CPCA

ZEBRA Scheme Business Case

FINAL
Submission

20 August 2021

Date: 20 August 2021

Telephone: 01353 667721

CAMBRIDGESHIRE & PETERBOROUGH COMBINED AUTHORITY

The Rt Hon the Baroness Vere
Minister of State
Department for Transport
Great Minster House
33 Horseferry Road
LONDON SW1P 4DR

The Mayor's Office
72 Market Street
Ely
CB7 4LS

Dear Baroness Vere,

ZEBRA Phase 2 Fast Track Submission

Following our successful ZEBRA Phase 1 application, my officers are working closely with Department for Transport representatives to submit as strong a business case as possible for the ZEBRA Phase 2 submission on 20 August.

I am fully committed to the conversion of our diesel buses to zero emission fuels, having confirmed the Combined Authority's commitment to the Independent Commission on Climate Change's recommendation to convert our entire bus fleet within the Cambridgeshire and Peterborough region by 2030. Moreover, during the three months since my election, I am pleased to be able to confirm CA Board approval to progress all 31 recommendations put forward by the Climate Commission, chaired by Baroness Brown.

This submission by Cambridgeshire and Peterborough Combined Authority for ZEBRA funding is not purely a matter of public transport but of public health. As a practicing consultant paediatrician in the local health service, I see the negative impacts of traffic pollution on the children and their families, and these effects are a very real concern.

As both a Mayor and a practicing doctor, I believe I am in a unique position, and I am determined that our policy actions are conditioned by compassion, cooperation and community. I am instructing my team to include public health and climate change as key criteria in everything we do.

A hundred people a year die because of air pollution in Cambridge and these new buses will reduce emissions in that central zone by over 40%, contributing significantly to improved public health, by removing 30 diesel buses from this historic city.

Cambridge is also one of the most important places in the world for medical research, and one which produces more than its fair share of the world's leading

influencers. Being a place of great importance to our national economy, the city has a projected 30% growth rate in the next few years, as a major contributor to the UKPLC GVA growth.

I believe it is imperative that this globally important city is seen to be embracing the adoption of new technologies that help to fight climate change and improve public health. That is why our Combined Authority's bid can muster such third-party contribution support and why our request of central government funding is a relatively small ask in comparison. I am convinced this bid delivers excellent value in terms of cost, public health, and economic influence.

I look forward to you supporting this application as a seed from which our alternative fuel vehicle fleet conversion will develop and grow rapidly.

Yours sincerely

Mayor Dr Nik Johnson
Mayor of Cambridgeshire and Peterborough Combined Authority

Contents

Executive Summary

[Section reference to the Business Case requirements in the Zero Emission Bus Regional Areas (ZEBRA) Scheme Phase 2: Business Case Development Guidance has been provided next to each point when addressed]

Changes from CPCA's ZEBRA EOI to our Final Business Case

EOI	Phase 2
Strategic Case	
An opportunity charging pantograph was originally proposed to be installed at the Operator Partner's depot.	The opportunity charging pantograph at the Operator Partner's depot was removed as later assessment showed that this would not be necessary.
Two opportunity charging pantographs were proposed to be installed at Babraham Road Park and Ride, powered by energy from the Solar Farm currently being installed at the Park and Ride site.	Opportunity plug-in DC chargers will be installed at Babraham Road Park and Ride in preference to the pantograph infrastructure to improve future interoperability and lower down cost of infrastructure. The plug-in chargers will still be sourcing their energy from the Solar Farm.
Commercial Case	
CPCA will own the in-depot and Park and Ride infrastructure and the Operator Partner will operate it while leasing it from CPCA.	The Operator Partner will procure, own, and operate the in-depot infrastructure, reflecting our analysis of risk transfer scenarios. Cambridgeshire County Council, which owns and operates the Babraham Park & Ride site, will procure and own the opportunity charging infrastructure, again reflecting our analysis of risk transfer scenarios. It will appoint a third party to operate this infrastructure through competitive procurement. Clawback provisions will be included in the Grant Agreements to ensure ability to recoup the Grant payment in the event of non-performance or exit of either party.
Financial Case	
Amount of funding asked at EOI: £4,215,000.	Amount of funding asked includes inflation rate per the Green Bus Model's guidance: £4,295,000.

1. Project Background

On 21 May 2021 the Cambridgeshire and Peterborough Combined Authority (CPCA), following consultation with partners to include Greater Cambridge Partnership (GCP), submitted an expression of interest (EOI) to DfT for funding from the ZEBRA (Zero Emission Bus Regional Application) fund.

CPCA was one of six successful bidders (out of 11) that submitted an Expression of Interest on the Fast Track process, and was invited to prepare a Final Business Case (this document) to be considered for funding.

Our project will see CPCA and GCP working with an Operator Partner to support the procurement of **30 new battery electric zero emission double-decker buses** – to enter service in the **second half of 2022** – and supporting depot and opportunity charging infrastructure (including the respective grid connections). Furthermore, our opportunity charging infrastructure will be directly connected to a new Solar Farm being installed at the Babraham Road Park & Ride site, meaning that **vehicles being charged at the Park and Ride will benefit from truly green well-to-wheel energy**.

With our committed local funding we are requesting **a grant award of only £4.295m – 64% of the permissible 75%** of the cost differential for the vehicles themselves, and no grant funding for the infrastructure – representing **an excellent investment for Government to make a significant improvement in air quality in one of the world's most famous cities**. This could enable DfT to fund as many as 14 more zero emissions buses as a result of the commitment from the public and private sector in this project. Furthermore, this investment will form the initial phase and pump-prime a **continuous programme to deliver our commitments to transition to a fully zero emissions fleet by 2030 and is an excellent investment for government enabling the ZEBRA funding to contribute to more projects across the country**.

By funding this project the Department for Transport will be a supporting a transformational scheme that:

1. Will mobilise quickly **to deliver zero emissions buses on the road in 2022**;
2. Delivers significant value for money with the **ZEBRA funding requested representing just 26% of the overall project costs**;
3. Will have an **immediate and significant impact on serious air quality issues which cause up to 100 early deaths each year** in the City of Cambridge; and,
4. Demonstrates UK Government's commitment to its climate change policies in one of the most recognised cities in the world.

2. Why Cambridge and Why Now?

Cambridge is one of the most complex cities in Britain for public transport to serve. The **city is the fastest growing in Britain**, a centre of world-leading innovation with a vibrant economy, rapid population growth and a series of consequential transport challenges including heavy congestion and air quality issues. These **air quality issues are directly related to 100 early deaths in our region each year**.

This project will deliver against our commitments **to improve air quality in the City of Cambridge which has exceeded recommended WHO pollution tolerance levels for years.** By concentrating zero emission buses into our principal AQMZ **we will deliver a material improvement on the quality of life for residents in the city** and **improve their access to outstanding public transport services** (3.6)**.**

Overall, there are around 350 buses operating on the urban and interurban bus network across the CPCA area. Funding from ZEBRA will enable us to **replace 10% of the most heavily polluting fleet, with the electric vehicles entering into operational service in the third quarter of 2022**. This bid fits into the vision we share with our operators of a rolling programme **to replace 30-35 buses a year** across the combined authority in order to decarbonise the entire network affordably, progressively, and systematically. By funding electric bus charging infrastructure in the region now, we are starting to **remove a significant barrier to operator transition to zero emission vehicles** by not only our local bus operators but also – with the solar-powered opportunity charging infrastructure – council service fleet (e.g. Cambridge City's all-electric bin lorries) and intercity coach operators.

Our newly elected Mayor places strong emphasis on public health, bus market reform, and tackling climate change. By **harnessing ZEBRA for pump priming, and the National Bus Strategy for longer term change,** we are hoping in the near future to require that **all new buses in the CPCA area are zero emissions vehicles.**

Cambridge is a gem in England's crown. It is one of our most recognised and famous cities. It is home to one of the top 10 educational establishments globally, attracts significant tourism, and has a proud history of securing inward investment for the UK. **Failure to accelerate decarbonisation of the public transport network in Cambridge undermines its importance as a national asset to the UK, and the Government's credibility** as a leader in the race to net zero.

The region has suffered chronic underfunding on a national level, and **this is a prime opportunity to level the playing field**. This will be **East Anglia's biggest investment to date in zero emission buses**, in a project that the **Government can stand on the world stage and be proud to say it enabled**.

3. Project Overview

Our proposal is for a **one-for-one replacement of 30 double-decker diesel buses with equivalent battery electric buses operating on our Park & Ride and Citi2 routes**, including in-depot charging infrastructure and opportunity charging infrastructure at a Park and Ride location (and respective grid connections) to extend vehicle range while the bus is operating a route.

The displaced Euro VI diesel Park & Ride buses will replace Euro IV and V buses in other areas in the region, **delivering wider air quality improvements outside of the direct scheme**.

Furthermore, to ensure value for money and **wider economic and health benefits**, we will explore opportunities to enable other municipal electric vehicles, buses, and coaches to have access to the opportunity charging facilities at the Babraham Road Park and Ride site.

The funding for this project will be made up through an amalgamation of private and public funding pots to ensure the best value for money is achieved with the funds available within the Cambridgeshire and Peterborough region. Operational costs will be built into the budgets for bus operators and local authorities, to ensure the necessary funding is available to sustain the scheme (3.11.1.2).

The breakdown of funding for our proposed scheme is set out in the table below (3.11.1.1):

Cost component (inc. installation/commissioning)	Amount (including inflation but exc. VAT and Optimism Bias)	Funded by	Breakdown of Amount by Funder
30 x double-decker battery electric buses	£13,431k	Operator	£7,035k
		ZEBRA	£4,295k
		CPCA/GCP	£2,101k
In-depot charging infrastructure upgrade for 16 dual 150kW chargepoints (including grid connection upgrade)	£1,937k	CPCA/GCP	£1,937k
Two (2) 150kW Plug-in Opportunity Charging Points at the Babraham Road Park & Ride site (including connection to the Solar Farm)	£175k	CPCA/GCP	£175k
Total	**£15,543k**		
Scheme Administration, M&E, Marketing & Communications, Overheads, and Advisory support (OB 10%)	£1,031k	**CPCA**	Scheme Administration, M&E, Marketing & Communications, Overheads, and Advisory support (OB 10%)
Total	**£16,574**		

Whilst we are asking for less than the DfT's envisaged funding per scheme of £25m - £35m (principally due to limitations in the ability of our local operators to finance a significant number of new buses following the COVID-19 pandemic), the **£4.295m** we are requesting will contribute towards the replacement of ~**10% of the overall 350 bus fleet** in operation on the urban and interurban bus networks across the CPCA area. This will kick-off a rolling bus replacement programme, replacing 30 vehicles a year across the combined authority to help enable transition to a fully zero emission fleet by 2030 (3.23 & 3.26).

Ability to use ZEBRA funding to support procurement of the vehicles will ensure there is enough capital in the project from other funding sources to install the **necessary charging infrastructure** to support the tranches of new buses implemented each year.

The economic assessment, based on the Department's Greener Bus Tool alone has indicated a **BCR of 1.12** over the period 2022-2038, representing **Low but positive Value for Money**, driven by the 86% reduction of absolute CO_2 emitted through the implementation of the scheme. Further monetizable and non-monetizable benefits not captured by the Greener Bus Tool (including improvements in the traveller experience and safety) **increase our forecast BCR to 1.89, representing Medium Value for Money**.

4. Strategic Case

A unique opportunity exists for Government to help one of the UK's most well-known cities kick-start its journey to decarbonise its public transport network. Adverse air quality metrics

are consistently exceeding the World Health Organisation's standards for particulate concentrations, even with an Air Quality Management Area (AQMA) rigidly in place since 2004 and, with buses contributing 49% of NOx emissions within the city centre, urgent action is required (3.10.2).

Within three years of project commencement Cambridge will benefit from **a >80% reduction in emissions on some of our most vital bus routes**, delivering **significant health benefits**, helping to **reduce the 100 early deaths attributable annually to poor air quality** in the region, **protecting our heritage** and infrastructure, and enabling us to **retain our proud status as a home of innovation** (3.8 & 3.9). It will also include **one of the UK's first fully green bus opportunity charging stations, powered by a Solar Farm** at one of our largest Park and Ride sites, which could also (subject to availability to be determined during the early operation of the scheme) be made available to other municipal vehicles and bus and coach operators (3.10.1).

Key risks and mitigations

- **Reduced passenger levels** – mitigated by our decision to support the purchase a lower number of buses in order not to over invest if passenger numbers do not return to pre-pandemic levels.
- **Poor performance of electric buses** – mitigated by our identification of competitive quotes for a 7+5-year (standard option + extended option) warranty offer from at least one potential bus manufacturer, and inclusion of a secondary opportunity charging station in place to ensure the buses can continue to run the requisite services.
- **Franchising** – mitigated by inclusion of clawback measures for the procurement contracts to ensure that if standards of service aren't met, or termination of service occurs, grant funding will be re-couped, and inclusion of covenants requiring retention and maintenance of charging infrastructure.

Deliverability

Our team undertook an Options assessment for investment into ZEBs, considering four scenarios; Do Nothing, Do Minimum, Do Something and Do Everything. We approached the assessment with the view that we want to deliver a scheme that has a short-term measurable impact, acts as a catalyst for future investment, and is deliverable working within the constraints of the regional context.

Deliverability of our proposed scheme has been thoroughly tested and assured through extensive market engagement with our local Bus Operators, Vehicle Manufacturers, Electricity Distribution Network Operator, and public sector partners. Letters of Support are included in our Business Case as evidence of this engagement.

5. Management Case

Our plan sees 30 zero emission buses and supporting charging infrastructure procured through the Scheme being operational and delivering benefits **as early as October 2022 with delivery of the final capital delivery of solar-powered opportunity chargers at Babraham Road P and R to be completed by December 2022**. We have confidence in our ability to achieve this due to:

- **Assurances and Letters of Support** provided by potential Bus Operator Partners, Manufacturers, our Electricity Distribution Network Operator, and our public sector partners.

- **CPCA's track record in on-time delivery**, enabled by our robust project, stakeholder, and risk management methodology (3.35 & 3.38).

Our scheme will be **one of the first ZEBRA-funded schemes to launch**, providing **a "quick win" for Government in one of the world's most famous cities**.

Key risks and mitigations

- **Delays in construction/deployment of buses and infrastructure –** mitigated through our engagement and the assurances that we have received from the breadth of partners we would require to deliver our scheme, responses from all of which have been considered when producing our project plan and critical path.
- **Tension between stakeholders –** mitigated by CPCA's tried and tested project management and relationship management methodology, and our existing relationships with the partners, ensuring that any issues can be raised and resolved quickly and efficiently.

Monitoring and Evaluation

CPCA has established **robust mechanisms in place to monitor and evaluate the impacts of new schemes** within our region. These are facilitated through internal data sources and collection methods, as well as contracts and relationships with partners throughout the area (3.40). Analysis is currently undertaken using traditional mechanisms but will be enhanced through the use of a new Model Data Environment, which is being implemented this year. Independent evaluators will also be used to undertake external analysis and monitoring and the results from our monitoring and evaluation processes shared with the DfT (3.41).

Deliverability

CPCA has **tried and tested project governance, risk and stakeholder management systems in place which have already enabled us (even as a relatively new organisation) to deliver schemes to time and to budget**. Our proposed methodology for the ZEBRA scheme aligns to the current way bus operations are delivered in the region and **contingency plans are in place in the event of any bus reform programmes from franchising**. We also have an informed project plan with critical path built off discussions with all the key players to ensure timeliness and accuracy of delivery (3.36).

6. Commercial Case

CPCA has consulted with a number of parties in respect of our ambitions to support the procurement and delivery of zero emission buses in Cambridge (3.22). Together with our public sector delivery partners, we have engaged our three principle local bus operators, four bus manufacturers, two potential providers of in-depot charging infrastructure, our local Distribution Network Operator ([redacted]), GCP's contractor delivering the Solar Farm at the Babraham Park and Ride facility, and two hydrogen producers (in order to understand comparative costs for Fuel Cell Electric Buses).

Through these engagements we have collected and analysed information and data on asset requirements in order to operate Zero Emission Buses (ZEBs) in Cambridge, cost ranges, and potential commercial structures and procurement routes.

Our proposed approach, which (designed with our external Counsel) addresses and mitigates State Aid, Subsidy, and Competition Act challenges, is to:

- Issue a Prior Information Notice (PIN) and run a PCR2015-compliant Expression of Interest process to identify potential Operator Partner bidders. This will also serve as the pre-qualification process for a single stage tender if required.
- Directly award the Operator Partner role if (as we expect based on our Market Engagement to date) there is only one viable Partner. Else to run a single-stage PCR2015-compliant procurement to select the Operator Partner.
- Require the Operator Partner to run open, transparent procurements for both the vehicles and in-depot charging infrastructure. CPCA will have oversight of both of these procurements.
- Grant Fund the Operator Partner to procure the vehicles, in-depot charging infrastructure, and to pay for the grid connection upgrade which CPCA has already agreed costings for with [redacted]. The Grant Conditions will include a claw back to enable CPCA to recoup any Grant not used in these procurements.
- Require Cambridgeshire County Council run an open, transparent, and PCR2015-compliant procurement for the Babraham Road opportunity charging infrastructure (and Solar Farm grid connection), and the corresponding Operations & Maintenance contract. CPCA will have oversight of this procurement.
- Grant Fund Cambridgeshire County Council to procure the Babraham Road opportunity charging infrastructure and Solar Farm grid connection. As above, the Grant Conditions will include a claw back to enable CPCA to recoup any Grant not used in these procurements.
- Include Service and Operating Level Agreement, and exit conditions in the Grant Agreements for both the Operator Partner and Cambridgeshire County Council, enabling claw back of the Grant payment in the event that these conditions are not met.

Key risks and mitigations

- **Subsidy control and Competition Act challenges -** mitigated by CPCA running a PCR2015-compliant process to select the Operator Partner, and requiring the Operator Partner and Cambridgeshire County Council to run open, transparent procurements for the vehicles and charging infrastructure. CPCA has also received legal advice illustrating that the proposed approach will enable the scheme to be State Aid compliant.
- **Higher operating costs than expected –** mitigated by CPCA working together with the operator to put in place robust financial checks to minimise the impact of unexpectedly higher operating cost on fares.
- **Poor reliability –** mitigated by the Grant Agreement requiring the Operator Partner to agree an appropriate warranty with the bus manufacturer and establish suitable contracts with organisations with the expertise (e.g. manufacturer and charging infrastructure providers) to advise the Operator Partner on best practices and provide training to the Operator Partner's staff. The Opportunity Charging infrastructure also provides resilience and mitigates lower-than-expected performance of batteries.
- **Uncertain residual value of capital expenditure in the event of clawback** – mitigated by engagement by CPCA (if required) of specialist technical advisors to assess market value of depreciated assets.
- **Capital costs for vehicles and infrastructure exceed available funding** – mitigated by our extensive market engagement and analysis to date, and inclusion of QRA-informed contingency and optimism bias in our calculations.

Deliverability

A number of commercial and procurement options have been considered and assessed to not only ensure appropriate risk allocation, ability to achieve value for money, efficiency of spend, and mitigation of subsidy control and competition act challenges, but also to ensure that it lays the foundations to deliver CPCA's commitment to enable transition to a fully zero emission fleet by 2030. In doing so CPCA has consulted extensively with internal and external specialists, and potential partners on our proposed approach, confirming acceptability and deliverability with these respective parties.

7. Financial Case

Our Financial Case demonstrates that CPCA's proposed ZEBRA scheme is affordable and can sustain benefits in the long term beyond the length of the scheme (3.28).

The directly-attributable financial requirements for our proposed ZEBRA scheme over the 8-year period of the Scheme Operation (from Q1/2 2022 – Q1/2 2029), inflation embedded, are as follows:

Items	2021 real prices inflated to expected date of incurrence Before optimism bias	Plus optimism bias
CAPEX		
30 x Double Deck Battery Electric Buses (OB 3%)	£13,430,954	£13,833,883
In-Depot and Out-of-Depot Charging Infrastructure (OB 10%)	£2,112,504	£2,323,754
Total CAPEX	**£15,543,457**	**£16,157,636**
OPEX		
Scheme Administration, M&E, Marketing & Communications, Overheads, and Advisory support (OB 10%)	£1,031,317	£1,134,449
Total OPEX	**£1,031,317**	**£1,134,449**

The funding for this scheme has been split across CPCA, GCP, the operator partner and the ZEBRA scheme (as shown in the table above) to ensure that we are able to achieve the best value for money for the limited resources available to the bus operators in the region.

Key risks and mitigations

- **Inability of the Operator Partner to commit to its agreed financial contribution** – mitigated by including the Operator Partner's financial contribution in our evaluation criteria for bids, and requesting evidence of ability to deliver this contribution, together with evidence that the bidder is able to demonstrate viability of its business as a going concern (3.29).
- **Capital costs for vehicles and infrastructure exceed available funding** – mitigated by our extensive market engagement and analysis to date, and inclusion of QRA-informed contingency and optimism bias in our calculations (3.32).
- **Poor reliability –** mitigated by the Grant Agreement requiring the Operator Partner to agree an appropriate warranty with the bus manufacturer and establish suitable contracts with organisations with the expertise (e.g. manufacturer and charging

infrastructure providers) to advise the Operator Partner on best practices and provide training to the Operator Partner's staff. The Opportunity Charging infrastructure also provides resilience and mitigates lower-than-expected performance of batteries.

Deliverability

CPCA has engaged with a wide variety of market participants (as set out in the Market Engagement section of the Commercial Case) in order to develop its estimates of costs (both CAPEX and OPEX) as shown in the previous section. The exception for this Business Case is maintenance and operating costs of electric buses, where data has been sourced / derived from the Department's Greener Bus Tool.

We will continue to engage with all local operators, informing them of the progress of our bid for the Scheme and, if successful, plans for the Operator Partner procurement.

8. Economic Case

Value for Money for our proposed ZEBRA scheme is demonstrated through the use of both the Department for Transport's Greener Buses Tool, and **significant additional monetised and non-monetised benefits**, not captured by the tool. DfT-advised sensitivities have also been calculated and presented in this Business Case (3.17).

Importantly, the funding contributions we have secured from both the CPCA and GCP will enable us to deliver this scheme with a minimum ask from DfT (3.16), **enabling the DfT to provide additional funding to support the delivery of zero emission buses and their associated benefits in other regions across the country**.

The economic assessment, based on the Department's Greener Bus Tool alone has indicated a **BCR of 1.12** over the period 2022-2038, representing **Low but positive Value for Money**, driven by the 86% reduction of absolute CO_2 emitted through the implementation of the scheme. Further monetizable and non-monetizable benefits not captured by the Greener Bus Tool (including improvements in the traveller experience and safety) **increase our forecast BCR to 1.89, representing Medium Value for Money** (3.14 & 3.15).

Preferred Scenario	Central		High		Low	
	NPV	BCR	NPV	BCR	NPV	BCR
Do Something (Plug-in Opportunity Charging)	**£1,063,411**	**1.12 Low**	**£5,020,778**	**1.56 Medium**	**-£2,533,208**	**0.72 Poor**

Key risks and mitigations

- **Expected benefits are lower than expected –** mitigated by our calculations building in different sensitivity scenarios to ensure that an array of outcomes is presented in the business case outlining when benefits are more or less effective. Even in our worst-case scenario, the benefits in reduction of air pollution are upheld and substantial.
- **Capital costs for vehicles and infrastructure exceed available funding** – mitigated by our extensive market engagement and analysis to date, and inclusion of QRA-informed contingency and optimism bias in our calculations.

- **Failure of the Operator Partner to deliver the scheme to our requirements –** mitigated by robust operational management practices and inclusion of claw back conditions in the Grant Agreement.

Deliverability

The Greener Bus Tool Model has been used to calculate the BCR and VfM, meeting DfT's requirements and reflecting its expectations and valuations. CPCA has also undertaken extensive analysis to develop a comprehensive list of additional monetised and non-monetised benefits, and has built in a number of additional variables and sensitivity scenarios to ensure that our projections are robust and that our scheme will deliver positive outcomes and value for money.

Strategic Case

1. Overview of our Strategic Objectives and Case for Change

1.1.1. A unique opportunity exists for Government to help one of the UK's (if not arguably the world's) famous cities to kick-start its journey to decarbonise its public transport network.

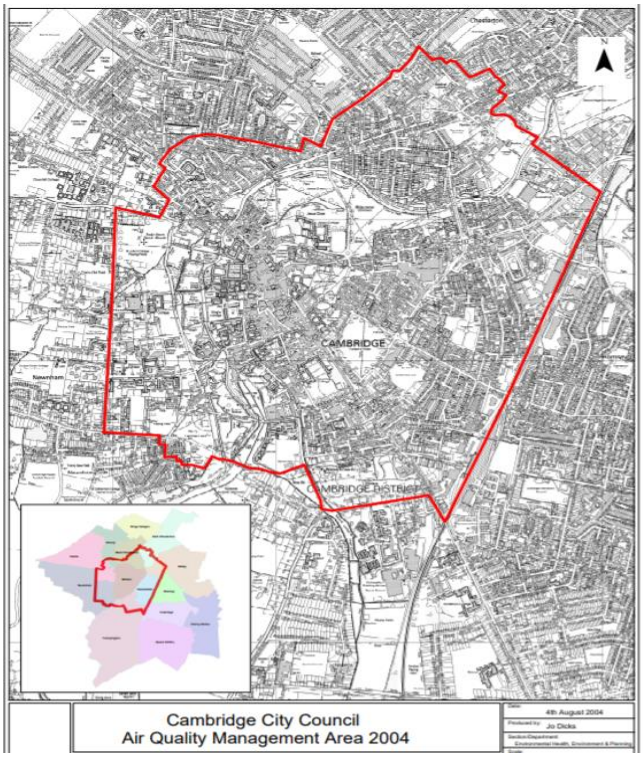
1.1.2. The ZEBRA scheme has attracted a lot of interest and represents an exciting programme of projects across England that will have National relevance – especially in pioneering how the bus market will evolve into a zero emission industry by 2030 off the back of an unprecedented disruption to the public transport sector caused by the COVID-19 pandemic.

1.1.3. With **air quality metrics consistently exceeding the World Health Organisation's standards** for particulate concentrations, an Air Quality Management Area (AQMA) rigidly in place since 2004, and buses contributing **49% of NOx emissions within the city centre,** urgent action is required.

1.1.4. The ZEBRA fund is ideally positioned to support the Cambridgeshire & Peterborough Combined Authorities, Cambridge City Council, Greater Cambridgeshire Partnership, and our local operators to **deliver East Anglia's biggest investment to date in zero emission buses**, in a project that **Government can stand on the world stage and be proud to say that it enabled**.

1.1.5. Our bid is not a knee-jerk reaction to our air quality issues: far from it. We have taken a structured, logical approach to understanding our issues, and identified how **a targeted intervention can deliver significant value for money, manage risk to both our funders and our operators**, and act as seed funding to catalyse investment in the region.

1.1.6. Within three years of project commencement **Cambridge will benefit from a >80% reduction in emissions on some of its most vital bus routes**, enabling it to r**etain its proud status for inward investment to UK Plc. as a home of innovation**. This includes **delivering one of the UK's first fully green opportunity charging stations,** powered by a Solar Farm at one of our largest Park and Ride sites, and which can support **not only decarbonisation of our Park and Ride services, but –** potentially **- intercity coach services to and from Cambridge and local electric municipal vehicle fleets**.



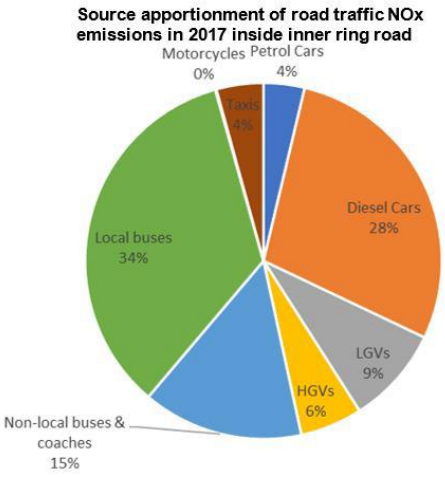
1.1.7. The time is now for levelling up of transport decarbonisation investment into East Anglia, and the place is Cambridge.

1.2. Why is intervention needed?

1.2.1. The Independent Report by the Cambridgeshire and Peterborough Commission for Climate Change[1] and Greater Cambridge Citizens' Assembly[2] highlighted key challenges facing our region and concluded that a number of actions are required to address these and deliver a range of benefits, including (but not limited to):

- more and better green space,
- a thriving natural world,
- better insulated and better ventilated homes,
- reduce environmental impact,
- cleaner air,
- grow and level up the economy,
- high quality job opportunities in the growing green economy,
- **better public transport**; and,
- improved health and well-being.

1.2.2. Cambridgeshire has **constantly exceeded the World Health Organisation's standards for particulate concentrations**, so much so that in 2004 Cambridge City Council designated the area inside the red boundary shown above as an **Air Quality Management Area (AQMA)** because of **high nitroxide levels caused by traffic**. The area extends along some radial roads outside of the ring road.



1.2.3. Analysis shows that **buses account for 49% of NOx emissions within the city centre**, with a high correlation between concentrations of NOx and the Cambridge bus station and bus routes. Furthermore, with the further planned urban growth of Cambridge **a three-fold increase in the demand for, and, use of public transport is predicted**. This would lead to a considerable worsening of air quality within the historic centre without adoption of zero emission vehicles.

1.2.4. A number of the selected routes service some of the **more deprived areas** within Cambridge where people are more likely to suffer health inequalities making them **more susceptible to air pollution**, which could be negated through the use of zero-emission buses.

1.2.5. **Delivering zero emission buses to Cambridgeshire and Peterborough Combined Authority's (CPCA) constituencies is therefore an important part of delivering our vision of a greener future economy.**

[1] CLIMATE COMMISSION REPORT_Final.pdf (hubspotusercontent40.net)
[2] https://www.greatercambridge.org.uk/city-access/greater-cambridge-citizens-assembly

1.2.6. **Cambridge City is a vital intellectual and economic national asset, competing on a global stage**. The Cambridgeshire and Peterborough Independent Economic Review (CPIER)[3] cited that **Cambridge University is in the top ten educational establishments in the world**, and the life sciences, bio-tech, and technology sectors clustered in and around the city as a model of sustained growth. To support these sectors, Local Plans for the area envisage **significant employment and housing growth** that will see the City grow by a third over the period to 2031.

1.2.7. Economic growth and wellbeing development are reliant on a world-class public transport system to support a regions most prized asset – **its people**. Greater Cambridge will become less attractive to businesses and individuals, **losing its international competitive edge** in attracting businesses to the UK over investing overseas, without the necessary support services required by its population.

1.2.8. To deliver growth levels in the current local plans, we need **triple the number of people using our bus services** and therefore the bus network needs to **double in size/scale**. These buses must be zero emission, or we will exacerbate the existing air pollution issue and leave a long-term legacy of high carbon emissions from public transport. Moving the bus fleet to zero emission is a central plank of delivering growth in Greater Cambridge and maintaining its international success.

1.2.9. Our Local Transport Plan (LTP)[4] sets out the agenda for tackling that transport infrastructure requirement, supported by the City Deal, focusing on **increasing modal shift to passenger transport** to accommodate that growth, whilst giving **measurable improvements in air quality, accessibility, and public health**.

1.2.10. Despite the CA's and industry's support and the financial commitment to the greener bus agenda, **government funding is still required to facilitate the urgent transition** that is required for the following reasons:

- There is currently no commitment from operators to alternative fuel vehicles in the locality with a relatively low current average fleet age reducing this incentive to invest further. Our scheme will accelerate this investment as operators in the region have agreed to invest ~£7m to front the equivalent price of 30 new diesel buses, with grant funding from ZEBRA, CPCA and GCP making up the additional costs for the vehicles and requisite charging infrastructure.
- COVID-19 has had a material impact on patronage levels, which are currently at 50% of their pre-pandemic levels. This has eroded the balance sheet positions of Operators, making it almost **impossible for operators to commit to capital spending to renew buses sooner than would otherwise be required, and for new vehicles which cost in excess of what a new diesel bus would cost**; and
- Given the critical air quality issues the City of Cambridge faces we believe that now is the right time to be investing in the transition of our bus network to zero emission vehicles.

[3] https://www.cpier.org.uk/media/1672/cpier-report-151118-lowres.pdf
[4] Local Transport Plan | Cambridgeshire & Peterborough Combined Authority (cambridgeshirepeterborough-ca.gov.uk)

1.2.11. The joint initiative between the Greater Cambridgeshire Partnership and [redacted] to trial two double-decker electric vehicles[5] over the past 16 months has shone a light on the benefits that are achievable – not just in air quality but also in passenger experience and perception. We want to build on this by making a material investment to jump-start the transition of the whole bus fleet in Cambridge and deliver real air quality benefits in our AQMA.

1.2.12. There is an urgent and compelling need to invest in Cambridge for the following reasons:

1.2.12.1. Despite cleaner vehicles operating in the city of Cambridge **air quality issues are at a critical point with buses being the highest contributor to emissions**.

1.2.12.2. Cambridge is a gem in England's crown. It is one of our most recognised and famous cities. It is home to one of the top 10 educational establishments globally, attracts significant tourism, and has a proud history of securing inward investment for the UK. **Failure to accelerate decarbonisation of the public transport network in Cambridge undermines its importance as a national asset to the UK, and the Government's credibility** as a leader in the race to net zero.

1.2.12.3. The Cambridgeshire and Peterborough Independent Economic Review (CPIER) places investment in transport infrastructure at the top of the short- and medium-term priority interventions for the region to enable the delivery of sustainable economic growth. The region has suffered chronic underfunding on a national level, and **this is a prime opportunity to level the playing field**.

1.2.12.4. Cambridge is a leading global city for innovation and emerging technology with ambitions to double our regional Gross Value Add (GVA) to the UK economy. **We have the skills and ambition to unlock additional benefits from accelerating the transition to zero emission transport**, and our proposed M&E plan taps directly into this rich capability.

1.2.12.5. Delays in the transition of our public transport fleet to zero emissions vehicles undermines our argument for getting people out of cars and onto clean, shared, public transport. **To enable clean growth at the rates forecast for Cambridge we need a clean public transport network**, which our Operators are not currently in the position to deliver.

1.2.13. Our rationale is fully aligned with national priorities and policy objectives, further strengthening the case for investment in Cambridge:

[5] Cambridge's First Electric Buses| East | Stagecoach (stagecoachbus.com)

Rationale	Mapping to DfT objectives	Mapping to ZEBRA objectives	
Addressing local air quality issues	• Reduce Environmental Impacts		• To support the government's commitment to decarbonisation and to reduce the transport sector's contribution to CO2 emissions
Maintaining the UK's position as a leader in Net Zero	• Reduce Environmental Impacts		• To support the roll-out of the 4,000 Zero Emission Buses that the government committed to in February 2020.
Prioritisation of transport investment to enable the delivery of sustainable economic growth	• Grow and Level Up the Economy	 	• To support partnership working between Local Transport Authorities, bus operators, and other local stakeholders as set out in the National Bus Strategy. • To support the roll-out of the 4,000 Zero Emission Buses that the government committed to in February 2020.
Supporting and leveraging the development of skills required for zero carbon economy, and delivering our ambitions for doubling GVA in the region	• Grow and Level Up the Economy • Reduce Environmental Impacts	  	• To support bus manufacturers in the development of zero emission bus technology. • To understand better the challenges of introducing zero emission buses and supporting infrastructure to inform future government support for Zero Emission Buses • To support partnership working between Local Transport Authorities, bus operators, and other local stakeholders as set out in the National Bus Strategy.
Delivering a world class public transport to improve users' journey and reduce reliance on cars	• Improve Transport for the User		• To support partnership working between Local Transport Authorities, bus operators, and other local stakeholders as set out in the National Bus Strategy.

1.3. Summary of our proposed Scheme

1.3.1. The urgency of our air quality issues, and significant source of these being buses in the City Centre, has catalysed local investment. The **GCP and CPCA will commit £5.245m of local funding** to support the transition to zero emission buses in Cambridge. **Our largest local Operator has also committed to paying £230,000 per vehicle for up to 30 new double decker electric buses (a total of £7.035m including inflation but excluding VAT and optimism bias)** subject to the remaining vehicle capital costs and infrastructure costs being paid for with public funding.

1.3.2. We wish to maximise the benefits from the local public and private sector funding available and are, therefore, proposing that **our Scheme will comprise 30 double decker electric buses (and associated in-depot charging infrastructure)**. These will **operate on our Park & Ride and Citi 2 services, which run directly through the AQMA**, and which we see as having the potential to deliver the most visible and significant benefits.

1.3.3. We have commissioned specialist consultancy from UK Power Network Services Ltd. which has concluded that opportunity charging will be required to enable the buses to complete their routes and mitigate risk of breakdown. Our intention is to install two **plug-in opportunity chargers at Cambridgeshire County Council's Babraham Road Park & Ride facility**, enabling buses to re-charge whilst collecting passengers, and benefit from being **powered by a green energy source, the Babraham Solar Farm, which is being installed above car parking spaces** at the Park & Ride as part of a separate green project – providing truly green "well to wheel" charging for buses at this site, and paid-for off-taking of energy for the Solar Farm.

1.3.4. The Park & Ride site also provides rest facilities for coaches travelling into and out of Cambridge, and **we will work with intercity coach operators to understand how our new opportunity charging station could be utilised by their services in the future and support them on their decarbonisation journey**. We will also explore how access to chargers can be extended for other types of municipal vehicles (subject to availability, with the Park & Ride services having priority).

1.3.5. **Plug-in rapid opportunity chargers at the Park & Ride site are required** to provide a level of risk mitigation for the electric buses when providing the route services stipulated. In adverse weather, such as cold and wintery conditions, it has been shown that there are additional power requirements, with one major study showing a 38% decrease in the range of electric bus batteries in temperatures between -5 and 0 degrees Celsius[6]. Also, battery degradation occurs over the lifetime of the battery and it has been indicated that after year 5 it may have degraded to such a level that the buses wouldn't be able to complete the entire service without opportunity charging.

1.3.6. Despite increased logistical challenges regarding safety and driver training, plug-in chargers are preferred to pantographs as they can provide **better interoperability for other electric vehicles** (subject to availability), and are also **considerably cheaper to implement than pantographs**, as shown in the Financial Case.

1.3.7. The use of **opportunity charging will also enable the two existing electric buses owned by [redacted] through its pilot with GCP to be used throughout the year**, addressing problematic battery capabilities during the winter months by providing en-route charging.

1.3.8. Our local funding will only stretch so far. The total anticipated cost of our Scheme **(including inflation but exc. VAT, optimism bias and contingency)** is £16.575m,

[6] The effect of cold weather on electric bus range, fuel cell wins. A study by CTE - Sustainable Bus (sustainable-bus.com)

with our local public contribution totalling £5.245m and private sector contributions £7.035m. **We are therefore seeking ZEBRA funding of £4.295m for our Scheme**.

1.3.9. A summary of our proposed Scheme is as follows:

- **30 double-decker electric buses** operating on a commercial basis on Cambridge's Park & Ride and Citi 2 routes
- **16 x 150kWh double charging points** (or equivalent) to be installed at the selected Operator Partner's depot
- **Grid connection upgrade, private substation, and low voltage wiring** at the selected Operator Partner's depot
- **Two (2) Opportunity Plug-in Rapid Chargers** at the Babraham Road Park and Ride site
- **Connection of the opportunity plug-in rapid chargers** to the Babraham Road Park and Ride Solar Farm embedded storage

1.3.10. It is worthwhile noting that the ZEBRA funding is only being used to fund the additional cost of an electric bus compared to that of an equivalent diesel bus (£140,500 of ZEBRA funding per vehicle equivalent to 64% of the incremental cost differential). This, therefore, means that the ZEBRA funds will be contributing toward an additional 9.5 electric buses for the CPCA region based on a price of £439k per bus.

1.3.11. Opportunity charging infrastructure at the Park & Ride site will not be required until late Autumn/early Winter 2022, to accommodate increased power requirements for running heating and poorer battery performance in cold weather. It will benefit from a Green energy supply being provided by the newly constructed Solar Farm at Babraham, providing a green "well-to-wheel" energy supply. The Babraham Park & Ride Solar Farm is anticipated to be operational and able to supply power for the Plug-in Opportunity Chargers by September/October 2022. Installation of the chargers and the connection to the embedded storage is not on the critical path and will be commissioned and installed when most appropriate before September 2022.

1.3.12. For the avoidance of doubt, and noting that ZEBRA only funds capital costs, all operational costs (e.g. energy costs) associated with the Scheme will be paid for as revenue expenditure by the party which incurs them.

2. Detailed Objectives and Case for Change

2.1 Improving Air Quality

Drivers and challenges

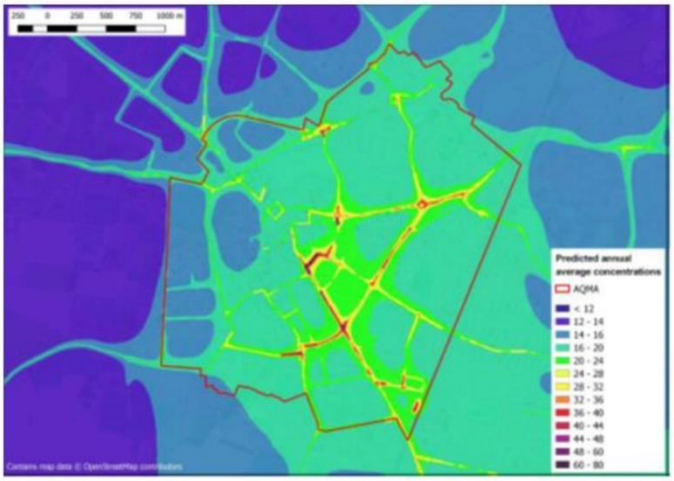
2.1.1. Cambridge City is our primary location choice due to its air quality exceeding legal limits in the past five years, and the expected expansion in buses services to cope with the economic and wellbeing growth prospects in the region that will exacerbate our air quality issues further. Our ZEBRA proposal will deliver significant air quality improvements with subsequent improved public health, substantially higher quality public transport experience and contribution to the wider economic growth.

2.1.2. **Over 100 deaths in Greater Cambridge are attributable to air pollution each year**. **Buses are the largest single contributor to emissions**[7]. This must change.

2.1.3. The Do Nothing scenario can only predict a deterioration in this statistic with current planned growth.

2.1.4. In the recent "Better Journeys Survey" run by GCP in the Cambridgeshire region, 82% of the 5,000 local respondents wanted to see improvements in their public transport with **improving air quality high on their list of priorities**[8].

Annual average NO_2 concentrations, central Cambridge, 2017, µg.m-3



2.1.5. Plans to tackle air quality are set out in the Combined Authority's LTP as well as the Air Quality Action Plan.[9] GCP also expressed ambitions in its March Report to limit the city centre to zero-emission vehicles from 2025[10]. The ZEBRA fund will be an extension of current projects and programmes that aim at improving air quality in the region, building on **strong fundamental foundations**, including:

- an extensive park and ride system;
- a sixteen-mile-long guided busway;
- an electric taxi policy; and,
- the UK's highest cycling mode share.

[7] Cambridge Clean Air Zone feasibility study (amazonaws.com)
[8] Thousands back Greater Cambridge vision for better journeys - Cambridge Ahead
[9] Executive summary (cambridge.gov.uk)
[10] Council and committee meetings - Cambridgeshire County Council > Meetings (cmis.uk.com)

2.1.6. A Clean Air Zone Feasibility Study published by the GCP[11] sets out that, **without intervention (i.e. a "do nothing" scenario), the rapid demographic and economic growth in Cambridge city centre risks continued exceedances for the next decade, with some areas seeing worsening air quality**. With economic success and high levels of growth in the region the air pollution situation remains close to exceedance of UK Standards, with some monitoring locations between 35 and 40ugm for annual mean Nitrogen Dioxide. **None of the city is compliant with World Health Organisation standards for particulate concentrations.** Current planned urban growth of 30% for Cambridge is predicated on a three-fold increase in public transport. This would lead to a considerable worsening of air quality within the historic centre without adoption of zero emissions vehicles.

2.1.7. This proposal of replacing current diesel buses with zero emission buses across the major routes within the city focuses on air quality management areas and is a first phase and **immediate short term solution** stimulating continued rollout for medium and long term public health improvements through cleaner city air.

How the ZEBRA funding will address drivers and challenges

2.1.8. The ZEBs in this project would operate on routes through the AQMA which are currently served by Euro VI buses, including the one serving UK's flagship Addenbrooke hospital. With 32% of departures being zero emission, and the released Euro VI buses replacing Euro IV and V on other AQMA routes, **we anticipate reducing in bus emissions in the city centre/Air Quality Management Zone (AQMZ) by 40-45%**.

2.1.9. Crucially, **NOx, PM and carbon emissions in the city centre/AQMZ are expected to return to environmentally acceptable levels following this intervention**.

2.1.10. Specifically (using the Department's Greener Bus Tool to calculate benefits):

- **After year 1** CO_2 emitted is expected to fall by 1,405,262 kg/CO_2e - a 74% reduction versus pre-implementation levels
- **After year 8** absolute CO_2 emitted is expected to fall by 12,175,980.4 kg/CO_2e - an overall decline of 80% on pre-implementation levels
- **After year 17** absolute CO_2 emitted is expected to fall by 27,997,093.29 kg/CO_2e, representing an overall decline of 86% on pre-implementation levels.

2.1.11. Furthermore, utilisation of Green energy to be sourced from the Babraham Road Park and Ride Solar Farm (due to be completed by October 2022) means that **buses charging at the Park and Ride will be truly zero emitting**, contributing even more towards improved emission controls in the region.

2.2. Maintaining the UK's position as a leader in Net Zero

Drivers and Challenges

2.2.1. A growing economy is at risk with an underfunded public transport network, with the Cambridge and Peterborough Independent Economic Review (CPIER) identifying

[11] https://ehq-production-europe.s3.eu-west-1.amazonaws.com/4850b6ce64d5b65aca421d9cd61fcddee33127b8/documents/attachments/000/002/050/original/Cambridge_CAZ_Final_Report.pdf

investment in public transport infrastructure as the region's top short- and medium-term priority. The CPIER also recommends that CPCA takes a 'placemaking' approach to developing new housing to support the local demographic and economic growth. This is evidenced by the clusters of life-science, biotechnology, and technology companies in and around the city that continuously and rapidly grows outward from the urban centre.

2.2.2. The bus market in the United Kingdom has seen a significant downturn in the past decade with Covid-19 having an additional impact in the past 18 months. There is an unclear path to recovery from the impact of Covid-19 and the potential impact from measures implemented from the National Bus Strategy are still unknown. Yet, **CPCA believes that the time is now to be investing in our bus network as the economy reopens to build back better**, placing buses as its top priority for transport integration, with Bus Service Improvement Plans (BSIPs) and Franchising ambition as its two major current activities.

2.2.3. The Cambridge and Peterborough Independent Economic Review (CPIER) also identifies **East Anglia as a region that is still yet to receive DfT grant funding toward transport decarbonisation and zero emission buses** and minimal grant funding in totality toward its environmental objectives.

2.2.4. Building on the emission reducing success of the trials of Cambridge's first two electric buses, the city is an ideal candidate for **the first full-scale deployment of zero emission buses in the region**.

How the ZEBRA funding will address drivers and challenges

2.2.5. The provision of high-quality public transport access in the city supports dispersal growth, fringe growth and corridor-led approaches to spatial planning. In addition, delivering higher levels of density in Cambridge, as explored by the CPIER, can only be delivered on the outer areas of the city, and would benefit from proximity to public transport links such as rail stations and bus services. **The transition to ZEBs will support in delivering better places by providing a sustainable means to travel, offering a differentiated public transport experience, and adding to the economic competitiveness of the region.**

2.2.6. The delivery and use of solar powered opportunity charging will provide a use case for other regions across the UK when implementing charging infrastructure, and will also provide the region with the ability to uplift their skills base through the learnings generated in the construction of the charging and solar farm sites. Incremental intra-city benefits may also be generated by **providing an asset which can be used by inter-city coach operators as they begin their decarbonisation journeys**.

2.3 Supporting levelling up, green recovery, and sustainable economic growth

Drivers and Challenges

2.3.1 As identified in the CPIER there is a disparity in the level of skills across the region creating some large levels of inequality. A transport-only led approach, according to

the CPIER, could have the effect of 'cementing the functional roles of some places'[12] and, thereby, reinforcing the inequality. Our ZEBRA scheme and LTP **focus on the wider impact that transport can have on the region, and our ZEBRA bid aims to support in the development of new skills across the region.** The implementation of this scheme will support and encourage the development of new skills in the transport sector improving future access to higher productivity jobs.

How the ZEBRA funding will address drivers and challenges

2.3.2 Cambridge City is a vital intellectual and economic national asset, generating more patents per head than anywhere else in the UK, and it competes on a global stage. As globally recognised innovation hub the transition to **ZEBs will not only deliver better public transport but will, also, provide an opportunity to continue the growth of economic investment in the future of mobility**. Our ZEBRA bid aims to further stimulate the local economy by providing more opportunities for local businesses in the future mobility sector through supply chain opportunities, developing a skilled workforce and encouraging inward investment by illustrating the regions commitment to the transition to ZEBs.

2.3.3 Opportunities that can be realised because of our new zero emission bus fleet and charging infrastructure include:

- **Upskilling**: Cambridgeshire County Council intends to retain ownership of the plug-in opportunity charge points, which can be used as platforms for other operators (with the selected Operator Partner sharing its experience) to learn and upskill their staff on electrifying and maintaining future fleet; and,
- **Innovation and R&D**: Academic institutions will be involved in the monitoring and evaluation of the zero-emission bus service delivery, enabling researchers and academics to further spearhead the already ongoing innovation and R&D on zero emission technologies.

2.3.4 If successful, our Business & Skills team will be key stakeholders in the design and delivery of our zero-emission bus scheme.

2.4 Delivering a world-class public transport to improve users' journey and reduce reliance on cars

Drivers and Challenges

2.4.1 To deliver the growth levels in the current local plans, we need to triple bus patronage numbers and therefore double the size/scale of the networks in operation. This will ensure Greater Cambridge retains its international competitive edge in attracting overseas businesses, however this must be combined with a zero-emission fleet to prevent exacerbating our air quality issues further. Therefore, moving the bus fleet to zero emission is a central plank of delivering growth in Greater Cambridge and maintaining its international success.

2.4.2 Bus patronage levels have also seen gradual year-on-year decline over the last decade across most of the country. Increasing reliance on private cars gives rise to congestion across our key route network, resulting in significant economic costs to the region. As the economy reopens, CPCA believes that this is an opportune

[12] cpier-report-151118-lowres.pdf

moment for bus operators to convince transport users to take the buses once again by delivering a world-class service.

2.4.3 Our LTP clearly sets out the ambition to deliver a world-class public transport network to improve passengers' experience. In April 2021, CPCA brought in house the Cambridgeshire and City of Peterborough bus teams to centralise and re-energise our policies such as reintroducing bus stop information, integrated fares and bus reform – including development of our BSIP and exploration of franchising. Our ZEBRA bid has been developed to be fully coherent with, and aligned to, the development of our BSIP.

How the ZEBRA funding will address drivers and challenges

2.4.4 Our ZEBRA scheme looks to shift modal preference away from private vehicles, by enhancing not only the bus service in the CPCA region, but also improving the Park and Ride service provided to residents and visitors. The improved Park and Ride bus routes will provide a better-quality and more comfortable service in the form of the green electric buses, and look to take advantage of the value-added perception of a zero emission service to build a larger patronage base and further reduce congestion levels in and around Cambridgeshire.

2.4.5 We believe supporting the accelerated introduction of Zero Emission Buses will support our vision of delivering a world-class bus service by:

2.4.4.1 **Improving users' journeys and perceptions of travelling by bus**: Zero emissions vehicles do not only save our passengers and local population from exhaust fumes but also the noise pollution generated by diesel engines (both within the vehicle and on roadside). Anecdotal evidence from the trials of our first two zero emission buses points to both a significant uplift of passenger experience and perceptions of buses in the general population. We want to build on this with an investment that can transition 10% (as opposed to the current 0.7%) of our fleet.

2.4.4.2 **Reducing reliance on cars**: the upgrade of Park & Ride facilities to incorporate Solar Farms for green energy, and provide electric vehicle charging infrastructure sites, is timely given the local governments wider strategy to reduce reliance on cars by investing in new infrastructure (GCP segregated busways and radial upgrades), expanding bus services and introducing demand management through space creation for buses and road pricing, as well as providing a revenue source to subsidise services and fares. These measures will put additional pressure on the Park and Ride sites and the demand for buses which, if this proposal is funded, will be zero emission.

2.4.6 The table below sets out how our proposed Scheme benefits a broad range of stakeholders, including current, potential, and non-users of the bus services.

User Group	Impact of ZEBRA Funding
City of Cambridge residents	- Delivery of ZEBs for use in the city area will reduce emissions and improve air quality, contributing to a reduction in air pollution attributable deaths - Availability of ZEBs can support individuals in achieving their own personal decarbonisation agendas - Reduced congestion as a greater uptake of park and ride services

	- Reduction in noise pollution generated by diesel engines
Cambridgeshire and Peterborough residents	- Euro VI diesel buses displaced from the current Park and Ride service will replace the higher polluting vehicles in the rural bus network, delivering improved air quality across a wider geography - Improved public perception, addressing the Better Journeys Survey findings which identified that 82% of respondents wanted to see improved public transport, with improving air quality high on the list of priorities
Bus users	- Health improvements as passengers will not be breathing in diesel fumes at the bus stop, and/or whilst travelling on the bus - Faster service on the premise that congestion is reduced from greater uptake in bus use - Reduction in noise pollution generated by diesel engines - Higher quality and more comfortable services provided by the zero emission buses
Park and ride users	- Park and Ride users will benefit from the enhanced quality of service with more comfortable, cleaner, and less noisy buses - Health improvements from air quality improvements at the Park and Ride site - The introduction of the plug-in opportunity charge points may reduce pavement space, affecting accessibility at the Babraham Road Park and Ride site
Non-bus users	Non-bus users may be converted to buses as they now see it as an attractive alternative as a result of consistently high service levels and the service now aligning with their green preferences
Operator	The operator may benefit from improved fare revenues from increased patronage levels due to the greater uptake of the service from green advocates and modal shifters, driven by an improved perception of the bus service The operator will also benefit from: - paid-for upgrade to its grid connection, and in-depot charging assets - newer assets, improving reliability and performance - operational cost savings from reduced maintenance and fuel costs - more experience with zero emission buses, preparing them for downstream investments
Pedestrians and cyclists	- Delivery of ZEBs for use in the city area will reduce emissions and improve air quality, delivering health benefits to pedestrians and cyclists - Potential for reduced congestion on the premise of a greater uptake of park and ride services - Cyclists have potential to use park and ride site to safely store their bike and travel into the city - Reduction in noise pollution generated by diesel engines

2.4.7 CPCA sees this ZEBRA fund as an opportunity to tackle climate change in the region by reducing emissions and tackling greenhouse gas impacts at a regional level. As well as, delivering better public transport, developing new skills, delivering more jobs, improving air quality, being part of the clean energy generation ecosystem and,

fundamentally, acting as a catalyst to achieve the transition of all bus routes to ZEBs in our locality by 2030.

3. CPCA's proposed scheme

3.1 Why this plan, and why now?

3.1.1 In total across the CPCA area, circa. 350 buses are registered to operate Public Service Vehicle / Stage Carriage services. ZEBRA funding will enable us to r**eplace almost 10% of our local fleet and deliver up to a 49% reduction in emissions attributable to buses in the city centre alone** (notwithstanding improvements outside the city centre from re-location of the Euro 6 buses currently operating the Park and Ride and Citi 2 services).

3.1.2 The bus market in the Authority area has one major operator and several Small Medium Enterprise (SME) operators as shown below.

3.1.3 ***Large and medium sized Operators***

Operator	Fleet size	Fleet composition
[redacted]	268 buses	• ZEB: 2 buses • Euro6: 80 buses • Euro5: 86 buses • Euro4: 100 buses
[redacted]	32 buses	• ZEB: 0 buses • Euro6: 9 buses • Euro5: 11 buses • Euro4: 10 buses • Euro3: 2 buses
[redacted]	21 buses	• ZEB: 0 buses • Euro6: 10 buses • Euro5: 5 buses • Euro4: 6 buses • Euro3: 0 buses
[redacted]	19 buses	• ZEB: 0 buses • Euro6: 19 buses • Euro5: 0 buses • Euro4: 0 buses • Euro3: 0 buses

3.1.4 Small Operators

Operator	Fleet size	Fleet composition
[redacted]	8 buses	• ZEB: 0 buses • Euro6: 3 buses • Euro5: 4 buses • Euro4: 1 buses • Euro3: 0 buses
[redacted]	3 public service vehicles	• ZEB: 0 buses • Euro6: 0 buses

		• Euro5: 0 buses • Euro4: 1 buses • Euro3: 2 buses
[redacted]	3 buses	• ZEB: 0 buses • Euro6: 3 buses • Euro5: 0 buses • Euro4: 0 buses • Euro3: 0 buses
[redacted]	6 buses	• ZEB: 0 buses • Euro6: 0 buses • Euro5: 0 buses • Euro4: 3 buses • Euro3: 3 buses
[redacted]	10 buses	• ZEB: 0 buses • Euro6: 0 buses • Euro5: 0 buses • Euro4: 7 buses • Euro3: 3 buses

3.1.5 This bid fits into our vision of **a rolling programme to decarbonise the entire network affordably, progressively, and systematically by 2030.** In our evaluation of the potential interventions for the ZEBRA fund our team evaluated the current context of the bus network in the region to identify the potential routes, partners and associated outcomes.

3.2 Options considered

3.2.1 Our team undertook an Options assessment for investment into ZEBs, considering four scenarios; Do Nothing, Do Minimum, Do Something and Do Everything. We approached the assessment with the view that we want to deliver a scheme that has a **short-term measurable impact**, acts as a **catalyst for future investment,** and is **deliverable working within the constraints of the regional context**.

3.2.2 ***1) Do Nothing: No investment in zero emission buses***

Disadvantages include:

- Worsening air quality as identified by the CPIER report discussed above, and our LTP
- Lack of seed funding for the local authority and operators to leverage the lessons learned from existing zero emission bus projects/portfolios
- Lack of seed funding will also prevent from existing zero emission bus projects/portfolios from being upscaled to achieve economies of scale
- Risk of falling short of the region's net zero carbon goal in transport

3.2.3 2) Do Minimum: a hypothetical scenario whereby DfT funding is not made available to CPCA

This option will enable us to:

- Support an Operator Partner to procure 14 zero emission buses to replace the oldest diesel units
- Install charging points to charge 14 vehicles (e.g. seven (7) dual 150kW charging points)
- Upgrade the grid supply connection to the selected Operator Partner's depot

3.2.3.1 **Benefits** include:

- **Minimal** air quality improvements on selected routes
- Lessons added to the existing lessons learned from the trial of two electric buses in a piecemeal fashion to inform a more significant transformation in the future
- Provides a limited incentive to bus operators to replace the oldest buses in their fleets

3.2.3.2 **Disadvantages** include:

- Further ZEB purchases may continue to lag in the near future given the anticipated continuation of the cost differential to equivalent diesel vehicles
- We risk falling well short of the region's net zero carbon goal in transport
- Slow rate of bus transitions means that infrastructure could sit idle

3.2.8 ***3) Do Something: a commercially sustainable option that considers rapidly evolving technology and future fleet replacement cycles not only for one operator but also the wider market.***

This option involves moderately expanding the number of zero emission buses operating in the CPCA area, and is well within the regional power capacity, meaning that no significant reinforcement work is required to enable execution.

- Six bus routes targeted (the five Park and Ride services, and the Citi 2 service)
- ZEBs will operate over an eight year period region wide, with lessons learned shared with partners and used to drive cost efficiency alongside evolving technologies throughout the life of the Scheme.
- ZEBRA funding supports the procurement by the selected Operator Partner of 30 zero emission buses e-buses to replace its oldest diesel units operating in the area, with the Euro 6 buses currently operating the Park & Ride route being transitioned to other routes within the area, replacing Euro 4 & 5 buses
- Infrastructure upgrade involving 15 in-depot charging points at the selected Operator Partner's depot, two (2) opportunity rapid plug-in chargers at the Babraham Park & Ride site, and associated grid connectivity infrastructure

3.2.8.1 **Benefits** include:

- Material air quality improvements on the selected routes, and on other routes where Euro 4 and 5 buses are replaced by displaced Euro 6 buses
- Some seed funding is available to further upscale CPCA's zero emission bus portfolios

- Lessons learned from the moderate expansion can be leveraged to enable a more significant transformation in the future
- Deliverability within the capabilities of at least one of the region's major Operator and capacity of the power network
- The power connection proposed (1.7MVA) will be able to accommodate the energy requirements of up to 50 buses, which facilitates an easier transition for the next 20 buses at the depot. With all the ground work and high level site assessments done to date, the power capacity can also be easily scalable in the future (provided no competition from neighbouring buildings) to 3-3.7MVA which will allow the Operator Partner to charge more than 110 electric buses in a depot

There is **no clear disadvantage** to this option as it has the right balance of scale and compatibility with what the region's power network can sustain in terms of capacity without introducing significant reinforcement work.

Our "Do Something" scenario is further broken down into three different options of opportunity charging in the Economic Case to demonstrate the difference in NPV and BCR. These options are:

- "Do Something (with plug-in opportunity charging)": this scenario envisages plug-in charge points as a means to deliver opportunity charging.
- "Do Something (with rapid plug-in opportunity charging)": this scenario envisages rapid-plug-in-chargers as a means to deliver opportunity charging.
- "Do Something (with no opportunity charging)": this scenario envisages a situation whereby we do not provide opportunity charging facility.

