

Appendix 1 – Tap on Tap off Full Business Case

West of England

Tap-on-Tap-off Project Full Business Case

Quality information

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Executive Summary

In 2019 over 72 million bus journeys were made on West of England public transport buses. With buses spending between 25% and 30% of their total journey at bus stops, bus users in the West of England experience significant journey time losses due to this dwell time. The Tap-on-Tap-off (ToTo) project aims to develop an integrated digital and contactless payment system for public transport buses so bus users may pay by simply tapping their card or digital barcode ticket upon boarding, and upon disembarking. Flexible ticketing and variable price capping will also be introduced as part of this project, ensuring that customers get the best value for their money and are not charged high prices for multiple journeys as they are now with the current flat fare system.

Removing the need for a driver-customer interaction upon boarding will drastically reduce dwell time at bus stops and will also remove the need for bus users to have prior knowledge of the bus network or ticket fares when paying for a journey. The ToTo project will also enable single-operator variable capping, so that the journeys made over a single operator's routes are guaranteed to offer the passenger the best Value for Money (VfM) possible.

Through the ToTo project, all operators based in the West of England region and North Somerset will receive financial support via a grant fund to procure and install Tap-off readers for their buses. Furthermore, registered buses which do not have barcode readers or modern ticketing machines will also receive support to allow them to upgrade their equipment. A funding of £2.07million has been secured (subject to approval of this business case) for the project from various public funds, namely the Department for Transport's (DfT) Transforming Cities Fund, the Bus Service Improvement Plan (BSIP) and City Regional Sustainable Transport Settlement (CRSTS) funds, and local public sector contributions from North Somerset Council.

Flexible ticketing and single-operator variable capping will be offered to passengers by operating companies as part of the ToTo service. Once the ToTo service is operational, development of a multi-operator ticketing system will begin.

The effects and successes of the project will be monitored after implementation through regular reports delivered by the project manager detailing the project progress. Improvements in passenger satisfaction based on the ToTo service will be monitored through the yearly Transport Focus survey reports. It is anticipated that the project will conclude by March 2023.

The ToTo project's objectives and predicted outcomes align with the wider local and national strategies, such as the National Bus Strategy and the West of England Combined Authority's Bus Service Improvement Plan (BSIP). Targets outlined in such strategies include growing patronage levels for buses by 24% by 2030, achieve 95% of bus services running on time, and reducing average bus journey times by 2% and 10% by the years 2025 and 2030, respectively. The predicted outcomes of the ToTo project are:

- Reduced bus operating costs equating to approximately £950k over the appraisal period including £156,000 based on the project's effect to reduced cash handling transactions.

- Increased bus patronage by an estimated average of 143,000 additional passenger boardings expected per year, owed to the simpler and potentially cheaper bus service which the ToTo projects aims to deliver.
- Journey time savings of approximately 1.1 million hours over the 10-year appraisal period (~110,000 hours per year). These savings will be earned through a reduction in dwell times at bus stops due to the faster boarding times.
- Estimated to produce a high Benefit Cost Ratio of 3.3, meaning that for every £1 invested, a benefit of £3.30 will be produced.

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1 Introduction

1.1 Purpose of the Report

This report presents the Final Business Case (FBC) for investment in Tap-on-Tap-off (ToTo) infrastructure on the West of England Bus network on behalf of the West of England Combined Authority (West of England CA) and North Somerset Council (NSC). This report outlines the case for investment and why public sector funding is required to implement this technology. The report is structured as below:

- Section 1, the 'Strategic Dimension' outlines the case for change and how the scheme aligns with business needs
- Section 2, the 'Economic Dimension' outlines the economic and Value for Money (VfM) case for the scheme
- Section 3, the 'Financial Dimension' outlines the scheme cost and funding ask
- Section 4, the 'Commercial Dimension' outlines the grant funding arrangements proposed
- Section 5, the 'Management Case' outlines the project management processes in place to deliver the scheme.

1.2 Background

The West of England is one of the UK's most prosperous regions with an economy worth over £33.2 billion a year. A net contributor to the national purse, with a population of over 1 million and over 43,000 businesses, the West of England competes on a global scale.

In 2016, three councils in the West of England, Bath and North East Somerset (B&NES), Bristol and South Gloucestershire, signed a devolution deal. As a result, significant powers and funding have been transferred to the region through the new West of England CA and West of England Mayor.

In 2018, the West of England Local Enterprise Partnership (LEP) led the installation of 89 on-street ticketing machines, known as iPoints, for the metrobus network so travellers could purchase their ticket prior to boarding the bus, removing the need for the driver-passenger interaction.

In 2019, Local Transport Authorities (LTAs) worked alongside bus operators to deliver improvements to the bus infrastructure for smaller operators (35 vehicles or less). The upgraded buses received upgraded ticket payment machines which allowed them to accept contactless bank payments and read barcodes. Smaller operators did not find it commercially viable to upgrade their payment methods before, but with the help of the LTAs there is now a near universal adoption of contactless payment methods (99%).

In July 2019, the West of England CA and NSC Committee presented a £350 million investment programme which planned out investments until March 2023 extending across the Investment Fund and Transforming Cities Fund (TCF). Of this £350 million, £114.93 million was allocated to Transport Infrastructure.

A funding programme has been approved on January 2021, where of the £114.93 million set

aside for Transport Infrastructure Investments, £71.482 million was planned for approved awards and allocations and £43.448 million was planned for associated 'tail' required to deliver the projects up to March 2023. One of those projects to be delivered via TCF funding is the ToTo system with price capping to migrate for multi-operator ticketing.

1.3 Project Description

This project aims to facilitate the development of new and simplified bus ticketing options across all buses in the West of England CA and NSC (collectively referred to as the West of England) by installing Tap-off contactless payment readers for passengers exiting buses. Tap-off readers will complement the existing contactless ticket purchasing methods available in buses in the West of England, enabling them to upgrade to a ToTo payment system with functionality similar to what is available in London. This will allow passengers to pay by simply tapping their contactless bank card at the beginning and end of their bus journeys. Automated systems will then calculate the most appropriate (cheapest) fare for customers' journeys.

Implementing the scheme will enable the following:

- Bus operators to introduce variable fare capping. This could include capping local fares on popular local trip journeys or introducing a flexible scale on capping to account for emerging travel patterns. This will provide customers with the best fares for the journeys made.
- Remove the need for bus driver and passenger interaction upon boarding the bus which will significantly reduce "dwell time" at bus stops and therefore making journey time savings.
- Bus users do not require prior knowledge of bus ticket types or prices, which drastically simplifies the process of using public transport. Guaranteeing bus users, the best price on their journey and removing the fear of overcharging will also act as a catalyst to increasing bus patronage.
- Developing a standardised ToTo system for the individual bus operators in the West of England will aid in establishing the integration required between services to facilitate the implementation of multi-operator capping in the future.
- The project will facilitate the installation of Tap-off readers across all bus operators in the West of England and provide further support to operators that do not have contactless Europay Mastercard Visa (cEMV) Ticketing System and barcode enabled ticker machines to deliver upgrades.

2 Strategic Dimension

2.1 Organisation Overview

The project is being taken forward by the West of England CA on behalf of the local authorities of Bristol, South Gloucestershire and B&NES and including provisions for North Somerset, who are not a member of the Combined Authority. The West of England CA is the Regional Transport Authority with responsibility for the regions devolved local transport budget as well as the franchising of local bus services in the area.

2.2 Business Strategy and Wider Strategies

This section outlines the key national and regional strategies that the project is aligned to.

2.2.1 National

The **National Bus Strategy** published in 2021, states the Government’s objectives for a more reliable, more frequent, and faster public transport service. Achieving this through LTAs working alongside bus operators in Enhanced Partnership (EP) arrangements. The National Bus Strategy promotes the establishment of EPs so that bus operators are offered financial support in return for services with improved quality and efficiency. Other objectives found in the National Bus Strategy vision are cheaper fares, comprehensible bus networks, and bus systems which are easier to use and understand. The National Bus Strategy also outlines the objectives which should be addressed by Bus Service Improvement Plans (BSIP), and the procedures detailing how EPs should develop Bus Service Improvement Plans.

2.2.2 Regional

The **Joint Local Transport Plan 4** (JLTP4) was developed by the West of England CA in 2019, and it contains policies and objectives which will govern the approach to transport developments in the West of England region. Figure 1 shown below details the JLTP4 framework, and how other regional strategies (discussed below) align themselves with the JLTP4.

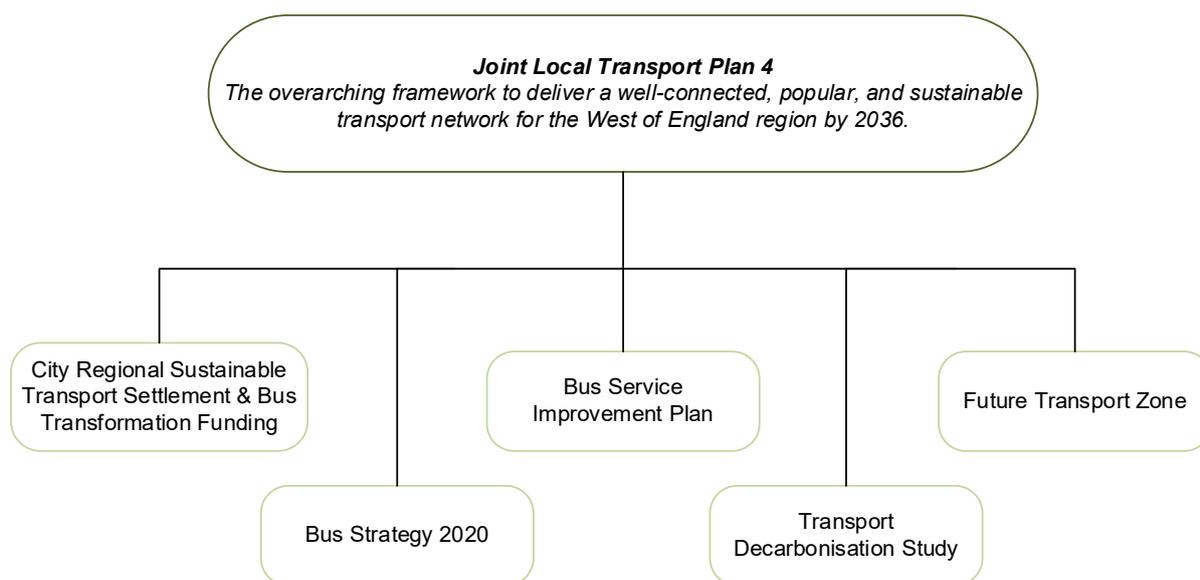


Figure 1: Joint Local Transport Plan 4 Framework

The **City Regional Sustainable Transport Settlement** (CRSTS) published by the West of England CA and NSC in 2021 draws upon the JLTP4, BSIP (discussed below), and various other strategies to set plans and objectives for transport projects from 2021 to 2026. The objectives outlined in the CRSTS which will be met by the introduction of an improved integrated public transport ticketing system, such as ToTo, are the following:

- Driving growth and productivity by achieving a more usable and integrated public transport ticketing system that will reduce economic transaction costs.
- Levelling up to an integrated and more accessible public transport system that provides accessibility for all and helps level-up across socio-economic groups.
- Decarbonising transport through the implementation of a more usable and integrated public transport ticketing system that makes the network more accessible for all and reduces transaction costs.

The West of England **Bus Services Improvement Plan** (BSIP) includes the aspiration for an integrated ticketing system, for multi-operator products and the wider application of digital ticketing on the network, enabling the network to transition being based on interchange and multi-operator being the norm. Furthermore, BSIP identified initiatives to address these objectives which includes providing help to operators to upgrade existing equipment to accept bank card ToTo and introduce adult ticket capping. It also targets addressing existing gaps in our multi-operator ticketing offer by working with operators to support establishment of multi-operator contactless bank card Pay-As-You-Go (PAYG) systems.

BSIP includes the commitment to deliver ‘*a network wide rollout of ToTo readers delivering Individual operator contactless bank PAYG with capping, by March 2023*’. This is subject to the funding released as part of this FBC.

BSIP includes the aspiration for fares to be lower and simpler. This could include local low fare-zones and lower point-to-point fares. This could include daily and weekly capping using ToTo readers. This will enable flexible ticket pricing that matches customer travel distances and ensures VfM fares. Fares that are perceived as good VfM are identified as an important factor in supporting patronage growth.

BSIP highlighted the objective for journey times to be decreased and have identified that buses spend 25 – 30% of their time at bus stops. Simpler fares can help reduce dwell times by reducing complexity for passengers and journey times can be improved further through the introduction of faster ticketing and payment methods such as ToTo.

