement the delivery model proposed. If untrue, CCC may not achieve best possible value for money from their procurement exercises. The work packaging strategy is to be market tested post OBC.
A3	Changes in the political landscape may impact the delivery model	During the lifecycle of programme, the political and policy landscape could change. This could drive a change in direction to in-source more delivery or outsource more to the supply chain, thus impacting the delivery model decisions made at the OBC stage.

Constraints

- 4.8.3. The following constraints have been captured while developing the commercial and procurement models for STZ and STM. Table 4-8 lists these constraints.

Table 4-8 – Commercial and Delivery Model Constraints

Reference	Constraints	Justification
C1	CCC's capacity to manage the outsourced delivery models	CCC would be constrained by their internal capacity to manage all commercial arrangements of an outsourced delivery model
C2	CCC capability to manage the outsourced delivery models	CCC would be constrained by their internal capability to manage all commercial arrangements of the outsourced delivery model
C3	CCC's systems and processes	CCC would be constrained by their internal systems and processes to manage all commercial arrangements of the outsourced delivery model
C4	Existing commercial arrangements for asset and maintenance services	If there is a change in the delivery model from the existing, the existing commercial arrangements would need to be updated or changed.

4.9 Programme Contracting Model

- 4.9.1. The appropriate contracting model for the Making Connections programme would depend on several factors. This would include the level of specification maturity, risk allocation and alignment to CCC's procurement objectives.
- 4.9.2. Table 4-9 summarises the range of contracting models available to CCC and the advantages and disadvantages of both. This longlist would be taken forward for further consideration post-OBC.

Table 4-9 – Programme Contracting Models

Procurement Strategy	Advantages	Disadvantages
<i>Public Ownership</i>		
Traditional Single Stage Consultant develops design in partnership with Client before competitive tenders are invited and before the main works contract is let. The Contractor appointed to deliver works (possibly including some level of Contractor design post-award) under a lump sum or a re-measurable contract.	- Established procurement route - The client develops the specification, manages risk and retains control and flexibility to change the specification - Award of contract on the lowest price basis /best value demonstrating Value for Money (potentially using quantities which may vary at completion) - Construction costs can be accurately determined in advance - The Contractor assumes responsibility and financial risk for the delivery of the design	- No incentive for a Contractor to innovate - No link between design and construction or Contractor input to design. - The nature of risks is not fully realised at the point of award resulting in the potential for an increase in outturn cost and delays with completion. - A detailed design is required in advance of procurement. - The sequential nature of design/construction extends the delivery duration - Can create an adversarial relationship between the contract parties - Further detailed design post contract award may result in programme delays
Design and Build The main Contractor is appointed to design and construct the works. They act as a single point of responsibility for delivering the project. Either a single-stage or two-stage tender process can be used to procure and appoint.	- Integration of design and construction leads to efficiencies in cost and time - Single point of responsibility for the Client resulting in lower a potentially reduced Client risk profile - Stimulates innovation, reducing cost - Price certainty can be obtained before commencement - Risks are identified and allocated during the procurement phase	- Detailed design, specification or requirements are required - There is reduced competition with fewer companies interested - The Contractor takes on greater risk and price risk into the estimate (increasing scheme costs) - Lack of flexibility to change the specification - In-contract scope change can be expensive - Delay to the delivery programme to allow for Contractor design development - Quality may be overridden by cost-efficiency - Limited design liability

Procurement Strategy	Advantages	Disadvantages
Management Contracting The works are constructed by several different contractors who are contracted to a management contractor. The management Contractor is generally appointed by the client early in the design process	• Overlap of design and construction leads to time efficiencies • Management Contractor and works Contractors can contribute to design development • Works packages can be let competitively within shorter procurement windows and market reflective pricing at different stages • Allows for scope changes later in delivery with lower impact due to phased delivery approach of trade packages of work	• A high-quality design brief is required as design completion would overlap construction • Lack of price certainty before letting construction contract • Experienced management Contractor required to secure successful delivery • Delays to design completion can impact the schedule and be costly • Procurement of works Contractors can impact on schedule
Construction Management The client appoints a design team and Construction Manager to oversee the delivery of the works. The works are then constructed by several different trade Contractors. The Construction Manager role is to manage, programme and coordinate the design and construction	• Time-saving due to overlap between design and construction • Contractors and trades can contribute to the design phase • Clear roles and responsibilities • The direct contractual relationship between client and trade Contractors results in increased price/cashflow certainty • Allows for scope changes later in delivery within lower impact due to phased delivery approach of trade packages of work	• Price and time certainty is not available until all work packages have been let • A detailed and clear brief is required to ensure quality delivery • An experienced delivery team is required • High levels of informed and pro-active communication management are required for successful delivery
Partnering / Alliancing Development of cooperative and collaborative relationships to improve project delivery performance. Usually combined with a traditional construction procurement strategy to align clients and Contractors	• Reduction in the number of contractual disputes once collaborative relationships established • Allows for early supply chain involvement in the project • Based on an open book style and a win/win approach • Greater levels of design integration within the construction process	• Success depends on all partners acting in a similar spirit and abiding by the rules • Requires additional client inputs and resources compared to more traditional projects • There is a potential learning curve for inexperienced parties

4.9.3. This selection of the optimal construction delivery model would be explored further post-OBC in parallel with the packaging strategy development. A multi-criteria decision-making tool would be used to inform the selection of the contracting model.

4.10 Work Packaging Strategy

- 4.10.1. The packaging strategy refers to the process of breaking down the components of a project or programme into manageable work packages or units. This facilitates planning, scheduling, procurement, and execution of the programme. It involves a review to group activities or tasks which could be related or similar packages. By dividing the project into smaller, more manageable units, work packaging allows for better planning and allocation of resources, reduces dependencies, and enables parallel work streams to progress simultaneously.
- 4.10.2. The purpose of the work packaging strategy for the Making Connections programme is to facilitate efficiency, coordination, and productivity for the programme. The packaging strategy would consider a risk-based approach and is underpinned by the STZ and STM component architectures.
- 4.10.3. The outcome of this risk-based exercise might suggest potential benefits, in either grouping work packages, or breaking them down further. This approach is in-line with best practice considered by the IPA Route map's procurement module.

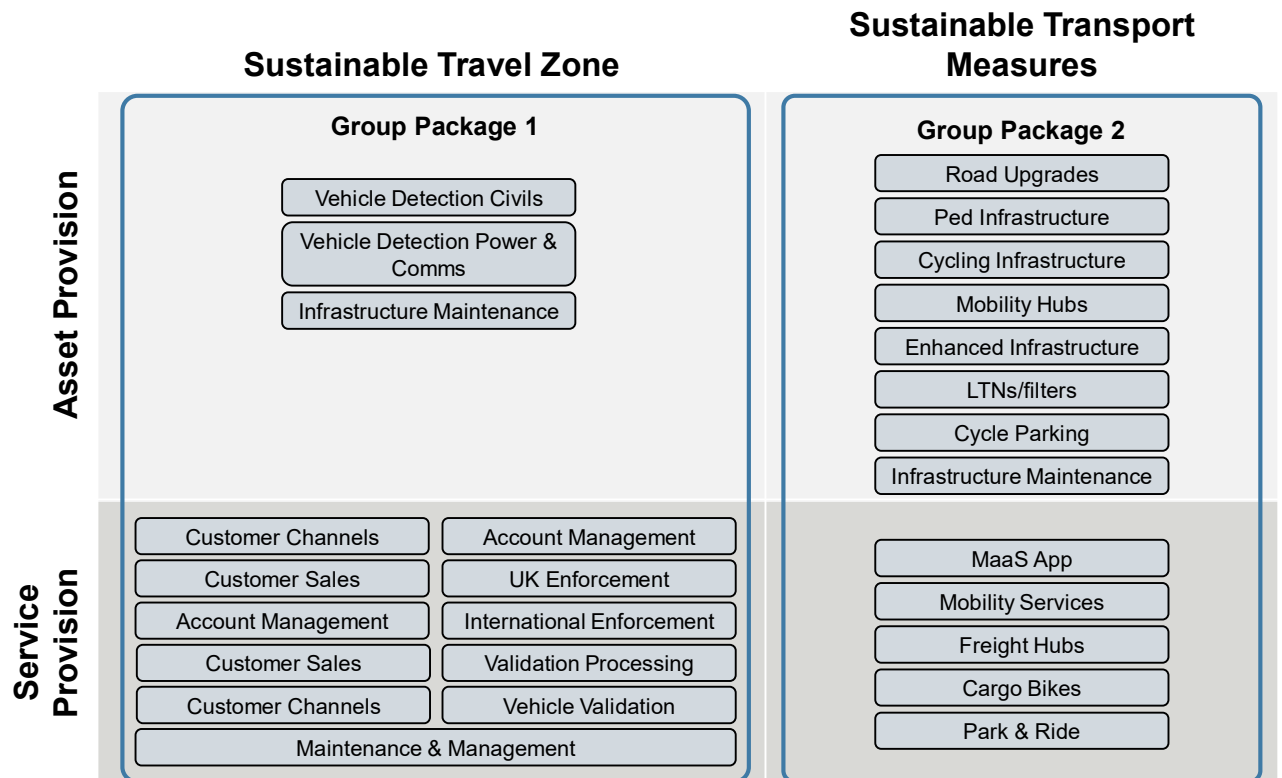
Outline Work Packaging Strategy

- 4.10.4. Two outline packaging proposals have been identified for the Making Connections programme. These have been developed on the basis that the STM and STZ would both largely be outsourced to the supply chain for delivery.

Option A – Vertical Packaging Strategy

- 4.10.5. A vertical packaging strategy groups both the asset and service provision components by STM and STZ 'projects'. The result of this is the grouping of the asset and service components. This is captured in Figure 4-7.

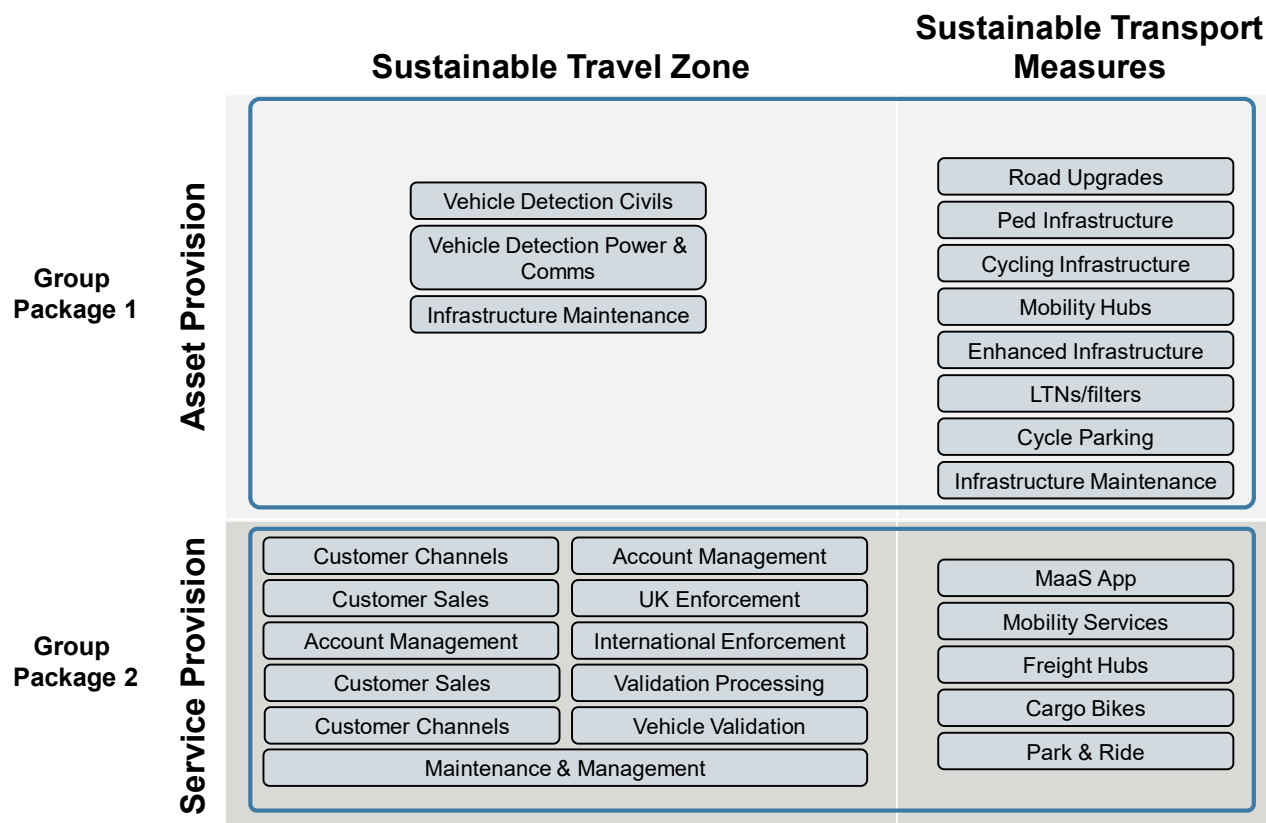
Figure 4-7 – Option A - Vertical Packaging Strategy



Option B – Horizontal Packaging Strategy

- 4.10.6. A horizontal packaging strategy would compile the asset provision components from both STZ and STM together and service provision components from both the STM and STZ together. This is captured in Figure 4-8.

Figure 4-8 – Option B - Horizontal Packaging Strategy



- 4.10.7. Post-OBC Option B would be explored further. Grouping the components by asset and service provision would favour the capability and capacity of the market. The Option A packaging strategy would likely reduce the value for money that CCC can achieve through the procurement process due to the need to traditional asset providers to partner with traditional service providers, likely where it is not needed.

- 4.10.8. The packaging strategy would be refined following a market testing exercise post-OBC.

4.11 Routes to Market

- 4.11.1. The size and complexity of the Making Connections programme provides several different routes to market for the procurement the Making Connections programme. This could include a new procurement exercise under the Public Contract Regulations (PCR) 2020 or the use of an existing framework.
- 4.11.2. A PCR compliant procedure would allow CCC to explore an open procedure, restricted procedure, competitive dialogue procedure or competitive procedure with negotiation. This

would provide CCC with flexibility to create a new framework to deliver the outputs of the programme. A supplier could qualify for the works through direct award or a later mini-competition for the packages of work.

- 4.11.3. Several factors would inform the choice of the most appropriate route to market. This would include the work packages being procured, how the route to market influences the risk allocation and pricing approach of the contract strategy and ensuring the route aligns with CCC's procurement objectives.
- 4.11.4. Likewise, CCC have access to existing frameworks. These existing frameworks would give CCC access to pre-qualified contractors to deliver the scheme, potentially offering the programme procurement speed and compliance. The existing frameworks available to CCC are captured over the following pages. These are separated by Consultancy and Construction frameworks.

PCR 2015/2020 Procurement Procedures

- 4.11.5. The new 'Find a Tender Service' (FTS) is the new UK e-notification service where notices for new procurements are required to be published in place of the Official Journal of the European Union's Tenders Electronic Daily (OJEU/TED).
- 4.11.6. This new publication applies to all public sector tenders valued above £4,733,252 (for infrastructure projects) which must be advertised.
- 4.11.7. Four options within the FTS procurement process have been considered:
- Open Tender
 - Restricted Tender
 - Competitive with Negotiation
 - Competitive Dialogue

- 4.11.8. These are described as follows:¹³⁰

Open Procedure

- 4.11.9. This procedure is often used for the procurement of commodity products which do not require a complex tender process in order to be purchased.
- 4.11.10. This procedure allows an unlimited number of interested parties to tender against defined parameters. There are no restrictions (e.g., pre-qualification) on the parties who are permitted to tender, meaning that some parties may not be suitable to carry out the work. This procedure is straightforward and transparent but can attract many potential bidders (which would require a greater degree of assessment and resource requirements).

¹³⁰ Adapted from https://www.procurementjourney.scot/sites/default/files/documents_library/Issue%20ITT%20-%20OJEU%20Process%20Timescales%20Document.pptx

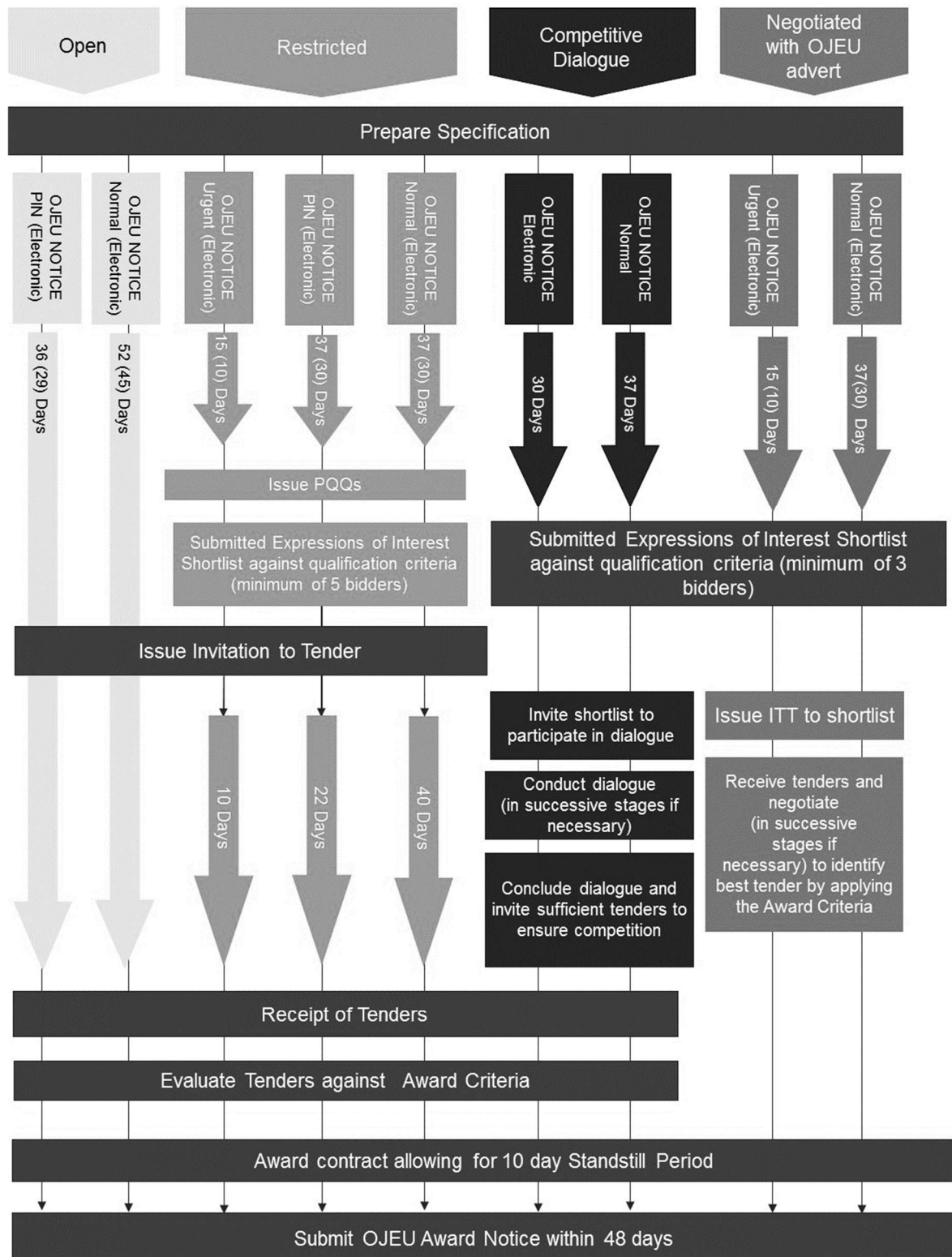
Restricted Procedure

- 4.11.11. This is a two-stage procedure. The first stage allows the contracting authority to set the minimum criteria relating to technical, economic and financial capabilities that the potential bidders must satisfy. Following evaluation of the responses to the first stage, typically five bidders (unless fewer qualify) are invited to tender in the second stage.

Competitive Dialogue

- 4.11.12. This procedure is appropriate for complex contracts where contracting authorities:
- are not objectively able to define the technical means capable of satisfying their needs or objectives, and/or
 - are not objectively able to specify the legal and/or financial make-up of a project.
- 4.11.13. This is a multi-stage procedure. The first stage is a pre-qualification to select the potential bidders to participate in the dialogue. In the second stage the contracting authority enters a dialogue with the potential bidders to identify and define the means best suited to satisfying their needs.
- 4.11.14. Any aspect of the contract may be discussed, including technical requirements for the works to be delivered and the commercial/contractual arrangements to be used. The dialogue may be conducted in successive phases with the remaining bidders being invited to tender. By the end of the dialogue phase the contracting authority's requirements would have been determined such that the scheme can be tendered. In the final stage, the remaining bidders from the dialogue phase are invited to tender for the scheme.
- 4.11.15. This procedure is used in more limited circumstances described in the Regulations and if the client is very clear about the requirement and does not wish to discuss alternative solutions then there is no need for dialogue.

Figure 4-9 – Public Contract Regulations 2015 - Procurement Routes



Competitive Procedure with Negotiation

- 4.11.16. This procedure is intended to be used where minimum requirements can be specified but negotiations with bidders may be needed to improve the initial tenders. The grounds for using this procedure are as follows:
- Where needs cannot be met without adaptation of readily available solutions.
 - Where the contract includes design or innovative solutions.
 - Where the requirement is complex in nature, in its legal and financial make-up or because of its risks.
 - Where the technical specifications cannot be established with enough precision.
 - In the case of unacceptable/irregular tenders.
- 4.11.17. Within this procedure, bidders initially submit tenders based on the information issued by the contracting authority. The contracting authority is then able to review the tenders it has received and negotiate with the bidders, following which the tenders would be resubmitted.
- 4.11.18. This procedure can only be used in the very limited circumstances described in the Regulations, generally where it is not possible to use either the Open or Restricted Tender route and would not be applicable to the award of the scheme. It may be appropriate where:
- The contracting authority is unable to produce an ITT / specification without discussing its needs in detail with suppliers (but iterative discussions with bidders should allow a detailed solution to be specified).
 - Where the solution is likely to be particularly complex and would require dialogue with bidders to conclude. The competitive dialogue procedure is generally used for complex procurements such as PFI / PPP projects.

The Procurement Bill

- 4.11.19. With the UK's departure from the European Union, the Cabinet Office is taking the opportunity to update public procurement legislation to improve the way it is regulated. This legislation is currently passing through Parliament with a 'go-live' date assumed during Q3 of 2024.
- 4.11.20. For Making Connections, these changes would potentially impact the way the programme undertakes a competitive tendering exercise. As a result, the timelines in Figure 4-2 would likely change. These impacts need to be monitored post-OBC and considered as part of the route to market selection.

Existing Frameworks

- 4.11.21. The frameworks accessible to CCC have been split by consultancy and construction services. These are shown in the tables below.

Table 4-10 – Consultancy Routes to Market

Consultancy Route	Overview	Value & Lots	Key Stakeholders
Eastern Shires Purchasing Organisation (ESPO)	ESPO is a public sector professional buying organisation (PBO), offering products and services across multiple framework categories. This includes Buildings, Energy, People & Professional Services and many others. Most of these frameworks are available free to use for Local Authorities, including People & Professional Services.	ESPO's Consultancy Services framework is arranged into 10 different lots and sub-lots. Each lot has access to many providers with experience delivering under that category. Where specialist advice is needed, a specific lot is available to address strategic projects.	Over 100 suppliers are on the framework with appropriate track record and experience to support the delivery of services.
Crown Commercial Services (CCS)	CCS is responsible for the legal framework for public sector procurement for the UK Government. CCS provides professional procurement services to the public sector to enable organisations to deliver improved value for money in their commercial activities and provide professional support, advising on technical issues, energy-saving and environmental improvements. Such quality and effectiveness should be achieved through competition.	The framework is arranged in 11 lots of varying levels of complexity and value of work from £0 – £3m up to £80m+.	£30 Bn Construction works and Associated Services 2 / Procure 23 (CWAS2/P23) Contract Was Awarded to 34 Suppliers for a period of 4.5 year
Joint Professional Services Framework (JPSF)	JPSF is Framework for use by Cambridgeshire County Council, the Greater Cambridge Partnership and the Cambridgeshire and Peterborough Combined Authority, to support transport infrastructure delivery.	N/A	N/A

Table 4-11 – Construction Routes to Market

Construction Route	Overview	Value & Lots	Key Stakeholders
Eastern Highways Alliance (EHA)	The EHA, Eastern Highways Framework 3 (EHF3), awarded in October 2020, covers 10 councils and includes schemes worth up to £30m such as roundabouts, cycle paths, new roads, and other infrastructure. Nine successful contractors have been awarded places on the framework, including	The framework is split into 3 lots of value £0 to £1.5 million, £1 million to £4.5 million and over £4 million respectively.	The EHA is led by Essex County Council on behalf of the EHA.

Construction Route	Overview	Value & Lots	Key Stakeholders
SCAPE	The Scape Civil Engineering and Infrastructure Framework is available to any local authority, Local Enterprise Partnership, and the wider public sector across England, Wales and Northern Ireland. It has been designed to accelerate infrastructure projects. Services qualifying for SCAPE include Site Investigation, Highways, Bridges, Structures, Flood Defence, Coastal Protection, Car Parks, Public Space.	The scope of the framework includes the following services with a project value between £50k and £100m+	Balfour Beatty was appointed as principal contractor to the £4bn framework in 2022.
Pagabo	Pagabo offers numerous frameworks in the Medium and Major Works, Demolition and Land Preparation, Civils and Infrastructure, Developer Led, Professional Services, Refit and Refurbishment, Furniture Solutions, Food Broker Services, Utilities Supply, ICT Solutions across Public and Private Sector Procurement Framework.	Pagabo is split across 19 different lots with unrestricted project value. Suppliers can be appointed nationally using Lot 1, or individually through Lots 2-19. This framework would run until April 2024.	The framework includes over 70 carefully selected providers across 7 regional areas.

4.12 Summary of Current Bus Commercial Structure

- 4.12.1. This section summarises the current situation in respect of the bus network including the regulatory model, service providers, vehicles, depots, and fares.

Regulatory Model

- 4.12.2. In common with most of the UK outside London, bus services in the Cambridge travel-to-work area are currently provided under the deregulated model established by the Transport Act 1985. The premise is that bus operators would provide the majority of bus services without subsidy in a contestable market. Bus operators are able to introduce new services, and amend or withdraw existing services, in response to changes in the market for bus travel or indeed in response to changes in the cost of provision or actions of competitors, subject to registration with the Traffic Commissioners.
- 4.12.3. The Transport Act recognises that some services considered socially necessary are not commercially viable and permits Local Transport Authorities (LTAs) to procure these under contracts and to provide subsidy.

Service Providers

- 4.12.4. Stagecoach East is the major provider of bus services in the Cambridge travel-to-work area, both commercially and under contract to the Cambridgeshire and Peterborough Combined Authority (CPCA) and other LTAs.

- 4.12.5. Whippet Coaches (part of the Ascendal Group) provides services under contract to the CPCA and the University of Cambridge. Stephenson's of Essex is the other medium-sized operator. Since October 2022 it has run services between Ely, Soham, Newmarket and Cambridge both commercially and under contract to the CPCA.
- 4.12.6. A few small operators (such as Dews Coaches, A2B Bus and Coach, Big Green Bus Company) are also in the market, providing services under contract to the CPCA.