3.2.13. ***4) Do Everything: larger fleet investment tying the operator to one technology with significant change management implications in a challenging public transport context following Covid-19.***

This option involves funding the replacement of all buses in the region, including those of the SME operators, and would require charging infrastructure upgrades not only at depots within our region, but also out-of-region depots for Operators which do not have a local depot.

3.2.13.1. **Benefits** include:

- Significant air quality improvements within the CPCA region (not just the City of Cambridge)
- Ability of CPCA to market the region as an "all-electric" (and likewise for the cities of Cambridge and Peterborough)

3.2.13.2. **Disadvantages** include:

- Unaffordability for CPCA, Operators, and the Department for electrifying at least nine (if not more) bus depots both within and outside of our region, and requiring multiple SME operators to invest when those that we have engaged with have stated that they are unable to do so
- Early retirement of buses, having adverse carbon footprint implications
- Insufficient local grid capacity, requiring significant, complex, and costly upgrade

3.3 Preferred option

3.3.1. Our preferred option is the **'Do Something' scenario** to deliver seed funding for fleet transition to set us on our journey for full fleet transition by 2030. Our fleet strategy is based on the premise that we want to deliver sustainable and realistic fleet transition. The ZEBRA funding will kick this transition off with the medium- and longer-term view that wider public transport policy needs to incentivise operators to invest in fleet transition.

3.3.2. The other options are either out of the funding scope available to CPCA or do not take drastic enough action to provide any air quality improvement benefits across the area, as we are reliant upon private operators making the transition to zero emission buses, which - in the current market - is not affordable for them.

3.3.3. In addition, our approach also allows us to take advantage of emerging technology and:

3.3.3.1. has been **confirmed as affordable and deliverable by at least one potential Operator Partner** in our region;

3.3.3.2. **does not commit us irrevocably to a single moment's technology;**

3.3.3.3. is **deliverable within incremental and affordable improvements to the local electricity supply** (as confirmed with our local Distribution Network Operator (DNO);

3.3.3.4. **caps the risk of over-investing in infrastructure at a bus depot which may need to be relocated by the end of the decade** due to economic regeneration; and,

3.3.3.5. **mitigates the risk presented by the unknown nature of patronage recovery** after Covid-19.

3.3.4. In addition, our approach also allows us to take advantage of emerging technologies in future fleet procurements.

3.3.5. Within "Do Something", we have also conducted a pros-and-cons analysis on opportunity charging options with our preferred option being "rapid plug-in chargers". By adopting this option we will be able to strike the balance between delivering a cost-effective solution and one which can fit with CPCA's strategic direction towards a larger scale of fleet transition in the future. The option will enable:

3.3.5.1. A zero emission well-to-wheel solution for opportunity charging which sources its energy from the solar panels at Babraham Road Park and Ride

3.3.5.2. A spare infrastructure capacity which will help either the Operator Partner or other operators transition to an electric fleet

3.3.5.3. An interoperable solution which works for the majority of vehicle models and possibly other comparable heavy vehicles (e.g. council vehicles, waste disposal vehicles, etc.).

3.3.6. We also believe that the operational challenges that come with opportunity rapid plug-in chargers can be addressed through the following measures:

- Addressing a reduction in charging times due to the need for a driver to plug and unplug the charger by through the use of a “pumpman” who can operate the chargers on behalf of the drivers and smooth out the process. The drivers can simply “stop” and “go”.
- Having a fully trained pumpman and drivers will also minimise the chances of buses driving away without unplugging the chargers.

3.3.7. Within “Do Something”, we have analysed further sub-options for powering the vehicles. These are as follows, with our analysis shown in the table below:
- 4-string batteries only with no opportunity charging infrastructure
- 4-string batteries with plug-in opportunity charging
- Roof-charging-equipped buses with Pantograph opportunity chargers

Option Assessment Criteria	4-string batteries		4-string batteries + additional opportunity chargers		Roof-charging-equipped buses + Pantograph opportunity chargers	
	Pros	**Cons**	**Pros**	**Cons**	**Pros**	**Cons**
Cost (impact on BCR)	Uplift in the BCR due to cost-savings		Lower BCR than "4-string batteries" alone but greater than the than "pantograph"			Reduction in the BCR
Wider strategic benefit		Removes the wider strategic benefit related to linking the project with a green energy source. Removes the wider strategic benefit related to providing future fleets with a shared opportunity charging facility.	Preserves the wider strategic benefit related to linking the project with a green energy source. Preserves the wider strategic benefit related to providing future fleets with shared opportunity charging facility. Enables use of the two existing electric buses during the winter months, improving air quality for the routes currently serviced by diesel buses during the winter months.		Preserves the wider strategic benefit related to linking the project with a green energy source. Preserves the wider strategic benefit related to providing future fleets with shared opportunity charging facility.	
Interoperability	This is a standardised model which can be re-deployed easily to other routes.		This is a standardised model which can be re-deployed easily to other routes. Enables use of the two existing electric			Future operators will have to buy roof-charging equipped buses to access the opportunity charging infrastructure.

			buses during the winter months.			
Operational efficiency		Some batteries may degrade faster than expected. Lack of opportunity charging means that some buses will require more frequent servicing, though this will be covered mostly by the warranty.	Enables use of the two existing electric buses during the winter months, reducing overall Peak Vehicle Requirement.	In the first few years, opportunity charging will only be used by a handful of vehicles of which the batteries have degraded faster than others in the fleet. Shorter charging (very marginally) duration allowed due to drivers having to come down from the vehicles and operate the chargers Drivers have to be careful not to drive away without unplugging the charger	More efficient and safer charging operation as drivers can operate the roof charger from within the vehicle	In the first few years, opportunity charging will only be used by a handful of vehicles of which the batteries have degraded faster than others in the fleet

3.4 Detailed Scheme for the preferred option

Assets to be funded

3.41 With a combination of local public sector funding, Operator Partner contribution, and the ZEBRA Scheme, we will fund the following assets:

- **30 double-decker electric buses** operating on a commercial basis on Cambridge's Park & Ride and Citi 2 routes
- **16 x 150kW double charging points** (or equivalent) to be installed at the selected Operator Partner's depot
- **Grid connection upgrade, private substation, and low voltage wiring** at the selected Operator Partner's depot
- **Two (2) Opportunity Rapid Plug-in Chargers** at the Babraham Road Park and Ride site
- **Connection of the opportunity rapid plug-in chargers** to the Babraham Road Park and Ride Solar Farm Smart Energy Grid Project

3.42 As part of our Scheme we will require the appointed Operator Partner to replace Euro 4 and 5 buses it currently operates in the area with Euro 6 buses that are displaced from the Park and Ride scheme. If the selected Operator Partner is not the existing Park and Ride Operator we will explore an equivalent contribution with that Operator Partner.

3.42.1 Opportunity charging infrastructure at the Park & Ride site will not be required until late Autumn/early Winter 2022, to accommodate increased power requirements for running heating and poorer battery performance in cold weather. The Babraham Park & Ride Solar Farm is anticipated to be operational and able to supply power for the Rapid Plug-in Chargers by September/October 2022. Installation of the rapid chargers and the connection to the embedded storage is not on the critical path and will be commissioned and installed when most appropriate before September 2022.

3.42.2 Opportunity charging will be an indispensable part of the project for the following reasons:

1. While the manufacturers promise a certain level of driving range for the powertrains, we believe that these will inevitably decline with the degradation of the batteries over the years. While these batteries can be covered by up to a 7-year warranty (subject to manufacturer's policy), an opportunity charging facility will reduce the frequency of servicing, help maintain service level, and keep peak vehicle requirement for future rollouts to the minimum.
2. Rapid plug-in chargers have been selected to be interoperable with future fleet rollout.

Route analysis and identification

3.42.3 We assessed a range of criteria in determining the preferred routes for the Zero Emission Buses. Our analysis is founded in our goals to deliver air quality and public health improvements within the City of Cambridge, and to deliver an initial fleet transition of up to 30 vehicles. Within this context, our assessment considered:

1. Operational coverage

2. Investment appetite from operators
3. Powertrain Choice
4. Depot Facilities
5. Route Analysis

3.42.4 Further consideration was also given to:

1. Delivering the best air quality improvements in the target area
2. Aligning with routes already delivered by an operator with suitable investment plans, depot facilities and operational coverage
3. Deliverability with the chosen fuel technology (Battery Electric Buses as opposed to Fuel Cell Electric Buses, for reasons as discussed in the Commercial Case).

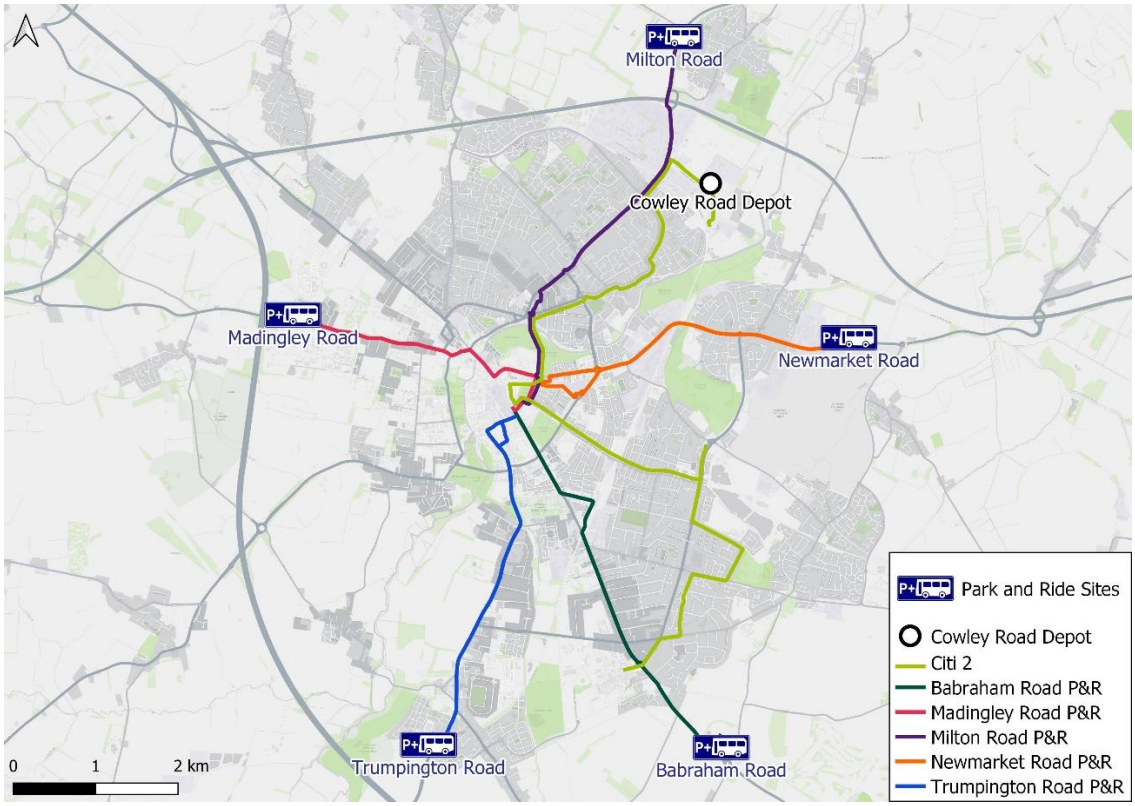
3.4.7. The exercise has been undertaken to evaluate the most suitable routes for the ZEBRA funded buses and has not been undertaken to benefit any specific operator. CPCA is committed to delivering an open procurement for the grant funding.

3.4.8. Our proposal is to convert vehicles operating the following routes from diesel to zero emission buses (specifically Battery Electric Buses):

- **the five Park & Ride services,** which reduce the number of cars entering the city core; and,
- **cross-city service Citi 2,** which links Cambridge North rail station to Addenbrookes via Chesterton, the City Centre and Romsey.

3.4.9. In a typical daytime hour, [redacted] operate 106 departures from central Cambridge, [redacted] 12 departures and other operators <1. Under these proposals, the number of departures from the city core run by ZEBs will rise from 2 to 38 - or around 32%.

Map of proposed electric bus routes



3.4.10. The five park & ride services run commercially by [redacted] into central Cambridge are essential to keep traffic moving in the city. Together they contribute 3,500 car parking spaces. To run these services [redacted] allocates 22 modern Euro VI double decker buses.

3.4.11. Each park & ride service has 4-5 buses painted in a distinctive colour scheme which remain permanently on that route. Part of our solution is to interwork the five routes with buses in one colour scheme with colour identification of each route delivered by full colour destination blinds.

3.4.12. By interworking the five ten-minute services, the 22 buses operate on all five routes several times a day.

3.4.13. We intend to install **two opportunity charging rapid plug-in chargers in the Babraham Road Park & Ride** site in the South East of Cambridge. Babraham is being reconfigured to install solar panels over the car park spaces to provide electrical power generation in a project funded by GCP and being managed and delivered by [redacted]. Our discussions with [redacted] have confirmed that there is sufficient power for rapid charging of a bus using a rapid plug-in charger solution, thereby e**nabling us to have truly green "wheel to wheel" opportunity charging at the Park and Ride site**. With this intervention we believe a 170-mile operating day for each bus is attainable without extra vehicles (i.e. **removing the need to increase Peak Vehicle Requirement (PVR) to operate an electric service**).

3.4.14. **Cowley Road Bus Depot** has been preliminary chosen as the location for the **16 in-depot charging points** as the Citi 2 terminates 300 metres from the depot. It is also a fairly central location and therefore is in close proximity to the termination of the Park and Ride routes that are being facilitated. At the end of their routes all drivers

have scheduled changeovers every five and a half hours under employment law; thus, it makes operational sense for the driver to take his break at the depot and be replaced by another bus, and driver, beginning the next service. By charging the bus at the depot entrance, the bus stands for an hour and provides an immediate “hot spare” vehicle ready to replace any zero-emission vehicle with a fault. In the peak hours this spare bus would run in service to provide drop back against congestion along the Citi 2’s route. This is an extremely useful characteristic and also **eliminates the need to buy opportunity charging capacity at the outer terminus** and supports not increasing the Peak Vehicle Requirement (PVR) to operate an electric fleet.

3.4.15. Citi 2 was selected for conversion on several grounds but most importantly is that it operates through some of the streets with the worst air pollution problems both in the city centre. Emmanuel Road, Parker St, Emmanuel St, St Andrews St, Regent St, Hobson St, Sussex St and King St, and Mill Road will all benefit from frequent zero emission buses replacing the Euro4/5 diesels currently operating on those routes. Other considerations included:

- On the south end of the Citi 2 route the scheme will provide electric buses to the world-renowned Addenbrookes Hospital and the Cambridge Biomedical Campus, both of which are major traffic generators on our network and home to a number of major research centres, as well as the world headquarters of Astra-Zeneca. In addition to the clear health benefits, **transition funded by the ZEBRA scheme will also provide an opportunity for prominent promotion of government’s investments in decarbonising public transport**.

- To the north of the city, the Citi 2 route terminates at Cambridge North rail station. This is only 300 metres from the Cowley Road bus depot, with benefits of this described above.

Operational Coverage

3.4.16. Existing operational coverage is important when assessing the potential suitability of a route within a particular region. Within the area we have defined for this intervention there are two prominent bus operators and three small operators as follows:

- [redacted] operates 130 buses out of its Cambridge depot and another 70 of their buses run into the city from other depots. It currently operates eight Citi routes which run at medium-high frequencies between the city’s suburbs and its central core; and the five commercial park & ride services at ten-minute frequencies. [redacted] also runs services into the city from St Neots, Royston, Haverhill, Newmarket, Ely and from St Ives and Huntingdon. The latter two towns benefit from the extensive guided busway linking them to Cambridge on reserved track. [redacted]s market share of passenger journeys in the defined area is over 95%.

- [redacted] operates circa. 20 buses on tendered bus services and 20 coaches on [redacted] Express services. Its largest route is the Universal, run with 10 buses on behalf of Cambridge University, connecting colleges with lecture halls and research facilities. [redacted] share of passenger journeys in the defined area is around 4.5%

- An hourly service linking estates east of the central core, five mornings a week is provided by [redacted] On Saturday mornings the same service is run by [redacted] On Fridays a short local link is provided by [redacted]. These three mainly rural operators provide infrequent tendered services into the city, wherein [redacted] have eight small buses; [redacted] three; and, [redacted] three.

Powertrain Suitability

3.4.17. The ZEBRA fund outlines that the suitable options for investment are either battery electric or fuel cell electric ("hydrogen") vehicles. Within the context of our operational parameters our team engaged with market participants and evaluated both options to assess the most suitable option for our preferred routes and. Pro's and con's of the respective technologies are set out in the Commercial case.

3.4.18. Our assessment has concluded that Battery Electric Buses are best suited to our preferred Scheme. Through market engagement with suppliers and our own research **we estimate the budget required to procure 30 electric double-decker buses to be ~£13,400k (including inflation but exc. VAT)**.

Depots & power

3.4.19. We have undertaken a wide-ranging review of bus depots in and around Cambridge. Only one is suitable to house 30 buses and the associated electrical charging equipment, this being at Cowley Road. The main depot site is owned by [redacted] although the northern-most part is leased to give additional capacity – itself an indication of the strength of the Cambridge bus market pre-Covid. As the site is an existing bus depot, planning permission for alterations associated with the operation of buses is not required.

3.4.20. Extensive engagement with power engineers and bus manufacturers has sized the requirement at 1.7MVA of power required overnight (and 800kVA during the day), which our local Distribution Network Operator [redacted] has confirmed is feasible, with room for expansion, at a cost for the initial 1.7MVA connection of £125,000 (exc. VAT). This does not include the in-depot infrastructure, which includes a private sub-station to step down from high to low voltage, low voltage distribution channels, and the charging units themselves. Based on feedback from the market (discussed in more detail in the Commercial Case) **we estimate the costs of the grid connection and in-depot infrastructure to be circa. £1,937k (including inflation but exc. VAT)**.

3.4.21. We have engaged closely with Greater Cambridge Planning Services and their team working on the North East Cambridge Area Action Plan (NECAAP) about the future of the Bus Depot at Cowley Rd. As such, the councils have confirmed that the retention of the Cowley Road depot use to 2031 will not inhibit the delivery of early phased development. This means that the depot will have at least 9 more years of uninterrupted operation.

3.4.22. If a new depot site is required, due to the Area Action Plan included within the Local Development Scheme, a new depot site location will be established with direct participation and input from the CPCA, GCP and the bus operator. Both authorities will ensure that the bus depot is in such a location that the bus operator can continue to operate the designated services stipulated in our Business Case.

3.4.23. A full cost-benefit analysis will also be conducted to ensure that the benefits of repurposing the current depot site to another urban redevelopment project will outweigh any costs (including sunk costs and loss in benefits) in respect of fixed infrastructure before the relocation is signed off.

3.4.24. The CPCA and GCP also have direct involvement and input into the North East Cambridge Area Action Plan and therefore planning and actioning of a new site, if required, will also correspond to the lifecycle of the in-depot charge points. This will ensure optimal use of the proposed charging infrastructure and an alignment to the additional investment, which would have been required even without a movement of depot, to upgrade the charging infrastructure that has reached the end of its life cycle after 8 years.

3.4.25. DfT can have full reassurance that the investment in the electric buses, which is what the ZEBRA funding is being allocated to, will remain protected, as it is within the bus operators contract that they are obligated to continue the operation of the target routes. The only difference is that the buses will be housed in a different location.

3.4.26. We have confirmed that Cowley Road will remain a bus depot for at least 5-10 years, but there is a small degree of long run uncertainty from the bus operator due to the impending bus franchising scheme instigated by the government. Therefore, bus operators across England are preparing contingency plans in the unlikelihood that it is no longer profitable/operationally viable for them to continue to operate their services.

3.4.27. Clawback provisions and conditions for the government grants are to be written into the contracts with the Operator Partner for the vehicles and in-depot charging infrastructure, and Cambridgeshire County Council for the Babraham Road Park and Ride opportunity charging infrastructure in case of a discontinuation of the services agreed upon. Covenants will also be written into the contracts of new bus franchisees who take control of the depot, ensuring that the infrastructure is continued to be utilised within the CPCA region.

3.4.28. We have also received assurances from our most likely Operator Partner that it is not considering a move from the region, and therefore sale of its depot in the next 10 years would only come as a last resort.

3.4.29. We have engaged Cambridgeshire County Council and have established it will own the plug-in charging assets at Babraham P&R (being grant funded by CPCA to procure this), and will either commission the supplier to provide maintenance services (which will be re-charged to the Operator Partner) or will come to an agreement whereby the Operator Partner will pay for and deliver the maintenance services directly. An agreement between Cambridgeshire County Council and Operator Partner will also need to be arranged for the cost of power incurred through the grid connection and power usage for bus charging. Again, this either be paid directly by the Operator Partner, or Cambridgeshire County Council will pay for the power connection and usage and then re-charge the Operator Partner in full. Cambridgeshire County Council already has a Lease Agreement with the Park & Ride services operator for use of the site, and we envisage adding access to, and use of the plug-in opportunity charge points to this Agreement.

3.4.30. The Operator Partner will – at least initially - have exclusive use of the plug-in opportunity charge points during the scheme and will be liable for 100% of operational costs during this period to ensure there is no distortion in the true cost of providing the electric bus service.

3.4.31. Subject to agreement with the Operator Partner provisions will also be made in the Grant Agreement to enable Cambridgeshire County Council to open the plug-in charge points to additional Operators, if/when the demand arises.

3.4.32. [redacted] (GCP's delivery partner for the Solar Farm) has provided a quote for connection costs of the plug-in charge points to the embedded storage facility. We have undertaken desk-based research and received quotes from providers to identify the likely cost of the plug-in charge points themselves and have **an estimated inclusive budget for the plug-in opportunity charging facility to be ~£175k (including inflation but exc. VAT)**.

Long term plans for the buses

3.4.33. CPCA will require the selected Operator Partner to retain the ZEBs for eight (8) years in Cambridgeshire and to retain any Euro 6 vehicles that are replaced by the ZEBs for five (5) years in the Cambridgeshire network. Our expectation is that the initial fleet of 30 ZEBs could provide a second-hand market for other operators in the region hoping to transition to ZEBs, and **we will investigate whether we can mandate a first refusal to other local operators should the selected Operator Partner sell the ZEBs at the end of the Scheme**.

Investment appetite

3.4.34. Our programme is designed as seed funding that will require investment from bus operators in the future. To protect the longer-term viability of this programme evaluating the investment appetite of operators has been a key component. We have engaged with our principal bus operators, specifically with all those able to fund new diesel vehicles themselves and with a history of fleet investment. These are [redacted].

- [redacted] **has stated that, should it be the preferred Operator Partner after our procurement process, it is committed to buying at least 30 electric double-decker buses, putting in at least £230,000 per vehicle** – a gross funding offer of £7.035 million (including inflation) + VAT. A Letter of Support confirming [redacted] commitment is provided in the Appendix to the Management Case.
- [redacted] has constraints in bidding within our target timeframes for the Scheme as its tendered service (Universal) is going out to re-tender shortly. Nonetheless [redacted] will be invited to tender for the Operator Partner role.
- [redacted] is committed to a diesel fleet at present. Also, its depot is [redacted] makes the provision of electric buses for a Park & Ride service in Cambridge technically and economically difficult (if not impossible) due to the dead mileage between the depot and the start and end points of the P&R routes (notwithstanding our proposal to install plug-in opportunity charge points). [redacted] is not currently in a financial position to lease or purchase a depot in the requisite location for our scheme.

3.4.35. No other Cambridgeshire bus company is operating a route that might qualify for the ZEBRA funding or is investing in brand new vehicles.

Benefits evaluation

3.4.36. Matrices will be used to measure progress and evaluate the impact of the ZEBRA scheme on the routes utilising the electric buses. The metrics chosen encompass those on the list in the ZEBRA guidance and overarching grant agreement, as well as additional metrics to monitor further impacts of the ZEBRA scheme.

3.4.37. A full list is shown in the Management Case Data Sources sub-section, with a summary shown below.

Metric type	Metric
Operational	Average daily ZEB mileage
Operational	Average daily ZEB energy consumption
Operational	Average daily diesel mileage and fuel consumption for each route (i.e. baseline / comparator data)
Operational	Number of ZEBs in operation
Operational	Number and type of internal combustion engine (ICE) buses replaced
Environmental	Average ZEB well-to-wheel greenhouse gas emissions
Environmental	Nitrous dioxide, micrograms per cubic metre
Environmental	Levels of particle matter (PM10 and PM2.5)
Operational	Bus patronage levels
Societal	Levels of congestion
Societal	Passenger satisfaction level with service
Societal	Disabled accessibility of buses
Operational	Park and ride utilisation rate

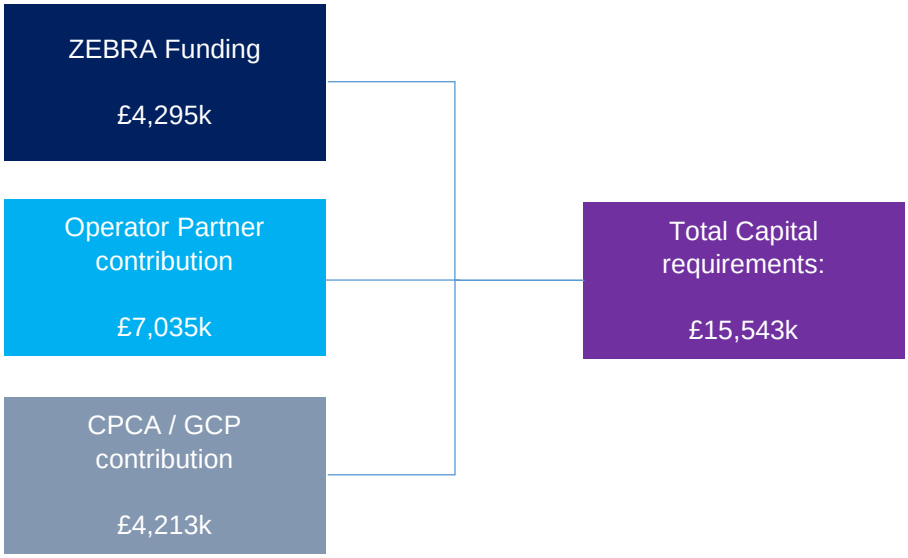
3.5 Funding for the Preferred Option

3.5.1. A summary of anticipated costs and funding sources is shown below:

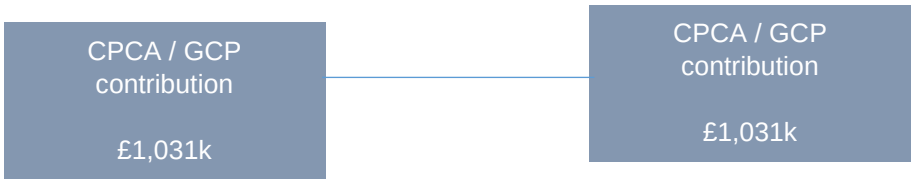
Cost component (inc. installation/commissioning)	Amount (inc. inflation but exc. VAT and Optimism Bias)	Spend Type	Funded by (inc. inflation but exc. VAT and Optimism Bias)
30 x double-decker battery electric buses	£13,431k	CAPEX	Operator commitment £7,035k *(100% cost of an equivalent diesel bus)*
		CAPEX	ZEBRA funding £4,295k *(56% of the cost premium between an electric double-decker bus and equivalent diesel bus)*
		CAPEX	CPCA / GCP funding £2,101k *(44% of the cost premium between an electric double-decker bus and equivalent diesel bus)*

Cost component (inc. installation/commissioning)	Amount (inc. inflation but exc. VAT and Optimism Bias)	Spend Type	Funded by (inc. inflation but exc. VAT and Optimism Bias)
In-depot charging infrastructure upgrade for 15 dual 150kW chargepoints	£1,937k	CAPEX	CPCA / GCP £1,937k
2 rapid chargers at Babraham Road Park and Ride	£175k	CAPEX	CPCA/GCP £175k
Scheme Administration inc. M&E (incurred by CPCA/GCP)	£1,031k	OPEX	CPCA / GCP / CCC £1,031k
Service Operations	£5,260k	OPEX	Operator Partner £5,260k

3.5.2. Overview of Funding Sources



Sources of operational expenditure funding are summarised in the following diagram:



3.6 Alignment of our Preferred Option with policy objectives

3.6.1. Cambridge is the fastest growing city in Britain, a centre of world-leading innovation with a vibrant economy, and rapid population growth. More widely, the CPCA region is also heavily investing in future mobility programmes including:

- a new demand responsive service trial,
- autonomous vehicle trials,
- active travel measures,
- eScooters,
- first and last mile solutions,
- investment in the rail network with new stations; and,
- Local Growth Fund investments in wider future mobility programmes.

3.6.2 **Inevitably, such rapid growth in the economy is followed by a series of consequential transport challenges including heavy congestion and air quality issues. The region has the remit, ambition and momentum to deliver transformation to its public transport network.** This is highlighted by the City Deal funding making significant investments in overall infrastructure and bus infrastructure, but without the added bonus of reducing carbon emissions from vehicles.

3.6.3 **This ZEBRA funding bid is the start of a full fleet transition programme that will see buses in Cambridgeshire fully zero emission by 2030.** We see ZEBRA as a transport, climate change and public health intervention tool. The newly elected Mayor places strong emphasis on public health, bus market reform, and tackling climate change. **We have committed to the Independent Climate Change report recommendations that all subsidised routes will be converted to zero emission buses by 2025 and all fleet by 2030.** Through harnessing ZEBRA, BSIP and bus market reform we want to rapidly get to the stage of declaring that all new buses in the CPCA Area will in future have to be zero emissions vehicles.

3.6.4 The tables below illustrate how the Scheme that we propose to deliver with the ZEBRA funding aligns wider policy objectives at CPCA and National level.

3.6.5 ***Alignment with key National (DfT) Policy Objectives***

National policy document: National Bus Strategy (Bus Back Better)	How does our scheme address the key themes of this policy?
Delivering better bus services	Our proposed ZEBRA scheme will help us deliver zero emission buses which are quieter, enabling more pleasant journeys and reducing noise pollution to the neighbourhoods. Our proposed scheme will help us strengthen the links between key park and ride facilities and bus services, making multi-modal journey experience smoother and encouraging modal shift.
Delivering for passengers	
A green bus revolution	ZEBRA funding will allow us to replace almost 10% of the entire bus fleet in CPCA with zero emissions vehicles, delivering significant benefits for air quality in the highly-patronised AQMZ.

National policy document: Department for Transport Objectives	How does our scheme address the key themes of this policy?
Grow and Level Up the Economy	**East Anglia has yet to receive funding for decarbonisation of buses. Our proposed Scheme addresses this,** and provides the opportunity for Government to deliver material benefits in one of the UK's most highly visible and famous cities. The East of England area sits as one of the lower funded regions per head and per job when compared to other

	regions in the United Kingdom. The East sits 7 out of 9 regions in spending per person and 6 out of 9 in spending per job.[13] Our ambition, is to appoint and operator who will then secure project partners through competitive procurement processes. **We will evaluate wider economic benefits of the Grant Award, such as creation of wider UK economic benefits from sourcing**, with a view to the benefits of our Scheme being distributed not just within Cambridge, but the wider nation. Furthermore, **our Grant Award will require the Operator Partner to share their knowledge and experience with other local Operator**s, and to participate in **our M&E programme in which we will involve local academic institutions**, helping to uplift skills in our local region. We will also **include our Business & Skills team as key stakeholders in the design and execution of the Scheme**, ensuring that we have understood and are able to exploit opportunities to share knowledge (e.g. with [redacted] in Norfolk, which has been funded by BEIS (through a Faraday Grant) to develop a new low-cost electric motor for zero emission buses.
Reduce Environmental Impacts	With the replacement of 10% of the CPCA's bus fleet with zero emission vehicles and **a reduction of carbon emissions on the six routes in scope by over 70% in the first year, this scheme will deliver significant environmental and public health improvements.**
Improve Transport for the User	Quality of service will improve with the deployment of electric buses on the routes in scope, delivering increased comfort for riders due to a smooth ride and less rattling, a reduction in noise pollution, and reduced emissions on the electric buses compared to the diesel alternatives.

National policy document: Transport Decarbonisation Plan	How does our scheme address the key themes of this policy?
Decarbonising all forms of transport	With strong cycling and active mobility schemes in place, ZEBRA funding will help deliver CPCA's vision for a greener urban transport network. This is especially true given our proposal for the ZEBs to run our Park and Ride service, including calling at our Babraham Park and Ride which is being upgraded to provide electric vehicle charging with locally sourced solar energy.
Multi-modal decarbonisation and key enablers	As above, our proposed scheme strengthens the link between park-and-ride facilities and bus services,

[13] Public spending by country and region (parliament.uk)

	encouraging multi-modal journeys and modal shift at the same time.

ZEBRA Scheme document: Guidance for development of phase 2 Business Case	How does our scheme address the key themes of this policy?
To support the government's commitment to decarbonisation and to reduce the transport sector's contribution to CO2 emissions.	With the replacement of 10% of the CPCA's bus fleet with zero emission vehicles and **a reduction of carbon emissions on the six routes in scope by over 70% in the first year, this scheme will deliver significant environmental and public health improvements.**
To support the roll-out of the 4,000 Zero Emission Buses that the government committed to in February 2020.	The 30 new electric buses will contribute directly to the promised roll-out of 4,000 zero emission buses in the UK, whilst **the investment that we make now will help support the wider transition of our entire fleet by 2030, significantly contributing to government's target to roll-out 4,000 new ZEBs** in this parliament.
To support bus manufacturers in the development of zero emission bus technology.	Lessons learned will be documented throughout the scheme through our robust M&E process, and metrics will be continually monitored and evaluated throughout the lifespan of the electric buses, with data and experiences being shared with bus manufacturers, academic partners, research institutions, and government.
To support partnership working between Local Transport Authorities, bus operators, and other local stakeholders as set out in the National Bus Strategy.	There are a large number of delivery partners working together across this scheme, with numerous local authorities, private providers and local stakeholders, all underpinned by a robust project management structure to ensure an efficient and collaborative delivery of this scheme. Lessons learned will be documented and shared amongst each partner to ensure improved collaboration in the future. CPCA would also welcome the opportunity to support the establishment of a national Zero Emissions Bus collaboration group with other ZEBRA and All Electric Bus town grant beneficiaries.
To understand better the challenges of introducing zero emission buses and supporting infrastructure to inform future government support for Zero Emission Buses	A dedicated Monitoring and Evaluation team will be in place throughout the lifespan of the scheme to document any findings/challenges and relay them back to our wider project team and also disperse more widely when deploying and running the electric buses and the corresponding infrastructure. The introduction of solar panel powered charge points within the charging infrastructure will also provide key learnings to the charging market, and the complex nature of the ownership structure of the charging infrastructure and charging aspects for Operators can be used to inform future projects.

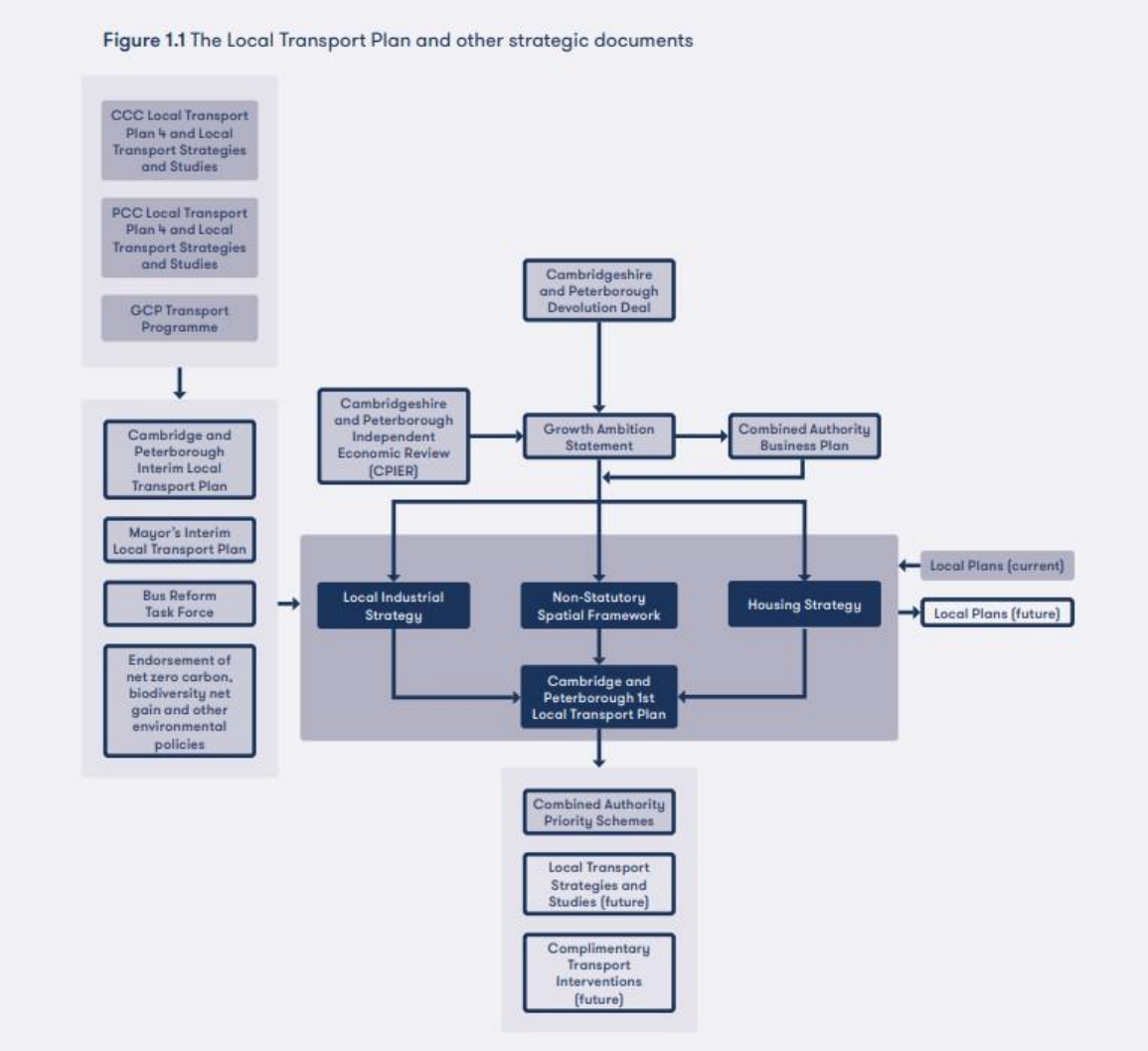
3.6.6 Alignment with key Regional (CPCA and other regions) Policy Objectives

Regional policy document: Ox-Cam Arc	How does our scheme address the key themes of this policy?
Productivity and jobs	Zero emission buses are a core part of the picture of an economically vibrant Arc in between Oxfordshire and Cambridgeshire which facilitates the outward growth from city centres. New economic and business centres are expected to be developed in the outer areas of cities, and better and greener means to travel, including zero emission buses, are required to connect people with new places where the opportunities are. This is the first phase for decarbonisation of regional connectivity, and one end of the arc ultimately joining a zero emission transport corridor to Oxford at the other end. We will explore how our proposed plug-in opportunity charging points at the Babraham Park and Ride site could provide valuable facilities for inter-city coach operators.
Placemaking	
Infrastructure and connectivity	The delivery of new electric buses demonstrates our commitment to “integrating sustainable and accessible transport options” right where homes and employment sites are situated.
Environment	Our proposed ZEBRA scheme will have a significant positive impact on air quality and carbon emissions from both a tank-to-wheel and modal shift perspective.

Regional policy document: EEH – Transport Connectivity Plans	How does our scheme address the key themes of this policy?
Environment	Our proposed ZEBRA scheme will be the first step of us demonstrating the potential of zero emission bus technology in improving our environment and health through improved air quality as well as reduction in carbon emissions.
Health	
Place shaping	Based on the routes selected, our proposed ZEBRA scheme will play a key role in facilitating the outward economic and demographic growth from Cambridge city centre. Complemented by strong cycling and walking infrastructure, as well as park-and-ride facilities, our proposed ZEBRA scheme will ensure that green transport options are easily accessible from homes and workplaces.
Connectivity	
Productivity	We have developed our proposed ZEBRA scheme with passengers’ productivity as our end-goal. Convenience in getting from one place to another as well as quieter, more comfortable journeys will allow passengers to use their time more efficiently, resulting in higher productivity.

3.6.7 Alignment with key Local (CPCA) Policy Objectives

The figure below illustrates the range of public policy that has fed into the LTP for the CPCA region. The transition to ZEBs is one of CPCA's priority schemes. The LTP focuses on increasing modal shift to passenger transport to accommodate growth, whilst **delivering measurable improvements in air quality, accessibility, and public health**. Considering the Independent Commission report, **CPCA is refreshing the LTP to go even further in the response to climate change** (and Covid-19 impacts). An Alternatively Fuelled Vehicle Strategy is part of that refresh, which is anticipated to be delivered in March 2022.



3.6.8 In addition to a clear alignment with CPCA and regional policies, the Scheme aligns with GCP's sustainable transport programme and GCP's city access programme which includes several projects supporting improvements to air quality such as, additional access restrictions for private vehicles, a freight consolidation pilot, development of a new parking strategy to encourage use of sustainable transport, new sensor technology at traffic signals to better prioritise bus and cycle trips, and electric DRT (Demand Responsive Transport) as part of developing MaaS (Mobility as a Service).

3.6.9 The relationship we have with the private sector bus operators in the region has been a key focus for CPCA in recent years and has seen positive outcomes. **In the last eighteen months we have built new strong links with our bus operators, with regular collaborative partnership meetings, which have been formalised under an independent (academic) chairperson ready for development and delivery of our Bus Service Improvement Plan (BSIP) under the National Bus strategy.** This has been of great benefit in delivering on Better Deal 4 Buses where grant funding has delivered four new bus services, three of them of strategic network importance across the Authority area. **Our ZEBRA scheme aligns with local operators' commitments to transitioning to ZEBs.**

3.6.10 The CPIER published its final report in September 2018, which was developed by the Cambridgeshire and Peterborough Independent Economic Commission (CPIEC).

3.6.11 The report evidences the very fast rate of economic and employment growth in the region and highlights the importance of planning to ensure that strong growth will remain sustainable and inclusive. **CPIER's KEY RECOMMENDATION #7 states "A package of transport and other infrastructure projects to alleviate the growing pains of Greater Cambridge should be considered the single most important infrastructure priority facing the Combined Authority in the short to medium term." This bid is a key part of meeting this requirement by delivering zero emission bus services which are targeted primarily at motorists to create modal shift whilst reducing emissions in our major AQMZ in the very heart of Greater Cambridge.**

3.6.12 If this ZEBRA application is successful, CPCA intends to use bus market reform to **ban new diesel buses from being procured** to operate on our bus routes from next year in line with our climate change commitments.

Fit with the CPCA's corporate plan

3.6.13 CPCA has a clear focus on the delivery of an improved transport network including significant infrastructure upgrades, improved rail connectivity and bus reform. These programmes are combined with a commitment to significant investment in new housing including new Market Towns, the local industrial and skills strategy, local economic recovery strategy, the independent commission on climate change and the greater south east energy hub. The combination of the strategic priorities, as set out in the CPCA Business Plan[14] all align with the desired outcomes for the ZEBRA fund. **The ZEBRA bid and resulting programme is a core element in the wider CPCA Business Plan and will catalyse the transition to ZEBs that is set for 2030**.

Interaction and dependency with other public sector programmes

3.6.14 Our plan is designed to interrelate and add value to wider public policy programmes and work to aid in delivering maximal value for money. In the context of Cambridgeshire this includes Cambridgeshire County Council, the Greater Cambridge Partnership and the local borough/town/city councils including Cambridge City Council and South Cambridgeshire District Council. Beyond this our programme aligns with the objectives set out in the National Bus Strategy and with our wider ambitions for bus reform in the region.

[14] COMBINED-AUTHORITY-BUSINESS-PLAN.pdf (cambridgeshirepeterborough-ca.gov.uk)

3.6.15 A summary of the other public sector programme interactions are as follows:

Organisation	Relationship	Benefit
DfT	Development of our Bus Service Improvement Plan (BSIP) is driven by the National Bus Strategy with full alignment with this ZEBRA funding application.	The national strategic policy context provides a clear rationale for intervention in the bus network to enable the transition to ZEBs
Greater Cambridge Partnership	The Greater Cambridge Partnership is developing various concepts for public transport within its City Deal Funding in bus infrastructure such as, Cambourne to Cambridge routes, CSETs and redeveloping one of our Park & Ride sites. This involves negotiations on the siting of bus opportunity charging infrastructure. As well as a City Access project bringing forward proposals to improve public transport and air quality and reduce congestion and carbon emissions.	The GCP is a key supporting partner and has established plans to invest in opportunity charging in the region.
Cambridgeshire County Council	Cambridgeshire County Council owns and runs the five Park & Ride sites which are served by the routes in scope, and in one of which we intend to install opportunity charging infrastructure. Both parties recognise the significant opportunity that ZEBRA affords for the City and wider region.	Our close working relationship with Cambridgeshire County Council provides access to these strategic public transport sites and associated opportunities.
City of Cambridge Council	The City of Cambridge Council declared an emergency AQMZ in 2004 but only with ZEBRA has an opportunity arisen to tackle the root of the problem. The City Council is very keen to deliver the ZEBRA bid and is working hard to support it.	The City of Cambridge Council must tackle their air quality issues and is extremely supportive of this programme to support in that objective.
Greater South East Energy Hub	CPCA is the Accountable Body for the Greater South East Energy Hub which works collaboratively with LEPS and member local authorities across the greater south east to coordinate and support the development of priority projects to investment readiness.	The decarbonisation of large engines and the associated zero emission infrastructure is a priority project. The Energy Hub is working with the Knowledge Transfer Network (KTN) Innovation Exchange (iX) to bring together innovators and commissioners to develop novel solutions for Net Zero places.

Management Case

1. Overview of the Management Case

1.1.1. Cambridgeshire and Peterborough Combined Authority ('CPCA') intends to support an Operator Partner to purchase 30 new zero emission battery electric buses to operate on the five Park and Ride routes into and out of Cambridge City Centre and the Citi 2 route, together with supporting charging infrastructure in the Operator Partner's depot. It also intends to support the procurement and installation of two plug-in charge points to be situated at the Cambridgeshire County Council-owned Babraham Park & Ride to be run on solar power, which will be owned and operated by Cambridgeshire County Council. This Management Case details the governance, monitoring and evaluations measures that CPCA will establish to ensure deliverability of its plan.

1.1.2. Total planned expenditure for the scheme is **£16.575m**, comprised of:

- An anticipated **Operator Partner commitment of £7.035m** + VAT;
- Confirmed **funding from the Greater Cambridge Partnership ('GCP') and CPCA of £5.245m**; and,
- A **grant from the Department for Transport's ZEBRA scheme of £4.295m**.

1.1.3. However, evidence and assurances will need to be provided to CPCA and the DfT by the bus manufacturers and the charging infrastructure providers that the electric buses and charge station to be procured meet the required standards and specifications as set out by the ZEBRA scheme and also that they meet the performance levels required to facilitate the bus routes across Peterborough and Cambridgeshire.

1.1.4. This Management Case sets out the detailed management arrangements that have been put in place to ensure the successful delivery and evaluation of the Scheme. It is presented in the following sections.

Section
Early Delivery
Governance
Project Plan
Stakeholder Engagement Plan
Risk Management
Monitoring and Evaluation

2. Early Delivery

2.1.1. Our plan sees 30 zero emission buses and supporting charging infrastructure procured through the Scheme being operational and delivering benefits as early as July 2022 with delivery of all buses expected by September 2022, subject to the capacity of the selected bus manufacturer to deliver buses by this date. Notwithstanding the capacity of the [redacted] we have confidence in our ability to achieve this given CPCA's track record in on-time delivery, enabled by our robust project, stakeholder, and risk management methodology. We also have assurances from [redacted] our local Distribution Network Operator (DNO) that it will be able to expedite delivery of power connection upgrades to the selected

Operator Partner's depot, and commitments from our delivery partners that they will work with us to meet our ambitious plan.

2.1.2. This will likely be **one of the first ZEBRA-funded schemes to launch**, and provides **a "quick win" for Government in one of the world's most famous cities**, further strengthening UK Government's reputation as a leader in the race to Net Zero.

Enabled by our robust project, risk, and stakeholder management methodology

2.1.3. In order to deliver the benefits of the project at the earliest opportunity possible, we will employ a robust governance structure, and CPCA's proven project, risk and stakeholder management techniques to ensure timely delivery of milestones in this project (detailed in Section 4 of the Management Case. Specifically:

- Our governance structure will ensure **clear, unambiguous assignment of accountabilities and responsibilities of the multiple parties involved in this project,** and timely and transparent reporting of progress, risks and issues
- We will use **a common and singular project plan that provides "one source of the truth"**, aligning delivery partner activities in order to identify and manage dependencies (e.g. securing consent in order to enable construction of assets) and achievement of the critical path.
- We will adopt **a common and singular view of risks and issues** will ensure early identification of problems and comprehensive management and mitigation across the delivery partners.
- In addition to risk and issue management, **our approach incorporates opportunity and value management**, placing opportunities to deliver faster, better, and more cost efficient outcomes at its heart.
- **Our stakeholder management process has already identified and commenced the process of engaging with, and securing formal support from key stakeholders** whose participation will be critical to enable delivery of this scheme (including a potential Operator Partner which has confirmed its intention to bid for the scheme and provide the required level of Operator contribution). We have already developed a Stakeholder Engagement Plan (SEP) (shown in section 4 Stakeholder Engagement Plan in the Management Case) and will use this to maintain and grow support for the scheme, whilst also identifying and addressing potential barriers before they become issues.

2.1.4. CPCA's senior responsible officer, Rowland Potter, has demonstrable experience delivering complex, multi-stakeholder schemes, to time and to budget, including Highways schemes at all stage of the project lifecycle, including the £110m A11 Mildenhall to Thetford dualling programme involving multiple district councils and both Norfolk and Suffolk County Councils, and most recently the transfer of Bus Operations from Peterborough City Council and Cambridgeshire County Council into a central delivery point within the CPCA. This experience, and CPCA's wider experience of successful scheme delivery, will be integral to enabling us to meet our ambitious timelines.

Enabled by private sector commitments

2.1.5. Our confidence in **delivery in October 2022 is supported by commitments from both a potential Operator Partner to deliver to meet this timeline, and** [redacted]

[redacted] to a three-day turnaround time to commence design and delivery of the depot grid connection upgrade (as opposed to the standard 90 day wait time) (See appendix for letter of support). Our market engagement with a leading bus manufacturer has also provided assurances that, if an order is placed for 30 double-decker electric buses in September 2021, these could be delivered and commissioned by October 2022.

3. Governance

3.1.1. CPCA will utilise PRINCE 2 project management principles to plan and manage the delivery of the ZEBRA. The framework will enable us to:

- Manage the delivery of the project through **monthly project reviews of progress against project plans and objectives**, with tracking of task progress and finances.
- **Manage risks and issues from bottom up**, including escalation through the governance structures of CPCA and our project delivery partners.
- **Ensure the project is focussed on, and achieves the respective stakeholder objectives** for the ZEBRA scheme and intended benefits (as described in Paragraph 1.5 of the Economic Case)
- **Manage stakeholder engagement** across the Department for Transport as sponsor, GCP as a funding partner, our Local Authorities, our project delivery partners, other local operators, and - crucially – passengers and our communities.

3.2 Governance structure and key roles

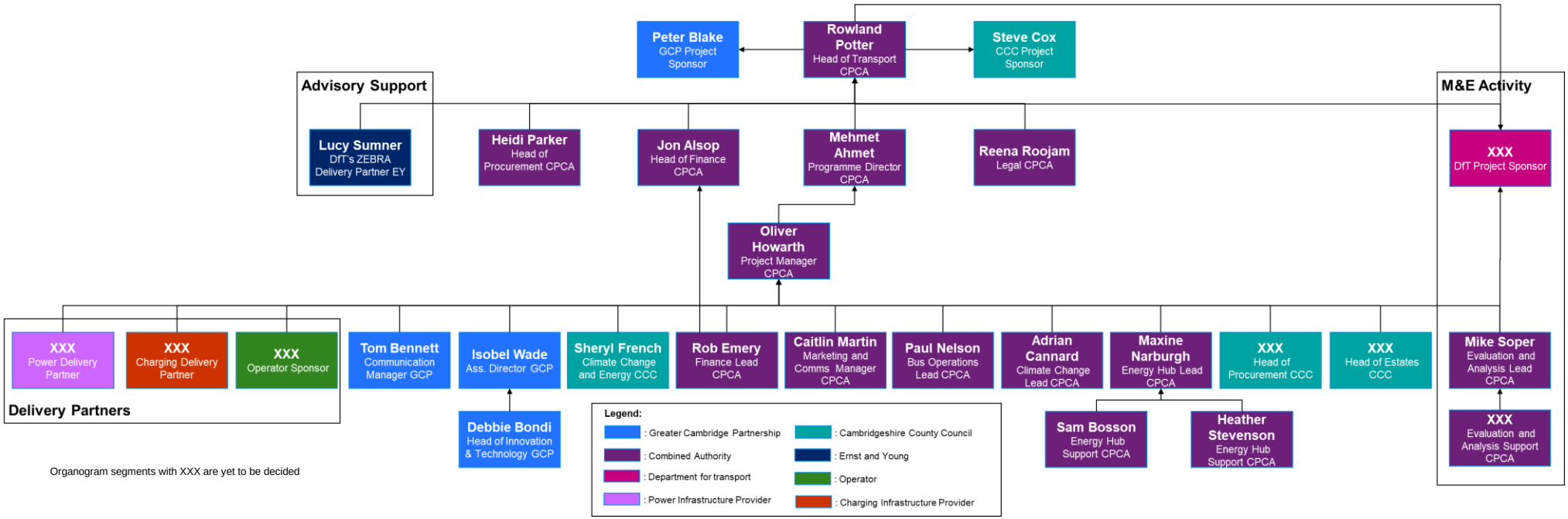
3.2.1. There are two parts to the ZEBRA Funding Scheme to take into consideration when setting out the governance structure:

1) **Delivery** – the deployment of the electric buses and construction of the charging facilities at the park and ride site and bus depot;
2) **Ongoing Management** – the continued day-to-day running and maintenance of the electric buses and charging hub sites.

1) Delivery

3.2.2. The figure below sets out the structure of the team that CPCA will assemble with all project delivery partners, sponsors and team members to deliver the scheme:

3.2.3. ***Project Delivery Team Structure:***

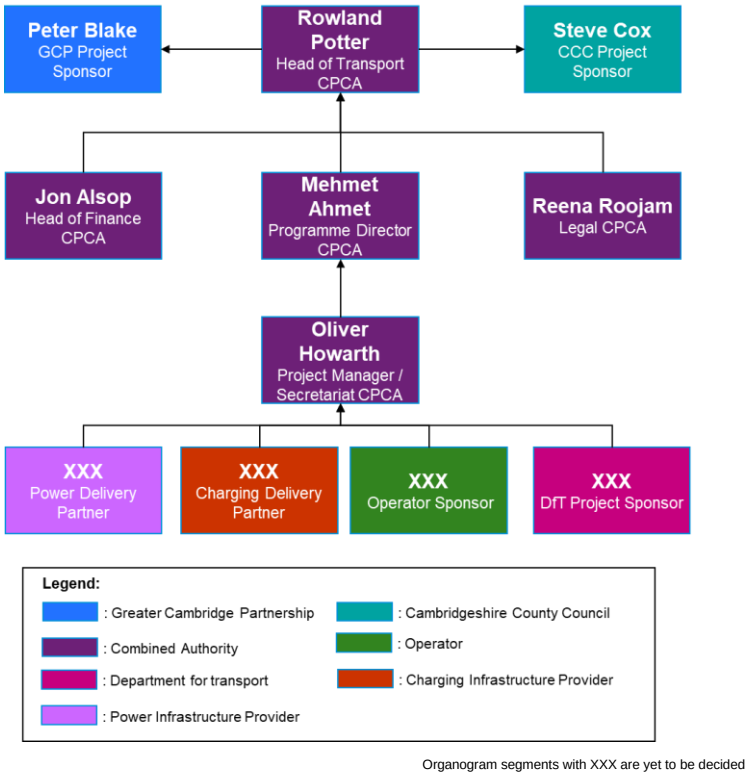


Organogram segments with XXX are yet to be decided

3.2.4. Project management measures as set out in section 4 of the Management Case will ensure effective collaboration across the broad range of stakeholders involved in this project.

Delivery Steering Committee

3.2.5. A Delivery Steering Committee will be established, bringing together Senior Representatives (the "Accountables") from the Delivery Partners to monitor progress and make decisions regarding changes to the design of, and/or funding allocations for the Scheme. Each representative will be required to have the requisite authority to make Scheme-level decisions on behalf of their respective organisations, ensuring timeliness of decision making and resolution of issues.



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3.2.6. The Delivery Steering Committee will meet quarterly during the Delivery phase of the project (at least four times between award of the Scheme by the DfT and anticipated completion of delivery in October 2022), with the following members:

- CPCA Director of Delivery and Strategy
- CPCA Programme Director (providing representation at both governance forums)
- CPCA Head of Finance (section 151 Officer)
- GCP Project Sponsor
- CCC Project Sponsor
- DfT Project Sponsor (or a nominated representative)
- Operator Partner Lead
- P&R Charging Infrastructure Partner Lead
- CPCA Project Manager (Secretariat)

3.2.7. A Standing Agenda will be in place for the Steering Committee meetings, and will include: Progress, Risks & Issues, Opportunities (including enablement of acceleration of transition of the wider fleet); and, stakeholder engagement.

3.2.8. Commercial discussions between the partners will be considered as Reserved Matters.

3.2.9. Steering Committee briefing papers will be prepared by the Secretariat and issued one week in advance of the Steering Committee meetings.

3.2.10. Minutes will be distributed in draft within three days of the Steering Committee meetings, and in final within a week. Minutes (save Reserved Matters) will be published on CPCA's website pursuant to the Local Government Transparency Code 2020.

3.2.11. Emergency Committees can be called with a minimum notice of three business days.

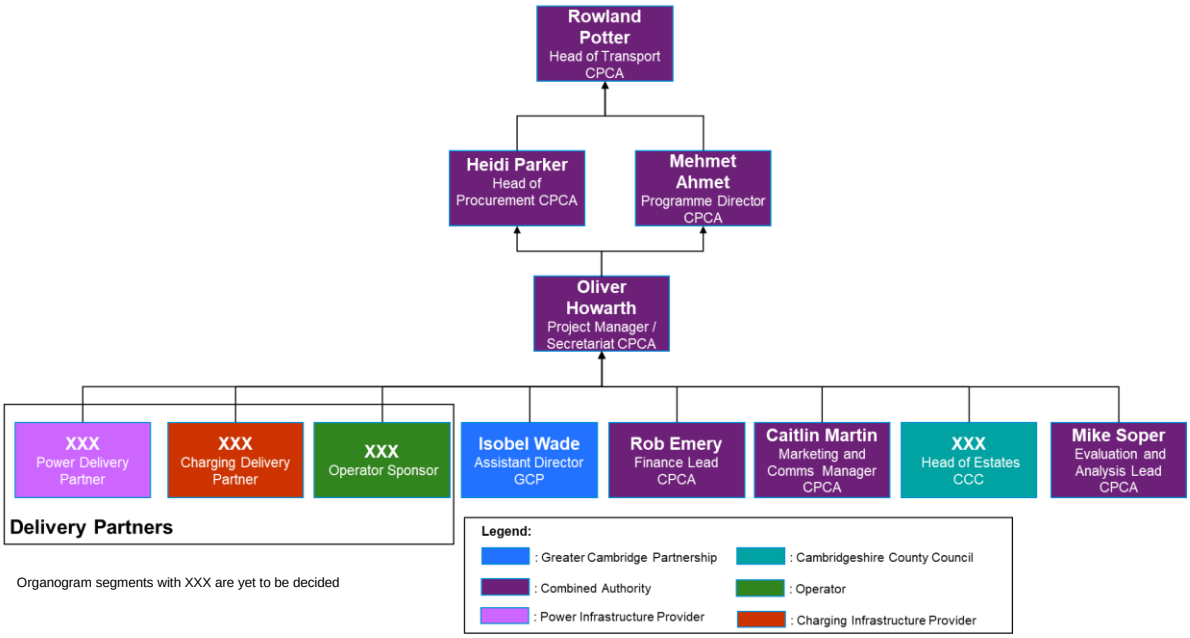
Delivery Project Board

3.2.12. A Delivery Project Board will be established, bringing together those with delivery responsibilities from across the Delivery Partners to monitor progress and make decisions regarding changes to the design of the Scheme (subject to these not changing the overall funding envelope or benefits profile of the Scheme, in which case they will require escalation to the Steering Committee). Each representative will be required to have the requisite delegated authority to make decisions (subject to the aforementioned restrictions) on behalf of their respective organisations, ensuring timeliness of decision making and resolution of issues.

3.2.13. The Delivery Project Board will meet at least every two weeks with the following members:

- CPCA Programme Director (providing representation at both governance forums)
- CPCA Project Manager (secretariat)
- CPCA Head of Procurement
- CPCA Financial Lead
- CPCA Evaluations & Analysis Lead
- CPCA Marketing & Communications Manager
- GCP Delivery Lead
- CCC Head of Estates
- Operator Partner Manager
- Power Delivery Partner Lead
- P&R Charging Infrastructure Partner Manger

Delivery Project Board Structure



3.2.14. A Standing Agenda will be in place for the Project Board meetings, and will include: Progress, Risks & Issues, Opportunities (including enablement of acceleration of transition of the wider fleet); and, stakeholder engagement.

3.2.15. Commercial discussions between the partners will be considered as Reserved Matters.

3.2.16. Project Board briefing papers will be prepared by the Secretariat and issued two days in advance of the Project Board meetings.