BSIP targets that ToTo will help to contribute towards include:

- Reducing bus journey times on designated corridors by 2% by 2025 and 10% by 2030.
- Achieve 95% of services running on time, defined as being no more than 1 minute early or 5 minutes late by 2030.
- Return to pre-pandemic patronage levels by 2025 and grow patronage by 24% by 2030.
- Increase passenger satisfaction to 89% for 2025 and 95% for 2030.

In the West of England, the **Future Transport Zones (FTZs)** programme currently being developed aims to deliver a package of innovative projects, such as Mobility as a Service (MaaS) systems or Mobility Hubs which are places with concentrated transport links and facilities for bike hires or electric vehicle charging points. The aims of these projects are to reduce congestion in urban areas and improve air quality.

The **Transport Decarbonisation Study (TDS)** is in development and seeks to provide the direction and necessary interventions needed to achieve the carbon neutral by 2030 target set out in the JLTP4 and the Climate Emergency Action Plan.

The **West of England Bus Strategy** outlines the overall vision for bus services in the West of England, aiming to achieve ‘a well-designed network that is simple, coherent and efficient.’ The strategy includes the following commitments:

- Smart payments and ticketing systems that will automatically choose the best value fare to improve the customer experience and help increase bus passenger numbers which is currently aimed at doubling bus passenger numbers by 2036.
- Convenient ticketing system that can help to reduce boarding time and so speed up journeys as well as improve access to public transport within the area.
- Provide a consistent ticketing and payment system in the area that is easily available and well promoted.
- Implement a PAYG system that will automatically charge the best value fare and also implement a daily and weekly cap.

The Bus Strategy includes a roadmap for ticketing and smart payments as shown in Figure 2 below. ToTo development will address the short-term goal of developing single-operator ticketing payment, and also set the stage for the medium term goal of expanded multi-operator ticketing.

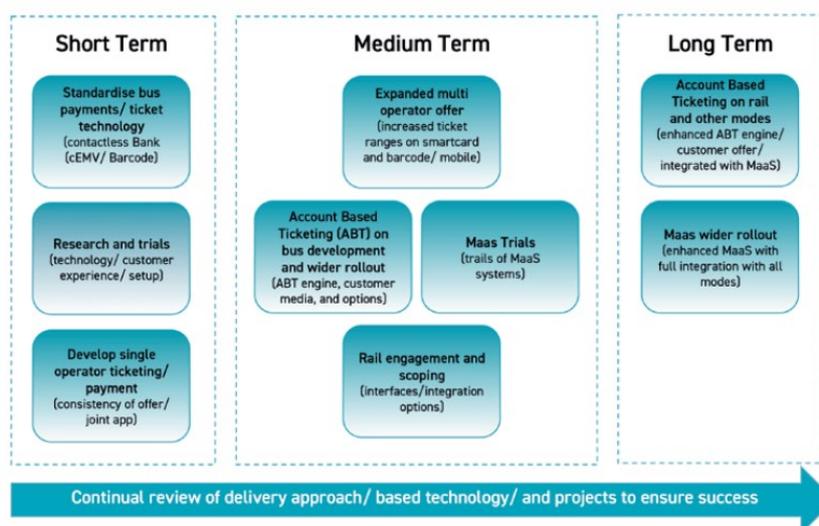


Figure 2: Roadmap showing the phases outlined by the West of England Bus Strategy for smarter payments and ticketing

2.3 Interdependencies

The FTZ programme aims to deliver a MaaS platform to provide customers with a single point of access to public transport ticketing. Further aims of FTZ are to allow the provision of new and expanded multi-operator tickets, and the development of multi-modal ticketing options. Although the ToTo project will focus on delivering a single-operator variable capping and flexible ticketing system, Phase 2 of the project lays the foundations for a multi-operator, and eventually multi-modal public transport system. The aims of the FTZ and the development of a MaaS platform therefore rely on the ToTo project setting the stage for multi-operator and multi-modal ticketing.

2.4 Existing Arrangements and the Impact of Not Changing

Bus services in the West of England, are generally operated on a commercial basis, with the local authorities providing any necessary infrastructure (e.g., stops and bus lanes). The West of England CA has responsibility for the franchising of any services which are not commercially viable but are deemed socially necessary. 12 operators are present in the region and collectively manage a complex bus network which serves over 70 million bus passenger journeys per year. Patronage levels have increased by 40% over a 7-year period demonstrating a significant growth in popularity for bus services which mirrors significant local investment in the network over that period. Although the number of passenger journeys decreased due to COVID-19, the number of passengers using public transport is expected to return to pre-COVID levels by 2025.

The majority of the buses in circulation, 625 out of 765 are operated by First Bus, with the remaining 11 operators owning approximately 18% of the total number of buses. Table 1 illustrates the distribution of public transport vehicles based on the operating company, as well as the ticketing technology used by the different operators.

Previous projects funded by the West of England CA and NSC have helped smaller operators to deliver contactless payment infrastructure resulting in a near universal adoption of modern ticketing machines on the regions buses. Only 5 buses (~0.65% of total buses) used by minor operators still rely on old ticketing machines; all operators with 35 vehicles or less are able to access support to upgrade to new ticket machines as part of a separate project which has already supported the upgrade of over 70 vehicles in the area. See Table 1 for a breakdown of existing ticketing technology on all operators.

Operator	Vehicles	cEMV enabled	Barcode enabled	No. of ToTo readers needed	No. of barcode readers needed	Potential new machines
First Bus	625	Y	Y	710	0	0
Stagecoach	42	Y	N	42	42	0
BCT (HCT group)	40	Y	Y	40	0	0
Faresaver	28	Y	Y	28	0	0
Bath Bus Co.	8	Y	Y	8	0	0
Eurotaxi	8	Y	Y	8	0	0
Carmel	4	Y	Y	4	0	0
CT Coaches	5	Y	Y	5	0	0
Arleen Coaches	1	N	N	n/a	n/a	1
Citistar	1	N	N	n/a	n/a	1
B&NES fleet	2	N	N	n/a	n/a	2
SGC fleet	1	N	N	n/a	n/a	1
Total Est	765			845	42	5

Table 1: Ticketing Technology and Vehicle Capacity of Bus Operators

The mix of existing payment methods are shown below in Table 2 and Table 3, splitting out the options available on First Buses from those of other operators. A small minority (14.1%) of First Bus tickets were purchased using cash, while for other operators cash represents a higher portion of total ticket sales (25%). The most popular payment method for First Bus tickets is the mobile ticketing app ‘mTickets’ (52%) and for other operator companies it is contactless payments (70%).

Payment method	Percentage (data on channel split actually supplied)
mTicket	52%
Contactless bank payment	28%
Cash	14.1%

Table 2: Current mix of ticket transaction type on First Bus

Payment method	Percentage (partial data + estimates)
Contactless bank payment	70%
Cash	25%

Table 3: Ticket transaction type of all operators excluding First Bus

Mobile ticketing (mTickets) and contactless ticketing is increasingly becoming popular in the West of England. Since 2018/2019 the share of revenue for First Bus attributed to cash payments has declined from around 40% to less than 15% in 2021/2022. Contactless payment methods have increased their share of revenue from 16% to 28%, with mTickets doubling from 26% to 52% in 2021/2022. This is in line with the trend observed in wider society, where payment by cash has followed a continuous decline magnified by the onset of the COVID-19 pandemic.

Bus fares in the West of England vary greatly by geographic location, the use of various types of discounts and the type of ticket that is selected. Current options offered by First Bus include:

- The ‘three-stop-hop’ for short journeys.
- Singles and day products provide options for people making longer or multiple journeys on a particular day.
- Packs of single tickets for people to make regular journeys over a longer time period.
- Weekly, monthly, and annual products that give a number of options for more regular passengers.

As shown below in Table 4, the average price of tickets in 2019/2020 has risen by 12p from 2014/2015.

	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020
Average fare	£1.93	£1.95	£1.98	£2.00	£2.03	£2.05
Fare increase	n/a	1.0%	1.5%	1.0%	1.5%	1.0%

Table 4: Average bus fare in the BSIP over time

There are currently four multi-operator bus products in the West of England area:

- AvonRider, whose tickets cover B&NES, Bristol, North Somerset, and South Gloucestershire.
- BathRider, whose tickets cover Bath urban area.
- BristolRider, whose tickets cover Bristol urban area.

- WestonRider, whose tickets cover Weston-super-Mare urban area.

The AvonRider, BathRider and BristolRider tickets are available as day or week tickets at adult, child, and student rates. WestonRider is only available as an adult day ticket.

Currently, there are 2 existing multi-modal tickets available in the West of England area. PlusBus is an add-on to single, return, and season tickets which offers unlimited bus and rail travel around the regions of Bristol, Bath, and Weston-super-Mare. The Freedom Travelpass is the other multi-modal ticket which can be purchased from local railway and bus station booking offices and provides travel through bus or rail between North Somerset, Bristol, South Gloucestershire, and B&NES. These tickets give bus passengers greater flexibility to plan and make journeys than single-operator tickets, but they are sold at a premium of between 5% and 65% dependent on location, product, and passenger characteristics. This currently makes them unattractive for most passengers and sales only make up 1% of total ticket sales.

There is a metrobus service that covers the greater Bristol area. It is a bus rapid transit system with no driver interaction as 100% of bus ticketing is through the use of mTickets and at stop ticket vending machines branded as iPoints. Both metrobus and First Bus routes operating in the Bristol inner 'flat fare' zone offer daily and weekly capping for adult passengers with the Tap and Cap initiative. This is similar to the ToTo initiative being suggested in this report, however, it is limited to all First Bus routes in the Bristol 'flat fare' Zone only and so cannot be used beyond this zone nor with other operators. Tickets for metrobus services can be purchased off-bus at 'iPoints' found at the bus stops, which provide real-time bus information and sell tickets. This minimises bus dwell time at stops. Currently, there are limited-stop routes, and are restricted to key destination stops.

All operators also accept cash and prepaid cards as forms of payment however, each individual bus journey will have a separate transaction, and other than the First Bus Tap and Cap offer in the 'flat fare' Bristol inner zone, there is no capped fare.

The state of the market means that delivering ToTo in a reasonable timeframe would not be commercially viable for large and small operators alike. Larger operators might be able to invest in this technology in the long term however, without this support, it would not happen for a number of years thus delaying the delivery of the benefits. In addition, as it is essential for the delivery of the multi-operator system, all bus operators will need to be upgraded at the same time as this would prevent investment in smaller operators which would result in a partial rollout that fails to deliver the benefits. As was done in Leicester, in order to ensure that all operators were treated the same with no competition issues or distortion of the market, the same level of grant is proposed to be offered to all operators regardless of size.

Not changing the current arrangements will impact other deliverables as part of the wider strategies, such as:

- Bus journey times targets may not be met, as stated in the BSIP to reduce average bus journey times on designated corridor by 2% by 2025 and by 10% by 2030.
- To maximise bus service reliability.
- National Bus Strategy objectives will not be met. These are listed in section 2.2.

- This will hinder the facilitation for multi-operator ticketing and capping to provide a comprehensive and joined-up bus network which maximises the range of journeys able to be made by bus.
- Simplified ticketing, which is mentioned in the BSIP as being a key objective for public transport, will not be delivered.
- Passenger satisfaction levels will continue to be lower than the national average for key metrics such as VFM, bus punctuality, and journey times.

Nationally payment for public transport usage by contactless bank cards are becoming the norm. Contactless ToTo payment has been implemented in London for many years and is slowly being implemented in other cities, such as Leicester. Not implementing this technology in the West of England and surrounding areas will make it a less attractive place to work and live and will work against the aspirations of West of England CA as outlined in the Bus Strategy and BSIP.

Unless the project covers all operators, we leave operators to deliver the next stage of the automated contactless independently with single-operator capping. This will lead to patchy delivery over many years with each developing bespoke rules which cannot necessarily be integrated to facilitate multi-operator best value ticketing. Furthermore, although larger operators may find the ToTo project affordable in the long term even without financial support, the project is not currently commercially viable due to the state of the market. Without receiving support, even larger operators will not find it viable to implement the ToTo project without experiencing major delays to the delivery of the service.

2.5 Business Needs and Service Gaps

The financial and social impact of COVID-19 on the public has had a drastic effect on the West of England's public transport sector. The number of annual passenger trips on public transport pre and post COVID-19 diminished by a factor of over 3 at the height of the pandemic, although usage levels are now recovering.