Vehicles

- 4.12.7. At present bus operators fund their own fleet renewal, except in very particular circumstances. Outright ownership rather than leasing is the most common model in the deregulated market.
- 4.12.8. Of the current fleet of around 210 vehicles in the Cambridge travel-to-work area, 32 buses are now zero-emission at the tail-pipe following a successful 'ZEBRA' bid to government. These buses are operating primarily on the Cambridge Park and Ride services. In addition, 9 zero-emission buses are due to enter service in 2023 with Whippet Coaches on the 'Universal' service for the University of Cambridge. The remainder are diesel buses, the majority conforming to Euro standards IV, V and VI. The CPCA has an ambition for all buses to be zero emission by 2030.

Depots

- 4.12.9. Stagecoach East has two depots, one in Cambridge (Cowley Road) and one at Fenstanton, with an outstation at Haverhill. Whippet Coaches' depot is also at Fenstanton. The approximate allocation of vehicles at present is around 120 at Stagecoach's Cambridge depot (including the outstation), around 40 at Stagecoach's Fenstanton depot and around 10 at Whippet's Fenstanton depot employed on services in the Cambridge travel-to-work area.
- 4.12.10. Stagecoach's Cowley Road depot is known to be space-constrained and is subject to medium to long-term proposals to regenerate the Cowley Road area as envisaged in the draft Northeast Cambridge Area Action Plan. There is therefore a significant need for depot expansion to accommodate the c. 180 additional buses required by Making Connections bus network envisaged at consultation. Further, conversion to zero-emission would require investment in facilities to provide energy to battery-electric or hydrogen-electric buses.

Fares

- 4.12.11. Bus operators are currently able to specify the fares that they charge. The major operator, Stagecoach East, sets broadly two types of fare:
- A single fare which changes according to distance – though are currently subject to the Department for Transport's capped fare scheme. The maximum fare value increases from £2.00 to £2.50 in November 2023, and this runs to November 2024; and
 - A zone-based fare that applies to period products such as weekly tickets. Only two zones apply to the Cambridge travel-to-work area – one for Cambridge (Cambridge Megarider)

and the surrounding villages, and one beyond (Cambridge Megarider Plus). These are heavily discounted compared to the single fares that applied before the DfT's capped fare scheme.

- 4.12.12. Stagecoach applies a discount of around one-third to fares for passengers under 19.
- 4.12.13. Most fares on other bus services are broadly similar, but with some variation – for instance, some operators apply the young person's discount to passengers under 16 rather than under 19, and different approaches apply to the periodicity of season tickets. Fares on 'Universal', procured by the University of Cambridge and operated by Whippet Coaches, are significantly lower.
- 4.12.14. There is also a multi-operator fare, available as a day ticket and weekly ticket, across Cambridgeshire. Some services are excluded, and the price is at a significant premium over own-operator tickets, particularly for journeys within Cambridge.
- 4.12.15. Elderly and disabled people travel for free off-peak (defined as any time between 09:30 and 23:00 on weekdays, and any time at weekends). Bus operators are reimbursed for these journeys under the 'no better off, no worse off' principle.

4.13 Scope for Bus Commercial Improvements

- 4.13.1. This section summarises the commercial improvements proposed in respect of the existing bus network, congestion charging and complementary measures.
- 4.13.2. Bus Improvement Measures include considerations in respect of service output, vehicle acquisition and fare reductions.

Service Output

- 4.13.3. The bus service proposition for Making Connections is based on that developed by SYSTRA in its 'Future Bus Network Concept' of 2020 on behalf of the CPCA. With some modifications this formed the basis of public consultation by GCP at the end of 2022.
- 4.13.4. It represents a very significant increase in bus service output (a more than doubling of estimated doubling of bus hours and bus kilometres) while the number of vehicles required to service the network doubles from around 180 to around 360 buses.
- 4.13.5. Around 45 of these additional buses are required to provide services on the three busways currently being promoted by the GCP: Water beach to Cambridge, Cambourne to Cambridge and Cambridge and Southeast. It assumed that these three schemes and the busway services would be delivered independently of Making Connections. That leaves a balance of 135 buses required to deliver the additional services for Making Connections.

Table 4-12 – The Estimated Scale of Change with Making Connections

DERs	October 2022 Bus Network	Making Connections Baseline*	Making Connections Consultation Network
Fleet Vehicle Requirement	178	212	359
Annual bus km (m)	12.1	15.8	32.8
Annual bus hours ('000)	633	826	1,702

*Note: Making Connections baseline consists of the bus network in operation as at 31 October 2022 plus the three proposed busway schemes (C2C, Waterbeach – Cambridge and CSETS) plus services between Cambridge South West Travel Hub and Cambridge city centre.

4.13.6. It can be seen that the Making Connections consultation network increases the size of the fleet by around 150 buses over the Making Connections baseline, split in round terms:

- 100 for Cambridge city and interurban services, including those on existing busways.
- 15 for additional services on the three busways currently being promoted by GCP (in addition to the 45 estimated to be required for a basic level of service); and
- 35 for rural connector and demand-responsive transport buses.

Vehicle Acquisition

4.13.7. The CPCA has an ambition for the entire local bus fleet to be zero-emission by 2030. Whilst this ambition is separate from Making Connections, the procurement strategy for Making Connections needs to be developed with this objective in mind.

4.13.8. Discussion with the CPCA suggests that a grant-funding model is currently preferred to achieve a fleet conversion to zero-emission. A leasing model is more likely to deliver the speed and scale of change required to achieve a zero-emission fleet. This is based on two broad factors:

- The uncertainty associated with a competitive bidding process to central Government for grant funding; and
- The fact that ZEBRA is only intended to be one-off seedcorn rather than wholesale funding. It funds up to 75% of difference between a diesel bus and zero-emission bus capex and 75% of the charging equipment capex. It does not fund mid-life costs (notably battery replacement) or fleet renewal.

Depots

4.13.9. A strategy for the expansion in bus depot capacity to accommodate the increased numbers of buses focuses on areas where it is likely to be easier to recruit a suitable labour force and distributes depots around the Making Connections area. However, there would remain a significant requirement to base buses to service needs in Cambridge. New depots should be developed and owned by the CPCA to remove a barrier to market entry for operators who are not active in the Making Connections area.

Fares

- 4.13.10. *Making Connections* proposes to reduce and simplify existing fares. This introduces several issues around: income generation, ease of passenger use (considering prospective as well as established bus users), and the impact on bus journey speeds; the latter in particular would be influenced by the technologies available for fare collection. These would need to be addressed in the range of ticket products offered, the method of retail, and the fare values chosen for each fare product.
- 4.13.11. The current *Making Connections* proposition is that a £1.00 single fare is charged for journeys within Cambridge and £2.00 for journeys outside Cambridge, or for journeys from outside Cambridge into Cambridge.
- 4.13.12. The following assumptions have been applied in the associated Financial Dimension:
- The £1.00 fare applies to the current Stagecoach ‘Cambridge Megarider’ zone; and
 - The current concessional fare structure is retained, with fares on period and under-19 tickets falling by the same proportion as now, and reimbursement for free concessions (estimated to be around 20% - 25% of the total) also falling by the same proportion.
- 4.13.13. LTAs have an obligation to provide the English National Concessionary Travel Scheme at off-peak times; powers to extend this concession (by provision in the AM peak or to companions of disabled passholders); and powers to provide a concession to young people under the age 16 and to those aged 16 – 19 in further education.
- 4.13.14. LTAs also have powers under retained European Union legislation to subsidise capped public transport fares (EU 2007/1307). These are the powers that we understand that Government is utilising to deliver the current £2.00 (from November 2023 £2.50) capped fare scheme in England. However, there are no powers of compulsion, which is why not all operators participate in the government’s scheme.
- 4.13.15. LTAs have access to powers to make multi-operator ticketing schemes, subject to statutory guidance by the Competition and Markets Authority (the so-called ‘block exemption’). This guidance limits the extent to which LTAs can influence the price of multi-operator tickets. However, agreements made under Enhanced Partnerships are not subject to these restrictions, and by inference this can be used to influence the price of operator ‘own product’ tickets. However, this can only be done with the agreement of the Partnership (for example, an operator might agree to a fare reduction in response to the introduction of bus priority measures).
- 4.13.16. Cambridge and Peterborough Combined Authority (CPCA) is currently developing a business case on bus reform across the authority area. At the time of writing, the Outline Business Case is due to be subject to audit in the autumn of 2023 with public consultation late in 2023 / early 2024, with a Mayoral decision on whether to proceed expected in June 2024.

- 4.13.17. It is then currently expected that bus reform would be implemented in at least two tranches (likely to be based on geographical areas), with the first tranche by December 2024 and the second tranche by November 2025.
- 4.13.18. Successful delivery of bus reform would require the CPCA to:
- Specify bus services – routes, service durations, frequencies; and
 - Specify ticketing products and fares.
- 4.13.19. Clearly, both of these activities would be in response to the funds that the CPCA has available, and a potential process sees:
- CPCA designs and continually reviews its bus proposition, including the element that is in addition to ‘business as usual’ and funded by the road user charge; and
 - Cambridgeshire County Council (as operator of the road user charge) makes funds available to the CPCA for the elements of the bus service proposition funded by the road user charge, and in return, CPCA provides assurance to CCC on how the funds have been applied.
- 4.13.20. There are two scenarios where the CPCA may not be able to rely on bus reform to deliver the bus service and fare changes associated with Making Connections:
- The programme for decision-making and/or implementation is delayed; or
 - Enhancements to the bus service and fares are required in advance of the current proposed timescale – i.e. before December 2024 (first tranche) or November 2025 (second tranche).
- 4.13.21. The principle behind an EP is that local authorities and bus operators negotiate enhancements to the bus service offer, recognising that each side may have to go beyond business as usual to deliver enhancements that would benefit bus users and attract more passengers. For instance, an LTA may commit to delivering bus priority measures, and in return bus operators may commit to increasing services or participating in a multi-operator ticketing scheme. Whilst these commitments are negotiated, once agreed they become legally enforceable on both sides.
- 4.13.22. With its existing powers under EU1370/2007, the CPCA could continue the existing DfT capped fare scheme beyond its current expected expiry of November 2024, or could offer an enhanced capped fare (such as £1 within Cambridge). However, it would need to make an Enhanced Partnership to be able to enforce operator participation in the capped fare scheme.
- 4.13.23. Similarly, an Enhanced Partnership is the simplest and most flexible means of delivering a multi-operator scheme (or, preferably, one based on interoperable fares).
- 4.13.24. The machinery devised under the Transport Act 1985 remains the process for securing bus services in addition to those which are provided commercially. The main mechanism is bus service tendering, but regulations made under the Act allow LTAs to procure a proportion of bus services by direct award. Where the spend is more than £600,000 a year, LTAs may

spend up to 25% by direct award – otherwise known as ‘de minimis’. This is a useful means of delivering enhancements to commercial services – such as higher frequencies, or evening and Sunday enhancements. It means that the passenger’s relationship (fares and information) remains with one bus operator. Many of the service changes proposed by Making Connections fall into this category.

- 4.13.25. To illustrate this, a package of improvements focused on ‘access to Addenbrooke’s Hospital’ is recommended. In a low-spend scenario, around £2.1m of spend is on service enhancements best delivered by direct award, as these are frequency and service duration enhancements, and around £2m has the potential to be tendered. Assuming no change to the CPCA’s current spend (both by tender and by ‘de minimis’), it would be possible to spend around £1.7m by direct award and remain within the limit for ‘de minimis’ – leaving a gap of around £400,000 that it would potentially be difficult for the CPCA to disburse.
- 4.13.26. One means of mitigating the potential downsides of tendering for enhancements on existing bus services is to ensure that an interoperable ticketing scheme is in place. This removes the potential for passengers to have to pay separately for travel on the tendered service and on the commercial service. A commitment under an EP for operators to advertise each other’s services on the same route or corridor addresses the issue that having more than one operator on a bus route complicates passenger information. This makes tendering for early morning and late evening enhancements more acceptable. It doesn’t, however, overcome the commercial difficulty involved in tendering a frequency enhancement. In the example set out above, it makes only a small difference to the scope to secure services by ‘de minimis’.

4.14 Commercial Strategy

- 4.14.1. The commercial strategy outlines how the client intends to contract with the supply chain. It summarises the role the supply chain would play, how it would be paid and the proposed risk allocation between the contract parties. The following section introduces CCC’s approach to risk allocation, discusses their pricing approach and introduces the preferred payment mechanism for the programme.
- 4.14.2. When selecting a preferred contracting model, the programme would consider the advantages and disadvantages of each model against the proposed Target Operating Model for the asset and service and the proposed delivery model for its development. The contracting model for the operations and maintenance phase can be selected once the Target Operating Model is fully defined.

Contracting Model

- 4.14.3. The selection of a preferred contracting model should be informed by the client’s appetite towards risk, the clarity and detail of its requirements, the capability and capacity of the market and the overall scheme contract packaging.

Form of Contract

4.14.4. For civil engineering works in the UK, there are two main forms of contract: The New Engineering and Construction (NEC) Contract suite of contracts; or the Institution of Civil Engineers (ICE) Conditions of Contract, which since August 2011 has been rebadged as the Infrastructure Conditions of Contract (ICC). These two options are discussed in more detail below.

New Engineering and Construction (NEC) Contract

- 4.14.5. The NEC Contract is a modern-day suite family of contracts that facilitates the implementation of sound project management principles and practices as defining legal relationships.
- 4.14.6. Key to the successful use of NEC is users adopting the desired behaviours from each party. The main aspect of this transition is moving away from a reactive and hindsight-based decision-making arrangement to one that is foresight based encouraging a creative environment with pro-active and collaborative relationships.
- 4.14.7. The contract has been developed to make improvements to more traditional forms of contract under three fundamental main headings:
- Flexibility – can be used in a wide variety of commercial situations for procuring a diverse range of works, services, and supply in any location.
 - Clarity and simplicity – NEC contracts are written in ordinary language using words, which are in common use to promote understanding.
 - Stimulus to good management – designed so that its implementation contributes to rather than detract from the effectiveness of the management of the work.
- 4.14.8. The NEC suite of contracts is broken down into three areas Works, Service and Supply. The table below outlines the suite of NEC Contracts and guidance on when to use each.

Table 4-13 – Types of NEC Works Contracts

NEC Contract	Abbreviation	When to use it
NEC Engineering and Construction Contract	ECC	For the appointment of a contractor for engineering and construction work, including any level of design responsibility.
NEC Engineering and Construction Subcontract	ECS	As a subcontract to the ECC, for the appointment of a subcontractor for engineering and construction work.
NEC Engineering and Construction Short Contract	ECSC	As an alternative to the ECC, for the appointment of a contractor for straightforward engineering and construction work which does not require sophisticated management techniques and imposes only low risk on both the client and contractor.
NEC Engineering and Construction Short Subcontract	ECSS	As a subcontract to the ECC or ECSC, for the appointment of a subcontractor for straightforward engineering and construction work which does not require sophisticated management techniques and

NEC Contract	Abbreviation	When to use it
		imposes only low risk on both the contractor and subcontractor.
NEC Design Build and Operate Contract	DBOC	For the appointment of a contractor to design, build and operate or maintain an asset over a defined period.
NEC4 Service Contracts	-	Services contracts available to appoint suppliers for the delivery of professional services with varying complexity, risk profile and timeframes.

Adapted from NEC4 Establishing a procurement and Contract Strategy – Volume 1

- 4.14.9. For single one-off complex engineering and construction projects with Contractor designed elements, the NEC Engineering and Construction Contract is usually selected as it provides a contract which provides a variety of options with different approaches to pricing, risk management, payment and delivery. The NEC ECC has six main options which are outlined in Table 4-14.

Table 4-14 – NEC ECC Main Options

Main Option	When to use it
Option A – Priced contract with activity schedule	This option is suited to projects where the scope is well defined, and a Contractor can price detailed activities. The Contractor bears the financial and delivery risk of Providing the Works in accordance with the Scope.
Option B – Priced contract with bill of quantities	This option is also suited to projects where the scope is well defined, and a Contractor can price detailed activities. However, it includes a remeasurement payment mechanism to assess the Price of work completed where the Scope included the scope of work but does not include detailed quantities. The Contractor bears the financial and delivery risk of Providing the Works in accordance with the Works Information and the agreed rates and the Client bears the financial risk of fluctuations in quantities of work completed.
Option C – Target contract with activity schedule	This option is used where the extent of the work to be done is not completely defined and uncertainty and high levels of delivery risk are present. Both client and contractor share the financial risk. Payment is based on the completion of activities on an activity schedule.
Option D – Target contract with bill of quantities	This option is also used where the extent of the work to be done is not completely defined and uncertainty and high levels of delivery risk are present. Both client and contractor share the financial risk. Payment is based on a re-measurable bill of quantities.
Option E – Cost reimbursable	This option is used when the works required cannot be defined sufficiently to inform even a target price. The Client bears the financial risk as the scope is not clearly defined prior to commencing the contract. The Contractor is paid their 'Defined Cost' plus fee.
Option F – Management contract	This option is used when a management contracting approach is required. The Contractor is paid a fee based on the work completed by Subcontractors and bears the risk of subcontractor's delivery in line with the Scope.

Adapted from NEC4 Establishing a procurement and Contract Strategy – Volume 1

- 4.14.10. Where a service needs to be delivered over a defined period of time, the NEC4 Service Contract is available. There are seven Service Contracts which is shown in Table 4-15.

Selection of the appropriate option depends on several factors, including type of service and risk profile.

Table 4-15 – NEC4 Service Contract Options

Main Option	When to use it
PSC	This option is used for the appointment of a supplier to provide professional services. Its use is not limited to projects where other NEC contracts are being used.
PSS	This option is used for the appointment of a subcontractor to provide professional services.
PSSC	This option is used as an alternative to the PSC, PSSC can be used for the appointment of a supplier for the provision of straightforward professional services which do not require sophisticated management techniques and impose only low risk on both parties.
FMC	This option is used for the appointment of a supplier for a definite period to manage and provide facilities management services.
FMS	This option is used for the appointment of a subcontractor for a defined period to manage and provide facilities management services. The FMS can be used as a subcontract to several other NEC4 contracts.
FMSC	This option is used as an alternative to the FMC, for the appointment of a supplier for a defined period to manage and provide straight forward facilities management services which do not require sophisticated management techniques and impose only low risk on both parties.
FMSS	This option is used for the appointment of a subcontractor for a defined period to manage and provide straightforward facilities management services which do not require sophisticated management techniques and impose only low risk on both parties.

Infrastructure Conditions of Contract (ICC)

- 4.14.11. The ICE Conditions of Contract were republished by Thomas Telford in 2011 as the Infrastructure Conditions of Contract (ICC). The standard suite of ICC contracts is outlined in Table 4-16 below.

Table 4-16 – Types of ICC Works Contracts

ICC Contract	When to use it
ICC Design and Construction Version	In this version, the contractor is responsible for the design and construction of the works. Contracts are lump sum with no remeasurement.
ICC Target Cost Version	This version encourages the contractor to be more involved in early design and planning. It provides incentivisation for both the employer and contract to share profits or loss compared to the agreed Target cost.
ICC Term Version	This version uses work orders to accommodate rolling renewal and replacement works and is based on re-measurement or lump-sum payment.
ICC With Quantities Version	This version is shorter than the measurement version and is intended for Engineer/Consultant designed works whilst acknowledging and providing for an element of Contractor design.

ICC Measurement Version	This version is based on traditional engineer designed, contractor-built works. Payment is on a remeasurement basis.
ICC Minor Works Version	Shortened version to cover minor works.

Risk Allocation

4.14.12. CCC's approach to risk allocation is driven by the organisations collective experience of major project delivery, including recent experience delivering highways schemes. The authority's appetite and desires are to promote an approach to risk allocation which is open and allocates the risk based on the party best placed to manage the identified commercial risks.

4.14.13. Table 4-17 considers CCC's risk allocation position.

Table 4-17 – Risk Allocation Table

Risk theme	Allocation		
	Client	Shared	Supply chain
Description			
Data accuracy – Inaccurate/ incomplete data may be provided to bidders during the procurement exercise leading to inaccurate pricing or solution	x		
Inflation risk - the cost of supplier's 'inputs' might rise over time due to inflation			x
Performance risk - risks that the services may not be delivered to the requisite performance/availability levels			x
Volume/Demand risk - Risk that the actual usage of the service varies from the levels forecast	x		
Currency risk - Risk that the cost of supplier's inputs would rise due to fluctuations in foreign exchange rates			x
Changes in the law risk - Risk that a specific change in law affects the supplier's ability to deliver any aspect of the contract to requirement time, budget and performance		x	
Solution/Design risk - Risk that the services have/project has not been designed adequately for the purpose required	x		
Delivery risk - Risk that the design and build phase of the project runs behind the planned timescales		x	
Scope change risk - Risk of a change in requirements or scope over the course of the Project			x
Supplier default risk - Risk of losses to the Contracting Authority as a result of supplier defaults e.g. data loss		x	
Termination risk - Risk that the programme would terminate (or partially terminate) the contract early i.e. before the end of the initial contract term		x	
Subcontractor insolvency risk - Risk that a subcontractor within the supplier's or subcontractors' supply chain becomes insolvent during the contract Term			x

Industrial action risk - Risk of industrial action by any of the supplier's staff			x
Unforeseen events risk (force majeure) - risk of unforeseen events affecting the supplier's ability to deliver any aspect of the contract to requirement time, budget and performance		x	

4.14.14. Currently, it is assumed that CCC would own the data accuracy, volume/ demand, Solution/Design risks, where appropriate. These risks are likely to be best placed managed and mitigated by CCC, rather than the supply chain.

4.14.15. For risks associated with inflation, performance, and currency, CCC would look to transfer these risks to the supply chain. CCC would also seek to share the risk of change in the law with the supply chain on an individual case by case basis. Where the change is uncontrollable by the supply chain, CCC would take ownership.

Pricing Approach & Payment Mechanism

4.14.16. CCC's approach to pricing and payment mechanisms would depend on the complexity and size of the work packages which develop. Again, this is based on recent delivery experience and CCC's desire to achieve value for money and apportion risk appropriately.

4.14.17. The pricing approach is driven by the degree of control sought over how something is delivered. Where the level of control sought is higher, an input-based approach is more likely to be appropriate while the greater the level of innovation sought is likely to drive an outcome-based approach.

Table 4-18 – Different Pricing Approaches

Pricing Approach	Description	Level of Risk Transfer to the Supplier
Firm Price	Charges would not be subject to increase due to indexation	High
Fixed Price	Charges would be subject to increase due to indexation	Medium / High
Cost Plus	Allows for the supplier to recover all actual costs incurred for the management and delivery of the services including overheads with an additional profit margin applied	Low
Time & Materials (T&M)	As for cost plus but T&M is normally based on a pre-agreed rate card plus an agreed profit applied to costs	Low

4.14.18. Previously, CCC have tended to agree fixed and firm price contracts in delivering smaller packages of works. This has been driven by the appetite to complete detailed design before inviting contractors to price delivery. Where the complexity has increased, a target cost approach has been preferential – supporting the promotion of innovation from the supply

chain. The payment mechanism is used to allocate the burden of delivery risk and incentivise the supplier to deliver to time and quality. The most appropriate would consider the outcomes of the risk allocation exercise while also understanding the following:

- Whether the pricing applies to inputs or outputs/outcomes (along this range, there is increasing risk transfer to suppliers, their payment being increasingly contingent on results).
- Whether the pricing applies to projects (with suppliers incentivised to deliver on time and budget e.g. by applying delay payments applied for late delivery of milestones) or for services (with suppliers incentivised to deliver expected quality by applying service credits for underperformance).

Table 4-19 – Payment Mechanisms

Payment Mechanism	Description	Level of Risk Transfer to the Supplier
Volume Based	The amount paid to the supplier varies according to how much the service is used, typically on a price per unit basis (but can be combined with a fixed element to cover any fixed costs)	Low to High
Payment by Results (Outcome based contracting)	A variant on the volume-based payment mechanism but rather than the amount paid to the supplier varying by usage, the amount paid varies by outcome achieved by the supplier	Medium to High
Guaranteed maximum price with target cost (Target Cost Incentive Fee)	Based on a 'target cost' and a 'guaranteed maximum price,' under this mechanism, there is gain and pain share between the parties depending on the extent to which there is a difference between actual costs and the target cost. The supplier is wholly responsible for costs above the guaranteed maximum price.	Medium to High

- 4.14.19. CCC's preferred payment approach is to agree either a schedule of lump sums or a Guaranteed Maximum Price with Target Cost Incentive Fee for asset delivery depending on the work package type and complexity. This approach would involve a "gain and pain" share between the parties, with incentivisation payments based on performance.

4.15 Human Resources Issues

- 4.15.1. The potential for human resource issues would be explored in further detail post-OBC during the development of the STM and STZ delivery models. With the proposed delivery model for STM following existing outsourcing practices it is current assumed that there would be no human resource issues in the implementation of the delivery model.

4.16 Contract Management

- 4.16.1. The outsourced contracts for the STZ and STM would be delivered in line with existing CCC contract management processes and procedures. Further detail on applicable processes and procedures would be confirmed at FBC.

4.17 Summary of Commercial Dimension

- 4.17.1. This Commercial Dimension summarises the procurement and contract strategies for the Making Connections programme. It considers the procurement objectives and an initial procurement model which aligns to the sustainable procurement policy of CCC and supports the development and delivery of the programme.
- 4.17.2. Following a delivery model assessment, an outsourced model has been proposed for further development post OBC for the STZ and STM. In parallel with the delivery model assessment, an initial work packaging strategy and a contract delivery model long list have been developed. These would be refined post-OBC in line with the contracting strategy development.
- 4.17.3. With the initial proposal to outsource the STZ and STM, no human resource issues are currently envisaged. However, this would need to be iterated as the delivery model is refined further.

5 Financial Dimension

5.1 Introduction

- 5.1.1. The Financial Dimension outlines the expected costs, funding arrangements and overall affordability of the Making Connections programme.
- 5.1.2. The Outline Business Case (OBC) Financial Dimension would:
- Summarise the source of funding available to the Making Connections programme;
 - Outline the projected affordability of the proposed Sustainable Travel Zone by analysing its estimated costs, revenues and risks;
 - Demonstrate that the proposed Bus Improvement Measures and Sustainable Transport Measures can, net of Sustainable Travel Zone expenditure, ultimately be funded from a combination of the GCP City Deal funding and the net financial proceeds of the STZ;
 - Show how the proposed STZ generates adequate funding for Bus Improvement Measures and Sustainable Transport Measures whilst balancing the affordability challenges of road users, particularly during the early (implementation) years of the scheme; and
 - Provide a high level commentary on any potential subsidy control implications.

Inherent uncertainties in revenue and cost estimating have been reflected in a range of sensitivities to measure potential upside and downside scenarios.

5.2 What is Required at this Stage?

- 5.2.1. The DfT's Transport Business Case Guidance outlines the areas that should be completed in the OBC Financial Dimension. Table 5-1 indicates where these requirements are met in this document.