3.2.17. Minutes will be distributed in draft within two days of the Project Board meetings, and in final within a week. Minutes (save Reserved Matters) will be published on CPCA's website pursuant to the Local Government Transparency Code 2020.

3.2.18. Emergency Boards can be called with a minimum of notice one business days.

Key roles description (individual, responsibility & accountability)

3.2.19. A dedicated team from the Combined Authority, Cambridge County Council and the Greater Cambridge Partnership is delivering this programme, with direct input from wider delivery partners, suppliers and key stakeholders who will need to provide the project team with inputs and services to ensure consolidated delivery across all aspects of the project.

3.2.20. There are a number of options for the scope of procurement and the implementation of the charging infrastructure as discussed in more detail in the Commercial Case. However, our preferred approach is that the Operator Partner will bid to secure the operating partner role for the grant funding and then will run secondary competitive procurements for the bus manufacturer and energy/charging point provider.

3.2.21. CPCA will, separately, grant fund Cambridgeshire County Council to procure and install the plug-in opportunity charging infrastructure at the Babraham Road Park and Road site, with advisory support from the Operator Partner on operational requirements.

3.2.22. The roles and responsibilities of each of the respective individuals is outlined below:

Combined Authority

Title	Role and Responsibility	Individual
Head of Transport	Accountable for both the deployment of the 30 electric buses and the construction of the charging stations at the park and ride and bus depot. The Head of Transport is the sole signatory for the Business Case. The Head of Transport is the Senior Responsible Officer accountable for the associated grant funding.	Rowland Potter
Programme Director	Accountable for programme control as a whole, for setting up the use case evidence, stakeholder interaction, and overarching programme reporting.	Mehmet Ahmet
Head of Finance	Responsible for developing a comprehensive and accurate budget, ensuring that the necessary internal funds are available, and discharging the responsibilities of a Section 151 Officer in accordance with regulatory requirements for Local Authorities.	Jon Aslop
Head of Procurement	Responsible liaison with the Operator Partner to ensure the needs of CPCA are met. Accountable for ensuring that the Grant Award competition is run in an open, transparent manner in accordance with PCR2015.	Heidi Parker
Legal Advisor	Responsible for providing legal advice for the scope of the project, as well as advising on security, data management and GDPR.	Reena Roojam
Finance Lead	Responsible for providing direct support to the Head of Finance to develop a comprehensive and accurate budget, and ensure that the necessary internal funds are available.	Rob Emery
Project Manager	Responsible for managing the project, including coordinating the inputs of the delivery partners, project performance, financial reporting, and benefit and risk management.	Oliver Howarth
Bus Operations Lead	Responsible for determining service specification requirements, managing the relationship with the Operator Partner, and preparation of the Business Case.	Paul Nelson

Title	Role and Responsibility	Individual
Marketing & Communications Manager	Responsible for disseminating information to the relevant stakeholders as well as announcements to the public	Emily Martin
Evaluations and Analysis Lead	Responsible for undertaking a benefit analysis of the intervention and putting in measures in place to ensure the monitoring and recording of these benefits against the pre-defined mandate.	Mike Soper
Climate Change Lead	Responsible for supporting the Evaluation and Analysis Lead to develop the measures and tools to evaluate the impact of the intervention, and environmental benefits expected from the adoption of the scheme.	Adrian Cannard
Energy Hub Lead	Responsible for providing practical support and expertise to the Business Case development team to support the development and financing of the energy project.	Maxine Narburgh
Energy Hub Support	Responsible for providing direct support to the Energy Hub Lead.	Sam Bosson Heather Stevenson

Greater Cambridge Partnership

Title	Role and Responsibility	Individual
Project Sponsor	GCP Senior Responsible Officer Accountable for the GCP grant funding, and a joint signatory (alongside the CA Director of Delivery and Strategy) for all CA/GCP/CCC governance related to the ZEBRA scheme funding.	Peter Blake
Assistant Director Sustainable and Inclusive Growth	Responsible for programme control for GCP, contributing to the evidence for funding for the scheme, GCP stakeholder management, and programme reporting for GCP stakeholders and contributing to scheme design/delivery through the project board and bid evaluation	Isobel Wade
Head of Innovation and Technology	Responsible for providing direct support to the GCP Delivery Lead.	Debbie Bondi
Communication Manager	Responsible for disseminating information to the relevant stakeholders as well as announcements to the public	Tom Bennett

Cambridge County Council

Title	Role and Responsibility	Individual
Project Sponsor	CCC Senior Responsible Officer and a joint signatory (alongside the CA Director of Delivery and Strategy) for	Steve Cox

	all CA/GCP/CCC governance related to the ZEBRA scheme funding.	
Climate Change and Energy Assistant Director	Responsible for supporting the Evaluation and Analysis Lead to develop the measures and tools to evaluate the impact of the intervention, and environmental benefits expected from the adoption of the scheme.	Sheryl French
Head of Estates	Accountable for planning for, and procurement and delivery of the Babraham Road Plug-in Opportunity Charge Points	TBC
P&R Facilities Manager	Responsible for planning for, and procurement and delivery of the Babraham Road Plug-in Opportunity Charge Points	TBC
Head of Procurement	Accountable for ensuring that the Babraham Road P&R Plug-in Opportunity Charge Points competition is run in an open, transparent manner in accordance with PCR2015.	TBC

Department for Transport

Title	Role and Responsibility	Individual
Project Sponsor	Accountable for ensuring disbursement and proper use of funding to meet policy objectives.	TBC after deadline

Operator Partner

Title	Role and Responsibility	Individual
Operator Partner Lead	Accountable for specifying, procuring (through an open competition), purchasing, acceptance, and commissioning of the zero emission buses and in-depot charging infrastructure, including grid connectivity and local battery storage, and management of these suppliers. Also responsible for supporting CCC/CPCA to specify and commission the Plug-in Charge Point infrastructure at the Babraham Park & Ride.	To be determined based on the outcome of CPCA's Grant competition.
Operator Partner Manager	Responsible for specifying, procuring (through an open competition), purchasing, acceptance, and commissioning of the zero emission buses and in-depot charging infrastructure, including grid connectivity and local battery storage, and management of these suppliers	To be determined based on the outcome of CPCA's Grant competition.

Power Delivery Partner

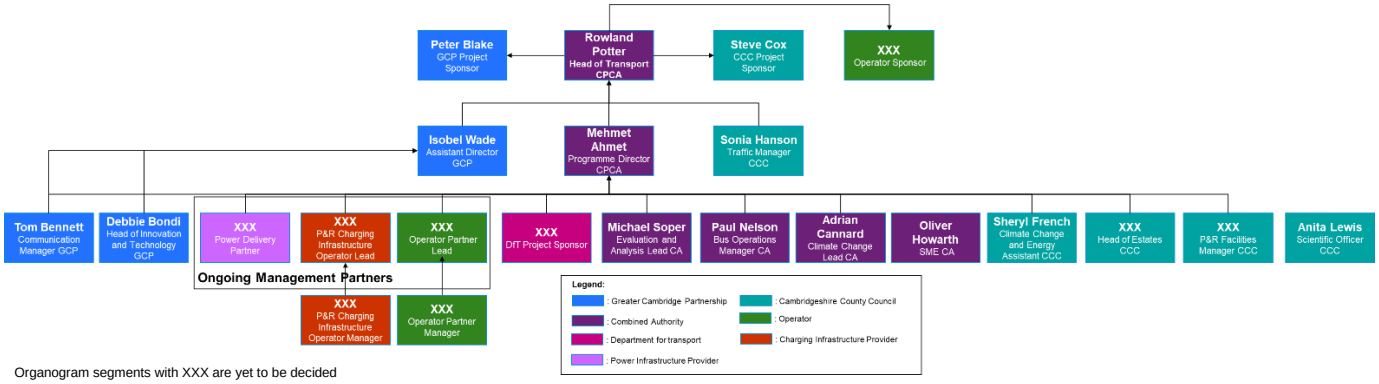
Title	Role and Responsibility	Individual
Power Delivery Partner	Accountable and Responsible for design, installation, and commissioning of the requisite grid connection upgrade to the chosen Operator Partner's depot.	TBC

P&R Charging Infrastructure Delivery Partner

Title	Role and Responsibility	Individual
Charging Delivery Partner	Accountable and Responsible for design, manufacturing, delivery, installation, and commissioning of the Babraham Road Plug-in Opportunity Charge Points.	To be determined based on the outcome of CCC's/CPCA's procurement exercise.

3.2. Ongoing Management

3.3.1. The figure below sets out the structure of the team which will manage the day-to-day running and maintenance of the deployed electric buses and charging infrastructure:



Organogram segments with XXX are yet to be decided

3.3.2. As the project transitions from Delivery to Operation, the Steering Committee and Project Board will be retained, but their respective focus areas changed from monitoring and ensuring Delivery to assuring Operations and Benefits Realisation. Standing Agendas will be revised accordingly, and the frequencies of the respective forums reduced to six-monthly for the Steering Committee, and quarterly for the Project Board (with the exception of the first three months of the Scheme (the "trial period"), where the frequencies will be maintained to ensure that the Scheme is successfully bedding in). The Power Delivery Partner and Heads of Procurement from CPCA and CCC will no longer be required to attend the Project Board.

3.3.3. During Operations the Project Board will be responsible for signing off / approving the quarterly Monitoring & Evaluation (M&E) data to be submitted to the DfT. This will be prepared and submitted to the Project Board by the Secretariat alongside Board papers.

Key roles description (individual, responsibility & accountability)

3.3.4. A small, dedicated team from the Combined Authority, Cambridge County Council, Greater Cambridge Partnership and the bus operator is managing this programme. This team comprises of the following roles:

Combined Authority

Title	Role and Responsibility	Individual
Head of Transport	Accountable for performance of the scheme, achievement of its target benefits, and decisions regarding claw back of funding in the event of failure of the Operator Partner to honour its Grant Agreement conditions	Rowland Potter
Deputy Head of Transport	Responsible for performance of the scheme, achievement of its target benefits, and decisions regarding claw back of funding in the event of failure of the Operator Partner to honour its Grant Agreement conditions.	Mehmet Ahmet
Bus Operations Manager	Responsible for monitoring the performance of the Operator Partner and holding it to account for delivery against Service and/or Operating Level Agreements as set out in the Grant Agreement. Also Responsible for identification, assessment, management and tracking of risks related to the Operator Partner's performance as they pertain to the Scheme.	Paul Nelson
SME	Responsible for benefit analysis and optimisation of operations and technology across the network of new buses	Oliver Howarth
Marketing & Communications Manager	Responsible for disseminating information to the relevant stakeholders as well as announcements to the public	Emily Martin
Evaluation & Analysis Lead	Responsible for ongoing monitoring and evaluation of the performance of, and benefits being delivered by the Scheme.	Mike Soper
Climate Change Lead	Responsible for supporting the Evaluation & Analysis Lead with evaluating the impact of the intervention, and environmental benefits expected from the adoption of the scheme.	Adrian Cannard

Greater Cambridge Partnership

Title	Role and Responsibility	Individual
Project Sponsor	GCP Senior Responsible Officer Accountable for the GCP grant funding, and a joint signatory (alongside the CA Director of Delivery and Strategy) for all CA/GCP/CCC governance related to the ZEBRA scheme funding.	Peter Blake
Assistant Director Sustainable and Inclusive Growth	Responsible for programme control for GCP, contributing to the evidence for funding for the scheme, GCP stakeholder management, and programme reporting for GCP stakeholders and contributing to scheme design/delivery through the project board and bid evaluation	Isobel Wade
Head of Innovation and Technology	Responsible for providing direct support to the GCP Delivery Lead.	Debbie Bondi
Communication Manager	Responsible for disseminating information to the relevant stakeholders as well as announcements to the public	Tom Bennett

Cambridge County Council

Title	Role and Responsibility	Individual
Project Sponsor	CCC Senior Responsible Officer and a joint signatory (alongside the CA Director of Delivery and Strategy) for all CA/GCP/CCC governance related to the ZEBRA scheme funding.	Steve Cox
Traffic Manager	Responsible for the monitoring of licensing and regulation of those who operate heavy goods vehicles, buses and coaches, and the registration of local bus services, as well as traffic levels on the roads	Sonia Hansen
Climate Change and Energy Assistant Director	Responsible for supporting the Evaluation & Analysis Lead with evaluating the impact of the intervention, and environmental benefits expected from the adoption of the scheme.	Sheryl French
Scientific Officer	Monitoring air quality and pollution within the Cambridgeshire region and disclosing it to the ongoing management team	Anita Lewis
Head of Estates	Accountable for management and availability of the Babraham Road Plug-in Opportunity Charge Points	TBC
Park & Ride Facilities Manager	Responsible for management and availability of the Babraham Road Plug-in Opportunity Charge Points	Campbell Ross-Bay

Operator Partner

Title	Role and Responsibility	Individual
Operator Partner Lead	Operator Partner Lead Accountable for its relationship with CPCA and delivery of the Operator Partner's commitments in accordance with its Grant Agreement, including service performance, data provision to enable M&E activities, and management of its supply chain partners..	To be determined based on the outcome of CPCA's Grant competition.
Operator Partner Manager	Operator Partner Manager Responsible for its relationship with CPCA and delivery of the Operator Partner's commitments in accordance with its Grant Agreement, including service performance, data provision to enable M&E activities, and management of its supply chain partners.	To be determined based on the outcome of CPCA's Grant competition.

P&R Charging Infrastructure Operator

N.B. This could also be the Operator Partner dependent on the outcome of CCC's competitive tender).

Title	Role and Responsibility	Individual
P&R Charging Infrastructure Operator Lead	P&R Charging Infrastructure Operator Lead Accountable for its relationship with CCC and ensuring availability and performance of the P&R Charging Infrastructure in accordance with the Service/Maintenance Contract.	To be determined based on the outcome of CPCA's Grant competition.
P&R Charging Infrastructure Operator Manager	P&R Charging Infrastructure Operator Manager Responsible for its relationship with CCC and ensuring availability and performance of the P&R Charging Infrastructure in accordance with the Service/Maintenance Contract.	To be determined based on the outcome of CPCA's Grant competition.

Resourcing

3.3.5. Individuals were chosen based on their previous experience and expertise in the associated area. Supporting partners were liaised with to ensure the individuals with the most relevant and deployable knowledge and skill sets were assigned to roles to ensure the most enhanced outputs could be created from collaborative working.

3.3.6. A more detailed breakdown of the leads' previous experience from across the delivery and ongoing management phases of the project has been provided in the Management Case appendix.

Assurances for delivery and ongoing management

3.3.7. CPCA will require evidence and assurances from our delivery and ongoing management partners to ensure they can deliver on the stipulations set out in the ZEBRA terms and conditions for bus specifications and requirements and also that

they meet the requirements set by CPCA on route facilitation and service standards. The overarching means of ensuring performance are that:

- Funds will not be provided by CPCA or DfT until the certificate of compliance with the current UK Bus Test Cycle procedure has been sent to CPCA. The manufacturer will need to be able to demonstrate how and when the bus is expected to be tested and provide assurance on the expected performance from the UK Bus Test Cycle procedure.

- Bidders for each area of the scheme must confirm they are not currently the subject of a recovery order following a decision by a court, or other competent body (including international bodies such as the European Commission, or panel or committee constituted under the EU-UK Trade and Cooperation Agreement) declaring any subsidy incompatible with the EU-UK Trade and Cooperation Agreement or any other international or domestic legal obligation relating to subsidy control. Should the bidder become subject to a recovery order during the period of the grant they must notify CPCA immediately and no further aid will be made whilst the recovery order is in force.

- To ensure that delivery and ongoing management partners have the financial capacity to deliver services over the 8-year assessment period, CPCA will conduct a financial standing evaluation. This will be based on the financial information in the two most recent published accounts. If operators fail the evaluation a parent company guarantee may be sought. Where this was not forthcoming, we would be unable to make an offer of partnership engagement for the scheme.

3.3.8. CPCA will also ensure that each supplier within the bid understands the covenants and terms and conditions that accompany the ZEBRA funding scheme agreement and consents to the clawback arrangements that will be enforced if they fail to maintain the delivery and service standards agreed to.

Reporting arrangements

3.3.9. Reporting arrangements will differ between the Delivery and Operational phases of the Scheme.

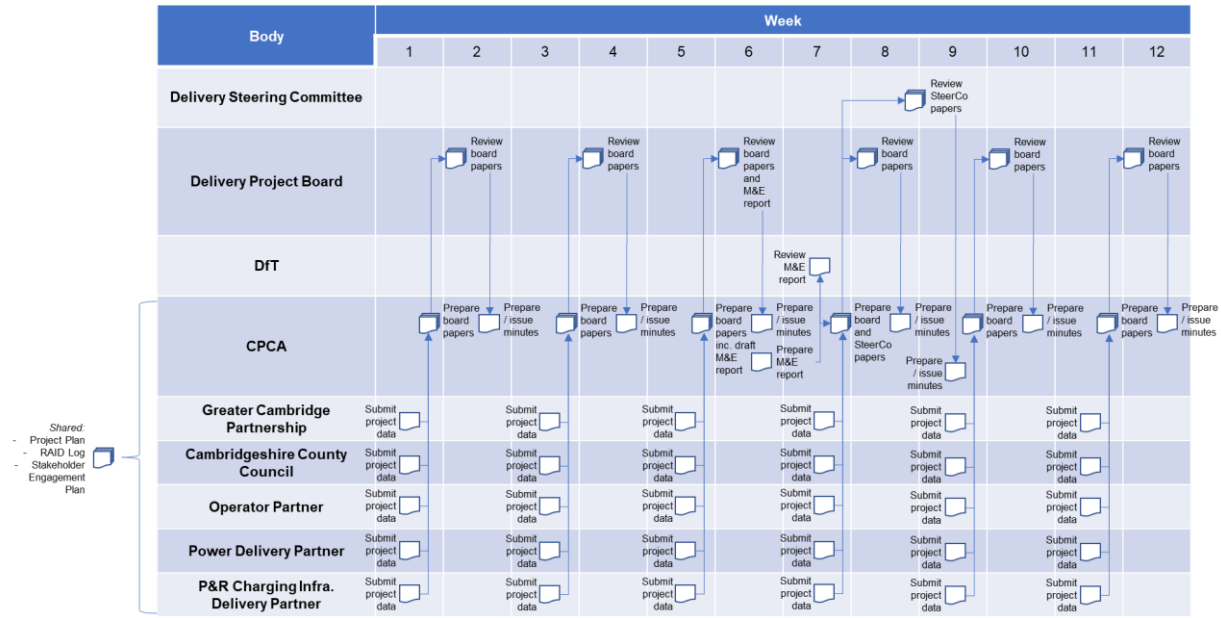
3.3.10. During “Delivery” reporting will adopt the process as illustrated in the figure below. This is predicated on:

- Quarterly Project Steering Committee Meetings
- Fortnightly Project Board Meetings
- Quarterly reporting by the Project to the DfT
- Sign-off by the Project Board of M&E reports being submitted to the DfT
- Use of a shared Project Plan, RAID Log, and Stakeholder Engagement Plan by the Delivery Partners.

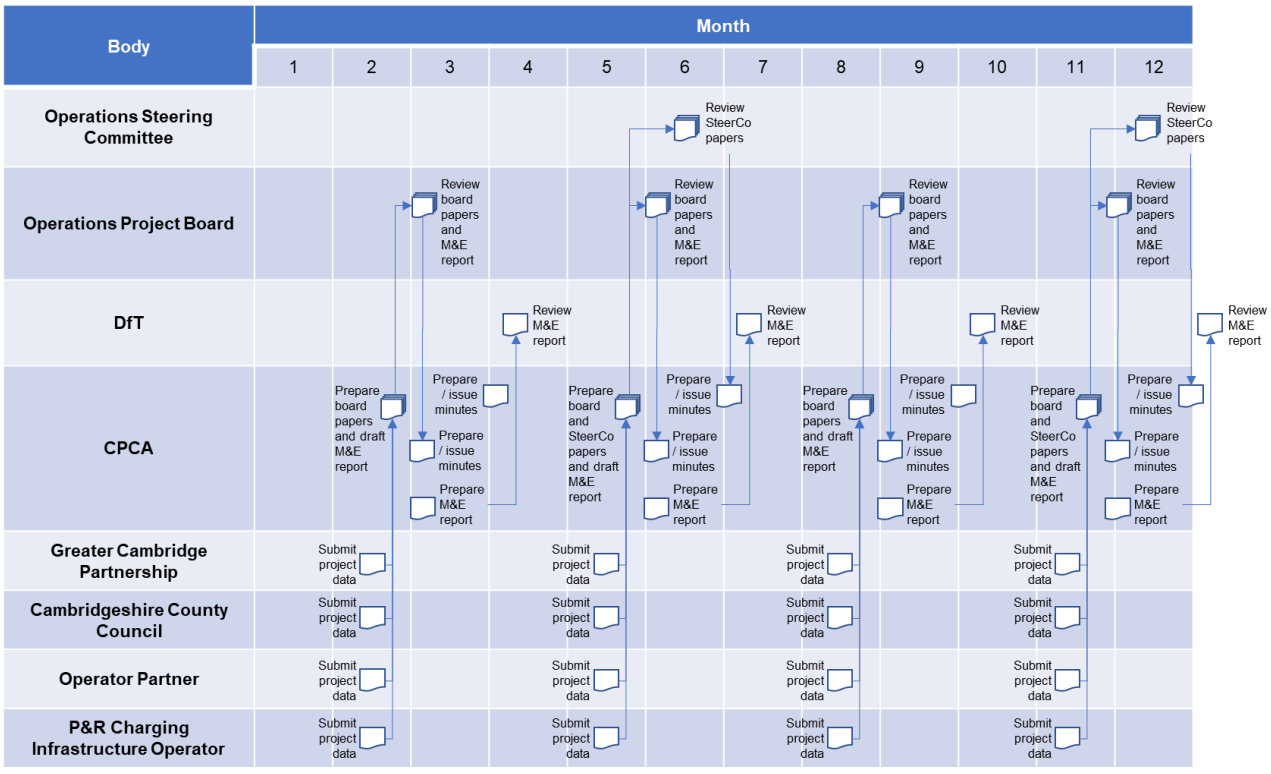
3.3.11. The content of the Quarterly Reporting to the DfT is outlined below:

- Progress/change to any key metrics
- Status update on key objectives/benefits
- Risk and issues update
- Opportunities

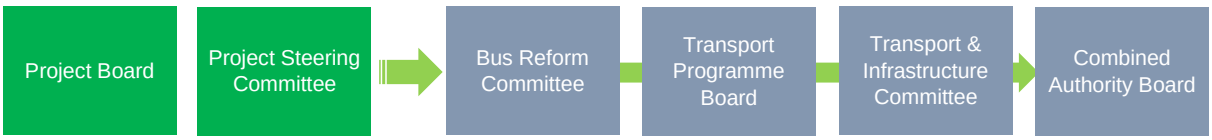
- Stakeholder engagement
- Outline of any change management decisions



3.3.12. During "Operations" reporting will adopt the process as illustrated in the next figure:



3.3.13. Internal project governance and reporting will also feed into CPCA's wider programme and corporate governance as illustrated below:



3.3.14. The Combined Authority Board is accountable for Budgetary and Programme Approval. Any decisions that could impact the overall envelope of the Project's budget or benefits profile will require approval from the Combined Authority Board.

Statement of Senior Level Support

3.3.15. The Greater Cambridge Partnership (GCP) is co-sponsoring and co-funding our Scheme, with £4.213m being committed for CAPEX and £1.031m for OPEX split in between GCP and the CPCA. Cambridgeshire County Council will own and take on responsibility for maintaining[15] the Babraham Park charging points and will provide Monitoring and Evaluation Support for the Scheme. All three organisations are recognised and invested in the importance of this Scheme – both in its ability to immediately improve air quality, and in paving the way to achieving our longer-term ambitions of 100% fleet conversion by 2025. Letters of Support for this Scheme from all three organisations are included in the Appendix to this Management Case.

3.3.16. As set out in the Strategic Case we have also engaged with market participants in to assess their appetite for our Scheme, and whether they could commit to delivering our ambitions, subject to funding being made available. We have received the following confirmations:

- Confirmation from a potential Operator Partner (Stagecoach) that it would purchase and operate 30 double decker electric buses on our prescribed routes, providing up to £7.035m + VAT (the equivalent cost of 30 diesel double-decker vehicles), maintaining the displaced EURO VI buses in the Cambridge Area, and committing to running the double-deck electric buses in the CPCA area for eight years.
- A formal quotation (subject to full site survey of the successful Operator Partner's Depot) from UKPN (our preferred Power Delivery Partner) for grid connection upgrades.

3.3.17. These representations provide us with assurance that our Scheme is deliverable within our ambitious timescales to make a rapid improvements in air quality in the Cambridge Air Quality Management Zone ('AQMZ')

4. Project Plan

4.1 Project Plan

4.1.1. We have developed a work breakdown structure ('WBS') and Project Plan for the delivery of our proposed Scheme. This sets out how we will structure our project to achieve our target October 2022 date for deployment of the vehicles into operational use through seven discrete work-streams, three of which (#1, #6, and #7) will be delivered by CPCA, one of which (#4) will be delivered by CCC, supported by CPCA, and the remaining five (#2, #3, and #5) will be delivered by the Operator Partner, with oversight and monitoring by CPCA.

4.1.2. A Gantt chart which provides a high-level timeline of the capital and operational delivery aspects of our proposed ZEBRA scheme is shown below. We aim to have both vehicles and in-depot charging infrastructure delivered and commissioned by September 2022, enabling operational service commencement in October 2022. Data

[15] Either itself through a contract with a maintenance provider, or by requiring the Operator Partner to do so through its Lease Agreement for the Park and Ride site.

collection and preparation for M&E will also begin concurrently with the commencement of operation.

4.1.3. Opportunity charging infrastructure at the Park & Ride site will not be required until Winter 2022, to accommodate increased power requirements for running heating and poorer battery performance in cold weather. The Babraham Park & Ride Solar Farm is anticipated to be operational and able to supply power for the Plug-in Opportunity Charge Points by December 2022. Installation of the Charge Points and the connection to the embedded storage is not on the critical path and will be commissioned and installed when most appropriate before December 2022.

4.1.4. If only a single viable Expression of Interest is received (as we expect based on our Market Engagement to date) we will look to Direct-Award the Operator Partner role to that bidder, subject to suitable diligence and scrutiny (explained further in section 1.9. in the Commercial Case). Else we will run a single-stage PCR2015-compliant procurement to select the Operator Partner. If a single stage procurement for the Operator Partner is run this tender process will lead to a 2 month delay in the appointment of an Operator, which in turn will lead to a 2 month delay for the delivery of each subsequent stage of the ZEBRA scheme and hence service commencement in December 2022 of both vehicles and in-depot charging infrastructure. This has been outlined on a secondary Project Plan shown below under "**Project Plan (In the event of more than one eligible bidder for Operator Partner's role)".**

Project Plan (In the event of one eligible bidder for Operator Partner's role)

Year	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	3
Month	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1
Estimated mm/yy	10/21	11/21	12/21	01/22	02/22	03/22	04/22	05/22	06/22	07/22	08/22	09/22	10/22	11/22	12/22	01/23	02/23	03/23	04/23	05/23	06/23	07/23	08/23	09/23	10/23
Project Initiation																									
ZEBRA Announcement	◆																								
Set up of the ZEBRA scheme project governance																									
Set up of the Operator Grant Award Competition																									
Workstream #1: Selection of the Operator Partner by CPCA (Direct Award Scenario due to 1 eligible bidder in the market at present)																									
Launch of the Grant Award Competition among operators																									
Bid evaluation																									
Contract negotiation and finalisation																									
Selected Operator Partner Announced		◆																							
Finalisation of the specification for buses and infrastructure																									
Setting up the procurement for electric buses																									
Development of safety cases for vehicles and infrastructure																									
Workstream #2: Procurement & Delivery by the Operator Partner of 30 double decker electric buses																									
Launch of the Bus Procurement																									
Bus Manufacturer appointed					◆																				
Bus Manufacturing taking place																									
Bus Delivery Completed (latest by end of Q3 22)												◆													
ZEB begins operation													◆												
Workstream #3: Procurement and Delivery by the Operator Partner of 16 in-depot dual charging points (Equipment and O&M)																									
Launch of tender, site visits, review and supplier selection																									
In-depot infrastructure provider appointed					◆																				
Obtain planning permission																									
Develop detailed design																									
Procurement of sub-stations and other items																									
Installation time: dual charging points																									
Charger Software integration																									
Completion of installation: dual charging points												◆													
Workstream #4: Procurement and Delivery by CPCA/CCC of 2 Babraham Road P&R Plug-in Charge Station (Equipment and O&M)																									
EXTERNAL CONTINGENCY: Babraham Road charge station is operationally reliant on the completion of installation of solar panel for power supply																									
Launch of tender, site visits, review and supplier selection																									
Pand R infrastructure provider appointed					◆																				
P&R Charge Station Accessibility Impact Analysis and mitigation planning																									
Permit application and planning and design																									
Charger Software integration																									
Construction and Installation of charge station																									
Install power connection to solar panel (solar panel to be completed by 10/22)																									
Completion (charge station will be completed together with the solar panels)														◆											
Workstream #5: Operator Partner Staff Training																									
Development of Bus & Infrastructure Maintenance training materials																									
Training of Operator Partner O&M staff											◆														
Development of Bus Driver training package																									
Training of Operator Partner Bus Drivers												◆													
Workstream #6: Marketing & Communications (MarComms)																									
Collaborative MarComms strategy development (Operator Partner & CPCA)																									
Preparation of MarComms material																									
MarComms strategy delivery																									
Workstream #7: Monitoring & Evaluation set-up																									
Co-design of M&E data capture mechanisms with delivery partners																									
Establishment of M&E data transfer, storage and analysis capabilities																									
Development of M&E reports																									
Operational Delivery																									
3-month trial period testing compatibility of vehicles and infra																									
Verification report upon trial completion that assets are fit for purpose															•										
Data collection and submission for M&E purposes													•	•	•	•	•	•	•	•	•	•	•	•	•
Monthly project update call													•	•	•	•	•	•	•	•	•	•	•	•	•
Quarterly project reporting (3 quarterly and 1 annual per year)													•			•			•			•			•
Monitoring and evaluation reporting (Years 3, 6 and 9 only)																									•

Batteries will not require opportunity charging at P and R until 05/23, so this is considered early delivery

The same reporting routine perpetuates until Year 9 or when the 8 year asset life is reached, whichever is soonest

KEY

Critical Path

Key Dependency

Project Plan (In the event of more than one eligible bidder for Operator Partner's role)

Year	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	3
Month	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1
Estimated mm/yy	10/21	11/21	12/21	01/22	02/22	03/22	04/22	05/22	06/22	07/22	08/22	09/22	10/22	11/22	12/22	01/23	02/23	03/23	04/23	05/23	06/23	07/23	08/23	09/23	10/23
Project Initiation																									
ZEBRA Announcement																									
Set up of the ZEBRA scheme project governance																									
Set up of the Operator Grant Award Competition																									
Workstream #1: Selection of the Operator Partner by CPCA (Open Competition Scenario where there are more than 1 eligible bidders)																									
Launch of the Grant Award Competition among operators																									
Bid evaluation																									
Contract negotiation and finalisation																									
Selected Operator Partner Announced																									
Finalisation of the specification for buses and infrastructure																									
Setting up the procurement for electric buses																									
Development of safety cases for vehicles and infrastructure																									
Workstream #2: Procurement & Delivery by the Operator Partner of 30 double decker electric buses																									
Launch of the Bus Procurement																									
Bus Manufacturer appointed																									
Bus Manufacturing taking place																									
Bus Delivery Completed (latest by end of Q4 22)																									
ZEB begins operation																									
Workstream #3: Procurement and Delivery by the Operator Partner of 16 in-depot dual charging points (Equipment and O&M)																									
Launch of tender, site visits, review and supplier selection																									
In-depot infrastructure provider appointed																									
Obtain planning permission																									
Develop detailed design																									
Procurement of sub-stations and other items																									
Installation time: dual charging points																									
Charger Software integration																									
Completion of installation: dual charging points																									
Workstream #4: Procurement and Delivery by CPCA/CCC of 2 Babraham Road P&R Plug-in Charge Station (Equipment and O&M)																									
EXTERNAL CONTINGENCY: Babraham Road charge station is operationally reliant on the completion of installation of solar panel for power supply																									
Launch of tender, site visits, review and supplier selection																									
Pand R infrastructure provider appointed																									
P&R Charge Station Accessibility Impact Analysis and mitigation planning																									
Permit application and planning and design																									
Charger Software integration																									
Construction and Installation of charge station																									
Install power connection to solar panel (solar panel to be completed by 10/22)																									
Completion (charge station will be completed together with the solar panels)																									
Workstream #5: Operator Partner Staff Training																									
Development of Bus & Infrastructure Maintenance training materials																									
Training of Operator Partner O&M staff																									
Development of Bus Driver training package																									
Training of Operator Partner Bus Drivers																									
Workstream #6: Marketing & Communications (MarComms)																									
Collaborative MarComms strategy development (Operator Partner & CPCA)																									
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Development of M&E reports																									
Operational Delivery																									
3-month trial period testing compatibility of vehicles and infra																									
Verification report upon trial completion that assets are fit for purpose																									
Data collection and submission for M&E purposes																									
Monthly project update call																									
Quarterly project reporting (3 quarterly and 1 annual per year)																									
Monitoring and evaluation reporting (Years 3, 6 and 9 only)																									

Batteries will not require opportunity charging at P and R until 05/23, so this is considered early delivery

The same reporting routine perpetuates until Year 9 or when the 8 year asset life is reached, whichever is soonest

KEY
Critical Path
Key Dependency

Project plan milestones (in the event of one eligible bidder – when there is more than one eligible bidder the expected completed dates will be delayed by two months across all tasks)

4.1.5. The table below provides detailed account of **how, when and by whom specific tasks will be achieved and deliverables produced**:

Key deliverables	Specific tasks	Owners	Completed by
Project Initiation	ZEBRA Announcement	CPCA	10/2021
	Set up of the ZEBRA scheme project governance	CPCA	10/2021
	Set up of the Operator Grant Award Competition	CPCA, CCC	10/2021
Workstream #1: Selection of partner operator	Launch of Grant Award Competition	CPCA	10/2021
	Bid evaluation for partner operator		11/2021
	Contract negotiation		11/2021
	Announcement of selected partner operator		11/2021
	Finalisation of bus and infrastructure specification		11/2021
	Set up procurement of for electric buses	Operator	12/2021
	Development of safety cases for vehicles and infrastructure	CPCA	12/2021
Workstream #2: Delivering 30 double decker electric buses	Launch of the Bus Procurement	Operator	12/2021
	Bus Manufacturer Appointed		02/2022
	Bus Manufacturing	Manufacturer	09/2022
	Bus Delivery and Commissioning (latest by end of Q1 22/23)	Operator	10/2022
	ZEB begins operation		10/2022
Workstream #3: Deliver 16 in-depot dual charging points	Launch of tender, site visits, review, and supplier selection	Operator and provider	11/2021
	In-depot infrastructure provider provided		02/2022
	Obtain planning permission for connection upgrade		02/2022
	Develop detailed design		04/2022
	Procurement of sub-stations and other items		07/2022
	Installation time: dual charging points		09/2022
	Charger Software integration		09/2022
	Completion of installation: dual charging points		09/2022
Workstream #4: Deliver Plug-in Charge Station	Launch of tender, site visits, review, and supplier selection	Operator (and CCC at P and R)	02/2022
	P&R infrastructure provider appointed		02/2022
	P&R Charge Station Accessibility Impact Analysis and mitigation planning		02/2022
	Permit application and planning and design		05/2022

Key deliverables	Specific tasks	Owners	Completed by
	Charger Software integration		06/2022
	Construction and Installation of charge station		11/2022
	Install power connection to solar panel (solar panel to be completed by 10/22)		12/2022
	Completion (charge station will be completed together with the solar panels)		12/2022
Workstream #5: Operator Partner Staff Training	Development of Bus & Infrastructure Maintenance training materials	Operator	06/2022
	Training of Operator Partner O&M staff		07/2022
	Development of Bus Driver training package		07/2022
	Training of Operator Partner Bus Drivers		08/2022
Workstream #6: Marketing & Communications (MarComms)	Collaborative MarComms strategy development (Operator Partner & CPCA)	CPCA	04/2022
	Preparation of MarComms material		06/2022
	MarComms strategy delivery		08/2022
Workstream #7: Monitoring & Evaluation set-up	Co-design of M&E data capture mechanisms with delivery partners	CPCA	07/2022
	Establishment of M&E data transfer, storage and analysis capabilities		09/2022
	Development of M&E reports		11/2022
Operational delivery	3-month trial period testing compatibility of vehicles and infra	Operator	12/2022
	Verification report upon trial completion that assets are fit for purpose		01/2023
	Data collection and submission for M&E purposes		Monthly from 10/2022
	Monthly project update call	CPCA	Monthly from 10/2022
	Quarterly project reporting (3 quarterly and 1 annual per year)		Quarterly from 10/2022
	Monitoring and evaluation reporting (Years 3, 6 and 9 only)	CPCA to commission an M&E specialist	Year 3, 6 and 9 only

4.1.6. ***Milestone Assurance***

4.1.7. The milestones in our project plan have been set out after engagement with each of the delivery partners (as set out in the Commercial Case), whereby extensive planning and research has taken place to determine the optimal bus routes and services to ensure we deliver the largest benefits and most efficient use of resources granted to us by the ZEBRA scheme.

4.1.8. This engagement has ensured that each of the delivery partners are in agreement with the timeline set out in the above project plan and that each milestone has been deliberated over, with input from each of the relevant parties, to guarantee that the critical path is feasible with the resources provided and also that the timeframe is reasonable and achievable for delivery.

Critical Path

4.1.9. The critical path outlines the sequence of dependant tasks that must be completed on time in order for the ZEBRA scheme to deliver the electric buses and charging infrastructure at the depot on the due date in October 2022.

4.1.10. The critical path flows from the initiation of the project and announcement of the ZEBRA scheme in October 2021, followed by the launch of the operator grant award competition and the announcement of the Selected Operator Partner in November 2021. The Operator Partner will then run the procurement for the appointment of the Bus Manufacturer and in-depot charging infrastructure, while in tandem Cambridgeshire County Council goes to market for, and appoints the provider of the Park and Ride plug-in opportunity charge points in February of 2022, supported by the Operator Partner in an advisory capacity. Installation of the in-depot charging infrastructure will then take place along with the power grid upgrade approximately from April to September 2022, while the plug-in opportunity charge points at Babraham Road will be installed and ready for operation in December 2022 after connection to the Solar Farm at Babraham.

4.1.11. The commissioning and completion of the dual charging points will occur in parallel with the development of Bus Driver training packages in August 2022. The training of Operator Partner bus drivers and the deployment of electric buses will take place and be complete in October 2022, with monitoring and evaluation activity to occur monthly up until year 8 of the scheme.

Interdependencies

4.1.12. Given the involvement of multiple parties in the Scheme, and requirements for power and charging infrastructure to be delivered in order for buses to be commissioned, we have identified and considered interdependencies, and set out our proposed management techniques as follows:

Independent variables	Dependent variables	Involved Parties	Interdependency measures
Time taken to obtain planning permission at the Park and Ride site	The commencement of electrical work involved in adding grid capacity The commencement of installation of charging infrastructure at P and R site	Cambridgeshire County Council, CPCA, Operator partner, DNO, and Charging Infrastructure Provider (CIP)	- CPCA will agree with Cambridgeshire County Council on a realistic turnaround time which can be committed to with certainty - Adhere strictly to an integrated timeline which has been agreed, tested and shared with all parties
The commencement of electrical work involved in adding grid capacity to the selected depot	The commencement of installation of charging infrastructure at the selected depot	Partner operator, DNO	- Commercial arrangement (e.g. KPI-based agreement) which entitles the commissioner to a discount in the event of a late delivery
Complexity of civil engineering work required at the Operator Partner's depot to install charging infrastructure	Time taken to complete the installation of charging points at the selected depot and Park and Ride site	Partner Operator, CIP	- CIP to be extensively involved in the procurement and design stage to accurately assess the physical situation of sites and, based on which, estimate time and cost requirements - Commercial arrangement (e.g. KPI-based agreement) which entitles the commissioner to a discount in the event of a late delivery

Independent variables	Dependent variables	Involved Parties	Interdependency measures
Complexity of civil engineering work required at the Park and Ride site to install Plug-in Opportunity Charge Points	Time taken to complete the installation of Plug-in Opportunity Charge Points at park and ride site	Partner Operator, CIP	- CIP to be thoroughly involved in the procurement and design stage to accurately assess the physical situation of sites and, based on which, estimate time and cost requirements - Commercial arrangement (e.g. KPI-based agreement) which entitles the commissioner to a discount in the event of a late delivery
Supply chain readiness and production capacity of bus manufacturers	The time taken for bus manufacturers to produce and deliver buses within stipulated timeframe	Partner Operator, Manufacturer	- Bidding manufacturers will be required to give a realistic estimate of delivery time in their proposals. - Commercial arrangement (e.g. KPI-based agreement) which entitles the commissioner to a discount in the event of a late delivery

Independent variables	Dependent variables	Involved Parties	Interdependency measures
External interdependency: The construction of the Solar Farm at the selected Park and Ride Site	Delay in the construction of the Solar Farm may cause delays in the construction of plug-in opportunity charge points or limit the ability of the infrastructure to operate with full capacity.	Cambridgeshire County Council, CPCA, Partner Operator, CIP, Solar Panels Provider	- Cambridgeshire County Council will work with the Solar Farm contractor to estimate a realistic turnaround time in order to ensure that installation of Plug-in Opportunity Charge Points can proceed un-interrupted and without delay. - The Solar Farm station is expected to be complete by October 2022, ready for use by buses which may require additional charging to support heating and address poorer battery performance in cold weather during the winter. Opportunity charging isn't on the critical path for bus delivery as it is not necessary until batteries are impacted by extreme winter conditions i.e. below 0 degrees C and after a number of years of battery degradation.

Key approval and assurance gates

Key approval gateway

4.1.13. CPCA has an established approval gateway to ensure that the proposed ZEBRA scheme will be governed effectively and every decision representative of the views of the democratically elected members of our constituent Local Authorities.

4.1.14. The Gateway Review process below sets out what is required (documentation to be produced and the approvals to be sought) at key stages of a project lifecycle

CPCA Gateway stages:

4.1.15. **Gateway 0:** Once the PID has been signed off by Directors, a Board Paper needs to be written to request funding.

4.1.16. **Gateway 1:** Once the SOBC has been developed, the document is reviewed to ensure that all relevant tasks have been completed. If an Options Assessment Report (OAR) or similar has been developed, this will need to be included within the submission. If a Value for Money (VfM) assessment has been completed, it will require sign-off from the CFO.

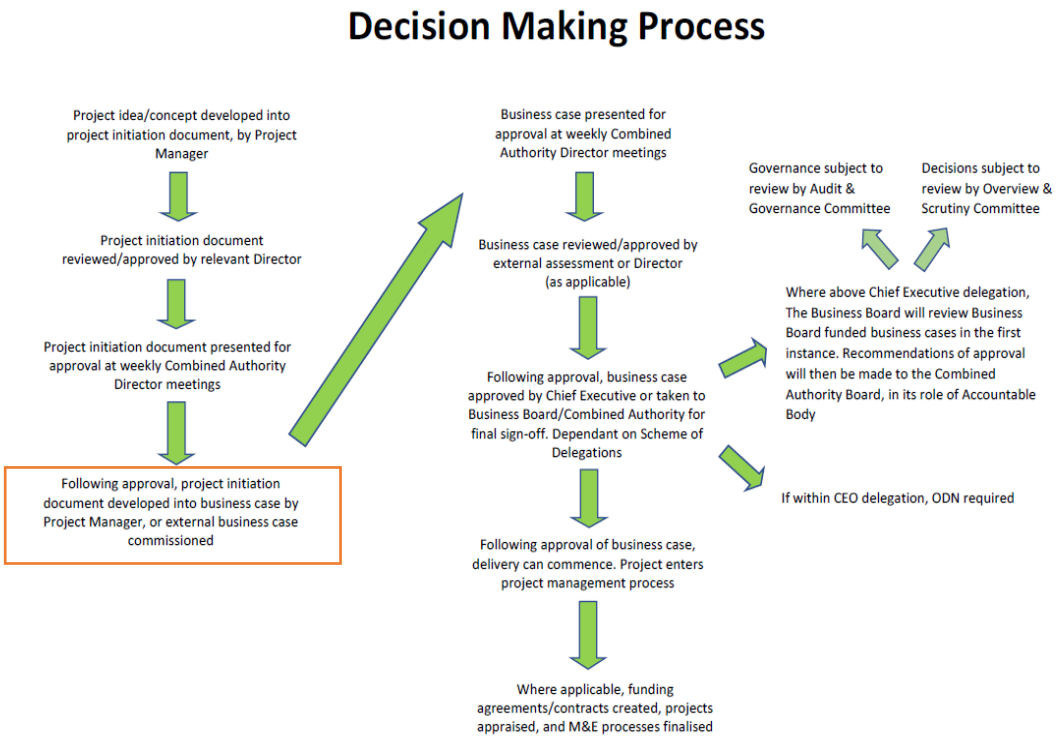
4.1.17. **Gateway 2:** Takes place after the OBC

4.1.18. **Gateway 3:** Takes place after the FBC → ***We are currently here.***

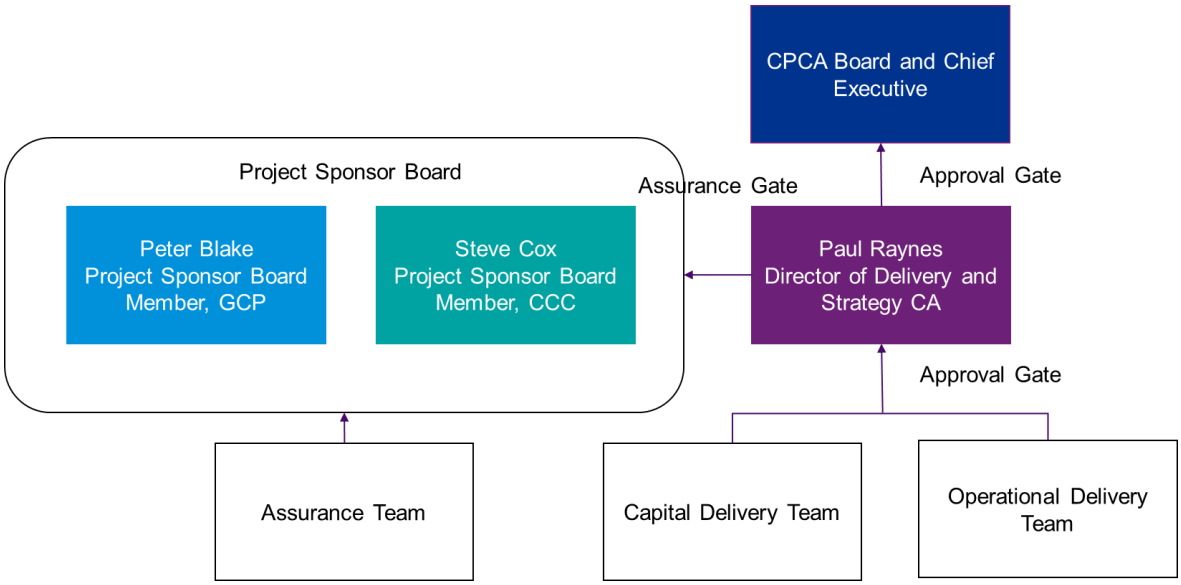
4.1.19. **Gateway 4:** Once construction or delivery has been completed, the Project Closure process must be completed.

4.1.20. **Gateway 5:** As agreed within an Evaluation Plan, continued monitoring and evaluation of the project post-completion.

4.1.21. Detailed decision-making pathway and approval process is summarised in the flowchart below:



CPCA's Assurance framework



4.1.22. In addition to a vertical approval process, we will also adopt a horizontal assurance reporting line which exists outside of the delivery team and is led by the Project Sponsor Board. The role of the Project Sponsor Board is to:

- be accountable with leading an assurance team who will assess the reporting of the project (e.g. data collection, quarterly reports, annual report, and M&E) from a third-party critical point of view. The assurance team will ensure that the delivery team's finding/reporting is aligned and accurate with the situation on the ground; and
- ensure that the project is running in a direction which is aligned with the wider local and regional strategic objectives.

Change management arrangements

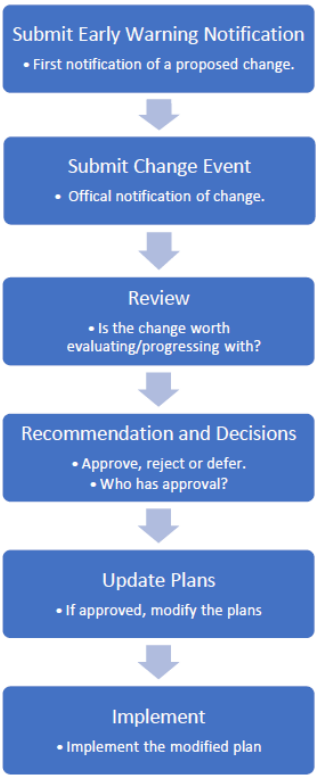
4.1.23. Once projects have started, any changes to the scope or delivery will be managed through an Early Warning and Change Control process, as stated in CPCAs "10 Point Guide to Project Management". This is the mechanism through which all requests to change the project or programme will be captured, evaluated, and then approved or rejected (shown in the Management Case appendix).

4.1.24. The change control process has six (6) steps to ensure that any change requested is suitably considered, research and consequential impacts documented and investigated to provide adequate evidence for change decisions. The six steps are listed below:

1. Submit Early Warning Notification
2. Submit Change Event
3. Review
4. Recommendation and Decisions
5. Update Plans
6. Implement

4.1.25. Early Warning Notifications (EWN) and Change Events (CE) will be submitted to notify and record all project changes. These will be recorded on the Early Warning and Change Event logs.

4.1.26. **Early Warning Notifications** will be the first opportunity to raise any potential change that could affect the scope, cost, programme, outputs, and/or deliverables of a project. These are supporting documents for future Change Events and advises the Project Team that a change may occur, and that additional mitigation may be required.



4.1.27. **Change Events** will be the formal step in reporting a change and requires detailed information about the event that is occurring. The exact implication of the change should now be known.

4.1.28. All EWNs and CEs should be reviewed by the internal Project Teams. Directors/SRO have full delegated authority to approve changes within the approved risk tolerance. If the changes exceed the risk tolerance, this must be discussed within CMT for approval of how to proceed.

Change Control Process

4.1.29. If a decision for change is made, then this change should be planned with appropriate recognition of the need for contingency, additional resources and a fall-back plan should the change cause unexpected problems.

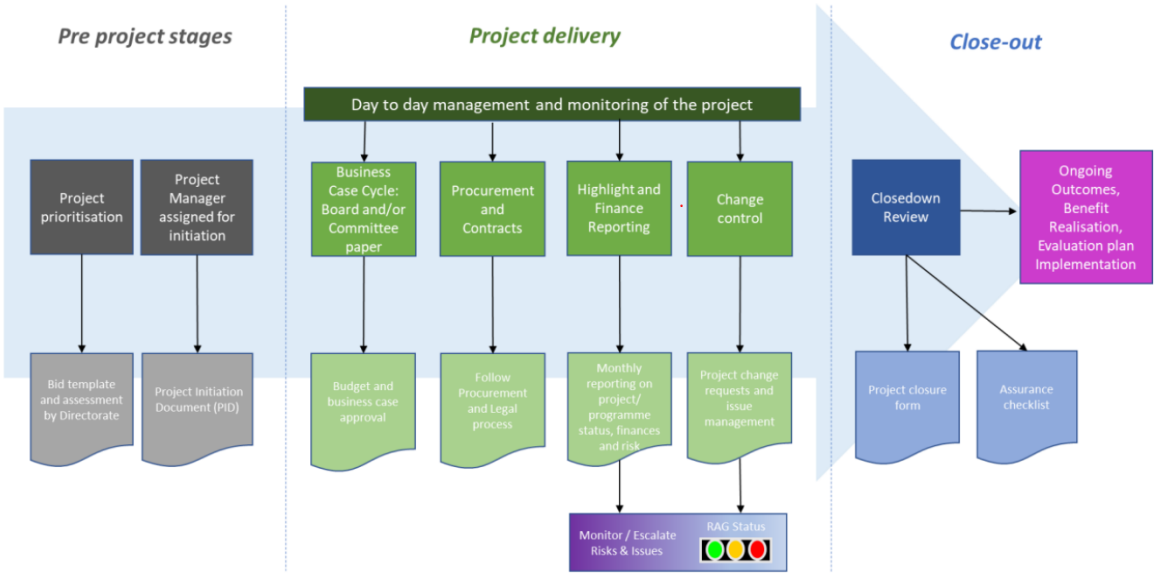
4.1.30. Examples of potential change scenarios, and our proposed mitigations are set out below:

Change scenario	Potential impact	Mitigation
CPCA approves plans for Franchising and accelerates these such that they cut across the ZEBRA scheme	The appointed Operator Partner may not be successful in securing the Franchise for the routes selected for the Business Case, resulting in loss of the vehicles from those routes.	CPCA will include purchase rights as part of the Grant award conditions and will also mandate that any Franchise which contains the P&R and Citi 2 routes is operated with zero emission vehicles,
Grid connection costs are significantly higher than forecast and/or an option with a better VfM (e.g. IDNO Private wire) is identified	This could reduce the number of buses that can be funded through the scheme and/or change the economics (costs, future revenues, and/or benefits) of the scheme	A full appraisal will be undertaken to understand the impact on costs and future revenues for the respective counterparties, and quantified benefits prior to any decisions being made.
Operational performance improvements in vehicle technologies over the next 9-12 months remove the need for Plug-in Opportunity Charge Points at the Babraham Park & Ride	Funds are spent on an asset that does not contribute to or enable delivery of the Scheme and its benefits.	We will maintain close dialogue with potential Operator Partners and Manufacturers, and re-assess requirements for the Plug-in Opportunity Charge Points during our Grant competition. We have staged our procurements such that, if the Operator Partners demonstrate that the charge points at Babraham Road are no longer required, we will not procure them.
The Operator Partner fails to deliver its obligations under the Grant Agreement	In our proposed Scheme this would result in CPCA being able to clawback grant funding. However this could have a materially / critically adverse effect on the Operator, resulting in it pulling out of running the routes in entirety.	We will work closely with potential and, ultimately, the preferred Operator Partner to structure the Grant Agreement to minimise the risks of inadvertently creating default, and will work constructively with the nominated Operator partner to look for opportunities in which we can help address service deficiencies before clawing back the Grant.

Project Management

4.1.31. Our project and programme management approach is based on PRINCEII and is designed to provide a clear framework for effective decision-making, and to provide confidence in respect of delivery of the required outputs on time and to budget. To achieve this, we adopt robust planning, governance, risk management, quality assurance, and stakeholder management as central pillars to our approach.

4.1.32. All of which have been set out throughout the Management case and a formal CPCA Project Management Process has been set out below:



4.1.33. Expectations will be set up front during an inception meeting to ensure clarity on outputs and outcomes. During the inception meeting we will agree staff working practices for the delivery, but also the ongoing management of the scheme, including our delivery plan, risk & issue management, quality management, budget management, milestones, and progress reporting requirements, codifying these in a Project Initiation Document. We will also agree the preferred engagement mechanism for communications with all delivery partners and providers to ensure the most effective collaboration methods.

4.1.34. The agenda for our fortnightly Project Board Meetings will progress against plan and budget, upcoming milestones, opportunities in the project (e.g. to accelerate delivery and/or add value), and discussion on risks, assumptions, issues, and dependencies. Should high-rated risks and/or issues emerge we will communicate these to relevant delivery partners and providers (i.e. outside of the fortnightly cycles) and agree relevant mitigation and/or avoidance plans.

4.1.35. In addition to our formal meeting cycle we will encourage a culture of collaboration, with frequent dialogue between project team members, subject to any constraints/restrictions agreed during the inception meeting.

4.1.36. We use a suite of Project Management Office tools to support us in the management of our projects. The suite includes planning, tracking, and progress management; risk, assumption, issue & dependency management; and stakeholder and

communications management. These artefacts will be accessible by all project team members on a secure access-controlled share point site, enabling seamless collaboration and joint working by our respective teams.

4.1.37. All Project Managers must use CPCA's SharePoint to save down all documentation. The Project Manager will create a standard filing structure within SharePoint, to ensure consistency across all directorates. Project Managers are ultimately responsible for ensuring these folders are correctly populated in readiness for any audits or monitoring requirements. Through the SharePoint, Project Managers can set up a shared space with externals to share documentation.

4.2 Stakeholder Engagement Plan

Key stakeholders

4.1.38. The CPCA project team has undertaken significant stakeholder engagement to support the development of this project. This sub-section outlines the key stakeholders and describes the engagement with these key approvers and influencers. (A description of the market engagement that has been conducted to garner insights and generate interest in the project has been provided in sub-section 1.1 of the Strategic Case.)

Stakeholders

Stakeholder	Stakeholder description	Interest
Cambridgeshire County Council	Cambridgeshire County Council is a supporting partner which owns and operates the five Park & Ride sites. We are working closely with Cambridgeshire County Council which all parties recognise is a vital opportunity for the city and county.	Cambridgeshire County Council run and operate the Park and Ride sites at which the bus services will call, and already has a Lease Agreement in place with the Park and Ride Service Operator. Cambridgeshire County Council will own and be involved in the installation of Plug-in Opportunity Charge Points in the Babraham Road Park and Ride site, and will add access, usage, and cost recovery (e.g. energy and maintenance) clauses for these assets in its Lease Agreement.

Stakeholder	Stakeholder description	Interest
Greater Cambridge Partnership	The Greater Cambridge Partnership (GCP) is a supporting partner and has established plans to invest in opportunity charging in the region.	GCP is developing various concepts for public transport within their City Deal and, as part of this, Cambridgeshire County Council and GCP have upgraded the Babraham Park & Ride site to incorporate a Solar Farm which will supply green electricity to cars parked at the site and buses using the opportunity charging infrastructure.
City of Cambridge Council	The Council is accountable to the constituents of the Cambridge area and for the services provided in the region and for the air quality.	City of Cambridge Council must tackle their air quality issues and is supportive of this project to support in that objective as confirmed by its leader at the CPCA Board on 28 July 2021.
South Cambridgeshire District Council	District Council accountable to the constituents of the South Cambridgeshire area and for the services provided in the region and for the air quality.	A small number of stops on the Park and Ride routes, including the Babraham Park and Ride site, are within the South Cambridgeshire District Area. The District Council will be engaged to secure support and endorsement for the scheme.
Passengers	The individual customers using the bus service in the Cambridgeshire region.	The passengers will have a vested interest in the quality, affordability and ease of use of the bus service and whether it coincides with their needs, which will determine their demand for the service.
Project Team (Section 3 in the Management Case)	The team delivering and operating the 30 e-buses and charging infrastructure and ensuring scheme objectives can be met and monitored.	The project team will be responsible for organising each aspect of the scheme to ensure the delivery of the 30 e-buses and their operation of the Cambridgeshire bus routes.
Charging Infrastructure Providers (CIP)	The charging infrastructure providers will provide the charge point equipment to the park and ride site and the bus depot	The charging infrastructure providers will install the charge point technology in the charge sites chosen.

Stakeholder	Stakeholder description	Interest
Power Infrastructure Providers (PIP)	The power infrastructure providers will provide the power upgrade to the charging sites, including any local storage solutions	The infrastructure partner will install and upgrade the power capability and solutions into the charge site regions if funding is awarded.
Operator Partner	The operator partner is in charge of procuring and operating the electric buses as well as the majority of charging infrastructure proposed in this business case.	The operator partner is reliant upon this funding to purchase and operate the buses, as well as upgrade its depot to enable sufficient charging capacity.
Local Transport Forums	This group refers to any NGO, association or interest group which represents the interest of local residents with respect to transport.	Local transport forums, such as the Local Liaison Forum, although the expression of local opinions on the ZEBRA scheme and give initial feedback on its application by local constituents.
Traffic Commissioner	Traffic Commissioners are responsible for the licensing and regulation of those who operate heavy goods vehicles, buses and coaches, and the registration of local bus services. They are assisted in this work by deputy Traffic Commissioners, who preside over a number of public inquiries.	The local Traffic commissioner will ensure the scheme complies with Service Standards such as Public Service Vehicle Accessibility Regulations (PSVAR), and does not disrupt other road users when it is implemented.
DfT	Founder and executive agent of HM government with regard to ZEBRA funding and the inter-linkage of the ZEBRA scheme wider transport network across the region.	DfT will look to ensure alignment with wider policy objectives: National Bus Strategy, Transport Decarb Plan, as well as other transport links and strategies in the region.
Civil Society Groups	Non-State, not-for-profit, voluntary entities and represent a wide range of interests and ties. They can include community-based organizations as well as non-governmental organizations (NGOs).	Civil Society Organisations (CSO's) have wide ranging interests but are based around improving the community welfare and will have a focus in this scenario around decarbonisation.

4.1.39. The list of stakeholders that the CPCA team has engaged during the early stages of the business case is contained in the Appendix.

DARCI Accountability Grid

4.1.40. The following table outlines the stakeholder groups and their roles within the roll out of the different project aspects to the deployment and operation of the CPCA electric bus scheme.