As part of wider strategies and the TCF programme there are targets to ensure that pre-pandemic levels are returned to the public transport sector by making the appropriate investments to attract users by providing better journey times, VFM and simplicity of the network. Offering contactless payment options, such as ToTo, which do not involve cash transactions or person to person touch points will help encourage people back onto public transport.

Based on the data from the Bus Passenger Survey published by Transport Focus in 2019, the time it took for passengers to board a bus was perceived by the public to be the second most influential factor affecting their journey length. Therefore, there is currently a need for faster onboarding and dwell time reduction. ToTo is a quick method of payment which will help to reduce vehicle dwell times.

Other pertinent results found in the 2019 Bus Passenger Survey published by Transport Focus are:

- Only 50% of bus users in the West of England were very or fairly satisfied with the VFM of their trip. Compared to the national average of 63%, bus trips in the West of England are seen as offering relatively low VFM.
- Public satisfaction regarding punctuality for buses in the West of England was 68%, which was below the national average of 74%
- Public satisfaction regarding journey times for buses in the West of England was 80%, which was below the national average of 85%.

Offering simplified ticket types, variable capping, flexible tickets, and multi-operator tickets (as facilitated by ToTo) are some of the ways to improve public perception of VFM for West of England bus users and can address some of the finding from Transport Focus.

Based on the Bus Strategy Consultation report produced by the West of England CA and NSC in June 2020, a substantial majority of people (82.2%) questioned agreed with the following ticket principles:

- Tickets/Payments through contactless payments;
- Same experience on all buses;
- PAYG system with daily and weekly capping;
- One account/app for tickets, payment journey planning, and information;
- No requirement for contactless bank cards; and
- Multi-modal transport integration.

Currently, 99% of registered vehicles in the West of England area can accept contactless bank payments as payment, and 94% have barcode/QR readers for digital tickets. The payments system needs to be standardised to cover contactless digital (smartphone) ticketing across the whole network, for all vehicles. This project would help to achieve this.

2.6 Problem Identification

The West of England bus network currently faces the following barriers to ticketing and payment:

- Lack of a common technology/payment and ticketing offer on all buses.
- A limited operator ticket scheme with an incomplete range, priced at a premium and not available in the best value format e.g. digital tickets on smartphones or capped PAYG.
- The price for some journeys, such as short trips on some services, is very high due to inflexibility in the current tickets offered.
- There are no consistent cashless payment systems across all bus operators as there are different apps required by different bus operators.

The current fare types in the West of England region are limited and not very flexible. Capping is present but only in certain circumstances. Furthermore, the current arrangement does not allow for a single ticket to be used across all bus operators, and there is no maximum capped price that can be implemented for multiple journeys across the entire bus network.

The current ticketing and payment system expects customers to have prior knowledge of the network and fares so they can order the most appropriate ticket from the driver.

Currently, customer interaction with the driver is mandatory in order to purchase a ticket, even when paying with contactless methods. This increases the dwell time of the bus at every stop, which slows the journey time down.

Some of the smaller operators do not have a modern cEMV machine and so customers will need to pay by cash. This has a knock-on dwell time affect as the bus driver needs to spend time taking in cash and paying back change.

2.7 SMART Objective and Project Scope

The key problems identified that the scheme will seek to resolve are:

- Problem 1 - Buses spend 25-30% of their time at bus stops. The public perceives this dwell time as being the second most influential factor affecting journey times. The required driver-customer interaction during boarding in the current system affects the dwell time and bus journey times.
- Problem 2 - Reader technology is not consistent among all buses.
- Problem 3 - West of England CA and NSC bus users were dissatisfied with bus journey times and punctuality relative to national average.
- Problem 4 - West of England CA and NSC bus users were dissatisfied with VFM relative to national average. The available ticket types are not perceived to offer decent VFM.
- Problem 5 - Price of average fare has risen steadily over the past years.
- Problem 6 - Current ticket payment system requires bus users to have prior knowledge of the bus network and fare types.
- Problem 7 - Current fare types are few and not very flexible, and existing capping is not working at a variable scale.
- Problem 8 - Current ticketing systems do not support the BSIP objective to deliver multi-operator as the norm and as a PAYG offer.

Based upon these problems the following objectives have been identified for the scheme:

- To reduce bus dwell times at stops through reducing driver interactions, reducing journey times, and improving punctuality.
- To offer passengers more affordable bus travel by facilitating flexible ticketing and variable fare capping.
- To facilitate the introduction of multi-operator products making it easier to interchange between operators and modes.
- To increase passenger satisfaction with the ticketing and boarding processes.
- To increase bus patronage on the West of England bus network.

Table 5 below indicates how through delivery of the scheme objectives the scheme will contribute to resolving the identified problems.

Problem/Objective	Objective 1 Reduce driver interactions	Objective 2 More affordable tickets	Objective 3 Multi-operator ticketing	Objective 4 Increased passenger satisfaction	Objective 5 Increased patronage
Bus dwell time	✓			✓	✓
Inconsistent reader technology	✓		✓		
User dissatisfaction with journey times and punctuality	✓			✓	✓
User dissatisfaction with VfM		✓		✓	✓
Fare price increases		✓			✓
Complex fare structures		✓	✓	✓	✓
Inflexible fares		✓	✓		✓
Ticket systems do not support multi-operator ticketing			✓		✓

Table 5: How delivery of objectives will resolve identified problems

The overarching BSIP sets a series of targets which the scheme would contribute towards:

- Target 1: Reduce average bus journey times on designated corridors by 2% by 2025 and by 10% by 2030.
- Target 2: Achieve 95% of services running on time, defined as being no more than 1 minute early or 5 minutes late, by 2030.
- Target 3: Return to pre-pandemic patronage levels by 2025 and grow patronage by 24% by 2030.
- Target 4: Increase passenger satisfaction to 89% for 2025 and 95% for 2030.

Additionally, as part of the scheme appraisal process a number of estimates have been made on potential scheme impacts. The monitoring and evaluation plan also identifies a series of indicators against which the schemes contribution to the identified objectives would be assessed. These are outlined in Table 6 below.

Objective	BSIP Targets	Appraisal Estimate	Proposed monitoring indicators/targets
Objective 1 Reduce driver interactions	<p>Reduce average bus journey times on designated corridors by 2% by 2025 and by 10% by 2030.</p> <p>Achieve 95% of services running on time, defined as being no more than 1 minute early or 5 minutes late, by 2030.</p>	The estimated journey time savings as a result of the ToTo service is 1,091,005 hours over the 10-year appraisal period.	Reduced average dwell time at bus stops
Objective 2 More affordable tickets			<p>Percentage of services offering variable fare capping/multi-operator ticketing by operator (target 100%)</p> <p>Percentage of fares where variable fare capping has applied</p>
Objective 3 Multi-operator ticketing			Percentage of ticket sales which are multi-operator products
Objective 4 Increased passenger satisfaction	Increase passenger satisfaction to 89% for 2025 and 95% for 2030		Increase in satisfaction with journey times, punctuality, and VfM
Objective 5 Increased patronage.	Return to pre-pandemic patronage levels by 2025 and grow patronage by 24% by 2030.	The scheme is anticipated to increase annual patronage by around 0.5% per year. This value is based on the local adjustments made to the default suggested value of 1.6% within the DfT's 2009 business case for investment in smart ticketing nationally.	Increase in bus passenger journey on the West of England Network

Table 6: How proposed targets and indicators align to objectives.

2.8 Project Scope

The delivery of this project will be split into two phases.

Phase 1

In Phase 1, funding will be released to the bus operating companies via grant funding to cover the initial investment in ToTo technology.

845 Tap-off readers will be procured by the bus operating companies and installed on all registered public transport buses in the West of England bus network. This upgrade will consist of the installation of a cEMV reader, IOPSU V5 (if not already fitted), cabling, and vehicle pole modification to allow reader fitment. Vehicles with double doors will be equipped with an extra set of Tap-off readers.

Support will also be given to bus operators with buses that currently do not have barcode payment enabled; up to 42 barcode readers will be procured and fitted to ensure all vehicles have digital ticketing capabilities. A further 5 complete modern ticketing machines will be fitted on buses which currently have older ticketing machines.

If funding allows there is also the potential for additional Tap-off readers to be installed at high-volume stops/locations.

The grant funding agreement will ensure that systems are developed by the operators to offer customers flexible ticketing and single-operator variable capping. Ongoing support and maintenance will be provided by the bus operators for the ToTo payment readers and developing back-office systems. Any other ongoing costs will be covered by the bus operators, except the ToTo license fees which are included in the grant fund for the first 3 years.

Phase 2

Once the ToTo readers have been procured and installed, and the ToTo service is operational, Phase 2 will commence. In Phase 2, development will begin on the multi-operator ticketing system. The core systems to do this will be delivered by the DfT and is not within the scope of this project. As part of this development, a multi-operator brokerage system must be designed and implemented to ensure that income is distributed among the separate operating companies for journeys which spanned more than one operator's service. Phase 2 activities will focus on development and configuration of these core systems to meet the needs of the West of England and its operators.

2.9 Measures of Success and Planning for Delivery

The effects of the ToTo scheme will be tracked and monitored through ticket sales data, yearly Transport Focus reports regarding customer satisfaction and the effect on journey times monitored through on-site bus stop service assessments. The project's measures of success and plans for delivery are detailed further in the Logic Model found in Figure 7.

2.10 Strategic Benefits

Delivering this scheme by implementing a completely contactless bank payment (cEMV) system will result in the following immediate network wide benefits:

- Reducing dwell times at bus stops as users can easily use the ToTo service instead of either paying by cash or ordering a ticket from the driver; both of which increase the current bus dwell time. This reduction in dwell time at every stop will amount to substantial journey time savings. The estimated journey time savings for the ToTo project is 1,091,005 hours over the 10-year appraisal period – the calculations for this estimate are detailed further in section 3.4.
- Offer bus users the guaranteed best value ticket options by calculating which ticket best suits the journey chosen, introducing capping to help save the customer money.
- The operating costs associated with cash handling and longer bus journey times will also decrease as a result of the ToTo service.
- The implementation of this project will help to increase the modal share of public transport by improving the attractiveness of buses. This will assist in reaching the bus patronage growth target stated in the JLTP4: From 9% bus patronage in 2011 to 17% by 2036.
- The ultimate aim of delivering a London style system will require a common platform across the entire West of England bus network. Achieving this will help the West of England stay in line with rest of the country, achieving government and wider strategy aspirations.
- According to the DfT's 2009 business case for smart ticketing nationally, implementing smart ticketing systems is expected to increase bus patronage by 1.6%. This value has been amended for this scheme and a full description is outlined in section 3.3

2.11 Options for Approach

Individual fare capping is a core stepping-stone to delivering multi-operator fare capping, which is an integral part of the strategy for increasing bus patronage within the West of England.

The option to support operators in the area to install suitable readers to deliver individual operator capping for adults, as a first phase, will facilitate the development of multi-operator capability following the delivery of core systems through a national approach as set out in the National Bus Strategy. This option enables the West of England to deliver early benefits to residents and create a standardised customer offer across the whole area which can be built upon to offer further benefits through multi-operator ticketing. The current state of the market means that although some operators may find the scheme affordable in the long term, it is not commercially viable at the moment. By providing support to operators in the region, all operators can deliver ToTo services much earlier than they would be able to otherwise.

The following options were considered but would not deliver all the outcomes of the preferred solution:

- Developing a local smartcard-based solution based upon ITSO technology - These solutions will still be developed, but for those markets which will not be able to make use of contactless technology, such as concessionary, scholars, seasons and transferrable carnets. However, they are not the route of choice for commercial operators and multi-operator tickets due the cost required in the retail end and limited functionality compared to more recent contactless payment card-based developments.

- Offering support exclusively to minor operators - Financial support is only given to smaller operators who may struggle to independently to meet the ToTo project affordability. This would reduce the amount of public funding used for the delivery of the project. Although major operators would find the scheme affordable in the long-term, the current state of the market means that all operators require support to meet commercial viability at this time. In order for the delivery of this project to stay within a reasonable timeframe, support must be given to all operators; larger operators would require much more additional time to independently afford it.
- Individual operator approach - Operators to develop automated contactless capping and PAYG systems independently, with no public sector support. This will lead to larger operators developing systems with bespoke rules that do not support the development of a universal customer offer and the expansion to multi-operator capping/best value ticketing. Although the ToTo project will be affordable in the long-term, because of the state of the market currently even larger operators may not find the scheme commercially viable at the moment. Without public funds, the delivery of this project would have to experience delays until the service becomes commercially viable to implement. Discussions with operators have shown that the majority of operators will not be able to deliver this technology without subsidy/support in the short term – with smaller operators unable to deliver this at all due to the capital costs involved.
- Developing a West of England in-house brokerage system – Development of a national brokerage system has been set out in the National Bus Strategy and authorities have been advised not to invest in their own systems. Other projects, such as the 2021 Leicester Smart Integrated Ticketing project, developed in-house brokerage systems because they were built on already existing schemes. Such a system would not be able to be expanded to the West of England. The investment proposed in this bid provides the necessary upgrades to all commercial and contracted services on-bus equipment to a common standard, which will enable it to take advantage of wider brokerage systems once they become available.