Table 5-1 – Contents of the Financial Dimension

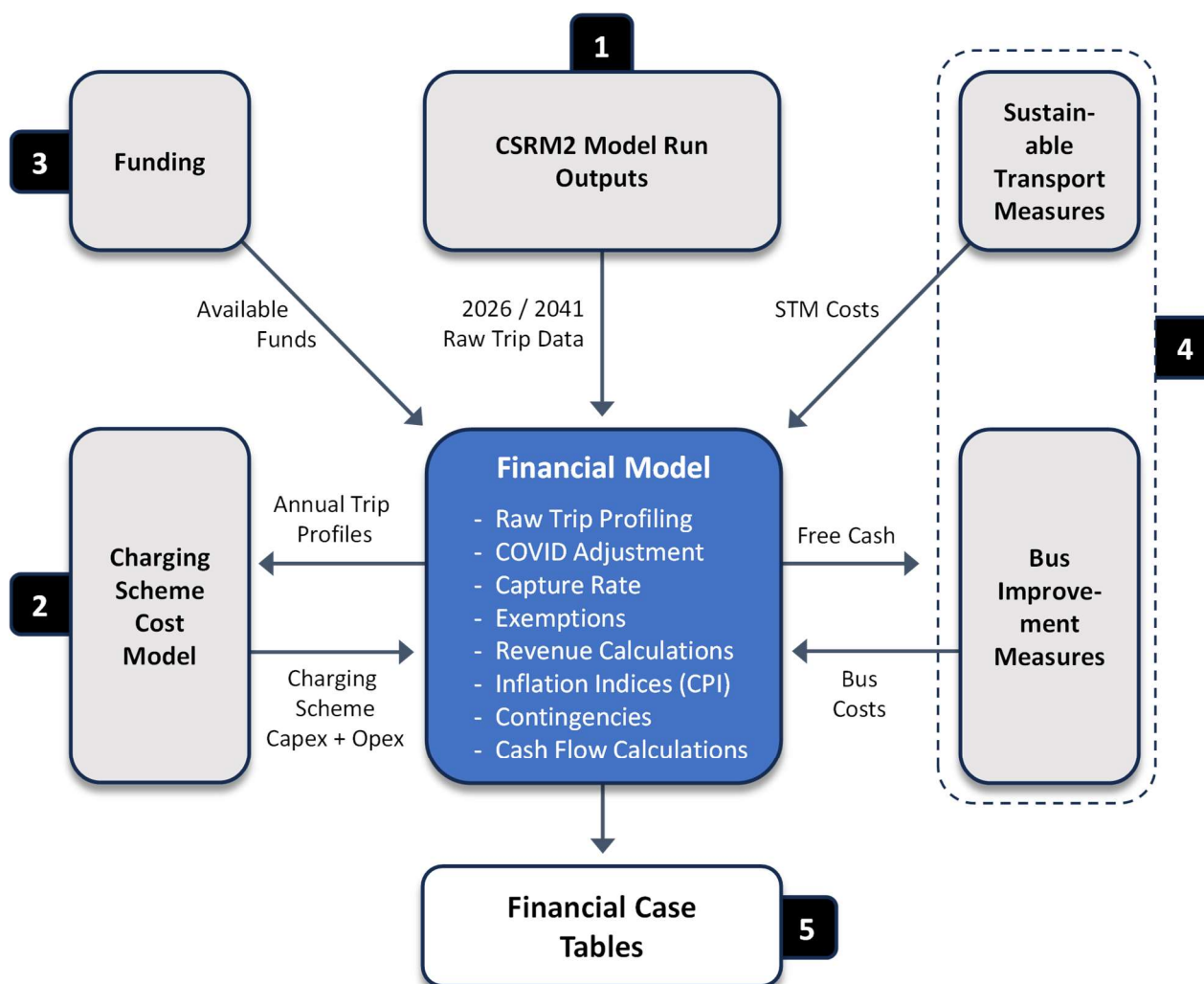
Content	DfT Requirements	Section
Introduction to Affordability	Outline the approach taken to assess affordability	0
Budget and Funding Cover	Provide analysis of the budget and funding cover for the proposal: set out, if relevant, details of other funding sources (for example, third-party contributions, fees).	5.4
Costs	Provide details of the expected whole life costs, when they would occur, breakdown and profile of costs by those parties on whom they fall and any risk allowance that may be required.	5.8

- 5.2.2. Additionally, in Section 5.11 of the Financial Dimension, a high-level commentary on any potential subsidy control implications is included. This would be updated at the Final Business Case (FBC) stage together with the addition of commentary on any potential tax and accounting considerations.

5.3 Financial Dimension Approach

- 5.3.1. The analysis outlined in this Financial Dimension is underpinned by a financial model developed specifically to assess the affordability of, and the net revenues generated by, the STZ. The financial model is fed by a range of assumptions in respect of trip volumes, daily charges, revenues, capital costs and operating costs.
- 5.3.2. Separately, high level cost estimates have been developed for the Bus Improvement Measures and the Sustainable Transport Measures and these are compared against the aggregate of the funding remaining after the STZ capital expenditure and the operating income generated by the STZ. A bottom-line net cash flow position is then calculated for the Making Connections programme to determine what, if any, funding shortfall remains.
- 5.3.3. A summary of the flow of data, including calculations carried out within the financial model itself, is shown in Figure 5-1.

Figure 5-1 – Financial Data Flow Chart



- 5.3.4. Data is summarised here for the initial period of the Making Connections programme and covers a period from 2024 to 2036 such that a minimum of 10 years of Sustainable Travel Zone revenues are shown in every scenario.
- 5.3.5. All values included in the Financial Dimension, including totals, are taken from source data outputs and then rounded to the nearest one decimal place.

5.4 Funding Assumptions

- 5.4.1. The key assumptions with regard to funding sources is that all initial funding would come from the GCP City Deal funds.
- 5.4.2. The first £50 million of the GCP City Deal funding is assumed to be sunk investment in the Bus Improvement Measures, i.e., it is non-recoverable. The forecast funding requirement over and above this £50 million in the initial years would also come from the GCP City Deal funding. This additional funding would be recoverable from STZ net revenues, repayable to GCP before the end of 2029 to allow delivery of wider programme commitments. After 2030, when GCP may cease to exist, there would be further income which would offset the initial £50 million but the assumption is that this would be allocated to future Sustainable Travel Measures over and above those currently planned.
- 5.4.3. Modest reserving of free cash is applied in some periods and used to fund expenditures in future periods. This approach allows for the forecast expenditure on Bus Improvement Measures and Sustainable Transport Measures to be smoothed.
- 5.4.4. Net revenues raised from the STZ are hypothecated in line with the Transport Act 2000 powers for spending associated with achievement of the County Council's local transport policies such as the bus improvement measures and the STMs.
- 5.4.5. No additional sources of funding are identified as being required in the current Financial Dimension.

5.5 Sustainable Travel Zone Financial Assumptions

- 5.5.1. The Financial Dimension provides summaries of five discrete scenarios: the Consultation Proposal, Scenario 1, Scenario 1A, Scenario 2, and Scenario 3.

Inflation Assumptions

- 5.5.2. Inflation assumptions are the same for all scenarios. The consumer price index (CPI) is applied to revenues and costs based upon historic and forecast CPI values by the Office for Budget Responsibility (OBR).
- 5.5.3. Actual data and forecast CPI data are produced by the OBR on a quarterly basis in respect of the previous twelve months. The financial model applies a four-quarter average in respect of each modelled year. A long-term rate of 2% is assumed for 2028 and beyond.
- 5.5.4. Key inflation assumptions are listed in Table 5-2 below:

Table 5-2 – Key Inflation Assumptions

Inflation (Annual %)	2023	2024	2025	2026	2027	2028+
Consumer Price Index (OBR)	6.2%	0.9%	0.1%	0.5%	1.6%	2.0%

5.5.5. Daily charge rates are first inflated in 2030 (with an assumed base date of 2027) and every three years thereafter.

5.5.6. Sustainable Travel Zone costs are inflated every year with an assumed base date of 2022.

Trip and Revenue Assumptions

5.5.7. Key trip and revenue assumptions relevant to each scenario are listed in Table 5-3 below.

Table 5-3 – Key Trip and Revenue Assumptions

Trip and Revenue Assumption	Consultation Proposal	Scenario 1	Scenario 1A	Scenario 2	Scenario 3
Days per Year of Charge	252	252	252	252	252
First Year of Charge	2026	2027	2027	2026	2027
Time of Day of Charge	2026: AM peak 2027+: All day	2027+: AM/PM peaks	2027+: AM/PM peaks	2026: AM peak 2027+: All day	2027+: AM/PM peaks
Daily Charge Rate (at Base Date)	Car £5.00 LGV £10.00 HGV £50.00	Car £5.00 LGV £10.00 HGV £50.00	Car £5.00 LGV £10.00 HGV £50.00	Car £5.00 (+ light vans) LGV £10.00 HGV £50.00	Car £3.00 LGV £10.00 HGV £50.00
Daily Trips (before discounts / exemptions)	AM Peak	AM/PM Peaks	AM/PM Peaks	AM Peak	AM/PM Peaks
	<u>2026</u> <u>2041</u> Car 26,798 32,751 LGV 5,861 7,072 HGV 791 818	<u>2026</u> <u>2041</u> Car 44,294 55,034 LGV 7,623 9,199 HGV 881 933	<u>2026</u> <u>2041</u> Car 44,294 55,034 LGV 7,623 9,199 HGV 881 933	<u>2026</u> <u>2041</u> Car 26,798 32,751 LGV 5,861 7,072 HGV 791 818	<u>2026</u> <u>2041</u> Car 54,855 65,408 LGV 7,630 9,211 HGV 895 967
	Total 33,450 40,641	Total 52,798 65,166	Total 52,798 65,166	Total 33,450 40,641	Total 63,380 75,586
	All Day			All Day	

Trip and Revenue Assumption	Consultation Proposal	Scenario 1	Scenario 1A	Scenario 2	Scenario 3
	20262041 Car67,94487,484 LGV14,99818,105 HGV1,8631,970			20262041 Car67,94487,484 LGV14,99818,105 HGV1,8631,970	
	Total84,805107,559			Total84,805107,559	
COVID Trip Adjustment	All daily trips are reduced by 10% to reflect post-COVID trip reductions	All daily trips are reduced by 10% to reflect post-COVID trip reductions	All daily trips are reduced by 10% to reflect post-COVID trip reductions	All daily trips are reduced by 10% to reflect post-COVID trip reductions	All daily trips are reduced by 10% to reflect post-COVID trip reductions
License Plate Read Charge Exemption	5% of all trips are assumed to be exempt from the charge due to a failure to accurately record the licence plate	5% of all trips are assumed to be exempt from the charge due to a failure to accurately record the licence plate	5% of all trips are assumed to be exempt from the charge due to a failure to accurately record the licence plate	5% of all trips are assumed to be exempt from the charge due to a failure to accurately record the licence plate	5% of all trips are assumed to be exempt from the charge due to a failure to accurately record the licence plate
Global Exemption (proxy for discounts, exemptions and reimbursements)	20% of all trips are assumed to be exempt from the charge	20% of all trips are assumed to be exempt from the charge	20% of all trips are assumed to be exempt from the charge	20% of all trips are assumed to be exempt from the charge	20% of all trips are assumed to be exempt from the charge
Hospital Charge Exemption (patients, visitors and staff parking – cars only)	None	2,750 car trips per day (693,000 per year) are assumed to be exempt from the charge	None	None	2,750 car trips per day (693,000 per year) are assumed to be exempt from the charge

Trip and Revenue Assumption	Consultation Proposal	Scenario 1	Scenario 1A	Scenario 2	Scenario 3
Free Days Exemption (applies only to car trips that are attached to an account)	None	None	2027+: 50 days per year	2026: 180 days per year 2027: 180 days per year 2028: 100 days per year 2029: 50 days per year 2030+: 0 days per year	2026: 180 days per year 2027: 180 days per year 2028+: 0 days per year
SME Daily Charge Discount	None	None	50% daily charge discount applied to 57% of LGV trips 50% daily charge discount applied to 35% of HGV trips	None	None
Penalty Charge Notices	Revenues and costs associated with PCNs are excluded from cash flows	Revenues and costs associated with PCNs are excluded from cash flows	Revenues and costs associated with PCNs are excluded from cash flows	Revenues and costs associated with PCNs are excluded from cash flows	Revenues and costs associated with PCNs are excluded from cash flows
Risk Adjustment	Net revenues are reduced by a 20% contingency	Net revenues are reduced by a 20% contingency	Net revenues are reduced by a 20% contingency	Net revenues are reduced by a 20% contingency	Net revenues are reduced by a 20% contingency

- 5.5.8. Gross trip volumes for the years 2026 and 2041 have been determined from traffic modelling outputs with trip volumes between 2026 and 2041 calculated using straight-line interpolation.

5.5.9. Estimated annual Sustainable Travel Zone chargeable trips over the period to 2036 are shown in Table 5-4 below:

Table 5-4 – Estimated annual Sustainable Travel Zone chargeable trips

Annual Net Chargeable Trips (millions of trips)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Summary of All Scenarios														
Consultation Proposal	0.0	0.0	5.8	14.9	15.1	15.4	15.7	15.9	16.2	16.4	16.7	17.0	17.2	166.3
Scenario 1	0.0	0.0	0.0	8.5	8.7	8.8	9.0	9.1	9.3	9.4	9.5	9.7	9.8	91.9
Scenario 1A	0.0	0.0	0.0	6.6	6.7	6.8	6.9	7.0	7.1	7.2	7.3	7.4	7.5	70.7
Scenario 2	0.0	0.0	3.2	7.1	8.5	11.7	15.7	15.9	16.2	16.4	16.7	17.0	17.2	145.6
Scenario 3	0.0	0.0	0.0	6.5	5.9	10.7	10.8	10.9	11.1	11.2	11.4	11.5	11.6	101.6

Annual Chargeable Trips (millions of trips)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Consultation Proposal														
Cars	0.0	0.0	6.8	17.5	17.8	18.1	18.4	18.8	19.1	19.4	19.7	20.1	20.4	196.0
LGVs	0.0	0.0	1.5	3.8	3.9	3.9	4.0	4.0	4.1	4.1	4.2	4.2	4.3	42.1
HGVs	0.0	0.0	0.2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5.0
Gross Chargeable Trips	0.0	0.0	8.4	21.8	22.1	22.5	22.9	23.3	23.7	24.0	24.4	24.8	25.2	243.2

Annual Chargeable Trips (millions of trips)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Consultation Proposal														
COVID Adjustment	0.0	0.0	-0.8	-2.2	-2.2	-2.3	-2.3	-2.3	-2.4	-2.4	-2.4	-2.5	-2.5	-24.3
Licence Plate Read Exemption	0.0	0.0	-0.4	-1.0	-1.0	-1.0	-1.0	-1.0	-1.1	-1.1	-1.1	-1.1	-1.1	-10.9
Global Exemption	0.0	0.0	-1.4	-3.7	-3.8	-3.9	-3.9	-4.0	-4.0	-4.1	-4.2	-4.2	-4.3	-41.6
Hospital Charge Exemption (n/a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Free Days Exemption (n/a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SME Discount (n/a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Chargeable Trips	0.0	0.0	5.8	14.9	15.1	15.4	15.7	15.9	16.2	16.4	16.7	17.0	17.2	166.3

Annual Chargeable Trips (millions of trips)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Scenario 1														
Cars	0.0	0.0	0.0	11.3	11.5	11.7	11.9	12.1	12.2	12.4	12.6	12.8	13.0	121.5
LGVs	0.0	0.0	0.0	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.2	20.7
HGVs	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	2.3
Gross Chargeable Trips	0.0	0.0	0.0	13.5	13.7	13.9	14.1	14.3	14.6	14.8	15.0	15.2	15.4	144.5

Annual Chargeable Trips (millions of trips)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Scenario 1														
COVID Adjustment	0.0	0.0	0.0	-1.4	-1.4	-1.4	-1.4	-1.4	-1.5	-1.5	-1.5	-1.5	-1.5	-14.4
Licence Plate Read Exemption	0.0	0.0	0.0	-0.6	-0.6	-0.6	-0.6	-0.6	-0.7	-0.7	-0.7	-0.7	-0.7	-6.5
Global Exemption	0.0	0.0	0.0	-2.3	-2.3	-2.4	-2.4	-2.5	-2.5	-2.5	-2.6	-2.6	-2.6	-24.7
Hospital Charge Exemption	0.0	0.0	0.0	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-6.9
Free Days Exemption (n/a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
SME Discount (n/a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Chargeable Trips	0.0	0.0	0.0	8.5	8.7	8.8	9.0	9.1	9.3	9.4	9.5	9.7	9.8	91.9

Annual Chargeable Trips (millions of trips)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Scenario 1A														
Cars	0.0	0.0	0.0	11.3	11.5	11.7	11.9	12.1	12.2	12.4	12.6	12.8	13.0	121.5
LGVs	0.0	0.0	0.0	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.2	20.7
HGVs	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	2.3
Gross Chargeable Trips	0.0	0.0	0.0	13.5	13.7	13.9	14.1	14.3	14.6	14.8	15.0	15.2	15.4	144.5

Annual Chargeable Trips (millions of trips)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Scenario 1A														
COVID Adjustment	0.0	0.0	0.0	-1.4	-1.4	-1.4	-1.4	-1.4	-1.5	-1.5	-1.5	-1.5	-1.5	-14.4
Licence Plate Read Exemption	0.0	0.0	0.0	-0.6	-0.6	-0.6	-0.6	-0.6	-0.7	-0.7	-0.7	-0.7	-0.7	-6.5
Global Exemption	0.0	0.0	0.0	-2.3	-2.3	-2.4	-2.4	-2.5	-2.5	-2.5	-2.6	-2.6	-2.6	-24.7
Hospital Charge Exemption (n/a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Free Days Exemption	0.0	0.0	0.0	-2.6	-2.7	-2.7	-2.8	-2.8	-2.8	-2.9	-2.9	-3.0	-3.0	-28.2
SME Discount *	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Chargeable Trips	0.0	0.0	0.0	6.6	6.7	6.8	6.9	7.0	7.1	7.2	7.3	7.4	7.5	70.7

*Note: the price elasticity of demand for LGVs and HGVs is assumed to be close to zero and therefore there is no change to trip volumes

Annual Chargeable Trips (millions of trips)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Scenario 2														
Cars	0.0	0.0	6.8	17.5	17.8	18.1	18.4	18.8	19.1	19.4	19.7	20.1	20.4	196.0
LGVs	0.0	0.0	1.5	3.8	3.9	3.9	4.0	4.0	4.1	4.1	4.2	4.2	4.3	42.1
HGVs	0.0	0.0	0.2	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	5.0
Gross Chargeable Trips	0.0	0.0	8.4	21.8	22.1	22.5	22.9	23.3	23.7	24.0	24.4	24.8	25.2	243.2

Annual Chargeable Trips (millions of trips)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Scenario 2														
COVID Adjustment	0.0	0.0	-0.8	-2.2	-2.2	-2.3	-2.3	-2.3	-2.4	-2.4	-2.4	-2.5	-2.5	-24.3
Licence Plate Read Exemption	0.0	0.0	-0.4	-1.0	-1.0	-1.0	-1.0	-1.0	-1.1	-1.1	-1.1	-1.1	-1.1	-10.9
Global Exemption	0.0	0.0	-1.4	-3.7	-3.8	-3.9	-3.9	-4.0	-4.0	-4.1	-4.2	-4.2	-4.3	-41.6
Hospital Charge Exemption (n/a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Free Days Exemption	0.0	0.0	-2.6	-7.7	-6.7	-3.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-20.7
SME Discount (n/a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Chargeable Trips	0.0	0.0	3.2	7.1	8.5	11.7	15.7	15.9	16.2	16.4	16.7	17.0	17.2	145.6

Annual Chargeable Trips (millions of trips)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Scenario 3														
Cars	0.0	0.0	0.0	14.0	14.2	14.4	14.5	14.7	14.9	15.1	15.2	15.4	15.6	148.0
LGVs	0.0	0.0	0.0	1.9	2.0	2.0	2.0	2.1	2.1	2.1	2.1	2.2	2.2	20.7
HGVs	0.0	0.0	0.0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	2.3
Gross Chargeable Trips	0.0	0.0	0.0	16.2	16.4	16.6	16.8	17.0	17.2	17.4	17.6	17.8	18.0	171.0

Annual Chargeable Trips (millions of trips)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Scenario 3														
COVID Adjustment	0.0	0.0	0.0	-1.6	-1.6	-1.7	-1.7	-1.7	-1.7	-1.7	-1.8	-1.8	-1.8	-17.1
Licence Plate Read Exemption	0.0	0.0	0.0	-0.7	-0.7	-0.7	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-0.8	-7.7
Global Exemption	0.0	0.0	0.0	-2.8	-2.8	-2.8	-2.9	-2.9	-2.9	-3.0	-3.0	-3.0	-3.1	-29.2
Hospital Charge Exemption	0.0	0.0	0.0	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-0.7	-6.9
Free Days Exemption	0.0	0.0	0.0	-3.9	-4.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-8.5
SME Discount (n/a)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Net Chargeable Trips	0.0	0.0	0.0	6.5	5.9	10.7	10.8	10.9	11.1	11.2	11.4	11.5	11.6	101.6

5.5.10. The estimated annual Sustainable Travel Zone revenues net of discounts, exemptions and risk adjustments over the period to 2036 are shown in Table 5-5 below:

Table 5-5 – Estimated annual Sustainable Travel Zone Revenues*

STZ Net Revenues (£ millions indexed, risk adjusted)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Consultation Proposal	0.0	0.0	32.0	81.6	82.8	84.1	90.5	91.8	93.1	100.2	101.6	103.0	110.8	971.6
Scenario 1	0.0	0.0	0.0	45.0	45.7	46.3	49.9	50.6	51.3	55.2	55.9	56.7	60.9	517.5
Scenario 1A	0.0	0.0	0.0	33.2	33.6	34.1	36.6	37.1	37.6	40.4	40.9	41.4	44.5	379.4
Scenario 2	0.0	0.0	21.7	50.6	56.2	69.1	90.5	91.8	93.1	100.2	101.6	103.0	110.8	888.7
Scenario 3	0.0	0.0	0.0	28.9	27.6	39.1	42.0	42.5	43.0	46.2	46.7	47.2	50.7	414.0

*These exclude the 20% revenue contingency. Should this not be needed in part, or fully, then it would mean there is additional money available for investment in transport.

- 5.5.11. The Consultation Proposal and Scenario 2 are both all-day schemes and therefore have the highest revenues, with the latter scenario being the lower of the two due to the scenario-specific exemptions and discounts.
- 5.5.12. Scenarios 1, 1A and 3 are all lower due to the charge being applied only during AM and PM peaks. Scenarios 1A and 3 are the lowest due, primarily, to the impact of scenario-specific exemptions and discounts (which are particularly pronounced in Scenario 1A) and, in the case of Scenario 3, a lower daily charge for cars.
- 5.5.13. The highest revenue scenario is approximately 2.5 times higher than the lowest revenue scenario which results in significant differences across the scenarios in terms of the amount of free cash available to fund Bus Improvement Measures and Sustainable Transport Measures.

5.5.14. The total impact over the period to 2036 of each discount, exemption and risk adjustment on overall Sustainable Travel Zone revenues is shown in Table 5-6 below:

Table 5-6 – Total Impact on Sustainable Travel Zone Revenues of Discounts, Exemptions and Risk Adjustments

STZ Net Revenues (£ millions indexed, risk adjusted)	Consultation Proposal		Scenario 1		Scenario 1A		Scenario 2		Scenario 3	
	£m	%	£m	%	£m	%	£m	%	£m	%
Cars	1,054.6	59.4%	655.3	65.5%	655.3	65.5%	1,054.6	59.4%	478.5	57.9%
LGVs	453.1	25.5%	222.8	22.3%	222.8	22.3%	453.1	25.5%	223.0	27.0%
HGVs	267.9	15.1%	122.1	12.2%	122.1	12.2%	267.9	15.1%	125.0	15.1%
Total Gross Revenue (~2036)	1,775.6	100.0%	1,000.2	100.0%	1,000.2	100.0%	1,775.6	100.0%	826.5	100.0%
COVID Adjustment	-177.6	-10.0%	-100.0	-10.0%	-100.0	-10.0%	-177.6	-10.0%	-82.6	-10.0%
Licence Plate Read Exemption	-79.9	-4.5%	-45.0	-4.5%	-45.0	-4.5%	-79.9	-4.5%	-37.2	-4.5%
Global Exemption	-303.6	-17.1%	-171.0	-17.1%	-171.0	-17.1%	-303.6	-17.1%	-141.3	-17.1%
Hospital Charge Exemption	0.0	0.0%	-37.3	-3.7%	0.0	0.0%	0.0	0.0%	-22.4	-2.7%
Free Days Exemption	0.0	0.0%	0.0	0.0%	-151.8	-15.2%	-103.6	-5.8%	-25.4	-3.1%
SME Discount	0.0	0.0%	0.0	0.0%	-58.0	-5.8%	0.0	0.0%	0.0	0.0%
Risk Adjustment	-242.9	-13.7%	-129.4	-12.9%	-94.8	-9.5%	-222.2	-12.5%	-103.5	-12.5%
Total Net Revenue (~2036)	971.6	54.7%	517.5	51.7%	379.4	37.9%	888.7	50.1%	414.0	50.1%

*Note: % values are relative to the relevant total gross revenue amount

Sustainable Travel Zone Cost Assumptions

- 5.5.15. Sustainable Travel Zone costs have been generated based on the level of detail for the scheme designs and architecture of this OBC. Inflation, a 40% capital cost risk adjustment and a 10% operating cost risk adjustment have been added to those estimates for the purpose of this Financial Dimension.

5.5.16. Capital costs between different scenarios are broadly the same. The estimated Sustainable Travel Zone capital costs over the period to 2036 are shown in Table 5-7 below:

Table 5-7 – Estimated annual Sustainable Travel Zone Capital Costs

STZ Capital Costs (£ millions indexed, risk adjusted)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Consultation Proposal	0.0	28.4	1.2	1.2	1.2	1.2	1.2	3.4	3.4	3.4	3.4	3.4	0.0	51.6
Scenario 1	0.0	0.0	28.4	1.3	1.3	1.3	1.3	1.3	3.5	3.5	3.5	3.5	3.5	52.0
Scenario 1A	0.0	0.0	28.3	1.3	1.3	1.3	1.3	1.3	3.5	3.5	3.5	3.5	3.5	51.9
Scenario 2	0.0	28.3	1.2	1.2	1.2	1.2	1.2	3.4	3.4	3.4	3.4	3.4	0.0	51.4
Scenario 3	0.0	0.0	28.4	1.3	1.3	1.3	1.3	1.3	3.5	3.5	3.5	3.5	3.5	51.9

5.5.17. The scenario-specific options described above have almost no impact on the size of the Sustainable Travel Zone and therefore capital costs are broadly similar across all scenarios.