Projects	Direct Organisation responsible for specifying the deliverables	Accountable Organisation fully accountable for making the key deliverables happen.	Responsible Organisation with responsibility for delivery	Consulted Those from whom input will be solicited.	Informed Those to be kept apprised of relevant developments.
Purchase and deploy of 30 e-buses	CPCA	CPCA / Bus operator	Operator Partner	CCC / GCP / City of Cambridge Council / CIP / PIP	CCC / GCP / City of Cambridge Council / CIP / PIP / Passengers / DfT
Operate the e-bus service	CPCA	Operator Partner	Operator Partner	CCC / GCP / City of Cambridge Council / CIP / PIP / Traffic comm-issioner	Passengers / Local Transport Forums / DfT
Decide e-bus routes	CPCA	CPCA	CPCA	Passengers / CCC / GCP / City of Cambridge Council / Local Transport Forums	Passengers / Local Transport Forums / DfT / Traffic commissioner
Install charging infra-structure within the Operator Partner's Depot	Operator Partner	Operator Partner	CIP Operator Partner	PIPs	DfT

Projects	Direct Organisation responsible for specifying the deliverables	Accountable Organisation fully accountable for making the key deliverables happen.	Responsible Organisation with responsibility for delivery	Consulted Those from whom input will be solicited.	Informed Those to be kept apprised of relevant developments.
Install charging infra-structure at the Babraham P&R site	CPCA	CCC	CIP / Operator Partner	CCC / City of Cambridge Council (re. Planning) / PIPs	Park and ride users / Road users / DfT
Upgrade power capacity for the Operator Partner's depot	Operator Partner	Operator Partner	PIPs Operator Partner	CCC / City of Cambridge Council (re. Planning)	DfT
Upgrade power capacity at the Babraham P&R	CPCA	CCC	PIPs / Operator Partner	CCC / City of Cambridge Council (re. Planning)	Park and ride users / Road users / DfT
Monitor & evaluate scheme benefits and outcomes	CPCA	CPCA	Project team / M&E specialist	Local transport forums / passengers / CCC / City of Cambridge Council	DfT / Members of public

Stakeholder engagement strategy

4.1.41. A detailed strategy for stakeholder engagement has been developed for CPCA's ZEBRA funding scheme and has been split into two forms 1) the delivery of the ZEBRA funding Scheme; and 2) Ongoing Management of the ZEBRA funding scheme, both involving the following steps:

- The compilation of a consolidated list of stakeholder's key to the delivery of the project. Stakeholders will be given a DARCI status, as set out above.

- Key messages are to be developed for engagement for each category of stakeholders.

- Public Announcement and Consultation when the scheme goes live – especially to fulfil the Equalities Impact Assessment.

4.1.42. Engagement with the stakeholders will involve two steps – the initial briefing / kick off meeting about the project aimed at gauging interest and capturing concerns, and further consultations and communications, aimed at capturing requirements and providing feedback every month in the Project Board Meeting.

4.1.43. Responses from stakeholders will be documented in a detailed table with the following fields – interest in the project, neutral vs. supportive vs. against, and issues raised. Based on this, for each stakeholder, an influence vs. interest mapping will be conducted.

Stakeholder management plan (meetings in place etc)

4.1.44. Stakeholder management will differ between the Delivery and Operational phases of the Scheme.

4.1.45. During “Delivery” management will adopt the process as illustrated in the figure below and described in more detail in sub-section 3 - Governance. This is depicted on the figures below:

- Quarterly Project Steering Committee Meetings

- Fortnightly Project Board Meetings

- Quarterly reporting by the Project to the DfT

- Public announcements at the initiation of ZEBRA and deployment of the service

4.1.46. During “Operations” stakeholder engagement will adopt the process as illustrated in the next figure:

- Monthly Monitoring Director Meetings: Monthly highlight reports are completed by project managers on all live projects and provide updates on the performance of projects. These reports are reviewed by directors at their monthly Director meetings

- Yearly review by the Monitoring and Evaluation Team: A yearly review will be undertaken by the Monitoring and Evaluation team to measure scheme progress against the key deliverables and ZEBRA objectives. Suitable metrics will be used (outlined in sub-Section (data collection in M&E section)) and compiled within the Annual Combined Authority Report shared with DfT

- Public announcements at the deployment of the service

Methods of Public Announcement

4.1.47. CPCA will engage in a variety of communication tools, technologies and applications for engaging with stakeholders and customers. Methods of engagement are listed below:

- Mass emails

- Social media (paid and organic)

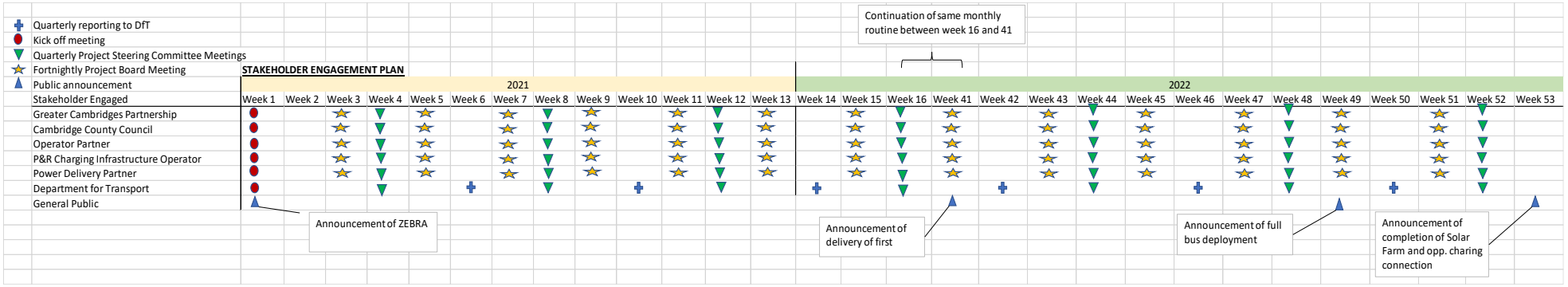
- Parish and district council newsletters
- Surveys and reporting
- We will also use consultation software including virtual exhibitions and pinpoint style consultation as needed.

4.1.48. The methods of engagement will be used to communicate strategy to the public through communications outlining the new Green bus service provided by the ZEBRA funding and also to further promote the park and ride schemes that run in and around Cambridge. We will use this platform to advertise the active travel to the park and ride schemes to further enhance the Green benefits felt in the region and encourage the uptake of cycle schemes with bike drop off at the park and ride sites.

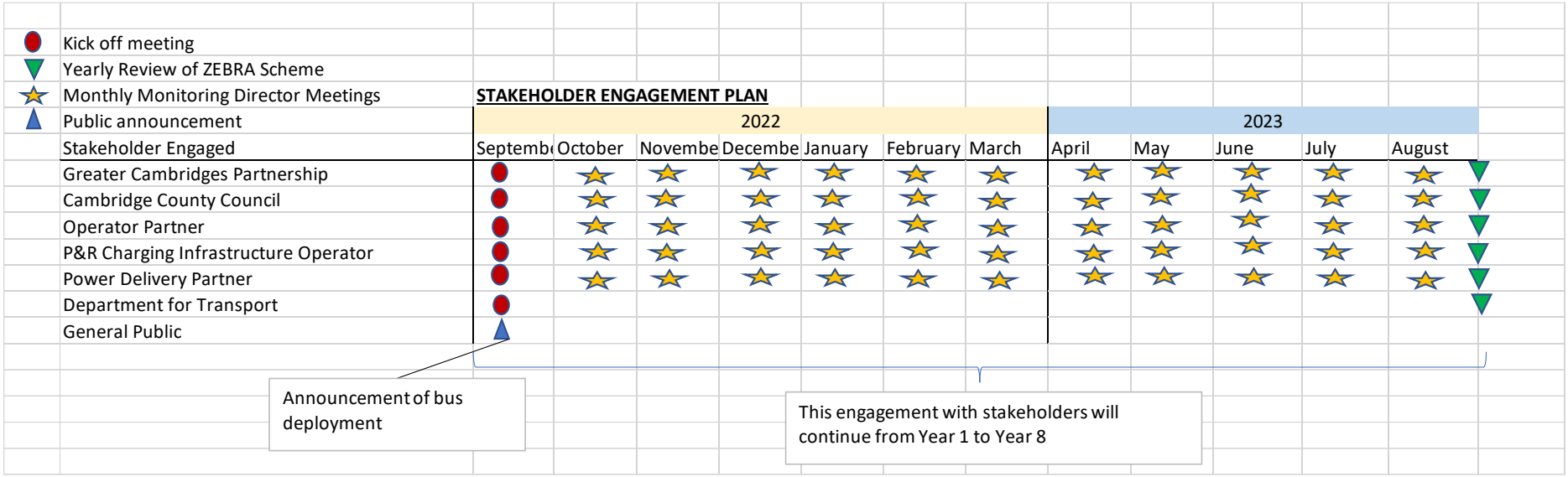
4.1.49. An initial wide-scale communication will be dispersed to the local community to indicate the implementation of a Green public transport service and quarterly updates will then be administered to update the public, but also all major key stakeholders on the progress of the ZEBRA scheme toward the key deliverables and objectives.

4.1.50. These communication channels will be utilised to inform, but also gain feedback on the services provided and insights into implementation of the new e-buses on bus routes and their overall impact on society from key stakeholder groups, such as passengers with impairment characteristics and those who utilise park and ride sites, to gain insights into any disruptions caused by the incidence of e-buses.

CPCA Delivery Stakeholder Management Plan



CPCA Operations Stakeholder Management Plan



4.3 Risk Management

Risk management techniques

4.3.1 CPCA's Risk Management Strategy establishes how project risks should be identified, treated, mitigated, and escalated. Everyone is responsible for identifying risks.

4.3.1.1 CPCA recognises the need for risk management to feature in our strategic, operational planning and decision-making governances. CPCA is committed to managing and minimising risk by identifying, analysing, evaluating, and treating risks that may impact the future success of the organisation.

4.3.2 The approach is based on: thinking logically; identifying key risks and what to do about each risk; deciding who is responsible and accountable for the risk; recording the risks and changes in risk exposure; monitoring the risks and learning from events.

4.3.3 The core principles of the Risk Management Strategy are:

- Integral part of all CPCA processes.
- Part of decision making.
- Explicitly addresses uncertainty.
- Based on the best available information.
- Tailored approach.
- Takes human and cultural factors into account.
- Transparent and inclusive.
- Dynamic, iterative, and responsive to change.
- Facilitates continual improvement of CPCA.

4.3.4 These principles will be achieved by:

- Establishing clear roles, responsibilities and reporting lines within CPCA for risk management;
- Following the Risk Management Methodology;
- Effective communication with all CPCA employees;
- Monitoring progress in implementing the strategy and reviewing the risk management arrangements on an on-going basis.

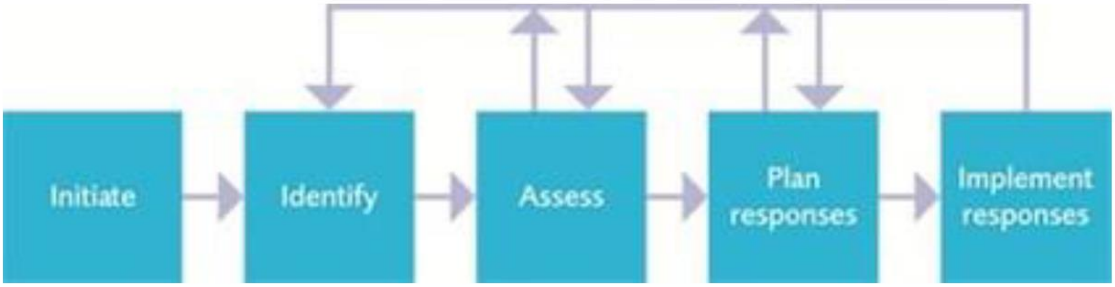
Risk roles and responsibilities to be appointed at the scheme level

4.3.5 The following key roles will be assigned to individuals within the Project Team to ensure that each action is accounted for and there is an individual responsible for each area of contention in the delivery of the scheme.

Role	Responsibility / Action	Individual
Corporate Risk Owner	- Authorises the risk and issue management strategy and its adjustment, improvement and enforcement - Ownership of strategic / corporate risks and issues, ensuring mitigation actions are dealt with at the appropriate senior level. - In charge of monitoring the strategy / corporate risk register. - Define clear rules for escalation and promotion. - Deploys a consistent language of risk management across the corporate, portfolio, programme and its projects.	Rowland Potter
Portfolio Director	- Ownership of portfolio-level risk and issues. - Assures portfolio adherence to the risk management principles - Define clear rules for escalation and promotion. - Deploys a consistent language of risk management across the portfolio, programme and its projects. - Escalates items across the programme boundaries to Corporate Risk Owner for resolution where necessary. - Communicates the progress of the resolution of issues in a clear and timely fashion across the portfolio. - Coordinates risk and issue management interfaces with programmes. - Provides support and advice on risks and issues to programmes. - Allocates risk and issues as appropriate.	Mehmet Ahmet
Project Risk Owner	- Ownership of project-level risk and issues. - Assures the project adherence to the risk management principles. - Deploys a consistent language of risk management across the projects. - Escalates items across the programme boundaries to Programme Risk Owner for resolution where necessary. - Communicates the progress of the resolution of issues in a clear and timely fashion across the project. - Allocates risk and issues as appropriate.	Oliver Howarth

Risk Management Methodology

4.3.6 There are 5 key stages in the risk management cycle, Initiate, Identify, Assess, Plan, and Implement (IIAPI) as illustrated in the diagram below:



4.3.7 The 5 stages of risk management are part of a cycle. Risk management is dynamic and so the identification phase needs to be carried out continuously. As the process is repeated throughout the project/programme/portfolio lifecycle, the assessment or response planning can lead to the identification of further risks and planning and implementing responses can trigger a need for further analysis and so on.

4.3.8 A key output from the initiation step is the risk management plan, which details how risk will be managed throughout the life cycle.

4.3.9 An individual risk is defined as “either a threat (i.e. uncertain event that could have a negative impact on objectives or benefits) or an opportunity (i.e. an uncertain event that could have a favourable impact on objectives or benefits)”

1. Initiate

4.3.10 The main output for the initiation phase is the Risk Management Strategy. This describes the key elements on how risk management will be implemented:

- Scope
- Objectives
- Roles and Responsibilities
- Process
- Tools

2. Risk identification

4.3.11 Risk identification starts with uncertain events being articulated as threats and opportunities. To help identify whether an uncertain event is a project, programme, portfolio or corporate risk, definition for these risk groups can be found below:

- Project – has a specific impact on a single project only.
- Programme – has common attributes across multiple projects (within an interdependent group of projects) and may affect the delivery of those associated projects.

- Portfolio – distinct directorial area, made up of a collection of individual projects and programmes that are not necessarily interdependent of each other e.g. Business & Skills, Housing, Transport & Strategy.
- Corporate – refers to the liabilities and opportunities that positively or negatively impact CPCA as an organisation.

4.3.12 Identification techniques draw on various sources of information. Identification of risks from previous projects, programmes and portfolios involves looking at lessons learned reports and risk registers.

4.3.13 The aim of the risk identification process is to generate a comprehensive list of risks, with relevant and up to date information important in identifying these risks. A variety of risk identification processes may be used as exemplified in the table below.

3. Risk Assessment

4.3.14 The assessment of risk can be broken down into how likely it is that a risk might become an issue, and what impact that issue would have. These are defined as likelihood and impact:

- The probability of an event occurring and when they might happen – likelihood.
- The potential severity of the consequences (positive and negative) should such an event occur – impact.

4.3.15 The following table below provides likelihood and impact descriptors to assist with this process:

4.3.16 Likelihood vs Impact definitions

Likelihood	
1	Rare – This event may occur but only in exceptional circumstances (0-5%)
2	Unlikely – Not likely to not occur under normal circumstances (6-20%)
3	Moderate - Given time likely to occur (21-50%)
4	Likely – The event will probably occur in most circumstances (51-80%)
5	Almost Certain – This event is expected to occur soon (81-99%)

Impact	
1	Negligible – Risks may have minimal damage / gain or long-term effect
2	Marginal – Risks may have minor loss / gain but little overall effect
3	Significant – Risks may have considerable loss / gain.
4	Major – Risks may have significant loss / gain.
5	Monumental – Risks may have extensive loss / gain and long-term effect.

4.3.17 Once every risk has been given a score for its likelihood x Impact, it is given an overall score and corresponding RAG status (Red Amber Green Rating).

4.3.18 Overall RAG Status:

Overall RAG Status		Impact				
		1	2	3	4	5
Likelihood		Negligible	Marginal	Significant	Major	Monumental
5	Almost Certain	5	10	15	20	25
4	Likely	4	8	12	16	20
3	Moderate	3	6	9	12	15
2	Unlikely	2	4	6	8	10
1	Rare	1	2	3	4	5

4.3.19 The RAG rating is an indictor to determine the severity of a risk. Priority will be given according to the RAG Status:

- Red – Require immediate action plans
- Amber – Require action plans and / or to be closely monitored as appropriate.
- Green – Can be "Accepted" and may not require action plans.

4. Mitigation and Control

4.3.20 Having prioritised the risk, potential responses will be developed for the higher risk events by:

a) Determining what can be done to reduce the probability of the risk occurring (therefore, reducing its likelihood).

b) Determining a plan and set aside contingencies to deal with if it does become realised (therefore, reducing its impact).

5. Implement Risk Reponses

4.3.21 The primary goal of the implement element is to ensure that the planned risk management (mitigation and control) actions are monitored as to their effectiveness and corrective action is taken where responses do not match expectation.

4.3.22 We will identify an individual as the risk owner, and another individual is identified as the rick actioner. The key roles are:

- **Risk Owner** – Responsible for the management and control of all aspects of risk assigned to them, including managing, tracking and reporting the implementation of the selected actions to address the threats or to maximise the opportunities.
- **Risk Actioner** – Responsible for the implementation of risk response actions. They support and take direction from the risk owner.

4.3.23 Once these individuals have been assigned it is their responsibility to track, manage and disseminate any updates with the project manager and ensure that escalation occurs when necessary.

4.4 Risk register

4.4.1 As discussed in the Commercial Case, the primary tool for risk management will be the risk register. The risks of the ZEBRA Funding Scheme will be managed across five headings:

- Cost risk
- Schedule risk
- Commercial risk
- Regulatory risk
- Technology/performance risk

4.4.2 These risks will be managed by the CPCA Project team led by the Director of Delivery and Strategy. The risk management covers the delivery and ongoing management of bus deployment, infrastructure construction and route operation activities as defined in this business case. The Project Managers will be responsible for:

i. Maintaining a risk register for their respective workstreams

ii. Consolidating the project-specific risks

iii. Presenting an updated risk register to the Steering Group on a monthly basis

iv. Planning and undertaking necessary actions to mitigate risks identified and escalating to Project Leads and Sponsors, where necessary

v. Maintaining the project-level risk register as a working document to be shared at monthly review meetings with stakeholders

4.4.3 The Risk Register provides the formal control model for risk management, with RAG coding for each risk identified. These are reviewed monthly, and changes of colour (R/A/G) have to be escalated and signed off by the Director of Delivery and Strategy.

RAG Definitions

Traffic light	RAG status definition	Action
Red	Red RAG status: • Without action, successful delivery is highly unlikely; • Directors need to investigate the potential problems; • Management action is needed immediately.	The issue should be escalated immediately to the responsible Combined Authority Director. Relevant actions to be carried out accordingly, or an action / mitigation plan identified.
	Red can indicate one or more of the following: 1) Significant overspend on budget with no clear means of retrieving the overspend; 2) Critical delays with no current means of time retrieval; 3) Decreased quality, with knock on effect for benefit realisation;	

	4) Project team does not have the resources or capacity to address issues; 5) Exceptional risk or a group of risks that are becoming issues.	
Amber	Amber RAG status: • Without action, successful delivery is in doubt; • Management action is needed; • The Senior Management team needs to assure itself that remedial action is being taken.	The Programme Manager (and Project Board where relevant) should be alerted. Relevant actions to be carried out accordingly, or an action / mitigation plan identified.
	Amber can indicate one or more of the following: 1) Committed/actual spend to date exceeds the budget/projected annual spend; 2) Time delays, but not very significant; 3) Quality affected, but won't affect tolerances or outputs; 4) Any problems can be fixed by the project manager; 5) Risks are highly likely to become an issue but can be retrieved with the correct mitigation.	
Green	Green RAG status: • Successful delivery has a high level of confidence; • Project Manager can proceed with the project plan as currently agreed.	No action needed beyond continuing active project management
	Green can indicate the following: 1) The budget is on track and may come in under budget; 2) The project will complete on time or ahead of schedule; 3) The quality comes in at the expected levels, or better; 4) The resources are suitable; 5) There are no risks that are likely to become issues which would cause overspend, delay, or otherwise put the project in jeopardy.	

4.4.4 The following table demonstrates the project-level risk registers for CPCA's ZEBRA scheme using the RAG rating above and providing a likelihood and severity rating.

Risk categories	Description of risks	Monitoring measures	Management/Mitigation of Risks	Risk manager/ mitigator	Likelihood	Severity	Risk score	RAG status
Cost Risk	Uncertainty around the cost of power connection	Continual communication with a range of power suppliers to ensure best price	A thorough consultation with UKPN has been undertaken to estimate the cost accurately. There are, however, assumptions in UKPN's quotation, which will be accounted for in our contingency calculations.	Operator	2	2	4	
	Uncertainty around the cost of installation and commissioning of local storage and charging infrastructure	Continual communication with a range of charging infrastructure suppliers to ensure best price	Contingency for the scheme costs will factor in a reasonable upper bound for installation and commissioning of local storage and charging infrastructure.	Operator	3	2	6	
	A rise in the cost of ZEB	CPCA/operator will keep in constant contact with a number of bus manufacturers	CPCA has consulted with a number of bus operators who have provided a range of quotes that are all competitive with a guarantee of competitive pricing when we choose our specified manufacturer through a competitive process.	Operator	2	2	4	

Risk categories	Description of risks	Monitoring measures	Management/Mitigation of Risks	Risk manager/ mitigator	Likelihood	Severity	Risk score	RAG status
Schedule Risk	Timeliness of delivery for electric buses	Initial discussions have been had, continue to keep in contact with bus operators and manufacturers to manage expectations	A grace period and exit clause will be included in the purchase agreement in the event of a late delivery.	Operator	4	3	12	
	Timeliness of delivery for charging infrastructure	Continual contact with infrastructure operators	A grace period and clause that will require the supplier to bear any additional cost incurred due to late delivery. [redacted]. has committed to a three-day delivery commencement period for the grid connection upgrade if we progress the scheme instead of normal 90 day period	Operator	3	2	6	

Risk categories	Description of risks	Monitoring measures	Management/Mitigation of Risks	Risk manager/ mitigator	Likelihood	Severity	Risk score	RAG status
Commercial Risk	Assumption on patronage level	Monitor COVID-19 impact and uptake of bus patronage as COVID restrictions ease	The Operator Partner will be responsible for keeping a satisfactory patronage level either through fare adjustment or service improvement.	Operator	3	4	12	
	Changes in ownership of depot/park-and-ride site	Stakeholder weekly meetings to monitor any risk	CPCA will agree with Cambridgeshire County Council on how the asset will be treated and valued in the event of a transaction.	CPCA	1	5	5	
	Operating cost of electric buses are significantly higher (e.g. maintenance and repairs) which affects fares	Research into market performance and ensure quality assurance of product	CPCA will work together with the operator to put in place robust financial checks to minimise the impact of unexpectedly higher operating cost on fares.	Operator	3	4	12	
	Uncertainty around residual value at the end of the terms of agreement	Track market evidence of residual values and build into agreement calculation	CPCA will determine how residual value should be derived as part of the grant award agreement process.	CPCA	4	3	12	

Risk categories	Description of risks	Monitoring measures	Management/Mitigation of Risks	Risk manager/ mitigator	Likelihood	Severity	Risk score	RAG status
Regulatory risk	Shift of regulatory regime from deregulated to enhanced partnership or franchising	Track regime shifts and ensure open communication with operators	CPCA will agree with the operators in advance, including the Operator Partner, on how different assets will be treated and valued in the event of a transaction.	CPCA	5	2	10	
Technology/ Performance Risk	Assumption on the life expectancy of batteries	Track market evidence and ensure quality assurance of product	This will be managed through the warranty period and transfer of knowledge from the manufacturer and Energy Services provider (if appointed by the Operator Partner) to the Operator Partner to support appropriate maintenance of the batteries.	Manufacturer	2	3	6	
	Assumption on driving range	Track evidence provided by the operator	This will be managed through the warranty period.	Manufacturer	2	3	6	

Risk categories	Description of risks	Monitoring measures	Management/Mitigation of Risks	Risk manager/ mitigator	Likelihood	Severity	Risk score	RAG status
	Assumption on reliability	Track evidence provided by the operator	This will be managed through the warranty period and transfer of knowledge from the manufacturer and Energy Services provider (if appointed by the Operator Partner) to the Operator Partner to support appropriate maintenance of the batteries.	Manufacturer	2	3	6	
	Assumption on charging speed	Track evidence provided by the operator	This will be managed through the warranty period and transfer of knowledge from the manufacturer and Energy Services provider (if appointed by the Operator Partner) to the Operator Partner to support appropriate maintenance of the batteries.	Infrastructure provider	2	3	6	

4.4.5 The process is managed by the Project Managers and will form part of the evidence for the ZEBRA funding management and are included as part of the stakeholder review meetings.

Dependencies

4.4.6 Consideration has also been given to the dependencies outside the control of the project and any existing issues that may affect the project's future success. These dependencies have been split into external and internal and have been outlined below:

External

Dependency	Issue	Reasoning	Impact
Increase in bus patronage levels	Drastic reduction in passenger numbers	COVID-19 reduced overall use of public transport due to cultural shifts in commute and health concerns	Reduce the income generated creating loss making service for operator, which then can't fulfil project objectives
Bus and infrastructure running costs and residual value remain as expected	Electric bus market still in infancy	Full life expectancy and residual values are not tried and tested on a large scale	Fares increase to maintain profitability. Operator makes a loss at the end of bus life.
Stable regulatory and policy environment	Change in government	Reduced governmental support leading to reduce public support	Fall in patronage and funding
Steady state in modal disruptors	New modal technology substitutes bus use	Creates a preferred substitute to bus transport i.e. [redacted]	Reduced demand for bus

Internal

Dependency	Issue	Reasoning	Impact
Resource availability	Lack of resource with relative skills required	Certain roles require individuals with niche experience and skill sets in order to deliver	Greater costs could be incurred, or milestones missed as time delays are incurred
RDEL budget availability to deliver M&E activities	Insufficient budgeted funds to deliver baseline M&E activity for to DfT standards	Funding provided by ZEBRA scheme is for Capital Expenditure only	Lack of sufficient M&E activity to track progress toward objectives
Collaborative working between delivery partners	Large number of stakeholder interests at play	Each party is looking to meet their own personal objectives which can lead to tensions arising	Strained relationships, not meeting objectives and ultimate failure of the scheme as a worst case scenario

4.4.7 The above issues have been noted and measures have been put in place, as can be seen in the risk register, to mitigate the impact of them to as high a degree as possible. These dependencies are to be treated as risks and have therefore been assigned a risk owner and will fall under our risk management methodology be continually monitored and managed.

4.4.8 However, there will be inherent risks when undertaking new technologies and policies that sit out with the control of the investing parties and have to be accepted in order to progress, and in this case, maintain the same service standards at a more beneficial impact to society.

Evidence of CPCA track record

4.4.9 The Cambridgeshire and Peterborough Devolution Deal was signed in 2017, which unlocked Investment Funding of £20m per year for 30 years, subject to 5-yearly Gateway Reviews. In March 2021, the Combined Authority completed its first Gateway Review with central government and were notified on 15 July 2021 that this had been successfully passed, unlocking the next 5-year tranche of Investment Funds. This review process has shown that the Combined Authority are successfully delivering projects and demonstrating positive outcomes to support greater investment opportunities and local priorities and boost the wider economic growth in the area. One example of a project being delivered using these funds is a new university in the city of Peterborough, which is set to open to the first cohort of students in September 2021.

4.4.10 CPCA has also recently successfully transferred Bus Operations from Peterborough City Council and Cambridgeshire County Council into a central delivery point within the CPCA.

4.4.11 As part of the Devolution Deal, the Combined Authority has also been given responsibility for certain devolved powers, such as the delivery of the Adult Education Budget within the region, and have also taken on responsibility for a multi-year, consolidated and, devolved transport budget.

4.4.12 The Combined Authority's Assurance Framework and Monitoring and Evaluation Framework sets out the governance of how projects should be delivered and ensure that projects are delivered effectively and in line with Government guidance. These frameworks are signed off by the Combined Authority Board, and central government.

GDPR and data management

4.4.13 The Cambridgeshire and Peterborough Combined Authority is a controller for the purposes of the Data Protection Act 2018. We collect, process and store a wide range of information, including personal information to deliver our services efficiently.

4.4.14 We are responsible for managing the information that we hold and we recognise that this information is important to the parties that it involves. We take our responsibilities seriously and use personal information fairly, correctly and safely in line with the UK's data protection laws.

4.4.15 Anyone who receives information from us is also under a legal obligation to do the same and will have a set of data protection clauses included in any contract with us.

4.4.16 Where we need to share sensitive or confidential information, we will do so only with the respective parties' consent, or where we are legally able to do so.

4.4.17 We will use personal and gathered information for a limited number of purposes and always in line with our responsibilities, where there are reasonable wishes of the parties involved, where there is a legal basis to use personal information and in relation to the parties rights.

4.4.18 We process personal information:

- For the purpose for which the information is provided, for example services we have provided in relation to transport, public service reform, business & skills and housing.
- To enable us to communicate with individuals and for the provision of services.
- To monitor our performance in providing services to the community, to gather statistical information to allow us to plan future provision of services to and to obtain opinions about our services.
- To meet various legal requirements.
- For the prevention and/or detection of crime.
- To process financial transactions including grants and payments directly involving us or where we are acting on behalf of other government bodies.
- For general processing where we have been given consent do so.
- Where it is permitted under the Data Protection Act, for example, to comply with legal obligations, or for us to seek legal advice or undertake legal proceedings.
- For marketing purposes to keep the designated party updated on the latest news and services.

4.4.19 We manage our records to help us provide a service. The retention periods we will hold records are determined based on the type of record, the nature of the activity, product or service. We will not retain records for any longer than necessary, or as required by law and when we dispose of personal information, we will do so in a secure way.

4.4.20 We will not share information with anyone outside of the Cambridgeshire and Peterborough Combined Authority except:

a. Where we have permission of the parties involved.
b. Where required for the service being providing.
c. Where we are required by law and by law enforcement agencies, judicial bodies, government, tax authorities or other regulatory bodies.
d. With third parties, external partners, and agencies assisting us in delivering our service to the relevant party.
e. With external partners to improve, and advance, the service we provide.

4.4.21 Information will only be shared where it is necessary, and permitted under the Data Protection Act. Any information shared will be proportionate and limited only to what is necessary.

4.4.22 The Cambridgeshire and Peterborough Combined Authority will ensure that the third party, external partner, or agency have sufficient systems and procedures in place to prevent the loss or misuse of personal information. Sharing will only take place under strict contractual agreements and/or sharing agreements.

4.4.23 **Transferring information overseas:** If personal information is transferred outside the European Economic Area (EEA) for processing or storage purposes the Cambridgeshire and Peterborough Combined Authority will ensure that safeguards are in place to protect it to the same standard we apply. We will ensure that any transfer only takes place if:

a) The European Commission has decided that the country or the organisation we are sharing information with will protect information adequately.

b) The transfer has been authorised by the relevant data protection authority, and/or

c) We have entered into a contract with the organisation with which we are sharing (on terms approved by the European Commission), to ensure information is adequately protected.

4.4.24 **Communications about our service:** We will contact relevant parties with information relevant to ZEBRA Scheme. By a variety of means including via email, text message, post and/or telephone. We may monitor or record calls, emails, text messages, or other communications in accordance with applicable laws.

4.4.25 **Prevention and detection of fraud:** The Cambridgeshire and Peterborough Combined Authority is required by law to protect the public funds it administers. Therefore, we may use any of the information provided to us for the prevention and detection of fraud, or to comply with the law. As well as conducting our own 'data matching' exercise, we may also share information with other public bodies. These include (but are not limited to):

- The Audit Commission
- Other Local Authorities
- Her Majesty's Revenue & Customs
- The Police
- Other bodies responsible for auditing or administration of public funds.

4.4.26 We may also share information with service providers or contractors and partner organisations, where the sharing of information is necessary, proportionate and lawful.

4.4.27 **Changes to the way we use information:** If we change the way we use information, and we believe parties may not reasonably expect such a change we will notify them and will allow a period of time to raise any objections before the change is made.

5. Monitoring and Evaluation

5.1 Overview

5.1.1 CPCA uses monitoring and evaluation to collect evidence about the effectiveness of its interventions in achieving their intended outcomes. This activity informs the development of our ongoing interventions, and the options appraisal and planning for new initiatives. It looks to identify what works, what doesn't work and why.

5.1.2 The Combined Authority's approach to monitoring and evaluation (M&E) is governed by our assurance framework and annually refreshed M&E framework that (under the terms of the devolution deal) is shared with government and DfT for approval each year, with any suggested changes signed off by the Board before being reflected in the framework.

5.1.3 The M&E framework has a tiered approach to monitoring and evaluation; this project would be classified as tier B as the project is funded through other streams and identified as being 'key' in terms of the expected benefits to be achieved. Michael Soper, CPCA's lead for M&E, will be assigned accountability for M&E for this investment.

5.1.4 The CPCA M&E lead will coordinate closely with the project level research contractor from the ZEBRA M&E team in order to share CPCA's findings and also confirm their commitment to the evaluation activities being performed by the ZEBRA team and provide the required data when requested.

5.1.5 CPCA's approach to Monitoring and Evaluation follows the Green Book Guidance on Appraisal and Evaluation and uses the Magenta Book definition of monitoring and impact evaluation:

- **Monitoring:** Seeks to check progress against planned targets, formal reporting and evidencing that spend and outputs are successfully delivered, and milestones met.
- **Evaluation:** The assessment of effectiveness and efficiency during and after policy/intervention implementation. It seeks to measure outcomes and impacts to assess whether anticipated benefits are realised.

5.1.6 The M&E team will use impact evaluation techniques to provide an objective test of what changes have occurred in the region, and the extent to which these can be attributed to the ZEBRA scheme by utilising the data being collected.

5.1.7 This evaluation will look to elicit key findings using the below criteria to ensure that the scheme objectives are progressing and on course to be met:

- the scale of investment/potential impact
- contribution to future strategic planning
- delivering statutory obligations
- degree of risk
- contribution to the evidence base/future learnings

5.1.8 The objectives of the ZEBRA scheme as outlined in the Strategic Case and Logic Model are:

1) Improving air quality
2) Supporting the levelling up and COVID-19 recovery agenda through sustainable economic growth

3) Supporting the development of skills required for zero carbon economy
4) Delivering a world-class public transport to improve users' journey and reduce reliance on cars

5.1.9 Our M&E team will use the criteria stated above to identify the impact of the ZEBRA scheme and measure its progress toward the above objectives, whilst also ensuring it does so in a sustainable and compliant manner. By starting our monitoring from the outset of the scheme, we can establish the baseline data, performance metrics and points of comparison that will enable us to understand a programme's impact into the long term.

5.1.10 There is a reliance upon delivery and ongoing management partners to collect and share a number of the data points needed for analysis and evaluation purposes, either in excel or report format. This will then be saved in data lakes and repositories, or within a specified SharePoint set up for the ZEBRA Scheme. Data lakes, repositories, and the SharePoint will also be used to store the information gathered by the CPCA through IoT devices installed across the region and other monitoring technologies that will feed our servers and consolidated by the M&E team.

5.1.11 This data will be stored, and analysis undertaken to consolidate and gain informative findings against key metrics and objectives. The analysis undertaken by the M&E team internally, through modelling tools already in operation, but also manual calculations will be compared against pre-implementation data sets to identify trends and track progress against the data sets in question.

5.1.12 All data consolidation and analysis will be undertaken on a monthly basis to ensure CPCA have early sight of growing trends and themes and will then be incorporated into a quarterly report, with data evidence, and shared with the DfT. This report will be produced by the Monitoring and Evaluation team and shared through a set-up shared space within CPCA's SharePoint for collaboration with the DfT.

5.1.13 CPCA is also commissioning a Model Data Environment in order to provide a fixed repository for data of the sort that will be gathered as part of the M&E on the Zebra Bus scheme. This is planned to incorporate timetable, public transport travel time and ticket data and will be used to uncover travel patterns, assess impacts of different variables within the operating environment, develop and test new strategies and support Local Plan work. This will also provide a basis for data collection, which can then be leveraged for ZEBRA impact analysis and monitoring. This is currently out for tender with an expectation that it will be implemented later this year.

5.1.14 An independent and external monitoring and evaluation contractor or university will be commissioned after Year 2 and Year 6 to undertake an interim evaluation and final evaluation to ensure that the findings from the internal M&E team are credible and representative of the conditions in the market and region. The CPCA Analysis and Evaluation Manager will oversee and manage the commission of this work, together with individual project managers, to ensure that it is of high quality and meets the needs / aims of the wider M&E framework agreed with government. Companies that have been commissioned in the past [redacted].

5.1.15 Assurances for the collection, consolidation and dissemination of the stipulated data sets by relevant delivery and ongoing management partners, will be written into each area of the contract during negotiations, and the granting of contracts by CPCA will be contingent on their agreement to these conditions. Partners will be liable to compensate the M&E team for missing data points without acceptable reasoning.

5.2 M&E governance

5.2.1 The Commercial, Economic and Financial cases has set out the project spend and output profile and will be used in conjunction with the monitoring arrangements (financial, benefits and risk) and analysis outlined in section 4 in the Management Case, section 1 of the Financial Case and section 2 in the Economic Case and to ensure that the ZEBRA scheme is reaching its stipulated objectives.

5.2.2 Quarterly highlight reports will be completed by project managers when the project is live and will provide updates on the performance, compared with the key deliverables and objectives. These reports will be reviewed by the Project Board at its quarterly meetings and by the Steering Committee every six months.

5.2.3 In addition, scheme-level M&E activity will be consolidated and shared with the Evaluation Contractor appointed by the Department and participate in project-level evaluation activities set out by the Evaluation Contractor.

5.2.4 The Board for the CPCA meets bi-monthly. As part of this framework there is a commitment for the board to receive a Performance Monitoring Report together with a more Strategic Overview of Performance against key metrics. The frequency of reporting will be kept under review and is dictated in part by the availability of metrics at a local level.

5.2.5 There will be an evaluation reporting timetable (with interim reporting where appropriate) to ensure the benefits of the investment decisions are understood and the lessons learnt are incorporated back into future policy work.

5.2.6 Any changes or variances to the project spend profiles, or key milestones, will be reported by the Project Manager and approved by the CPCA. On approval a variation letter to the Funding Agreement will be issued.

5.2.7 At present the outline M&E plan for zero emissions buses has three stages.

- **Stage one** will be a process evaluation looking at the implementation of the first 30 new buses (by September 2022) and carrying forward the learning into the next phase. Issues to be considered would largely be technical, organisational, and financial.
- **Stage two** will be an interim assessment on the progress toward achieving the desired outcomes for the project and is likely to focus on a detailed analysis of the impact on air-quality (with pre-implementation collected data compared to the base-line report).
- **Stage three** would be conducted up to six years after implementation and focus on the achievement of desired impacts including on public health.

5.2.8 The CPCA is committed to sharing it's learning from the evaluation with the Department of Transport and other local authorities and operators. It is expected that there will be considerably early interest in the stage one report as it will provide considerable learning around the implementation of a zero emission fleets. Stage two and three will be shared in line with the wider reporting arrangements for the devolution deal; we expect the findings to feature as part of our future gate-way government evaluation, demonstrating that the authority remains effective at delivering and securing future benefits.

5.3 Key roles

5.3.1 The overall responsibility for M&E (this framework and the execution of the activity associated with it) is held at director level at the CPCA within the post of Director of Delivery & Strategy and at an operational level with the Head of Evaluation and Performance Monitoring. The CPCA has agreed a contract with Cambridgeshire County Council (part of the wider Cambridgeshire Insight partnership) to provide an appropriate level of officer support for M&E including local knowledge, expertise and supporting capacity in order to undertake the work associated with the framework in the period leading up to and including the first 'Gateway' assessment for the Authority.

5.3.2 The CPCA funds a significant amount of delivery work from third parties from both the public and private sector. As part of their funding these agencies are expected to fully engage with the Monitoring and Evaluation framework. The CPCA may delegate the responsibility to conduct or commission appropriate M&E themselves and report findings back. The CPCA has also agreed a contract with Cambridgeshire County Council (part of the wider Cambridgeshire Insight partnership) to provide an appropriate level of officer support on Monitoring and Evaluation, including local knowledge, expertise and supporting capacity.

5.3.3 In addition, the Finance Director maintains a responsibility to regularly report on spend and to support the integration of this reporting with the wider M&E work. Specific responsibilities are outlined in the table below.

Role	Responsibility	Resource
Head of Transport	Setting the CPCA's strategic approach to Monitoring and Evaluation, including annual review and disseminating the evaluation conclusions.	Rowland Potter
Head of Evaluation and Performance Monitoring	Monitoring progress against Devolution Deal objectives and of the wider CPCA project of activity, including funded projects and programmes.	Michael Soper
Project Manager	Preparation of individual Monitoring and Evaluation Plans. Maintaining a repository of Monitoring and Evaluation data; extend and curate current evidence base.	TBD
Local Evaluation and monitoring team	Contractors undertaking individual evaluation.	TBD
CPCA Communications Manager	Dissemination of evaluation conclusions.	Emily Martin

5.4 Logic Model

5.4.1 A Logic Model for our M&E activities is shown in section 5.4.2.8.

5.4.2 The approach to benefits management and tracking will be as follows:

1) ZEBRA funding scheme objectives: initial objectives are specified in the strategic section of this business case.

2) Establishing the intended benefits and outcomes matrices for the ZEBRA scheme, and the baseline position: During the due diligence process, before the grant agreement, a workshop will be facilitated with the project delivery and ongoing management partners. In this workshop a detailed benefits tracker aligned to CPCA and DfT benefits realisation requirements will be shared. The tracker will define targets, baselines, the required evidence base, and reporting measures. These will be completed by the project delivery team, ongoing management team and the monitoring and evaluation team. The tracker will then be reviewed by the Steering Group and shared with the Project Delivery and Strategic Lead for sign-off.

The following principles will be adopted for determining and agreeing on the final benefits to be evaluated:

A. All benefits should be SMART – Smart, Measurable, Attainable, Relevant, Time-bound.
B. The benefits should be trackable through the life of the project.
C. Benefits should be specified, and metrics should be developed across four categories (detailed in the following benefits tracker table):
    a. Improving air quality
    b. Sustainable economic growth
    c. Development of skills required for zero carbon economy
    d. Delivering a world-class public transport to improve users' journey and reduce reliance on cars
D. Lessons learned from benefit tracking process should be captured and disseminated by the Marketing & Communications Manager.

3) Developing an action plan: Using the baseline as a starting point, CPCA will develop an action plan for the ZEBRA scheme and delivery team to adhere to. This will include milestone dates and target dates for achieving benefits and will assign a 'benefit owner' from the delivery team. The 'benefit owner' will input their respective plan for collecting information and monitoring benefits ahead of the kick-off of the project. The tracker will be 'owned' by the lead Project Manager of the ZEBRA scheme delivery team; and then will be passed to the lead Ongoing Management Project Manager, or the Monitoring and Evaluations Project Manager.

4)Collecting periodic updates from the project: The Accountable Officer of the SROs will provide monthly updates of the 1) the baseline business case; 2) the benefits assessment tracker plan; and 3) the benefits tracker to the Fortnightly Project Board Meetings. This will be examined by the Project Managers and then fed

upwards to the CPCA Director of Delivery and Strategy. The exact dates for submission by the Delivery team to the Quarterly Project Steering Committee Meetings is still yet to be decided.

5) Providing periodic updates to the Steering Committee: The Delivery Steering Committee will meet quarterly during the Delivery phase of the project (at least four times between award of the Scheme by the DfT and anticipated completion of delivery). Steering Committee briefing papers will be prepared by the Secretariat and issued one week in advance of the Steering Committee meetings. The exact dates for submission by the Delivery team to the Quarterly Project Steering Committee Meetings is still yet to be decided.

***6) Providing periodic updates to DfT*:** A quarterly report will be produced by the Monitoring and Evaluations team outlining:

1) the key objectives of the ZEBRA scheme;

2) benefits tracking against the objectives and milestones;

3) progress against all metrics in the ZEBRA guidance;

4) documented lessons learned; and

5) any risks in achieving objectives.

All quarterly reports will need to be signed off by the Project Board.

7) Capturing lessons learned and disseminating knowledge: The benefits tracker will contain two tabs related to lessons learned and knowledge dissemination. The former lists the lessons learned from the projects; the challenges that were faced; and how those challenges were resolved. The latter contains the planned approach for how the knowledge gained from these projects will be disseminated. These tabs will be completed by project teams, reviewed by the respective project managers, and fed into the periodic update process detailed in Steps 4, 5 and 6. In particular, learnings will be incorporated into the Phase 2 ZEBRA Business Case application and procurement and charging infrastructure construction processes to improve the approach of future projects (subject to change control). The structure of our initial lessons learned, and knowledge dissemination tracker is shown below.

Lessons learned	Knowledge dissemination or collaboration activity
- Lesson summary - Challenge (where appropriate) - Resolution (where appropriate) - Permission to share with wider public audience - Date – lesson recorded	- Number of delivery partners and collaborative partners - Number of publications to share impacts of the scheme to the public and authorities - Other communications activities - Number of skills obtained for zero carbon economy - Attraction and retention of qualified personnel to deliver scheme - Staff training (number of staff/spend)

	- Sharing of public transport improvements

8) Reassessing benefit targets iteratively: The benefit targets will be reassessed at various points, including after the due diligence of the ZEBRA scheme and throughout the development of the Fortnightly Project Board meetings, Quarterly Project Steering Committee Meetings, and Quarterly Reporting to the DfT, to ensure targets remain achievable, any risks are escalated and changes are signed off by the Project Board and cascaded to the Evaluations Controller at the DfT.

EVALUATION AND MONITORING FRAMEWORK LOGIC MODEL: ZEBRA SCHEME FUNDING

This Logic Model focuses outlines the scheme pre-implementation in July 2021 and will be revised when the impact and implications of COVID are better known

Policy Context

- Ambitious targets for reducing air pollution and in the area, as well as wider objectives, such as mode share shift in the area, increasing social mobility and delivering sustainable growth
- The local bus operators have no current commitments to new vehicle investments and given patronage levels have reduced by 50% of pre-COVID-19 levels, operators are not looking to commit to more than what a new diesel bus would cost
- Given the current critical air quality issues in the city of Cambridge now is the right time to be investing in the transition of our bus network to zero emission vehicles

Programme Objectives

- Improving air quality
- Supporting the levelling up and COVID-19 recovery agenda through sustainable economic growth
- Supporting the development of skills required for zero carbon economy
- Delivering a world-class public transport to improve users' journey and reduce reliance on cars

Programme Rationale

- Despite cleaner vehicles operating in the city of Cambridge air quality issues are at a critical point with buses being the highest contributor to emissions
- The Cambridgeshire and Peterborough Independent Economic Review (CPIER) identifies investment in transport infrastructure at the top short- and medium-term priority for the region to enable the delivery of sustainable economic growth
- Cambridgeshire is a leading global city for innovation and emerging technology and this fund can support the introduction of ZEBs to support the development of skills required for zero carbon economy and delivering an improved GVA in the region
- Delivering a world class public transport to improve users' journey and reduce reliance on cars

Delivery

Inputs

- £6.9m committed by the Operator partner to procure the buses
- £4.605m allocated from CPCA/GCP for the bus procurement, infrastructure upgrade and running costs
- £4.215m ZEBRA funding from DfT toward the bus procurement
- £1.031mCPCA/GCP for running and project management costs

Activities

- CPCA to research highest impact bus routes and create ZEBRA funding Business Case
- CPCA/CCC/GCP to liaise with stakeholders and delivery partners and facilitate infrastructure upgrade at P&R sites
- Operator partner to engage and agree procurement of buses and infrastructure upgrade for depot

Benefits

Outputs

- Deployment of 30 new electric buses on the 5 P&R bus service routes and the Citi2 route
- 2 charge stations constructed, one at the Operator bus depot and the other at Barbraham Road P&R
- Lessons learnt for the deployment of electric buses and erection of charging stations for future projects

Outcomes

- Reduce carbon emissions and improve air quality
- Reduce congestion levels
- Improve the quality and comfort of bus services in Cambridgeshire
- Potentially increase bus patronage levels through better, greener service
- Upskill the local community through infrastructure learnings

Impacts

- Improve air quality in the region, contributing to National carbon reduction targets and reduce emission related health problems
- Attract increased foreign direct investment as improved air quality
- Lower the levels of congestion in City of Cambridge
- Potential to create a centre of excellence for charging infra.

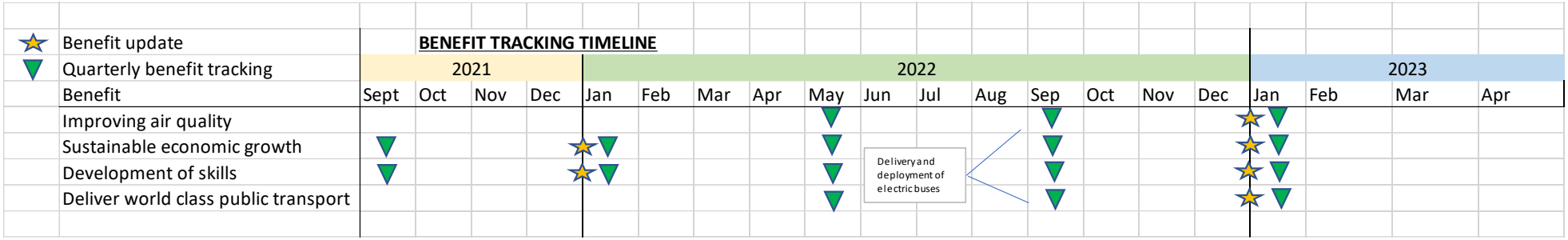
Underlying Assumptions

- Bus patronage levels return to similar levels pre-COVID
- Operator and Infrastructure partners can deliver and maintain services contractually obliged to
- Bus performance is as stipulated by manufacturers

Possible Metrics

- Patronage Levels
- Nitrous dioxide, micrograms per cubic metre
- Levels of particle matter (PM10 and PM2.5)
- Rate of congestion
- P&R utilisation rate
- Utilisation of charging facilities

Benefits tracking timeline



5.5 Data sources

5.5.1 The Combined Authority will establish a baseline for, and monitor progress, against a set of relevant indicators outlined by the ZEBRA scheme guidance and are provided below. These indicators will be shared by the CPCA with GCP, CCC and Project Delivery Partners to ensure all parties are informed on the metrics in question.

5.5.2 The CPCA M&E team will collect relevant information and data from delivery partners and suppliers; report on progress; monitor the progress of project impacts against key metrics; and share relevant information and data with stakeholders, including the Evaluation Contractor from the Department for Transport.

5.5.3 Details of the data sources that will be used to monitor and evaluate progress against the relevant outputs, outcomes, and impacts have been split under 4 different headers:

1. ZEBs and charging infrastructure outputs;
2. Scheme costs;
3. Data to inform analysis of carbon impacts; and
4. Bus service related data points

5.5.4 The below tables outline the data sets collected, the owner of data sets, the data source, collection methods and the frequency of collection.

1. ZEBs and charging infrastructure outputs

Data set	Owner	Data source	Data collection method	Frequency of collection
Number of ZEBs purchased	CPCA	Operator	Operator will provide information from procurement contract	One-off
Number of ZEBs in operation	CPCA	Operator	Operator will provide information from the buses run on routes	Daily
Number and type of internal combustion engine (ICE) buses replaced	CPCA	Operator	Operator will provide information based off planning from procurement	One-off
Number (and capacity) of charging facilities introduced	CPCA	Charging infrastructure provider (CIP)	CIP will provide information based on charge sites established	One-off
Charging methodology e.g. depot overnight, en-route charging	CPCA	CPCA	Bus operator will provide information based on planning of bus routes and charging needs of buses	One-off
AC or DC charging	CPCA	CPCA	CPCA have decided on DC charging for sites	One-off

2. Scheme costs

Data set	Owner	Data source	Data collection method	Frequency of collection
Purchase cost per ZEB (add explanatory footnote)	CPCA	Manufacturer	Bus manufacturer will provide capital cost for buses	One-off
Purchase cost per equivalent ICE bus	CPCA	Manufacturer / Operator	Bus operator / manufacturers will use existing knowledge and market research to denote an equivalent cost	One-off
Average operational cost (incl. maintenance and infrastructure) per ZEB (£ per month)	CPCA	Operator	Bus operator will monitor and document the operational costs throughout the life of the ZEB and charging and charging infrastructure costs	Monthly

Data set	Owner	Data source	Data collection method	Frequency of collection
Average operational cost (incl. maintenance and infrastructure) per ICE (£ per month) (if ICE buses operational in fleet)	CPCA	Operator	Bus operator will use the data captured in the analysis of their ICE bus fleets to provide the comparison against electric buses	Monthly
Cost of electric infrastructure (upfront cost) (£)	CPCA	CIP / Power provider	CIP and power provider have provided their quotes on the cost of charging infrastructure implementation and power grid upgrades	One-off

3. Data to inform analysis of carbon impacts

Data set	Owner	Data source	Data collection method	Frequency of collection
Average daily ZEB mileage	CPCA	Operator	Operator will provide information gathered by onboard bus analytics	Daily
Average daily ZEB energy consumption	CPCA	Operator	Operator will provide information gathered by onboard bus analytics	Daily
Average daily diesel mileage and fuel consumption for each route (i.e. baseline / comparator data)	CPCA	Operator	Operator will provide information gathered by onboard bus analytics	Daily
Average ZEB well-to-wheel greenhouse gas emissions	CPCA	Operator	Derived from the Operator Partner's Power Purchase Agreement (including any Renewables Energy Guarantees Origin (REGO) certificates), Operator power consumption/electricity usage data, and historic Ofgem/BEIS data on Carbon Intensity of the GB Electricity Supply	Daily
Average battery state of charge before / after charging	CPCA	Operator	Operator will document the state of charge after each charge and share data	Daily
Time of day ZEB charged and electricity tariff (including electricity generation source)	CPCA	Operator	Operator will document and the time of day ZEB charged and share data	Daily

Data set	Owner	Data source	Data collection method	Frequency of collection
Nitrous dioxide, micrograms per cubic metre	CPCA	Cambridge City Council	Cambridge City Council has five air quality monitoring stations i.e. Roadside Sites, in the central parts of Cambridge; they measure Nitrogen Dioxide and Particulate Matter (PM10 and PM2.5). These stations are continuously monitoring 24/7 and provide highly accurate hourly data.	Hourly
Levels of particle matter (PM10 and PM2.5)	CPCA	Cambridge City Council		Hourly

4. Bus service related data points

Data set	Owner	Data source	Data collection method	Frequency of collection
Bus patronage levels	Operator	Operator	Operator will provide information gathered by onboard bus analytics	Daily
Levels of congestion	CCC	Traffic commission	Congestion levels are monitored by the traffic commission in the area by measuring the traffic levels on the road through traffic cameras	Daily
Passenger satisfaction level with service	CPCA	Passenger survey	A passenger survey will be conducted by CPCA for local users of the bus service and answers will be consolidated to gain a user experience of the services	Yearly
Disabled accessibility of buses	CPCA	Passenger survey	A passenger survey will be conducted by CPCA for local users of the bus service and answers will be consolidated to gain a user experience of the services	Yearly
Park and ride utilisation rate	CCC	CCC	CCC will monitor the amount of spaces utilised at each of the park and ride sites through the uptake of spaces	Daily

5.5.5 These metrics will be used to measure progress and evaluate the success of the scheme. The metrics chosen encompass those on the list in the ZEBRA guidance and overarching grant agreement, as well as additional data sets to monitor further impacts of the ZEBRA scheme.

5.5.6 At the outset of the project, CPCA will contact and agree with the relevant delivery partners and stakeholders the means to capture the data sets stipulated to ensure quality standards are adhered to and the data meets our requirements and standards.

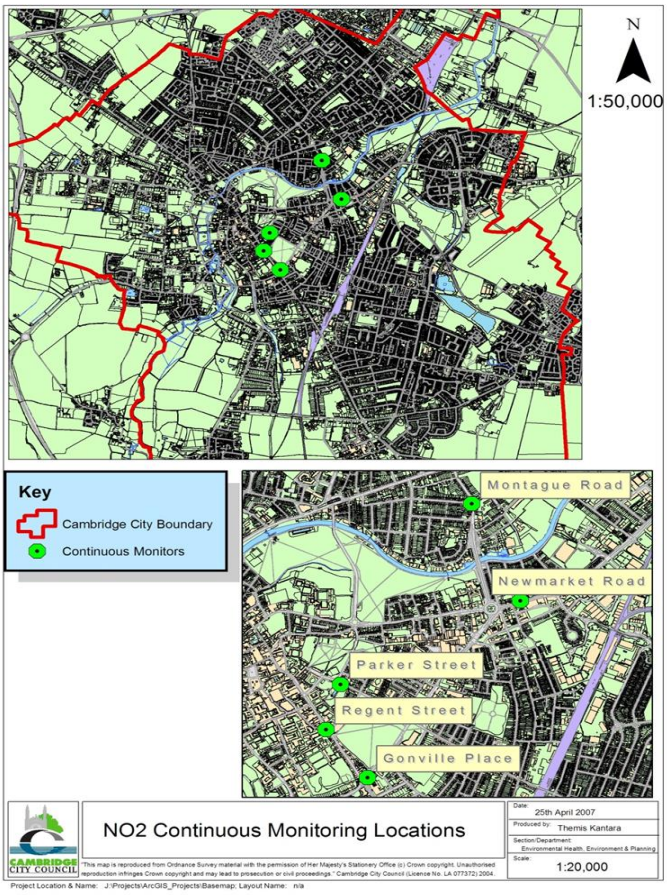
5.5.7 The data sourced by the Monitoring team and various stakeholders will be used to inform the evaluation of the CPCA's ZEBRA scheme against the objectives set out by the Department for Transport and will be provided to the Evaluation Contractor for review and affirmation toward ZEBRA guidance objects. It will also provide evidence for the scheme's overall impacts in the Cambridgeshire Region.

How data will be sourced

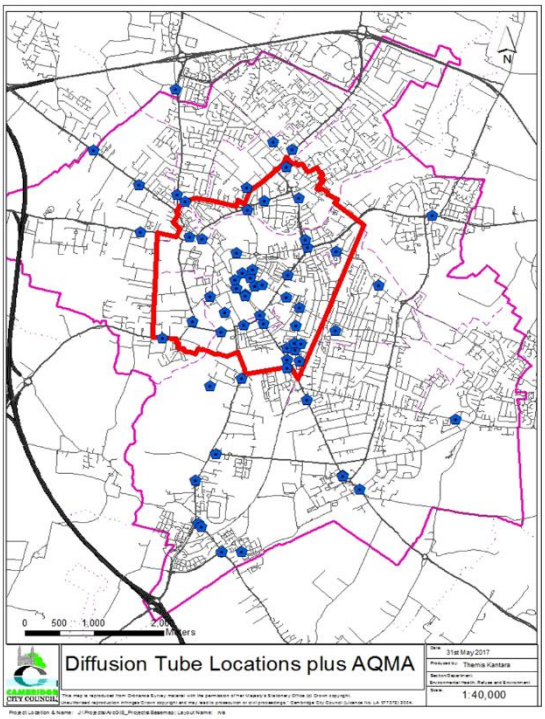
5.5.8 The data to inform our key metrics will be gathered and shared from a variety of sources. Delivery partners of the ZEBRA scheme, but also stakeholders and ongoing managers of the deployed electric buses and charging infrastructure will collect and assemble data points to build out and inform the matrices being analysed.

- ***Air Quality*** - Cambridge City Council has 5 roadside air quality monitoring stations in the central parts of Cambridge; they measure Nitrogen Dioxide and Particulate Matter (PM10 and PM2.5). These stations are continuously monitoring 24/7 and provide highly accurate hourly data. Cambridge also collects monthly Nitrogen Dioxide data from diffusion tubes, a less accurate measuring device, but spread over a wider area, which provides a secondary source for air quality changes. This data will be compiled by CCC and shared monthly with the M&E team for further analysis and reporting. CPCA are also looking to invest further into current emission hot spot areas created by the current diesel buses in order to undertake specific monitoring and highlight the impacts of the electric buses; Drummer Street is a particular area we would look in closer detail.

Map of Roadside Air Quality Monitoring Stations:



Map of Diffusion Tube Sites:



- ***Traffic / congestion levels*** – the Monitoring and Evaluation team has a number of IoT devices erected across the city to monitor road traffic and congestion levels. These devices feed back into their central database and will be consolidated daily to show changes in vehicle numbers on the road and congestion and traffic figures. Once the Model Data Environment is up and running as discussed in the Overview the following data will be available from this source:

  A) travel data: readily available transport data including, ONS, travel to work Census data, flow data, travel demand into/out and between hubs within the CPCA, Traffic-master data

  B) transport infrastructure e.g. local scheme, Highways England and Network Rail, pinch point and constraint information, network improvements (committed and aspirational) across all model.

- ***Community Experience –*** the Monitoring and Evaluation team will deploy an quarterly survey into the CPCA community which will build off the already existing Bus Services: Delivery Review survey, to evaluate the experience of the service by both users and non-users. A focus of the survey will be to evaluate both the positive and negative impacts of the services on users and non-users including protected groups. There will also be user group sessions held by CPCA whereby members of the public that live and utilise the bus services within CPCA are engaged through focus groups and questionnaires in order to receive feedback on the bus services and address any issues, concerns, or opportunities that they may raise regarding the operations and services provided by bus operators. Once the Model Data Environment is up and running as discussed in the Overview the following data will be available population trends, unemployment rates, jobs, housing, economic output and growth over time and Local Plan development site allocations by geographic area.