2.12 Strategic Assessment of Investment Options

Consideration has also been given to the mechanisms that could be used to fund delivery of the scheme:

- One of the investment options that could be used is for West of England CA to use the allotted funding to procure the equipment and systems themselves, which they could then lease to the operating companies.
- The alternative investment option is for West of England CA to issue the funding directly to the bus operator companies via a grant funding agreement so that they can procure the necessary technologies themselves.

It was determined that the optimal investment option is for grant funding to be given to the operators directly. The West of England CA procuring the equipment is likely to take longer and be more complex and operators already have pre-existing supplier arrangements in place. Each operator is also likely to have different requirements.

Utilisation of a grant funding agreement with appropriate conditions, enables operators to deliver the desired systems to their requirements in a quick and more cost-effective manner.

2.13 Risks and Constraints

Estimates of West of England bus patronage predict that the number of annual bus users will recover to pre-COVID levels by 2025. Such factors are hard to estimate however, as they could be heavily influenced by how the pandemic progresses and any future restrictions. These events could pose a risk to the success of the project by postponing the date by which the number of bus users returns to pre-COVID levels. Furthermore, the behaviour of the public may change depending on the progression and effects of COVID-19 at that time. Additional people working from home or shopping online could reduce the demand for bus travel. Failure to return to pre-COVID patronage levels could mean that ongoing costs associated with the project are not affordable by smaller operators, who are unable to generate sufficient revenue to offset ToTo's ongoing costs.

If there is a delay to the release of the funding to the operating companies, or the funding becomes unavailable, then this will pose a risk to the success of the project; it will push back the procurement process for equipment and systems which the operating companies require. It is unlikely that the ToTo scheme would be affordable by bus operating companies if they did not receive funding to cover the initial investment costs needed for the project as they will need to make upfront payment when they order the equipment.

Without ToTo, multi-operator ticketing cannot be implemented, and so operators have been engaged to ensure they are onboard with the delivery of ToTo and will not, in the meanwhile, consider adopting other technologies, such as smartphone applications and other simpler capping applications.

Risks to delivery of the project have been covered in Appendix A1. 1 however, it is worth noting that the main and most likely constraint on project delivery will be the supplier lead times for the systems needed for the project. This will affect the timescales by which operators are able to get the technology operational and offer capped ticketing. The West of England CA will continue to work with the operators and suppliers to understand the timescales associated with procurement of the technology.

2.14 Stakeholders' Views and Requirements

The key stakeholders affected by the project are the bus operators as well as the general public and bus users.

Operators

Direct engagement with all operators has been undertaken via a series of meetings over several months as part of the BSIP discussions but also separate discussions with operators - FirstGroup and Stagecoach, as well as with all other operators in the West of England Bus Operators Association (WEBOA) multi-operator meetings over last 6 months. Meetings have been undertaken to ensure they are all onboard with the concept of adopting ToTo technologies. As part of engagement to date operators noted that the true potential will be realised when the multi-operator ticketing approach is implemented.

Operators were initially consulted as part of the development of the West of England BSIP and on meeting the requirements of the National Bus Strategy. Their engagement and views regarding a smart integrated ticketing system such as ToTo were discussed.

All operators were supportive of this initiative as it would lay the foundations for their multi-operator ticketing goals.

Operators did not generally object to a fare reduction or standardisation package, based on the BSIP requirements, with smaller operators supportive of a simplified ticketing system and pricing structure delivered through a move to multi-operator ticketing as the norm. Operators with the largest fleets in the area have already stated an intention to introduce lower fares and local low fares, using both digital ticketing and proposed ToTo systems with capping to simplify the customer offer and ensure VFM.

A majority of operators highlighted that the initial cost of equipment and installation would make ToTo undeliverable on a commercial basis and that in order to ensure complete coverage of all vehicles in the area to a compatible standard, financial support from the West of England CA and NSC would be needed to implement the systems. The ongoing costs – bar from the ToTo license fee for the first 3 years - will be managed by the operators.

Public/Bus Users

Engagement with the general public was undertaken through the West of England Bus Strategy consultation surveys which took place between February and March 2020. Almost 2,000 responses were received relating to what people thought of the bus network. A substantial majority of respondents (82.2%) agreed with the following ticket principles, indicating public support for the planned outcomes of the scheme:

- Tickets/Payments through contactless payments;
- Same experience on all buses; and
- PAYG system with daily and weekly capping.

3 Economic Dimension

Developing a standardised ToTo system for the individual bus operators in the West of England will aid in establishing the integration required between services and support the development of multi-operator fare capping systems and their implementation as a next step. This Economic Dimension considers the monetised and an element of non-monetised benefits of the scheme and concludes on the anticipated VfM of the project.

3.1 Longlist Appraisal

As discussed in the Strategic Dimension section 2, consideration was given to different types of technological solutions and methods of releasing the funding to achieve the desired scheme objectives in determining the preferred option. These alternative arrangements are not considered to influence the core economic benefits of the scheme for users and hence no appraisal of options has been considered within this Economic Dimension.

3.2 Methodology

The methodology chosen adopts the principle of achieving a proportionate approach which:

- Maximises the use of the existing data sources, with assumptions made where necessary and proportionate;
- Focuses on the monetising the most significant/likely benefits/disbenefits associated with the scheme; and
- Reflects the best practice principles outlined in the DfT Transport Appraisal Guidance (TAG) guidance.

The DfT’s VfM framework sets out four categories of benefits and how these should be used when presenting scheme benefits. This is reproduced below in Figure 3.

Established Monetised Impacts	Evolving Monetised Impacts	Indicative Monetised Impacts	Non-monetised Impacts
<i>Included in initial and adjusted metrics</i>	<i>Included in adjusted metric</i>	<i>Considered after metric using switching values approach</i>	
Journey time savings Vehicle operating costs Accidents Physical activity Journey quality Noise Air quality Greenhouse gases Indirect tax	Reliability Static clustering Output in imperfectly competitive markets Labour supply	Moves to more/less productive jobs Dynamic clustering Induced investment Supplementary Economy Modelling*	Security Severance Accessibility Townscape Historic environment Landscape** Biodiversity Water environment Affordability Access to services Option and non-use values

Figure 3: Four categories of benefits of ToTo project

The approach concentrates on the ‘Established Monetised Impacts’ which are determined through the Marginalised External Costs of Congestion (TAG unit A5.4) guidance. This approach is also adopted in the calculation of the DfT’s Active Mode Appraisal Toolkit and the Rail and Bus appraisal tools.

Other impacts mentioned within the table were not taken into consideration due to proportionality and availability of the data to inform the scheme.

A spreadsheet model was developed building upon the approach adopted by the DfT approved Leicester ToTo project, with adjustments made to make use of local data. The spreadsheet model was devised to calculate monetised benefits for the following scheme impacts:

- Passenger journey times savings - through the faster boarding times, reflecting lower interaction with the driver.
- Reduced bus operating costs - through reduced cash handling operating cost and reduced bus journey times.
- Increased bus patronage - through increased attractiveness of bus experience using ToTo.
- Modal Shift benefits - associated with users switching to bus from car and the associated decongestion, accident reduction, air quality, noise and greenhouse gas benefits associated with this.

3.3 Assumptions and Data

The following assumptions and data were utilised in the development of the spreadsheet model. Data was provided by the West of England CA and/or local bus operators where relevant. Key values and sources are summarised in Table 7 below.

Parameter	Value	Source
Bus Passenger Boarding (annual)	72,330,743	DfT (Table BUS0109a) - 2019
Bus patronage split (First Bus/Other operators)	90/10	West of England CA
Number of passengers considered for analysis:		
First Bus Passengers - Contactless (buy ticket) to Contactless ToTo	16,907,323	Local Operators
First Bus Passengers - Cash to Contactless Tap & Cap	3,813,682	Local Operators
Other Operators Passengers - Contactless (buy ticket) to Contactless ToTo	5,063,152	Local Operators
Average boarding time savings per passenger:		
First Bus - Contactless (buy ticket) to Contactless ToTo	1.79 seconds	Local Operators
First Bus - Cash to Contactless ToTo	2.8 seconds	Local Operators

Other Operators - Contactless (buy ticket) to Contactless ToTo	2.8 seconds	Local Operators
Benefit uptake rate	70% from year 1 onwards	West of England CA/ Local Operators
Scheme duration	10 years (2023-2032)	West of England CA
Average Bus Occupancy (Persons)	10.0	DfT Table BUS0304 – 2019 (Averaged for Met/non-met areas)
Average trip length	By mode	NTS Table NTS0303 / DfT Table BUS0302a - 2019
Average marginal operating cost value per bus hour operated	£14.02 (2010 prices)	DfT concessionary travel reimbursement calculator – Value retained from Leicester model
Average Car Occupancy	1.49	A1.3.3 TAG July 2021
Values of Time Per Bus Passenger – Market Prices £ per hour (2010 prices)	Per year	A1.3.2 TAG July 2021
Journey Purpose Split	Work – 1.9% Commuting – 18.0% Other – 80.1%	A1.3.4 TAG July 2021
CO ₂ non-traded values	£ per tonne of CO ₂	A1.3.3 TAG July 2021
Marginal External Cost		A5.4.2 TAG July2021
Discount Rate	3.5% per year	A1.1 TAG July2021
GDP deflator		TAG July 2021

Table 7: Key data and sources for calculations

Within the West of England CA in 2019 there were 72 million annual bus passenger boarding. The distribution of these across First Bus and other operators was split 90/10 (%). Therefore, there were 65 million (First Bus) and 7 million (Other operators) passengers boarding respectively.

The 2019 bus ticket transactional data was provided by the West of England CA and displayed the current bus transaction splits and then the new implicit ticketing splits due to the implementation of ToTo. For First Bus 26.6% and 6.0% of contactless (buy ticket) and cash transactions respectively were expected to transition to ToTo. For other operators 70.0% of contactless (buy ticket) ticket transactions were expected to move to ToTo with cash transactions remaining at the same level. These values applied to the respective annual boarding produced the number of passenger boarding considered for analysis within Table 7.

No baseline growth was added to the core appraisal, this was considered proportionate and a considerate approach due to impact of COVID-19 on public transport. However, a sensitivity test of a 2% increase in annual patronage each year of the appraisal was carried out. The 2%

baseline increase was calculated from the average West of England annual patronage level changes from 2010-2019.

The scheme is anticipated to increase annual patronage by around 0.5% per year. This value is based on the local adjustments made to the default suggested value of 1.6% within the DfT's 2009 business case for investment in smart ticketing nationally. The local adjustments were due to buses within the West of England having already implemented contactless and mobile ticketing compatibility, so are already part way towards 'integrating smart ticketing'.

The average boarding time savings per passenger was calculated based upon observed boarding times captured by the West of England CA in 2019. The transaction times were based on a 'real world' approach, therefore included the actual time for a customer to complete a boarding transaction including interaction with their phone and searching in wallets. The Tap and Cap timings presented within the spreadsheet model were derived to ensure they are consistent with how the other timings were recorded. Additionally, those figures are in line with time savings presented within the Leicester model and literature produced by Professor Begg¹.

The benefit uptake rate was determined through analysing First Bus 2019 ticket transaction data provided by the West of England CA. Here 30% of the tickets transactions were either existing Tap and Cap, group, discount, or concession tickets that could be purchased via cash/contactless (buy ticket) methods. The remaining 70% were tickets that had the potential to be converted to ToTo. Moreover, as contactless is already implemented on buses it was assumed that changing over to ToTo could be instant as no new approach is being introduced

3.4 Cost-Benefit Analysis

Cost

The total project costs provided by the West of England CA were given at £2.070 million. This value is distributed over several years and over two phases. A full breakdown is described in the Financial Dimension, section 4.

In Phase 1, funding will be released to the bus operating companies via grant funding to cover the initial investment in ToTo technology. In Phase 2, development will begin on the multi-operator ticketing system.