5.5.18. Operating costs between different schemes differ largely due to differences in assumed trip-related transaction volumes and contact channel costs. The estimated annual Sustainable Travel Zone operating costs over the period to 2036 are shown in Table 5-8 below:

Table 5-8 – Estimated annual Sustainable Travel Zone Operating Costs

STZ Operating Costs (£ millions indexed, risk adjusted)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Consultation Proposal	0.0	0.6	12.4	13.8	11.7	10.3	9.1	9.3	9.6	9.8	10.1	10.4	10.6	117.7
Scenario 1	0.0	0.0	0.6	11.7	9.8	8.7	7.8	7.1	7.3	7.5	7.7	7.9	8.0	84.0
Scenario 1A	0.0	0.0	0.6	9.1	7.9	7.6	7.2	7.0	7.2	7.3	7.5	7.7	7.9	77.0
Scenario 2	0.0	0.6	10.0	11.1	9.9	9.2	8.6	8.8	9.0	9.3	9.5	9.7	10.0	105.7
Scenario 3	0.0	0.0	0.6	11.0	9.2	8.5	7.8	7.4	7.5	7.7	7.9	8.1	8.3	83.9

Net Cash Flow and Funding Needs

5.5.19. The estimated Sustainable Travel Zone net cash flows and funding requirements over the period to 2036 are shown in Table 5-9 below:

Table 5-9 – Sustainable Travel Zone Cash Flow and Funding Need

STZ Cash Flow and Funding Need (£ millions indexed, risk adjusted)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Summary of All Scenarios														
Consultation Proposal Cash Flow	0.0	-29.0	18.4	66.6	69.9	72.6	80.2	79.1	80.2	87.0	88.1	89.3	100.2	802.4
Consultation Proposal Funding Need	0.0	29.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.0

STZ Cash Flow and Funding Need (£ millions indexed, risk adjusted)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Summary of All Scenarios														
Scenario 1 Cash Flow	0.0	0.0	-29.0	32.1	34.7	36.4	40.8	42.2	40.5	44.2	44.8	45.4	49.4	381.5
Scenario 1 Funding Need	0.0	0.0	29.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.0
Scenario 1A Cash Flow	0.0	0.0	-28.9	22.8	24.4	25.3	28.2	28.9	27.0	29.6	29.9	30.3	33.1	250.5
Scenario 1A Funding Need	0.0	0.0	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.9
Scenario 2 Cash Flow	0.0	-28.9	10.5	38.3	45.1	58.7	80.7	79.7	80.7	87.6	88.7	89.9	100.8	731.7
Scenario 2 Funding Need	0.0	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.9
Scenario 3 Cash Flow	0.0	0.0	-29.0	16.6	17.2	29.4	32.9	33.9	32.0	35.0	35.4	35.7	39.0	278.2
Scenario 3 Funding Need	0.0	0.0	29.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.0

STZ Cash Flow and Funding Need (£ millions indexed, risk adjusted)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Consultation Proposal														
STZ Operating Income *	0.0	-0.6	19.6	67.8	71.1	73.8	81.4	82.5	83.6	90.4	91.5	92.6	100.2	853.9
STZ Capital Costs **	0.0	-28.4	-1.2	-1.2	-1.2	-1.2	-1.2	-3.4	-3.4	-3.4	-3.4	-3.4	0.0	-51.6
Net STZ Cash Flow	0.0	-29.0	18.4	66.6	69.9	72.6	80.2	79.1	80.2	87.0	88.1	89.3	100.2	802.4

STZ Cash Flow and Funding Need (£ millions indexed, risk adjusted)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Consultation Proposal														
STZ Funding Need	0.0	29.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.0

*Note: Net STZ revenues minus operating costs

**Note: Including annual reserving

STZ Cash Flow and Funding Need (£ millions indexed, risk adjusted)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Scenario 1														
STZ Operating Income *	0.0	0.0	-0.6	33.4	35.9	37.6	42.1	43.4	44.0	47.7	48.2	48.8	52.9	433.4
STZ Capital Costs **	0.0	0.0	-28.4	-1.3	-1.3	-1.3	-1.3	-1.3	-3.5	-3.5	-3.5	-3.5	-3.5	-52.0
Net STZ Cash Flow	0.0	0.0	-29.0	32.1	34.7	36.4	40.8	42.2	40.5	44.2	44.8	45.4	49.4	381.5
STZ Funding Need	0.0	0.0	29.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.0

*Note: Net STZ revenues minus operating costs

**Note: Including annual reserving

STZ Cash Flow and Funding Need (£ millions indexed, risk adjusted)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Scenario 1A														

STZ Operating Income *	0.0	0.0	-0.6	24.1	25.7	26.5	29.4	30.1	30.4	33.1	33.4	33.7	36.6	302.3
STZ Capital Costs **	0.0	0.0	-28.3	-1.3	-1.3	-1.3	-1.3	-1.3	-3.5	-3.5	-3.5	-3.5	-3.5	-51.9
Net STZ Cash Flow	0.0	0.0	-28.9	22.8	24.4	25.3	28.2	28.9	27.0	29.6	29.9	30.3	33.1	250.5
STZ Funding Need	0.0	0.0	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.9

*Note: Net STZ revenues minus operating costs

**Note: Including annual reserving

STZ Cash Flow and Funding Need (£ millions indexed, risk adjusted)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Scenario 2														
STZ Operating Income *	0.0	-0.6	11.7	39.5	46.3	59.9	82.0	83.0	84.1	91.0	92.1	93.3	100.8	783.1
STZ Capital Costs **	0.0	-28.3	-1.2	-1.2	-1.2	-1.2	-1.2	-3.4	-3.4	-3.4	-3.4	-3.4	0.0	-51.4
Net STZ Cash Flow	0.0	-28.9	10.5	38.3	45.1	58.7	80.7	79.7	80.7	87.6	88.7	89.9	100.8	731.7
STZ Funding Need	0.0	28.9	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	28.9

*Note: Net STZ revenues minus operating costs

**Note: Including annual reserving

STZ Cash Flow and Funding Need (£ millions indexed, risk adjusted)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Scenario 3														

STZ Operating Income *	0.0	0.0	-0.6	17.9	18.4	30.7	34.2	35.2	35.5	38.5	38.8	39.2	42.4	330.1
STZ Capital Costs	0.0	0.0	-28.4	-1.3	-1.3	-1.3	-1.3	-1.3	-3.5	-3.5	-3.5	-3.5	-3.5	-51.9
Net STZ Cash Flow	0.0	0.0	-29.0	16.6	17.2	29.4	32.9	33.9	32.0	35.0	35.4	35.7	39.0	278.2
STZ Funding Need	0.0	0.0	29.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.0

*Note: Net STZ revenues minus operating costs **Note: Including annual reserving

- 5.5.20. The total estimated funding required for the Sustainable Transport Zone is in the region of £29 million for all scenarios, including inflation and risk adjustments.
- 5.5.21. Notwithstanding significant differences in individual net cash flows between scenarios, every scenario generates sufficient net cash flows to support the upfront funding requirements.

5.6 Bus Improvement Measures Financial Assumptions

- 5.6.1. Inflation included in the calculation of Bus Improvement Measures costs is assumed to be the same as the values assumed for Charging Infrastructure.
- 5.6.2. Bus improvement measures include considerations in respect of service output, vehicle acquisition and fare reductions. These measures are described in more detail in the Commercial Dimension.

Network Improvements

- 5.6.3. It is currently assumed that the cost of providing the service enhancements is net of estimated revenue and that new vehicles are purchased through a lease or equivalent financial arrangement where the cost to the GCP is spread over the life of the asset – these amounts are included in the cost table further below.

Fare Reductions

- 5.6.4. The Making Connections programme proposes to reduce and simplify existing fares. To provide a consistent set of assumptions for the assessment of the scenarios a 25 % reduction in fares has been applied.
- 5.6.5. We recognise that, depending on the final scheme selected, there may be a need to revise the service specification to fund the £1/2 fares proposal.
- 5.6.6. £1/£2 fares are affordable in all scenarios, apart from during the 'ramp up' period of Scenario 3, where there is insufficient funding without other sources being identified due to the high cost of providing 100 free days and the subsequent reduction in funding available to spend on bus service improvements.
- 5.6.7. The exact amount of funding available would be dependent on final decisions around charging hours, charge levels and the scale of discounts, exemptions and reimbursements.
- 5.6.8. Further work beyond the OBC would need to be undertaken by CPCA to establish the programme of bus investment, including the final proposition on bus fares.

Cost Assumptions

The estimated cost of Bus Improvement Measures over the period to 2036 are shown in Table 5-10 below.

Table 5-10 – Bus Improvement Measures Costs

Bus Improvement Measures Costs (£ millions, indexed, risk adjusted)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Consultation Proposal	5.0	10.0	21.0	65.0	65.0	65.0	65.0	64.0	65.0	71.5	72.4	74.0	80.0	722.9
Scenario 1	10.0	10.0	15.0	25.0	25.0	33.0	33.5	34.5	33.5	36.5	37.0	37.5	40.0	370.5
Scenario 1A	5.0	8.0	15.0	17.5	23.0	23.0	23.0	23.5	22.5	23.5	24.0	24.0	26.0	258.0
Scenario 2	5.0	10.0	10.0	35.0	45.0	51.0	65.0	64.0	65.0	71.5	72.4	74.0	80.0	647.9
Scenario 3	5.0	8.0	10.0	11.0	18.0	30.0	28.0	28.0	27.5	29.0	29.0	29.0	30.5	283.0

5.7 Sustainable Transport Measures Financial Assumptions

- 5.7.1. Inflation included in the calculation of Sustainable Transport Measures costs is assumed to be the same as the values assumed for Charging Infrastructure.
- 5.7.2. At this stage, an illustrative package of options has been developed for sustainable transport measures (see Appendix L). The exact allocation of funding and programme of measures would be further developed post-OBC. Given the nature of the sustainable transport measure programme, it is flexible and would be adjustable should changes need to be made to the future funding profiles.

Cost Assumptions

The estimated cost of Sustainable Transport Measures over the period to 2036 are shown in Table 5-11 below.

Table 5-11 – Sustainable Transport Measures Costs

Sustainable Transport Measures Costs (£ millions, indexed, risk adjusted)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Consultation Proposal	0.0	0.0	0.4	1.4	1.4	14.0	15.0	15.0	15.0	15.0	15.0	15.0	20.0	127.2
Scenario 1	0.0	0.0	0.2	0.4	1.5	3.5	7.0	7.5	7.0	7.5	7.5	7.5	9.0	58.6
Scenario 1A	0.0	0.0	0.2	0.5	0.5	0.5	5.0	5.0	4.5	6.0	6.0	6.0	7.0	41.2
Scenario 2	0.0	0.0	0.4	1.4	1.4	14.0	15.0	15.0	15.0	15.0	15.0	15.0	20.0	127.2
Scenario 3	0.0	0.0	0.2	0.4	0.4	0.6	5.0	5.9	4.5	6.0	6.0	6.5	8.0	43.5

5.8 Total Net Cash Flow Summary

5.8.1. A total net cash flow summary table (Table 5-12) has been calculated based upon the estimated revenue and cost summaries above.

Table 5-12 – Total Net Cash Flow Summary

Total Net Cash Flow (£ millions, indexed, risk adjusted)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Consultation Proposal														
STZ Operating Income	0.0	-0.6	19.6	67.8	71.1	73.8	81.4	82.5	83.6	90.4	91.5	92.6	100.2	853.9
STZ Capital Costs *	0.0	-28.4	-1.2	-1.2	-1.2	-1.2	-1.2	-3.4	-3.4	-3.4	-3.4	-3.4	0.0	-51.6
Bus Improvement Measures Costs	-5.0	-10.0	-21.0	-65.0	-65.0	-65.0	-65.0	-64.0	-65.0	-71.5	-72.4	-74.0	-80.0	-722.9
Sustainable Transport Measures Costs	0.0	0.0	-0.4	-1.4	-1.4	-14.0	-15.0	-15.0	-15.0	-15.0	-15.0	-15.0	-20.0	-127.2
Net Cash Flow (before Funding / Cash Reserves **)	-5.0	-39.0	-3.0	0.3	3.5	-6.4	0.2	0.1	0.2	0.5	0.8	0.3	0.2	-47.6
GCP £50m Investment	5.0	10.0	21.0	14.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0
Funding from Repayable Sources / Cash Reserves	0.0	29.0	0.0	0.0	0.0	6.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	35.4
Repayment of Repayable Sources / Cash Reserves	0.0	0.0	-18.0	-14.3	-3.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-35.4
Net Cash Flow (after Funding / Cash Reserves)	0.0	0.0	0.0	0.0	0.3	0.0	0.2	0.1	0.2	0.5	0.8	0.3	0.2	2.4

Total Net Cash Flow (£ millions, indexed, risk adjusted)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Consultation Proposal														
Cumulative Cash Flow (after Funding / Cash Reserves)	0.0	0.0	0.0	0.0	0.3	0.3	0.4	0.5	0.7	1.2	2.0	2.2	2.4	

*Note: Including annual reserving

**Note: Cash reserves retain a portion of free cash flows to be applied against future expenditures

Total Net Cash Flow (£ millions, indexed, risk adjusted)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Scenario 1														
STZ Operating Income	0.0	0.0	-0.6	33.4	35.9	37.6	42.1	43.4	44.0	47.7	48.2	48.8	52.9	433.4
STZ Capital Costs *	0.0	0.0	-28.4	-1.3	-1.3	-1.3	-1.3	-1.3	-3.5	-3.5	-3.5	-3.5	-3.5	-52.0
Bus Improvement Measures Costs	-10.0	-10.0	-15.0	-25.0	-25.0	-33.0	-33.5	-34.5	-33.5	-36.5	-37.0	-37.5	-40.0	-370.5
Sustainable Transport Measures Costs	0.0	0.0	-0.2	-0.4	-1.5	-3.5	-7.0	-7.5	-7.0	-7.5	-7.5	-7.5	-9.0	-58.6
Net Cash Flow (before Funding / Cash Reserves)	-10.0	-10.0	-44.2	6.7	8.2	-0.1	0.3	0.2	0.0	0.2	0.3	0.4	0.4	-47.6
GCP £50m Investment	10.0	10.0	15.0	15.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0

Total Net Cash Flow (£ millions, indexed, risk adjusted)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Scenario 1														
Funding from Repayable Sources / Cash Reserves	0.0	0.0	29.2	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.4
Repayment of Repayable Sources / Cash Reserves	0.0	0.0	0.0	-21.7	-7.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-29.4
Net Cash Flow (after Funding / Cash Reserves)	0.0	0.0	0.0	0.0	0.5	0.0	0.3	0.2	0.0	0.2	0.3	0.4	0.4	2.4
Cumulative Cash Flow (after Funding / Cash Reserves)	0.0	0.0	0.0	0.0	0.5	0.5	0.8	1.0	1.1	1.3	1.6	2.0	2.4	

*Note: Including annual reserving

**Note: Cash reserves retain a portion of free cash flows to be applied against future expenditures

Total Net Cash Flow (£ millions, indexed, risk adjusted)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Scenario 1A														
STZ Operating Income	0.0	0.0	-0.6	24.1	25.7	26.5	29.4	30.1	30.4	33.1	33.4	33.7	36.6	302.3
STZ Capital Costs *	0.0	0.0	-28.3	-1.3	-1.3	-1.3	-1.3	-1.3	-3.5	-3.5	-3.5	-3.5	-3.5	-51.9
Bus Improvement Measures Costs	-5.0	-8.0	-15.0	-17.5	-23.0	-23.0	-23.0	-23.5	-22.5	-23.5	-24.0	-24.0	-26.0	-258.0

Total Net Cash Flow (£ millions, indexed, risk adjusted)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Scenario 1A														
Sustainable Transport Measures Costs	0.0	0.0	-0.2	-0.5	-0.5	-0.5	-5.0	-5.0	-4.5	-6.0	-6.0	-6.0	-7.0	-41.2
Net Cash Flow (before Funding / Cash Reserves **)	-5.0	-8.0	-44.1	4.8	0.9	1.7	0.2	0.4	0.0	0.1	-0.1	0.3	0.1	-48.7
GCP £50m Investment	5.0	8.0	15.0	17.5	4.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0
Funding from Repayable Sources / Cash Reserves	0.0	0.0	29.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	29.1
Repayment of Repayable Sources / Cash Reserves	0.0	0.0	0.0	-22.3	-5.4	-1.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-29.1
Net Cash Flow (after Funding / Cash Reserves)	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.4	0.0	0.1	-0.1	0.3	0.1	1.3
Cumulative Cash Flow (after Funding / Cash Reserves)	0.0	0.0	0.0	0.0	0.0	0.3	0.5	0.8	0.8	0.9	0.8	1.1	1.3	

*Note: Including annual reserving

**Note: Cash reserves retain a portion of free cash flows to be applied against future expenditures

Total Net Cash Flow (£ millions, indexed, risk adjusted)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Scenario 2														
STZ Operating Income	0.0	-0.6	11.7	39.5	46.3	59.9	82.0	83.0	84.1	91.0	92.1	93.3	100.8	783.1
STZ Capital Costs *	0.0	-28.3	-1.2	-1.2	-1.2	-1.2	-1.2	-3.4	-3.4	-3.4	-3.4	-3.4	0.0	-51.4
Bus Improvement Measures Costs	-5.0	-10.0	-10.0	-35.0	-45.0	-51.0	-65.0	-64.0	-65.0	-71.5	-72.4	-74.0	-80.0	-647.9
Sustainable Transport Measures Costs	0.0	0.0	-0.4	-1.4	-1.4	-14.0	-15.0	-15.0	-15.0	-15.0	-15.0	-15.0	-20.0	-127.2
Net Cash Flow (before Funding / Reserves **)	-5.0	-38.9	0.1	1.9	-1.3	-6.3	0.7	0.7	0.7	1.1	1.4	0.9	0.8	-43.3
GCP £50m Investment	5.0	10.0	10.0	25.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0
Funding from Repayable Sources / Reserves	0.0	28.9	0.0	0.0	1.3	6.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.6
Repayment of Repayable Sources / Reserves	0.0	0.0	-10.1	-26.5	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-36.6
Net Cash Flow (after Funding / Reserves)	0.0	0.0	0.0	0.4	0.0	0.0	0.7	0.7	0.7	1.1	1.4	0.9	0.8	6.7
Cumulative Cash Flow (after Funding / Reserves)	0.0	0.0	0.0	0.4	0.4	0.4	1.2	1.8	2.5	3.6	5.0	5.9	6.7	

*Note: Including annual reserving

**Note: Cash reserves retain a portion of free cash flows to be applied against future expenditures Total Net Cash Flow (£ millions, indexed, risk adjusted)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	Total
Scenario 3														
STZ Operating Income	0.0	0.0	-0.6	17.9	18.4	30.7	34.2	35.2	35.5	38.5	38.8	39.2	42.4	330.1
STZ Capital Costs *	0.0	0.0	-28.4	-1.3	-1.3	-1.3	-1.3	-1.3	-3.5	-3.5	-3.5	-3.5	-3.5	-51.9
Bus Improvement Measures Costs	-5.0	-8.0	-10.0	-11.0	-18.0	-30.0	-28.0	-28.0	-27.5	-29.0	-29.0	-29.0	-30.5	-283.0
Sustainable Transport Measures Costs	0.0	0.0	-0.2	-0.4	-0.4	-0.6	-5.0	-5.9	-4.5	-6.0	-6.0	-6.5	-8.0	-43.5
Net Cash Flow (before Funding / Cash Reserves **)	-5.0	-8.0	-39.2	5.2	-1.2	-1.2	-0.1	0.0	0.0	0.0	0.4	0.2	0.5	-48.3
GCP £50m Investment	5.0	8.0	10.0	11.0	16.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	50.0
Funding from Repayable Sources / Cash Reserves	0.0	0.0	29.2	0.0	0.0	1.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	30.4
Repayment of Repayable Sources / Cash Reserves	0.0	0.0	0.0	-16.2	-14.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-30.4
Net Cash Flow (after Funding / Cash Reserves)	0.0	0.0	0.0	0.0	0.6	0.0	-0.1	0.0	0.0	0.0	0.4	0.2	0.5	1.7

Cumulative Cash Flow (after Funding / Cash Reserves)	0.0	0.0	0.0	0.0	0.6	0.6	0.6	0.6	0.6	0.6	1.0	1.2	1.7	
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*Note: Including annual reserving

**Note: Cash reserves retain a portion of free cash flows to be applied against future expenditures

5.9 Risks and Sensitivities

- 5.9.1. A range of sensitivity tests were carried out on variables that could impact the net cash flows generated by the Sustainable Travel Zone.
- 5.9.2. Sensitivities were mostly carried out on Scenario 1 and Scenario 2 to provide an indication of the impact on an AM/PM peak charging scenario (Scenario 1) and an all-day charging scenario (Scenario 2). Sensitivities that could specifically impact other scenarios (such as the application of free days) were carried out on those additional scenarios.
- 5.9.3. The sensitivities measure the impact on total net cash flows over the period to 2036. Outputs are presented in both real 2023 terms and percentage terms that compare the movements to the unsensitised scenario. The sensitivity analysis assumes that contingency amounts included in the base scenarios are not applied to offset downside sensitivity results.
- 5.9.4. Contingency amounts are also shown in the summary table (also in real 2023 terms). To the extent that these can, in practice, be applied to offset downside sensitivity cases then the impact on net cash flows would be less than shown, or zero. If offsetting is not possible then net cash flows, and consequently the funds available for Bus Improvement Measures and Sustainable Transport Measures, would be impacted.
- 5.9.5. The results of the sensitivities are outlined in Table 5-13.

Table 5-13 – Sensitivity Test Outcomes

Total Net Cash Flow Impacts (£ millions, real 2023)		Scenario 1		Scenario 2		Scenario 3	
		£	%	£	%	£	%
Unsensitised Net Cash Flows		314.2	n/a	601.6	n/a	227.0	n/a
Base Case Contingencies	Revenue	107.6	n/a	184.1	n/a	85.79	n/a
	Capital Cost	13.0	n/a	13.0	n/a	13.02	n/a
	Operating Cost	6.4	n/a	8.1	n/a	6.42	n/a
Economic Sensitivities ¹	CPI +1% / year	-19.5	-6.2%	-33.4	-5.5%		
	CPI -1% / Year	20.3	6.5%	34.8	5.8%		
	Cost Index +1% / year	-8.5	-2.7%	-9.5	-1.6%		
Trip Volume Sensitivities	+10%	53.5	17.0%	87.5	14.5%		
	-10%	-53.5	-17.0%	-87.5	-14.5%		
	Return to Pre-COVID ²	43.3	13.8%	73.5	12.2%		

Total Net Cash Flow Impacts (£ millions, real 2023)		Scenario 1		Scenario 2		Scenario 3	
		£	%	£	%	£	%
Sustainable Travel Zone Cost Sensitivities	Capex +10%	-3.3	-1.0%	-3.3	-0.5%		
	Capex -10%	3.3	1.0%	3.3	0.5%		
	Opex +10%	-6.4	-2.0%	-8.1	-1.4%		
	Opex -10%	6.4	2.0%	8.1	1.4%		
	Both Costs +10%	-9.7	-3.1%	-11.4	-1.9%		
	Both Costs -10%	9.7	3.1%	11.4	1.9%		
Account Take-up Sensitivities ³	+20%	8.0	2.5%	-6.8	-1.1%		
	+10%	4.0	1.3%	-3.4	-0.6%		
	-10%	-4.0	-1.3%	3.4	0.6%		
Trips per Account Sensitivities	Higher Trips / Account			2.8	0.5%	1.7	0.7%
	Lower Trips / Account			-3.6	-0.6%	-2.2	-1.0%
Free Days Sensitivity ⁴	50 Days Indefinitely	-85.4	-27.2%	-126.0	-20.9%	-63.3	-27.9%

Supporting Notes:

- 1 Net cash flows are negatively impacted by higher CPI inputs over the measured period because revenues escalate more slowly during the early years of the scheme (revenue inputs have a base date of 2027 whereas cost inputs have a base date of 2022). Over the long term it is expected that this trend would reverse given the annual ratio of revenues to costs.
- 2 This sensitivity reduces the 10% COVID trip discount by 2 percentage points each year starting in 2028 until the trip discount reaches zero.
- 3 This sensitivity produces opposing results for Scenario 1 and Scenario 2. In Scenario 1, higher account take-up delivers positive outcomes due to the lower total costs associated with transactions linked to accounts. In Scenario 2, the lower costs are offset entirely by the fact that a higher number of account holders are now eligible for free days.
- 4 This sensitivity adds 50 free days per year per account-holding car driver in any year in the base case scenario where that allowance would otherwise be zero.

5.10 Affordability

- 5.10.1. Revenues generated from the STZ result in positive net cash flows in all periods except for the period containing the initial investment costs, which itself can be easily funded from recoverable GCP City Deal funds.
- 5.10.2. Sensitivity analysis indicates that the current approach to contingency sizing is adequate to cover a range downside scenarios without reduction to the net cash flow position.

- 5.10.3. Given the strong net cash flow position of the STZ, it is highly unlikely that any downside scenario could result in an overall loss.
- 5.10.4. Were any downside scenario to exceed the contingency amounts then less free cash would be available to fund the Bus Improvement Measures and Sustainable Transport Measures. However, these expenditures could be scaled accordingly such that overall affordability is maintained. Forward expenditure commitments should take this into account such that some flexibility remains to scale expenditure should the net cash flow of the Sustainable Transport Zone be less than is forecast.

5.11 Subsidy Control Considerations

Bus Services

- 5.11.1. The Subsidy Control Act 2022 replaces the previous EU State Aid regime. However, it does not replace the machinery under the Transport Act 1985 for securing local bus services. The 1985 Act assumes that most bus services would be operated on a commercial and potentially competitive basis. It requires local transport authorities to procure any additional local bus services by means of competitive tender, except where the 'de minimis' regulations apply. These regulations allow LTAs with a spend of more than £600,000 per annum to direct award up to 25% of their spend, with no cap on the size of individual contract values.
- 5.11.2. Many of the 'Making Connections' proposals consist of enhancements to existing services. Should the CPCA pursue franchising then clearly these are straightforward to deliver as the services in their entirety become parts of franchises. However, if the CPCA delays or withdraws from implementation of franchising then the authority would need to revert back to the 1985 Act machinery. This is likely to constrain the delivery of enhancements to existing services, as for various reasons these are generally best delivered using a direct award mechanism. It may favour the early delivery of entirely new services such as the proposed Cambridge orbit routes.

Fares

- 5.11.3. The legislative basis for the proposed cap on the value of bus fares is retained EU legislation (EU1370/2007). This requires authorities not to over-compensate public transport operators: "the competent authority shall compensate the public service operators for the net financial effect, positive or negative, on costs incurred and revenues generate in complying with the tariff obligations in a way that prevents overcompensation". EU1370/2007 goes on to explain that the net financial effect consists of the costs an operator incurs by complying with a public service obligation, minus any positive financial effects, minus receipts, plus a reasonable profit. This is consistent with the requirements which British LTAs and bus operators are familiar with in regard to reimbursement for concessionary bus travel.

- 5.11.4. As with services, a franchise regime which specifies fares and is competitive eliminates the need for these considerations.

Zero-Emission Buses

- 5.11.5. The bus operations costings developed for Making Connections assume that any additional buses required to deliver the Making Connections bus network over and above the existing fleet would be zero-emission. Given the additional capital costs associated with zero-emission buses, it cannot be assumed that bus operators would self-fund these.
- 5.11.6. In a franchise scenario, the provision of buses of a certain age or type can be specified in the contract specification. In the existing deregulated regime, the provision of resources to commercial bus operators has the potential to represent unfair competitive advantage, even though the provision of those resources is to address market failure (i.e., the inability of bus operators to purchase zero-emission buses and associated infrastructure at market rates). There are a number of ways of overcoming this, one of which is for the LTA to hold a competition for the supply of buses to bus operators. A precedent exists for the provision of subsidy in the form of zero-emission buses and charging equipment (without a competition) to an operator which has been referred to the Subsidy Advice Unit (part of the Competition and Markets Authority) for advice under the Subsidy Control Act 2022. However, the LTA is still responsible for assessing whether the provision of that subsidy is permissible under the Act, and in the circumstances in the Making Connections area consideration should be given to a competitive approach for disbursing new buses in the absence of franchising.

6 Management Dimension

6.1 Purpose

- 6.1.1. The Management Dimension describes how the scheme would be delivered through project management best practice. It outlines the engagement undertaken with stakeholders, presents the key risks and demonstrates that an appropriate governance structure is in place to oversee the programme.
- 6.1.2. This Management Dimension includes the current scheme programme and commentary on governance, quality assurance, communications, benefits and risk management and monitoring and evaluation.