- ***Fleet i.e. number of ZEB, price, mileage etc.*** – the Monitoring and Evaluation team will receive the data points regarding the fleet and the ongoing operating/management of the fleet from the bus operator. The data sources for the individual data points will be sourced from either the operator's procurement contract with the bus manufacturer, onboard bus analytics, or their route planners. All of which will be consolidated and shared with the CPCA M&E team for further analysis. Our current contracts have an obligation on passenger numbers and journeys not operated. Other data needed for our analysis will be specified and included in our new contracts for the ZEBRA scheme.

- ***Bus charging and charging infrastructure*** – the M&E team will gather and consolidate data on the charging infrastructure from the charging infrastructure provider and also the power provider.

  - The costs for the infrastructure and additional power provision will be stipulated in the procurement contracts and the Power Purchase Agreement and will be shared with CPCA and the M&E team.

  - The bus charging data and information will be collected and shared from a number of sources. Data points centred around the operating of the charge points will be gathered by the Park and Ride charge station operator for the Babraham Road charge station; and also from the bus operator who will share the data collected at

their bus depot; all of which will be captured by the charge points as they are being utilised on their backend software.

- The charging methodology and the policies around charging will be written and documented by the M&E team at CPCA.

5.6 Pre-implementation Monitoring

5.6.1 There are already measures in place to monitor the key comparable data sets needed for future comparison post ZEBRA scheme. This has been undertaken by delivery partners, local authorities, and transport commissions to inform decision making and undertake analytics into performance, supervision and scrutinization. We will therefore be able to leverage already existing data sets to draw comparisons between pre-and post-ZEBRA scheme implementation.

5.6.2 The required pre-implementation data sets and methodology for comparison has been documented below:

Pre-scheme data set	Monitoring reasoning and methodology
Average operational cost (incl. maintenance and infrastructure) per ICE (£ per month)	Bus Operators in the region have already compiled this information as internal metrics to monitor financial performance and budget for the future. Normalised data will be provided to CPCA to establish the baseline against which efficiency/impact of operating ZEBs will be measured.
Average daily diesel mileage and fuel consumption for each route	The bus operators in the region have compiled this information as internal metrics to monitor performance and ensure accurate future planning and preparation.
Air Quality	Cambridge City Council has 5 air quality monitoring stations i.e. Roadside Sites, in the central parts of Cambridge; they measure Nitrogen Dioxide and Particulate Matter (PM10 and PM2.5). These stations are continuously monitoring 24/7 and provide highly accurate hourly data to provide an indicator of air quality in the region to indicate any future combating measures and progress toward air quality goals
Bus patronage levels	The bus operator in the region compiles this information as internal metrics to monitor financial performance and budget for the future
Levels of congestion	The traffic commission will have compiled this data to date by measuring the traffic levels on the road through traffic cameras and IoT devices installed across the region to use as an indicator for future planning and evidence for the implementation of transport improvements in the region
Park and ride utilisation rate	CCC will monitor the amount of spaces utilised at each of the park and ride sites through the uptake of spaces to monitor performance and inform future planning

5.7 Comparison methodology

5.7.1 CPCA will use the pre-scheme data sets as a baseline to draw direct comparisons against pre- and post-implementation levels across the region. This will be used to evaluate the performance of the scheme and its impact toward the key deliverables

and objectives within the partner contracts and ZEBRA scheme guidance. It will also inform and highlight the impacts of the implementation of the ZEBRA scheme, which can then be applied as an example use case for other cities of a similar size to the scale of beneficial impacts that could be felt from the scheme.

5.7.2 Nearby regions and cities of similar characteristics that did not undertake the implementation of a similar scheme, can be used as a control group (insofar as data is published / provided to CPCA) to provide assurance of the impacts from the implementation of the electric buses and consequential charging infrastructure.

5.7.3 An evaluation will then be undertaken to calculate the scheme benefits and quantify the overall impact of the benefits experienced by the scheme to create context against, not just the monetizable impacts, but also the non-monetizable impacts across the region.

5.7.4 CPCA has also put out a tender for a Data Model Environment, which we are hoping to have up and running by the end of this year. This will collect data points and store them for analysis to be undertaken in a two-tier approach. The lower level tier will be for the Data Environment, while the High-Level Model Environment allows a wide range of options for development and infrastructure, and external scenarios, to be assessed. The transport network should allow for the performance and impact of different combinations of development and infrastructure options and external scenarios to be assessed against a wide variety of measures. This will also therefore be leveraged to undertake analysis on the impacts of the ZEBRA scheme and allow a more comprehensive mapping of the benefits felt from the implementation of electric buses in the CPCA region.

5.8 User assurances for data sharing

5.8.1 Assurances for the collection, consolidation and dissemination of the stipulated data sets to CPCA and the M&E team by the relevant delivery and ongoing management partners, outlined above, will be written into each area of the contract during negotiations, and the granting of contracts by CPCA will be contingent on their agreement to these conditions. If they fail to adhere to the conditions the partner in breach of the conditions will be liable to compensate the M&E team for the collection fees of the missing data set.

5.8.2 CPCA will own within the public sector the primary devices for collecting air quality information and CCC already have agreements and information sharing arrangements in place with CPCA and have their air quality data publicly available. Hence there is little risk that this information will not be readily available when required by CPCA. Wider Public Health data is collected and analysed by the Public Health Intelligence Team based at the County Council, whom we have excellent working relationship with and are constantly collaborating with, currently on a Post-COVID Transport Recovery programme.

5.8.3 It is inherent in the nature of our particular Combined Authority that we bring partners and partnerships together and collaborative working has always been a part of the way in which we have monitored and evaluated our county.

5.9 Data Storage, Maintenance and Distribution

5.9.1 Raw and consolidated data will be shared by the relevant delivery and ongoing management partners for internal analytics to take place and information will also be provided in the form of reports submitted to the Steering Committee meetings each month.

5.9.2 The CPCA Project Manager will use CPCA's SharePoint to save down all documentation. The M&E Project Manager will create a standard filing structure within the SharePoint to ensure consistency across all directorates. Project Managers are then ultimately responsible for ensuring these folders are correctly populated in readiness for any audits or monitoring requirements.

5.9.3 Analysis will be undertaken monthly in order to document progress toward the ZEBRA Scheme objectives using the data sets outlined above. We will also undertake analysis to compare pre-scheme data sets to compare against VfM and BCR calculations set out in this Business Case to show that our estimations were fair and accurate. If there are discrepancies between actual results and what was expected in our pre-implementation analysis, an investigation will be undertaken to explore why this is the case and identify any rectifying measures to bring actual results in line with what was expected.

5.9.4 This analysis will be undertaken on a monthly basis to ensure CPCA can take early action, if results are not meeting objectives. All this analysis and will then be consolidated into a quarterly report, with the corresponding data evidence, and will shared with the DfT evaluation contractor. This report will be produced by the Monitoring and Evaluation team and shared, through a set-up shared space within CPCA's SharePoint and the DfT.

5.9.5 The CPCA M&E team will consolidate all data sets required by the Department of Transport for their independent evaluation in an excel or report written format with the corresponding analysis; sources; and logic; documented and clearly set out and consolidate them in appraisal handover packs.

5.9.6 Any additional requirements from the DfT can be requested through the Evaluation Contractor and all data shared will be signed off by the M&E team, as well the Director of Delivery and Strategy.

5.10 M&E budget

5.10.1 The Monitoring and Evaluation team are provided with a budget to contract independent evaluators at the end of year 2 and year 6 in order to give an independent adjudication on the performance of the scheme against its key metrics and objectives.

5.10.2 The budget for the independent external evaluation and upgrades to the monitoring equipment throughout the lifespan of the scheme are outlined below:

Year	1	2	3	4	5	6	Total
Monitoring (Air quality	£20,000	-	-	£10,000 (Sensor maintenance	-	-	**£30,000**

sensor deployment)				and renewal cost)			
Evaluation (Independent external evaluation costs)			£25,000 Interim evaluation			£35,000 Final evaluation	**£60,000**
							£90,000

5.10.3 It is the CPCA's intention to start a quarterly tracking survey of passengers and non-passengers, however these questions would be added into an a survey that is already in operation and would therefore incur no extra cost to CPCA.

5.11 Quality Assurance

5.11.1 In a further effort to ensure the quality of all evaluation work, the CPCA will further develop its relationships with the CCC, GCP and delivery partners, as well as the academic community and other organisations such as the Urban Transport Group plus government departments to ensure that a wide range of data inputs can be sourced to provide improved insights into the impact of the implementation of the e-buses in Cambridge. An external quality review will be undertaken on evaluation activities at the end of Year 2 and Year 6 and will be commissioned from the M&E budget to have an independent local evaluation and monitoring team review the impacts of ZEBRA scheme.

5.11.2 The assurance framework requires project managers to identify, at the initiation stage, what their project is to deliver; with all projects developing a logic model detailing the inputs, outputs, outcomes, and impact to be achieved.

5.11.3 The M&E framework has a tiered approach to monitoring and evaluation; this project would be classified as tier B, the project is funded through other streams and identified as being 'key' in terms of the expected benefits to be achieved. Therefore, it is subject to a full independent evaluation commissioned by the CPCA, and the Monitoring and Evaluation team will reserve funding to undertake an interim independent evaluation after the end of year 2 (which could be a precursor for further investment into M&E activity), with similar funding to be reserved for after year 6 of the scheme.

5.11.4 The Combined Authority has strong links with best practice in M&E through the 'What Works Centre for Local Economic Growth' (LSE) and partner work with Cambridge University. We employ a dedicated monitoring and evaluation manager who will oversee the development of the logic model and the M&E plan for the delivery of the 30 zero emissions buses. The reporting arrangements for monitoring work would be to the CPCA Transport Committee (with additional input from the relevant scrutiny panel) and to the Climate Change Working Group (a sub-committee of the board) which is monitoring our delivery of carbon reduction following the report of our Independent Commission on Climate Change.

5.12 Risk Management

5.12.1 The Combined Authority will use its developed risk management approach (outlined in section 1.6) in order to outline methods of risk identification, mitigation, escalation and reporting. Senior Officers of the Combined Authority will be responsible for the identification and management of the risks, with the support of an Assurance Manager and ongoing risk registers are maintained and incorporated into the monthly highlight reports.

5.13 Reporting to the Department of Transport

5.13.1 CPCA will implement appraisal handover packs as a method of passing forward appraisal information to DfT as the evaluator. CPCA will also develop portfolio approaches for evaluation which will enable meta-analysis to be verified on appraisal and modelling assumptions to be easily interrupted. Evaluation work will be aligned as much as possible with the appraisal evidence needs stipulated by DfT and indicate any areas of concern or remediation, if necessary.

5.13.2 The sign off of the Performance Monitoring Report by the Board with the Strategic Overview of Performance will enable key metrics to be consolidated and analysed. This will provide the foundations for the progress reports to be compiled each quarter for the Department of Transport.

5.13.3 The quarterly timeframe will allow sufficient time to pass for operational and also strategic benefits to be felt across the wide range of data sets, as certain beneficial impacts may lag due to the nature of change required by the implementation of the electric buses i.e. the cultural shift away from private vehicle use.

6 Management Case Appendix

5.14 Project leads background

Personal details	*Information Identified*	*Source of info & date*	
Full name	Rowland Potter		
Role or position	Head of Transport – Senior Responsible Officer	Rowland Potter	19/08/21
Years of Experience in role	15 years	Rowland Potter	19/08/21
Other business interests	• Head of Transport – CPCA (2018-pesent) • Head of Transport – Cambridge City Council Actively involved in complex multi partner transport projects across multiple mode forms since 2006, delivering projects of all sizes and complexity.	Rowland Potter	19/08/21

Personal details	*Information Identified*	*Source of info & date*	
Full name	Mehmet Ahmet		
Role or position	Programme Director	Mehmet Ahmet	19/08/21
Years of Experience in role	20 years	Mehmet Ahmet	19/08/21
Other business interests	• Transport Manager – CPCA (2020-pesent) Provides a wide range of experience having worked for private sector and local government clients. Mehmet brings an international perspective having successfully delivered a broad range of transportation projects across various geographies.	Mehmet Ahmet	19/08/21

Personal details	*Information Identified*	*Source of info & date*

Full name	Jon Aslop		
Role or position	Head of Finance	LinkedIn	10/08/21
Years of Experience in role	16 years	LinkedIn	10/08/21
Other business interests	• Head of Finance – CPCA (2018-present) • Director – Aslop & Co. (2015-18) • Service Line Leader – Mouchel (2012-15) • Finance Service Delivery Manager – Liberata (2008-12)	LinkedIn	10/08/21

Personal details	***Information Identified***	***Source of info & date***	
Full name	Heidi Parker		
Role or position	Head of Procurement	LinkedIn	10/08/21
Years of Experience in role	17 years	LinkedIn	10/08/21
Other business interests	• Head of Procurement – CPCA (2018-present) • Strategic Procurement Manager – Cambridge City Council (2015-20) • Procurement Manager – Tower Hamlets Council (2009-14)	LinkedIn	10/08/21

Personal details	***Information Identified***	***Source of info & date***	
Full name	Oliver Howarth		
Role or position	Project Manager	LinkedIn	10/08/21
Years of Experience in role	17 years	LinkedIn	10/08/21
Other business interests	• Bus Strategy Manager – CPCA (2019-present) • General Manager – HCT Group (2018-19) • Operations Director – First West Yorkshire Ltd (2017-18) • Business Manager – First Group (2012-16)	LinkedIn	10/08/21

Personal details	***Information Identified***	***Source of info & date***	
Full name	Paul Nelson		
Role or position	Bus Operations Lead	LinkedIn	10/08/21
Years of Experience in role	35 years	LinkedIn	10/08/21
Other business interests	• Public Transport Manager – CPCA (2021-present) • Public Transport Manager – Cambridgeshire City Council (1986-2021)	LinkedIn	10/08/21

Personal details	***Information Identified***	***Source of info & date***	
Full name	Emily Martin		
Role or position	Marketing & Communications Manager	LinkedIn	10/08/21
Years of Experience in role	22 years	LinkedIn	10/08/21
Other business interests	• Head of Communications – CPCA (2020-present) • Senior Marketing & Communications Manager – Impra Group Ltd (2017-20) • Director – ATP Charity Consultant (2011-17) • Marketing and Communications Manager – ICE Renewables (2010-15)	LinkedIn	10/08/21

Personal details	***Information Identified***	***Source of info & date***	
Full name	Michael Soper		
Role or position	Evaluations and Analysis Lead	LinkedIn	10/08/21
Years of Experience in role	27 years	LinkedIn	10/08/21
Other business interests	• Evaluations and Analysis Lead – CPCA (2021-present) • Research Team Manager – Cambridgeshire County Council (1998-2021) • Researcher – Hull City Council (1995-98)	LinkedIn	10/08/21

Personal details	***Information Identified***	***Source of info & date***	
Full name	Adrian Cannard		
Role or position	Climate Change Lead	LinkedIn	10/08/21

Years of Experience in role	17 years	LinkedIn	10/08/21
Other business interests	• Strategic Planning Manager – CPCA (2018-present) • Director of Strategy and Planning – Greater Cambridge Greater Peterborough Enterprise Partnership (2013-18) • Head of Strategic Support – East of England Local Government Association (2010-13)	LinkedIn	10/08/21

Personal details	***Information Identified***	***Source of info & date***	
Full name	Maxine Narburgh		
Role or position	Energy Hub Lead	LinkedIn	10/08/21
Years of Experience in role	18 years	LinkedIn	10/08/21
Other business interests	• Regional Hub Manager – Greater South Eats Energy Hub (2018-present) • Economic Development Project Manager – Ipswich Borough Council (2014-18) • Managing Director – Bright Green (2006-14)	LinkedIn	10/08/21

Personal details	***Information Identified***	***Source of info & date***	
Full name	Isobel Wade		
Role or position	Delivery Lead	LinkedIn	10/08/21
Years of Experience in role	9 years	LinkedIn	10/08/21
Other business interests	• Assistant Director – (Greater Cambridge Partnership (2018-present) • Deputy Head Housing Diversification – Ministry of Housing, Communities and Local Government (2013-18) • Desk Officer Devolution – Cabinet Office (2012-13)	LinkedIn	10/08/21

5.15 Letters of Support

The letters of support are contained in the Appendix and they include:

- Cambridgeshire and Peterborough Independent Commission on Climate
- Business Board
- Cambridge City Council
- Cambridgeshire County Council
- Greater Cambridge Partnership
- Mayor of Cambridgeshire and Peterborough
- Greater South East Energy Hub
- UK Power Network Services
- Stagecoach

5.16 10 Point Guide to Project Management

The 10-Point Guide to Project Management is in the Appendix

Commercial Case

1. Overview

1.1 Cambridgeshire and Peterborough Combined Authority (CPCA) has consulted with a number of parties in respect of our ambitions to support the procurement and delivery of zero emission buses in Cambridge. Together with our public sector delivery partners (the Greater Cambridge Partnership, Cambridgeshire County Council, the Cambridge City Council, and South Cambridgeshire District Council), parties with which we have engaged include our three principle local bus operators, four bus manufacturers, two potential providers of in-depot charging infrastructure, our local Distribution Network Operator (UKPN), CCC's contractor delivering the Solar Farm at the Babraham Park and Ride facility (which would be contracted to provide the power connection for the Plug-in Charge Station if we are successful), and two hydrogen producers (in order to understand comparative costs for Fuel Cell Electric Buses).

1.1.1 Through these engagements we have collected and analysed information and data on asset requirements in order to operate Zero Emission Buses (ZEBs) in Cambridge, cost ranges, and potential commercial structures and procurement routes.

1.1.2 In this Commercial Case, CPCA details the exact list of goods and services to be procured, procurement strategy, and commercial feasibility for this intervention, including risk transfer and future proofing in the event of a change in the market.

2. Market Engagement

2.1 Parties with which CPCA has engaged are set out in the table below.

2.1.1 CPCA has not (as yet) engaged with financiers because the necessary funding is being sourced from an amalgamation of contributions from the CPCA, the GCP, the bus operator, and the ZEBRA grant, in order to cover the associated costs. It will be the responsibility of the Operator Partner to determine how it proposes to fund its share of the vehicle purchase. Nonetheless, we will ask Operator Partner bidders to set out their plans for the funding/financing of their vehicles within their proposals in order to assess affordability and identify any risks to the long-term viability of the scheme.

2.1.2 Furthermore, CPCA's Chief Executive Officer is meeting with the National Infrastructure Bank over the coming weeks to understand capacity of the Bank to financially support schemes in the CPCA area. Funding of CPCA's contribution may be such a scheme. If this is the case, this Business Case will be updated accordingly, including to reflect any financing costs and conditions.

Organisation type	Organisation	Role on this project	Nature of engagement
Public Sector Delivery Partners	Greater Cambridgeshire Partnership (GCP)	CPCA's co-sponsor of our local regional grant	Engagement to co-develop governance mechanisms for the local grant element of the Scheme
	Cambridgeshire County Council	Owner and operator of the Park & Ride sites in and around Cambridge and proposed owner of the two Plug-in Opportunity Charge Points at	Determination and agreement of planning, permitting, power connection, commercial and operational arrangements for the two Plug-in Opportunity Charge Points at the Babraham Park & Ride site

Organisation type	Organisation	Role on this project	Nature of engagement
		the Babraham Park & Ride site Traffic Commissioner	Determination of Traffic Commissioner engagement protocols during the vehicle commissioning and M&E phases of the Scheme.
	City of Cambridge Council	Provider of M&E data for the Scheme	Determination of M&E arrangements for the Scheme
Local Bus Operators	[redacted]	Potential Operator Partner for the Scheme	Assessment of interest to bid for the Grant funding to operate 30 ZEBs in Cambridge and financial capability to contribute to Scheme capital costs Determination of power and infrastructure requirements, depot constraints, and operational implications of running ZEBs Advice on costs for this Business Case
	[redacted]	Potential Operator Partner for the Scheme	
	[redacted]	Potential Operator Partner for the Scheme	
Power / Energy Providers	[redacted]	Local Distribution Network Operator (DNO) which will be contracted to deliver and/or support the connection upgrade to the Operator Partner's depot	Determination of costs and timelines for the grid connection upgrade to the Operator Partner's depot
	[redacted]	Potential Charging Infrastructure and Management Partners	Determination of charging infrastructure requirements and potential costs charging facilities at the Operator Partner's depot
	[redacted]	GCP Delivery Partner for the Babraham Road Park & Ride Solar Farm	Determination of physical connection requirements and costs for the two Plug-in Opportunity Charge Points at the Babraham Park & Ride site
	[redacted]	N/A – These companies will have no role in our Scheme	Understanding of the costs and complexities of making green hydrogen available for a Fuel Cell Electric Bus (FCEB) fleet operating in Cambridge
Bus Manufacturers	[redacted]	Potential providers of Zero Emission Buses for our Scheme	Determination of the feasibility of different powertrains for our local needs, infrastructure requirements, and costs of

Organisation type	Organisation	Role on this project	Nature of engagement
	[redacted]		Battery and Fuel Cell Electric Buses, and delivery timelines for buses once orders are placed. Determination of availability of data for M&E purposes.
	[redacted]		

2.1.3 *We have engaged in detail only with [redacted]) at this stage since [redacted] Buses in Cambridge as demonstrator vehicles jointly funded by the GCP, thereby providing us with significant insights into costs and data available for M&E purposes, and a relationship with [redacted] which has supported us with additional advice on support in respect of charging infrastructure and power requirements. We will continue to engage with more manufacturers and distributors such as [redacted] to get further quotes to act as comparators for our procurement exercise. However, we believe that the quote that we have obtained [redacted] is representative of the market and sufficiently robust for our budgeting purposes at this stage.

Consultation with potential suppliers (inc. existing partnership arrangements)

2.1.4 Based on our engagements with potential suppliers in the market, we believe that the scope of CPCA's ZEBRA scheme is deliverable based on the following information, which demonstrates appetite in the market to bid for and deliver our Scheme within our financial envelope and proposed procurement strategy.

2.1.5 **Bus operators:** we have engaged with our principal bus operators as set out above, identifying at least one operator which is able to meet the operator funding contribution requirements, and operate 30 vehicles on the Park & Ride and Citi 2 routes in scope for the Scheme. Specifically:

- [redacted] has stated that, should it be the preferred Operator Partner after our procurement process, it is committed to buying at least 30 electric double-decker buses, putting in at least £230,000 per vehicle – a gross funding offer of £7.035 million + VAT. A Letter of Support confirming Stagecoach's commitment is provided in the Appendix to the Management Case.

- [redacted] (operator of 20 vehicles for Cambridge University's tendered "Universal" cross-Cambridge service, and a further 20 commercially operated coaches for [redacted] service) has constraints in bidding within our target timeframes for the Scheme as its tendered service (Universal) is going out to re-tender shortly. Nonetheless [redacted] will be invited to tender for the Operator Partner role.

[redacted] is committed to a diesel fleet at present. Also, its depot is [redacted] makes the provision of electric buses for a Park & Ride service in Cambridge technically and economically difficult (if not impossible) due to the dead mileage between the depot and the start and end points of the P&R routes (notwithstanding our proposal to install Plug-in Opportunity Charge Points). [redacted]

2.1.6 **Power/energy providers:** we are in direct talks with our local DNO which is [redacted], and also with its trading arm, [redacted], which we have engaged (through competitive tender) as electric power consultants for the

Scheme. No other DNO has the power infrastructure in CPCA area to provide the requisite grid connection to the chosen Operator Partner's depot. Specifically:

- [redacted] has provided an initial and revised quotation for a grid connection upgrade to an depot which is illustrative of the anticipated location of a depot required to operate the Park & Ride and Citi 2 services. Through our engagements with [redacted] it has committed to a three-day delivery commencement period for the grid connection upgrade if we progress the scheme (as opposed to the standard 90-day turnaround period).
- [redacted] is already contracted to GCP to deliver the Babraham Road Park & Ride Solar Farm, which is expected to be operational by September/October 2022. [redacted] will be contracted to provide the connection from the embedded storage at the Solar Farm to the Plug-in Opportunity Charge Points at the Park & Ride site (but not the Charge Points themselves). [redacted] has provided a formal quotation for this cost, which will be incremental to the existing Solar Farm build costs, and funded through GCP's existing partnership with Cambridgeshire County Council as owner of the Park & Ride site.
- Three organisations ([redacted] replied to our Request for Quotation for the energy consultancy role for this Business Case). Both [redacted] also provided indicative costs for the depot charging infrastructure and have confirmed their interest in, and intention to bid to provide depot charging infrastructure and associated services should we progress the scheme.
- [redacted] both responded to our request for information to inform our evaluation of the feasibility of use of FCEBs in Cambridge. A summary of our evaluation is set out below.

2.1.7 We will also be engaging with an Independent Distribution Network Operator (IDNO) in the future to explore the possibility to provide a private wire connection to the Depot. The IDNO could then scale the connection to CPCA's needs and a commercial arrangement could be established whereby CPCA could benefit from future connections to the private wire. This proposition is yet to be investigated in the required detail to provide a direct comparison against the alternative of commissioning [redacted] We will, however, engage in such discussions between the submission date of this business case and completion of the procurement exercise in order to ensure that we are securing best Value for Money ('VfM') for Government's investment.

2.1.8 **Bus manufacturers**: [redacted] have all expressed interest in our Scheme and have pointed us towards openly published information regarding their products, noting that the Operator Partner will ultimately make the decision regarding the manufacturer that it procures its buses from through a competitive process run with oversight from CPCA. Per above, we have had (and continue to have) more detailed discussions with [redacted] which is an established partner in our region through the GCP's joint initiative with Stagecoach to operate two BEBs in Cambridge.

2.1.9 Based on the information we have sourced from our market engagement exercise our assessment of the pros and cons of Battery Electric Buses (BEBs) as compared to Fuel Cell Electric Buses (FCEBs) is set out below.

Battery Electric Buses		Fuel Cell Electric ("Hydrogen") Buses	
Pros	Cons	Pros	Cons
✓ Battery electric buses are more suited for urban routes as they	× The main disadvantage of battery electric buses is the	✓ Hydrogen fuel can be transported to areas which do	× Green hydrogen production infrastructure (i.e. electrolysis

are more energy and space efficient. ✓ Battery electric buses are more cost efficient in terms of vehicle purchase price, but also the cost of the requisite fuelling/charging infrastructure, and running costs ✓ We have already established that there is an affordable power supply in the form of a grid connection to a nearby High Voltage (HV) line for the likely location of the Operator Partner's depot. ✓ Battery Electric Buses are a more mature technology than Fuel Cell Electric Buses, with a more mature supply chain and (at present) higher reliability.	strain it adds to the already limited power capacity in Cambridge × With longer time taken to fuel/charge a battery electric bus there could be a higher peak vehicle requirement than an equivalent diesel or fuel cell electric fleet. This is not an immediate issue for the Park & Ride fleet given that there is ample charging time overnight, but could be for other routes in the future.	not have sufficient power capacity. ✓ Fuel Cell electric buses buses can run longer routes with more demanding power requirements (e.g. due to topology and heating/cooling needs) ✓ Fuel Cell electric buses can be re-fuelled in around three times as long as equivalent diesel models (7 mins v 2.5 mins) , and therefore have a peak vehicle requirement similar to diesel fleets.	facilities) is highly expensive. × Green hydrogen production facilities take up more space than EV charging facilities and would not be suitable for the urban situated routes and depots that we have targeted for this project. × The region has no local alternative hydrogen production infrastructure nearby, thereby requiring hydrogen to be transported long distance via freight which is counterproductive to our de-carbonisation agenda. × Proposals show that instead of one lorryload of bio-diesel (38,000 litres), the Cambridge depot would require 7-9 lorryloads of hydrogen, negating some of the green credentials of hydrogen.

2.1.10 Our conclusion from this exercise, and our experience from the two BEBs already operating in Cambridge, is that this Scheme will be delivered through the procurement and operation of BEBs. Please note that this does not preclude FCEBs from featuring in the overall future fleet to meet CPCA's ambitions for all buses operating in Cambridge to be zero emission by 2030.

Future market engagements

2.1.11 **Bus operators:** We will continue to engage with all local operators, informing them of the progress of our bid for the Scheme and, if successful, plans for the Operator Partner procurement.

2.1.12 **Power/energy providers:** The Operator Partner will be responsible for selecting and/or procuring (through a secondary competition) a depot charging infrastructure and services provider. Notwithstanding this we will be open to engaging with providers of such services and connecting them with potential bidders for the Operator Partner role. We will also invite parties to continue providing us (at their expense) with costs and information to provide benchmarks to support our evaluation of tenders for the Grant Awards.

2.1.13 Per above, we will also be engaging with an IDNO in the future to explore the possibility to provide a private wire connection to the chosen Operator Partner's depot.

2.1.14 We have considered whether a third-party Infrastructure Provider might be willing to invest to deploy Plug-in Opportunity Charge Points and lease them to Cambridgeshire County Council/our Operator Partner as opposed to Cambridgeshire County Council procuring the infrastructure. Based on our energy consultant's estimates we anticipate that, at in peak demand (i.e. during winter months a few years into the scheme), one charge point will be used for seven in every 10 minutes, 10 hours per day, with the second charge point providing contingency. Despite this, as isolated assets, we believe that there will be very limited market interest in providing these "as a service". We will continue nevertheless to engage the market through to commencement of procurement to test this assumption.

2.1.15 **Manufacturers:** The Operator Partner will be responsible for procuring (through an open and competitive process with CPCA oversight) a Bus Manufacturer to manufacture, deliver, and support maintenance of the vehicles. As per power/energy providers, we will be open to engaging with providers of such services and connecting them with potential bidders for the Operator Partner role. We will also invite parties to continue providing us (at their expense) with costs and information to provide benchmarks to support our evaluation of tenders in our oversight role.

Go-to-market approach

2.1.16 Later sections in this Commercial Case set out the requirements that we have developed to date; our options assessment for the contracting, ownership, and commercial model; and, how we will execute grant award competition.

2.1.17 **Operator Partner:** Taking into account the information set out in this Commercial Case, our preferred approach for delivering this project will be to competitively tender for an Operator Partner, which will be awarded a Grant to purchase the battery electric buses, in-depot charging infrastructure, and power upgrade through competitive procurement processes. This Grant will be contingent on the Operator Partner continuing to run the Park & Ride and Citi 2 routes with battery electric buses for a minimum of eight years, re-deploying any displaced EURO VI buses into CPCA area to replace older EURO IV and V buses, and retaining whatever vehicles are bought with the grant within the wider CPCA area for a minimum of eight years. The Grant will also be contingent on the Operator Partner meeting certain Service Level Agreements ('SLA's') and Key Performance Indicators ('KPI's'), for example service quality, maintaining the buses and charging infrastructure in a good state of repair, and provision of assurances that fares will not be increased as a result of running battery

electric buses. The Grant will be repayable (in part or in full, dependent on the circumstances) if these conditions precedent are not met.

2.1.18 For the avoidance of doubt, the Park & Ride and Citi 2 services themselves will continue to be operated as commercial services as opposed to being transitioned into an operating contract. This is, however, subject to the outcomes from CPCA's assessment of options for its future local bus market pursuant to development of its Bus Service Improvement Plan ('BSIP').

2.1.19 **Vehicles and In-Depot Charging Infrastructure:** We will require the Operator Partner to run a secondary competitive procurement for the Vehicles and In-Depot Charging Infrastructure with oversight from CPCA.

2.1.20 In both options the Operator Partner will procure and own vehicles and in-depot charging infrastructure, however we have decided that bidders for the Operator Partner will be required to run secondary procurement competitions for bus manufacturers and charging infrastructure providers with CPCA oversight on this process.

2.1.21 Pro's and Con's of the two options are set out below.

Bundling of the vehicles and in-depot charging infrastructure elements of the Scheme into the Operator Partner tender		Require the Operator Partner to run a secondary competition	
Pros	Cons	Pros	Cons
✓ Allocates risk for the costs of the vehicles and infrastructure to the bidding consortium when submitting its bid into the CPCA for the Grant competition ✓ Does not require a secondary procurement and can therefore commence delivery immediately following grant award, enabling CPCA to meet its ambitious timelines ✓ Provides more confidence in capability of the Operator Partner to deliver from the outset, having engaged and agreed a plan with its preferred partners ✓ Enables CPCA to require vehicle and charging infrastructure providers in the	× CPCA expects that only one bidder may submit a tender for this competition. On the basis that this is recognised by the market, there is no incentive for cost optimisation across the consortium, resulting in higher overall costs to CPCA × Limits competition to the market, with the Operator Partner likely to select its incumbent vehicle and charging infrastructure providers. The	✓ Improves competition in the market which may result in better value for money for CPCA ✓ Enables the Operator Partner to fully engage with CPCA following appointment prior to selecting vehicle and charging infrastructure providers	× Adds cost and complexity to the process for both the Operator Partner and the CPCA × Increases the risk of cost overruns if bids to the Operator Partner exceed CPCA's budget for the Grant Award to the Operator Partner × Elongates the timelines for delivery, potentially jeopardising CPCA's target date of May 2022 for delivery of the operational service

consortium to set out what wider UK economic benefits are achievable through their selection/appointment ✓ Provides more certainty of deliverability and clarity of cost up-front in the process	advice that we have received is that a consortium approach presents a high risk of failing to be State Aid compliant and, therefore, this can no longer be an option for our scheme.		

2.1.22 Based on the above our preferred option is to appoint an operator and, then, require the operator to run secondary procurements for the other service providers.

2.1.23 For the purposes of this Business Case submission, we have set out the Commercial and Procurement arrangements for both options.

2.1.24 **Park and Ride Plug-in Charging Infrastructure:** Cambridgeshire County Council will be grant-funded to procure, install, and commission Plug-in Charge Points for the Babraham Park & Ride site, which it will then own. Cambridgeshire County Council is already working in partnership with; and being grant-funded by the Greater Cambridgeshire Partnership; to deliver a Solar Farm at the Babraham Park & Ride site. [redacted] is delivering the Solar Farm and will be contracted (through an extension to its existing contract) to provide a connection from the new embedded storage facility to the Plug-in Charging Station (for which a quotation has been provided), but not to provide the Plug-in points themselves, the provision of which will be tendered through open procurement.

2.1.25 Based on the advice of our energy consultant we anticipate that the Plug-in Charge Points will be available for the Park & Ride and Citi 2 Operator Partner, but Cambridgeshire County Council will reserve the right to make the Charge Points available to other operators (e.g. Coach operators) and also to public vehicles if/when the Charge Station is upgraded to provide facilities to all vehicle types such as, HGVs, taxis, cars and bikes, in order to support the decarbonisation of the transport sector. But, only to the extent that this does not adversely impact the Park & Ride and Citi 2 Operator Partner's ability to deliver services in accordance with its Grant Agreement commitments.

2.1.26 Cambridgeshire County Council will request quotations for Operations & Maintenance ('O&M') services for the opportunity Charging Station at the Babraham Park & Ride site from both the equipment provider and from the Operator Partner, and will select the most economically advantageous tender accordingly. Cambridgeshire County Council will make it clear in both tenders (for the Operator Partner, and for the opportunity Charging Station) that it reserves the right to select the O&M services which represent best VfM. If the Operator Partner is selected to provide O&M for the Charging Station at the Babraham site it will re-charge such costs to the Cambridgeshire County Council inclusive of a nominal management fee.

2.1.27 It will be the responsibility of the Operator Partner to pay for power for all charging infrastructure, including the in-depot and Babraham P&R infrastructure.

2.1.28 Cambridgeshire County Council has an existing Lease Agreement with the current Park & Ride bus service Operator to enable the Operator to access and use the Park & Ride facilities for a nominal fee. Access to the Plug-in Charge Points and O&M and electricity re-charging arrangements (if applicable) will be added to this Agreement (or an equivalent version thereof if a non-incumbent Operator is selected as Operator Partner).

Tender publication

2.1.29 Both tenders (the Grant Competition tender for the Operator Partner to be run by CPCA, and the Opportunity Charging Station tender to be run by Cambridgeshire County Council) will be publicly announced through our procurement web page. A notification will also be sent to all potential bidders for the Operator Partner role (i.e. bus operators currently serving the region).

Futureproofing for a potential Franchising regime

2.1.30 Our long-term strategy is to help enable full conversion of the bus fleet operating in our area to zero emissions vehicles by 2030, cascading ZEBs through the system and achieving full fleet replacement within the decade. The ZEBRA fund will kick that off, protecting the taxpayer by retaining the option of funding the remaining conversions through operators' balance sheets, encouraged by future franchising rather than upfront subsidy. The rationale for this replacement strategy is that:

- it allows us to take advantage of developing technology;
- it does not commit us irrevocably to a singular technology, noting Government ambitions to establish a hydrogen economy;
- it spreads the mid-life battery replacement risks and costs so as to improve the trading position;
- it is deliverable within incremental and affordable improvements to electricity supply; and
- it caps the risk of over-investing in infrastructure at a bus depot which, may need to be relocated by the end of the decade due to economic regeneration or change in regulatory regime (i.e. from the current deregulated market to a Franchised market in the region).

2.1.31 Although CPCA does not have any intention to acquire any asset in the form of buses or depots, we will include a clause in the Grant Agreements which will enable us to re-acquire the assets at remaining book value (taking into account depreciation and amortisation if applicable) in the event of a change in policy agenda (e.g. under a franchising regime in which assets are owned by the local/combined authority).

3. Scope of procurement

3.1 Goods and services to be procured as part of CPCA's proposed ZEBRA scheme are set out below:

3.1.1 Please note that the ZEBRA funding received will be used for capital costs only (i.e. purchase of buses, charging infrastructure and power upgrades). All operating expenses will be paid by CPCA/GCP/Cambridgeshire County Council and the Operator Partner).

Zero Emission Buses:

3.1.2 The selected Operator Partner will be responsible for procuring the 30 electric double-decker buses through a competitive procurement process run with oversight from CPCA.

Items	Estimated Per Unit Cost (£ including inflation to delivery year but exc. VAT and optimism bias)	Estimated Total Cost (£ including inflation to delivery year but exc. VAT and optimism bias)
30 double-decker battery electric buses on the five Park and Ride services into and out of Cambridge City Centre and Citi 2 services	447,698	13,430,954
Total		**13,430,954**

3.1.3 The Operator Partner, as part of the Prior Interest Notification, will be required to define the vehicle specifications (which, at a minimum, will be for double decker buses capable of travelling 160 miles on a single charge, with a minimum 10-year battery warranty, and seating 70 passengers, and include our livery requirements, PSVAR requirements, and ability to connect to Plug-in Opportunity Charge Points. The Operator Partner will also be responsible for commissioning the vehicles.

3.1.4 The exact frequency of bus services will depend on schedule determinations by the successful Operator Partner. However, on average, our requirement is for the 30 vehicles to operate on the five Park and Ride routes with the following frequencies: every 10 minutes on weekdays, 20 minutes on Saturdays, and 30 minutes on Sundays; and on the Citi 2 route to replicate the existing schedule.

Depot Infrastructure Upgrades:

3.1.5 15 dual charging points will be installed in the selected Operator Partner's depot which will provide the facility to accommodate all 30 electric buses. A new 1.7MW power supply and associated infrastructure (Private step-down substation, trunking and cable conduits, a smart charging system, and ancillary safety equipment) will be required as set out below.

Items	Estimated Per Unit Cost (£ including inflation but exc. VAT and optimism bias)	Estimated Total Cost (£ including inflation but exc. VAT and optimism bias)
In-depot charging infrastructure		
DNO HV Metering substation and connection to DNO network	125,000	125,000
Increased cost for alternative DNO metering sub-station (add. 100m)	30,000	30,000
DNO risk allowance	50,000	50,000
DNO substation foundation	30,000	30,000
Private substation foundation	30,000	30,000
Civils Islands and Cable ducts, signs, etc.	250,000	250,000
Civils risk allowance	31,000	31,000
1.7MVA Private substation including civils and fit-out	140,000	140,000

LV distribution and communication network	92,000	92,000
DC chargepoints (dual-outlet) x 16	7,500	120,000
DC chargepoints power cabinet x 5	110,000	550,000
Private electrical risk allowance	90,200	90,200
Project detailed design and assessment	120,000	120,000
Construction Prelims - CDM, Welfare and Supervision	180,000	180,000
Prelims and Project Management Risk	30,000	30,000
Inflation (3.7%)	69,123	69,123
Total		**2,112,504**

3.1.6 CPCA's energy consultant has advised that it would be possible to upgrade this infrastructure to support a larger number of vehicles (3.7MVA to accommodate more than 110 buses) but this is, as yet, un-costed, since it will require a comprehensive route analysis of all routes run from the selected depot to determine peak energy requirements.

3.1.7 **Opportunity Rapid Plug-in Chargers:** Two opportunity rapid plug-in chargers (the second to avoid single point of failure) will be installed at the Babraham Park and Ride site, connected to the solar farm being developed by GCP above the car parking places to provide green energy to charge the buses when using the opportunity charging infrastructure.

Items	Estimated Per Unit Cost (£ including inflation but exc. VAT and optimism bias)	Estimated Total Cost (£ including inflation but exc. VAT and optimism bias)
P and R charging infrastructure		
Electrical Works Package*	70,056	70,056
Civil and Structural Works Package*	53,126	53,126
General Prelims	25,032	25,032
Charging equipment (DC twin charger)	26,967	26,967
Total (including inflation, but excluding VAT and optimism bias)		**175,181**

4. Procurement strategy

Sourcing options, and ownership and commercial models

4.1 Buses: The buses will be owned and operated by the Operator Partner. Unlike other authorities considering Franchising (e.g. LCRCA), CPCA currently has no intentions to own vehicles and, as the organisation responsible for Operating, Staffing, and Maintaining the vehicles, and the organisation best placed to protect and secure residual value for the vehicles, the Operator Partner is best placed to own the vehicles. It is also highly likely that the Operator Partner will require financing for its contribution of the vehicles, and that (if so) the vehicles will need to be used as collateral in the financing deal.

4.2 Energy: The Operator Partner will pay for all energy consumed in charging its vehicles both in-depot and out-of-depot (i.e. at the Babraham Park & Ride site). In practice this could see CCC re-charge the Operator Partner for power consumed from the Babraham Park & Ride charging station, however this would be at a nominal pass-through rate. The

reason for this is not to distort the true costs to the Operator Partner of operating battery electric buses.

4.2.1 **Charging infrastructure:** The ownership of charging infrastructure adds a layer of complexity to the relationship between CPCA, Cambridgeshire County Council, and the Operator Partner. Per above, CPCA's preference is for the Operator to procure, own and maintain its in-depot charging infrastructure, and for Cambridgeshire County Council to own the Opportunity Charging Station at the Babraham Park and Ride site. The in-depot charging infrastructure will be procured by the successful Operator Partner in an open and competitive process. The Charge Points will be delivered through grant funding to CCC who will in turn run a competitive process.

4.2.2 Either way, as part of the terms of the Grant Agreement, should CPCA wish to buy the depot off the Operator in the event of a reform of the local bus market, CPCA will reserve the right to an independent valuer to discount the purchase price by the agreed depreciated book value of the charging infrastructure assets which it has funded.

4.2.3 CPCA will require evidence and assurances from their delivery and ongoing management partners that they can deliver on the stipulations set out in the ZEBRA terms and conditions for bus specifications and requirements and also that they meet the requirements set by CPCA on route facilitation and service standards.

4.2.4 Funds will not be provided by CPCA or DfT until the certificate of compliance with the current UK Bus Test Cycle procedure has been sent to CPCA. The manufacturer will need to be able to demonstrate how and when the bus is expected to be tested and provide assurance on the expected performance from the UK Bus Test Cycle procedure.

4.2.5 Notwithstanding our preferred option, for the sake of completeness we set out in this section how we have considered retaining ownership of the in-depot charging infrastructure versus the Operator Partner owning it, and providing justification for the latter (the Operator owning the in-depot charging infrastructure).

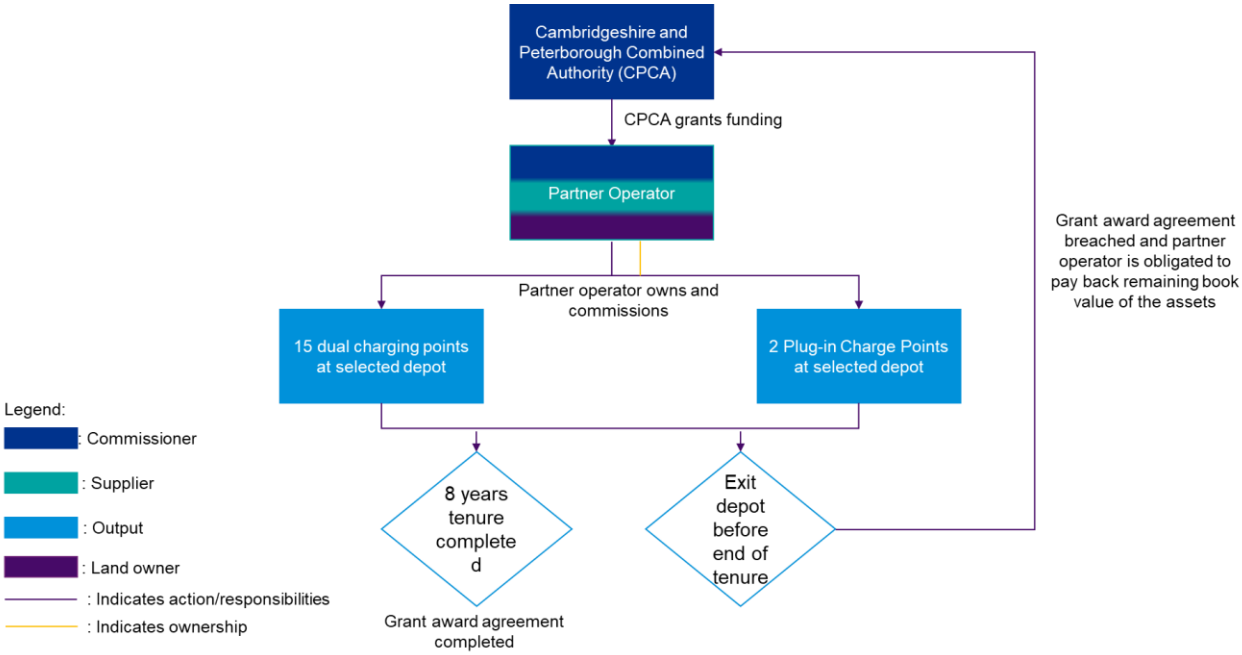
A. In-depot charging infrastructure (16 dual charging points, high voltage connection, and low voltage distribution infrastructure)

4.2.6 <u>Model A1: in-depot charging infrastructure is wholly owned by the Operator Partner (Preferred Option)</u>

4.2.6.1 In this model, CPCA provides the selected operator with funding to commission all infrastructure that is built on its premise. The infrastructure is therefore owned by the operator and it is responsible for operating as well as maintaining (O&M) them.

4.2.6.2 The condition for this arrangement is in exchange for ownership the operator is obligated under the grant award agreement to utilise and maintain the infrastructure for its entire 8- year lifetime. Should the operator choose to exit the depot before the 8-year tenure, an agreed accounting treatment in the grant award agreement will take effect and the operator is required to pay CPCA back the remaining book value (taking into account depreciation) of the charging infrastructure.

4.2.6.3 This arrangement can be summarised in the flowchart below:



4.2.6.4 The advantages and disadvantages of this model to CPCA are described below:

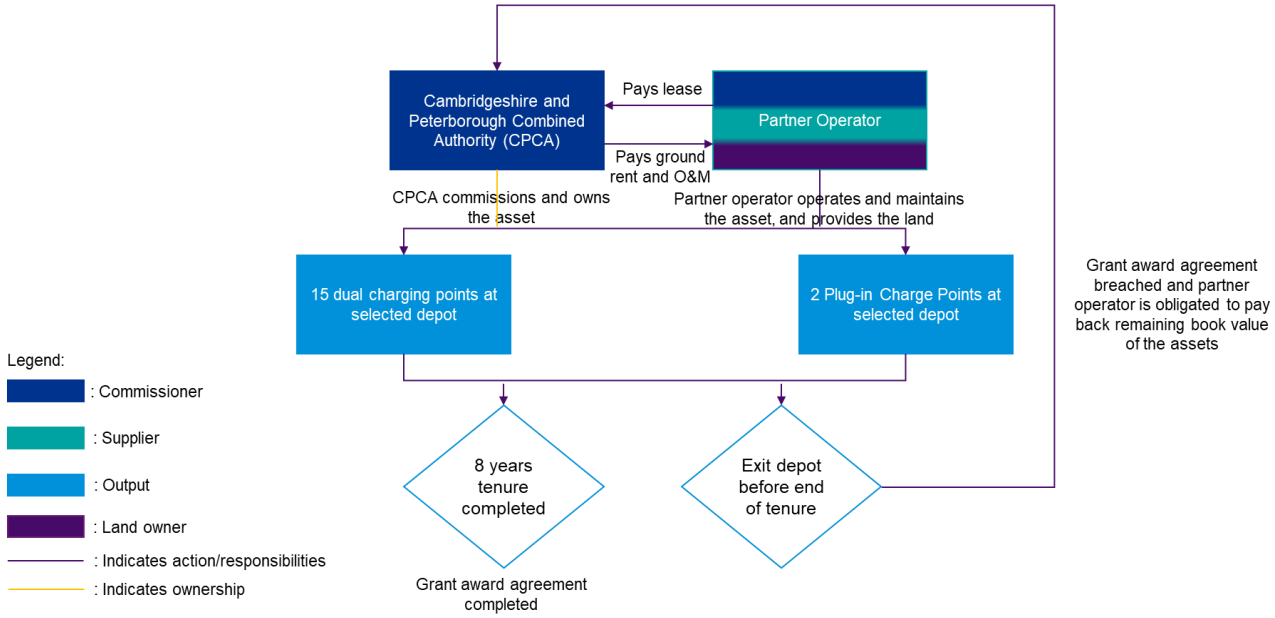
Advantages	Disadvantages
– Risk for availability and performance of the assets is transferred in whole to the Operator Partner. – The agreement incentivises the Operator Partner to fully utilise the charging infrastructure. – The administrative burden on CPCA is relatively small as most responsibilities have been delegated to the Operator Partner. CPCA's role will mainly be to oversee the operations and collect data from operators for M&E purposes. – The expenditure involved in operating and maintaining the assets is covered by the Operator Partner.	– CPCA relinquishes potential future lease income had it retained ownership of the infrastructure, which could have been a revenue stream to CPCA. – CPCA may be setting an expectation among operators in the market in relation to the government's willingness and ability to invest in charging infrastructure. Operators may not be incentivised to invest in their own infrastructure, instead waiting for future grants. – Efforts will need to be made to agree a mutually agreeable accounting treatment for depreciation given the lack of market value benchmarks.

4.2.7 Model A2: In-depot charging infrastructure is wholly owned by CPCA

4.2.7.1 In this model, CPCA commissions and retains the ownership of the infrastructure and gets permission for the infrastructure to be installed in the premise owned by the Operator Partner. The Operator Partner is responsible for operating and maintaining the asset as a condition of the Grant and loan of the asset, as well as paying for the cost of energy.

4.2.7.2 The condition for this arrangement is that the infrastructure is leased by CPCA to the operator whereby the latter pays peppercorn rent (discounted by taking into account ground rent and the cost incurred by the operator on O&M) to the former for a committed period of 8 years. In the event the operator chooses to exit the depot before

the end of 8-year tenure, it will be obligated to pay the remaining book value of the infrastructure. This arrangement can be illustrated with the flowchart below:



4.2.7.3 The advantages and disadvantages of this model to CPCA are described below:

Advantages	Disadvantages
– CPCA retains the right to levy future income from owning the infrastructure instead of giving it up to the operator. However, rent obtained from lease needs to be offset with peppercorn ground rent for using the Operator Partner's premise and cost of O&M for using the Operator Partner's service, meaning that this is likely to be negligible. – CPCA sets a reasonable expectation among operators in terms of how it can help with addressing market failure in the ZEB market using the repayable grant approach (effectively as a lease provider with time commitment). The repayable grant provided by CPCA helps operators spread the high upfront cost in exchange for paying for the lease premium. However, operators that have strong balance sheet will still be better off investing in their own infrastructure.	– This is a more complex arrangement than Model 1 and more negotiation efforts will be required. – Efforts will need to be made to agree a mutually agreeable accounting treatment for depreciation given the lack of market value benchmarks. – The Operator Partner may only agree to either the lease arrangement or residual value repayment agreement, but not both. – If the Operator Partner is only bound by the lease agreement, it is less incentivised to commit to retaining the asset should the operator need to exit the depot for profitability reasons within the 8-year term. This could result in hand-back of the charging infrastructure assets to CPCA in a used condition, and CPCA having no alternative location to deploy the assets, negating any remaining value in the assets.

4.2.7.4 *Rationale for preferring Model 1:*

1) The agreement incentivises the Operator Partner to fully utilise the charging infrastructure.
2) The administrative burden on CPCA is relatively small as most responsibilities have been delegated to the Operator Partner. CPCA's role will mainly be to oversee the operations and collect data from operators for M&E purposes.
3) Expenditure involved in operating and maintaining the assets is covered by the operator. In Model 2 CPCA could make losses since the lease paid by Operator Partner needs to be offset by the cost of ground rent and O&M.
4) Model 1 reduces the risk of an Operator Partner handing-back the charging infrastructure assets to CPCA in a used condition before the term, and CPCA having no alternative location to deploy the assets, negating any remaining value in the assets.

B. Opportunity Charging Infrastructure

4.2.8 Since this infrastructure will not be sited in the Operator Partner's depot, and has the potential for future use by other operators, it is CPCA's preference that it is not owned by the Operator Partner.

4.2.9 We have considered whether a third-party Infrastructure Provider might be willing to invest to deploy an Opportunity Charge Station and lease them to Cambridgeshire County Council/our Operator Partner as opposed to Cambridgeshire County Council procuring the infrastructure. Based on our energy consultant's estimates we anticipate that, at any point in time, one charge point will be used for seven in every 10 minutes, 10 hours per day, with the second charge point providing contingency. Despite this, as isolated assets, we believe that there will be very limited market interest in providing these "as a service". We will continue nevertheless to engage the market through to commencement of procurement to test this assumption.

4.2.10 As such both models set out below see Cambridgeshire City Council procuring and owning the Plug-in Opportunity Charge Points infrastructure.

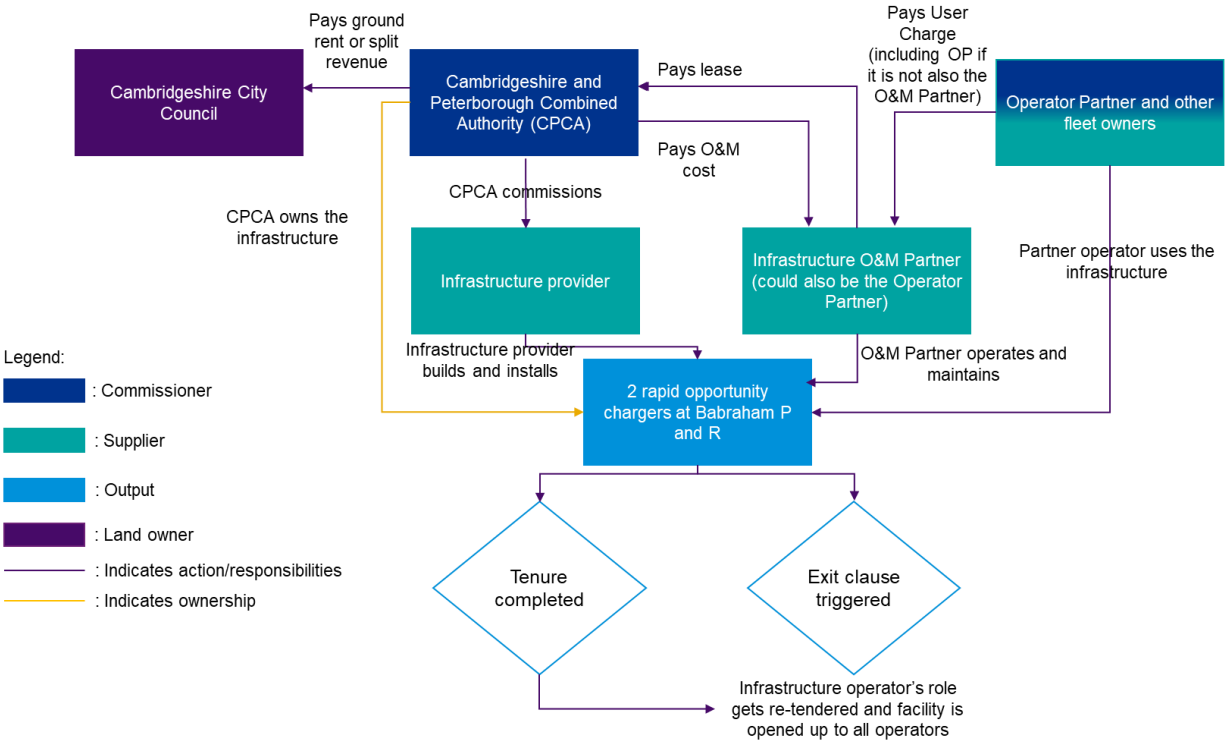
4.2.11 <u>Model B1: Owned by Cambridgeshire County Council, Giving the Operator Partner an Opportunity to also be the O&M Partner (Preferred Option)</u>

4.2.11.1 In this model, the infrastructure will be commissioned and owned by Cambridgeshire City Council. The role of O&M (Operation and Maintenance) Partner will be tendered out to a third-party supplier for which the Operator Partner is also eligible to bid, with conditions added to the existing Lease Agreement between the Park and Ride services Operator and Cambridgeshire City Council.

4.2.11.2 The condition for this arrangement is that:

- the O&M Partner will be paying a nominal lease premium to Cambridgeshire City Council for the use of infrastructure (this lease will be offset by the cost of O&M incurred by the Operator Partner if Operator Partner is appointed as the O&M Partner as well);
- the facility will be open to wider electric fleets in Cambridge such as our council electric bin lorries and other coach operators. However, we expect that the usage of opportunity charging will mainly cater to the needs of Operator Partner because it is expected that the Operator Partner will be the only entity with a significant electric bus fleet for the next three years; and

- there will be an exit clause available for Cambridgeshire City Council to re-tender the infrastructure operator's role to a third-party operator after a certain period of time during the contract and open the facility up to other operators, as it sees appropriate (i.e. opening up the facility can bring about higher level of utilisation).



4.2.11.3 The advantages and disadvantages of this model to Cambridgeshire City Council are described below:

Advantages	Disadvantages
– Cambridgeshire City Council (CCC) retains a source of potential future income from owning the infrastructure instead of giving it up to the Operator Partner. – Greater cost efficiency and more consistent performance is expected from having the Operator Partner (if chosen) provide O&M for in-depot and out-of-depot charging assets. – The Operator Partner (if chosen) will be better incentivised to maintain the out-of-depot charging infrastructure since they have no re-course to a third party (e.g. CPCA) for inadequate maintenance.	– Cambridgeshire City Council will need to ensure that the chargers are sufficiently utilised to keep the chargers commercially viable. This can be addressed by opening the chargers up for wider electric fleet in Cambridge (e.g. electric bin lorries already operating in the city)

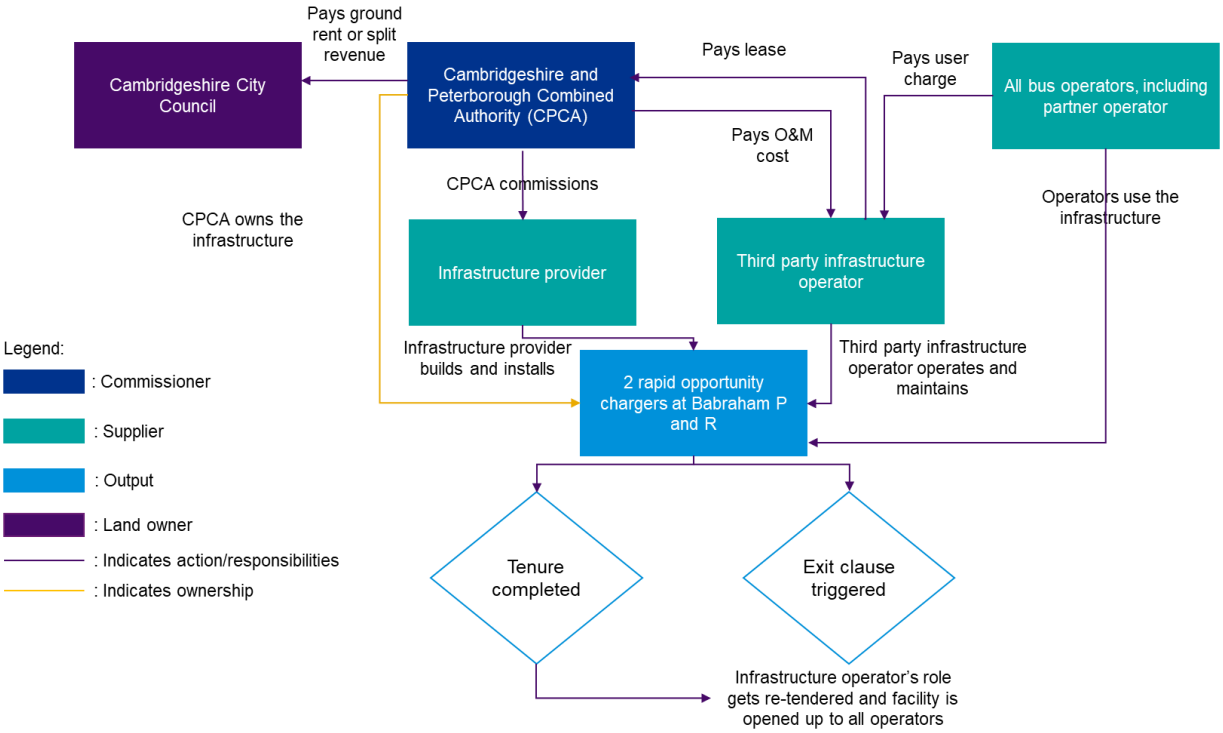
4.2.12 Model B2: Owned by Cambridgeshire City Council, Operated by a third-party Infrastructure Operator who is not the Operator Partner

4.2.12.1 In this model, the infrastructure will be commissioned and owned by Cambridgeshire City Council. A third-party infrastructure operator will be

maintaining and operating it. The facility will be open to all operators for use.