Phase 2 (multi-operator) is essential for the scheme to meet the benefits throughout the appraisal period as the transport network in the West of England changes from the current single operator ticketing dominant network to one that is based on multi-operator as the norm. The move to a multi-operator/interchange-based network is set out in the West of England Bus Strategy as well as the BSIP and CRSTS submissions and will be a key area of work over the next 3 to 5 years in delivering on the requirements of the National Bus Strategy; this transition needs to be supported by the outputs of the ToTo project.

For the purpose of economic appraisal, due to the nature of the scheme involving equipment (Phase 1) and IT software/services (Phase 2) separate values of optimism bias were applied

¹ The Impact of Congestion on Bus Passengers – Professor David Begg

to each phase costings. A value of 10% was added to Phase 1. This was based upon Greenbook guidance and a high degree of confidence in the cost for procuring and installing equipment. For Phase 2 although no specific category is provided for on-bus technology in the guidance, as the costs provided are estimates, the level of optimism bias selected was in line with Stage 2 of scheme development for highways, set at 23%.

The equipment set to be used for this scheme is set to last the 10-year appraisal period. However, to account for a replacement cost a sensitivity model has been carried out for an additional 845 reads at £325 per reader after 5 years. This cost would be an operator responsibility after the scheme has been initially setup and grant funded.

All the final cost used with the spreadsheet model and the details of Present Value Cost (PVC) considers the discounting and deflation to 2010 prices on yearly basis.

Benefits

A summary of the monetised cost and benefits is displayed in Table 8 below. The scheme is anticipated to provide the following key quantified benefits:

- Passenger Journey times savings: An annual time saving of 110,000 hours for bus passenger from reduced boarding times.
- Reduced bus operating costs: An average annual time reduction of 10,910 bus operating hours and approximate cash handling operating cost saving of £15,600 per annum.
- Increased bus patronage: An average approximate increase in 143,069 passenger boardings per year with 50% assumed from mode shift therefore leading to a reduction of total:
 - 480,098 car trips;
 - 3,121,475 km of car traffic; and
 - 185 tonnes of CO₂e and 1,196kg of NO_x over 10 years.
- Key scheme impacts which have not been monetised include:
 - Increased bus journey time reliability due to reduced boarding time variability;
 - Increased affordability for passengers due to fare capping; and
 - Improved journey quality as a result of a simplified ticketing and payment process.

Benefit - Cost Summary (in 2010 Prices unless stated)			
2023 Scheme opening year			
2032 Final appraisal year			
			Scheme impact estimate
		UNIT	
Time savings for passengers	Total bus passenger hours saved through boarding efficiencies	HOURS	1,091,005
	PVB of total bus passenger value of time-saving	£	£ 4,654,417
	Total bus passenger valued time saving benefits (£ Present Value Benefits) (2010 prices)	£	£ 4,654,417
Mode-shift benefits	Net change in bus passenger trips	TRIPS	1,430,691
	Net change in car vehicle trips	TRIPS	-
	Reduced Car km travelled	KM	3,121,475
	Congestion (£)	£	£ 589,219
	Infrastructure (£)	£	£ 2,142
	Accident (£)	£	£ 64,842
	Local Air Quality (£) - NOx emission reduction	£	£ 24,490
	Noise (£)	£	£ 4,381
	Greenhouse Gases (£)	£	£ 13,159
	Indirect Taxation (£)	£	-£ 59,081
	Marginal External Benefits from reduced car travel (£ Present Value Benefits) (2010 prices)	£	£ 639,152
Carbon and Air Quality	Change in CO2e - arising from reduction in car KM travelled (monetised above)	TONNES	-
	Change in Nox emissions - arising from reduction in car KM travelled (monetised above) KG	KG	1,196
Cost savings for bus operators	Reduction in cash handling costs for operators (£ PVB)	£	£ 155,707.63
	Total bus operating hours saved	HOURS	-
	Saving to bus operators through reduced operating hours (£ PVB)	£	948,115
	Third Party ongoing operating costs over entire appraisal period (2010 Values)		-£ 150,156
	Total cost savings for bus operators (£ Present Value Benefits) (2010 prices)	£	953,666
Total Benefits	Total benefits 2023-2032	£	£ 6,247,235
	Total Benefits 2023-2032 (£ Present Value Benefits) (2010 prices)	£	£ 6,247,235
Costs	Funding sought from Transforming Cities Fund	£	£ 2,070,000
	Optimis Bias	£	£ 311,000
	Re-valued to 2010 prices	£	£ 1,893,614
	Total Costs (£ Present Value Costs) (2010 prices)	£	£ 1,893,614
	Total Benefits 2023-2032 (£ Present Value Benefits) (2010 prices)	£	£ 6,247,235
	Benefit/Cost Ratio (BCR)		3.3

Table 8: Benefit Cost Summary Table (in 2010 prices unless stated)

The spreadsheet model and the TAG AST, TEE, AMCB and PA tables are contained within Appendix A1. 3 through to A1. 6.

Based upon the monetised scheme impacts the core BCR was estimated at **3.30**, with a PVB of £6.2 million, PVC of £1.9 million and Net Present Value (NPV) of £4.4 million in 2010 prices.

According to the DfT's VfM classifications this would be classed as **High** VfM. Given the scale of the BCR it was not considered necessary to make adjustments to account for non-monetised benefits.

A breakdown of the yearly benefits over the appraisal period is displayed within Table 9. A full breakdown of benefit by category is displayed in Appendix A1. 7.

Year	Benefit Totals
2023	£707,721
2024	£710,055
2025	£716,190
2026	£667,637
2027	£638,206
2028	£609,088
2029	£581,293
2030	£565,069
2031	£538,625
2032	£513,351
Total	£6,247,235

Table 9: Total benefits by year over appraisal period

3.5 Distributional Impact Assessment

A scoping exercise was undertaken to determine whether a Distributional Impact (DI) assessment was appropriate, see Appendix A1. 8. The only scheme impact which met the DI scoping criteria was affordability. Bus fares are likely to change as an outcome of the scheme impacting affordability, due to the introduction of fare capping and new better value ticketing offers including in the long-term multi-operator ticketing. The precise response of individual operators to the new ticketing possibilities offered by this technology cannot be determined at this time, and therefore it is not considered possible to ascertain the precise nature of the changes in affordability for different routes and user groups. The introduction of capping should increase affordability for all bus users, however as bus travel is skewed towards lower income groups this should benefit these at-risk groups particularly.

3.6 Uncertainty Analysis

Sensitivity tests, results of which can be found in Table 10 were undertaken to determine the benefits of the scheme under different scenarios and also to provide a robust valuation. The following scenarios were considered on top of the 10-year appraisal:

- Sensitivity 1 – Additional 2% baseline growth to bus patronage each year (in line with previous growth pre-COVID).
- Sensitivity 2 – After 5 years replacement equipment required (Operators Cost);
- Sensitivity 3 – Reduction from 70% uptake to 60% uptake of scheme;
- Sensitivity 4 – Reduction from 70% uptake to 50% uptake of scheme;
- Sensitivity 5 – A return of only 80% pre-COVID patronage + 70% uptake of scheme;

- Sensitivity 6 – A return of only 80% pre-COVID patronage + 60% uptake of scheme;
- Sensitivity 7 – A return of only 80% pre-COVID patronage + 50% uptake of scheme;
- Sensitivity 8 – After 5 years replacement equipment cost + 80% Patronage + 50% uptake.

Test	PVC	PVB	BCR
Core	£1,893,614	£6,247,235	3.30
Sensitivity 1	£1,893,614	£6,432,517	3.40
Sensitivity 2	£1,893,614	£6,028,826	3.18
Sensitivity 3	£1,893,614	£5,446,874	2.88
Sensitivity 4	£1,893,614	£4,646,512	2.45
Sensitivity 5	£1,893,614	£5,126,729	2.71
Sensitivity 6	£1,893,614	£4,486,440	2.37
Sensitivity 7	£1,893,614	£3,846,150	2.03
Sensitivity 8	£1,893,614	£3,627,741	1.92

Table 10: The results of the sensitivity tests

All the sensitivity scenarios are derived from the core scenario and result in a BCR value which is considered **High** VfM apart from the final worst case (Sensitivity 8) which is a fraction below a BCR value of 2 indicating **Medium** VfM.

Sensitivity 1 had a higher BCR value due to the increased in patronage. Because of the impact of COVID-19, this 2% increase in patronage was not considered within the core case as a conservative measure.

3.7 Appraisal Summary Tables

The Appraisal Summary Table summarising the monetised and qualitatively assessed scheme impacts is contained within Appendix A1. 6.

4 Financial Dimension

4.1 Introduction to Affordability

Public funding will be used to cover the initial investment necessary for bus operators to procure the required ToTo systems via Grant Funding Agreements with each operator. As stated in the Strategic Dimension section 2, the state of the market means that delivering ToTo in a reasonable timeframe would not be commercially viable for large and small operators alike. Larger operators might be able to invest in this technology in the long term, however, with this support it would not happen for a number of years thus delaying the delivery of its benefits. In addition, it is essential for delivery to be multi-operators so that the whole bus market is upgraded simultaneously as this would prevent investments into the smaller operators that could result in a partial rollout which would not deliver all the potential benefits. As was done in Leicester, the same level of grant will be offered to all operators regardless of size to ensure they are all treated the same and no competition issues arise.

Although the ToTo project will incur additional ongoing costs for the operation of the systems, it will also be financially beneficial as it will reduce costs due to a decrease in cash-handling and in the long-term will increase operator revenue due to increased bus patronage. These factors will offset one another, resulting in ongoing costs which are affordable by all bus operators.

The ongoing operational costs of ToTo (beyond the first 3 years) will be met by the individual bus operators. This includes any equipment replacements. The lifecycle of the equipment is considerably longer than the 3-year agreement, and so will also be the bus operators' responsibility.

Table 11 shows the total funding ask as well as the assumed costs required to deliver the infrastructure. As indicated the funding available for the implementation of this project is anticipated to more than covers the costs.

	Amount (£)
Total funding available	£2.07 million
Total project cost	£2.07 million

Table 11: Comparison of funding available and project cost

The operational cost of the multi-operator systems to be funded through a transaction fee applied to multi-operator tickets which, using the same approach as in Leicester, is estimated at 3.5%. Each operator will be responsible for covering this cost through their individual systems contracts.

4.2 Budgets and Funding Cover

	Amount (£)
Total funding available	£2.07 million
DfT (TCF) funding contribution	£1.2 million
Local public sector contribution	£70,000 (NSC only)
CRSTS	£800,000

Table 12: Breakdown of funding sources

Table 12 above shows the source of all funding for this project; with the majority of the West of England CA funding coming from TCF and CRSTS funding pots. As NSC is not part of the West of England CA a proportionate local contribution will also be provided by them relating to buses in the NSC area only. For Phase 2 in 2023, funding is proposed from the region's CRSTS award. The quarterly funding overview is given below in Table 13.

	2021/22	2022/2023				2023/2024	Total
	Q4	Q1	Q2	Q3	Q4	Year	
ToTo delivery support	£-	£5,000	£5,000	£5,000	£5,000	£-	£20,000
Toto readers	£461,500	£87,750	£391,500	£60,450	£27,300	£-	£1,098,500
Barcode readers	£-	£10,500	£-	£-	£10,500	£-	£21,000
Marketing/promo	£-	£-	£7,500	£-	£7,500	£-	£15,000
Toto multi-op	£-	£-	£-	£-	£-	£570,000	£570,000
NSC contribution	£-	£-	£70,000	£-	£-	£-	£70,000
Risk	£-	£28,875	£28,875	£28,875	£28,875	£230,000	£345,500
Total	£461,500	£132,125	£502,875	£94,325	£79,175	£800,000	£2,070,000

Table 13: Quarterly breakdown of funding

4.3 Costs

Table 14 shows the breakdown of the anticipated fixed costs relating to the equipment that will be installed on each bus. These figures have been directly provided by the suppliers. Table 15 shows the breakdown of costs relating to the delivery of the entire project based upon the number of units required to get the entire West of England network to the required standards.