Scheme Delivery

- 6.1.3. The GCP is the local delivery body for the City Deal with central Government, and is responsible for overseeing the development of all schemes funded through the City Deal, including Making Connections. It is proposed that post OBC, CCC, as the local highway authority, fulfils the role of programme delivery body and are responsible for the day-to-day project management. GCP would keep programme level overview through their responsibilities for the City Deal. CCC would thus be responsible for procuring and delivering the proposed charging element of the Sustainable Travel Zone (STZ), and the delivery of the proposed sustainable transport schemes with the support of appointed contractors and partners where appropriate. CPCA, as the local transport authority, has a key role in overseeing the delivery of the proposed bus enhancements. Further detail pertaining to Programme Implementation is set out in Section 6.4.

What is Required at this Stage?

- 6.1.4. The DfT's transport business case guidance outlines the areas that should be covered in the Management Dimension at the OBC stage. The following table indicates where these requirements are met in this document.

Table 6-1 – Contents of the Management Dimension

Content	DfT Requirements	Management Dimension Section
Programme Reporting	Describe the reporting arrangements including delegated authorities, exception reporting, tolerances and change control.	6.2
Programme Scope	Set out deliverables and decisions that are provided/received from other projects and any constraints: this may include drop-dead delivery dates, resources and circumstances	6.3
Programme Implementation	Summarise the key-work packages, product and work break down structures for executing the work	6.4

Content	DfT Requirements	Management Dimension Section
Programme Plan	Outline a plan with key milestones, progress and include a critical path	6.5
Stakeholder Engagement And Communications	Set out the communications strategy and plans that accounts for all stakeholders, aligning with those outlined in the strategic dimension	6.6
Risk And Issues Management	Provide arrangements for risk management and issues that are likely to affect delivery and implementation	6.7
Lessons Management	Produce a strategy and plan for learning from other proposals, learning throughout the proposal and sharing lessons with other teams	6.8
Benefits Management	Produce a longlist of prioritised benefits and a Benefits Logic Map to show how benefits contribute to strategic objectives.	6.9
Data And Information Security	Explicitly address the protection of critical systems, digital assets and commercially sensitive data	6.10
Carbon Management	Provide a detailed and robust carbon management plan, which reports predicted emissions against baseline values, includes credible mitigation of associated risks, and provides sufficient evidence on the programme team's overall ability to manage and reduce carbon emissions.	6.11

6.2 Programme Reporting

6.2.1. The following section includes details of the reporting arrangements for the Making Connections programme. A summary of the delegated authority, exception reporting, tolerances, and change control processes is provided below:

- **Delegated Authorities:** The programme has established a clear structure of delegated authorities. This means that specific individuals or groups have been appropriately assigned decision-making power and responsibility for different aspects of the programme in line with the GCP's Assurance Framework; these responsibilities are summarised in Table 6-2.
- **Exception Reporting:** The programme follows the system for exception reporting set out in the GCP's Assurance Framework, which means that any significant deviations from the planned activities, budgets, or timelines are reported; this reporting mechanism is set out in the 'Programme Reporting' subsection below.
- **Tolerances:** Tolerances refer to the predefined limits or thresholds within which the programme can operate without requiring formal approval or intervention. These limits, which are explored in the 'Management Methodology' subsection below, are set for various aspects such as budget, schedule, quality, and scope. The defined tolerances provide flexibility for day-to-day management and ensure that significant deviations are escalated and addressed appropriately.
- **Change Control:** The Making Connections Programme has a change control process in place to manage any requested changes to the programme's scope, objectives, or deliverables. The process, which is summarised in the Management Methodology

subsection below, ensures that all changes are evaluated, documented, and approved or rejected based on their impact, feasibility, and alignment with the programme's goals.

The change control arrangements thus help maintain the programme's focus and prevent uncontrolled or unauthorised changes.

- 6.2.2. These reporting arrangements, delegated authorities, exception reporting, tolerances, and change control mechanisms are designed to ensure effective governance, transparency, and control over the implementation of the Making Connections programme; they enable informed decision-making, risk management, and the successful delivery of the programme's objectives.

Management Methodology

- 6.2.3. The project management and development of the Making Connections programme is aligned with the PRINCE2 methodology and the DfT's Evaluation Guidance for Local Authority Major Schemes Development methodology.
- 6.2.4. The programme's aims, management processes and resources have been agreed by the Programme Board and are owned by the GCP Project Manager (currently the Director of City Access). The key principles are set out below:
- The overall scope of the programme is set by the GCP Executive Board;
 - The programme is governed by a Project Board that receives reports on programme activity including spend, quality and risks;
 - The Project Board can request from the Project Manager all information required for it to perform its governing role;
 - The Project Manager must present all information to the Transport Projects Board that they consider is required for the Board to perform their governing role; and,
 - The Project Manager has full day-to-day responsibility for the delivery of technical work streams and is employed by GCP.
- 6.2.5. Scheme delivery is being managed in accordance with the structure outlined in Figure 2-1. Table 6-2 outlines the function and reporting relationships of the groups at each management level. Upper management levels that focus on strategic issues are the GCP Executive Board and GCP Joint Assembly. Technical programme-focused management groups are the Programme Board, Programme Manager, Transport Projects Board and the Project Manager.

Table 6-2 – Roles and responsibilities¹³¹

Management Level	Function
GCP Executive Board	The GCP Executive Board is the key decision-making body, responsible for ensuring the objectives of the Greater Cambridge City Deal are met. The Executive Board is responsible for commissioning projects funded by money provided through the City Deal and for overall control of that programme of investments. The Executive Board includes leaders from each partner organisation and members of the public can participate in meetings, posing questions to be discussed. The Executive Board has the authority to approve recommendations and make decisions related to individual scheme approval, funding release, and project progress monitoring.
GCP Joint Assembly	The Joint Assembly is the strategic, local advisory, and scrutiny body for the GCP Executive Board. The Joint Assembly is composed of elected members from the constituent local authorities and representatives from other constituent organisations. There are 15 members in total; Cambridge City Council (CCC) and South Cambridgeshire District Council (SCDC) have three representatives on the Joint Assembly, with political balance in each Authority's membership reflecting the balance of the political parties on the relevant Council. The Assembly also includes three co-opted members nominated by the business board and three co-opted members nominated by the University of Cambridge. The Joint Assembly's role is to offer expertise and feedback to the Executive Board to assist in decision-making.
Programme Board	Key officers and stakeholders, prioritising schemes, managing programme-level risks and capturing shared benefits.
Programme Manager	Technical and procedural oversight of projects and programme level benefit management. Reports to the Project Boards.
Transport Projects Board	Overall control of each GCP transport project. Senior representatives in line with PRINCE2 requirements.
Project Manager	Day to day management of the project and delivery of technical work streams on behalf of GCP.

- 6.2.6. The GCP is focused on both programme and project-level governance. Issues of key importance at both the programme and project level are addressed at the highest levels of governance. Issues of a more technical and non-strategic nature are addressed by key officers.
- 6.2.7. At the programme level, an officer technical group made up of key officers and stakeholders develops the overall scheme prioritisation and seeks to manage programme-level risks and capture shared benefits. The Project Manager, in consultation with the Programme Manager, would raise programme-level issues with the GCP Executive Board and Joint Assembly as required.
- 6.2.8. At the project level, a Project Team works up scheme details and reports to a Project Manager who guides the overall technical development of the project, in combination with key officers. At project gateways, reports are made to the City Deal Executive Board on progress and to seek decisions on important project-related matters.

¹³¹ Greater Cambridge Partnership (2021). *Governance - Assurance Framework*

Programme Reporting

- 6.2.9. The fundamental process of capturing change in the Making Connections programme is undertaken through the Programme Status Report. The Programme Status Report is presented at regular meetings of the Project Board and if required can be submitted between Project Boards at the Project Manager's discretion.
- 6.2.10. The Programme Status Report is the main input to the Project Board and summarises progress and change on the programme. The following list sets out the issues typically covered in the Programme Status Report:
- Schedule management, including key activities and achievements in report period
 - Serious issues and actions required by governance body
 - Key activities in the forthcoming period
 - Programme progress review and reporting on key milestones including RAG rating
 - Key issues
 - Key risks
 - Early warning of change control events
 - Budget updates and cost management

Decision Making and Change Control

- 6.2.11. The GCP decision-making process involves collaboration between elected representatives, advisory committees, officers, and external stakeholders to ensure democratic accountability, strategic oversight, and effective project and programme delivery.
- 6.2.12. For the varying level of programme decisions that are made in relation to the scheme, the Project Manager has the authority to determine which category a decision falls under, of which there are four types:
- **Key decisions:** these decisions are as defined in the City Deal Assurance Framework and are the major 'gateway' decisions to allow the overall programme to progress. These key decisions form the outer scope of the programme and define its parameters. Key decisions are the responsibility of the Executive Board with advice from the Joint Assembly and Chief Executives;
 - **Scope change decisions:** these decisions are those which would take the programme out of scope of the programme parameters agreed at the key decision-making stage and impact cost, quality or time. The Making Connections SRO is responsible for informing the Executive Board of any changes in the scheme's scope, costs, and implementation timescales. The Executive Board then assesses the impact of these changes on the overall scheme programme and collaborates with the SRO to address specific issues;
 - **Major decisions within scope:** these decisions are within the agreed programme parameters but are still considered 'major decisions' because they have an impact on cost, quality and time. A major decision is the sole responsibility of the Project Board; and

- **Programme management decisions:** these are decisions which do not impact cost, quality or time e.g. moving budget between work streams. The Project Manager takes these decisions.

Progress, Assurance and Approvals

Assurance and Approvals Pathway

- 6.2.13. Making Connections is progressing through the GCP's standard approval processes, with all decisions being made by management groups, outlined in Table 6-2, with the appropriate level of authority. There are a number of key milestones in the Project Programme (see Table 6-8) where internal and/or external approvals are required in order for the programme to progress.
- 6.2.14. As part of the approval process, assurance is carried out at each stage of the programme and at all gateway review points. The assurance process for the Making Connections programme is set out in the City Deal Assurance Framework, which complies with the DfT's requirements for Assurance Frameworks.

GCP Assurance Framework

- 6.2.15. The Assurance Framework sets out the role of the GCP Joint Assembly in scrutinising GCP Executive Board decisions. The Assurance Framework outlines the proposed membership, responsibilities, processes and principles that would be in place for agreeing and overseeing the delivery of a robust transport infrastructure programme as part of the overall City Deal goals of integrating transport and strategic spatial planning.
- 6.2.16. The varied membership of the GCP Joint Assembly helps to ensure that it is both independent and sufficiently representative of a variety of viewpoints and stakeholder groups, in order to provide effective scrutiny of decision-making. Local partners are committed to ensuring that robust systems and processes would be in place in line with DfT guidance to develop and agree on a deliverable programme that offers value for money.

Independent Advice

- 6.2.17. The assurance process for Making Connections includes the involvement of independent advisors who are appointed to provide robust and independent scrutiny of the business case, and the scheme as a whole, at each key decision point.
- 6.2.18. The role of the independent advisor includes providing advice to the scheme promoters, the GCP Joint Assembly and the GCP Executive Board on whether or not the Making Connections programme should be approved to progress to the next stage of assessment, as well as suggesting any conditions that must be met by the scheme promoter.
- 6.2.19. SYSTRA is acting as the independent advisor for Making Connections and would review this OBC prior to the Executive Board's formal review and approvals process; hence, Making Connections cannot proceed to the FBC stage prior to receiving the requisite independent scrutiny. A list of documents that have been reviewed by SYSTRA is provided in the following table.

Table 6-3 – Log of Documents Reviewed by SYSTRA

Element	Date Provided	Comments Received
Options Assessment Report (First Version)	August 2022	August 2022
Appraisal Specification Report (First Version)	August 2022	August 2022
Strategic Outline Case	August 2022	August 2022
Appraisal Specification Report (Second Version)	July 2023	August 2023
Options Assessment Report (Second Version)	July 2023	August 2023
Outline Business Case	August 2023	August 2023

Financial Approvals

6.2.20. In terms of financial approvals, the following statements would be prepared as part of the FBC for consideration and approval by the GCP Executive Board:

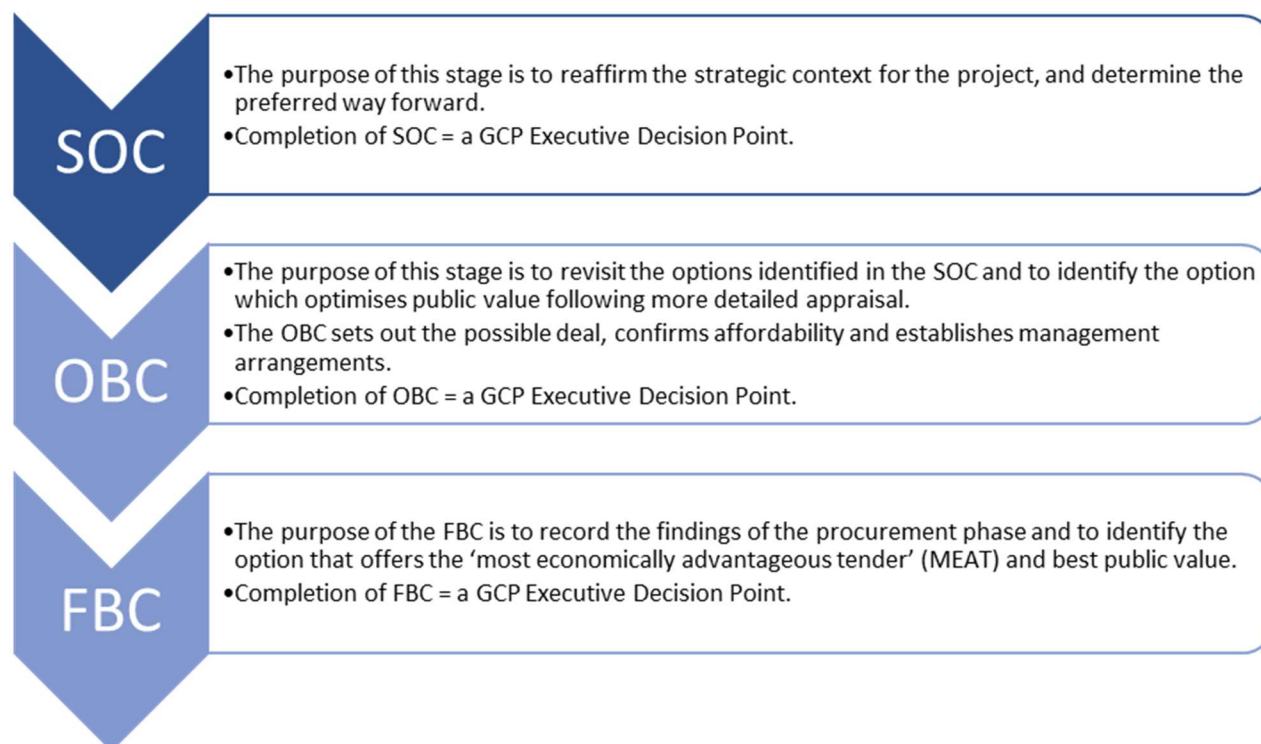
- A budget statement – to show the resource costs over the lifespan of the programme;
- A cash flow statement – to show existing spend, and the cash which would be spent on the preferred option, if it goes ahead; and
- A funding statement – to show the proposed sources of the required funds; this would include the contingencies necessary to ensure there is sufficient financial cover for risks and uncertainties.

Progress Route

6.2.21. The programme is following the three business case stages set out in the HM Treasury's Programme Business Case Guidance; these stages are described below and are shown in Figure 6-1:

- Strategic Outline Case (SOC), consisting of high-level analyses which establish the need for the programme and identify the options to be short-listed;
- Outline Business Case (OBC), containing more detailed analyses of short-listed options to assist with the identification of a preferred option, and setting out the financial, commercial, and management strategies; and
- Full Business Case (FBC), updating the preferred option analyses and confirming the final financial, commercial, and management strategies.

Figure 6-1 – The Three Stages of the Business Case Process¹³²



6.2.22. The scheme is currently at the second stage of the business case process, OBC, which would need to be submitted to, and approved by, the GCP Executive Board. If approved, and subject to CCC's decision-taking processes it is anticipated that the scheme would progress to the FBC stage in winter 2023.

6.2.23. The ultimate decision on whether to implement the Sustainable Travel Zone (STZ) sits with CCC; this is because CCC possess the necessary legal powers as the local highway authority.

6.3 Programme Scope, Dependencies and Constraints

6.3.1. The Making Connections programme is formed of three constituent elements; namely, improvements to bus services, the creation of a sustainable travel zone, and investing in other sustainable travel schemes, including smarter travel initiatives.

6.3.2. Making Connections is a constituent part of the City Access programme. City Access is GCP's sustainable transport strategy and forms part of its overarching sustainable transport programme. The sustainable transport programme is composed of four programmes that contribute to the following aims:

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

¹³² HM Treasury (2018). *Programme Business Case Guidance*

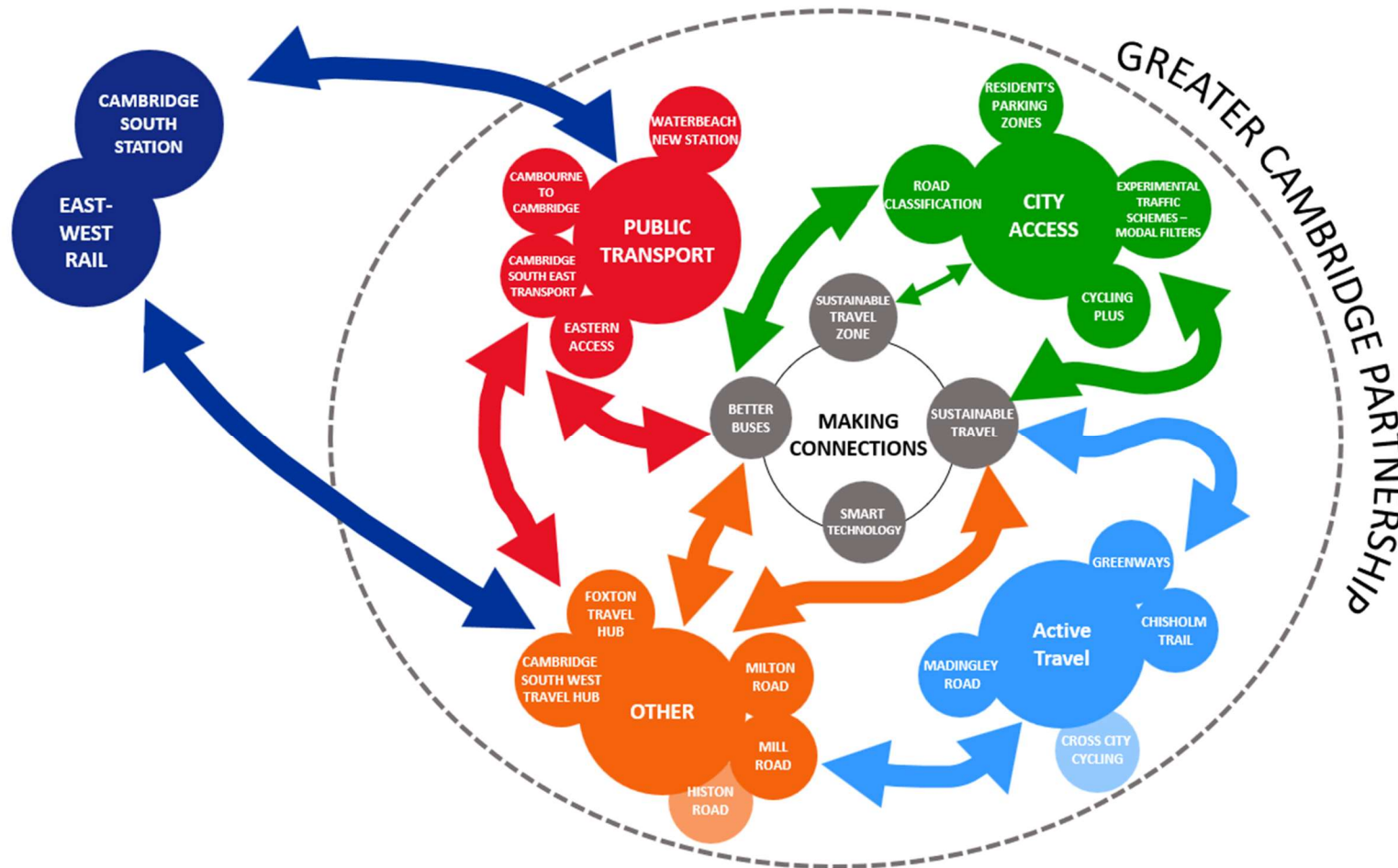
- Keep the Greater Cambridge area well connected to the regional and national transport network, opening up opportunities by working closely with strategic partners;
- Reallocate limited road space in the city centre and invest in public transport (including Park & Ride) to make bus travel quicker and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

6.3.3. The four sustainable transport programmes are listed below, and their interdependencies are shown in Figure 6-2:

- **City Access Programme:** is GCP's sustainable transport strategy that includes the following schemes: Making Connections, road classification, cycling plus, experimental traffic schemes and residents' parking schemes;
- **Public Transport Programme:** consists of four corridor projects that aim to provide better public transport and active travel routes for growing communities to the north (Waterbeach to Cambridge), southeast (Cambridge Southeast Transport), east (Cambridge Eastern Access) and west (Cambourne to Cambridge) of Cambridge;
- **Active Travel Programme:** a programme of active travel schemes designed to increase cycling, scooting, jogging and walking in Greater Cambridge (including: Chisholm Trail, Cross-City Cycling and the Greenways programme); and
- **Other Transport Schemes Programme:** a suite of corridor improvements and transport interchange schemes; this, includes Milton Road, Histon Road, Mill Road, New Waterbeach Station, Cambridge Southwest Travel Hub and Foxton Travel Hub.

6.3.4. Whilst the sub-programmes under the four sustainable transport programmes are being managed independently, certain interdependencies exist with Making Connections; these interdependencies are also illustrated below in Figure 6-2. Please note that completed schemes are lightly shaded; namely, Histon Road and Cross City Cycling.

Figure 6-2 – Programme Interdependencies¹³³



¹³³ Greater Cambridge Partnership

- 6.3.5. The interdependencies shown in Figure 6-2 highlight the inter-scheme relationships that need to be considered when developing the designs for, and subsequently implementing, each of the Making Connections work packages. For example, wider sustainable travel measures must be developed in consideration of the active travel programmes, the Cycling Plus scheme and the Experimental Traffic Schemes, as all schemes propose modifications to Greater Cambridge's active travel network.
- 6.3.6. Similarly, the GCP public transport schemes would provide further public transport capacity to complement that provided through Making Connections, and the implementation of the Sustainable Travel Zone would likely increase demand for those schemes. Therefore, whilst the viability of Making Connections is not directly dependent on the delivery of these schemes, prior to its proposed commencement, they would influence demand. The GCP's latest Transport Programme is set out in Figure 6-4 and includes a column that sets out how the programmed completion dates of each scheme align with the proposed opening year for Making Connections.

Table 6-4 – GCP's Transport Programme

Project	Current Delivery Stage	Programmed Completion Date	Alignment with Planned Opening Year for Making Connections
Cambridge Southeast Transport (CSET) Phase 1	Construction	2024	-2 Years
Cambridge Southeast Transport (CSET) Phase 2	Design	2026	Same year
Cambourne to Cambridge / A428 Corridor	Design	2026	Same year
Waterbeach to Cambridge	Early Design	2027	+ 1 Year
Eastern Access	Early Design	2027	+ 1 Year
West of Cambridge Package	Design	2025	-1 Year
Milton Road	Construction	2024	-2 Years
City Access Project	Design	2024	-2 Years
Whittlesford Station Transport Infrastructure Strategy	Initial Options	2023	-3 Years
Cycling Plus	Initial Options	2027	+ 1 Year
Chisholm Trail Cycle Links Phase 2	Design	2024	-2 Years
Madingley Road (Cycling)	Design	2025	-1 Year

Project	Current Delivery Stage	Programmed Completion Date	Alignment with Planned Opening Year for Making Connections
Waterbeach Greenway	Project Initiation	2025	-1 Year
Fulbourn Greenway	Early Design	2025	-1 Year
Comberton Greenway	Design	2025	-1 Year
Melbourn Greenway	Design	2025	-1 Year
St Ives Greenway	Design	2025	-1 Year
Barton Greenway	Design	2025	-1 Year
Bottisham Greenway	Design	2025	-1 Year
Horningsea Greenway	Design	2024	-2 Years
Sawston Greenway	Design	2025	-1 Year
Swaffhams Greenway	Design	2025	-1 Year
Haslingfield Greenway	Design	2025	-1 Year
Waterbeach Station	Design	2025	-1 Year

- 6.3.7. The progress of GCP's wider programme of schemes is dependent on a number of key decisions and potential enquiries. Therefore, the interface between Making Connections and the public transport schemes is being carefully managed with regular planning and coordination meetings taking place between delivery teams to ensure the impact of any potential delays is mitigated appropriately; this includes a consideration of the scheduling of construction activities.
- 6.3.8. Not only is there a potential interdependency between the construction phases of each programme, but considerations are also being taken during the design phase to ensure that the design of one scheme does not impact another. The coordination between each major programme is a significant task for the GCP and one which features as a heightened risk on the Risk Register see Appendix N.

Programme Dependencies

- 6.3.9. The success and financial viability of the Making Connections programme has a relationship with a number of other activities, projects and programmes.
- 6.3.10. In addition to the programme interdependencies above, the following table sets out a longlist of potential relationships and dependencies; these dependencies, and the extent of their relationship with Making Connections, would be reviewed as the programme is refined.

- 6.3.11. Regarding the dependencies related to the bus network, it should be noted that the Bus Services Act of 2017 provides the CPCA, as the Local Transport Authority, with powers to reform the bus market. The Act provides the option to franchise bus services or create an enhanced partnership. The CPCA has established a Bus Reform Task Force whose role is to consider and recommend appropriate reforms to bus services, strategies and public information. The Bus Reform Task Force is preparing a business case that is appraising the relative merits of enhanced partnership working or franchising; the outcome of this process has a key impact on the route to delivering of the bus service improvements proposed as part of Making Connection programme.

Table 6-5 – Making Connections Programme Dependencies

Dependency	How it may impact the development of the scheme
Bus Fleet Capacity - at present there are not enough buses to meet the Making Connections service expansion proposals.	The Making Connections programme includes proposals for the expansion of, and enhancements to, Cambridge's bus network. The proposals include more frequent services, with longer operating hours, more rural connections, and new routes into growing employment areas. Moreover, the procurement mechanism for expanding the bus fleet should reflect the CPCA's commitment for all buses to be zero emission by 2030. To achieve this, it is estimated that the current bus fleet in the Greater Cambridge area may need to double in size. The doubling of the bus fleet equates to an additional 130 buses, with 100 buses serving the core network and 30 buses serving rural areas. The delivery of the bus fleet is dependent on effective coworking with operators and manufacturers and the development of a procurement strategy that presents an attractive arrangement for potential service providers. The ability to deliver fleet capacity expansion also has a strong relationship with the outcome of the CPCA's ongoing bus reform work. The Bus Reform Task Force is preparing a business case that is appraising the relative merits of enhanced partnership working or franchising.
Bus Depot and Station/Stop Capacity would need to be expanded to meet the Making Connections bus service expansion proposals.	Cambridgeshire's existing bus depot and station/stop network is operating at or near capacity. The Making Connections programme is likely to require a review of this network to accommodate additional buses. The expansion of the bus depot and station/stop network would thus need to occur alongside the delivery of the overall Making Connections programme to achieve the desired level of service. The ability to deliver bus depot and station/stop capacity expansion is also related to the outcome of the CPCA's bus reform work. The Bus Reform Task Force is preparing a business case that is appraising the relative merits of enhanced partnership working or franchising.