4.2.12.2 The condition for this arrangement is that:

- the Operator Partner, as well as any other operators using the infrastructure, will be paying user charges to the third-party infrastructure operator;
- the third-party infrastructure operator will pay a lease premium to Cambridgeshire City Council; and
- at the end of the lease term the role of infrastructure operator is re-tendered to identify the most competitive infrastructure operator in the market.



4.2.12.3 The advantages and disadvantages of this model to Cambridgeshire City Council are described below:

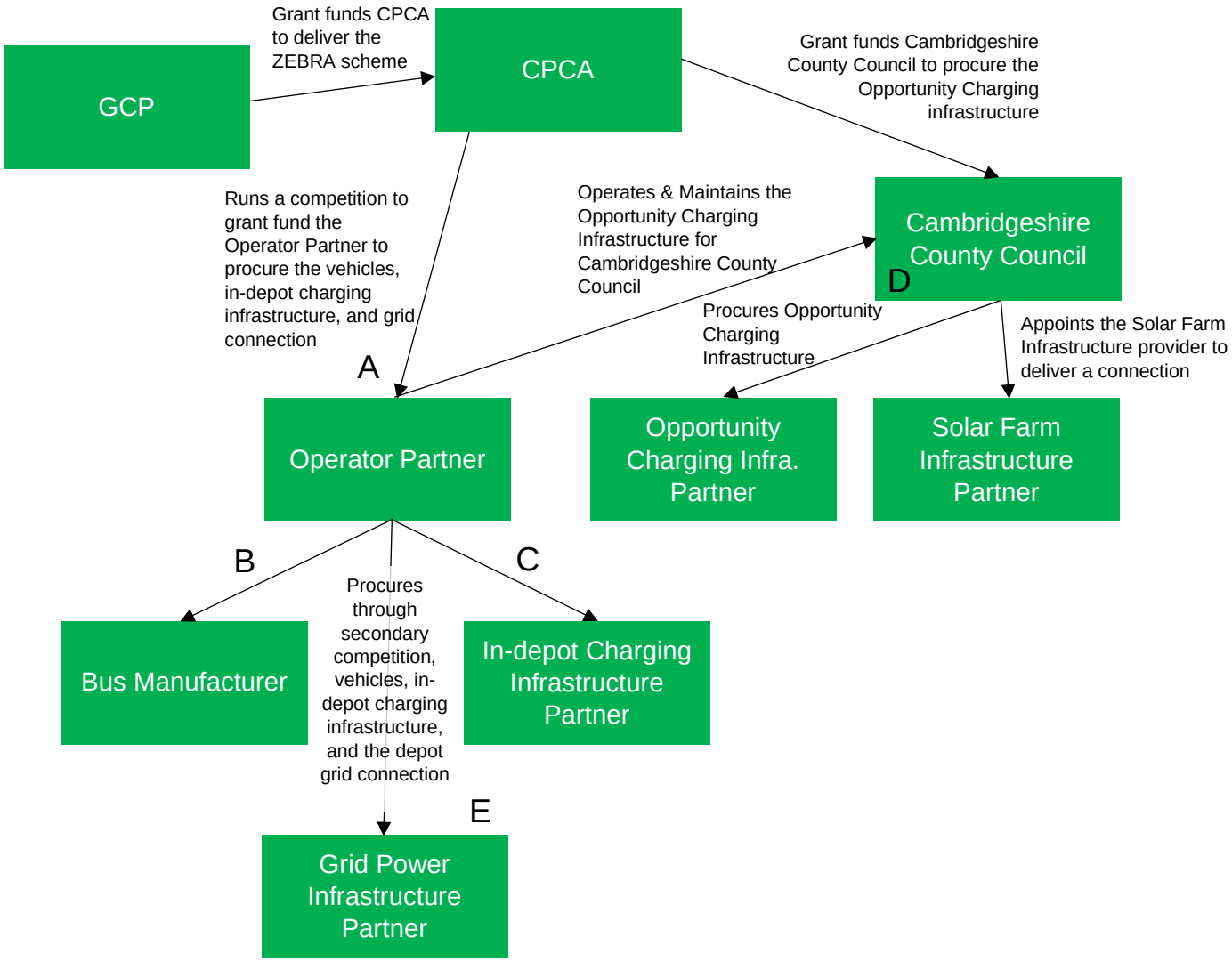
Advantages	Disadvantages
– Cambridgeshire City Council retains a source of income from owning the infrastructure instead of giving it up to the Operator Partner. However, rent obtained from the lease needs to be offset with cost of O&M for hiring the third-party infrastructure operator's service. – Cambridgeshire City Council does not get locked down with the Operator Partner and is able to benefit from increase in greater utilisation as and when the demand arises.	– The Operator Partner is expected to be the only entity with electric buses for quite some time. If Cambridgeshire City Council overestimates the pace of adoption of other operators, it may lose out from the cost efficiencies enabled through having one operator for both vehicle and infrastructure. – Model 2 increases the opportunity for the Operator Partner to make claims against Cambridgeshire City Council for poor/non-performance of the assets, since it is not maintaining them.

4.2.12.4 *Rationale for preferring Model 1 (Operator Partner maintains the* Plug-in Opportunity Charge Point *infrastructure):*

1) The Operator Partner is expected to be the only entity with electric buses for quite some time. Greater cost efficiency can be expected from having one operator for both vehicles and infrastructure if the Operator Partner is also the O&M Partner.
2) Model 2 increases the opportunity for the Operator Partner to make claims against CPCA for poor/non-performance of the assets, since it is not maintaining them.

Preferred option to deliver target outcomes

4.2.13 A summary of our preferred option is illustrated in the figure below. Figures in the diagram map to descriptions of our preferred commercial strategy in the narrative below.



Cost component (inc. installation/commissioning)	Amount (inc. inflation but exc. VAT and Optimism Bias)	Spend Type	Funded by
30 x double-decker battery electric buses	£13,431k	CAPEX	Operator commitment £7,035k *(100% cost of an equivalent diesel bus)*
		CAPEX	ZEBRA funding £4,295k *(56% of the cost premium between an electric double-decker bus and equivalent diesel bus)*
		CAPEX	CPCA / GCP funding £2,101k *(44% of the cost premium between an electric double-decker bus and equivalent diesel bus)*
In-depot charging infrastructure upgrade for 15 dual 150kW chargepoints	£1,937k	CAPEX	CPCA / GCP £1,937k
2 rapid chargers at Babraham Road Park and Ride	£175k	CAPEX	CPCA/GCP £175k
Scheme Administration inc. M&E	£1,031k	OPEX	CPCA / GCP / CCC £1,031k
Service Operations	£5,260k	OPEX	Operator Partner £5,260k

4.2.14 CPCA will engage the operator partner who will then be required to run a secondary competitive procurement for the bus manufacturer, charging infrastructure and the power providers. It will be stipulated in the contract that Service Level Agreements will have to be maintained and continuation of operation. If they are not met, or operations are ceased, then clawback measures will be in place to ensure the refund of public funds to the amount after depreciation over time.

4.2.15 CPCA will also ensure that the Operator Partner has undertaken the necessary procurement practices when running their secondary procurements. CPCA has already undertaken extensive market research and gained quotations from providers and manufacturers for the purposes of budgeting. CPCA will also require a full breakdown of the supplier contracts and evidence of each cost, with an agreement from each supplier on their role and output delivery for the scheme.

4.2.16 CPCA will vet their suppliers and will require their suppliers to do the same when procuring to ensure that we are not sourcing from companies who may risk violating UK's MSA, AML and ABAC regulations. Risk mitigation plans will flow from suppliers and then CPCA will undertake their own mitigations to safeguard from each provider, manufacturer and operator.

A. Operator Partner (Grant Award)

Selection Mechanism

4.3 Despite [redacted] letter of support and financial commitment to this business case, we still intend to open up the grant funding opportunity competitively to all operators who serve the CPCA constituencies. However, given the significance of the financial commitment required from the Operator Partner's part to deliver the ideal scale of intervention specified by this business case, we will include operator's financial contribution and its value-add to this project as one of the selection criteria.

4.3.1 As discussed above, we have previously engaged with two other major operators serving the CPCA constituencies and neither have shown preparedness to invest in zero emission vehicles, understandably due to the recent impact of COVID-19, the upcoming re-tender of [redacted] bus services and the difficulty in route to depot logistics for [redacted] outlined in the Market Engagement section, above. Per above, CPCA's preference is for the Operator to procure, own and maintain its in-depot charging infrastructure, and for Cambridgeshire County Council to own the Plug-in Opportunity Charge Points at the Babraham Park and Ride site. We will require bidders for the Operator Partner tender to commit to running secondary competitive procurements for the bus manufacturers and charging infrastructure providers (our preferred option).

4.3.2 In the event that we have only one bidder for the grant competition, which CPCA believes is possible, CPCA will commission specialist external consultancy to assess the tenderer's proposal to help ensure Value for Money in lieu of a competitive process for the operator.

4.3.3 In the event an alternative operator tenders for, and emerges as preferred bidder for this project, sufficient due diligence will be conducted to provide comfort that both a financial contribution and benefits (in terms of air quality and public health improvements) of at least the same scale, or otherwise greater, can be provided. This includes critically assessing the alternative operator's for proposed routes, and technical viability of its proposed depot and charging infrastructure arrangements.

Contract Structure for preferred option

4.3.4 During the "Build" stage, we will require the selected Operator Partner to enter into a grant award agreement with us which specifies all of the conditions for the grant award, including repayment provisions.

4.3.5 The table below offsets out key responsibilities of the respective parties in this agreement:

Parties	Key responsibilities
CPCA	– Setting the responsibilities and key accountability points with the Operator Partner, particularly with regards to the procurement of buses. – Setting out the O&M responsibilities for the Operator Partner. – Defining the specification for vehicle requirements including the enhanced PSVAR standards. – Providing a clear reporting mechanism and expectations on various KPIs for the operators to report back to CPCA. – Providing a clear commercial agreement of how the various assets (e.g. buses, charging points at depots and park and ride) are to be treated in terms of ownership and commercial model for charging infrastructure, (options considered and our preferred options are set out above), decommissioning/afterlife and exit clauses.

	– Setting a clear collaboration mechanism amongst CPCA, the Operator Partner, power company [redacted]), manufacturers, infrastructure provider, and other contracted suppliers. – Be responsible for securing planning permission. – Be responsible for assurance that the Operator Partner has delivered its responsibilities to the full extent. – Be responsible for developing marketing, corporate (internal) and stakeholder (external) communications materials in relation to the proposed ZEBRA scheme.
Operator Partner	Procurement responsibilities: – Be responsible for procuring the 30 electric double-decker buses. – Be responsible for procuring the in-depot charging infrastructure and depot power / connection upgrade. – Assist CPCA in procuring the charging power at Babraham Road. This includes working with Cambridge County Council at planning and design stages. Operational responsibilities: – Be responsible for the operation and maintenance of the vehicles, charging points (at the depot) and Plug-in Opportunity Charge Points (at the P&R site). – Be responsible for operating the vehicles at the selected routes for a minimum of 8 years. – Be responsible for maintaining a minimum service level (with exceptions during extraordinary circumstances, such as local and nationwide lockdowns). The current frequency for targeted routes is set at every 10 minutes on weekdays, 20 minutes on Saturdays, and 30 minutes on Sundays. – Be responsible for the rent or user charge payable to the CPCA/third-party infrastructure operator for using the Plug-in Opportunity Charge Points at the P&R site. – Be responsible for delivering reporting documents required by CPCA, including datasets or data points required for monitoring and evaluation purposes. – Be responsible for arranging a power purchase agreement with the (I)DNO and paying for usage at both the in-depot and out-of-depot sites.

4.3.6 The Operator Partner would be liable for the repayment of the proportion of grant provisions administered to them minus any depreciation over time if they fail to meet any of their procurement or operational responsibilities stated above, or if any breach occurs to the contract signed between the Combined Authority and the Operator Partner.

B. Buses (Procurement)

Selection Mechanism

4.4 The selected Operator Partner will be responsible for procuring the 30 electric double-decker buses through an open and competitive procurement process. As part of the PIN the Operator Partner will have been encouraged to engage manufacturers (both local or overseas via local distributors) and define the specifications (which, at a minimum, will be

for double decker buses capable of travelling 160 miles on a single charge, with a minimum 10-year battery warranty, and seating 70 passengers, and include our livery requirements, PSVAR requirements, and ability to connect to Plug-in Opportunity Charge Points). The Operator Partner will also be responsible for commissioning the vehicles.

Contract Structure

4.5 The Operator Partner will enter into a purchase agreement with a manufacturer. As CPCA is not involved in the procurement of the buses, CPCA will simply take the role of an overseer to ensure that the buses procured match the specifications desired and are delivered in a timely manner. CPCA will also ensure that any unspent Grant funding is recovered.

Parties in agreement	Key responsibilities
Operator Partner	– Be responsible for procuring the 30 electric double-decker buses. – Be responsible for specifying the tender requirements, including negotiating for deals and conditions for warranty as well as staff training on maintenance, among others. – Be responsible for holding the selected manufacturer to account on the timeliness of delivery and quality of new buses. – Be responsible for bringing in a capable O&M partner, if necessary. – Be responsible for engaging with financiers to raise fund for their financial contribution to this project, establishing financing agreements and ensuring the best value for money from such deals. – Be responsible for operating the buses safely and in line with best practices advised by the manufacturer to optimise their asset life. – Providing an option for CPCA to purchase the vehicles at remaining book value (taking into account depreciation and amortisation) should the Operator Partner opt to exit the market prior to the 8 year period.
Manufacturer	– Be responsible for delivery of the buses as specified in the purchase agreement. – Be responsible for honouring the warranty within the stipulated period. – Be responsible for delivering other ancillary services as part of the agreement (e.g. staff training on maintenance).

C. In-depot charging infrastructure

Selection Mechanism

4.6 The selected Operator Partner will procure, commission, and own the in-depot charging infrastructure (including charging points, low voltage distribution infrastructure, and step-down substation). We anticipate funding the installation of 15 dual charging points that will be installed in the selected Operator Partner's depot, providing the facility to accommodate all 30 electric buses. Since the infrastructure is to be installed at the Operator Partner's depot, it will also be responsible for commissioning and setting the specifications for the charging points according to the operating requirements.

Contract Structure

4.6.1 During the "Delivery" stage, the infrastructure provider will enter into an agreement with the Operator Partner. Although CPCA is not involved in this contract, it will be an overseer to ensure that the infrastructure delivered meets the requirements of this business case. CPCA will also ensure that any unspent Grant funding is recovered.

Parties in agreement	Key responsibilities
Operator Partner	– Be responsible for assuring the deliverables of the charging infrastructure provider. – Be responsible for collecting data on behalf of CPCA for monitoring and evaluation purposes. – Be responsible for bringing in a capable O&M partner to maintain the in-depot charging points. – Be responsible for using the infrastructure safely and in line with the best practices advised by the infrastructure provider to optimise the asset life.
Infrastructure provider	– Be responsible for delivering and installing charging points at selected depot in a timely manner. – Be responsible for honouring the warranty agreement within the stipulated period of time. – Be responsible for O&M if it is also appointed as the O&M partner.

4.6.2 During the "Operate" stage, the "Operational Responsibilities" of the grant award agreement will take effect and the Operator Partner is expected to operate and maintain the charging infrastructure, as well as collecting data necessary for monitoring and evaluation purposes.

4.6.3 There is a minor risk that the Operator Partner will cease service operations and terminate their presence in the CPCA region, due to impracticable obligations caused by the implementation of franchising. This is minimal and we have received assurances from Operator Partners that this would be a last resort. However, as a contingency we have set out the following risks that accompany the sale of the depot and mitigating factors:

Risks of sale	Mitigating factors
Accounting treatment of charging infrastructure	– It will be agreed within the Operator Partner and CPCA contracts the accounting standards that will be applied to the valuation and the depreciation methods over the lifetime of the project. An independent valuator will also be appointed by CPCA to formulate a mutually agreeable accounting treatment and arrive at a fair recoupable asset value during the time of exit/sale.
Continuation of charging infrastructure	– Covenants will be written into the sale of depot contracts to ensure that the new Operator Partner will abide by the terms and conditions of the ZEBRA scheme and that the charging infrastructure will continue to be run for the ZEBs.
Loss of grant funding	– Clawback conditions will be written into the contract with the Operator Partner to ensure that if they do terminate their operations, or do not meet Service Level Agreements that funding can be recouped to the necessary authorities and DfT.

4.6.4 Our ZEBRA scheme is looking to predominantly fund the operation and continuation of ZEB in the CPCA region and we will therefore ensure by all means possible that in the event that the Operator Partner terminates operation that the funds and infrastructure is protected for future use.

D. Plug-in Opportunity Charge Station

Selection mechanism

4.7 The plug-in opportunity charge station at the park-and-ride site on Babraham Road will be procured by Cambridgeshire County Council with support from the Operator Partner who will help specify the charge points and advise on operational requirements.

4.7.1 The selection of charging infrastructure provider and operator will also be conducted on a competitive basis.

4.7.2 Cambridgeshire County Council will request quotations for Operations & Maintenance ('O&M') services for the plug-in opportunity charge station at the Babraham Park & Ride site from both the equipment provider and from the Operator Partner, and will select the most economically advantageous tender accordingly. Cambridgeshire County Council will make it clear in both tenders (for the Operator Partner, and for the Plug-in Opportunity Charge Points) that it reserves the right to select the O&M services which represent best VfM. If the Operator Partner is selected to provide O&M for the Plug-in Opportunity Charge Points at the Babraham site it will re-charge such costs to the Cambridgeshire County Council inclusive of a nominal management fee.

4.7.3 [redacted] is the incumbent supplier delivering the Solar Farm at the Babraham Park & Ride site. It will be contracted (by extension of its existing contract) to provide a private wire from the embedded storage on the solar farm to the new Plug-in Opportunity Charge Points. For the avoidance of doubt it will not deliver or install the charge points themselves.

Contract structure for Plug-in Opportunity Charge Points at the Babraham Road P&R site

4.7.4 During the "Delivery" stage, the infrastructure provider will enter into an agreement with Cambridgeshire County Council. Cambridgeshire County Council will own the infrastructure. Although the Operator Partner is not involved in this contract, it will still be obligated by its grant agreement with CPCA to provide expert advice on the tender documents as well as quality of deliverables.

4.7.5 We anticipate using Cambridgeshire County Council's Terms and Conditions of Business for the contract; however, will invite bidders to propose amendments and/or their own Terms and Conditions, which we will require the facility to negotiate. These could come in the form of the time delay of installation caused by the completion of the Solar Panel Farm; however this delay is not on our critical path for delivery and shouldn't impact costs only time for delivery.

Parties in agreement	Key responsibilities
Cambridgeshire County Council	– Be responsible for engaging with suppliers and preparing for the tender documents. – Be responsible for assuring the deliverables of charging infrastructure provider with the assistance of Operator Partner. – Be responsible for applying for, and attaining planning permission.

Infrastructure provider	– Be responsible for delivering and installing charging points at selected depot in a timely manner – Honouring the warranty in the "Operate" stage.

4.7.6 During the "Operate" stage, Cambridgeshire County Council will enter into an agreement with the selected charging infrastructure operator and, separately, will extend (or novate) its Lease Agreement with its Park and Ride services Operator to facilitate access to, and use of the Plug-in Opportunity Charge Points.

4.7.7 It will be expected that the bus operator undertakes the O&M costs while they are the sole users. However, if the Charge Points are opened to other users, then it will be agreed that the Operator Partner receives preferential use of the chargers and will only have to pay their proportion of O&M costs.

Parties in agreement	Key responsibilities
Cambridgeshire County Council	– Be responsible for the cleanliness and upkeep of the general Babraham P&R site. – Be responsible for honouring its obligations under the Lease Agreement with the Operator Partner
Operator Partner	– Be responsible for honouring its obligations under the Lease Agreement with Cambridgeshire County Council
Infrastructure operator / Operator Partner (dependent on which party is selected to provide O&M services).	– Be responsible for operating and maintaining the assets. – Be responsible for collecting data for monitoring and evaluation purposes, and the provision of this data to CPCA.

E. Upgrading the grid connection to the selected Operator Partner's depot

4.7.8 As explained above, due to its presence in CPCA's locality and commitment to expedite turnaround times, it is likely that [redacted] as well as its energy consultant trading arm will be engaged to provide the increased power capacity required at the Operator Partner's depot.

4.7.9 However, due to the regulated nature of the energy market, additional grid connections will be owned by the DNO despite investment by CPCA, since a license is required to own grid connections on public land. Grid connections on private land are owned by the land holder – in the case of the Operator Partner's depot this will be the Operator Partner (or its landlord); in the case of the Babraham Park & Ride site this will be Cambridgeshire County Council.

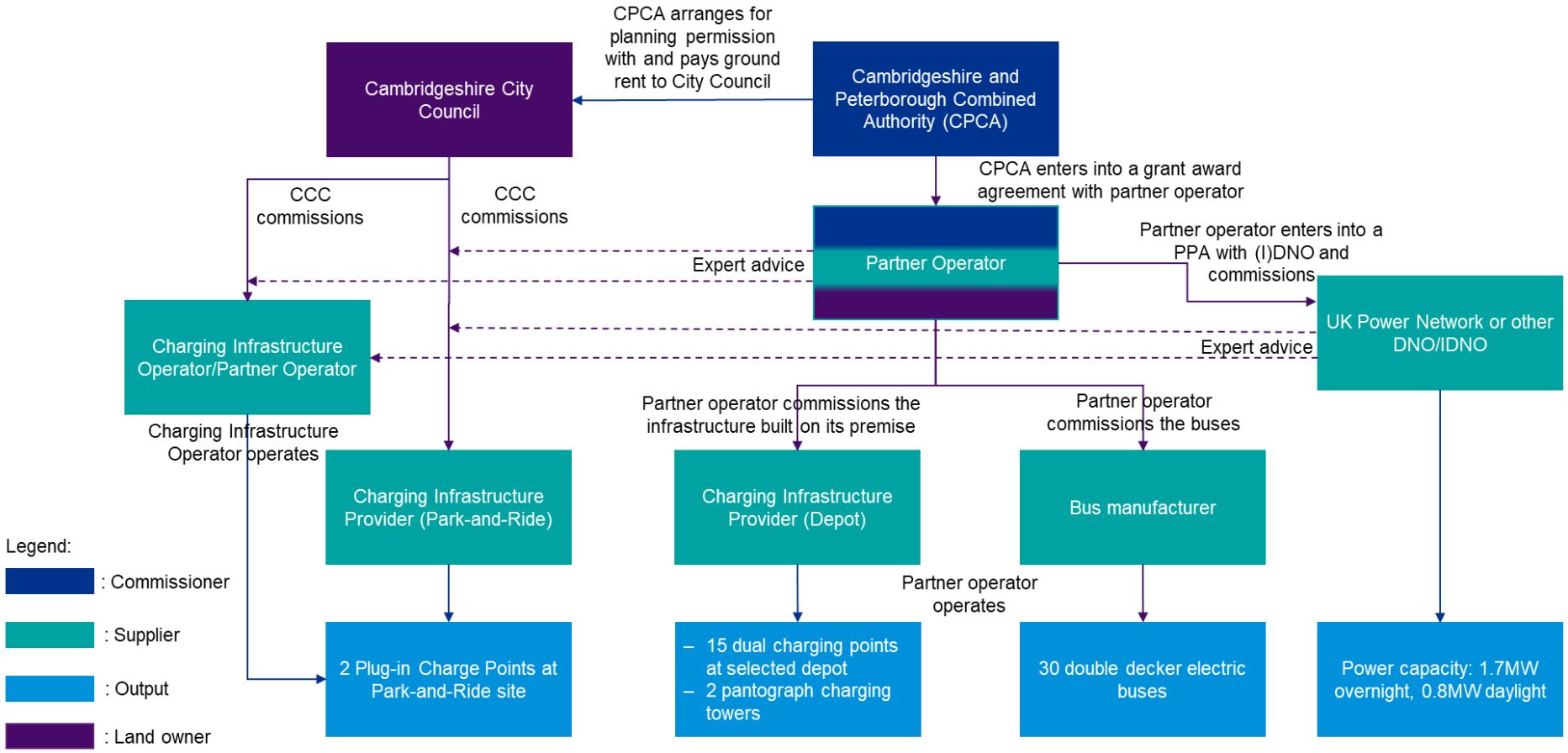
4.7.10 Given the ownership structure of the grid connection, and the need for close collaboration between the Operator Partner and power company to arrange site access, our preferred model is to grant fund the Operator Partner which will then pay [redacted] for the upgrade of the grid connection to its depot. CPCA will, however, oversee this – including reviewing costs to ensure that these are in line with our expectations from our discussions to date with [redacted]

4.7.11 We will also be engaging with an IDNO in the future to explore the possibility to provide a private wire connection to the Depot. The IDNO could then scale the connection to CPCA's needs and a commercial arrangement could be established whereby CPCA could benefit from future connections to the private wire. This proposition is yet to be investigated in the required detail to provide a direct comparison against the alternative of commissioning [redacted]. We will, however, engage in such discussions between the submission date of this business case and completion of the procurement exercise in

order to ensure that we are securing best Value for Money ('VfM') for Government's investment.

Illustration of the preferred contract and procurement structure

The contractual landscape described above is summarised in the following diagram:



4.8 *Operator Partner, Vehicle, and in-depot charging infrastructure procurement strategy*

Overview

4.8.1 To address Subsidy Control and Competition Act requirements a PCR2015 compliant procurement process will be run to award a grant (repayable if obligations are not met) to an Operator Partner which will then be required to run a secondary open and transparent competitive procurement process for the 30 battery electric double decker buses and in-depot charging infrastructure (with CPCA oversight), and to run these buses on Cambridge's five Park & Ride routes into and out of the city centre and the Citi 2 services, with the option to also procure Operations & Maintenance ("O&M") services.

4.8.2 A Prior Information Notice (PIN) and PCR2015-compliant Expression of Interest will be issued to identify potential Operator Partner bidders. This will also serve as the pre-qualification process for a single stage tender if required. If only a single viable Expression of Interest is received (as we expect based on our Market Engagement to date) we will look to Direct-Award the Operator Partner role to that bidder, subject to suitable diligence and scrutiny. Else we will run a single-stage PCR2015-compliant procurement to select the Operator Partner.

4.8.3 This will be a Negotiated Procedure with prior call for competition to ensure that we are able to secure an economically advantageous tender and provide the facility to negotiate specific aspects about the deployment of the infrastructure and the O&M contract with our preferred bidder. Justification for use of this procedure is provided above.

4.8.4 Guidance around this process can be found as part of the Government Functional Standards documentation set, with a specific suite of materials relating to grants. Whilst these central government policies need not be followed to the letter, they provide a sensible framework for a fair and transparent process, and will be materially adopted by CPCA.

Process – Grant Award Route

4.8.5 Along with a suite of other minimum requirements relating to senior responsible officers, business case development and other areas, the Government Functional Standards includes a policy document on competition for funding. It states that competition is to be used by default for government grant awards, with uncompleted or 'direct' awards only by exception.

4.8.6 If a direct award is not possible for the reasons we have discussed above (and embellished below), two approaches for grants are commonly utilised: open competition and challenge funds.

- Open competition – applicants compete in response to a published advert (including award criteria) for a single grant
- Challenge funds – applicants compete in response to award criteria for a portion of a pot of funding

4.8.7 Given the infrastructure investment proportion of the scheme and desire not to duplicate the need for installation across multiple sites, along with the intention that a single route is served with the bus and infrastructure investment, an open competition (with single grant to awarded to one successful applicant) is proposed. A 'challenge funds' approach is therefore discounted at this stage.

Direct Award Justification

4.8.8 Per the guidance, the following examples are provided in which a direct award may be appropriate:

- to an organisation that is the only provider of the service that the grant is being set up to fund;
- to an organisation which inhabits a unique position offering a particularly specialist function;
- when the value of the grant is low and the cost of approaching the market through a competition would clearly exceed the benefit to be gained from competition between suppliers;
- when there is extreme urgency, where such urgency was not foreseeable and was not as a result of any action or inaction on the part of the grant award department; and
- in the event of a market failure.

If the EoI process for the Operator Partner demonstrates that the conditions above have been met, we will look to proceed with a direct award to the sole viable bidder.

4.8.9 In this instance, whilst it is considered that there may be a case for an immediate direct award to the incumbent Park and Ride and Citi 2 services operator (which is known to have the appropriate local depot infrastructure in place and has confirmed commitment to our funding requirement), for the benefit of demonstrating transparency and open competition – and mitigating any state aid concerns – CPCA has determined that approval for a direct award should not immediately be sought and, instead, the PIN and EoI process as set out above (which may lead to an open competition for an Operator Partner or a direct award) is our referred option.

4.8.10 The following diagram[16] details the process overview for competition:

4.8.11 Specific references to the Government Grants Information System (GGIS) will be replaced with equivalent CPCA tools and systems where available in our Project Initiation Documents for this project should we be successful.

[16] **Source: 'Government Functional Standard GovS015: Grants v2.0 - INTRODUCTION', June 2020**

4.8.12 CPCA, through development of the business case has undertaken a number of the 'Design and Development' and 'Market Engagement' steps, which are documented in Sections 1.1 and 1.2 of this Commercial Case. The following sections discuss how the final four stages of the grant lifecycle will be addressed for our planned Open Competition.

Process Overview

4.8.13 Grant award criteria – first stage selection: Given the complexity of the operator and authority requirements and responsibilities, the vehicle and in-depot charging infrastructure grant award itself will form only one part of the activities required. It is proposed that the grant competition will yield a successful applicant which responds with a plan for meeting the authority's requirements pertaining to: 1) the provision of electric buses on P and R routes; 2) experience in operating and maintaining charging infrastructure; 3) a commitment to financial contribution equivalent to the cost of new diesel buses; and, 4) the quality of the proposal in meeting the strategic objectives as well as VfM specified in this business case.

4.8.14 Grant award criteria – second stage negotiation: Once that applicant is identified, there will need to be a further negotiation period – albeit based around high-level principles articulated in the advertised competition – pertaining to the approach to installation, operation and maintenance, and future ownership of the charging infrastructure to be installed. Agreement in relation to these terms will be a condition of contract finalisation for the vehicle and infrastructure procurement grant.

Open Competition – Considerations Step-by-Step

4.8.15 A number of factors are to be considered when determining a suitable competition setup. Per section 21 of 'Minimum Requirement Five: Competition for Funding', the key steps in the competition process that we will adopt are as follows:

- Defining our requirements – enabling an ability to compere like with like where possible;
- Setting the Grant Agreement terms and conditions – with as much of the terms set out up-front, although details will also need to be confirmed via negotiation, given complexities regarding potential future ownership of infrastructure and associated commercial implications;
- Setting the rules of the process – to include criteria and timings, along with confirmation bid costs are not to be reimbursed; and,
- Assessing potential delivery partners – application of criteria as set out above, in order to identify a preferred applicant.

4.8.16 In addition, market engagement - most notably advertisement of the grant competition – will form a key part of this phase.

Compliance with Government's Standards on Grant Award

4.8.17 A description of how CPCA plans to adhere to these standards is recorded in the table below.

Minimum Standards for Government Grants	CPCA's Adherence to these Standards
All government grants shall have a named Senior Responsible Officer	- Rowland Potter of CPCA will be the Senior Responsible Officer (SRO) of the transport competition grant.

throughout the lifetime of the grant.	
Departments shall ensure they have a robust grants approval process to approve spend over £100k.	The grant approval process will be set out in further detail closer to the launch of the grant award competition. However, as key principles: - CPCA agrees to pay the Operator Partner for the project (as a contribution only) as a maximum amount[17] in respect of the grant funding period, for eligible CAPITAL - The Operator Partner is responsible for ensuring that the terms and conditions of the Grant Funding Agreement are reflected in a *collaboration agreement*. Before submitting a claim payment the Operator Partner must enter into a *binding arrangement with CPCA.* - The Operator Partner will be required to appoint an '*Accountable Officer*' who is responsible for advising the Recipient and project partners, making decisions and providing information on behalf of the Recipient, ensuring that all grant agreement conditions are met. - A *Project Board* will be established by CPCA on which all delivery partners, including the grant recipients, shall be represented.
New government grants should be considered for submission to the New Grants Advice Panel.	- An advisory panel with representatives from CPCA and Cambridgeshire County Council will be in place throughout delivery. - Names of the advisory panel will be confirmed prior to the launch of the Grant award procurement.
A robust business case shall be developed for the grant.	- This Business Case bid for ZEBRA funding will have been approved by the Department for Transport ('DfT') should CPCA be progressing with the Grant award process. CPCA anticipates that the DfT will require a final ("Full") business case to be submitted upon CPCA's selection of its preferred bidders for the Operator Partner grant, and out-of-depot Charging Infrastructure provider.
Government grants should be completed by default.	- The government grant competition will be conducted through a PCR-compliant negotiated competition process. The first stage will involve selecting the preferred supplier and second negotiation on terms and conditions of grant award, including the ownership arrangement around charging infrastructure.
All government grants should be awarded through robust grant agreements.	- The Overarching Grant Agreement between the DfT and CPCA underpins the terms and conditions of the award. CPCA will ensure that these terms and conditions will be reflected on the grant award agreement with the Operator Partner.

[17] **Unless CPCA agrees to a variation**

All government grants shall be subject to timely and proportionate due diligence and fraud risk assessment.	- As stated below under 'Grant-making process', there will be a rigorous due diligence process in awarding the grant. This will be audited by an independent auditor.
All grants should be subject to performance and monitoring.	- The performance and monitoring process related to the award is detailed in the Management Case of this Business Case.
All government grants should be reviewed annually at a minimum with a focus on financial reconciliation.	- The financial review process is detailed in the Financial Case of this Business Case.
All those involved in the development and administration of grant awards should undertake core training in grant management best practice.	- A training process will be developed for the programme team.

4.9 *Plug-in opportunity charging procurement strategy*

4.9.1 A second competition will be run by Cambridgeshire County Council (CCC) to procure opportunity charging infrastructure at the Babraham Park & Ride site, with the option to also procure Operations & Maintenance ('O&M') services. This will be a Negotiated Procedure with prior call for competition to ensure that we are able to secure an economically advantageous tender.

4.9.2 The Negotiated Procedure with prior call for competition has been selected for the following reasons:

- There is more than one supplier in the market with the capability to deliver the Plug-in Opportunity Charge Points.
- We require the facility to negotiate specific aspects about the deployment of the infrastructure with preferred bidder(s).
- We require the facility to remove or include O&M of the infrastructure from the scope of the tender dependent on whether it is more economically advantageous to award it to the Operator Partner or an independent third party.
- We anticipate using CCC's Terms and Conditions of Business for the contract; however will invite bidders to propose amendments and/or their own Terms and Conditions, which we will require the facility to negotiate.

4.9.3 This competition will be run by CCC's procurement team in accordance with Public Contracts Regulations ('PCR') 2015.

4.10 Compliance with State Aid rules

4.10.1 CPCA's Procurement Team reviews all projects on a case by case basis to determine and assess the nature of the expenditure, its contractual value and the optimal means by which to achieve a value for money compliant process. This includes market engagement, risk analysis and a review of best practice.

4.10.2 CPCA is familiar with the UK Subsidy Control regime, and recognises that EU State Aid Rules ceased to apply to UK Law on 1.1.2021, with these being replaced by (a) Public International law obligations under WTO subsidy control mechanisms; (b) A UK domestic subsidy control regime (pending) and (c) EU/UK Trade and Co-operation

Agreement ("TCA") incorporated into UK Law by section 29 European Union (Future Relationship) Act 2020.

4.10.3 CPCA has consulted with and received advice with regard to our procurement route and Grant Competition requirements, and continues to consult, with its internal legal advisors regarding our preferred procurement route and Grant Competition requirements.

4.10.4 Legal advice has been provided by CPCA's external counsel, Addleshaw Goddard. The full legal opinion is available in the Appendix of this Commercial Case. In response to this legal opinion we have structured our approach to conduct an open, PCR2015-compliant competition for selection of our Operator Partner and, also, to require the selected Operator Partner to conduct an open and transparent procurement for the bus manufacturer and in-depot charging infrastructure provider, with oversight from CPCA. By adopting this strategy we are mitigating both potential State Aid and Subsidy Control risks.

4.10.5 CPCA is cognisant of the BEIS published guidance (on 31.12.2020) for public authorities, Complying with the UK's international obligations on subsidy control: guidance for public authorities which it has regard to when providing subsidies and the 5 steps that CPCA (as a public authority) must consider when awarding subsidies from 1 January 2021:

4.10.6 CPCA acknowledges that the TCA's subsidy control provisions (Chapter 3 of Title XI- which applies to goods and services) are of direct relevance to subsidies it grants and are required to meet the terms of all of the 'principles' set out in the TCA (or expose itself to a risk of challenge by way of judicial review). TCA defines a 'subsidy' by way of its four-fold test all four elements of which need to be established.

4.10.7 CPCA is familiar with the transparency obligations of publishing details of all subsidies it grants or maintains on its official website to enable any "interested party" to assess compliance.

4.10.8 CPCA will not grant a subsidy "where it has or could have a material effect on trade or investment between the Parties", (germane in relation to how CPCA intends to allocate any grant funding received to operators should its bid be successful) and ensures compliance with TCA by having in place an effective system of subsidy control determining that the granting of an individual subsidy respects the six principles.

4.10.9 CPCA actively avoids the grant of any prohibited subsidy (prohibited per se-Article 3.5 of Title XI). The lawfulness of any other subsidy would be actionable only where it has, or could have, a negative effect on UK/EU trade and investment. The threshold of negatively affecting UK/EU trade and investment is unlikely be met in most cases by the award of a grant per se but the risk that it may distort competition within the UK may be increased particularly where given to only some economic actors in a particular geographic region such as CPCA Transport Authority area.

4.10.10 Per above, CPCA intends to mitigate any such risk by awarding grants, resulting from any successful bid for ZEBRA funding, to local bus operators only after the conclusion of an open, transparent, competitive bidding exercise, run and managed by CPCA's procurement team, for the award of any such subsidy.

4.10.11 Likewise, an open, transparent, PCR-compliant competition will be run by CCC for the out-of-depot charging infrastructure (equipment, installation, commissioning, and operations & maintenance).

4.11 *Compliance with PSVAR*

4.11.1 CPCA will work together with the selected Operator Partner to ensure that the buses delivered meet all the specifications of PVSAR 2000, including but not limited to the following. Delivery of these requirements will be conditions precedent in the Grant Agreement between CPCA and the Operator Partner.

- Accessibility features for disabled passengers
- Assistive boarding features for passengers on wheelchair
- Low floor buses
- Audible and visible announcement features on buses

4.11.2 Likewise, relevant requirements (such as those set out in the Disability Discrimination Act) will be mandated for the siting and installation of charging infrastructure – both within the Operator Partner's depot, and infrastructure at the Babraham Park & Ride site.

4.12 Stakeholder control and management

4.12.1 A full DARCI table has been provided in section 4 of the Management Case outlining the ownership and responsibilities of each area of the scheme.

4.12.2 CPCA will also ensure that each supplier within the bid understands the covenants and terms and conditions that accompany the ZEBRA funding scheme agreement and consents to the clawback arrangements that will be enforced if they fail to maintain the delivery and service standards agreed to.

4.12.3 To ensure that delivery and ongoing management partners have the financial capacity to deliver services over the 8-year assessment period, CPCA will conduct a financial standing evaluation. This will be based on the financial information in the two most recent published accounts. If operators fail the evaluation a parent company guarantee may be sought. Where this was not forthcoming, we would be unable to make an offer of partnership engagement for the scheme.

4.13 *Rationale for the opted financing option*

4.13.1 CPCA has not engaged with financiers because the necessary funding is being sourced from an amalgamation of GCP, a contribution from the bus operator, along with the ZEBRA grant, in order to cover the associated costs. It will be the responsibility of the Operator Partner to determine how it proposes to fund its share of the vehicle purchase.

4.13.2 CPCA has considered entering into a commercial agreement to finance vehicles itself and lease them to the Operator Partner as other authorities (e.g. LCRCA) are considering, but has decided against this for the following reasons:

1. It is not in CPCA's long term objectives to own vehicles, even in Franchising is selected as the preferred long-term option for the region.
2. An operator in the market has demonstrated a strong enough balance sheet to raise such funding either from its own reserves or through a commercial loan. This is expected to be a more cost-effective financing option than leasing

vehicles from CPCA, considering there is support from public funding as well which reduces the amount of capital subject to interest repayments.

3. Such a model introduces unnecessary complications with the ownership structure of the buses and risk allocations.

4.13.3 Bidders for the Operator Partner role will determine how they will raise their contribution to the purchase price of the vehicles to ensure achievement of best value for money overall. Bidding operators will be required to demonstrate the various financing options considered, their respective impact on financing costs, and affordability of their proposed financing models in their bids to CPCA.

4.13.4 CPCA will be advising bidders to apply the grant funding to the chassis and frame elements of their vehicle so as to reduce the Finance or Operating Leases (if so required) for these traditional elements of a bus where residual value and performance risk can be better managed by an operator, and to consider Component Leasing of the battery from an energy management services provider (e.g. [redacted].) which is likely to be better placed to help the operator manage and protect the residual value of this new technology.

4.13.5 Notwithstanding the above, CPCA's Chief Executive Officer is meeting with the [redacted] over the coming weeks to understand capacity of the Bank to financially support schemes in the CPCA area. Funding of CPCA's contribution may be such a scheme. If this is the case, this Business Case will be updated accordingly, including to reflect any financing costs and conditions.

4.14 *Procurement timeline and process*

4.14.1 Project Gantt Chart: We have developed a detailed project timeline which describes the key activities at different stages of procurement and for all the relevant workstreams necessary for this project. Below are two timelines based on two scenarios that are possible as a result of our proposed procurement approach.

4.14.1.1 In the event of 1 eligible bidder: As shown by the Gantt chart below, we aim to have all the vehicles and in-depot charging infrastructure ready by September 2022 and operation to begin by October 2022, with the Park and Ride Charge Station in operation by December 2022 after the Solar Panel Farm is complete.

4.14.1.2 In the event of more than one eligible bidder: As shown by the second Gantt chart below, we aim to have all the vehicles and in-depot charging infrastructure ready by October 2022 and operation to begin by November 2022, with the Park and Ride Charge Station in operation by February 2023 after the Solar Panel Farm is complete.

5. Output Based Specifications

***Details of known vehicle and* charging asset requirements**

5.1 The following table sets out our known requirements for outputs, owners, and how they will be managed commercially.

Procurement scope	Detailed requirements	Commissioned and owned by	How they will be managed/operated
30 electric double decker buses	30 double-decker buses [redacted]	Operator Partner	The Operator Partner will operate and maintain the buses for a fixed period of 8 years at a minimum.

15 dual charging points at the selected Operator Partner's depot	15 new 150kW dual chargers	Operator Partner	The Operator Partner will operate and maintain the infrastructure for a fixed period of 8 years at a minimum.
Plug-in Charge Station at the Babraham Road P&R site	2 DC rapid opportunity charge point slots	CCC	CCC will commission either the Operator Partner or a third-party infrastructure operator to operate and maintain the asset.

5.2 ***Details of known grant award conditions***

5.2.1 The following table sets out our known requirements for conditions of the grant award, whereby failure to demonstrate capability to meet these will prevent an operator from being appointed, and failure to adhere to these will result in the grant becoming repayable to CPCA.

Asset / Service	Grant conditions
Service	Operation of 30 electric double-decker buses on the five Park & Ride routes into and out of Cambridge City Centre and cross-city service Citi 2, with the following average service frequency, for a minimum of eight (8) years: - every 10 minutes on weekdays; - 20 minutes on Saturdays; and, - 30 minutes on Sundays
Service	Relocation of any EURO VI buses displaced by the introduction of the 30 electric double-decker buses on the five Park & Ride routes into and out of Cambridge City Centre and service Citi 2 running cross-city, to replace EURO IV and EURO V Diesel buses operating elsewhere in the CPCA region.
Vehicles	Procurement of 30 electric double-decker buses, meeting our minimum requirements as follows: - capable of travelling 160 miles on a single charge; - a minimum 10-year battery warranty' - seating 70 passengers; - with digital illumination curtains capable of carrying / displaying CPCA livery; - built to PSVAR 2020 standards; and, - ability to connect to plug-in opportunity charge points
Vehicles	Maintained in a good state of repair (in accordance with the manufacturers requirements) and cleanliness throughout the operating period
Vehicles	Inclusion in the Operator's lease term of a clause to enable transfer of ownership to CPCA at a pre-agreed point in time (e.g. after eight years)
Charging Infrastructure	Procurement, operation, and maintenance, of 15 dual charging points to be sited in the Operator Partner's depot
Charging Infrastructure	Procurement operation, and maintenance, of plug-in charge points to be sited in the Operator Partner's depot
Charging infrastructure	Commissioning of grid connection capacity upgrades to enable charging of at least 32 electric double-decker buses

Charging infrastructure	OPTIONAL: operation and maintenance of two plug-in charge points to be situated on the Babraham Park & Ride facility

6. Risk allocation/apportionment and transfer

6.1 In order to ensure that foreseeable risks are sufficiently addressed in the contract we have developed a risk allocation matrix to summarise the approach to managing and mitigating potential risks. These are aligned to the following categories:

- Cost risk refers to the risk of the project running into a situation whereby the costs of procurement exceed the budget.
- Schedule risk refers to the risk of the project experiencing delays at any point or throughout the supply chain.
- Commercial risk refers to the risk of running into a situation whereby business viability is compromised due to the novel elements involved in approaching the business model or external threats (e.g. subsequent lockdowns).
- Regulatory risk refers to the risk of running into a situation whereby large-scale restructuring of the business model is required due to changes in regulatory regime (e.g. from deregulated to enhanced partnership or franchising).
- Technology/Performance risk refers to the risk of the relatively new zero emission technology not being able to live up to its promised specifications (e.g. life expectancy, rate of degradation of batteries, charging time, driving range, reliability, durability, benefits promised in terms of carbon savings, etc.).

6.2 We have allocated each risk to the entity which is most capable of managing or mitigating that particular risk.

Risk categories	Description of risks	Risk manager/ mitigator	Risk approach	Management/Mitigation of Risks
Cost Risk	Uncertainty around the cost of power connection	CPCA	Treat – approached an IDNO to keep pricing competitive	A thorough consultation with [redacted] has been undertaken to estimate the cost accurately and quoted prices have been provided and compared against industry averages and IDNO have also been approached.
	Uncertainty around the cost of installation and construction of charging infrastructure	CPCA	Treat – approached a number of providers to ensure competitive pricing	Our Financial Case includes both optimism bias and contingency for overspend in respect of infrastructure. We believe this is sufficient to cater for uncertainties but have established a robust change control and escalation process in the event that costs exceed contingency.

Risk categories	Description of risks	Risk manager/ mitigator	Risk approach	Management/Mitigation of Risks
	A rise in the cost of ZEB	CPCA	Treat – approached a number of manufacturers to ensure competitive pricing	CPCA has consulted with a number of bus operators who have provided a range of quotes that are all competitive with a guarantee of competitive pricing when we choose our specified manufacturer.
Schedule Risk	Timeliness of delivery for electric buses	Operator	Treat – CPCA have reached out to individual manufacturers to gain a scope of delivery timings to plan around	A grace period and exit clause will be included in the purchase agreement in the event of a late delivery.
	Timeliness of delivery for charging infrastructure	CPCA	Tolerate – there is only one provider in the area, however they have given us a delivery timeline, shown in the critical path	A grace period and clause that will require the supplier to bear any additional cost incurred due to late delivery. [redacted] has committed to a three-day delivery commencement period for the grid connection upgrade if we progress the scheme instead of normal 90 day period
Commercial Risk	Assumption on patronage level	Operator	Tolerate – outside of our control due to COVID and other factors	The Operator Partner will be responsible for keeping a satisfactory patronage level either through fare adjustment or service improvement.
	Changes in ownership of depot/park-and-ride site	CPCA	Treat – we have additional clauses and covenants in contracts to ensure clawbacks and continuation of services in the case of withdrawal	CPCA will agree with Cambridgeshire County Council on how the asset will be treated and valued in the event of a transaction.

Risk categories	Description of risks	Risk manager/ mitigator	Risk approach	Management/Mitigation of Risks
	The operating costs of electric buses are significantly higher (e.g. maintenance and repairs) which affects fares	Operator	Transfer – relatively untested technology in our region, however monitoring will help understand costs and mitigate if necessary, but ultimately sits with operator	CPCA will work together with the operator to put in place robust financial checks to minimise the impact of unexpectedly higher operating cost on fares.
	Uncertainty around residual value at the end of the terms of agreement	CPCA	Tolerate – relatively untested technology, will monitor more mature schemes	CPCA will determine how residual value should be derived as part of the grant award agreement process.
Regulatory risk	Shift of regulatory regime from a deregulated market to enhanced partnership or franchising	CPCA	Transfer – agreements in place with operators if they discontinue operations with clawbacks and covenants, so funding will be protected	CPCA will agree with the operators in advance, including the Operator Partner, on how different assets will be treated and valued in the event of a transaction.

Risk categories	Description of risks	Risk manager/ mitigator	Risk approach	Management/Mitigation of Risks
	Greater Cambridge Planning Service may require the depot to be relocated for urban redevelopment purposes	CPCA	Tolerate – **Charging infrastructure:** it is understood that the redevelopment will not require the depot to be relocated before 2031 which would have allowed us to make full use of the entire life of in-depot chargers. Treat – **Vehicles:** despite the relocation of said depot, electric bus services will continue. CPCA will work with the operator to identify a new depot location to anticipate any development in 2031.	A full cost-benefit analysis would also have been conducted to ensure that repurposing current depot site for other urban redevelopment purposes would have outweighed any costs (including sunk costs and loss in benefits) in respect of fixed infrastructure before the relocation is signed off. DfT's investment in the electric buses will remain protected. Buses will continue to serve the targeted routes. The only difference is they will now be housed in a different location.
Technology/ Performance Risk	Assumption on the life expectancy of batteries	Manu-facturer	Tolerate/treat – based off market research and most recent studies. However, we will train drivers and maintenance workers with best practice to maintain battery life	This will be managed through the warranty period and transfer of knowledge from the manufacturer and Energy Services provider (if appointed by the Operator Partner) to the Operator Partner to support appropriate maintenance of the batteries.
	Assumption on driving range	Manu-facturer	Tolerate/treat – based off market research and most recent studies. However, we will train drivers and maintenance workers with best practice to pro-long driving range	This will be managed through the warranty period.

Risk categories	Description of risks	Risk manager/ mitigator	Risk approach	Management/Mitigation of Risks
	Assumption on reliability	Manu-facturer	Tolerate/treat – based off market research and most recent studies. However, we will train drivers and maintenance workers with best practice to maintain reliability	This will be managed through the warranty period and transfer of knowledge from the manufacturer and Energy Services provider (if appointed by the Operator Partner) to the Operator Partner to support appropriate maintenance of the batteries.
	Assumption on charging speed	Infra-structure provider	Tolerate/treat – based off market research and most recent studies. However, we will train drivers and charge operators to ensure best practice and performance	This will be managed through the warranty period and transfer of knowledge from the manufacturer and Energy Services provider (if appointed by the Operator Partner) to the Operator Partner to support appropriate maintenance of the batteries.

Contract and implementation timescales

6.3 With reference to the procurement timelines above, the following contracts and implementation timescales will apply to our Scheme:

Procurement scope	Commissioner(s)	Contracted parties	Duration	Exit Clause Conditions
Grant Award Competition	CPCA	Operator Partner	8 years from time of commissioning	Repayment of remaining book value of assets paid for with the grant award
30 electric double decker buses	Operator Partner	Manufacturer	Delivery 6 months from time of execution with 10 year warranty period	Late delivery beyond grace period stipulated on contract Material performance issues outside of the warranty provisions

Procurement scope	Commissioner(s)	Contracted parties	Duration	Exit Clause Conditions
15 dual charging points at the selected Operator Partner's depot and supporting power connection infrastructure	Operator Partner	In-depot Charging Infrastructure Provider	Delivery 6 months from time of execution with 8 year warranty period	Late delivery beyond grace period stipulated on contract Material performance issues outside of the warranty provisions
In-depot charging infrastructure operations & maintenance ("O&M")	Operator Partner	In-depot Charging Infrastructure Provider	Annual (12 month) rolling O&M contract	Reliability / Availability / Performance breaches, else three months' notice (or as otherwise agreed)
Two plug-in opportunity charge points at the Babraham Road P&R site	Cambridgeshire County Council	Opportunity Charging Infrastructure Provider	Delivery 6 months from time of execution with 8 year warranty period	Late delivery beyond grace period stipulated on contract Material performance issues outside of the warranty provisions
Opportunity charging infrastructure operations & maintenance ("O&M")	Cambridgeshire County Council	Opportunity Charging Infrastructure Provider -OR- Partner Operator	Annual (12 month) rolling O&M contract	Reliability / Availability / Performance breaches, else three months' notice (or as otherwise agreed)

Capability and skills of the delivery team

6.4 Details regarding the key roles and responsibilities for the project team for both the Delivery and Operational phases of our Scheme are set out in the Management Case (including an organisation chart).

Output milestones linked to monitoring and evaluation plan

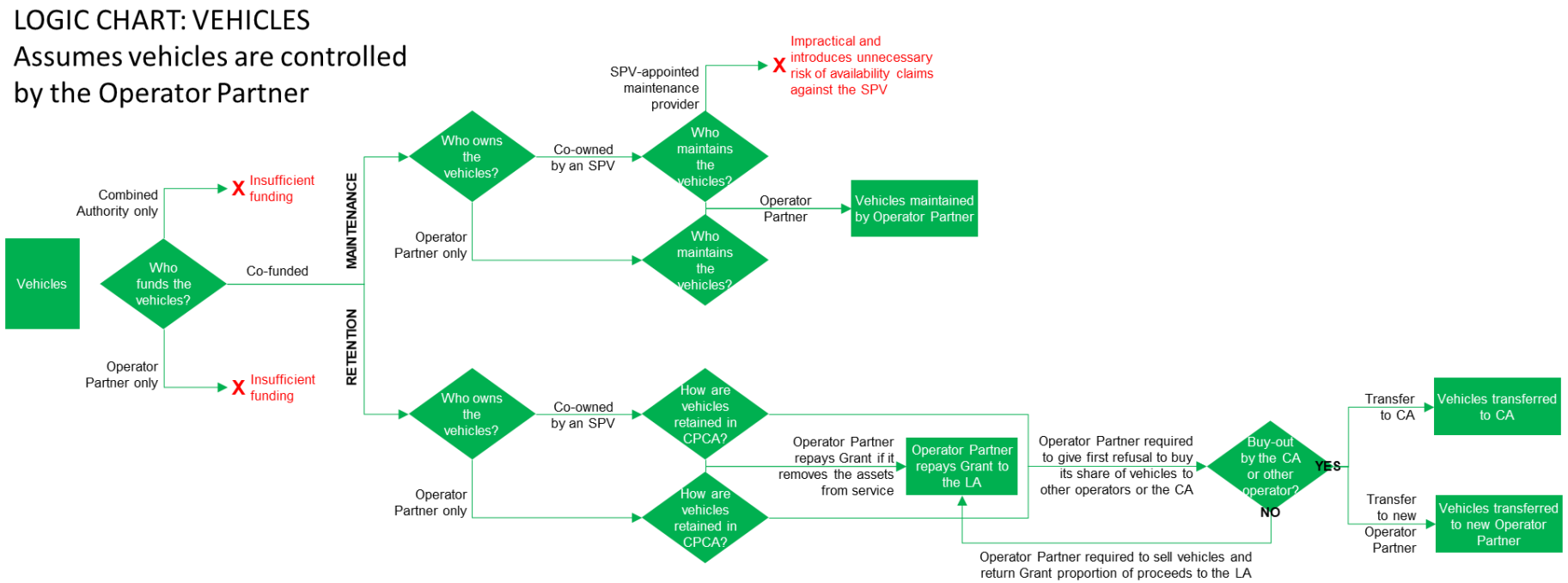
6.5 We recognise that the deliverables of this project will affect the impact we can observe through our monitoring and evaluation ('M&E') mechanism, which is explained in greater detail under the Management Case. The table below describes how some metrics will be contingent to us hitting the desired milestone for deliverables in order to realise the promised M&E outcomes. Most of our interventions will be introduced from day 1 of operation of which the impact should be observable almost immediately. However, we expect that the return of bus ridership level from upgrading our vehicles will happen more gradually and consequently the impact we can expect from this metric (the carbon emission per capita).

Output Milestones relevant to M&E	M&E metrics affected	How this will be measured
Number of e-buses introduced (30 buses from day 1 of operation)	Air quality (NOx and PM 2.5/10)	Air quality roadside sensors and diffusion tubes along targeted routes
	Carbon emissions saved (tank-to-wheel)	Kilometres ('km's') travelled by the electric bus fleet
Number of charging points and (15 charging points from day 1 of operation, and two further charging points from October 2022)	Carbon emissions saved (well-to-tank)	Energy bill/consumption record provided by the DNO Utilisation rate data
Ridership/patronage level (this is expected to be 50% of pre-COVID level from day 1 of operation and returning to pre-COVID level by year 2.	Carbon emissions per capita throughout the day	Ridership/payments data provided by bus/payments/ ticketing operator
	Modal shift from other modes to bus	Ridership/payments data provided by bus/payments/ ticketing operator

7. Commercial Case Appendix

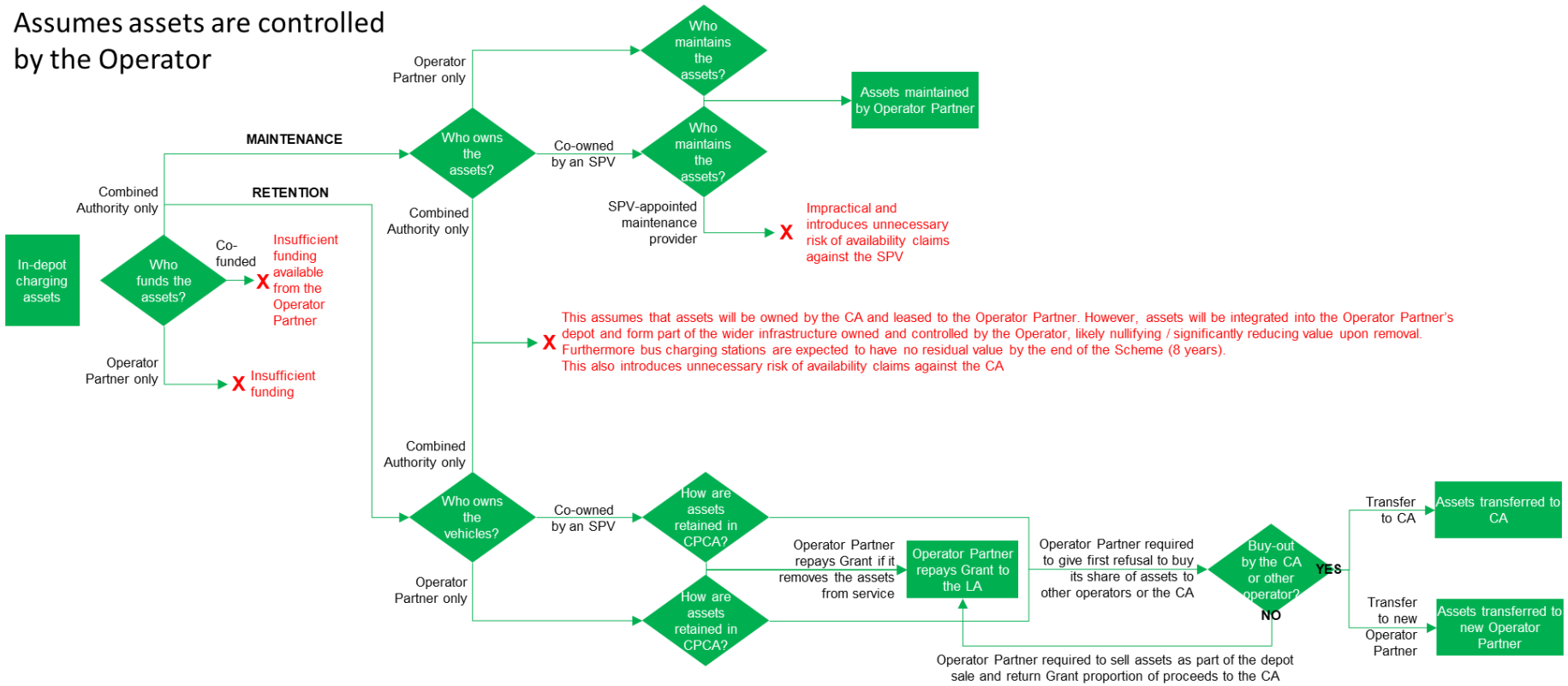
Full Legal Opinion on State Aid Implications of DfT Funding is provided in the Appendix

Logic paths for asset ownership options



LOGIC CHART: IN-DEPOT CHARGING ASSETS

Assumes assets are controlled by the Operator



Financial Case

1. Overview

1.1. The purpose of this Financial Case is to demonstrate that CPCA's proposed ZEBRA scheme is affordable and can sustain benefits in the long term beyond the length of the scheme.