Equipment	Costs (£)
Reader	£325
IOPSU V5	£105
Cabling	£50
Installation	£385
Vehicle pole modification to allow reader fitment	£300
Total	£1,165

Table 14: Breakdown of equipment costs

Phase	Grant	Cost (£)	No. required	Total
1	Project delivery	£20,000	1	£20,000
	ToTo reader (+single-operator capping)	£1,165	845	£984,425
	3-year ToTo licence	£135	845	£114,075
	Barcode reader	£500	42	£21,000
	Marketing/Promotions	£15,000	1	£15,000
	Phase 1 Total			£1,154,500
	Phase 1 Risk			£115,500
	Phase 1 Total including risk			£1,270,000
2	Multi-operator development	£200,000	1	£200,000
	Multi-operator onboarding	£25,000	12	£300,000
	Multi-operator technology support	£70,000	1	£70,000
	Phase 2 Total			£570,000
	Phase 2 Risk			£230,000
	Phase 2 Total including risk			£800,000
1 & 2	Phase 1 & 2 Total including risk			£2,070,000

Table 15: Breakdown of project costs

The risks presented in Table 16 are derived from potential for additional readers above those that have been already identified for Phase 1 and Phase 2 and have been calculated to be approximately 40% of the estimated total which could potentially be due to higher setup and onboarding costs. Appendix A1. 2 provides further details on the risks this funding is allocated towards.

Risks		
Extra ToTo readers	75	£97,000
Extra barcode readers	4	£2,000
ToTo delivery support	1	£10,000
Marketing/ promo	1	£6,000
40% of Phase 2's estimated total		£230,00
Total		£345,500

Table 16: Breakdown of the risks allocation for the project

After the ToTo systems goes live, marketing and promotions will be undertaken to inform the public of the new system. Bus operators will fund their own marketing and promotion activities for both the initial ToTo single operator rollout and subsequent multi-operator development.

4.4 Accounting Implications

Accounting arrangements will be managed as per existing West of England CA and NSC delivery and financing structures. The funding agreements with operators will stipulate that the West of England CA will release 50% of the funding allocated to operators upon their signing the grant agreement (to allow the purchase of equipment) and then the remaining 50% when it is confirmed that operators have ToTo successfully operating with ticket price capping in place. This is because the supplier will require 50% payment upfront upon order, which the operators will need access to. Each bus operator will need to provide evidence of the order being made, and then proof that their vehicles are live with capping. This proof will be checked by West of England CA for each operator.

The size of the grant awarded to each operator will be based upon the number of vehicles each operator has operating in the West of England area, and the number of ToTo readers those vehicles require.

The bus companies will be required to fund any costs over and above the granted amount in the case of cost escalation, meaning that the West of England CA will not be liable to cover any additional costs.

5 Commercial Dimension

5.1 Commercial Approach

The commercial approach to the procurement of ToTo technology is to provide grant funding to operators via signed Grant Funding Agreements so that operators can undertake the procurement exercises required to procure the technology needed to deliver ToTo capabilities and ensure standardisation of contactless technology. This section outlines the commercial arrangements proposed.

5.2 Output-Based Specification

The following outputs will be procured via operators existing procurement arrangements:

- 845x Tap-off Readers;
- 3x years of ToTo licencing;
- 42x Barcode readers; and
- Associated marketing and promotional activities and development of a multi-operator brokerage arrangement.

The first phase of the project will be considered to be live when contactless Tap-off readers are installed and operational with best fare capping in place for all individual operator tickets including single, returns, day tickets and week tickets as a minimum.

The second phase would be to support develop multi-operator systems when national systems are confirmed, and core systems are available. This would consist of technical support, West of England area systems establishment which would include tickets, reimbursement, configuration, and setup. This would be considered operational upon the expansion of ToTo best fare capping to multi-operator tickets.

5.3 Procurement Strategy

Procurement of the Phase 1 scheme elements will be via Grant Funding Agreements with the bus companies, who will then lead the procurement and installation of the technologies.

The Grant Funding Agreement conditions will require evidence of the installation of machines by a specified date. 50% of the grant will be paid on confirmation of an order with a supplier and 50% on evidence of single-operator digital capping being live in the West of England by a specified date. The bus companies will use their existing supplier arrangements to purchase and install machines.

Phase 2 development of multi-operator systems will be progressed in line with the delivery of core systems as per the National Bus Strategy. The core systems are unlikely to be available until 2023 and the introduction of these systems will be dependent on whether areas are in a position to progress. The introduction to Phase 1 of this project and parallel work with operators to refresh the existing multi-operator scheme will support the transition to the multi-operator system. The Phase 2 procurement will be done through the procurement system created by the DfT in accordance with the National Bus Strategy.

During the implementation of the contactless ticketing system and fare capping on individual operators' services the promotion of the new system will be led by the respective operators through their existing procurement arrangements. A fixed allocation for the West of England CA and NSC promotional activities has been included in the budget.

The draft grant conditions are below:

1. The equipment is installed and live with single operator digital capping on adult day and week fares is operational by 31/03/2022.
2. A register of the fleet equipped with Tap and Cap equipment is provided to the West of England CA by 31/03/2022.
3. All fleet operating within the West of England area to have Tap and Cap functionality for at least 5 years from 31/03/2022.
4. If Tap and Cap functionality within the West of England area is terminated within 5 years, then either the ticketing equipment used on these services purchased through this grant is transferred to the ownership of the West of England CA, or the grant money is repaid.
5. The basis of any grant repayment will be £233 per bus per year of non-use within the period 1 April 2022– 31 March 2027. No grant repayment will be liable after 31 March 2027.
6. All subsequent operational costs for this equipment are paid for by [THE OPERATOR].
7. [THE OPERATOR] fully co-operates in future partnership work to implement multi-operator digital capping within the West of England area, with a view to implement within 2023/24.

The delivery of ToTo is aligned with the BSIP and EP aims and objectives which will provide the mechanism for it to move to as a Business-as-Usual feature for authorities and operators who will work in partnership enabling ToTo to continue beyond the proposed 5-year agreement.

5.4 Human Resource Issues

It is anticipated that the project will be delivered through existing project management and ticketing manager resource within West of England CA and NSC with specialist support from external partners as required. No human resource issues are foreseen.

Further support will be required for Phase 2 and requirements will be identified following details of the core national system delivery.

5.5 Sourcing Options

Operators will procure equipment from existing suppliers. The West of England CA has confirmed that operators will have the ability to procure direct from suppliers or through national procurement frameworks with fixed prices. This will ensure that all operators will be able to procure at a competitive price.

Development and procurement of core multi-operator systems will be confirmed through the national approach as described in the National Bus Strategy.

Consideration was given to whether the West of England CA could procure the equipment and lease to operators. This option was considered likely to slow delivery of the project and not offer best VfM.

5.6 Payment Mechanisms

Grant payments will be made to the operators through the West of England CA's existing financial systems and the arrangements stipulated within the Grant Funding Agreements.

5.7 Pricing Framework and Charging Mechanisms

The equipment being installed will provide operators with the technology to implement ticket price capping and to offer a wider range of pricing options for passengers. Grant funds will cover the cost of operating the technology for the first 3 years, with operators required as part of grant conditions to fund the costs in the final 2 years of the grant agreement.

There will be no additional charges introduced to the public to specifically cover the cost of operating this new equipment.

Delivery of the project will facilitate ticket price capping and new ticketing options, and the development of systems for multi-operator ticketing. Arrangement for this will align with the emerging national system.

5.8 Risk Allocation and Transfer

The risk of delivery and any financial risks relating to the purchase and installation of equipment will be taken by the bus operators themselves. Operators will also be responsible for the delivery of their system to a timescale set in the grant conditions. Operators will be required to cover the cost if it is greater than the grant.

5.9 Contract Length

The grant agreements will be based on a 5-year agreement between the West of England CA and operators.

5.10 Contract Management

The contract/grant agreement monitoring of the various arrangements described above will be in accordance with the existing contracts and agreements in place and new contracts as required.

6 Management Dimension

6.1 Introduction and Objectives

The purpose of the Management Dimension is to provide confidence that the project will be successfully delivered. It includes information relating to the delivery of the project, and other key elements closely related to it, such as, project plan, assurance, governance, implementations, stakeholder engagement, risk and issues management, lessons learnt, benefits management and evaluation and project closure.

6.2 Evidence of Similar Projects

The “Connected Leicester – Hub and Spoke Plan” was a similar project approved by DfT that sought to integrate smart ticketing into the already existing system by implementing a ToTo system with capped fees.

This scheme, which is in the process of being delivered will enable passengers in Leicester to ride the bus without knowing the ticket types and fares, operator names, or the names of the stops. The project includes multi-operator capping through existing local systems which means that passengers can use any operator without having to arrange another ticket or fare. The anticipated outcomes include saving an estimated 442,549 hours per year due to faster boarding times, an additional 412,227 to the existing 25 million boardings per year (increase in 1.6%) and reduced operating costs of £108,281 per year as well as saving 2,068 bus operating hours per year. There has been ongoing liaison between the Leicester project and this one to ensure that lessons learnt and best practice from that project are captured by this similar project.

The West of England authorities have experience of delivering similar outputs as required by this project as evidenced by the West of England LEP funded 2019 ‘Contactless’ project, which involved the introduction of a contactless payment system on buses in the west of England. This project focused on introducing payment technology to smaller operators who would otherwise be unable to afford to implement it. The project resulted in 99% of buses in the regional being able to accept contactless payments as an alternative to cash, providing an excellent starting point from which to implement ToTo.

Elsewhere multi-operator and digital contactless fare capping schemes have already successfully been implemented in London and Nottingham and is in process in Birmingham.

6.3 Governance, Organisational Structure and Roles

The delivery of the project will be overseen by the West of England CA Integrated Smart Payments and Ticketing Manager, Edward Hopkins, who will coordinate with officers from the West of England authorities and Bus operators where necessary.

The individual Bus Operators will be responsible for the procurement and installation of the technology utilising existing arrangements.

The West of England CA will act as the managing authority responsible for managing and monitoring project delivery against cost, time and quality through the existing joint working and

government structures. Proposed project governance arrangements can be seen in Figure 4 below.



Figure 4: Project Governance

There will be a regular forum with operators in the WEBOA multi-operator group that meet on a regular basis to ensure engagement will take place.

The delivery of the project will be overseen by the West of England CA Integrated Smart Payments and Ticketing Manager who will act as Project Manager and who will coordinate with officers from the West of England authorities and bus operators where necessary. The Project Manager will plan, delegate, monitor and control all aspects of the project, and the motivation of those involved, to achieve the project objectives within the expected performance targets for time, cost, quality, scope, benefits, and risks.

The Senior Responsible Officer (SRO) for the project will own the project vision and success criteria with the Project Manager and the roles of the SRO for this project will be carried out by the West of England CA Head of Transport Integration. They will influence and manage the environment which the project outcomes will be delivered including the management of strategic risks, ensuring appropriate assurance, strategic direction remains in place and ensure appropriate governance is in place including steering/board meetings and highlight reports at the required frequency. The Regeneration, Development, and Transportation Steering Group will provide oversight of the project who, along with the SRO, will provide a unified direction for the project and Project Manager, managing and resolving strategic risks and issues as well as changes to cost; time; and quality outside the Project Manager’s defined thresholds.

Project delivery groups will be formed to oversee the delivery of implementation for each individual operator following the entry into the grant agreements. The project delivery group membership will include representatives from operators, the West of England CA, key suppliers, and any relevant partners critical to successful delivery. These project delivery

groups will be tasked with delivering the project in line with grant conditions and to the agreed scope and timescales with issues and risks with the potential to impact delivery escalated to the Project Manager as required.

6.4 Assurance

This project is being developed, delivered, and reported on in line with the requirements of the May 2020 the West of England CA Assurance Framework and April 2020 West of England CA TAG. The West of England CA will provide assurance of the project via the Grant Assurance Team (and supporting consultants), who will review the business case and supporting evidence and provide a recommendation on whether to approve. Final approval will be provided by the West of England CA Joint Committee discussed below.

Figure 5 and Figure 6 shown below both details of the structure and frameworks for various different committees within the West of England CA. Figure 5 shows an overview for the framework for the West of England Joint Committee, the West of England CA, and the LEP Board. Figure 6 shows the detailed composition of the groups and committees which constitute the West of England CA Joint Committee.