Dependency	How it may impact the development of the scheme
Inadequate grid capacity and charging infrastructure for electric buses —significant additional charging infrastructure would need to be delivered to meet the Making Connections bus service expansion proposals.	Reflecting the Cambridgeshire and Peterborough Climate Commission's recommendations (2021), the CPCA's draft Local Transport and Connectivity Plan (LTCP, 2022) contains a commitment for all buses to be zero emission by 2030. The CPCA's Zero Emission Bus Regional Areas (ZEBRA) bid, to assist in providing 30 electric buses, was approved in 2021. There is an intention to see a further 150 buses provided by 2025, and thereafter a further 40 each year until the entire fleet has been replaced. To cater for this change, appropriate charging infrastructure would need to be introduced, which is beyond the scope of the Making Connection programme. The nature of this change may further constrain bus depot capacity, and, in some cases, it may be necessary to re-site bus depot facilities. The increased requirement for electricity at the existing and, if required, new depot sites, would place additional demand on the local electrical grid. Early engagement with UK Power Networks and CCC, and soft market testing with bus providers, is thus ongoing. The issues of grid capacity and the provision of charging infrastructure are being considered in the business case of the CPCA's bus reform work, which includes an options appraisal of potential delivery models.
GCP Busway Schemes – the success of the CSET Phase 2 and Cambourne to Cambridge (C2C) schemes would be influenced by the impact of Making Connections on reducing congestion, and would also contribute to the attractiveness of using bus services in the area.	Making Connections and the other schemes within the wider City Access programme, aim to reduce congestion in Greater Cambridge; this would be key to reducing journey times for buses and also making Park & Ride more attractive and successful. The mode-switching resulting from the STZ would create additional demand for proposed Park & Ride facilities, such as those proposed as part of C2C and CSET. The development of these two traffic-free corridor schemes would also increase the attractiveness and patronage of bus services to the west and south of the city and thereby further contribute to the Making Connections objectives of reducing congestion, improving journey times and reliability and increasing the number of trips made by bus
Lack of Park and Ride (P&R) and Travel Hub Capacity —the existing number of spaces at Cambridge P&Rs may need to be expanded to meet additional demand created by Making Connections.	Cambridge's existing network of five park and ride sites was operating at or near capacity prior to the COVID-19 pandemic. As a result, the GCP programme includes the provision of up to 10,000 additional Park and Ride spaces around the city region. Here, the GCP has expanded Trumpington Park and Ride, and has proposals for additional capacity at the Cambridge South West Travel Hub (CSWTH) and the Foxton Travel Hub, as well as new/relocated hubs proposed via the Cambourne to Cambridge, Cambridge Eastern Access and Waterbeach to Cambridge schemes; the Making Connections programme is likely to further increase demand. The scheme traffic modelling would be regularly reviewed to assess the likely supply and demand for Park and Ride spaces*.
*Please note that the parking and public transport models are not capacity constrained; hence, there are no parking or service capacity constraints restricting people from choosing park and ride as a preferred travel option	
Delivery of Cambridge South Station —could significantly improve public transport access to the CBC and thus influence the modal choices of people accessing the site.	Cambridge South station could make the CBC and Southern Fringe more accessible and enable significant future development at the site. The delivery of Cambridge South could thus change the potential number of people choosing to drive to Cambridge, and/or use park and ride services. Hence, the scheme shares the aim of Making Connections to enact modal share and reduce congestion. The effect of Cambridge South on traffic flows in Cambridge has thus been accounted for in the scheme modelling.

Dependency	How it may impact the development of the scheme
Extent and rate of development in Greater Cambridge —the viability of Making Connections would be influenced by the extent to which growth occurs in the city	The modelling underpinning Making Connections is informed by the levels of growth set out in Local Plans. The rate of growth in Cambridge would have a significant impact on the potential revenue generation of the Making Connections programme. The potential for alternative growth trajectories can be considered during the scheme development process as sensitivity tests of scheme viability. Following the introduction of any scheme, monitoring and evaluation of impacts would allow the scheme to be adapted to reflect observed outcomes.
Technological Change —innovations have the potential to change both the need to travel, our travel behaviours and the delivery of road charging schemes.	The GCP is committed to using new technologies to create a clean and efficient transport system. The final specification of the Making Connections programme, including the proposed sustainable transport measures, would be influenced by the technologies available at the procurement stage.
Approvals —delays to approvals of part or all of the programme could impact the holistic delivery of the programme.	Timescales in relation to statutory processes in order to deliver the scheme, for example, the need to obtain any planning permission, and the publication and confirmation of any Orders.

6.4 Programme Implementation

Programme Workstreams

- 6.4.1. The work breakdown structure for the Making Connections programme is set out in the following table. No activities or spend of programme resources would take place outside the defined workstreams, as together they define the entirety of the scope of the programme. Each workstream has a name to define it and a reference which assists in the organisation of programme files.

Table 6-6 – Workstream Breakdown Descriptions¹³⁴

Workstream Name	Description
Programme Management	All activities related to the management of technical work streams throughout the programme and general day to day communication and engagement with the client and partner organisations.
Outline Business Case	Work related to the production and management of the Outline Business Case.

¹³⁴ Making Connections Technical Team

Workstream Name	Description
Impact Assessments	The purpose of the workstream is to provide input into the business case based on the effects arising from Making Connections; the assessments included are as follows: • Noise Assessment – identifies the potential change in noise levels along highway links within the study area. • Air Quality – identifies the potential change in local air quality along highway links within the study area. • Health Impact Assessment – the approach used to judge the potential health impacts of Making Connections on a population, particularly on vulnerable or protected groups. • Carbon – a Carbon Management Plan sets out how greenhouse gases would be managed and minimised across the whole lifecycle of the scheme. • Business Impact Assessment – High-level impact analysis which assesses business impacts in terms of workforce, customers and supply chains.
Equality Impact Assessment (EQIA) and Social Impact (SI) and Distributional Impact (DI) Assessments	• The EqIA considers the impact of Making Connections on relevant groups who share characteristics which are protected under the Equality Act, as well as others considered to be vulnerable within society. • The Social Impact Assessment (SIA) considers the likely impacts of Making Connections on the human experience, and its impact on social factors which are not considered in wider economic or environmental impacts. • The Distributional Impact Assessment (DIA) considers the variance of impacts from the Programme across different social groups. The SIA and DIA form part of the options appraisal process and feed into the Appraisal Summary Table.
Delivery Model Assessment	The Delivery Model Assessment (DMA) provides an assessment of the possible delivery models for Making Connections and its component parts, including: • Roadside Equipment; • The STZ payment system – back office and enforcement methods; and, • Infrastructure requirements – bus depot facilities, bus service management and sustainable transport measures. The DMA sets out the target operating model for how the charging component would work, the roles and responsibilities of different organisations and a summary of which elements should be outsourced or delivered in-house.

Workstream Name	Description
Charging Scheme Design	Technical work relating to the design and operation of the Charging Scheme for the STZ; this includes outline design of the scheme boundary and entry signage and camera locations. Technical notes have been produced for: • Target Operating Model - charging scheme; • Concept of operations for the charging scheme; • High-level roadside equipment design; • Back office operations; • Customer sales and payment channels; and, • STZ Enforcement . This workstream also has produced a series of notes on potential Discounts, Exemptions and Reimbursements and the mechanisms to administer them.
Bus Proposition Design and Sustainable Transport	Technical work to produce illustrative bus and sustainable transport networks that could be delivered as part of the Sustainable Travel Zone. This workstream is aligned with the work of the CPCA's Bus Reform Task Force. The Task Force is currently preparing a business case that is appraising the relative merits of enhanced partnership working and franchising. The GCP is liaising closely with the CPCA throughout this process.

Programme Delivery Approach

- 6.4.2. As set out above, it is proposed that CCC, as the local highway authority, would fulfil the overarching role of Delivery Body for the Making Connections programme.
- 6.4.3. It is recognised that other organisations, including CPCA as the local transport authority also have delivery roles, including in relation to the bus proposition, within the overall programme. The details of this arrangement, and the role of the GCP, would be decided within the FBC.
- 6.4.4. The role of CCC, as the Delivery Body, would be to deliver the highway-related component schemes of the Making Connections programme with the support of appointed contractors and partners where appropriate. Although the GCP has overseen development of this OBC, subject to future decision-taking, the current view is that the FBC for Making Connections would therefore be overseen by CCC.

Relationship between CCC and the CPCA

- 6.4.5. Cambridgeshire County Council, as local highway authority, and the Cambridgeshire and Peterborough Combined Authority, as the local transport authority, have a long-established working relationship, with ongoing collaboration on procedural and financial matters.
- 6.4.6. The detailed management arrangements for the implementation and operational phases of Making Connections are still under development but would build upon those already-established arrangements and protocols. These arrangements would respect key commercial issues and constraints, including those related to the road user charge and bus elements, that are set out in the Commercial Dimension to this OBC. In particular, detailed

mechanisms related to bus service procurement, and implementation of the proposed fares initiative, are dependent on the outcome of the ongoing CPCA work on bus reform.

Given this, the detailed management protocols and arrangements for Making Connections would therefore be established after the approval of this OBC and would be presented in the Full Business Case.

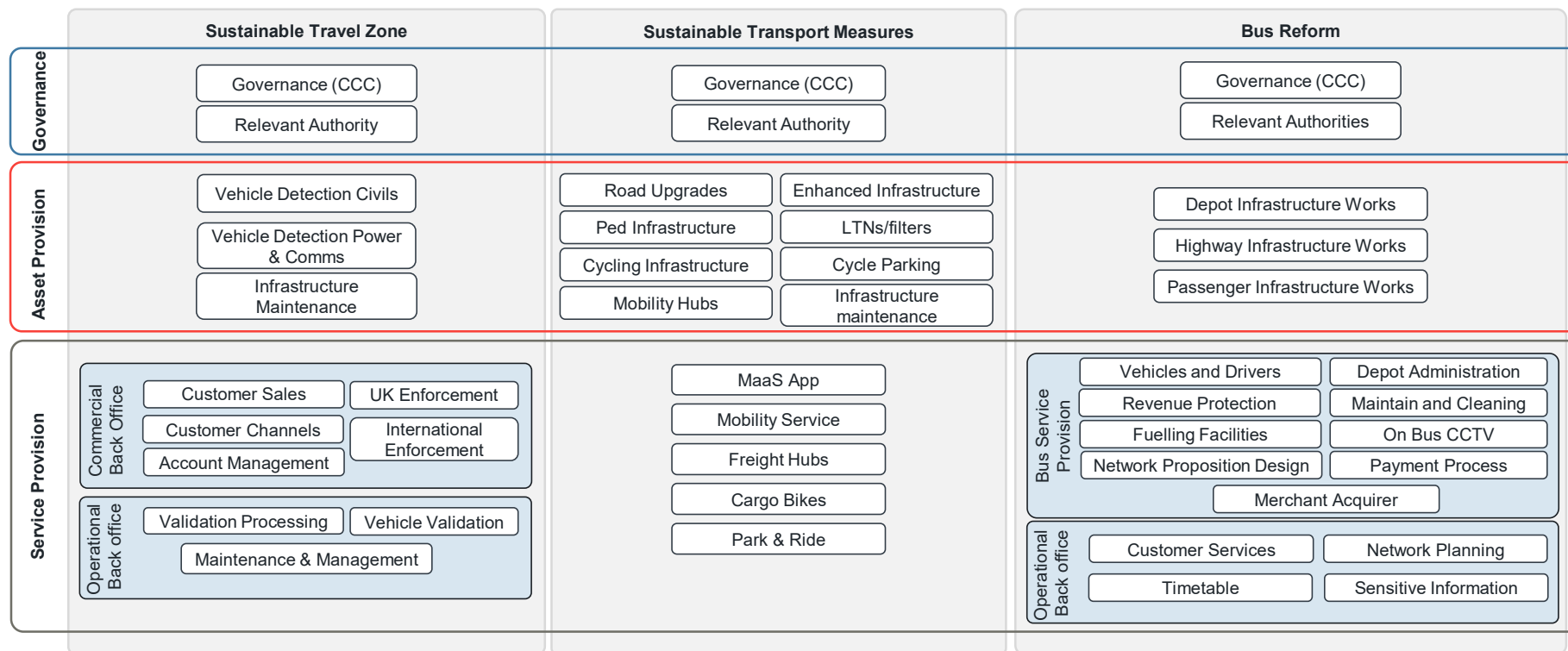
Programme Delivery

- 6.4.7. A core Making Connections team would be put in place to coordinate programme development and delivery. The implementation and operation of the component schemes of the Making Connections programme, including the proposed sustainable transport measures, would be undertaken by Delivery Agents and Operating Agents; these agents are set out in the table below.
- 6.4.8. Delivery Agents are subcontractors or other public sector bodies tasked with delivering a scheme in whole or in part. An Operating Agent is a sub-contractor or other public body tasked with operating (and/or decommissioning) a scheme in whole or in part.
- 6.4.9. The component schemes of the Making Connections programme, including the sustainable transport measures, are shown in Figure 6-3. To ensure that the programme is appropriately resourced, a combination of the following resources would be drawn upon:
- Lead Advisor (the multi-disciplinary consultant team set out in Figure 6-4)
 - GCP resource
 - CCC resource
 - Supplementary resources from the independent consultant market, where appropriate, e.g. where additional Project Management resources are required
- 6.4.10. Further detail on the procurement approach for securing this resource is detailed in the Commercial Dimension of this OBC.

Programme Delivery Architecture

- 6.4.11. The various roles that would need to be fulfilled at each phase of the programme lifecycle, and for each component scheme of the Making Connections programme, are set out in the Commercial Dimension, which is based on the delivery architecture set out in Figure 6-3. It is not possible to specify all of the actual organisations that would undertake these roles at this stage of the Making Connections programme.

Figure 6-3 – Making Connections Scheme Delivery Architecture

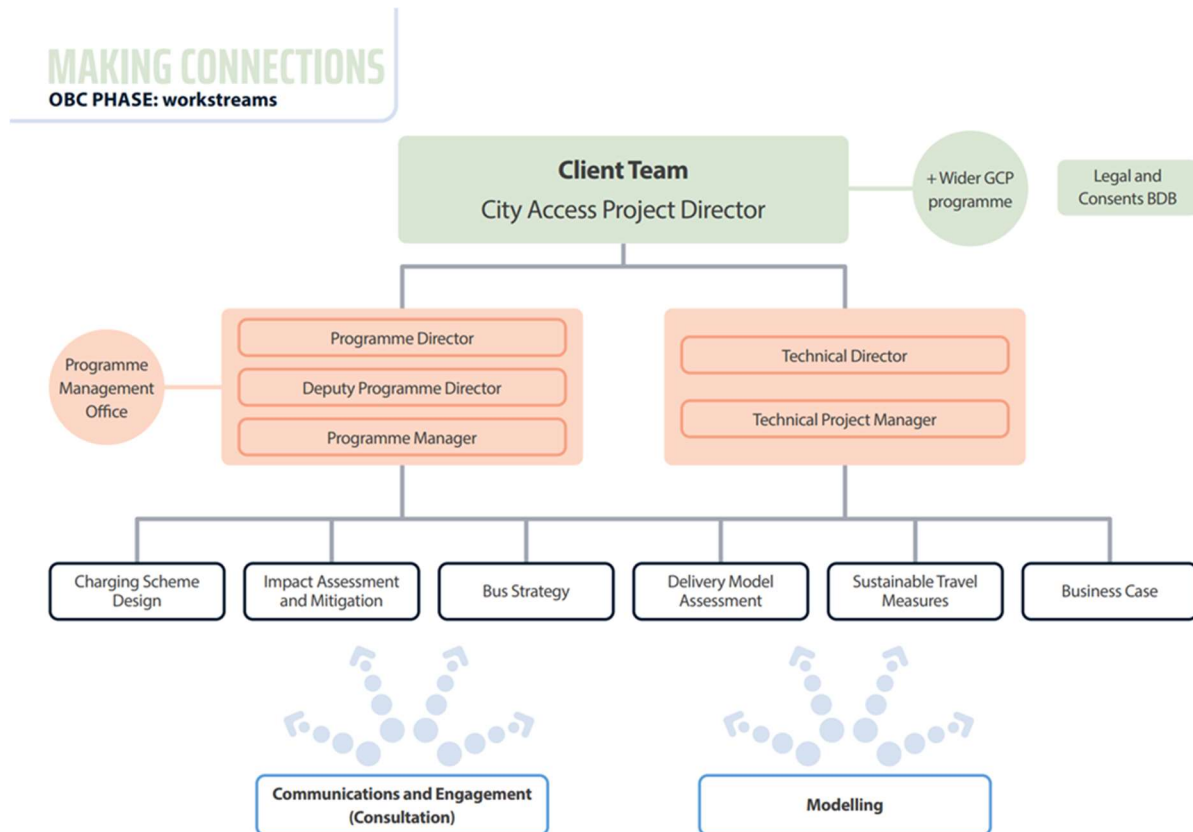


- 6.4.12. In determining the best-placed Delivery Agent for each scheme, the rationale applied is that where CCC currently have the responsibilities for delivery/operation of the activities relating to the component schemes of the Making Connections programme, it is likely that this would continue. This assumption would be reviewed at the FBC stage when the required resource and technical capability to deliver each scheme is better understood.
- 6.4.13. Where the legal service provider is included as the lead body, this is due to acknowledgement that a specialist central resource may be required to coordinate and develop the Traffic Regulation Orders (TRO) and the Charging Scheme Order (CSO).
- 6.4.14. Each component scheme of the Making Connections programme would likely require Implementation Funding. Hence, each scheme is being developed in accordance with its own timescales to allow the appropriate appraisals to take place and subsequent funding to be released.
- 6.4.15. The implementation and operation of the component schemes of the Making Connections programme would be undertaken by one or more of the Delivery or Operating Agents; this information is provided in the Commercial Dimension.
- 6.4.16. It is proposed that Project Managers would be allocated to each scheme as appropriate; the level and quantity of project management resources required would be appropriate for the complexity and value of the scheme. There is also the possibility that some of the schemes would become standalone projects in the future, depending on the outcome of the Risk Potential Assessment (RPA) and the policy design components.

The Delivery Team

- 6.4.17. The delivery team, headed by the overarching Making Connections Programme Director, manages the day-to-day delivery of the Making Connections programme and is accountable to the Project Board. The team coordinates inputs from the technical advisors responsible for the delivery of the key workstreams, including:
- Programme Management
 - Business Case
 - Options Development and Appraisal
 - Charging Scheme Design
 - Impact Assessment and Mitigation
 - Delivery Model Assessment
 - Sustainable Transport Measures
 - Bus Strategy and network development
 - Commercial and Financial
 - Communications and Engagement
- 6.4.18. The delivery team structure is illustrated in Figure 6-4 below.

Figure 6-4 – Making Connections delivery team structure

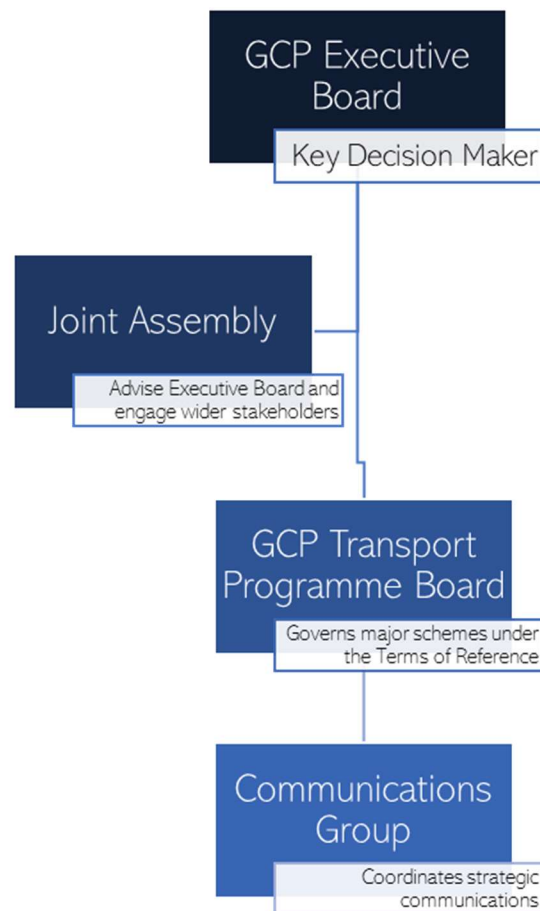


Governance, Organisational Structures & Roles

Project Governance

- 6.4.19. As set out in the Strategic Dimension, the GCP is the local delivery body for the City Deal with central Government and is responsible for overseeing the delivery of all schemes funded through the City Deal. As such the Making Connections programme is currently overseen by the GCP, although CCC, as the local highway authority, would also have a key role. In relation to the road user charging element of the Making Connections programme, the legal powers to implement a charging scheme sit with CCC as the local highway authority. CCC would therefore make the final decision in relation to any charging scheme and would be responsible for making the Charging Scheme Order to implement the charging scheme.
- 6.4.20. The GCP operates as a Joint Committee that is jointly governed under powers delegated by its three local authority partners (CCC, Cambridge City Council and South Cambridgeshire District Council). The GCP is led by a decision-making Executive Board which coordinates the overall strategic vision, and drives forward the partnership's programme of work.
- 6.4.21. The GCP Executive Board, as a joint committee of the three Councils, was established by Cambridgeshire County Council (CCC) under section 102(1) (b) of the Local Government Act 1972 and by Cambridge City Council and South Cambridgeshire District Council under section 9EB of the Local Government Act 2000. The three Councils have agreed to delegate exercise of their functions to the Executive Board to the extent necessary to enable the Executive Board to pursue and achieve the objectives of the Greater Cambridge City Deal and to undertake any actions necessary, incidental or ancillary to achieving those objectives, and, accordingly, the three Councils have made the necessary changes to their respective schemes of delegation. The Executive Board may further delegate to officers of the three Councils.
- 6.4.22. The GCP is run in accordance with a clear governance structure, agreed by all partners. The governance structure of the GCP is shown in Figure 6-5.

Figure 6-5 – Governance Structure¹³⁵

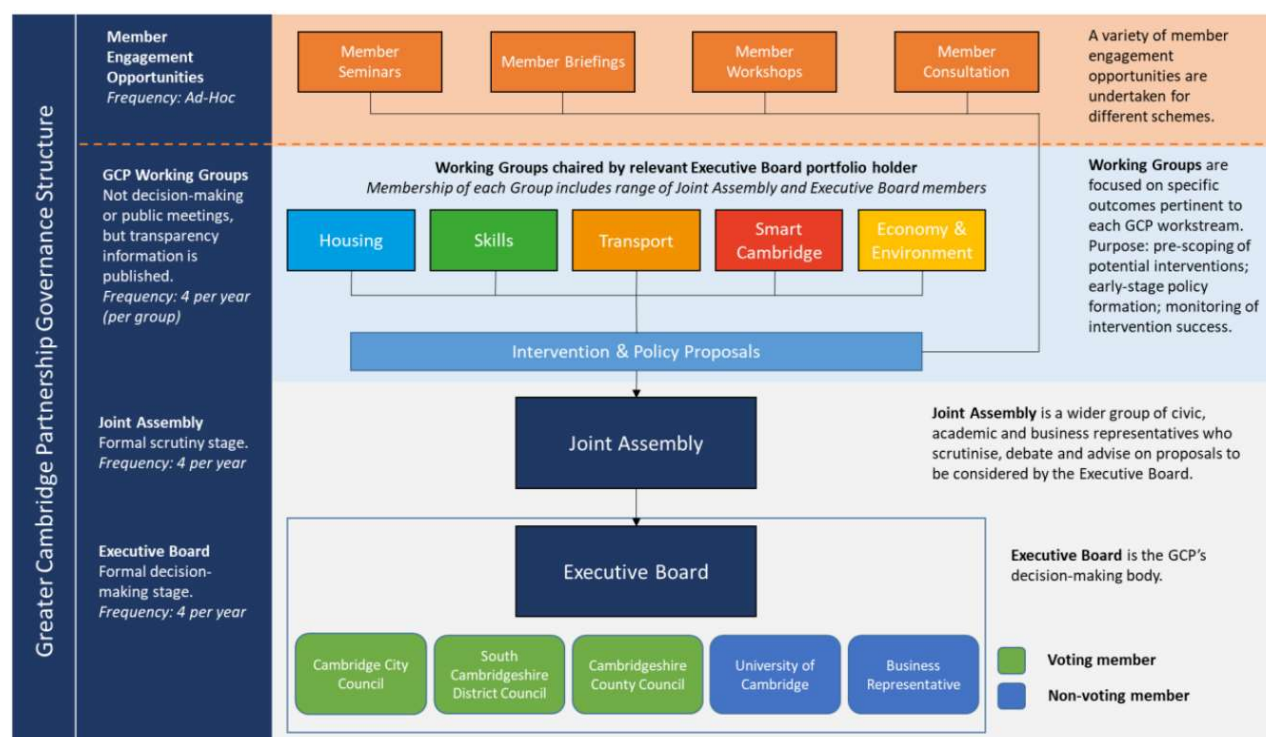


Executive Board

- 6.4.23. The composition and responsibilities of the Executive Board are set out in Table 6-2. The rules governing the Executive Board only allow the three local authority representatives voting rights; however, the Board consider the advice of the other representatives (currently the CPCA Business Board, and the University of Cambridge) to make sure decisions represent the business and academic sectors.
- 6.4.24. The following figure provides a more detailed summary of the GCP's governance structure.

¹³⁵ Greater Cambridge Partnership (2021). *Governance - Assurance Framework*

Figure 6-6 – GCP Executive Board and Joint Assembly Governance Structure¹³⁶



Joint Assembly

- 6.4.25. The composition and responsibilities of the Joint Assembly are set out in Table 6-2. The current members of the Joint Assembly and their respective roles are listed on the CCC website.
- 6.4.26. The Joint Assembly draws on the broad expertise of its 15 members to scrutinise and advise on the Executive Board's key decisions relating to the projects and programmes within its portfolio of schemes.

Transport Programme Board

- 6.4.27. The GCP Transport Programme Board is responsible for overseeing all major transport schemes being delivered as part of the City Deal. The purpose of the Programme Board is to:
- Provide visible governance in line with the City Deal Assurance Framework;
 - Advise on programme wide level decisions before they go to the GCP Executive Board;
 - Guide project managers in developing proposals to meet the agreed objectives;
 - Review the proposals and challenging solutions on impact, benefits and value for money; and,
 - Act as a sounding board for concepts and ideas.