1.2. The directly-attributable financial requirements for our proposed ZEBRA scheme over the 8-year period of the Scheme Operation (from Q1/2 2022 – Q1/2 2029), inflation embedded, as follows:

Items	2021 real prices inflated to expected date of incurrence Before VAT and optimism bias	After optimism bias (exc. VAT)
CAPEX		
30 x Double Deck Battery Electric Buses (OB 3%)	£13,430,954	£13,833,883
In-Depot and Out-of-Depot Charging Infrastructure (OB 10%)	£2,112,504	£2,323,754
Subtotal CAPEX	**£15,543,457**	**£16,157,636**
OPEX (covered outside ZEBRA funding)		
Scheme Administration, M&E, Marketing & Communications, Overheads, and Advisory support (OB 10%)	£1,031,317	£1,134,449
Total	**£16,574,775**	**£17,292,085**

1.3. Outside of the scope of this Scheme includes the cost of vehicle maintenance, infrastructure maintenance, and energy cost which will be incurred by the Operator Partner as it delivers zero emission bus services in the City of Cambridge.

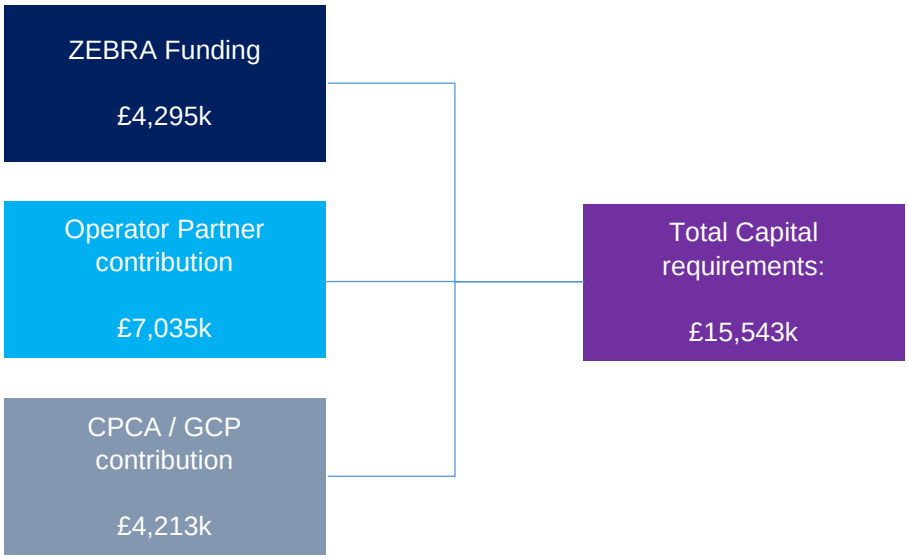
Items	2021 real prices inflated to expected date of incurrence Before VAT and optimism bias	After optimism bias (exc. VAT)
Vehicle maintenance	£2,299,502	£2,529,452
Operating cost	£2,695,439	£2,964,983
Infrastructure maintenance	£264,596	£291,056
Total	**£5,259,538**	**£5,785,491**

1.4. Sources of funding are as follows:

Cost component (inc. installation/commissioning)	Amount (inc. inflation but exc. VAT and Optimism Bias)	Spend Type	Funded by
30 x double-decker battery electric buses	£13,431k	CAPEX	Operator commitment £7,035k *(100% cost of an equivalent diesel bus)*

Cost component (inc. installation/commissioning)	Amount (inc. inflation but exc. VAT and Optimism Bias)	Spend Type	Funded by
		CAPEX	ZEBRA funding £4,295k *(67% of the cost premium between an electric double-decker bus and equivalent diesel bus)*
		CAPEX	CPCA / GCP funding £2,101k *(23% of the cost premium between an electric double-decker bus and equivalent diesel bus)*
In-depot charging infrastructure upgrade for 15 dual 150kW chargepoints	£1,937k	CAPEX	CPCA (Transforming Cities fund) / GCP (City Deal fund) £1,937k
2 rapid chargers at Babraham Road Park and Ride	£175k	CAPEX	CPCA (Transforming Cities fund) /GCP (City Deal fund) £175k
Scheme Administration inc. M&E	£1,031k	OPEX	CPCA / GCP / CCC £1,031k
Service Operations	£5,260k	OPEX	Operator Partner £5,260k

1.5. Sources of capital funding are summarised in the following diagram (including inflation, but excluding VAT and optimism bias):



1.6. Sources of operational expenditure funding are summarised in the following diagram:

1.7. This Financial Case has also taken into consideration the following key risks and set out CPCA's proposed mitigations respectively:

- **Funding risk:** There is a risk whereby the Operator Partner is unable to commit to its previously agreed financial contribution. We will mitigate this by including the Operator Partner's financial contribution in our evaluation criteria for bids, and request evidence of ability to deliver this contribution.
- **Cost risk:** There is a risk whereby the costs quoted by suppliers may exceed the cost profiling we have undertaken at this stage. We have mitigated this by consulting the market to develop robust costings. We will also apply additional measures to mitigate cost overruns. These include:
    - In the event of a single bidder for the Operator Partner we reserve the right to appoint an independent technical advisor to support any direct award process.
    - In the event that the preferred bidder is an Operator Partner without a depot near to our chosen routes we will closely scrutinise the bidder's cost submission and assumptions and engage our technical and energy consultants to assess viability of the bidder's submission.
- **Technology risk:** There is a risk whereby the performance of various technologies employed do not live up to their promised specifications. The award agreement will require the Operator Partner to agree an appropriate warranty with the bus manufacturer (including coverage of the battery and powertrain performance), and establish suitable contracts with organisations with the expertise (e.g. manufacturer and charging infrastructure providers) to advise the Operator Partner on best practices and provide upskilling/training to the Operator Partner's staff.

1.8. Risks which impact benefits but not costs are discussed, together with their implications for sensitivities, in the Economic Case.

2. Funding profile

2.1 Scheme CAPEX and OPEX whole life costs

2.1.1. The table below provides a detailed breakdown of the capital and operational expenditure requirements for our proposed ZEBRA scheme. As referenced in other cases, assuming we begin operation in Q3/Q4 2022, we expect that the 8-year operation will end in Q1/Q2 2029.

Year	1	2	3	4	5	6	7	8	9		
Base Price: 2021	2021	2022	2023	2024	2025	2026	2027	2028	2029		
Capital Expenditure										**Total**	**Total with OB**
Buses											
30 double decker battery electric buses	13,430,954									13,430,954	13,833,883
Subtotal (OB 3%)	13,430,954									13,430,954	13,833,883
In-depot Charging Infrastructure*											
DNO HV Metering substation and connection to DNO network	125,000									125,000	137,500
Increased cost for alternative DNO metering sub-station (add. 100m)	30,000									30,000	33,000
DNO risk allowance	50,000									50,000	55,000
DNO substation foundation	30,000									30,000	33,000
Private substation foundation	30,000									30,000	33,000
Civils Islands and Cable ducts, signs, etc.	250,000									250,000	275,000
Civil risk allowance	31,000									31,000	34,100
1.7 MVA Private substation including civils and fit-out	140,000									140,000	154,000
LV distribution and communication network	92,000									92,000	101,200
DC chargepoints (dual-outlet) x 16	120,000									120,000	132,000
DC chargepoints power cabinet x 5	550,000									550,000	605,000
Private electrical risk allowance	90,200									90,200	99,220
Project detailed design and assessment	120,000									120,000	132,000
Construction Prelims - CDM, Welfare and Supervision	180,000									180,000	198,000
Prelims and Project Management Risk	30,000									30,000	33,000
Inflation (3.7%)	69,123									69,123	76,035
Subtotal (OB 10%)	1,937,323									1,937,323	**2,131,055**
Opportunity Chargers at Babraham Road P and R (Optional)											
Electrical Works Package	70,056									70,056	77,061
Civil and Structural Works Package*	53,126									53,126	58,438
General Prelims	25,032									25,032	27,536
DC Charging Equipment (Twin Chargers)	26,967									26,967	29,663
Subtotal (OB 10%)	175,181	0	0	0	0	0	0	0	0	175,181	**192,699**
Total CAPEX With Optimism Bias	**15,543,457**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**15,543,457**	**16,157,636**
Revenue Expenditure										**Total**	**Total with OB**
Costs incurred by CPCA/CCC/GCP											
Scheme Administration	54,987	56,079	57,369	58,689	60,038	61,419	62,832	64,277		475,691	523,260
Monitoring and Evaluation	20,391		26,592	21,763			40,774			109,520	120,472
Marketing and Communications	6,627	6,759	6,914	7,073	7,236	7,402	7,572	7,747		57,329	63,062
Financial Management	28,343	28,906	29,571	30,251	30,946	31,658	32,386	33,131		245,192	269,711
Asset Management	10,705	10,918	11,169	11,426	11,688	11,957	12,232	12,514		92,609	101,869
Advisory Support	50,976									50,976	56,074
Subtotal (OB 10%)	172,029	102,661	131,615	129,201	109,909	112,437	155,797	117,668		1,031,317	**1,134,449**
Grand Total (With Optimism Bias 10%)	15,715,487	102,661	131,615	129,201	109,909	112,437	155,797	117,668		16,574,775	**17,292,085**
Other costs unaccounted for incurred by Operator											
Vehicle Maintenance	265810	271089	277324	283702	290227	296902	303731	310717		2,299,502	2,529,452
Operating Cost	311578	317766	325074	332551	340200	348024	356029	364217		2,695,439	2,964,983
Infrastructure Maintenance (in-depot and P and R)	30,586	31,193	31,911	32,645	33,395	34,164	34,949	35,753		264,596	291,056
Total (OB 3%)	**607,974**	**620,048**	**634,309**	**648,898**	**663,822**	**679,090**	**694,709**	**710,688**		**5,259,538**	**5,785,491**
*Inflation and contingencies are baked in suppliers' quotes											

Scheme CAPEX

2.1.2. Capital costs ('CAPEX') for the scheme (to be part-funded by ZEBRA) have been derived from market engagement, provision of quotations from independent suppliers (including two quotations from energy management companies for the in-depot charging infrastructure), and desk-based research. Further information on the sources of financial data is provided in Management Case appendix in Letters of Support and in Financial Case appendix.

Scheme OPEX

2.1.3. Operational costs ('OPEX') for the Scheme will be funded by the parties which incur the revenue expenditure. No claim is being (or can be) made against the ZEBRA fund for this OPEX, however it is shown for comprehensiveness per as the Greener Bus Business Case Guidance.

2.1.4. GCP, CPCA, and Cambridgeshire County Council have provided formal confirmation that they are able to accommodate this within their current RDEL budgets.

2.1.5. We anticipate that potential Operator Partners will also be able to accommodate these operational costs, which should be equivalent to or, ideally, less than the cost of operating equivalent diesel buses given fuel and maintenance savings.

2.1.6. In exchange for their capital contribution, the Operator Partner benefits from a new electric bus for the price of a diesel one, and the associated lower maintenance and fuelling costs. Operator Partner also gets to keep all of the revenue from running the new electric bus service.

2.1.7. **Local Authority RDEL expenditure:** Our forecase scheme administration costs are as follows. This assumes the following employment costs per staff grade:

- Grade 3 Median (£30,000-£35,000 pa),
- Grade 5 Median (£62,845 pa); and,
- Grade 7 Median (£86,965 pa).

Activities	Resource Requirements	Estimated cost p.a. before inflationary impact
Scheme administration	30% utilisation of: - 1x Grade 3 - 1x Grade 5 - 1x Grade 7	£53,943
Monitoring and evaluation	Based on quotes of previous M&E specialists hired by CPCA in the past	£100,000
Marketing and communications	10% utilisation of: - 1x Grade 5 Preparation and publication of Marketing and Communications materials	£6,500 TBD
Financial Management	30% utilisation of: - 1x Grade 3 - 1x Grade 5	£27,853
Asset management	30% utilisation of: - 1x Grade 3	£10,500
Advisory support	Light-touch ad-hoc budget for consultancies where necessary to support with procurement and implementation activities.	£50,000

2.1.8. **Operator Partner OPEX**: Using the Department's Greener Bus tool we have estimated the following Operator Partner OPEX requirements for the Scheme:

Assets	Other revenue costs	Incurred by	Estimated amount
Electric buses	Operation (including energy consumption)	Bus operator partner	c. £310,000 per year (Source: Greener Bus Tool)
	Maintenance	Bus operator partner	c. £270,000 per year (Source: Greener Bus Tool)
Infrastructure: • In-depot dual charging points • Plug-in opportunity Charge Points at the Babraham Road Park and Ride site	Operation	Selected charging infrastructure operator (This could be the bus operator partner itself)	c. £30,000 per year (Source: CPCA's benchmark from market engagement)
	Maintenance		
	Energy consumption		c. £0.15/kWh (usage TBD)
	Lease uplift for the Park and Ride services to be able to access and use the Plug-in		To be agreed with Cambridgeshire County Council in the Park and Ride

	opportunity Charge Points (if applicable)		Services Lease Agreement

Financial responsibilities

2.1.9. Finanical responsibilities for the respective counterparties are as follows:

Party	Funding to be provided (after inflation)	To be spent on	Responsibilities
Department for Transport (DfT)	£4,215k £4,295k	- Electric buses (part-funding (56%) the premium between an electric double decker bus and an equivalent diesel bus) - Battery warranty (at 80% capacity) for up to 12 years.	Alongside CPCA and GCP the Department for Transport is a sponsor of the Scheme. It does not demand a financial return but requires assurance that taxpayer funds are being used appropriately and are generating economic returns. It's responsibilities are: - Assurance and approval of this Business Case - Proper disbursement of funding in line with HM Treasury Green Book principles - Monitoring & Evaluation of the Scheme and Government's investment - Claw-back of the Grant if not used and/or its Grant conditions are not met.
CPCA / GCP	£4,171k £4,213k (£2,250k from GCP)	- Electric buses (part-funding (44%) the premium between an electric double decker bus and an equivalent diesel bus) - In-depot charging infrastructure at the selected	GCP is a sponsor of the Scheme. It does not demand a financial return but requires assurance that taxpayer funds are being used appropriately and are generating economic returns. Like the DfT its responsibilities are: - Assurance and approval of this Business Case - Proper disbursement of funding in line with HM Treasury Green Book principles - Monitoring & Evaluation of the Scheme and Government's investment - Claw-back of the Grant if not used and/or its Grant conditions are not met.

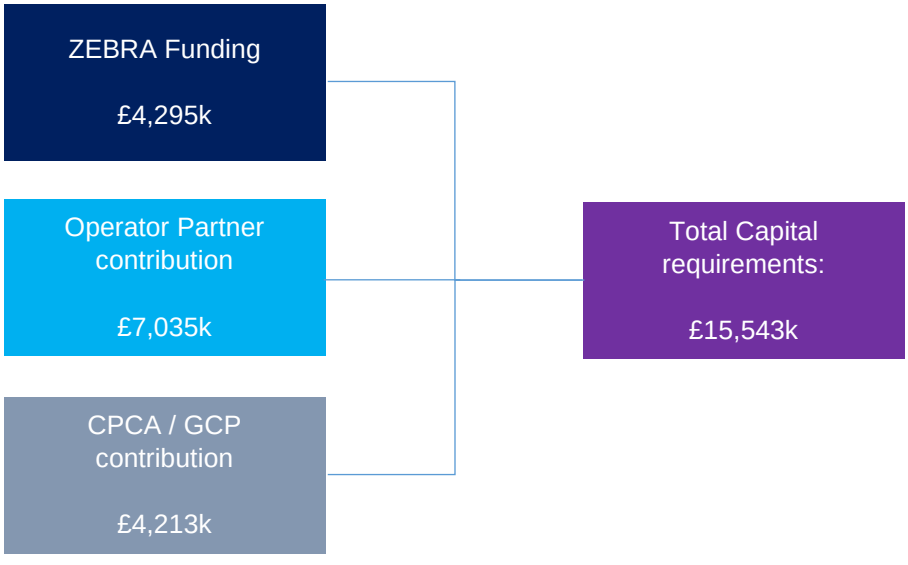
Party	Funding to be provided (after inflation)	To be spent on	Responsibilities
CPCA	Revenue cost: £940k £1,031k OB allowance: £708.9k	Operator Partner's depot - Rapid charging points and Babraham Road Park and Ride - Grid connection upgrade for the selected Operator Partner's depot	CPCA is both a sponsor of the Scheme and its administrator together with the responsibilities as set out above for GCP and the DfT, CPCA has responsibilities for: - Day to day engagement with the Operator to monitor and evaluate performance - Data Collection - Project management in both the Delivery and Operational phases of the scheme as set out in the Management case (including resourcing and discharging the project governance responsibilities) - Designing and executing the Operator Partner Grant Competition in accordance with PCR2015 - Management and disbursement of the Grant in accordance with Local Authority accounting standards/requirements. - Management of its Resource Delivery (RDEL) budget in accordance with Local Authority accounting standards/requirements

Party	Funding to be provided (after inflation)	To be spent on	Responsibilities
Cambridge-shire County Council	Nil	N/A	Cambridgeshire County Council will be a beneficiary of the Grant funding and will use it to procure, install, and commission plug-in opportunity charge points at its Babraham Park and Ride site. This will give rise to the following responsibilities: - Designing and executing a competition for the provision (and potential O&M) of Opportunity plug-in opportunity charge points in accordance with PCR2015 - Management and disbursement of the Grant in accordance with Local Authority accounting standards/requirements. This includes robust scrutiny in respect of connection costs payable to [redacted] for connection of the Opportunity plug-in opportunity charge points to the Solar Farm embedded storage. - Proper Asset Management for the plug-in opportunity charge points including management of the O&M contract and holding the O&M contractor to account for maintaining the assets in a good state of repair.

Party	Funding to be provided (after inflation)	To be spent on	Responsibilities
Operator Partner	£6,900k £7,035k	- Electric buses (fully-funding (100%) the cost of an equivalent diesel double-decker bus)	The Operator Partner will be both a beneficiary of Grant funding (for procurement of vehicles, in-depot charging infrastructure, and grid connection infrastructure), and will be a sponsor itself through provision of capital (financed or otherwise) for the vehicles. It's financial responsibilities, which will be set out in the Grant Agreement, are as follows: - Seeking and assuring other sponsors that it has secured best Value for Money for its procurements of vehicles and in-depot charging infrastructure - Robust and appropriate management of its supply chain for vehicles and charging infrastructure, including holding the supply chain to account against contractual obligations and warrantees - Payment of all relevant operational costs for the Scheme (i.e. fuel/energy, O&M for infrastructure, staffing, etc.). - Working with the CPCA and other delivery partners to seek to identify and realise cost optimisation opportunities. - Maintaining the assets in a good state of repair in line with manufacturers standards to ensure protection of residual value.

How CAPEX will be funded

2.1.10. The capital assets to be acquired are as listed on Table 1.0. Based on CPCA's market engagement with potential suppliers in the market, the capital cost requirements total approximately £15,543,457 (after inflation but before VAT and optimism bias). The cost will be split among DfT, Operator Partner, CPCA and GCP in the following fashion:



2.1.11. With reference to the diagram above:

1. The ZEBRA funding indicates the amount of funding we are applying for in this scheme.
2. Operator Partner's contribution indicates the support we have from [redacted] which has indicated in their Letter of Support to us that it is willing to contribute to the equivalent cost of 30 new diesel buses (@ £230,000). This contribution totals to £7,035,000 (including inflation, but excluding VAT and optimism bias).
3. The remaining capital cost requirements will be addressed through funding from the Greater Cambridge Partnership and CPCA, with a combined contribution of £4,213,458.

2.2. *Risk allowances: Optimism Bias and Quantitative Risk Assessment (QRA) for CAPEX*

A. Optimism Bias

Buses

2.1.2.1 We have included a 3% optimism bias in the costing of our buses per the Green Book methodology. In reality, we do not expect that the cost of buses will be more than what is quoted here since our cost estimate has been derived from conversations with five manufacturers in the market. We have also obtained quotes from three of them but are unable to share specific information due its commercially sensitive nature. Data sources are available in the appendix.

Infrastructure

2.1.2.2 We have included a 10% optimism bias, which is within the lower-end range recommended by Green Book guidance (Source: Supplementary Green Book Guidance – Optimism Bias), to show that we are prepared for accommodating cost overruns to a reasonable extent.

2.1.2.3 The rationale behind choosing a lower-end figure of 10% is because we expect that cost overrun will be minimal from the CAPEX perspective since we have undertaken a thorough market consultation to form our cost estimates. We have obtained quotes from 3 infrastructure providers, one of whom we have engaged to conduct a site assessment and design exercise at the potential depot and P and R target sites to come up with an accurate cost estimate. The quotes provided range from £1.1m-£1.9m. Furthermore, as all of the proposed capital acquisitions will be introduced within one year of securing the funding, we run very little risk of the cost estimates becoming obsolete due to time lapse. Data sources are available in the appendix.

2.1.2.4 An overview of how cost overruns will be managed through procurement process and contractual agreement is available in Section 1.1. above.

2.1.2.5 The optimism bias above also indicates the amount of room in the budget that CPCA has to accommodate for any CAPEX overrun.

B. Quantitative Risk Assessment (QRA)–informed Contingency

2.1.2.6 Utilising an Expected Monetary Value (EMV) methodology we have developed a Quantitative Risk Assessment (QRA) for the two primary types of CAPEX using the cost ranges that we collected from our market analysis (see the Appendix to this Financial Case), and applying a probability weighting to determine the potential (risk adjusted) percentage variance from our baseline cost :

Items	Low (10% probability)	Baseline (50% probability)	High (40% probability)	Contingency (negative means likelihood of saving)	% of Baseline
Electric buses (cost per bus)	£423,383	£447,698	£479,688	+£10,364	+2.3%
Infrastructure	£1,116,306	£2,112,504	£2,721,291	+£107,038	+5.1%

2.1.2.7 We will work with suppliers to minimise the contingency above to the best of our ability. However, we will also push any liability for cost overruns beyond what is provided for optimism bias to suppliers through our contracting agreement. It is also noteworthy that a +10% risk and contingency as well as +3.7% inflation rates have been embedded by the supplier into their quote (baseline figure) for in-depot infrastructure.

2.1.2.8 Per above, we have employed an EMV QRA methodology whereby the values of low, baseline and high are multiplied with their respective probability which are subsequently summed up.

2.1.2.9 For electric buses:

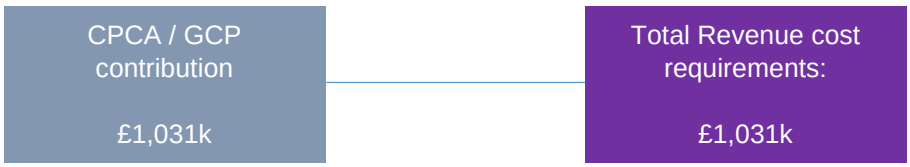
- EMV for electric buses = 10% x £423,383 + 50% x £447,698 + 40% x £479,688 = £458,062
- Contingency is therefore = (EMV – Baseline)/Baseline % = 2.3%

2.1.2.10 For infrastructure:

- EMV for infrastructure = 10% x £1,116,306 + 50% x £2,112,504 + 40% x £2,721,291 = £2,219,542
- Contingency is therefore = (EMV – Baseline)/Baseline % = 5.1%

***How* OPEX will be funded:**

2.1.2.11 The revenue costs to CPCA, GCP and Cambridgeshire County Council included within the scope of this Scheme include overheads, programme management, and M&E reporting. As set out above, the total present value of RDEL to administer the project will amount to £1,031,317 (after inflation but before optimism bias).



2.1.2.12 CPCA and Greater Cambridge Partnership (GCP) will contribute to a pot of funding to cover revenue expenditure associated with this programme, including the cost of overheads, programme management, advisory support, and M&E reporting.

2.1.2.13 Within CPCA and GCP respectively, the funding will be sourced from CPCA's RDEL budget.

Risk allowances: Optimism Bias and Quantitative Risk Assessment (QRA) for OPEX

A. Optimism Bias

2.2 We have also embedded a 10% optimism bias to the estimated revenue expenditure, which is within the range recommended by Green Book guidance, in anticipation for possible cost overruns in running the scheme.

2.2.2 The rationale behind embedding the lower end of the recommended range is because CPCA/GCP/CCC has robust internal management capacity with a wealth of experiences running similar projects in the past. We have also taken into account the same inflation factor as used in the Greener Bus Model and a 10% optimism bias to provision for any additional overhead costs.

B. Quantitative Risk Assessment

2.2.3 Staff salary within CPCA undergoes an established review procedure every year. However, we have developed a view in terms of contingency in cases where greater involvement is required from our internal team than what is currently assumed:

Items	Low (75% of baseline utilisation) Probability: 10%	Baseline Probability: 50%	High (125% utilisation) Probability: 40%	Contingency (negative means likelihood of saving)
Revenue cost	£773,487	£1,031,317	£1,289,146	+8%

2.2.4 There will be funds within the RDEL budget to accommodate for both optimism bias and contingency specified above as set out in the confirmations provided above.

Funding drawdown sequence

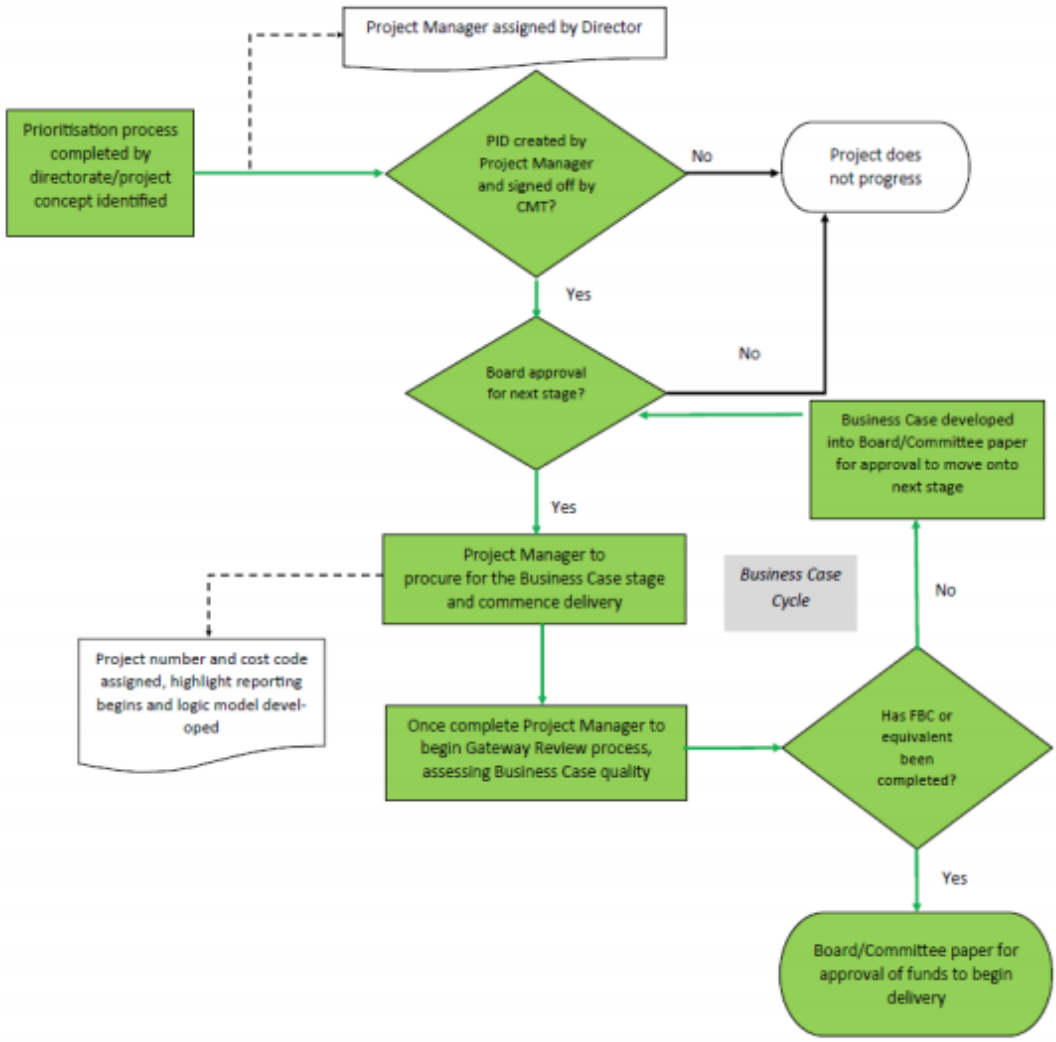
2.2.5 CPCA's general principles are that:

1. Every payment to a Delivery Partner must be approved by the CPCA's ZEBRA Scheme Board, which comprises the following members:
    - Rowland Potter (Head of Transport, CPCA);
    - Steve Cox (Project Sponsor, Cambridgeshire County Council);
    - Peter Blake (Project Sponsor, Greater Cambridgeshire Partnership); and,
    - Mehmet Ahmet (Project Director, CPCA)
2. We will request that the drawdown of funding from DfT and GCP to CPCA is done within 30 calendar days upon the approval of the procurements of our Operator Partner and Opportunity Charging Infrastructure Provider to mitigate any delays in start dates which may delay delivery of the operational service. We

expect that some providers may require a partial down payment to start work (e.g. Bus Manufacturers requesting 10% on placement of the order and the remaining 90% on completion).

3. Where payment is due on delivery (e.g. Cambridgeshire County Council's Opportunity Charge Station) we will commit to making the payment within 60 days upon successful delivery of the associated goods and/or services.

2.2.6 Our approval process is as follows:



2.2.7 The anticipated funding disbursement timeline is as follows (all figures reflect prices inflated to the year of estimated delivery):

Key payment milestone	Amount (£)	Approval by the	Drawdown of funding by CPCA	Payments to be made to	Payor (Donor)	Payee (Recipient)

		Project Board	from funders	recipients by		
Buses	6,396k (*4,295k from the DfT and 2,101k from GCP*)	02/2022	05/2022 (From DfT and GCP to CPCA)	11/2022	CPCA Operator partner (whereby the Operator partner will also be covering the down payment on buses itself)	Operator Partner (for onward payment to the bus manu-facturer) The Operator Partner will contribute £7,035k.
In-depot charging infra-structure	1,937k *(149k from GCP)*	02/2022	05/2022 (From GCP to CPCA)	11/2022 for in-depot infra-structure	CPCA	Operator Partner (for onward payment to the depot charging infra-structure provider)
Out-depot charging infrastructure (Babraham Road P and R)	175k	02/2022	05/2022 CPCA-funded	02/2023	CPCA	Cambridgeshire County Council for onward payment to infrastructure provider.

2.2.8 Please refer to the Gantt Chart on the next page for the complete sequence of drawdown and payments.

Year	1	1	1	1	1	1	1	1	1	1	1	1	2	2	2	2	2	2	2	2	2	2	2	2	3
Month	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1
Estimated mm/yy	10/21	11/21	12/21	01/22	02/22	03/22	04/22	05/22	06/22	07/22	08/22	09/22	10/22	11/22	12/22	01/23	02/23	03/23	04/23	05/23	06/23	07/23	08/23	09/23	10/23
BOARD APPROVAL: CPCA, CCC and GCP																									
Project Initiation																									
ZEBRA Announcement																									
Set up of the ZEBRA scheme project governance																									
Set up of the Operator Grant Award Competition																									
Workstream #1: Selection of the Operator Partner by CPCA (Direct Award Scenario due to 1 eli le bidder in the market resent)																									
Launch of the Grant Award Competition among operators																									
Bid evaluation																									
Contract negotiation and finalisation																									
Selected Operator Partner Announced																									
Finalisation of the specification for buses and infrastructure																									
Setting up the procurement for electric buses																									
Development of safety cases for vehicles and infrastructure																									
Workstream #2: Procurement & Delivery by the Operator Partner of 30 double decker electric buses																									
Launch of the Bus Procurement																									
Bus Manufacturer appointed																									
Bus Manufacturing taking place																									
Bus Delivery Completed (latest by end of Q3 22)																									
ZEB begins operation																									
Workstream #3: Procurement and Delivery by the Operator Partner of 15 in-depot dual charging points (Equipment and C l)																									
Launch of tender, site visits, review and supplier selection																									
In-depot infrastructure provider appointed																									
Obtain planning permission																									
Develop detailed design																									
Procurement of sub-stations and other items																									
Installation time: dual charging points																									
Charger Software integration																									
Completion of installation: dual charging points																									
Workstream #4: Procurement and Delivery by CPCA/CCC of 2 Babraham Road P&R Plug-in Charge Station (Equipment and M)																									
EXTERNAL CONTINGENCY: Babraham Road charge station is operationally reliant on the completion of installation of sola nel for power supply																									
Launch of tender, site visits, review and supplier selection																									
Pand R infrastructure provider appointed																									
P&R Charge Station Accessibility Impact Analysis and mitigation planning																									
Permit application and planning and design																									
Charger Software integration																									
Construction and Installation of charge station																									
Install power connection to solar panel (solar panel to be completed by 10/22)																									
Completion (charge station will be completed together with the solar panels)																									
Workstream #5: Operator Partner Staff Training																									
Development of Bus & Infrastructure Maintenance training materials																									
Training of Operator Partner O&M staff																									
Development of Bus Driver training package																									
Training of Operator Partner Bus Drivers																									
Workstream #6: Marketing & Communications (MarComms)																									
Collaborative MarComms strategy development (Operator Partner & CPCA)																									
Preparation of MarComms material																									
MarComms strategy delivery																									
Workstream #7: Monitoring & Evaluation set-up																									
Co-design of M&E data capture mechanisms with delivery partners																									
Establishment of M&E data transfer, storage and analysis capabilities																									
Development of M&E reports																									
Operational Delivery																									
3-month trial period testing compatibility of vehicles and infra																									
Verification report upon trial completion that assets are fit for purpose																•									
Data collection and submission for M&E purposes													•	•	•	•	•	•	•	•	•	•	•	•	•
Monthly project update call													•	•	•	•	•	•	•	•	•	•	•	•	•
Quarterly project reporting (3 quarterly and 1 annual per year)													•			•			•			•			•
Monitoring and evaluation reporting (Years 3, 6 and 9 only)																									•
Quarterly project reporting (3 quarterly and 1 annual per year)													•			•			•			•			•
Monitoring and evaluation reporting (Years 3, 6 and 9 only)																									•

Batteries will not require opportunity charging at P and R until 05/23

The same reporting routine perpetuates until Year 9 or when the 8 year asset life is reached, whichever is soonest

KEY

- Drawdown funding from DfT
- Drawdown funding from CPCA/GCP
- Contribution from Operator partner
- Approval sign-off
- Payment

3. Long term viability and wider benefits

3.1 Long term viability

3.1.2. There are a number of drivers which will influence the longevity of the use of battery electric buses in Cambridge, the majority of which sit with the market outside of CPCA's control, but which we can influence or mitigate, and others which are in our control. These drivers include:

- **National Policy:** including short/medium/long-term revenue support. CPCA will continue to work closely with the Department for Transport and Government to understand and inform national policy to help ensure it supports sustainable travel in our region.
- **Local Policy:** CPCA and our local authority partners are committed to zero emission buses as a sustainable form of mass transport in our region, and to full conversion of the fleet in our region by 2030, starting with tendered services by 2025. Our policy will act as a catalyst, encouraging transition, kick-started with the ZEBRA scheme.
- **Commercial feasibility:** the ability of operators to continue making sustainable profits from running zero emission bus services beyond the 8th year and without financial help from the government. This will be driven by the ridership level and cost of maintenance, repair, and asset renewal (e.g. battery and charger replacement as well as their ability to meet their promised asset life), both of which we have taken account of in the design of our Scheme as follows:
    - Our Scheme benefits significantly from no CAPEX support being needed beyond Year 1. Having bridged the gap for the Operator between a Diesel and Battery Electric Bus in entirety (between ZEBRA and CPCA/GCP) the Operator should (all things remaining equal) be benefitting from upsides due to the lower maintenance costs, significantly lower fuel costs, and – at least for the next few months – enhanced BSOG. This should help the Operator Partner to mitigate downside demand risks and maintain the service.
    - The Grant we award to the Operator Partner is repayable (proportional to % time completed) up to eight years, which is when we would expect Charging Infrastructure and Batteries - the things that we are effectively funding – to need to be replaced. This provides comfort that the scheme will endure for eight years but creates a risk that it is not sustained after eight years. This is mitigated by the general trajectory of the market, Operator commitments not to buy Diesel buses beyond 2025, and CPCA's own policy agenda (and that of UK Government) to support and incentivise use of buses.
- **Compatibility with existing infrastructure:** The CPCA area has limited grid network capacity. The viability of running electric buses relies on having in place sufficient grid network capacity to power the buses. CPCA will consider the competition for power requirements for electric vehicle charging infrastructure for all modes of transport and work with our local distribution network operators to inform long term planning based on our forecasts and policy agenda.
- **A robust supply chain, especially the establishment of secondary/tertiary and battery recycling markets to protect and preserve residual value**: Other jurisdictions (e.g. Scotland) are exploring how devolved and local government

can support establishment of secondary markets (including embedded storage and recycling) for batteries in order to help make first-purchase more affordable, and address concerns regarding electrical waste. CPCA will engage its Business and Skills team to work with local academic institutions and businesses to explore local opportunities for second/third life batteries in the region.

3.2 Delivering benefits beyond the scheme

3.2.1.1.1. **Wider UK economic benefits:** CPCA's preferred procurement strategy is to appoint an Operator Partner which will then run secondary procurement competitions for a bus manufacturer and depot charging infrastructure provider. In the process of both the procurement of the Operator Partner and secondary procurements we will request and require that service providers set out the wider economic benefits that their bid delivers across the UK (e.g. job creation from sourcing of goods or services), with this being measured as a key Social Value evaluation criteria in our assessment.

3.2.1.1.2. **Improving commercial feasibility for our Operator Partner:** CPCA will work closely with the Operator Partner to ensure that a sufficient ridership level is maintained throughout the delivery of the service and beyond. It is part of CPCA's local transport plan to decarbonise through modal-shift, encouraging the preference of private car users to public transport such as buses and trains. In the context of the urban bus routes targeted for this specific intervention, CPCA is already doing this by having in place a well-networked walking and cycling paths within city centres which provide easy access for pedestrians and local residence to the closest bus stops.

3.2.1.1.3. Maintaining asset performance and optimising asset life will have a significant implication on whole-life cost. We will work closely with the Operator Partner and share our technical resource and expertise to help inform appointment by the Operator Partner of a suitable supplier (e.g. battery management service providers such as Zenobe and NEOT) to advise on best practices for battery charging behaviour, driving behaviour, and maintenance to ensure that the operator partner is getting full value out of the acquired assets.

3.2.1.1.4. **Developing a long-term strategy and infrastructure plan for zero emission transport:** Our proposed ZEBRA scheme is CPCA's first step to decarbonise the entire bus fleet within the region. However, our locality is constrained in terms of grid network capacity and the continuation and expansion of zero emission buses will have to be commensurately accompanied by the availability in infrastructure. This includes working with grid connection provider on planning for future energy requirements and exploring other powertrains (e.g. hydrogen fuel cell), especially for routes serving more rural or connection deprived areas. We believe that a zero-emission bus regime can be realised in Cambridge with a clear plan for energy infrastructure and mix of fleet in terms of powertrains into the future.

3.2.1.1.5. **Robust supply chain with clear access to secondary/tertiary and recycling market:** Delivering zero emission buses, in particular that of battery electric powertrains, requires significant consideration of the afterlife treatment of assets. The sustainability of supply and stability of battery prices relies on our ability as a country to optimise the use of batteries and recycle expired batteries into new ones. Raw materials used for making batteries are heavily

reliant on imports and rare, non-renewable resources, which are very carbon-intensive to mine. Cambridge, being a global hub for academic, innovation and R&D excellence, is very well-positioned to spearhead research in nascent areas such as battery optimisation, recycling, and manufacturing. We believe that Cambridge's capabilities play an important role in ensuring that ZEB can be sustainably delivered not just in our own locality but also other parts of the UK, and are planning to establish a comprehensive and open M&E programme for our Scheme accordingly.

4. Cost estimation and control

4.1 Approach to estimating and refining costs

4.1.1 CPCA has engaged with a wide variety of market participants (as set out in the Market Engagement section of the Commercial Case) in order to develop its estimates of costs (both CAPEX and OPEX) as shown in the previous section. The exception for this Business Case is maintenance and operating costs of electric buses, where data has been sourced / derived from the Department's Greener Bus Tool

4.1.2 We will continue to engage with all local operators, informing them of the progress of our bid for the Scheme and, if successful, plans for the Operator Partner procurement

4.1.3 The Operator Partner will be responsible for selecting both a vehicle manufacturer and a depot charging infrastructure and services provider. Notwithstanding this we will be open to engaging with providers of such goods and services and connecting them with potential bidders for the Operator Partner role. We will also invite parties to continue providing us (at their expense) with costs and information to provide benchmarks to support our evaluation of tenders for the Grant Awards.

4.1.4 As discussed in the Commercial Case, we will also be engaging with an IDNO in the future to explore the possibility to provide a private wire connection to the chosen Operator Partner's depot

4.1.5 We have considered whether a third-party Infrastructure Provider might be willing to invest to deploy Plug-in Opportunity Charge Points and lease them to Cambridgeshire County Council/our Operator Partner as opposed to Cambridgeshire County Council procuring the infrastructure. Based on our energy consultant's estimates we anticipate that, at any point in time, one charge point will be used for seven in every 10 minutes, 10 hours per day, with the second charge point providing contingency. Despite this, as isolated assets, we believe that there will be very limited market interest in providing these "as a service". We will continue nevertheless to engage the market through to commencement of procurement to test this assumption

4.1.6 We are aware that we may only have one bidder for role of the Operator Partner for the Scheme. In such an event CPCA will commission specialist external consultancy to assess the tenderer's proposal to help ensure Value for Money in lieu of competitive tension. This will take into account any additional costings we have collected from the market between now and the procurement exercise.

4.1.7 In the event an alternative operator tenders for, and emerges as preferred bidder for this project, sufficient due diligence will be conducted to provide comfort that both a financial contribution and benefits (in terms of air quality and public health improvements) of at least the same scale, or otherwise greater, can be provided. This includes critically assessing the alternative operator's for proposed routes, and technical viability of its proposed depot and charging infrastructure arrangements

(whereby CPCA may chose to commission external advisors to support its evaluation).

4.1.8 Our procurement strategy for both the Operator Partner and Opportunity Charging Infrastructure Provider roles has been designed to take the above into consideration, with both using a Negotiated Procedure to provide us with the opportunity to critique and challenge costs and potential benefits prior to entering into a contract. We will use the Negotiated Procedure to help ensure that are securing best Value for Money for the taxpayer and our local communities, both now and in the long term.

4.1.9 If, however, costs received during the procurement exercises do exceed our budgets (including contingency, we have established a robust governance and escalation process to review, challenge and – if necessary – source additional budget (subject to benefits continuing to stack up).

4.2 Managing cost overruns and contingencies

4.2.1 We have adopted (and will continue to adopt) three strategies to minimise cost overruns and mitigate the need for us to use contingency funding. These are as follows:

- **Comprehensive market consultation and cost contingency assessment:** in developing the costing requirements for this Financial Case, we have conducted comprehensive market consultation to obtain quotes and cost estimations where exact quotations have not been possible (e.g. civil engineering work to enable the installation of charging infrastructure). Based on the ranges provided, and the experience of the organisations we have consulted, we have calculated cost contingencies using upper and lower bounds of potential costs, and probabilities of these being realised (i.e. an Expected Monetary Value (EMV) Quantitative Risk Analysis (QRA) technique. We have also included informed optimism bias for both vehicles (3%) and infrastructure (10%) costs.

- **Supplier incentives:** We will require all bidders to provide robust Best and Final Offer (BAFO) costs through the Negotiated Procedure procurement processes. This enables us to manage the suppliers against these offers and mitigate / minimise the risk of overruns.

- **Effective project governance and project management techniques:** We will establish a robust and effective governance structure and project management techniques which encourage easy interface, alignment, communications, and collaborations among different suppliers, and within the chain of command. Frequent tracking and reporting, and open/transparent communications will ensure that we identify risks and issues that could cause overruns quickly, and escalate these accordingly for resolution. Contingency “pots” will be tightly governed by CPCA’s s.151 Officer, with approval required from both the s.151 Officer and Project Director (via. the Project Board) for use of contingency for a specific asset/procurement. Cost overruns beyond contingency for a specific asset (i.e. that need cross funding or additional funds outside of the scheme) will require Steering Committee approval.

- **Effective corporate governance:** Material overruns that cannot be funded from within the project and require allocation of non-project resource will require CPCA Board approval.

4.2.2 Sensitivity Scenarios and Proposed cost management/control mechanisms

4.2.3 In developing the risks and proposed cost management/control mechanisms, we have developed potential downside scenarios based on the risks identified, and evaluated the potential impact of these scenarios on the finances of this project:

Sensitivity scenarios	Impact on finances	Impact on benefits (detailed discussion in Economic Case)
Scenario 1: Delay in delivering the infrastructure and/or vehicles	This will change the payment schedule but, all other things remaining equal, should not change the financial envelope for the scheme.	Reduced benefits due to delay in improvement in air quality and other benefits associated with replacement of diesel buses with zero emission buses
Scenario 2: Service level agreements not being met	This will lead to overburdened expenditure whereby unused assets, such as batteries, still needing to be maintained (e.g. through trickle charging) regularly regardless of usage. It will also likely result in a need for CPCA to incur additional Marketing & Communications costs as a result of needing to engage with customers to address the poor customer experience. Breaches in the Service Level may also result in a breach of the Grant Agreement conditions, resulting in a requirement to clawback the whole or part of the grant.	Reduced benefits due to reduction in service level.
Scenario 3: Future exit of the Operator Partner from the route	This will result in the Operator Partner having to repay the grant-repayable share of the remaining book value of assets (i.e. both vehicle and infrastructure) to the CA. The CA will subsequently repay the remaining book value of DfT's contribution proportionately.	This depends on whether the new routes the operator chooses to serve instead of the existing ones. Presumably, operators will choose to serve routes where patronage levels are higher, and this should result in higher benefits consequentially. However, if the Operator exits the route because it seizes operation as a business, this will lead to a loss in benefits.
Scenario 4: Battery life / vehicle life / infrastructure life not meeting	This will result in higher capital cost as battery replacements make up about 30-35% of the price of a bus; however, this is	This will result in lower NPV and BCR as more frequent battery replacement adds to the NPC.

Sensitivity scenarios	Impact on finances	Impact on benefits (detailed discussion in Economic Case)
manufacturers warranties and being unavailable and/or needing to be replaced early.	expected to be dealt with by the operator through warranty and should not impact the scheme financials.	

*The impact of Scenario 2 and 3 on the NPV and BCR are discussed in the Economic Case. The impact of Scenario 4 is currently mitigated via manufacturer's warranty which is understood to cover up to 7+5 years of the battery life.

4.3.4 The table on the following pages summarises our assessment of risks and how we have treated them in our planning of contingencies for this Scheme: (all prices are inflated to year of delivery, but excluding VAT and optimism bias).

Risk categories	Description of risks	Probability and Impact	Risk manager / mitigator	Treatment in this Financial Case	Management / Mitigation of Risks
Funding Risk	The Operator Partner is unable or unwilling to fund the requisite share of the cost of the buses	We have a letter of support from one potential Operator partner committing to the figure as set out above for the Operator Partner share, reducing the probability of this risk occurring. However, if it were to occur it could have a significant impact in terms of a shortfall in funding for the buses which would need to be made up by GCP/CPCA or the DfT. For the sake of prudence we have assumed that the worst case scenario is that the Operator Partner is only able to pay 75% of the cost of an equivalent diesel bus.	CPCA	Accept that we may have fewer buses running	This will be included as one of the conditions in the grant award agreement between CPCA and the Operator partner.

Risk categories	Description of risks	Probability and Impact	Risk manager / mitigator	Treatment in this Financial Case	Management / Mitigation of Risks
Cost Risk	Costs for grid connection upgrades at the selected Operator Partner's depot and / or Park & Ride site exceed our budget	Grid connection costs can range from £60k to over £1m. We have been quoted ~£125k. Based on the known ranges we believe a 60% cost tolerance (i.e. £200k) at 50% probability is prudent.	Operator Partner, supported by CPCA	We have considered a contingency of £59.5k in our EMV QRA assessment for this contingency. This is above and beyond Optimism Bias.	- CPCA has consulted with the largest connection provider in the region, [redacted] - A thorough consultation with [redacted] has been undertaken to estimate the cost accurately. The cost estimate included in this Business Case has been provided by [redacted] following its assessment of the proposed P and R site and a depot illustrative of a potential Operator Partner - We have sought to reduce assumptions in [redacted] quotation but will work closely with the selected Operator Partner and [redacted] to monitor costs and thoroughly assess costs that exceed [redacted] quotation.

Risk categories	Description of risks	Probability and Impact	Risk manager / mitigator	Treatment in this Financial Case	Management / Mitigation of Risks
	Uncertainty in respect of the cost of installation and construction of in-depot and out-of-depot charging infrastructure due to additional site installation costs	Research recently completed for Transport Scotland indicates that the cost of DC chargers for 30 buses could range from £1.12m to £2.72m including in-depot connection infrastructure. We have been quoted £2.11m. Given the range known and amount quoted, we believe that a 4% cost tolerance is reasonable for infrastructure.	In-depot infrastructure: Operator Partner, supported by CPCA Out-of-depot infrastructure: CCC, supported by CPCA	We have included a contingency of c. £107k in our EMV QRA assessment for this contingency. This is within what we have accounted for Optimism Bias.	The Operator Partner will be required to secure a BAFO from its selected Charging Infrastructure Provider and hold it to account for delivery against this BAFO. Project Board approval will be required to enter into contingency for costs in excess of those budgeted from procurement. SteerCo approval will be required to surpass contingency, subject to availability of funding.

Risk categories	Description of risks	Probability and Impact	Risk manager / mitigator	Treatment in this Financial Case	Management / Mitigation of Risks
	Uncertainty in respect of the cost of buses	Research recently completed for Transport Scotland indicates that the cost of a double decker electric bus is equivalent to £433,288. We have been quoted £423,370-479,675 depending on specifications of batteries and modifications requested. Given the range known and amount quoted, we believe that we have embedded sufficient cost tolerance in our costing.	Operator Partner	We believe that this is the higher end of the quote and hence can be treated as a contingency embedded in our costing. Nonetheless, we have included a 3% optimism bias.	The Operator Partner will be required to secure a BAFO from its selected Vehicle Manufacturer and hold it to account for delivery against this BAFO. CPCA will be part of the approval board for every procurement conducted by the Operator Partner. In the event, the selected manufacturer provided a more expensive quote than £447,698 (which is the per unit cost of the bus under the preferred scenario), this will be properly investigated and challenged with the quote the CA managed to obtain.

Risk categories	Description of risks	Probability and Impact	Risk manager / mitigator	Treatment in this Financial Case	Management / Mitigation of Risks
Technology / Performance Risk	Assumption on the life expectancy of batteries	Unknown at this stage due to there being insufficient benchmark data	Operator Partner	No contingency has been included at this stage as we believe that this is manageable by the Operator Partner through the warranty process, and providing contingency may make the Operator Partner less willing to hold the bus manufacturer to account	This will be managed through the warranty period and transfer of knowledge from the manufacturer and Energy Services provider (if appointed by the Operator Partner) to the Operator Partner to support appropriate maintenance of the batteries. No funds will be paid out until the certificate of compliance with the current UK Bus Test Cycle procedure has been sent to CPCA. Where a vehicle has not yet been tested, consideration will be given to this on a case-by-case basis. The manufacturer will need to be able to demonstrate how and when the bus is expected to be tested and provide assurance on the expected performance from the UK Bus Test Cycle procedure.

Risk categories	Description of risks	Probability and Impact	Risk manager / mitigator	Treatment in this Financial Case	Management / Mitigation of Risks
	Assumption on driving range	Unknown at this stage due to there being insufficient benchmark data	Operator Partner	This impacts driving Peak Vehicle Requirement to deliver the service in accordance with the Grant Agreement. We are not including contingency to support the purchase of additional vehicles to meet the service levels specified in the Grant Agreement as we expect the Operator Partner to work with its selected manufacturer to ensure buses procured are fit for purpose.	This will be managed through the warranty process by the Operator Partner. UK Bus Test Cycle will be a required procedure as outlined above.
	Assumption on reliability	Unknown at this stage due to there being insufficient benchmark data	Operator Partner	As above	This will be managed through the warranty period and transfer of knowledge from the manufacturer and Energy Services provider (if appointed by the Operator Partner) to the Operator Partner to support appropriate maintenance of the batteries. UK Bus Test Cycle will be a required procedure as outlined above.

Risk categories	Description of risks	Probability and Impact	Risk manager / mitigator	Treatment in this Financial Case	Management / Mitigation of Risks
	Assumption on charging speed	Unknown at this stage due to there being insufficient benchmark data	Operator Partner	As above	This will be managed through the warranty period and transfer of knowledge from the manufacturer and Energy Services provider (if appointed by the Operator Partner) to the Operator Partner to support appropriate maintenance of the charging infrastructure. UK Bus Test Cycle will be a required procedure as outlined above.

4 Legal requirements

5.1 CPCA's compliance with legal requirements, including adherence to PCR2015, State Aid legislation, PSVAR, and how we will comply with Government requirements for issuing and managing grants, is set out in the Commercial Case.

5 Financial Case Appendix

5.1 Data used within the DfT's Greener Bus Tool

5.1.1 The majority of our economic appraisal of monetised benefits applied the assumptions included in DfT's Greener Bus Tool. The additional data points we have recorded within the tool include:

Items	Data point	Data Source
Double-decker Electric Buses (Baseline)	£439,123	Quote from a bus manufacturer
Infrastructure (Baseline)	£1,881,429	Quote from [redacted] for in-depot infrastructure
Infrastructure maintenance	£17,000 per year	Quote from [redacted] for in-depot infrastructure
Average annual km travelled	65,698 km	[redacted] the operator currently operating the targeted routes)
Average vehicle speed of buses	22 km/h	Smarter Cambridge Transport
Average population growth per annum	1%	ONS population estimates

Supplemental data used in our analysis (including non-monetised benefits)

Items	Data point	Data Source
Double-decker Electric Buses (High)	£470,500	Quote from a bus manufacturer
Double-decker Electric Buses (Low)	£415,273	Quote from a bus manufacturer
Infrastructure (Low)	£1,094,924	Quote from [redacted] for in-depot infrastructure
Infrastructure (High)	£2,721,291	Quote from [redacted] for connection of the pantograph opportunity charge points to the Babraham Solar Farm Quote from [redacted] for in-depot infrastructure
Staff training cost	£5,000 per individual	Transport Scotland ZEB Innovative Financing Ideas Pack
Staff training set up	3 day free sessions for 8 employees each	Quote from a bus manufacturer
Average growth in number of journeys per annum	-1.6%	DfT Bus Statistics

Economic Case

1. Overview

1.1. The purpose of this Economic Case is to demonstrate the Value for Money for our proposed ZEBRA scheme. In the spirit of the ZEBRA competition and holding the comparative parameters constant among all applicants, we have used the Greener Buses Tool to calculate the economic benefits from our proposed ZEBRA scheme and presented the outcome of analyses using this tool.

1.2. We believe, however, that our scheme delivers significant additional benefits (both monetisable and non-monetisable) not currently captured within the Greener Buses Tool, and that these need to be taken into account when considering the value for money argument for investing in Cambridge.

1.3. **The funding contributions we have raised from parties** such as Greater Cambridgeshire Partnership, the CA and Operator Partner **have also allowed us to deliver this scheme as well as its benefits with minimum ask from DfT**. This will also enable DfT to have more room of funding to support the delivery of zero emission buses and their associated benefits in other regions across the country. **The funding we seek from ZEBRA is therefore £4.295m (including inflation in delivery year, but excluding VAT and optimism bias), which is well less than the 75% incremental allowance between the costs of diesel and electric buses.**

1.4. Even ***excluding*** **monetised benefits not calculated by the Greener Buses Tool and non-monetised benefits** (which are considered to be **strongly economically positive**) we believe that our scheme provides reasonable Value for Money, with a positive (>1) BCR and a **LOW** rating for our Central Case per the DfT's VfM guidance.

1.5. However, when additional monetised benefits not calculated by the Greener Bus Tool are added, this improves to **MEDIUM** value for money.

1.6. When non-monetised benefits are also considered, we firmly believe that our Scheme represents **HIGH** value for money.

1.7. We have also ensured that the funding requested £140,500 per vehicle (before, VAT and optimism bias) is within DfT's 75% incremental cost differential mark. Given the cost of an equivalent diesel bus at £220,000 and the quote of reference for an e-bus is £439,123 per unit (also before inflation, VAT and optimism bias), £140,500 therefore represents 64% of the incremental difference of cost between the new double-decker battery electric bus and equivalent diesel bus.

1.8. Benefits delivered by our proposed scheme are as follows:

Benefit group	Monetised	Monetised, but not captured in GBT	Non-monetised
Environment	– Carbon emissions saved – NOx emissions saved – PM 2.5 emissions saved	– NOx and PM 2.5 emissions saved from replacing Euro IV vehicles with Euro VI vehicles currently serving the target routes.	– Prevention of early deaths from respiratory diseases – Provision of capacity to

		– Spare infrastructure capacity to facilitate and incentivise further rollout of ZEBs	
Society	– Operating cost saved – Maintenance cost saved	– Value of upskilled workforce – Multiplier effect from jobs created and safeguarded – Inward investment attracted to CPCA as a result of funding	– Number of students/ apprentices who will have access to enriched learning experience from a live operating environment – Number of R&D projects enabled – Protection of Cambridge's jobs and income from tourism

1.9. We aim to deliver VfM to taxpayers through the following outcomes:

1.9.1. **Better bus services on the busiest routes in Cambridge:** targeting the busiest routes in Cambridge will maximise the benefits that come with the **higher quality of journey and customer experience** which comes with electric buses, including: quieter and more comfortable journeys and **better accessibility features** for passengers with special needs.

1.9.2. **Better health quality for Cambridge city centre:** deploying electric vehicles will not only **reduce air pollutants** but also **change the way people travel** with an effective campaign strategy. We want to show to our local communities our commitment to deliver greener transport for Cambridge and the fact that the electric bus routes are part of a strong and more expansive, green transport network well connected to Park and Ride sites, and cycling and pedestrian paths. Furthermore, transition to Zero Emission Buses is a fundamental enabler of our proposed Clean Air Zone. **Inability to transition our bus fleet will prevent us from progressing our Clean Air Zone plans, contributing to more preventable deaths.**

1.9.3. **Greater upskilling and R&D opportunities for those in the bus industry and academics alike:** we believe that having a live operating environment will not only allow the **upskilling of technical staff** but also **enrich the learning and R&D potential for apprentices, graduates, as well as researchers at higher education institutions** in CPCA.

1.9.4. **Greater growth opportunities from jobs created and safeguarded:** introducing an electric bus fleet into Cambridge will require the industry to **develop new talent** with the expertise and capabilities to manage as well as optimise the new technologies. For instance, new engineers will need to be hired to provide regular training on operating and maintaining electrochemical powertrains to engineers and drivers who are already accustomed to working with ICE powertrains. Through retraining and upskilling, we are also strengthening the resilience of our existing talents, safeguarding their jobs in the future, pool as CPCA transitions into a zero-carbon economy.

1.9.5. **Inward investment from the private sector:** Cambridge has been the centre of technology companies, including those which are focusing on delivering innovative zero emission solutions to support the economy's green agenda. The region's focus in such high-value sectors is also evidenced through our higher than national average GVA per capita. We believe that ample public sector investment will add on top of our existing reputation as the global hub of technology R&D and innovation to boost the confidence of more innovative green businesses, especially SMEs, to start out in Cambridge.

1.9.6. **Protection of our historic environment and maintaining tourism:** Cambridge attracts 8.2million visitors annually, worth circa. £849million to the local economy, and accounting for nearly 22% of jobs in the city[18]. Environmental quality is a key determinant of competitiveness of places[19] [20], especially as tourists are becoming more environmentally conscious. The significant reductions in emissions that our scheme will deliver will not just help us maintain our vital tourist industry through improving air quality, but also in helping us maintaining the fabric and appearance of our historic buildings, which are both soiled and damaged by particulates from vehicle exhaust[21] (with this damage being included in the damage costs included in the Greener Bus Tools).

1.10. We have also considered some sensitivity scenarios whereby our benefits might be reduced. These include the following events:

1.10.1. **Fall in population growth in Cambridge City**: Since one of the benefits from carbon, NOx, and PM 2.5 saved is predicated upon pre-existing costs to health already incurred by the people of Cambridge, a fall in population will therefore translate into a proportionate decline in benefits.

1.10.2. **Failure of the Operator Partner to deliver its service level agreement**: Since the benefits from emission saving are predicated upon the operator being able to maintain a typical service level, the benefits from emission saving will also fall according to the level of provision, which is often affected by demand. In this scenario, we have assumed that the pre-COVID trend of declining bus ridership level of 1.6% on average per annum will perpetuate. Nonetheless, actions have been taken by the government through the potential of franchising and fleet decarbonisation to reinstate the commuters' preference to travel with buses. This assumes that passengers will revert to driving to make up for those journeys no longer served by the reduced service level.

1.10.3. **Exit of the Operator Partner from one of the Scheme routes:** Bus operators are expected to face a few financially difficult years ahead due to the impact of COVID-19 on bus ridership level. We therefore have included a scenario whereby the operator may have to pull out from one of the target routes, as unlikely as it may be since we have picked the busiest routes in Cambridge city centre, due to financial difficulties. Similarly, this assumes that passengers will revert to driving to make up for those journeys no longer served by the route.