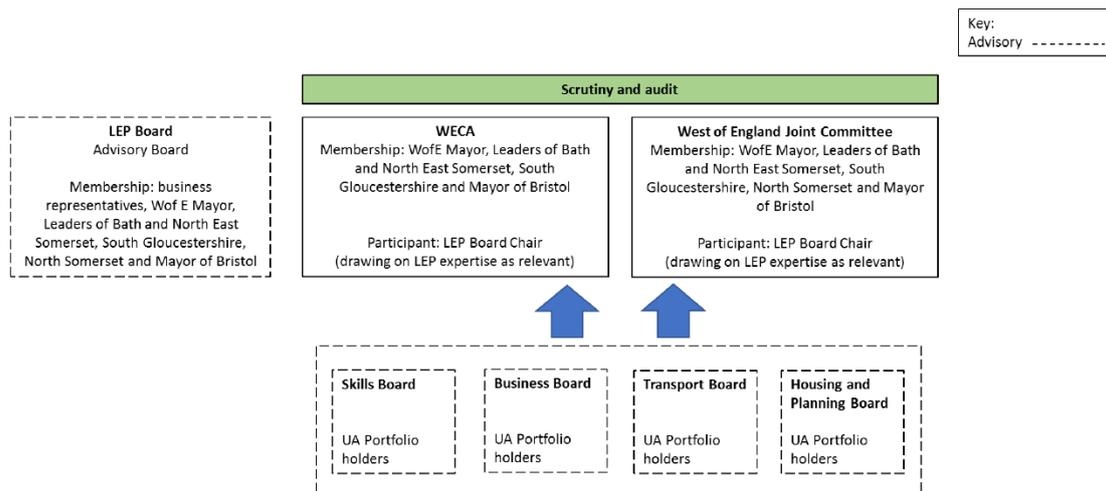


Figure 5: Framework showing relationship between West of England Joint Committee, the West of England CA, and LEP Board

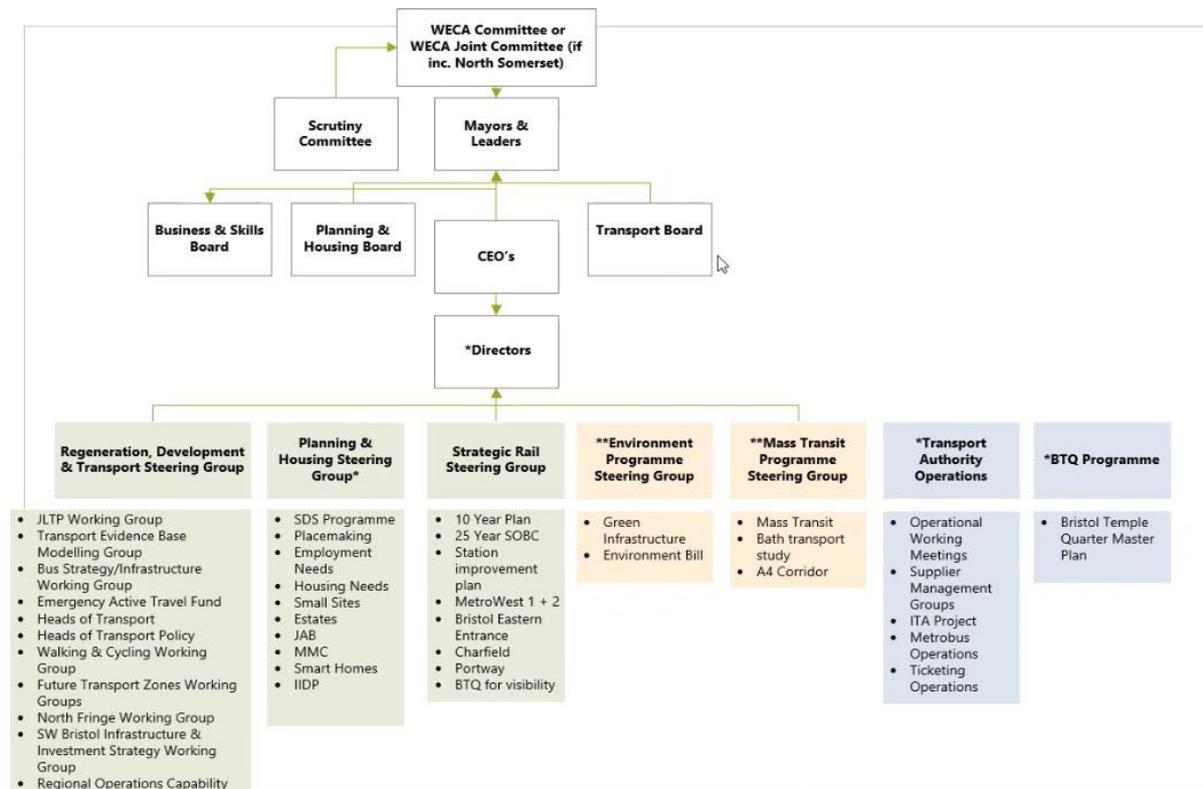


Figure 6: Composition of the West of England CA Joint Committee

6.5 Project Reporting

The Project Manager is responsible for providing regular project reporting updates to the SRO and board/steering group. The Project Manager’s reports will include:

- Delivery process progress report;
- Financial spend to date and forecast spend;
- Outputs to date;
- Risk register update;
- Changes to the project programme; and
- Closing and evaluation project report at the end of the delivery stage.

6.6 Project Implementation and project plan

The project is split into 2 main phases: upgrading buses with single-operator capping and implementing multi-operator tickets and capping. Table 17 below shows a list of work packages that make up this project and their corresponding dates.

Work Packages	Dates
Phase 1	
Grant agreement development	28/01/2022
Operator engagements/agreements	31/01/2022 – 30/06/2022

Equipment installation	01/04/2022 – 31/03/2023
Phase 2	
Engagements/requirements gathering	01/04/2022 – 31/03/2023
Delivery/development activities	01/04/2022 – 31/03/2023
Stakeholder engagement	Continuous

Table 17: Work Packages

Phase 1 consists of all buses in the West of England area being upgraded by March 2023 and Phase 2 consists of expanding the tickets to incorporate multi-operators. Table 18 below shows the key milestone outputs.

Milestone	Completion Data
FBC Committee Approval/Grant Agreement	28 th January 2022
80% of buses upgraded and live	September 2022
90% of buses upgraded and live	December 2022
100% of buses upgraded and live	March 2023
Expanded to multi-operator tickets	2023/2024

Table 18: Key Project Milestones

These plans and timeframes have been developed based on the information obtained by operating companies regarding supplier lead times and realistic installation dates. Through communication with operators, First Bus have confirmed that if the funding is available, ToTo can be delivered on their buses by June 2022. Risks which could affect key project milestones include delays in the release of funding causing operators to miss the window of equipment procurement by the specified dates. These risks have been mitigated by using suitable grants arrangements in line with the agreed upon timeline so the equipment can be ordered as soon as possible. Additionally, suppliers have already been directly contacted and they have confirmed stock and installation availability.

6.7 Project Scope, Dependencies and Constraints

The project scope consists of a grant for operators running registered services in the West of England CA and NSC areas. Phase 1 is the delivery of single-operator capping for adult tickets and Phase 2 is the development of multi-operator capability based on a core national system. This has been shown in Table 17.

The project is dependent of the delivery of the core national systems intended for multi-operator expansion. This will be particularly pertinent in Phase 2 of the project.

The two major constraints are the suppliers' lead times and the stock that is available. To mitigate the likelihood of these constraints causing issues, suppliers have already been contacted, and their stock and equipment availability has been confirmed for the proposed

timeframes. The supplier of 95% of machines of the area (ticketer) states a lead time of 12 weeks from order, while Stagecoach have confirmed that their supplier has a lead time of 6 to 9 months. The West of England CA will continuously work with operators to manage and track this constraint.

6.8 Stakeholder Engagement and Communications

The key stakeholders for the project are the bus operators and the general public.

Operators will be responsible for the delivery of the project and as such have been actively engaged in the development of the project to date and will continue to be engaged via ongoing meetings during the delivery phases of the project. Beyond this project the West of England CA and NSC will have an EP with all bus operators by April 2022. This will ensure a productive and close relationship between the LTAs and the bus operators and will yield continuous engagement and communication. This will also require suitable ongoing reports to be submitted by the operators.

Operators will be responsible for marketing the new ticketing arrangements offers and fare capping as a result of the Phase 1 of the project, with funding allocated for a wider marketing and promotions campaign upon key milestones through to the equipment install and go live stage to ensure that the travelling public is aware of the requirement of ToTo and the benefits that the new system will provide across operators.

Bus user engagement will be undertaken throughout the delivery phase of the project through the Bus User Panel. It will also be used with all the bus companies that provide any type of service within the relevant West of England area.

The ongoing yearly surveys undertaken by Transport Focus will be another source of public engagement, from which continuous public feedback can be used to evaluate the improvements in customer satisfaction resulting from the ToTo project.

The communications plan for this project, found below in Table 19, has been based on the role of the West of England CA and NSC as providing grant funding rather than procuring directly. As such, the communications approach is based on the coordination of delivery plans and partnerships working with bus operators, and with external marketing organisations led by bus operators when new systems/functionality are launched with overarching external messaging through the West of England CA and NSC.

Key areas of communication for WECA and the project will be:

- Internal/governance – effective communication with internal stockholders and groups to ensure the successful delivery of the project to time; cost; and quality as well as the effective management of risks/issues.
- Effective communication as to the project scope, delivery, and timescales to raise awareness with other linked areas supporting business as usual (such as the transport operations team).
- Ensuring appropriate engagement to enable and support planning/delivery of marketing and promotion plans both by WECA/NSC and bus operators.

Name of Communication	Target Audience	Purpose	Frequency	Method
Distribution Project Inception Documents (PID)	All stakeholders	Distribute plan to alert stakeholders of project scope and to gain buy-in.	Before project start date/ before individual bus operator delivery start dates	Individual meetings with stakeholders Regular group bus operator meetings Steering group and board meetings WECA SharePoint/Teams
Project and delivery team meetings	Core team	To review detailed plans (tasks assignments and action items). Review detailed project plans. Issue & risk management.	Regular scheduled bi-weekly or ad hoc as needed	Meeting (face to face/Teams/Zoom)
	SRO	Strategic planning. Project and finance management. Issue reduction & risk management.	Regular scheduled bi-weekly or ad hoc as needed	Meeting (face to face/Teams/Zoom)
	Delivery teams	To manage the delivery of the project and its outputs from grant agreement to go-live with identified functionality.	On formation of teams (for each individual operator implementation) regular scheduled weekly and ad hoc as needed	Meeting (face to face/Teams/Zoom)
	Internal and bus operators' stakeholders	To keep informed so there is an awareness as to the status of the project as well as progress, timelines,	Communicate information on the project in particular during development and initiation ad go	Meeting (face to face/Teams/Zoom) Emails/Share

		and key dates.	live/launch	Point
Status reports	Board/ Steering group	Update project steering group on status and discuss critical issues. Work through escalated issues and change requests here.	Regular scheduled steering group meeting - monthly or ad hoc as needed	Meeting (face to face/Teams/ Zoom) Highlight reports
	WECA committee/ grant assurance	Update on status, critical issues, and finance. Change request outside of the agreed threshold reviewed/approved here.	Regular scheduled highlight reports - Quarterly or ad hoc as needed	Highlight reports
	BAU teams	To keep informed of progress, timelines, and key dates - creating awareness of interdependencies and enabling planning for change and go-live.	Regular scheduled monthly or ad hoc as needed	Meeting (face to face/Teams/ Zoom) Emails/Share Point
	Bus operators	Update on project initiation and timelines, gain feedback on technical and funding approach to ensure buy-in and deliverability of the project.	Regular scheduled monthly or ad hoc as needed	Meeting (face to face/Teams/ Zoom) Emails/Share Point
Marketing/ Communications	WECA Communications team	To keep informed of progress, timelines, and key dates.	Communicate information on the project; key go-live milestones; and the customer offer Regular monthly meetings - ad hoc meetings as required for each operator go-live	Meeting (face to face/Teams/ Zoom) Emails/Share Point
	Bus operator/ marketing	To keep informed of progress, timelines,	Communicate information on the	Meeting (face to

	communications	and key dates.	project; key go-live milestones; and the customer offer Regular monthly meetings - ad hoc meetings as required for each operator go-live	face/Teams/Zoom) Emails/Share Point
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Table 19: Overall project communications plan

6.9 Risk and Issues Management

See Risk Log attached as Appendix A1. 1.

6.10 Lessons Management

The approach to this scheme has built upon lessons learnt from the implementation of contactless payment technology in the West of England, as well as the experience from the ongoing implementation of ToTo technology in Leicester.

Key lessons from Leicester include ensuring that the grant agreement is simple as possible and to not complicate it. They have recommended to include all operators that will be involved in the West of England area. Furthermore, the Leicester 2021 project found that tapping off will not increase the time taken for passengers to exit their bus as many passengers have been found to Tap-off as the bus arrives at the bus stop in advance of the doors opening.

From the smart ticketing project based on the West of England Contactless business case, it was learnt that small operators have taken longer to engage than initially anticipated and so the assumption of an extended period for installation was made.

The Project Manager will be responsible for the submission of a closing and evaluation report at the end of the project which will detail the successes and lessons learnt from the project to inform future projects. Upon approval by the Transforming Cities Fund Board (TCFB), it will be shared among other project in the programme help improve the effectiveness of their projects.