¹³⁶ Greater Cambridge Partnership. *Greater Cambridge City Deal Assurance Framework*

6.4.28. The membership of the Project Board is set out below:

Table 6-7 – Programme Board Membership¹³⁷

Role	Organisation
Executive	GCP
Senior User	CCC
Financial Lead	GCP and CCC as accountable body
Programme Manager	GCP
Project Managers	For projects in scope, with support from consultants as Suppliers (if required)

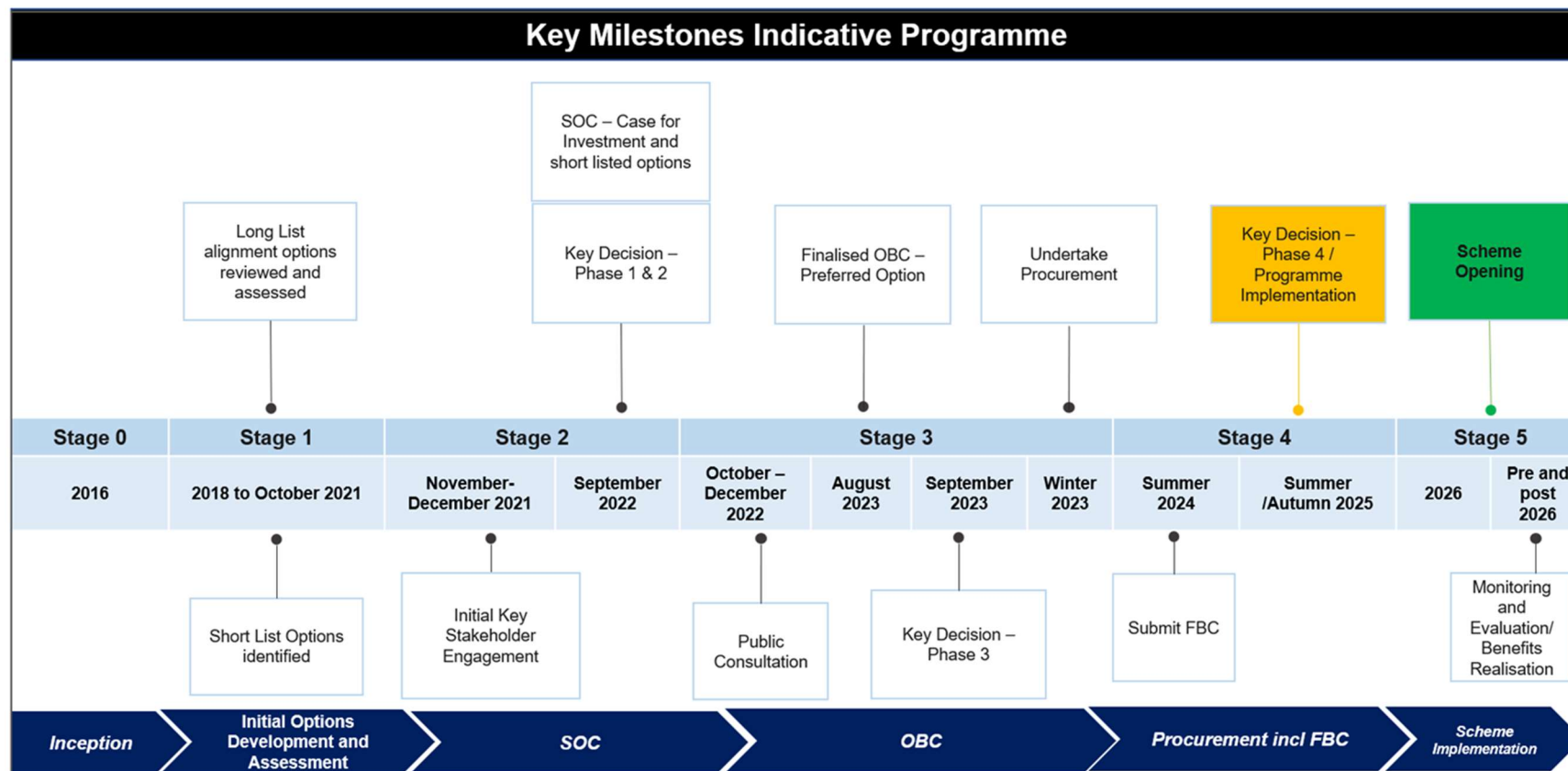
6.5 Programme Plan

6.5.1. A programme showing the project development and delivery stages is presented in Figure 6-7 – Programme Gantt Chart and provides:

- Duration and milestones of all tasks;
- Relationships and interdependencies between the various activities; and,
- Project phases.

¹³⁷ Greater Cambridge Partnership (2021). *Governance - Assurance Framework*

Figure 6-7 – Programme Gantt Chart



- 6.5.2. If the programme should change, this would be reported through the Project Managers Report to seek approval from the GCP Executive Board. The following table provides the key milestones and their currently anticipated delivery dates; items in green text have been completed. Separate detailed programmes of implementation for the bus programme and wider sustainable travel measures are provided in Appendix L. Subject to approvals, these programmes commence from 2023/2024 onwards.

Table 6-8 – Key milestones

Stage	Key Tasks	Actual / Estimated Completion Date
Stage 0 – Inception	N/A	2016
Stage 1 – Initial Options Development and Assessment	N/A	2018
Stage 2 – SOC	Initial Key Stakeholder Engagement	November 2021 – December 2021
Stage 2 – SOC	SOC – case for investment & short-listed options	September 2022
Stage 2 – SOC	Key Decision - Phase 1&2	September 2022
Stage 3 – OBC	Public Consultation	October to December 2022
Stage 3 – OBC	Finalised OBC - preferred option	August 2023
Stage 3 – OBC	Key Decision - Phase 3	October 2023
Stage 4 – Soft Market Testing	Engagement with the market	Early 2024
Stage 4 – FBC	Submit FBC	Summer 2024
Stage 4 – Procurement	Undertake procurement	Summer/Autumn 2024
Stage 5 – Scheme Implementation	Programme implementation	Winter 2024 to Summer 2026
Stage 5 – Scheme Implementation	Opening	Autumn 2026
Stage 5 – Scheme Implementation and monitoring	Monitoring and Evaluation / Benefits Realisation	- Quarterly Progress Updates - September 2026 to September 2028 - Interim Findings Report – 2028 - Final Report January – 2032-34

6.6 Stakeholder Engagement and Communications

Communications Strategy

- 6.6.1. This section sets out the strategy for communications and stakeholder management. Effective communication is critical to the success of the programme, and, as a result, all communication activities are guided by a programme Communications Plan and are signed off by the Making Connections project manager.
- 6.6.2. The Communications Plan for Making Connections is guided by the principle of the City Deal-wide communication strategy. The purpose of the strategy is to ensure that accurate and timely messages about the programme are disseminated to a range of identified stakeholder groups. Accordingly, the strategy outlines how the programme would keep

internal and external stakeholders informed about relevant programme information, including forthcoming stakeholder engagement events and key programme milestones.

Stakeholder Engagement

- 6.6.3. Stakeholder engagement for the Making Connections programme is managed by the programme's Communications and Engagement Team and is an ongoing process. The methods and frequency of engagement for the programme's different audiences and details of the Stakeholder engagement process to date are documented within the Consultation Report.
- 6.6.4. The Communications and Engagement Team maintain a Communications Log for the programme, which can be provided upon request. The Communications Log keeps a formal record of all programme consultation and includes the following headings: date; attendees; Subject matter/title of meeting; and organisations represented.

Engagement to Date

- 6.6.5. This section provides a high-level overview of the engagement and consultation activities that have been undertaken on behalf of GCP for Making Connections. A more detailed description of the consultation activities to date and their objectives is included in the Strategic Dimension.
- 6.6.6. The most recent formal public consultation event took place between 17th October 2022 and 23rd December 2022. A range of materials were prepared to help people interpret the proposals and the consultation was promoted extensively via a number of communication channels to raise awareness and encourage participation. Further details of the materials used are provided in the Consultation Report.
- 6.6.7. The consultation sought views on the following measures:
- Transforming the bus network
 - Investing in other sustainable travel schemes
 - Creating a Sustainable Travel Zone
- 6.6.8. The consultation proposal package also sought a view on a list of proposed Discounts, Exemptions, and Reimbursements, which were informed by the previous consultation and engagement with key stakeholders in Autumn 2021.

Consultation materials

- 6.6.9. The consultation utilised a number of core materials, as follows:
- **Leaflet:** A leaflet was directly delivered to circa 68,500 households, business, leisure and commercial properties in Greater Cambridge. The leaflet drew attention to the consultation and indicated where more information could be found;
 - **Brochure:** A 28-page brochure was prepared which outlined the background to the proposals and explained the potential options including proposed changes to the bus network. The brochure was available online and in hard copy at local libraries;

- **Consult Cambs:** All consultation material was available via the Consult Cambs portal, GCP's online engagement platform. This included an interactive map of the proposed Making Connections Future Bus Network where users could select 'before' and 'after' options to view the proposed changes to bus services;
- **Online Survey:** An online questionnaire, hosted on the Consult Cambs website for the duration of the consultation period, was the main mechanism through which respondents could comment on the proposals. Hard copies of the questionnaire and accessible copies were available on demand via a phone service; and,
- **Demographically Representative Poll:** A demographically representative poll was undertaken in addition to the online survey. The poll collected feedback from 1,000 residents whose demographics align with the make-up of the population of Cambridge as per Census 2021.

6.6.10. The consultation was promoted via the following methods:

- **Advertising:** An audio advertisement was broadcast regularly on Cambridge 105 Radio during the consultation period;
- **Stakeholder emails:** Emails were sent out to stakeholders during the consultation period on using the GovDelivery channel;
- **Media coverage:** a summary of scheme press coverage is provided in the Consultation Report;
- **Social media:** information about the consultation was posted throughout the consultation period on GCP's social media channels through Facebook and Twitter; and,
- **Consultation video:** a short video was produced which was added to the GCP YouTube channel.

6.6.11. In addition to the above, 20 consultation events were held. The meetings gave people the opportunity to find out more about the proposals and put questions directly to the programme team. Consultation events were either held online or in person and typically lasted two or three hours each. A number of the events were held in response to comments or requests from the public or politicians. All events were planned to occur ahead of the pre-Christmas period and with a buffer period of 10 days to respond to the consultation before it closed in December 2022.

6.6.12. A full breakdown of the consultation events is provided in Table 2-2 of the Making Connections Consultation Report.

6.6.13. To supplement the online survey and public events, over 70 targeted focus groups and outreach events were held to gain the input of those likely to have an interest in, or who might be affected by, the proposals. These events were organised proactively and in response to requests from stakeholders and the community. The majority of events were held during the consultation questionnaire period, with a few events held on either side of the consultation questionnaire period.

- 6.6.14. More detail on these events and a full list of meetings is provided in Appendix C of the Making Connections Consultation Report.

Stakeholder Responses

- 6.6.15. A summary of the responses provided by key stakeholders is set out in the Strategic Dimension, and those received via the public consultation portal are summarised in the Consultation Report.

6.7 Risk and Issues Management

- 6.7.1. This section sets out the arrangements for risk and issues management. Risks are events that have not happened but may happen, whereas issues are known to have happened.
- 6.7.2. The management of risk and uncertainty is key to the successful delivery of the Programme, as it identifies threats to delivery and enables effective risk management actions to be assigned. The approach to the management of programme risks, which aligns with the principles of HM Treasury's Orange Book¹³⁸, is set out below and includes:
- A continuous approach
 - Thorough identification of risks
 - Assessment of risks (including the assignment of risk ratings)
 - Active risk avoidance, mitigation and management
 - Effective communication of the risks to the project team

Risk Management Strategy

- 6.7.3. The GCP has adopted a robust Risk Management Framework to ensure effective management of risks in order to enable the successful delivery of all City Deal funded projects, including the Making Connections programme. GCP's risk management framework is updated on a monthly basis and reported to the GCP Board quarterly.
- 6.7.4. The risk management strategy for this programme is based on the core principles for risk management set out within PRINCE2 guidance and applied proportionally to the value of the scheme. The procedure for identifying key risks aligns with the following process:
- **Identify:** Complete the risk register (as appropriate to the area of the programme and/or the producing organisation) and identify risks, opportunities and threats;
 - **Assess:** Assess the risks in terms of their probability and impact on the programme objectives;
 - **Plan:** Prepare the specific response to the threats (e.g. to help reduce or avoid the threat), and/or plan to maximise opportunity in the case that these threats do occur;
 - **Implement:** Carry out the above in response to an identified threat if one occurs; and
 - **Communicate:** Report and communicate the above to relevant team members and stakeholders.

¹³⁸ [HM Treasury \(2023\). Orange Book Guidance](#)

6.7.5. Risk management must be an ongoing process, as illustrated by the GCP risk management process illustrated below.

Figure 6-8 – GCP Risk Management Process¹³⁹



6.7.6. To facilitate the effective management of risks associated with the scheme’s delivery, risks have been considered in terms of two broad categories:

- **Strategic Risks** – these are presented in the Project Managers report and are those risks which impact the overall delivery of the programme scope; and
- **Technical Risks** – these are associated with specific work streams and are managed by the Project Manager.

6.7.7. The Project Manager has responsibility for overseeing the Risk Management process. In accordance with the GCP Risk Management Framework, the roles, responsibilities and reporting lines for risk management have been clearly defined within the programme team.

Risk Register

6.7.8. A series of assumptions and exclusions workshops have taken place with technical experts from each project workstream. The purpose of these workshops was to ensure that the risk register fully reflected changes and progress made on programme delivery post-SOC; this enabled the team to benchmark their risks against the updated scope, cost and programme, and facilitated the production of the quantified risk register found in Appendix N.

6.7.9. The risk register was updated to reflect the output of these reviews to ensure that risk exposure was baselined against the programme scope (across all workstreams) and cost

¹³⁹ Greater Cambridge Partnership (2021). *Governance - Assurance Framework*

(with reference to the Charging Scheme, Demand and Financial Models). This exercise has helped to ensure a robust approach to capturing risk (threats and opportunities) and estimating uncertainty.

- 6.7.10. The evaluation of risks and uncertainties using the matrix approach to risk quantification in the programme risk register, is in line with best practice and commensurate with the outline stage of this programme.
- 6.7.11. A minimum and maximum quantification of each risk is provided in the two columns on the right of Table 6-9. From the QRA, a Monte Carlo simulation has been undertaken to optimise the risk assessment and analyse the sensitivities surrounding the risk allocations used. The optimised quantified value of risk for each option is shown in the Financial Dimension.
- 6.7.12. The risk register sets out the following:
- Details of the risk
 - The likelihood of the risk
 - The impact of the risk.
 - The mitigation strategy, including risk owners. The anticipated reduction in exposure to risk, as a result of those mitigations, the target score, is provided in Appendix N.
 - An overall assessment of the current status of the risk or issue which would be one of the following categories:
 - **Red** – significant and live risk with high potential to occur and to impact programme delivery either at the strategic or technical level;
 - **Amber** – risk and issue that has lower potential to occur and lower impact; and,
 - **Green** – risk is unlikely to occur and or has no major impact.

The five highest risks, identified at this stage in the programme's evolution, are listed the table below; these risks all fall into the red risk category.

Table 6-9 – Programme risks

Risk ID	Risk Title	Risk Owner	Risk Description	Cause of Risk	Consequence of Risk	Current Assessment	Mitigation Measures	Minimum Value	Maximum Value
6	Development and delivery of the bus network upgrade may delay introduction of STZ charging	CPCA and CCC	The Cambridge and Peterborough Combined Authority (CPCA) are at an early stage of progression towards the key milestones to deliver bus reform across the network.	Bus network delivery is dependent on CPCA, and the charging scheme is dependent on Cambridgeshire County Council (CCC), Independent review of the bus service reform case - the independent review may not agree progression of this business case to public consultation Delayed of delivery of bus network improvements / bus offer is not sufficiently attractive and/or believed to be deliverable Both organisations have their own approval processes – scope for delivery timescales to be misaligned and hence delays.	Acceptability of the scheme - Charging cannot be imposed Auditor may reject the bus service reform business case, leading to circa 3-6 months to formulate an alternative strategy and ratify through governance. In the worst case this could be a showstopper.	High	Early strategy work to shape delivery model, programme and options in franchised or enhanced partnerships. Explore easy to implement bus improvements. Develop clear and simple comms on the bus offer - What and When. Establish a Bus Integration working group to provide closer working with CPCA and bus operators Effective communication between CPCA and GCP to manage the sequencing of the bus network upgrade and the introduction of the STZ charging infrastructure upgrades and the mechanism via which funding can be transferred.	£7,740,000	£12,900,000
27	Bus service reform may not be implemented in time to support delivery of Making Connections / adequate interim measures available	CPCA	Bus reform may not be implemented in time to support delivery of Making Connections / adequate interim measures available	The Cambridge and Peterborough Combined Authority (CPCA) are at an early stage of progression towards the key milestones to deliver bus reform across the network. Independent review of the bus reform business case - the independent review may not agree progression of this business case to public consultation	This would necessitate the implementation of interim measures, however there is no certainty around what these would be or the potential cost and schedule impact.	High	Actively develop contingency plan for bus reform including potential interim measures if there's a delay in implementation.	£2,580,000	£ 7,740,000
33	Behavioural change may increase congestion outside of hours in which STZ charging applies.	CPCA	Introduction of STZ charging may drive changes in travel behaviour that increase pressures on travel outside of times within which the STZ charge applies.	Highways network is very sensitive and can become very congested on Saturdays. Currently charge does not apply on Saturdays	It may be more costly to operate buses on Saturdays including revised timetables to account for longer journeys, cost of operation would increase impact on net revenue.	Medium	Review points would be built into the monitoring and evaluation strategy.	£2,580,000	£ 7,740,000

Risk ID	Risk Title	Risk Owner	Risk Description	Cause of Risk	Consequence of Risk	Current Assessment	Mitigation Measures	Minimum Value	Maximum Value
39	Zero-emission bus technologies	CPCA	Zero-emission bus technologies may not be able to deliver daily bus service mileages required	Bus strategy calculations assume 1 ZEB can replace one diesel bus. Caveats in strategy highlights that the ZEBs would not have the capacity to complete some journeys currently done by buses.	Could be mitigated by partial sourcing of hydrogen buses however this could have a significant cost impact. Alternatively, the implementation of opportunity charging at the end of service, but this would need the introduction of charging equipment in locations where we could receive objections, and might need to install additional substations to provide sufficient power for fast charging. This could also impact service frequency.	High	Could be mitigated by partial sourcing of hydrogen buses Alternatively the implementation of opportunity charging at the end of service, but this would need the introduction of charging equipment in locations where we could receive objections and might need to install additional substations to provide sufficient power for fast charging Accept continued operation of diesel buses.	£2,580,000	£ 7,740,000
35	Bus operating cost inflation	CPCA	Bus operating cost inflation and CPI out-turn may not be consistent with CPI forecasts	Uncertainty around salary increases, fuel etc. This is built into the cost plan. We have assumed that all of the cost headings would be increased by CPI, except for bus drivers and engineers who are modelled as increasing by CPI plus an additional 20% in 2026 (one-off additional increase).	Costs may be over or understated. Probability is 100% BC - Forecast overstated, savings against operating cost forecast, ML value represents zero deviation from forecast on assumption that forecast is accurate. Max value forecast is understated, additional costs incurred CPI forecasts were predicting that inflation would have fallen by Quarter 2 2023, and that by quarter 2, 2024 inflation would be practically zero. However, inflation may continue to increase and revised forecast may show this trend continuing for longer than expected.	High	Monitor tender costs and build in lessons learned into the forward procurement programme.	-£2,580,000	£ 7,740,000

6.7.13. Risk management processes have been employed and recorded throughout the programme lifecycle. The risk register is monitored and, if necessary, updated at regular workshops and meetings. The Project Manager has responsibility for overseeing the Risk Management process. DfT Major Scheme guidance has been followed in order to identify, assess and mitigate risks.

Issues Management

6.7.14. Key issues for implementation usually arise when identified risks to the programme materialise and therefore become issues rather than risks. In order to prevent delays to the programme, where key issues are identified, it is assumed that programme work would progress while they are being considered by the Project Board and that the issues would be resolved promptly or escalated to the Joint Assembly and Executive Board, as deemed necessary. All issues are recorded in the Programme's Risk Register, which is regularly reviewed and updated. As with risks, each issue is assigned an impact level, a corresponding mitigation measure and an owner.

6.8 Lessons Management

- 6.8.1. The effective management of lessons learned plays a crucial role in the success and sustainability of any transport programme by providing an opportunity for stakeholders to identify and capitalise on the experiences gained during the planning, implementation, and operational stages.
- 6.8.2. This section outlines the importance of lessons management within the context of the Making Connections programme and presents a framework for capturing, analysing, and applying these lessons to enhance programme outcomes.

Purpose of Lessons Management

- 6.8.3. The primary purpose of lesson management is to foster continuous improvement, reduce risks, and maximise the value of a given investment. The Lessons Management Plan for Making Connections sets out how the programme team would systematically capture and disseminate knowledge throughout the proposal and share lessons with other teams.
- 6.8.4. The anticipated benefits of the Lessons Management Strategy are set out in the following table.

Table 6-10 – Outcomes of Effective Lessons Management

Lessons Management Outcome	Description
Inform Effective Decision-Making	The Lessons Management Strategy prioritises analysing lessons learned from two sources: the Making Connections programme itself and other projects. The purpose of this process is to enable the programme team to make more informed choices, anticipate potential challenges, and optimise resource allocation.

Lessons Management Outcome	Description
Mitigate Risks	Identifying lessons from similar past projects or initiatives would also assist with the mitigation of risks associated with the implementation of Making Connections. The Risk Management Strategy for the programme includes strategies to minimise disruptions, avoid costly mistakes, and ensure smoother project delivery by understanding challenges encountered by others.
Enhance Efficiency	'Learning a lesson' is often perceived as rectifying a past mistake, but an effective Lessons Management Strategy also identifies applicable best practices, process improvements, and innovations. Focusing on learning from positive interventions would enable the programme team to optimise resources, reduce delays, and streamline workflows.
Facilitate Organisational Learning	Lessons management is also about longevity. The Lessons Management Strategy seeks to instil a culture of learning within the delivery team by promoting knowledge sharing, collaboration, and the exchange of ideas among team members, stakeholders, and partners. The purpose of this collective learning is to strengthen the GCP's capacity to deliver successful projects.

The Lessons Management Strategy

- 6.8.5. The Lessons Management Strategy for Making Connections is aligned with the principles set out within the DfT's Transport Business Case Guidance to ensure the Strategy supports a robust and well-informed decision-making process.
- 6.8.6. The Strategy has three core sections, which are listed as follows:
- Learning from other proposals
 - Continuous learning throughout the proposal
 - Effective knowledge sharing with other teams

Learning from Other Proposals

- 6.8.7. The following table sets out the sequential steps that the programme team has taken to ensure lessons from other projects are incorporated into the management and development of the Making Connections programme.

Table 6-11 – Lessons Management – Learning from Other Proposals

Sequence	Step	Actions
1	Identify relevant projects	The team conducted a thorough review of similar transport projects, both domestically and internationally, to identify relevant proposals from which to derive valuable insights and lessons learned.
2	Analyse best practices	The team evaluated successful projects with similar objectives, focusing on their strategies, methodologies, key challenges faced, and innovative solutions employed. This 'success mapping exercise' was captured in the Programme's Key Decisions and Actions Log.
3	Establish partnerships	The programme delivery team have established relationships with other project teams, such as the team that delivered the Birmingham Clean Air Zone, in order to promote knowledge-sharing networks and better understand their experiences and best practices.

Sequence	Step	Actions
4	Conduct comparative analysis	The programme team have sought to compare and benchmark the Making Connections programme against other successful projects, where appropriate. The monitoring and evaluation framework for the programme (included in Appendix D) specifically includes mechanisms for identifying areas for improvement and potential risks based on learning from other projects.

Evidence of Similar Projects

- 6.8.8. A selection of the relevant transport projects that CCC and the Greater Cambridge Partnership (GCP) have delivered in recent years is described in the table below.
- 6.8.9. The successful delivery of these projects demonstrates the organisations' ability and experience in relation to transport projects, which include public transport investment and operation, traffic management and enforcement elements. The lessons learned in these projects would continue to be invaluable in the potential delivery of Making Connections.

Table 6-12 – Evidence of Similar Projects

Project	Organisation	Time Period	Description	Approximate Cost
Bus lane and bus gate enforcement in Cambridge	CCC	2016	In 2016 CCC installed closed circuit television (CCTV) cameras to record vehicles entering bus lanes during restricted hours. The scheme was designed to improve bus lane enforcement and reduce delays resulting from unauthorised vehicles using the lanes. The four bus lanes currently being enforced are: - Elizabeth Way (24 hours); - Newmarket Road (heading out of Cambridge between River Lane and Barnwell Bridge, 24 hours); - Newmarket Road (heading into Cambridge between Barnwell Bridge and River Lane, 24 hours); and, - Hills Road (heading into Cambridge between Bateman Street and Union Road, between 7am and 7pm). In 2016, the total amount of income CCC received through Penalty Charge Notices issued for illegal use of a bus lane or bus gate was £349,419. In 2017, following the introduction of the bus gates in Cambridge, this increased to £1,244,394 and in 2018 revenue increased further to £1,738,567¹⁴⁰. CCC invest these monies into public transport and highway improvements*.	TBC
Cambridge Zero Emission Buses Regional Area (ZEBRA)	CPCA	2021	Working in partnership, the CPCA and GCP successfully delivered a business case that secured funding for 30 new electric double-decker buses for the Cambridge area. As part of the bid, the two organisations demonstrated that they had the support of local bus operators and had undertaken suitable engagement with UK Power Networks regarding supporting infrastructure. The bid also provided the associated infrastructure costs and an outline procurement strategy. This provides a clear example of successful coworking between the two organisations. The business case requested a grant award of £4.295 million from the Zero Emission Buses Regional Area (ZEBRA) scheme initiative for 2021-22. The grant is contributing to the delivery of zero-emission replacements for 10% of the region's 350 buses in operation on the urban and interurban network.	£16.5 million
Park & Ride operation	CCC	Ongoing	CCC maintains and operates a successful network of five highly utilised park and rides that are located at the periphery of the city. The success of Cambridge's Park and Ride Network demonstrates CCC's ability to effectively work with bus operators and implement measures that facilitate modal shift and intercept car trips at the edge of the city.	N/A
The Cambridgeshire Guided Busway (CGB)	CCC	2011 to present	The CGB opened in 2011 and is the longest guided busway in the world. It provides a high quality public transport connection from Huntingdon and St Ives to the north west of Cambridge, and between Addenbrooke's Hospital and Trumpington Park & Ride to the south of Cambridge. Access to Cambridge City Centre is provided via on-street running with sections of bus priority. The maintenance track that runs alongside the guided section of CGB was opened to pedestrians, equestrians and cyclists in 2011; this complementary measure now regularly experiences more than 1,000 cycle trips per day, with an average of 1,363 journeys measured in 2022.¹⁴¹ The success of the CGB shared-use track demonstrates CCC's ability to deliver infrastructure that simultaneously promotes public transport use (post implementation bus patronage rose 33% on the CGB corridor as per CCC (2012) Cambridgeshire Guided Busway Post-Opening User Research) and active modes. The scheme required the introduction of a suite of TRO measures, including bus priority measures introduced on Milton Road, to counter delays caused by congestion in the evening peak. CCC also undertook a comprehensive stakeholder engagement exercise with statutory and non-statutory bodies across the length of the corridor. At the scheme's public inquiry the inspector noted that the "detailed proposals have been the subject of significant consultation" and that the "public inquiry, which extended over 31 days, provided a major opportunity for groups and individuals to have their objections heard and for questions to be put to CCC's witnesses". At the conclusion, the Inspector recommend that planning permission be granted within the various limits provided for in the draft Order.	£150m (This is the total cost of the Cambridgeshire Guided Busway, and included a £109m contribution from Cambridgeshire County Council)
The Cambridge Core Traffic Scheme (CCTS)	CCC	1997 - 2003	Like Making Connections, the CCTS scheme aimed to deliver improved access for pedestrians, cyclists and buses through traffic management and bus priority measures; these changes were made at various locations within Cambridge's inner ring road. The measures were implemented in phases between 1997 and 2003. The measures aimed to promote sustainable modes of travel and further improve the city centre environment. <u>Between 1993 and 2003 the number of private vehicles in the city centre fell by 15%, which is partly attributable to the CCTS measures.</u>	£7m (This is an estimate as the costs were part of a wider package of Busway costs)

¹⁴⁰ Cambridgeshire Insight Open Data (2019). *Bus Lane and Bus Gate Enforcement*

¹⁴¹ Cambridgeshire Insight (2023). *Cambridgeshire Annual Cycling Counts*

Strategy for Learning Throughout the Programme

6.8.10. The following table sets out the steps that the programme team has taken to ensure lessons are learned throughout the programme lifecycle.