1.10.4. **Other sensitivity scenarios include:**

[18] Visit Cambridge
[19] Environmental management of a tourist destination A factor of tourism competitiveness – Mihalic 1999
[20] Tourists and Air Pollution: How and Why Air Pollution Magnifies Tourists' Suspicion of Service Providers
[21] Air Quality damage cost update 2019

1.10.4.1. **10% decrease in annual average km travelled by each bus;**

1.10.4.2. **Higher per unit cost of buses (£470,500 instead of £439,123);**

1.10.4.3. **BSOG remaining at 6p; and**

1.10.4.4. **Life expectancy being reduced from 17 to 8 years.**

1.11. The impacts these scenarios have on NPV and BCR are demonstrated in Section 2 below.

2. Value for Money

2.1 Summary of proposed value for money categories, non-monetised benefits and risks and uncertainties

2.1.1 Monetised and Non-monetised benefits

2.1.1.1 CPCA believes that our scheme will deliver significantly more benefits than the monetised benefits identified by the Greener Bus Tools. The table below sets out a number of non-monetised benefits which we believe can be justified for our proposed ZEBRA scheme, and which serve to improve the benefits case and case for investment in our scheme.

Monetised benefits	Non-monetised benefits
– Reduction in carbon emissions – Reduction in NOx emissions – Reduction in PM concentration in the air – Saving in operating costs – Saving in maintenance costs – Saving in fleet replacement cost of old fleet	– Prevention of preventable early deaths (100 per year in the CPCA area) from respiratory problems linked to poor air quality – Upskilling opportunities for local workforce, especially technical staff of bus operators in the locality – Spare infrastructure capacity to facilitate and incentivise further rollout of ZEBs – Opportunities for local innovation and R&D hub to further advancement in zero emission powertrains. – Multiplier effect from stimulus to local businesses that provide or support the delivery of zero emission-related goods and services – Wider economic benefits from sourcing of goods and services from other UK regions – Protection of Cambridge's jobs and income from tourism

2.1.2 Risks, uncertainties, and sensitivities tested

2.1.2.1 There are several risks and uncertainties which can compromise the delivery of benefits. These risks are set out below and taken into account as sensitivity scenarios in our NPV and BCR calculations shown in this Economic Case. These are as follows:

Uncertainties	Assumed impact	RAG
Fall in population growth in Cambridge City	The largest dip in population growth in Cambridge city was in 2007 whereby population shrank by 1%. We will therefore assume the worst scenario under this sensitivity parameter whereby population shrinks by 1% in the next 8 years and so does the benefits from carbon, NOx, and PM impact.	
Failure of the Operator Partner to deliver its service level agreement	Bus ridership level has been experiencing a steady decline even prior to the pandemic. In Cambridgeshire, ridership level has fallen on average by 1.6% every year over the past decade. We believe that delivering new buses and transitioning to franchising will help us improve service quality and affordability, which will reinstate the public's preference to travel with bus once again. However, for this sensitivity scenario, we will assume that the pre-COVID trend will perpetuate until the end of the scheme.	
Exit of the Operator Partner from one of the Scheme routes.	Six (6) routes will be served by the proposed ZEBRA fleet. Exiting one route will therefore reduce the benefits by circa.15%. We will also assume that the exit will occur from the eighth year of operation onwards.	
Costs for grid connection upgrades at the selected Operator Partner's depot and / or Park & Ride site exceed our budget	Grid connection costs can range from £50k to over £1m. We have been quoted ~£125k. Based on the known ranges we believe a 60% cost tolerance (i.e. £200k) at 50% probability is prudent. We have therefore, included a contingency of £59.5k based on our EMV QRA assessment.	
Uncertainty in respect of the cost of installation and construction of in-depot and park & ride charging infrastructure due to additional site installation costs	Research recently completed for Transport Scotland indicates that the cost of DC chargers for 30 buses could range from £1.12m to £2.58m including in-depot connection infrastructure. We have been quoted £1.88m. Given the range known and amount quoted, we believe that a 4% cost tolerance is reasonable for infrastructure. A site assessment has also been commissioned and conducted by UK Power Network Services to come up with a reliable costing for in-depot and park & ride infrastructure.	

Uncertainties	Assumed impact	RAG
Uncertainty in respect of the cost of buses	Quotes we have obtained indicate that the cost of a double decker electric bus ranges from £423,370-479,675 depending on specifications of batteries and modifications requested. We have also obtained a quote for the preferred specification at £447,686. Given the range known and amount quoted, we believe that we have embedded sufficient cost tolerance in our costing. Please refer to Financial Case for cost tolerance embedded.	

2.2 Value for Money calculation scenarios

2.2.1 Further to the sensitivity scenarios above, we have also developed four different scenarios as part of our optioneering exercise. We have undertaken appraisals for the first three scenarios as the "Do Everything" scenario requires a more extensive study before an analytical appraisal can be produced. We would also like to highlight the marginal improvement that DfT's funding will provide to the value for money of our scheme by comparing "Do Minimum" and "Do Something".

2.2.2 Do Nothing: No investment in zero emission buses

Social Benefit	Social Costs
– No investment is required by any party to decarbonise. Business will carry on as usual.	- Worsening air quality (carbon emission, NOx and PM 2.5 impact) - Lack of seed funding for the local authority and operators to leverage the lessons learned from existing zero emission bus projects/portfolios - Lack of seed funding will also prevent from existing zero emission bus projects/portfolios from being upscaled to achieve economies of scale - Risk of falling short of the region's net zero carbon goal in transport

2.2.3. Do Minimum: a hypothetical scenario whereby DfT funding is not made available to CPCA

2.2.4. This option will enable us to:

- Support an Operator Partner to procure 14 zero emission buses to replace the oldest diesel units
- Install charging points to charge 14 vehicles (e.g. seven (7) dual 150kW charging points)
- Upgrade the grid supply connection to the selected Operator Partner's depot

Social Benefits	Social Costs
– Minimal air quality improvements on selected routes	- Lack of scale means a more expensive per unit cost of vehicles and that infrastructure, being a fixed cost

– Lessons added to the existing lessons learned from the trial of two electric buses in a piecemeal fashion to inform a more significant transformation in the future – Provides a limited incentive to bus operators to replace the oldest buses in their fleets	with a set capacity, is not always fully utilised - Further ZEB purchases may continue to lag in the near future given the anticipated continuation of the cost differential to equivalent diesel vehicles - We risk falling well short of the region's net zero carbon goal in transport

2.2.5. Do Something: a commercially sustainable option that considers rapidly evolving technology and future fleet replacement cycles not only for one operator but also the wider market.

2.2.5.1. This option involves moderately expanding the number of zero emission buses operating in the CPCA area, and is well within the regional power capacity, meaning that no significant reinforcement work is required to enable execution.

- Six bus routes targeted (the five Park and Ride services, and the Citi 2 service)
- ZEBs will operate over an eight year period region wide, with lessons learned shared with partners and used to drive cost efficiency alongside evolving technologies throughout the life of the Scheme.
- ZEBRA funding supports the procurement by the selected Operator Partner of 30 zero emission buses e-buses to replace its oldest diesel units operating in the area, with the Euro 6 buses currently operating the Park & Ride route being transitioned to other routes within the area, replacing Euro 4 & 5 buses
- Infrastructure upgrade involving 15 dual in-depot charging points at the selected Operator Partner's depot, 2 plug-in charge points at the Babraham Park & Ride site, and associated grid connectivity infrastructure

2.2.5.2. **Note:** Our "Do Something" scenario is further broken down into three different options of opportunity charging in the Economic Case to demonstrate the difference in NPV and BCR. These options are:

- "Do Something (with plug-in opportunity charging)": this scenario envisages plug-in charge points as a means to deliver opportunity charging.
- "Do Something (with rapid plug-in opportunity charging)": this scenario envisages rapid-plug-in-chargers as a means to deliver opportunity charging.
- "Do Something (with no opportunity charging)": this scenario envisages a situation whereby we do not provide opportunity charging facility.

Social Benefits	Social Costs
– Significant air quality improvement in selected routes – Some seed funding is available to further upscale CPCA's zero emission bus portfolios – Lessons learned from the moderate expansion can be leveraged to enable a	- Reasonable investment commitment required from both private and public sector parties to undertake the change exercise.

more significant transformation in the future – More recently procured diesel buses can be phased out gradually at the right time and used to replace the older Euro IV and V buses	

2.2.6. Do Everything: *larger fleet investment tying the operator to one technology with significant change management implications in a challenging public transport context following Covid-19.*

2.2.7. This option involves funding the replacement of all ~350 buses in the region, including those of the SME operators, and would require charging infrastructure upgrades not only at depots within our region, but also out-of-region depots for Operators which do not have a local depot.

Social Benefits	Social Costs
– Significantly larger scale of benefits from carbon savings and reduction of NOx and PM in the air – Accelerated path towards CPCA's and Government's net zero goal in transport	– This is unaffordable for CPCA at present and would require significant reallocation of capital from other schemes which could deliver wider benefits to the CPCA population. – Our SME Operators are not currently in a position to finance their contribution. Such a scheme would put significant financial strain on these operators and risk jeopardising their businesses. – The CPCA region currently lacks the infrastructure both in terms of grid power capacity and hydrogen fuel production, distribution and storage facilities to accommodate for a larger scale transition. Our assessment is that such a scale of infrastructure cannot be built on top of the bus sector alone, but an aggregated demand from other sectors such as industrial.

2.2.8. The chosen option for our ZEBRA bid is the 'Do Something' scenario to deliver seed funding for fleet transition to set us on our journey for full fleet transition by 2030. Our fleet strategy is based on the premise that we want to deliver sustainable and realistic fleet transition. The ZEBRA funding will kick this transition off with the medium- and longer-term view that wider public transport policy needs to incentivise operators to invest in fleet transition.

2.3 Benefit Cost Ratios, Net Present Value Calculations, and VfM categories of our options

2.3.1. The Value for Money assessment, **as calculated by the DfT's Greener Bus Tool** (using monetised benefits only) for the options which we have appraised is shown in the table below.

Scenarios	Central		High		Low	
	NPV	BCR	NPV	BCR	NPV	BCR

Do Nothing	-£9,973,932	N/A	-£13,931,299	N/A	-£6,377,312	N/A
Do Minimum	-£373,344	0.93 **Poor**	£1,473,427	1.30 **Low**	£-2,051,767	0.59 **Poor**
Do Something (Pantograph Opportunity Charging)	-£12,134	0.99 **Poor**	£3,945,233	1.40 **Low**	-£3,608,754	0.64 **Poor**
Do Something (Plug-in Opportunity Charging)	**£1,063,411**	**1.12 Low**	**£5,020,778**	**1.56 Medium**	**-£2,533,208**	**0.72 Poor**
Do Something (No opportunity charging)	£1,411,981	1.16 **Low**	£5,369,348	1.62 **Medium**	-£2,184,639	0.75 **Poor**
Sensitivities for "Do Something (Plug-in Opportunity Charging)"						
Do Something (Falling population)	£364,411	1.04 **Low**	£3,940,620	1.44 **Low**	-£2,877,752	0.67 **Poor**
Do Something (Falling SLA/demand)	£109,571	1.01 **Low**	£3,670,881	1.41 **Low**	-£2,986,539	0.66 **Poor**
Do Something (Operator's exit from 1 route)	£385,549	1.04 **Low**	£3,956,766	1.45 **Low**	-£2,784,920	0.69 **Poor**
Do Something (8 year life expectancy)	-£3,843,509	0.57 **Poor**	-£1,802,116	0.80 **Poor**	-£5,688,894	0.36 **Poor**
Do Something (BSOG remaining at 6p)	£1,063,411	1.19 **Low**	£5,020,778	1.90 **Medium**	-£2,533,208	0.54 **Poor**
Do Something (-10% in annual average mileage)	£6,183	1.00 **Low**	£3,567,813	1.40 **Low**	-£2,869,125	0.64 **Poor**
Do Something	£126,649	1.01 **Low**	£4,084,016	1.41 **Low**	-£3,469,971	0.65 **Poor**

(Vehicle cost @£470,500)						

2.3.2. The table above outlines a number of scenarios, all with varying likelihood. Further information on these scenarios is provided below:

- **Fall in population**: this scenario is very unlikely as it goes against past, current and future projections indicate population growth will occur within the CPCA region as more people move to smaller cities in the aftermath of COVID-19 and the growing investment projects taking place wihtin Cambridge to improve infrastructure and attract increased business investment.
- **Fall in bus patronage levels:** a gradual recovery has already begun in patronage levels since the incidence of COVID-19 and with vaccine programmes rolled out demand is expected to increase further. Furthermore; a) the region has an ambitious aim to expand investment and demand for new business which is expected to boost use of public transport throughout the region; b) covid has changed the way people travel and work - more people are living outside London now and Cambridge is expected to see an insurgence of this migration, increasing its population and therefore need of services.
- **Battery replacement:** The main scenario has taken into account the cost of extended warranty for batteries which cover up to 12 years. The warranty will ensure an 80% capacity of the batteries. It is assumed that the batteries can operate for another 5 years (up to the 17th year) with regular maintenance from then.

2.3.3. We have chosen “Do Something (Plug-in Opportunity Charging)” as our main scenario in this business case despite not having the most optimal BCR for the following strategic reasons:

- The scenario provides an opportunity charging facility which help further transition to electric fleet in Cambridge
- The plug-in opportunity charging facility is plugged into a green energy source, which is the solar panels currently in construction at Babraham Road Park and Ride
- Opportunity charging is expected to be required when batteries have degraded to a certain level by mid-life
- Installing the more interoperable rapid plug-in chargers will mean that the chargers are not only accessible to bus operators but also, potentially (subject to avaialbility), other fleets such as Cambridge City’s entirely electric bin lorriesand other council vehicles.

2.3.4. A full pros-and-cons analysis of the options considered and our jusrification for selecting our preferred option of including opportunity charging at the Park & Ride site is set out in the Strategic Case.

2.3.5. Use of the Greener Buses Tool:

- Operational data used for the NPV and BCR analysis have by and large followed the figures embedded in the Greener Bus Model. This includes the Tank to Wheel carbon emissions per unit of fuel consumed which are calculated based on the average annual km travelled by each bus.

- Where inputs on these operational data required by the model, we have included these under the Appendix section below as well as their respective sources.

2.4. Inclusion of monetised benefits outside the Greener Bus Model

2.4.1. Using the main scenario, which is the “Do Something (Plug-in Opportunity Charging)” scenario, we have also demonstrated the impact of other economic benefits which have not been considered within the Greener Bus Model:

Upskilling opportunities for local workforce, especially technical staff of bus operators in the locality

Upskilling opportunities for staff at selected depot

2.4.2. Our anticipation from market engagement is that bus manufacturers and battery providers are willing to provide the Operator Partner’s staff with the necessary training to operate and maintain an electric bus fleet for free. From market engagement and as shown in the *Zero Emission Bus Financing* report published by Transport Scotland, we understand that it costs approximately £5,000 to train an employee. Based on the size of the proposed target depot, we expect to involve at least 28 engineers in this training.

Air quality benefits from Euro IV and V replaced with the Euro VI at the selected depot

2.4.3. The electric buses proposed will be replacing an existing Euro VI fleet which will be deployed to other routes which are currently being served by Euro IV and V buses. We have assumed that at least 20 Euro IV and 10 Euro V buses will be replaced by the Euro VI fleet which will lead to an improvement in NOx and PM 2.5 emissions based on the marginal external cost of NOx and PM 2.5 specified in WebTAG A3.4 and the following paper published by European Environment Agency which demonstrates the specifications of buses by emission standards: (The same GDP deflator and discount rate have been applied to base appraisal year of 2021 as indicated in the Greener Bus Model)

Table 3-23: Tier 2 exhaust emission factors for buses, NFR 1.A.3.b.iii

Type	Technology	CO	NMVOC	NOx	N2O	NH3	Pb	CO2 lube
Units		g/km	g/km	g/km	g/km	g/km	g/km	g/km
Notes			Given as THC-CHA	Given as NO2 equivalent				due to lube oil
Urban CNG Buses	Euro I - 91/542/EEC I	8.400	0.371	16.500	n.a.	n.a.	2.89E-05	1.860
	Euro II - 91/542/EEC II	2.700	0.313	15.000	n.a.	n.a.	2.68E-05	1.590
	Euro III - 2000	1.000	0.052	10.000	n.a.	n.a.	2.37E-05	1.590
	EEV	1.000	0.045	2.500	n.a.	n.a.	2.37E-05	n.a.
Urban Buses Standard	Conventional	5.710	1.990	16.500	0.029	0.0029	1.90E-05	2.650
	Euro I - 91/542/EEC I	2.710	0.706	10.100	0.012	0.0029	1.61E-05	2.050
	Euro II - 91/542/EEC II	2.440	0.463	10.700	0.120	0.0029	1.55E-05	1.480
	Euro III - 2000	2.670	0.409	9.380	0.001	0.0029	1.62E-05	0.861
	Euro IV - 2005	0.223	0.022	5.420	0.012	0.0029	1.54E-05	0.265
	Euro V - 2008	0.223	0.022	3.090	0.032	0.011	1.54E-05	0.265
	Euro VI	0.223	0.220	0.597	0.040	0.009	1.54E-05	0.265
Coaches Standard	Conventional	2.270	0.661	10.600	0.029	0.0029	1.37E-05	0.663
	Euro I - 91/542/EEC I	1.850	0.624	8.100	0.009	0.0029	1.26E-05	0.630
	Euro II - 91/542/EEC II	1.600	0.416	8.950	0.008	0.0029	1.25E-05	0.596
	Euro III - 2000	1.910	0.399	7.510	0.004	0.0029	1.35E-05	0.563
	Euro IV - 2005	0.150	0.021	4.510	0.012	0.0029	1.28E-05	0.530
	Euro V - 2008	0.150	0.021	2.570	0.034	0.011	1.28E-05	0.530
	Euro VI	0.150	0.021	0.496	0.033	0.009	1.28E-05	0.530

Source: European Environment Agency (2018)

2.4.4. Taking into consideration the additional economic benefits above, a revised NPV and BCR analysis for our Scheme is provided below:

Do Something (Plug-in Opportunity Charging)	**Central**		**High**		**Low**	
	Initial NPV	**Initial BCR**	**Initial NPV**	**Initial BCR**	**Initial NPV**	**Initial BCR**
Greener Bus Tool's scope	£1,063,411	1.12 **Low**	£5,020,778	1.56 Medium	-£2,533,208	0.72 **Poor**
Other Economic Benefits	**Change in NPV**	**Change in BCR**	**Change in NPV**	**Change in BCR**	**Change in NPV**	**Change in BCR**
Carbon and air quality benefits from replacing old Euro IV and V with Euro VI (replaced by e-buses)	+£613,873	+0.77	+£2,279,243	+0.96	+£74,482	+0.70
Value of training to staff	+£141,449		+£141,449		+£141,449	

(provided free by manufacturer)						
Overall NPV BCR analysis	**Final NPV**	**Final BCR**	**Final NPV**	**Final BCR**	**Final NPV**	**Final BCR**
	£1,818,734	1.20 Low	£7,441,471	1.84 Medium	-£2,324,501	0.74 Poor

Spare infrastructure capacity to facilitate and incentivise further rollout of ZEBs

2.4.5. The power grid connection (1.7MVA at night and 0.8MVA during the day) being delivered through this scheme will have capacity to accommodate a further 20 electric double-decker bus fleet in the future. This will allow us to future-proof the future rollout of electric buses in Cambridge (as more buses meet their asset age and therefore are appropriate to be transitioned out) by putting in place spare capacity today. This will also enable the Scheme to deliver higher value for money in the near future with 50 electric buses operating in Cambridge:

2.4.6. For this scenario we have also assumed that the additional 20 buses can be delivered by 2025 with minimum alteration needed to the depot apart from adding 10 more dual chargers (including out-of-GBM-scope monetisable benefits).

Future scenario with 50 buses	**Central**		**High**		**Low**	
	NPV	**BCR**	**NPV**	**BCR**	**NPV**	**BCR**
	£4,323,593	1.31 **Low**	£13,525,278	1.96 **Medium**	-£2,439,852	0.83 **Poor**

2.4.7. Furthermore, site assessments undertaken to date suggest that the power capacity can be easily scalable in the future (provided no competition in demand from neighbouring buildings) to 3-3.7MVA which will allow us to accommodate for more than 110 buses in a depot.

2.5. Non-monetised benefits

2.5.1. Per above, CPCA believes that our scheme will deliver significantly more benefits than the monetised benefits identified by the Greener Bus Tools. These benefits include the following which – we believe - when considered in additionality to the monetised benefits calculated above, provide a robust argument for our proposed scheme representing a **HIGH** value for money investment.

2.5.1.1. Prevention of preventable early deaths (100 per year in the CPCA area) from respiratory problems linked to poor air quality

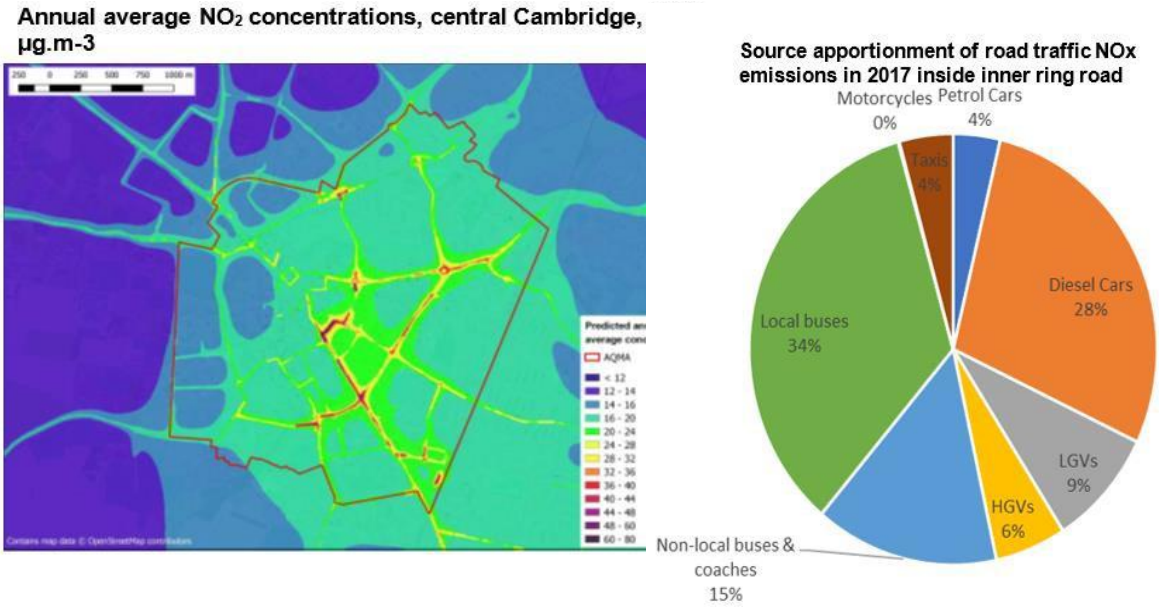
2.5.1.1.1. Cambridge City has air quality issues with areas exceeding legal limits in the last five years. Over 100 deaths in Greater Cambridge are attributable to air pollution each year. Buses are the largest single contributor to emissions. Without action, air quality is predicted to deteriorate with planned growth. The zero emission buses will be focused on running 32% of hourly departures in the air quality management area.

2.5.1.1.2. Analysis shows that buses account for 49% of NOx emissions within the city centre and a high correlation between concentrations of NOx and the Cambridge bus station and bus routes. Current planned urban growth of 30% for Cambridge is predicated on a three-fold increase in public transport. This would lead to a

considerable worsening of air quality within the historic centre without adoption of zero emissions vehicles.

2.5.1.1.3. A Clean Air Zone Feasibility Study published by the GCP demonstrates that, without intervention, this growth means a risk of continued exceedances for the next decade, with some areas seeing worsening air quality.

2.5.1.1.4. The EV buses would operate on routes through the AQMA which are currently served by Euro VI buses. With 32% of departures being zero emission and the released Euro VI buses replacing Euro IV and V on other AQMA routes represents a reduction in bus emissions in the city centre/AQMZ by 40-45%.



[1] https://consultcambs.uk.engagementhq.com/1836/document

[2] https://uk-air.defra.gov.uk/aqma/details?aqma_ref=311

2.5.1.2. Alignment with CPCA's Green Skills initiatives to provide apprentices and students with more enriching learning and practical experiences

2.5.1.2.1. Skills for the Green Economy in the CPC: The development of the provision in the Combined Authority area to support the Green Economy is emerging. There are a number of bids that are in development or have been submitted to aid the expansion of provision. Some providers have already developed a course offers and others are scoping out this new curriculum area.

2.5.1.2.2. Having a live operating environment in Cambridge will therefore go a long way in providing apprentices and students to get access to a practicum experience which enriches their learning. Furthermore, a live operating environment would also enable researchers from key higher education institution in Cambridge to further advance R&D projects in green technologies. Skills initiatives which will play in synergy with our proposed ZEBRA scheme include:

Schemes	Mechanism to enrich the scheme with a live operating environment
Future schemes	

Peterborough College: The Green Technology Centre in Peterborough (Towns Funds) The intent of this scheme is to develop a new centre focusing on Green Technologies. The centre will be a new skills facility for emerging industries – in particular electric vehicles and sustainable construction This will include training apprentices and upskilling vehicle technicians on modern methods of maintaining' in a safe working environment, electric vehicles. This will result in learners and apprentices developing knowledge and skills relating to the repair and maintenance of electric vehicles.	A live operating environment in Cambridge will allow apprentices of this programme access to a practicum learning experience in real life. This includes learning directly from expert maintenance engineers and experiencing first-hand how vehicles are repaired and maintained
College of West Anglia: NetZero Skills Centre at Wisbech. It is anticipated that the green skills centre will focus on three sectors required to achieve net zero by 2050: – Energy sector: design of a new curriculum to train new entrants and up and reskill existing workers. Examples include the need to increase low carbon electricity generation to ensure demand can be met whether in home or transport, installation and maintenance of energy storage devices and batteries, development of additional technicians able to install electric vehicle charging points. – Motor vehicle: The majority of new cars will be electric by 2030. This centre will deliver courses to support the change in skill requirements in this industry. Motor technicians will need a new skill set to service and repair electric vehicles, including programming and diagnostic skills. – Construction: modern methods of technology, skills to retrofit existing buildings including insulation and cladding, installation and maintenance of ground and air source heat-pumps for commercial and domestic buildings.	A live operating environment in Cambridge will give apprentices and students in this programme practicum opportunities, especially those who focus on green energy and motor vehicles. By introducing students/apprentices/ researches directly to the challenges (e.g. engineering, computing, and programming) currently being faced in the bus depot, we will be able to encourage innovation and ideation from our younger generations.
Strategic Development Fund for all Colleges in Cambridge This is a collaborative endeavour by all colleges in Cambridge to procure specialist equipment across the colleges and extend the range and scope of specialist Green Technology training. This will support modern methods of construction, sustainability, decarbonisation / net zero with specific reference to air and ground source heat pumps, solar thermal and PV and other renewable energies, biomass / hydrogen boiler fitting, electric vehicle and charge point installation / maintenance, hydrogen fuel cells.	Specialist equipment can be better utilised by creating an experiment that simulates a live operating environment. Having this environment in Cambridge will allow students to observe, simulate and address operating challenges with innovation and R&D.
Current schemes	
L2 and L4 Sustainability Certificate – A corporate training/workforce development product that will focus on core carbon literacy skills with a focus on identifying and implementing opportunities and strategies to improve sustainability in their work setting/sector. This will include some interviews/case	These sustainability certification trainings will fit perfectly with our proposed ZEBRA scheme. While learners are provided with live case

studies from a range of companies in different sectors, along with a number of example case studies from different sectors that will support learners to identify how they could improve sustainability in their work setting/role. – An FE/apprenticeships product, focused on core carbon literacy skills with additional units/projects in line with sector specific guidance around carbon reduction as a broader, industry and practical project-based product	studies to solve problems, the scheme can also benefit from talents with carbon literacy skills to help establish best practices in monitoring and evaluation as well as identify green opportunities at the depot.

2.5.1.3. Multiplier effect from stimulus to local businesses that provide or support the delivery of zero emission-related goods and services

2.5.1.3.1. As part of our commitment to align with PPN 06/20 – taking into account social value in the award of central government contracts – we will ensure that 10% of the overall procurement assessment will be attributed to social value, which includes the contribution of the contract to job creation, the growth of local businesses, and good stewardship of the environment.

2.5.1.3.2. In addition, according to MHCLG's Guidance on Additionality, the following multiplier effects can be applied to the following impacts on social value:

a) **Jobs created: 180 additional FTEs** are expected to be directly created from this investment in the next 5 years. This is derived from analysis undertaken on the Local Growth Fund programme (2016-20) whereby 6 direct jobs per £100k invested were created.

b) **Jobs safeguarded: 774 additional FTEs** are expected to be indirectly created or safeguarded as a result of this investment in the next 5 years. This is derived from analysis undertaken on the Local Growth Fund programme (2016-20) delivering 24.2 indirect and safeguarded jobs per £100k invested by that programme by end of monitoring period.

2.5.1.4. Opportunities for local innovation and an R&D hub to further advancement in zero emission powertrains.

2.5.1.4.1. We believe that having a live Battery Electric Bus operating environment in Cambridge, a global hub for R&D and innovation, will enable several R&D projects related to electrochemistry and electrochemical engineering which would have otherwise been not feasible to conduct. Enabling these R&D projects in Cambridge will give the UK market the best chance to further advance the efficiency and sophistication of these relatively new green technologies, especially with respect to driving range, asset life, and degradation rate of batteries, as well as methods to refurbish and remanufacture used batteries.

2.5.1.4.2. These are weaknesses of the battery powertrain which we believe can be addressed by putting the best of talents from all over the world that we have in Cambridge. Consequently, this will have a long-lasting impact on how much more efficiently and sustainably zero emission buses can be operated in the future and benefit not only Cambridge but the entire UK bus market.

2.5.1.5. Wider economic benefits from sourcing of goods and services from other UK regions, such as private investments attracted into CPCA's locality

2.5.1.5.1. Cambridge has been the destination for many investments from technology and biotechnology SMEs in the **past 3 years**. The investments made in the region totalled to **approximately £208m which attracted 89 inward investment projects over** the same period of time. This has been made possible not only by the great talents that Cambridge readily offers but also investments by both central and local governments in the region. To show this correlation, **since 2010, a total of 415 investment projects** have been implemented **creating around 12,270 jobs** in the CPCA region both by central and local funding schemes.

2.5.1.5.2. We believe that the ZEBRA funding scheme has the potential to generate such benefits to Cambridge, by attracting further private sector investment into the region thus creating further economic benefits. With the correlation above, we believe that our ZEBRA investment has the potential to attract inward investment projects from the private sector. **With a £10m public investment in our ZEBRA scheme (CPCA, GCP and DfT's contributions combined), we expect that 4 inward investment projects from the private sector** can be realised in the next 3 years.

2.5.1.6. Protection of Cambridge's tourism industry jobs and income from tourism

2.5.1.6.1. Finally, Cambridge attracts 8.2 million visitors annually, worth circa. £849 million to the local economy, and accounting for nearly 22% of jobs in the city[22]. Environmental quality is a key determinant of competitiveness of places[23] [24], especially as tourists are becoming more environmentally conscious. The significant reductions in emissions that our scheme will deliver will not just help us maintain our vital tourist industry through improving air quality, but also in helping us maintaining the fabric and appearance of our historic buildings, which are both soiled and damaged by particulates from vehicle exhaust[25] (with this damage being included in the damage costs included in the Greener Bus Tools).

2.5.1.6.2. A study done by Dong et al (2019)[26] of Southwestern University of Finance and Economics in Chengdu, China, examined the impact of PM 2.5 on tourism levels in 337 cities in China with the following controlled variables: scenic views (*Scenic)*, tourism infrastructure (*Hotel*)*,* availability of transport infrastructure (*Transport*), size of municipal administration, GDP, and size of population. The findings are unsurprising. Not only that worse air quality is correlated with lower inbound tourist volume, proximity with highly polluted cities is also correlated with lower inbound tourist volume which suggests a spill over effect. While it is not possible to prove the same trend will occur in the UK or monetise the loss in revenue from tourism, it is plausible to think that the same hypothesis applies and can lead to economic losses.

[22] Visit Cambridge
[23] Environmental management of a tourist destination A factor of tourism competitiveness – Mihalic 1999
[24] Tourists and Air Pollution: How and Why Air Pollution Magnifies Tourists' Suspicion of Service Providers
[25] Air Quality damage cost update 2019
[26] The Impact of Air Pollution on Domestic Tourism in China: A Spatial Economic Analysis – 2019 [Source]

3. APPENDIX: Data sources, assumptions and WebTAG categories used in BCR calculations

3.1 Data used within the DfT's Greener Bus Tool

3.1.1 The majority of our economic appraisal of monetised benefits applied the assumptions included in DfT's Greener Bus Tool. The additional data points we have recorded within the tool include:

Items	Data point	Data Source
Double-decker Electric Buses (Baseline)	£439,123	Quote from a bus manufacturer
Infrastructure (Baseline)	£1,937,323	Quote from UKPNS for in-depot infrastructure
Rapid opportunity chargers at Babraham P and R	£171,825	Quote from [redacted]
Infrastructure maintenance	£17,000 per year	Quote from [redacted] for in-depot infrastructure
Average annual km travelled	65,698 km	[redacted]
Average vehicle speed of buses	22 km/h	Smarter Cambridge Transport
Average population growth per annum	1%	ONS population estimates

3.1.2 Supplemental data used in our analysis (including non-monetised benefits)

Items	Data point	Data Source
Double-decker Electric Buses (High)	£470,500	Quote from a bus manufacturer
Double-decker Electric Buses (Low)	£415,273	Quote from a bus manufacturer
Infrastructure (Low)	£1,094,924	Quote from [redacted] for in-depot infrastructure
Infrastructure (High)	£2,721,291	Quote from [redacted] for connection of the pantograph opportunity charge points to the Babraham Solar Farm Quote from [redacted] for in-depot infrastructure
Staff training cost	£5,000 per individual	Transport Scotland ZEB Innovative Financing Ideas Pack
Staff training set up	3 day free sessions for 8 employees each	Quote from a bus manufacturer
Average growth in number of journeys per annum	-1.6%	DfT Bus Statistics
GVA per capita in CPCA region (2019)	£30,840	Cambridgeshire Insight

3.1.3 Breakdown of infrastructure cost

Items	Estimated Per Unit Cost (£ including inflation but exc. VAT and optimism bias)	Estimated Total Cost (£ including inflation but exc. VAT and optimism bias)
In-depot charging infrastructure		
DNO HV Metering substation and connection to DNO network	125,000	125,000
Increased cost for alternative DNO metering sub-station (add. 100m)	30,000	30,000
DNO risk allowance	50,000	50,000
DNO substation foundation	30,000	30,000
Private substation foundation	30,000	30,000
Civils Islands and Cable ducts, signs, etc.	250,000	250,000
Civils risk allowance	31,000	31,000
1.7MVA Private substation including civils and fit-out	140,000	140,000
LV distribution and communication network	92,000	92,000
DC chargepoints (dual-outlet) x 16	7,500	120,000
DC chargepoints power cabinet x 5	110,000	550,000
Private electrical risk allowance	90,200	90,200
Project detailed design and assessment	120,000	120,000
Construction Prelims - CDM, Welfare and Supervision	180,000	180,000
Prelims and Project Management Risk	30,000	30,000
Inflation (3.7%)	69,123	69,123
Total		**2,112,504**

Items	Estimated Per Unit Cost (£ as per quote)	Estimated Total Cost (£ as per quote)
P and R charging infrastructure		
Electrical Package		
Design to Stage 4	3,105	3,105
Modification and Metering to existing Solar LV Switchgear	13,579	13,579
Cabling Power – Armoured Cables buried	21,678	21,678
Earthing Cabling / Bonding	3,933	3,933
Control Cabling (Mechanically Protected)	8,714	8,714
Local Screen Interfaces (subject to design)	1,725	1,725
Metering and Power Loggers / Push Cards	2,933	2,933
Earthing Charger Bases	1,725	1,725

Commissioning Assistance – 2 days	1,380	1,380
RFI Posts or Mount to P&R Columns	1,288	1,288
Subcontractor Prelims	3,862	3,862
Budget / Design Contingency	4,794	4,794
Civil and Structural Work		
Design to Stage 4	2,070	2,070
Trenching (backfilled with extract spoil)	14,835	14,835
1 No Track Crossing (to Compound)	4,370	4,370
2 No Bases for Chargers	1,869	3,738
30 mtrs of Curb Line (provisional sum)	5,750	5,750
Concrete Topping and Compacted Base	13,800	13,800
Barriers & Lining Provision	3,910	3,910
Budget / Design Contingency	3,635	3,635
General Prelims		
General Construction Plant	2,070	2,070
Traffic Management, Security & Segregation	4,830	4,830
Access Equipment	1,380	1,380
Welfare Provision	978	978
Principal Contractor Team (PM, TWC, SM, BM)	12,420	12,420
Principal Designer	2,875	2,875
Major Equipment Supply		
1off. Free-standing Twin 150kVA DC + OEM Commissioning	26,450	26,450
Total		**171,825**
Total (including inflation but excluding VAT and optimism bias)		**175,181**

3.1.4 Breakdown of infrastructure maintenance cost

Items	Estimated Per Unit Cost (£ as per quote)	Estimated Total Cost for 8 years (£ as per quote)
In-depot charging infrastructure		
HV maintenance (client substation and associated infrastructure)	1,700	13,600
EV Charger maintenance (annual 1st line response, repair and replacement within warranty)	6,200	49,600
Software fee (Annual)	13,000	104,000
P and R infrastructure maintenance		
Rapid charger maintenance	9,100	72,800
Total		**240,000**
Total (including inflation but exc. VAT and optimism bias)		**264,596**

3.1.5 Operational data assumptions

3.1.5.1 Assumptions on operational data have followed the ones prescribed by the Greener Bus Model.

3.1.6 Network / Route plans

3.1.6.1 The exercise has been undertaken to evaluate the most suitable routes for the ZEBRA funded buses and has not been undertaken to benefit any specific operator. CPCA is committed to delivering an open procurement for the grant funding.

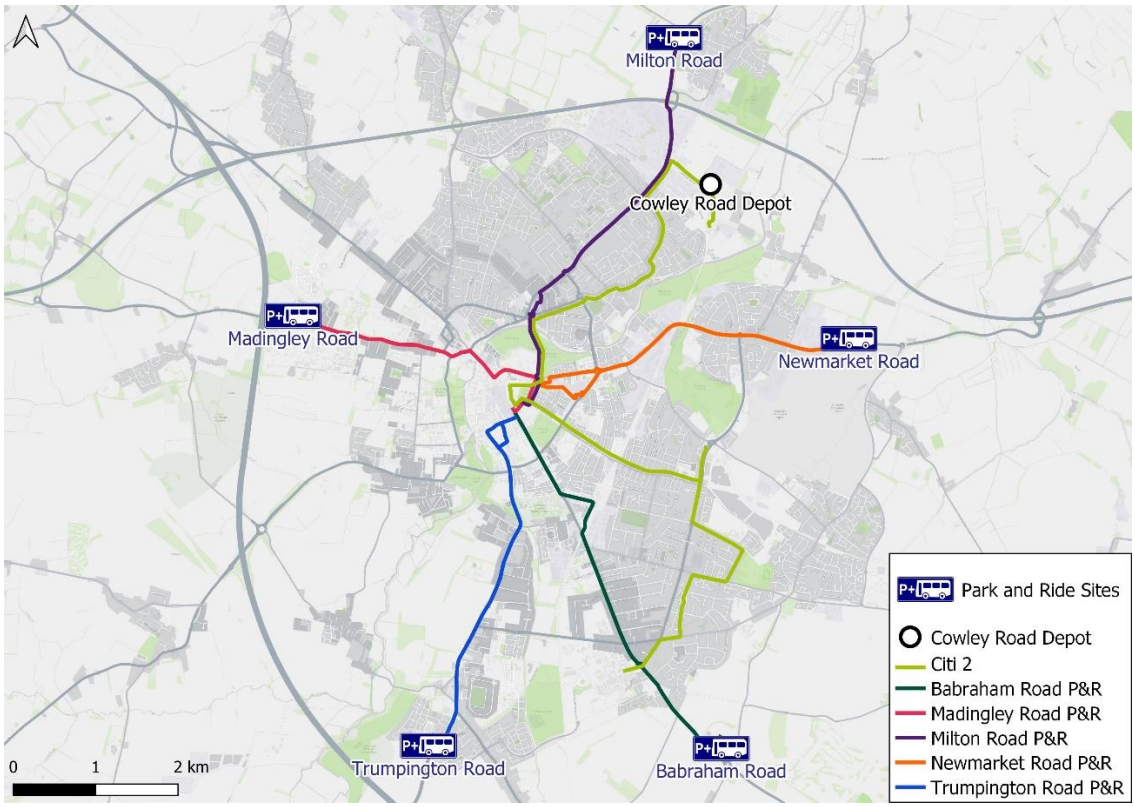
3.1.6.2

3.1.6.3 Our proposal is to convert vehicles operating the following routes from diesel to zero emission buses (specifically Battery Electric Buses):

- **the five Park & Ride services,** which reduce the number of cars entering the city core; and,
- **cross-city service Citi 2,** which links Cambridge North rail station to Addenbrookes via Chesterton, the City Centre and Romsey.

3.1.6.4 In a typical daytime hour, [redacted] and other operators <1. Under these proposals, the number of departures from the city core run by ZEBs will rise from 2 to 38 - or around 32%.

Map of proposed electric bus routes



3.1.6.5 The five park & ride services run commercially by [redacted] into central Cambridge are essential to keep traffic moving in the city. Together they contribute 3,500 car parking spaces. To run these services [redacted] allocates 22 modern Euro6 double decker buses to these services.

3.1.6.6 Each park & ride service has 4-5 buses painted in a distinctive colour scheme which remain permanently on that route. Part of our solution is to interwork the five routes with buses in one colour scheme with colour identification of each route delivered by full colour destination blinds.

3.1.6.7

3.1.6.8 By interworking the five ten-minute services, the 22 buses will operate on all five routes several times a day.

3.1.6.9 We intend to install **two opportunity rapid plug-in chargers at the Babraham Park & Ride** site in the South East of Cambridge. Babraham is being reconfigured to install solar panels over the car park spaces to provide electrical power generation in a project funded by GCP and being managed and delivered by [redacted]. Our discussions with [redacted] have confirmed that there is sufficient power for rapid charging of a bus, thereby **enabling has to have truly green "well to wheel" opportunity charging at the Park and Ride site**. With this intervention every 3 hours 40 minutes for each bus, we believe a 170-mile operating day for each bus is attainable without extra vehicles (i.e. **removing the need to increase Peak Vehicle Requirement (PVR) to operate an electric service**).

3.1.6.10 Citi 2 was selected for conversion on several grounds but most importantly that operates through some of the streets with the worst air pollution problems both in the city centre. Emmanuel Road, Parker St, Emmanuel St, St Andrews St, Regent St, Hobson St, Sussex St and King St, and Mill Road will all benefit

from frequent zero emission buses replacing the Euro4/5 diesels currently operating on those routes. Other considerations included:

- On the south end of the Citi 2 route the scheme will provide electric buses to the world-renowned Addenbrookes Hospital and the Cambridge Biomedical Campus, both of which are major traffic generators on our network and home to a number of major research centres, as well as the world headquarters of Astra-Zeneca. In addition to the clear health benefits, **transition funded by the ZEBRA scheme will also provide an opportunity for prominent promotion of government's investments in decarbonising public transport**.
- To the north of the city, the Citi 2 route terminates at Cambridge North rail station. This is only 300 metres from the Cowley Road bus depot. All drivers have scheduled changeovers every five and a half hours under employment law; thus, it makes operational sense for the driver to take his break at the depot and be replaced by another bus and driver beginning the next service. By charging the bus at the depot entrance, the bus stood for an hour provides an immediate "hot spare" vehicle ready to replace any zero-emission vehicle with a fault. In the peak hours this spare bus would run in service to provide drop back against congestion along the Citi 2's route. This is an extremely useful characteristic and also **eliminates the need to buy opportunity charging capacity at the outer terminus** and supports not increasing PVR to operate an electric fleet.

3.1.7 Operational Coverage

3.1.7.1 Existing operational coverage is important when assessing the potential suitability of a route within a particular region. Within the area we have defined for this intervention there are two prominent bus operators and three small operators as follows:

- [redacted] operates 130 buses out of its Cambridge depot and another 70 of their buses run into the city from other depots. It currently operates eight Citi routes which run at medium-high frequencies between the city's suburbs and its central core; and the five commercial park & ride services at ten-minute frequencies. [redacted] also runs services into the city from St Neots, Royston, Haverhill, Newmarket, Ely and from St Ives and Huntingdon. The latter two towns benefit from the extensive guided busway linking them to Cambridge on reserved track. [redacted] market share of passenger journeys in the defined area is over 95%.

- [redacted] operates circa. 20 buses on tendered bus services and 20 coaches on [redacted] services. Its largest route is the Universal, run with 10 buses on behalf of Cambridge University, connecting colleges with lecture halls and research facilities. [redacted] share of passenger journeys in the defined area is around 4.5%

- An hourly service linking estates east of the central core, five mornings a week is provided by [redacted]. On Saturday mornings the same service is run by [redacted]. On Fridays a short local link is provided by [redacted] These three mainly rural operators provide infrequent tendered services into the city, wherein [redacted] have eight small buses; [redacted], three; and, [redacted], three.

3.1.8 Completed greener bus tool

3.1.8.1 We have attached a copy for each scenario in our formal submission because the secondary scenarios in the model do not provide the following option for BSOG: “Basic BSOG rate + LCEB, AVL and Smartcard Uplifts”.

Scenarios	GBT
Do Nothing	N/A (derived from carbon, NOx, and PM 2.5 impact)
Do Minimum	Greener Buses Model - ZEBRA Phas
Do Something (pantograph opportunity charging)	Greener Buses Model - ZEBRA Phas
Do Something (rapid opportunity charging)	Greener Buses Model - ZEBRA Phas
Do Something (no opportunity charging)	Greener Buses Model - ZEBRA Phas
Do 50 buses (rapid opportunity charging)	Greener Buses Model - ZEBRA Phas

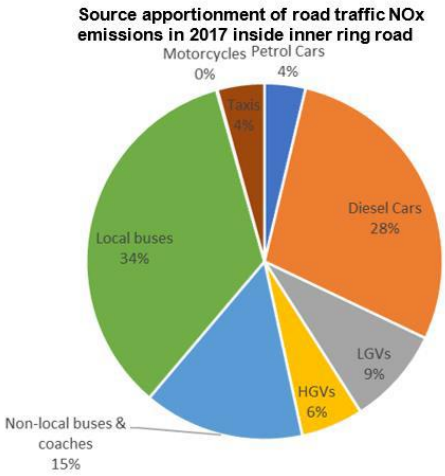
Appendix – Equality Impact Assessment

Stage 1 – Names of those involved in preparing the assessment	
1. Project Lead	Rowland Potter
2. Others	Oliver Howarth

Stage 2 – What are the aims and objectives of the proposal?
CPCA is applying for Zero Emission Bus Regional Area (ZEBRA) funding scheme with an ambition to support the procurement of ~30 zero emission buses (ZEBs) to operate in Cambridge, improving air quality and helping to address climate change in the region. In addition, CPCA expects it to also deliver better public transport, develop new skills, deliver more jobs, be part of the clean energy generation ecosystem and, fundamentally, act as a catalyst to achieve the transition of all bus routes to ZEBs by 2030. The Independent Report by the Cambridgeshire and Peterborough Commission for Climate Change[27] highlighted key challenges facing our region and concluded that a number of actions are required to address these and deliver a range of benefits, including (but not limited to): - more and better green space, - a thriving natural world, - better insulated and better ventilated homes, - reduce environmental impact, - cleaner air, - high quality job opportunities in the growing green economy, - better public transport; and, - improved health and well-being.

[27] CLIMATE COMMISSION REPORT_Final.pdf (hubspotusercontent40.net)

Cambridgeshire has constantly exceeded the World Health Organisation's standards for particulate concentrations, so much so that in 2004 Cambridge City Council designated the centre of Cambridge as an Air Quality Management Area (AQMA) because of high nitroxide levels caused by traffic. The area extends along some radial roads outside of the ring road.



Analysis shows that buses account for 49% of NOx emissions within the city centre, with a high correlation between concentrations of NOx and the Cambridge bus station and bus routes. Furthermore, with the further planned urban growth of Cambridge a three-fold increase in the demand for, and use of public transport is predicated. This would lead to a considerable worsening of air quality within the historic centre without adoption of zero emissions vehicles.

Delivering zero emission buses to Cambridgeshire and Peterborough Combined Authority's (CPCA) constituencies is therefore an important part of delivering our vision of a greener future economy.

This proposal will tackle major concerns about air quality and public health. By targeting the zero emission buses into the AQMZ on short, cross-city services, 32% of bus departures will be zero emission. CPCA will also mandate that any Euro 6 buses replaced by ZEBs must remain in the CPCA region and replace any Euro 4 or Euro 5 buses. If this ZEBRA is successful, the CA intends to use bus market reform to ban new diesel buses from our bus routes from next year.

This funding will support in the delivery of the following equality outcomes:

- continued provision of important bus services delivering a place that supports people in accessing public services, employment and leisure options
- the upskilling of residents in the public transport industry in a rapidly growing industry
- a consistent livery creating an impression of unity as described in the National Bus Strategy[28] with enhanced passenger communication aids both inside and outside the vehicles
- supporting the improvement in air quality, an issue that has been seen to disproportionately impact vulnerable groups, in the City of Cambridge by transitioning the largest contributor to emissions to a zero emissions fleet[29] supporting protected groups who suffer the most from climate change issues

Stage 3 –Who will be affected by this proposal? . *Describe what is changing and why*
Residents across the CPCA region will benefit from the transition of the Park and Ride services to ZEBs as a core means to travel into Cambridge City centre. The community in the city of Cambridge will especially benefit due to reduced air pollution in the city, and

[28] Bus Back Better (publishing.service.gov.uk)

[29] **https://consultcambs.uk.engagementhq.com/1836/documents/2050**

wider communities will also benefit from the introduction of the Euro 6 diesel vehicles transitioned off the park and ride service into their areas.

Bus and non-bus users will be positively impacted by this project. Bus users both in the city of Cambridge and wider area will benefit from either zero emission or lower emission buses. The technology change may also encourage non-bus users to alter their mode choice toward buses. These passenger benefits are further increased by the benefits likely to be seen by the operator and wider future mobility sector with programmes to deliver skills development and enhancing the resiliency of public transport jobs in the region.

In a Better Journeys Survey delivered by the Greater Cambridge Partnership[30] the following demographic mix of respondents was identified:

- Nearly 73% of respondents were travelling to work in their journey
- Over 51% travelled by car and under a quarter by bicycle with 10% using the bus
- 82% of respondents wanted to see improved public transport with improving air quality high on the list of priorities
- Balanced split between male and female riders
- Majority of respondents were between 25 – 54 years of age
- Majority working either full or part time (83%)
- 7% identifying that they had a disability

Many protected groups are associated with a greater risk of socio-economic disadvantage and, therefore, at a disproportionately higher risk of suffering from adverse climate change impacts. This project will support in delivering positive impacts for protected groups across the CPCA region.

- The CPCA region has a slightly higher proportion of people aged 16-64 when compared to the East of England meaning the continued delivery of high quality commuter Park and Ride services is expected to deliver a benefit for this demographic.
- The region also has a higher proportion of Minority Ethnic and Asian/Asian British when compared to the East of England. As minority ethnic groups have been seen to be disproportionately likely to be in poverty the continuation of these bus services will support these communities.
- The region has a higher than average proportion of One Family Households and slightly lower proportion of One person households. One person households are more likely to require the use of public transport and, therefore, the reduction in emissions and continued delivery of these services will benefit families across the region including young children and pregnant women.
- The main language in the region is English with a variety of other languages making up 5.5% of the population. The consistent branding and additional communication aids in the services will support the proportion of the population who do not use English as their first language.

Stage 4 – Relevant Research/Data -

[30] Choices for Better Journeys Report - Final Draft (greatercambridge.org.uk)

Data Source (include link where published)	What does this data include?
	Age, gender, ethnicity, disability information for the Combined Authority, or its area
Cambridgeshire and Peterborough Equality and Diversity Policy	CPCA Policies on equality and diversity
National Bus Strategy, 2021	Equality impact evalution information contained in the NBS
Climate Change Committee, 2020, Net Zero: The UK's contribution to stopping global warming	Information on the impact on PPCs as a result of climate change and air quality
TfL to trial innovative new bus sound to improve road safety - Transport for London	Insight on measures to deal with the lack of noise from ZEBs
Transport for Everyone: an action plan to promote equality, Department for Transport	To identify national public policy on public transport equality
Improving Transport Accessibility for All – a Guide to Good Practice	Best practice guidance on vehicle standards

Stage 5 – Impact				
List Groups Affected	Positive Impact	Negative Impact	Neutral Impact	Please explain the impact
City of Cambrige residents	X			Delivery of ZEBs for use in the city area will reduce emissions and improve air quality
Outer Cambridge residents	X			The Euro 6 diesel buses will replace the higher polluting vehicles in the rural bus network delivering improved air quality
Bus users	X	X		The expectation is that the introduction of ZEBs will have a positive impact for bus users but there is a risk, due to the unknown impacts of new technology on operational costs, that fares could increase or decrease as a result of the introduction of ZEBs.
Protected Characteristics				
Sex	X			There will be additional space for prams presenting a positive impact for women who are primarily responsible for childcare and lone parents who are predominantly female.
Gender Reassignment			X	No differential impacts have been identified in relation to gender reassignment.
Age	X			The National Climate Change Committee has stated that vulnerable groups are both more likely to suffer from increasing temperatures and disproportionately benefit from

				reduced air pollution.[31] The transition to ZEBs in the city of Cambridge will aid in the improvement of air quality and could benefit both the old and the young. Both visual and audio tools will be installed on the vehicles to aid with passenger communication.
Disability	X	X		As described in the 'Age' section the Climate Change Commission indicates that vulnerable groups have the most to gain and lose from climate change. In addition, the Cambridge County Council Anti-Povery Strategy has found that disabled people are more likely to be less economically active. This project ensures the continued provision of high quality public transport in Cambridge and continue to support access to jobs. The vehicles will benefit from enhanced PSVAR requirements including spaces for wheelchairs, on board screens providing real-time information and both audio/visual communication tools. The lower levels of noise from the electric buses when compared to diesel buses presents potential negative impacts for vulnerable road users particularly for people who are blind or partially sighted.[32] The installation of the plug-in charging infrastructure may have an impact on pavement space at Babraham Park and Ride. This may have a negative impact on people with disabilities.
Race & Ethnicity	X			Cambridge is one of the most diverse places in the country outside of London with a rising proportion of people identifying themselves as belonging to other ethnic groups. Ethnic minority groups in Cambridge have a range of income levels but the Council's Anti-Poverty Strategy indicated that BAME people in

[31] **Climate Change Committee, 2020, Net Zero: The UK's contribution to stopping global warming**

[32] **TfL to trial innovative new bus sound to improve road safety - Transport for London**

				Cambridgeshire may be more likely to experience poverty of low income. The Climate Change Committee identifies that people in poverty are most likely to be affected by the risks and impacts of Climate Change.[33] The improved air quality in the city of Cambridge as a result of this programme could have a positive impact on the BAME community.
Sexual Orientation			X	No differential impacts have been identified in relation to sexual orientation.
Religion or Belief (or No Belief)			X	No differential impacts have been identified in relation to religion or belief.
Pregnancy & Maternity	X			There is some evidence that poor air quality can lead to pregnancy complications[34] so this programme could have a positive impact in preventing this. In addition, the buses will have space for prams as a result of the enhanced PSVAR standards.
Marriage and Civil Partnership (note this only applies in relation to eliminating unlawful discrimination (limb 1))			X	No differential impacts have been identified in relation to marriage and civil partnerships

Stage 6 - Actions to mitigate, advance equality or fill gaps in information
There is little negative impact on PPCs in the delivery of this programme. CPCA will work together with the selected Operator Partner to ensure that the buses delivered meet all the specifications of PVSAR 2000, including but not limited to the following. Delivery of these requirements will be conditions precedent in the Grant Agreement between CPCA and the Operator Partner. - Accessibility features for disabled passengers - Assistive boarding features for passengers on wheelchair - Low floor buses - Audible and visible announcement features on buses Likewise, relevant requirements (such as those set out in the Disability Discrimination Act) will be mandated for the siting and installation of charging infrastructure – both within the Operator Partner's depot, and infrastructure at the Babraham Park & Ride site. One identified issue is the reduction in sound from buses could have the potential to impact people with hearing and sight impairment.

[33] **Climate Change Committee, 2020, Net Zero: The UK's contribution to stopping global warming**

[34] **Health matters: air pollution - GOV.UK (www.gov.uk)**

CPCA will evaluate the benefit, by examining relevant examples, of including artificial bus noise on the ZEBs as part of the tender specifications. CPCA will consult with the RNIB and affected users in the first few months of the operation to understand the impacts.

Some electric buses have lower seat numbers potentially reducing capacity.
CPCA specifies the seating requirements for the buses to be in line with current capacity of the diesel bus services.

Electric buses can have power issues that impact reliability
CPCA specifics that the operator meets certain service standards including reliability and has undertaken detailed analysis on the number of vehicles required to deliver the routes.

The installation of the opportunity charging may have an impact on vulnerable people by negatively impacting accessibility at the Park and Ride site.
CPCA will ensure, in the designs for the charging infrastructure, that consideration is given to having suitable space around the plug-in charge points so as to not impact accessibility.

As part of our monitoring and evaluation plan CPCA will look to identify the operational cost difference as a result of ZEBs.
Information on the difference between the operations of diesel buses and ZEBs.

It is expected that the ZEBs will not be accessible for all and the wider community transport service options for certain protected groups are expected to continue in their current form.

Stage 7 – Continuous Consultation with Stakeholders	
Data Source (include link where published)	What does this data include?
CPCA will engage in a consultation with RNIB and affected users in relation to bus noise	Survey results identifying if the transition to ZEBs has had a negative or positive impact
CPCA will deliver a site evaluation of the impact on accessibility as a result of the plug-in charge points installation	A report detailing the potential impacts on accessibility.
Quarterly Passenger Survey	Bus and non-bus user survey delivered regularly by CPCA

Stage 8 - Final impact analysis
Three potentially negative impacts have been identified in the project including accessibility issues around the installation of the plug in opportunity chargers variance on the price of fares and impact of lower vehicle noise on people with visual and hearing impairments. Mitigation measures have been put in place to address these negative impacts as described above. In addition to completing the studies mentioned above, CPCA will continue to focus on the impact of ZEBs to society and, in particular, vulnerable groups and will update the assessment accordingly. The project is expected to deliver a range of positive impacts improving disproportionate impacts on the community as a result of public transport. The enhanced PSVAR standards, reduced air pollution and newer vehicles will all support in delivering improved access to services for protected groups. The air pollution impacts, especially, have a wide ranging positive impact on many protected groups who are disproportionately likely to suffer as a result from air pollution.

Stage 9 – Monitoring and Evaluation

CPCA has developed a robust Monitoring and Evaluation framework for this project that will consistently monitor the following information:

a. Improving air quality
b. Sustainable economic growth
c. Development of skills required for zero carbon economy
d. Delivering a world-class public transport to improve users' journey and reduce reliance on cars
e. Both user and non-user experience

CPCA will combine these sets of data to understand the real impact delivered to improve equality. The detailed M&E framework is in the Management Case section of the Full Business Case.

Appendix – Letters of Support

CPCA Confirmation on RDEL Support

Hi Oliver,

Following discussion with our Head of Transport I am happy to confirm that the below resource requirements are in place for the delivery of the ZEBRA project as set out below.

Let me know if you need anything more.

Thanks,
Rob

Activities	Resource Requirements	Estimated cost p.a. before inflationary impact	How the Requirement is met
Scheme administration	30% utilisation of: - 1x Grade 3 - 1x Grade 5 - 1x Grade 7	£53,943	The Transport team will deliver this this within their existing capacity which is already costed into the Combined Authority's budget.
Monitoring and evaluation	Based on quotes of previous M&E specialists hired by CPCA in the past	£100,000	It is expected that the majority of monitoring data will be acquired in the course of normal business across the passenger transport service and bus franchising workstreams. There is capacity within the approved Bus Review Implementation budget to top this up if required.
Marketing and communications	10% utilisation of: - 1x Grade 5 Preparation and publication of Marketing and Communications materials	£6,500 TBD	This will be managed within the day-to-day operation of the Combined Authority's communications team.
Financial Management	30% utilisation of: - 1x Grade 3 - 1x Grade 5	£27,853	A Finance Manager is assigned to support the Delivery and Strategy Service and will meet this requirement, with support as required from the Deputy S73 Officer, and transactional finance teams.

Activities	Resource Requirements	Estimated cost p.a. before inflationary impact	How the Requirement is met
Asset management	30% utilisation of: - 1x Grade 3	£10,500	While not anticipated, as asset ownership will fall to the delivery partner, there is sufficient capacity within the existing passenger transport team to meet this need.
Advisory support	Light-touch ad-hoc budget for consultancies where necessary to support with procurement and implementation activities.	£50,000	The majority of these costs will be met within the Combined Authority's existing procurement and legal teams however there is capacity within the Bus Review Implementation budget if additional resource is required.

Robert Emery
Business Board S151 & Dept. S73 Combined Authority

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Tel: 07923 250200

The Combined Authority supports agile working, so please don't feel you need to respond to this email outside your working hours.

CAMBRIDGESHIRE & PETERBOROUGH COMBINED AUTHORITY | THE BUSINESS BOARD

At the heart of Cambridgeshire & Peterborough is Compassion, Co-operation and Community

HM Government

We must keep on protecting each other.

NHS

HANDS FACE SPACE

STAY ALERT | CONTROL THE VIRUS | SAVE LIVES

Appendix – Point to Point Guide on Project Management