Table 6-13 – Lessons Management – Learning Throughout the Programme

Sequence	Step	Actions
1	Establish learning objectives	Clear learning objectives were set at the outset of the proposal, as part of the development of the SMART objectives, to ensure that all team members understand the project's goals and the expected outcomes.
2	Regular reviews and reflections	The overall programme manager, and the leaders of individual work packages, undertake periodic reviews to assess progress, identify challenges, and capture lessons learned. At weekly progress meetings, team members are also given space to reflect on their experiences and share insights; this enables positive and negative practices to be incorporated into future decision-making processes.
3	Documentation and knowledge management	In line with the Greater Cambridge City Deal Assurance Framework, the Making Connections programme has followed a robust documentation process. The Programme has an Issues and Actions Log that is used to capture key findings, lessons learned, and best practices throughout. The Log is owned and monitored by the project manager and is stored on a centralised SharePoint platform to ensure easy access and dissemination of information within the team.

Strategy for Sharing Lessons with Other Team

6.8.11. The following table sets out the steps that the programme team has taken or would take, to ensure lessons learned as part of the Making Connections programme can be shared effectively.

Table 6-14 – Lessons Management – Sharing Lessons with Other Teams

Step	Actions
Prepare a Dissemination Plan	As part of the monitoring and evaluation process, the Making Connections team would create a comprehensive 'Dissemination Plan' for sharing lessons learned with other teams, including stakeholders, partners, and relevant organisations. The Plan would set out appropriate communication channels and platforms for effective knowledge transfer.
Develop a programme case study	At the point the Programme becomes operational or is closed, the GCP would prepare a programme case study highlighting the key insights, successes, challenges, and lessons learned from Making Connections. This document would act as a central repository for lessons learned and would be published on the GCP website and made readily available to interested parties.
Feedback mechanisms	The GCP and its team of consultants have established clear feedback mechanisms to gather insights from across its suite of programmes and projects. A formal meeting takes place weekly to foster a two-way communication flow for continuous learning and improvement

Step	Actions
Workshops at programme close	The Making Connections team would hold a collaborative workshop at the end of the programme to engage with other teams and project managers within GCP and CCC. The workshop would provide a platform for open discussions, encouraging knowledge sharing and the cross-pollination of ideas.

Lessons Management Summary

- 6.8.12. The Lessons Management Strategy for Making Connections promotes learning from other proposals, continuous learning throughout the proposal, and effective knowledge sharing with other teams, in order to enhance decision-making, minimise risks, and promote the success of the programme.

6.9 Benefits Management

- 6.9.1. The justification for any intervention should be based on the benefits it can achieve. A benefits realisation plan (BRP) has been prepared to help realise the forecast benefits and scheme objectives of the Programme.
- 6.9.2. The following table sets out the BRP for Making Connections, which demonstrates how benefits have been planned for and would be tracked and realised through scheme implementation.

Table 6-15 – Making Connections Benefits Realisation Plan

Link to Programme Objective	Programme Benefit	Expected Level of Benefit	Programme Beneficiary	Responsible Party	Requirement to Achieve Benefit	Evaluation Criteria	Timescale of Benefit
To reduce carbon emissions from transport	Reduction in carbon and greenhouse gas emissions	To be confirmed via the full Carbon Management Plan. Contribution towards goal of achieving Net Zero Cambridgeshire 2045 through reduction of emissions from transport.	-Greater Cambridge Residents -Visitors -Local Economy	GCP/CCC	TBC	Analysis of local transport data (including Google AP).	Short-term (by 2030)
To improve air quality in the city centre	Improvement in local air quality	Reduction in the incidence of chronic bronchitis and the incidence of mortality attributed to air pollution and particulate matter. Correlated reduction on use of health services and health expenditure for the aforementioned human health issues.	-Residents -Visitors -Employees -Local Environment -Health Providers	GCP/CCC	TBC	Data analysis of local air quality monitoring stations for all available metrics (PM2.5, PM10, NO2) compared to baseline data and historical trends. Key metrics to assess include improved health outcomes and reduction in health expenditure (e.g. hospital admissions, mortality, impacts and chronic bronchitis impacts).	Short-term (by 2030)

Link to Programme Objective	Programme Benefit	Expected Level of Benefit	Programme Beneficiary	Responsible Party	Requirement to Achieve Benefit	Evaluation Criteria	Timescale of Benefit
To improve access to jobs and education for people, especially those living in rural areas	Improvement in connectivity to jobs and education	Reduction in journey time delay between residential and employment/education facilities. Reduction in disparity between rural/urban areas in relation to Indices of Multiple Deprivation Domains (employment/education/skills/training).	-Greater Cambridge Residents -Visitors -Local Employers -Local /Regional Economy	GCP/CCC	TBC	Data collection via Google Directions API (cannot go back in time), local transport data or Mobile Network Data (MND) Data analysis of Indices of Multiple Deprivation domains - Employment, education skills and training.	Medium-term (by 2034)
To contribute to the GCP target to reduce traffic by 15% from the 2011 baseline	Reduction in congestion within the defined STZ area	Reduction in journey times delay for both private and public transport modes. Reduction in congestion by 15% from the 2011 baseline.	-Greater Cambridge Residents -Visitors -Local Employers -Local Economy	GCP/CCC	TBC	Data collection via Google API / MND / traffic surveys to assess vehicle kilometres driven by type of vehicle and improvements in journey time compared to baseline.	TBC
To reduce congestion in Cambridge							
To reduce journey times and improve journey reliability							

Link to Programme Objective	Programme Benefit	Expected Level of Benefit	Programme Beneficiary	Responsible Party	Requirement to Achieve Benefit	Evaluation Criteria	Timescale of Benefit
To increase the number of trips by bus	Improvement in the accessibility, reliability and affordability of bus services	Increase in bus patronage.	-Greater Cambridge Residents -Visitors -Local Employers -Bus Operators	GCP/CCC/CPCA	TBC	Data collection including bus patronage, bus user interviews and journey time data, assessed against baseline numbers undertaken prior to bus service improvements.	TBC
To increase the number of trips by cycle	Improvements to the local active travel environment	Increase in number of and location of walking and cycling trips. Correlated increase in overall physical and mental health of residents and reduction in use of health services and health expenditure.	-Pedestrians -Cyclists -Local Economy	GCP/CCC	TBC	Data collection via existing bi-annual pedestrian and cycle counts across radial and river cordons. Potential for targeted survey data to assess user experience and use of improved infrastructure; this could include a shared data collection programme with other cycling scheme e.g. the Greenways programme.	TBC
To increase the number of trips on foot				GCP/CCC	TBC		TBC
To reduce the number of road accident casualties	The fostering of a safer transport environment	Reduce prevalence of injuries and fatalities from road accident collisions. Correlated positive impact on local economy from increased productivity and reduced use of health services.	-All transport Users -Health Providers -Local Economy	GCP/CCC	TBC	Data analysis of open source collision data from police records compared to baseline.	TBC

Link to Programme Objective	Programme Benefit	Expected Level of Benefit	Programme Beneficiary	Responsible Party	Requirement to Achieve Benefit	Evaluation Criteria	Timescale of Benefit
To raise sufficient net revenue to fund the transformation of the bus network and wider Sustainable Transport Measures	The creation of a self-funding transport network	Obtaining adequate funding to achieve aims of the Local Transport Plan and create sustainable self-funding transport network.	-CCC -Bus Users	GCP/CCC/ CPCA	TBC	Analysis of programme financial information	TBC
To enable the re-allocation of road space to buses, pedestrians, and cyclists	The re-allocation of road space in favour of sustainable modes	Increase in access to good public transport and active travel infrastructure which adheres to best practice guidance (LTN 1/20). Correlated impact on use of and experience of public transport, walking and cycling.	-Greater Cambridge Residents -Visitors -Local Employers -Local Economy	GCP/CCC	TBC	Monitor GCP/CCC scheme delivery of active travel and public transport schemes	TBC

6.10 Data and Information Security

Introduction

6.10.1. The Making Connections Programme involves the integration of various systems and the handling of sensitive data. Therefore, it is essential to ensure that critical systems and digital assets are protected. This section outlines the measures and strategies that are being implemented to safeguard these aspects within the programme environment.

Protecting Critical Systems

6.10.2. To ensure the integrity and availability of critical systems are protected, the following measures are being implemented:

- **Robust Access Control:** Implementing strict access control mechanisms would be crucial to prevent unauthorised access to critical systems. This involves the use of strong authentication methods, such as multi-factor authentication, and role-based access controls to restrict system access to authorised personnel only;
- **Regular Updates and Patching:** Critical systems are regularly updated with the latest security patches and updates. This helps to mitigate vulnerabilities that could be exploited by malicious actors and enhances the overall security posture of the systems;
- **Intrusion Detection and Prevention Systems:** Implementing intrusion detection and prevention systems would enable the identification and mitigation of potential threats in real-time. This involves the monitoring of network traffic, system logs, and other indicators of compromise to detect any unauthorised activities and respond promptly;
- **Disaster Recovery and Business Continuity Planning:** Robust disaster recovery and business continuity plans are established to ensure the rapid recovery of critical systems in the event of an incident or disruption. Regular backups of critical data and systems are performed, and testing of these recovery procedures are conducted periodically to validate their effectiveness; and
- **Protecting Digital Assets:** Digital assets, including software applications, databases, and intellectual property are protected from unauthorised access, modification, or theft via the following measures:
 - **Data Encryption:** Sensitive data stored within the systems are encrypted to prevent unauthorised access, both at rest and during transmission. Strong encryption algorithms and secure key management practices are employed to ensure the confidentiality and integrity of the data.
 - **Secure Development Practices:** although no new applications and software are expected to be developed as part of the Making Connections Business Case, if any are required these would follow secure coding practices including conducting regular security code reviews, using secure development frameworks, and performing penetration testing to identify and address any vulnerabilities before development.
 - **User Awareness and Training:** All employees and stakeholders involved in the programme would undergo regular security awareness training programmes. These

programmes would educate individuals about best practices for handling digital assets, recognising phishing attempts, and adhering to secure data handling procedures.

Protection of Commercially Sensitive Data

6.10.3. Commercially sensitive data, including financial information, customer data, and proprietary business information, needs to be protected to comply with applicable regulations. The following strategies are implemented to safeguard commercially sensitive data:

- **Data Classification and Access Controls:** Commercially sensitive data are classified based on its sensitivity level, and appropriate access controls are implemented accordingly. This would ensure that only authorised personnel can access and handle the sensitive data, limiting the risk of unauthorised exposure or leakage;
- **Regular Security Audits:** Periodic security audits are conducted to identify potential vulnerabilities and ensure compliance with data protection regulations. This would involve reviewing access logs, performing vulnerability assessments, and conducting penetration testing to assess the effectiveness of security controls and identify areas for improvement; and
- **Compliance with Data Protection Regulations:** The transport business case would prioritise compliance with relevant data protection regulations, such as the General Data Protection Regulation (GDPR) or other applicable laws. Adequate measures are implemented to protect personal data, including obtaining appropriate consent, providing data subject rights, and maintaining data breach notification procedures.

Data Information and Security Policies

6.10.4. The table in Appendix T provides a summary of relevant policy documents that contribute to the protection of critical systems, digital assets and commercially sensitive data related to the Making Connections Programme; these policies include:

- Greater Cambridge Partnership's Privacy and Data Protection Policy
- Cambridgeshire County Council's Data and Information Security Policy
- GCP's Risk Management Framework
- CPCA's Information and Sharing Framework
- CCC's County Emergency Management Plan
- CCC's Pseudonymisation and Anonymisation of Data Policy

6.11 Carbon Management Plan

Introduction

6.11.1. The Carbon Management Plan (CMP) for the Making Connections programme outlines a comprehensive strategy to measure, report, and mitigate carbon and greenhouse emissions associated with the programme. The CMP is provided in Appendix H.

- 6.11.2. Through the adoption of this plan, GCP and CCC demonstrate their commitment to sustainable development, climate action, and the reduction of greenhouse gas emissions to foster a low-carbon and climate-resilient future for Greater Cambridge.

Carbon Management

- 6.11.3. As per DfT guidance, in relation to the CMP, the Management Dimension should provide a summary of:

- Predicted emissions against baseline values
- Include credible mitigation of associated risks
 - Notes risks to achieving the SMART objectives in the Strategic Dimension
- Provides sufficient evidence on the programme team's overall ability to manage and reduce carbon emissions

Predicted emissions against baseline values

- 6.11.4. The Making Connections CMP would establish and embed the PAS2080 carbon management process. While the data and outputs are currently in progress and therefore not yet available, a significant part of the carbon workstream which feeds into the CMP is a proportionately detailed, quantified whole-life carbon appraisal. The output of said quantification is a carbon baseline against which the impacts and carbon outcomes of the proposed interventions (scenarios) and future progress toward achieving carbon reduction targets can be measured. An initial assessment of available Making Connections modelling scenarios – DS1, i.e., 'Do-Maximum' and DS6 – would be presented alongside the Carbon Statement of Case as a precursor to the full CMP.
- 6.11.5. Fuller details on the appraisal methodology are available in the Appraisal Specification Report (ASR) in Appendix B. The whole-life carbon analysis considers a scheme's whole-life carbon impact in accordance with categories and principles identified in PAS2080, including Before Use, Use and After Use / End of Life. This pertains not just to capital (embodied) carbon associated with the creation and management of infrastructure itself, but also the user's utilisation of the asset, i.e., user emissions, as well as additional impacts or removals.
- 6.11.6. Five user emissions scenarios are to be appraised: the Do-Minimum scenario, to be compared against four alternative 'Do-Something' user emissions scenarios. These would be quantitatively appraised and supplemented by relevant and proportionate assessment of capital carbon and additional impacts and/or removals to build a whole-life carbon appraisal for all five scenarios. As above, two of the 'Do-Something' user emissions scenarios would be quantified first (DS1 and DS6) to showcase the potential 'Do-Maximum' user emissions carbon impact and scale of emissions reductions to be achieved. The remaining two, as well as capital carbon information would be supplemented at a later date when the appropriate data is available to build a quantified whole-life carbon impact for all scenarios. These

scenarios would form the basis of the full Carbon Management Plan, also to be provided at a later date.

- 6.11.7. The Carbon Management Plan would contextualise these carbon impacts and their implications, and devise (in line with PAS2080:2023) actions and opportunities to actively manage adverse carbon impacts and promote activities which yield beneficial carbon outcomes associated with the scheme.

Predicted emissions

- 6.11.8. The quantified carbon assessment is in progress and therefore the finalised whole-life emissions results are not available at the time of publishing; the GCP would publish the outputs in the completed CMP once available.
- 6.11.9. Prior to the publication of the CMP, it is important to note that Making Connections is anticipated to bring significant decarbonisation benefits for the transport network in the long run by providing and incentivising alternatives to private vehicle use and their associated emissions. However, the extent to which these benefits outweigh any adverse carbon impacts – both to general traffic flows and capital carbon – is yet to be determined.
- 6.11.10. The capital (embodied) carbon impact involved in construction and maintenance to establish the scheme is a necessary carbon ‘payment’ to unlock required transport behaviour changes. The carbon management process would be established for the scheme through the CMP, which enables the management of capital carbon emissions which are within the scheme’s control (i.e., any built infrastructure) and to influence user emissions, the latter of which the GCP or CCC cannot directly control due to numerous external factors.
- 6.11.11. The CMP would aim to minimise the capital carbon impact of the scheme by influencing further design evolution and construction practices. However, as the Making Connections programme does not involve significant construction and associated maintenance activities, the levels of capital carbon are not expected to be as significant as large-scale transport infrastructure schemes.
- 6.11.12. While best-practice quantification would be used alongside the best available data, there are limitations to the extent to which this can capture the full impact of the scheme. There are several factors which may result in the scheme providing a greater carbon reduction than indicated in the assessment, such as larger mode-savings that could be realised in combination with other policies and interventions such as GCP’s active travel programme.
- 6.11.13. Similarly, it is possible that the quantified impact may differ from the logically anticipated impact because modelling is inherently uncertain and cannot definitively predict future impacts. While the CSRM2 model is multi-modal that distinguishes between individual links, it is possible that carbon benefits of the scheme may be underestimated or overestimated and that the potential benefits or disbenefits may not have been fully captured at this stage. If this is the case, not only would the logic behind Making Connections being the right type of scheme remain crucial, but so too would the strategic significance of this scheme. For further information, please see the Carbon Management Plan in Appendix H.

Risk Mitigations Strategy

- 6.11.14. The SMART objectives for Making Connections include reducing carbon emissions. The scope of works associated with the CMP enables the management of carbon and therefore helps to mitigate the risk of carbon-related objectives not being achieved.

How does the CMP contribute to minimising risks associated with the project?

- 6.11.15. Delivering a best-practice carbon management process would help minimise the following programme risks:

- Demonstrating a robust strategic case – the whole-life carbon quantification of carbon impacts would provide further evidence on how this scheme contributes to decarbonisation commitments; and
- Demonstrating robust analysis of scheme impacts and a proactive approach to their management – capital carbon impacts can be significant and can erode some of the user emission savings that stand to be gained from modal-shift. Carbon management would ensure impacts are fully understood and addressed to maximise the net-impact of the scheme.

How does the CMP contribute to minimising risks associated with not achieving SMART objectives?

- 6.11.16. The agreed strategic and SMART objectives of Making Connections are detailed in Section 2.6.10 of the Strategic Dimension and those most pertinent to the carbon workstream are listed below:

- To reduce carbon emissions from transport
- To contribute to the GCP target to reduce traffic by 15% from the 2011 baseline

- 6.11.17. Crucially for this scope of work, reducing carbon emissions from transport (in part by reducing traffic) is not just a scheme-specific requirement, but necessary for the broader decarbonisation agenda which is ratified by decarbonisation commitments; the GCP shares Cambridgeshire County Council's commitment to be Net Zero by 2045. Accordingly, the risks of not achieving the SMART objectives have broader implications than the scheme alone, including the risks/implications associated with climate change for Cambridgeshire.

- 6.11.18. Regarding the specific Programme objectives, all are to some extent interconnected through their relation to carbon and decarbonisation outcomes. For example, increased trip making by bus/cycle/on foot is linked to reducing congestion in Cambridge and vice versa, and both are linked to the 15% traffic reduction target and vice versa, all of which contribute to reducing emissions from transport and decarbonisation more broadly. The objectives have been agreed upon with a key outcome in mind – reducing private vehicle kilometres to transform the use of Greater Cambridge's transport networks. This in turn would contribute to decarbonisation.

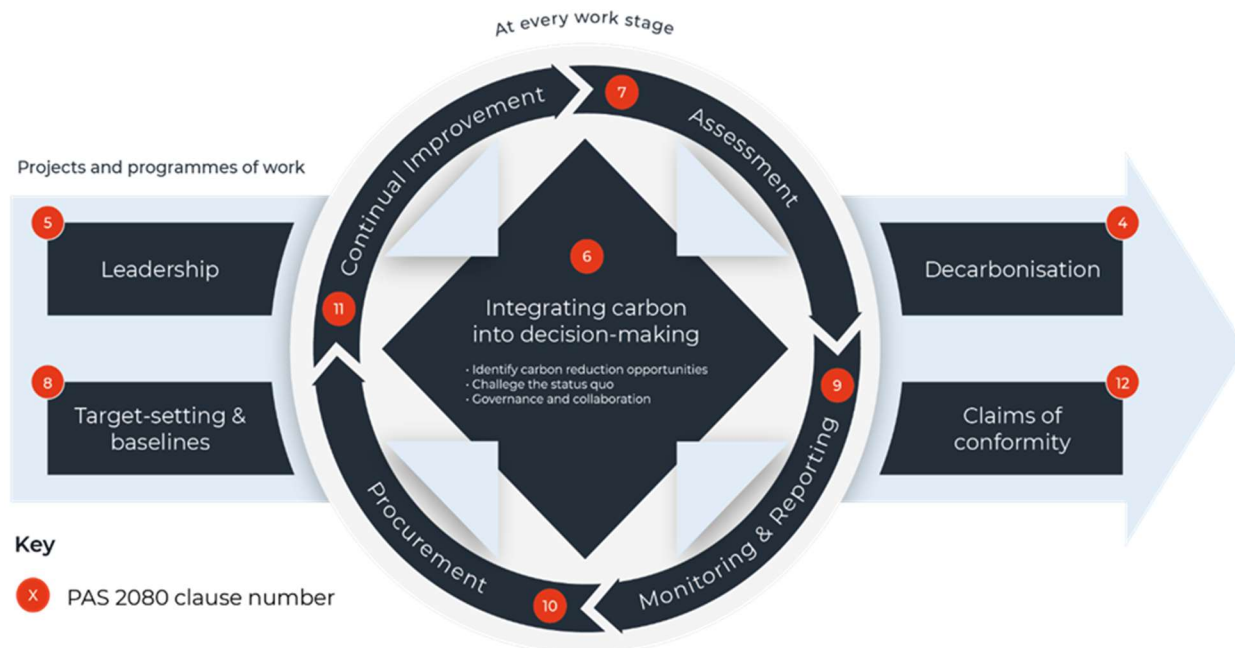
- 6.11.19. A core function of the quantified carbon assessments which underpin the CMP would be to showcase the relative merits of different road user charging scenarios and illustrate their

relative carbon impact to enable decision-makers to comprehensively consider the scheme. It is anticipated that the quantified assessment would make the case for the scheme in carbon terms. Lowering the level of the charge is a risk to the 15% traffic reduction target – a key carbon outcome; this therefore poses a risk to the other objectives because reducing private vehicle kilometres enables and facilitates the other objectives.

The Project Team's Ability to Manage and Reduce Carbon Emissions

- 6.11.20. WSP is accredited to PAS 2080 (2016) having been audited by the appropriate organisation. Carbon management is embedded in the team's internal project management systems to ensure a compliant approach to carbon management in scheme delivery. The Making Connections OBC CMP would embed carbon management through the scheme's delivery by establishing a PAS2080-compliant approach to carbon management. The CMP would account for all of the PAS2080 Clauses illustrated in Figure 6-9 below.

Figure 6-9 – PAS 2080 Carbon Management Process¹⁴²



- 6.11.21. In addition to accounting for all Clauses, the carbon workstream (beyond the CMP alone) aims to embed carbon management through project delivery and management by hosting a carbon workshop. The workshop would bring workstream and design leads together to foster a collaborative and embedded approach to carbon management. Furthermore, carbon would continue to be part of the scheme's development due to the iterative nature of the carbon management process.
- 6.11.22. The CMP would outline actions to minimise adverse carbon impacts and maximise beneficial carbon outcomes for the scheme. As such, the project team – via the CMP and

¹⁴² PAS 2080 (2023). WSP UK Ltd

carbon scope of works – can manage and reduce carbon emissions through the PAS2080-compliant carbon management process.

- 6.11.23. By doing so, identified carbon outcomes can be achieved as well as mitigating risks to meeting the SMART objectives; thereby, not only contributing to making the carbon and strategic case for the Making Connections scheme, but also meeting statutory decarbonisation commitments.

6.12 Monitoring and Evaluation

- 6.12.1. Monitoring and evaluation (M&E) are essential parts of any transport programme. The process provides an opportunity to improve performance by reviewing past and current activities, with the aim of replicating good practice and eliminating mistakes in the future. This section outlines the monitoring and evaluation plan for the Making Connections programme.
- 6.12.2. The GCP has a responsibility to report on how funding is being utilised, how its expenditure represents value for money to the taxpayer and how spending aligns with the City Deal objectives.
- 6.12.3. Arup has been commissioned to undertake a scoping exercise for the monitoring and evaluation (M&E) of the Making Connections Cambridge project. This Monitoring and Evaluation scoping report for the Making Connections Cambridge (MCC) Evaluation feeds into the Outline Business Case (OBC).
- 6.12.4. The DfT's 'Monitoring and Evaluation Framework for Local Authority Major Schemes' guidance document forms the basis of the monitoring strategy alongside the GCP's Assurance Framework.
- 6.12.5. The DfT's guidance sets out the requirements for the monitoring of schemes and outlines three tiers of monitoring and evaluation, these are:
- Standard monitoring
 - Enhanced monitoring
 - Fuller evaluation
- 6.12.6. The Making Connections programme would follow the enhanced monitoring practice as the scheme is likely to be more than £50m in value.
- 6.12.7. The programme would be monitored against a set of enhanced indicators; the indicators are shown in the M&E Scoping Report in Appendix D with suggested data sources. The indicators have been identified based on an agreed list of research questions based on the Making Connections Logic Model, which includes the following key stages of the scheme:
- Inputs, if made available by the GCP (i.e. what is being invested in terms of resources, equipment, skills and activities undertaken to deliver the scheme). For Making Connections this would include revenue generated and public and sustainable transport improvements;

- Outputs (i.e. what has been delivered and how it is being used);
- Outcomes (i.e. intermediate effects, such as changes in traffic flows, modal shifts) and
- Impacts (i.e. longer-term effects on wider social and economic outcomes e.g. supporting economic growth).

Monitoring and Evaluation Plan

- 6.12.8. Following the scoping exercise, a detailed Monitoring and Evaluation framework would be developed; this would include a detailed data collection and analysis plan to support the implementation of Making Connections and the evaluation of the programme post-completion.
- 6.12.9. Cambridge has an existing network of infrastructure to monitor traffic data, journey times and air quality. This existing network would be supplemented with further data collection measures, where appropriate, to ensure that a robust data set is maintained.

Table 6-16 – Monitoring and Evaluation – Planned Work Activities

Stage	Activity	Deliverable	Date
Evaluation scoping	Contained in M&E Scoping Report (See Appendix D)	Evaluation Scoping Report	August 2023
Baselining	This is a data collection and results stage that would be carried out 3-6 months pre-implementation of the intervention.	Baselining Report	May / June – November / December 2025
Ongoing monitoring	Building on the baselining report, suggest quarterly updates on key indicators against counterfactual, to understand how the impact unfolds – and provide crucial feedback to decision makers	Quarterly Progress Updates	January 2025 – January 2027 (Duration 2 years)
Interim ex post findings report	2 years after the implementation of the programme it is advisable to evaluate the transport and environmental impacts of the programme	Interim Findings Report	March 2027
Longer-term ex post findings report	5-7 years after implementation it is advisable to evaluate all aspects of the scheme using robust ex post evaluation approaches	Final Report	March 2031-33

- 6.12.10. This component of the M&E timeline focuses on stage 1, and the scoping report provides an indicative plan for future stages. During the implementation phase of the programme, monitoring would be undertaken to assess the impact of the work being carried out and also to establish the extent of behaviour change.

- 6.12.11. The post-programme evaluation would establish whether Making Connections achieves its SMART objectives, which would be based on the timescales set out in the Benefits Realisation Plan.
- 6.12.12. The direct post-project evaluation is expected to be undertaken in 2027 to reflect the completed implementation benefits realisation period following two years of operation. To evaluate the impact and understand the effectiveness of the scheme, data would be collected to measure the success of the scheme against the themed assessment criteria which were identified as measures of success. To this extent, the approach to monitoring and evaluation goes beyond the basic requirements of the DfT's standard monitoring guidance and is also closely aligned with the Benefits Realisation Plan.
- 6.12.13. The scope of this evaluation would be in line with HMT's Magenta Book, which sets out guidance for methods of evaluation, encompassing the development of indicators and a counterfactual, utilising data effectively, evaluation governance and the dissemination of findings.
- 6.12.14. A table summarising the monitoring and evaluation indicators and their associated M&E methodology is provided in the M&E Scoping Report in Appendix D.



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