6.11 Data and Information Security

Anonymised data will be collected from operators in order to monitor the outputs and success of the project. The frequency of this data collection will be confirmed at a later date. All personal information will be stripped from the data before it is received by the project, therefore minimising any issues associated with data protection.

6.12 Benefits Management and Evaluation

As part of the outlined investment, £20,000 of funding has been allocated to project deliver/support activities to ensure the delivery of the success of the project during and after operators' initial go-live. This will ensure management of implementation and the success of delivery. The Project Manager will be required to write a project highlights report as well as a closing evaluation project report which will detail the delivery of the outputs of the project.

Improvements in the satisfaction levels of bus users in the West of England CA and NSC area will be monitored through the yearly surveys conducted by Transport Focus, which assesses the public’s perception of public transport service and VfM. The effect of the ToTo scheme will be visible through customer satisfaction in the years before and after ToTo implementation.

To monitor the improvements that the ToTo scheme will have on bus journey times, data can be collected through on-site measurements of dwell time at bus stops.

As stated in section 6.8, partnership using mechanisms such as the planned EP will enable continuous engaged with operators so that regular data and reporting will be available to help identify and mitigate potential issues during and post project delivery.

The following objectives have been identified for the scheme:

- To reduce bus dwell times at stops through reducing driver interactions, reducing journey times, and improving punctuality.
- To offer passengers more affordable bus travel by facilitating flexible ticketing and variable fare capping.
- To facilitate the introduction of multi-operator products making it easier to interchange between operators and modes.
- To increase passenger satisfaction with the ticketing and boarding processes.
- To increase bus patronage on the West of England bus network.

The below logic map Figure 7 outlines how the **inputs** to the project (the funding, staff time and legal arrangements) will deliver the **outputs** of the scheme (the physical hardware and back-office processes required to utilise the hardware) and how these will contribute to **outcomes** for users and long-term **impacts** for society. The numbers within the logic map indicate where the identified scheme objectives (as indicated above) sit within this framework.

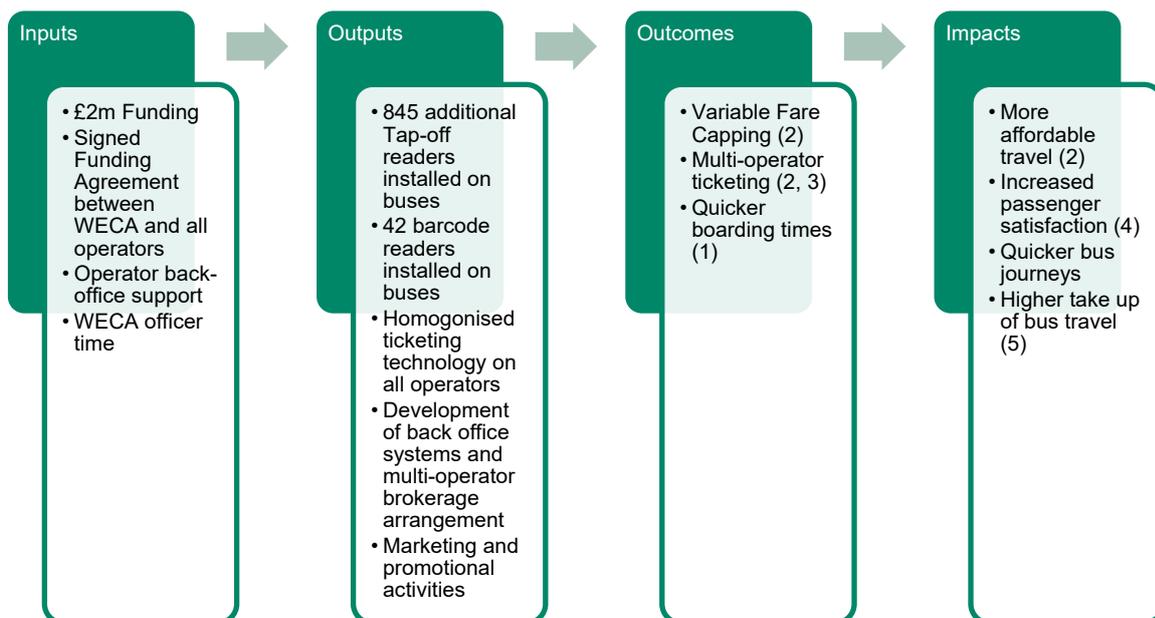


Figure 7: Scheme logic map

Table 20 outlines a set of indicators which are proposed to be used to monitor and evaluate the scheme’s performance in achieving the planned outputs, outcomes and impacts as indicated in Figure 7. It also outlines the data sources and proposed monitoring frequencies associated with each indicator, and where available indicates the baseline situation. For the impact indicators many external factors could and may also influence passenger satisfaction, running times, and passenger journeys. Consideration will therefore be given to the national trends shown for these criteria as well as the changes shown in comparative areas (where ToTo has not been implemented over the monitoring period) to establish whether it is possible to conclude on whether ToTo has impacted these factors.

Indicator	Data source	Primary/Secondary Data	Collection requirements	Monitoring timescales	Baseline situation
Output indicators					
Percentage of buses where Tap-off readers have been installed by operator	Operator data	Primary	Request quarterly	Quarterly	0%
Outcome Indicators					
Percentage of services offering variable fare capping by operator	Operator data	Primary	Request quarterly	Quarterly	0%
Percentage of services offering multi-operator ticketing products	Operator data	Primary	Request quarterly	Quarterly	0%
Average dwell time at bus stops	Dwell time survey	Primary	Bespoke survey	1-year post implementation of Phase 1	Baseline data to be collected
Percentage of fares where variable fare capping has been applied plus associated fares before and after capping	Operator data	Primary	Request quarterly from operators	Quarterly	0%
Percentage of ticket sales which are multi-operator products	Operator data	Primary	Request quarterly from operators	Quarterly	0%

Impact Indicators					
Bus passenger satisfaction with journey time, punctuality, and VfM	Transport Focus Bus Passenger Surveys	Secondary	Reported annually	1-year post implementation of Phases 1 and 2.	Journey time: 80% Punctuality: 68% VfM: 50%
Bus services running on time by local authority	DfT Bus Statistics BUS0902	Secondary	Reported annually	1-year post implementation of Phases 1 and 2.	76.6% 2018/19 average
Bus passenger journeys on the West of England network	DfT Bus Statistics BUS0109a	Secondary	Reported annually	1-year post implementation of Phases 1 and 2.	66.1m in 2019/20

Table 20: Planned monitoring and evaluating activities

Table 21 below outlines the key targeted benefits that the scheme needs to ensure are achieved to meet its objectives. A series of actions have been identified with owners to ensure these benefits are achieved.

Targeted Benefit	Action Required	Action Owner	Timescales
Ensure operators meet the conditions of the funding agreements	Operators will be required to provide suitable evidence	PM	For the duration of the funding agreement
Ensure installed equipment remains operational	Operators will be required to provide suitable evidence that equipment remains in use	PM	31 st March 2027
Ensure dwell time reductions are achieved	Monitoring of dwell times. Discussion with operators if dwell times haven't improved.	PM	End of Phase 1
Ensure external factors do not erode journey time and punctuality benefits	WECA is working with operators to develop an EP arrangement to improve the quality of the bus network	WECA and operators	Ongoing
Ensure operators offer fare capping as soon as possible	Ongoing engagement with operators regarding any delays	PM	All buses to be offering this by March 2023
Ensure capped fares are publicised and offer VfM	Operators to publicise any new single operator ticketing products	Operators	By March 2023
Ensure users are aware of how to use ToTo	Operators to explain the process	Operators	By March 2023
Manage risks to bus patronage improvements	COVID-19 uncertainty remains a risk to bus patronage recovery. WECA is working with operators to develop an	WECA and operators	Ongoing

	EP arrangement to improve the quality of the bus network.		
Ensure multi-operator tickets are offered as soon as possible	Ongoing engagement with DfT and operators regarding any delays	PM	Targeting 2023/2024
Ensure multi-operator tickets are publicised and offer Vfm	WECA will market the multi-operator ticketing arrangements	WECA	Targeting 2023/2024

Table 21: Benefits realisation plan

6.13 Project Closure

This project will be delivered across the West of England CA and NSC network by March 2023.

West of England CA and NSC will release the funds and the project will be handed over to operators so every operator will oversee procurement, installation, ongoing support, and back-office systems configuration.

The additional £135 per reader contribution is to support operators in covering the additional cost of ToTo readers license fees for the first 3 years (£45 per reader per year) after which the operators will be responsible for this cost.

Appendix A Supporting Material

Risk	Risk Impact	Likelihood (L / M / H)	Impact (L / M / H)	Mitigation	Likelihood after mitigation (L / M / H)	Impact after mitigation (L / M / H)
One or more of the bus operators experience delays in the delivery of ToTo service. Lead times for systems are expected to be high (6-9 months for Stagecoach) as similar equipment is being procured for projects like ToTo all around the country.	Region-wide rollout of ToTo service would fail. The bus routes managed by the operators experiencing delays would suffer from negative public image, and the areas which rely on these bus routes would be disproportionately affected. This would delay the expansion to multi-operator ticketing systems.	M	H	Technologies implemented are mature and have been tested in previous projects, such as the Leicester 2021 Smart Integrated Ticketing project. Previous projects' experiences can be used to aid in this implementation. Engagement with operators shows that they are aware of long lead times, and the programme delivery will account for this. The grant offer will include claiming back money if the operators do not deliver (so grant conditions will be set to apply for 5 years).	L	M
One or more of the bus operators withdraw from participation in the scheme.	Some operators do not upgrade, and the project does not meet the full set of project objectives.	M	H	Early engagement with bus operators to confirm support and evaluate feedback grant offer will include claiming back money if the operators do not deliver (so grant conditions will be set to apply for 5 years).	L	M
Not enough readers procured for the scheme in the long term (perhaps new procured buses)	Some buses do not upgrade their readers, so variable capping cannot be implemented	H	H	The bus companies will fund any costs above the grants where costs of equipment are more than the grant. This means that if any additional equipment is necessary, the	L	L

require additional readers, or faulty readers).	holistically. May affect certain areas/routes disproportionately. Multi-operator capping is also delayed as homogenisation of reader technology is required for this.			bus operators must procure and fund them.		
Operators failing to pay the operating costs.	Maintenance of payment systems and back-office software systems will stop operating. Technology necessary for ToTo service fails, and project does not meet the full set of project objectives.	L	H	Ensure that operating costs for the technology implemented are affordable, and that the economic benefits of the ToTo scheme (such as increased bus patronage) can help cover some of the operating costs. Paying 3 years for ToTo license would offset some of the operational costs.	L	M
COVID-19 transport restrictions issued by Government.	If transport restrictions are imposed based on the predicted impact of public transport on the spread of COVID-19, either some (if restrictions are regional) or all routes would be suspended. Would delay adoption of ToTo scheme and reduce bus patronage to zero until restrictions are lifted. It may not be possible to assess the success of the project if new	L	H	Hard to predict spread of COVID-19, although the government is averse to imposing further restrictions. The ToTo scheme would remove the need for physical tickets as well as driver-traveller interactions, so could potentially reduce the spread of COVID-19 on public transport. Omitting data from months where restriction is imposed from assessment	L	H

	restrictions are imposed					
Inconsistent technologies installed in West of England CA buses.	Would lead to inconsistent customer experiences as different tickets would be needed to board different buses. The multi-operator tickets may be delayed further as homogenisation of readers is required for this.	M	H	Ensuring project objectives of installing same technology on all buses is adhered to. The small number of buses not currently equipped with modern ticketing machines will be supported to upgrade their ticketing system.	L	L
Inconsistent offers available for customers, perhaps variable capping, flexible ticketing, or multi-operator ticket types are not delivered by some operators.	Would lead to inconsistent customer experience, as some services would use flexible ticketing and variable capping whilst other do not. May affect different regions disproportionately depending on which operator/route is affected. Would also delay development of network wide multi-operator ticket types.	M	H	Grant agreement conditions will include maintaining availability for the different proposed fare types. The EP which will start in 2022 will also include further requirements for bus operators. Furthermore, grant offer will include claiming back money if bus operators do not deliver services (grant conditions will be set to apply for 5 years).	L	H
Limited availability or high lead times of equipment cause costs to exceed the funding allocated for the ToTo project.	Insufficient funding was allocated to project, therefore the allocated financial support given to operators couldn't cover equipment/other	M	H	An optimism bias for the costs of 6% is included with regards to risk costs. Furthermore, additional funding schemes could be sought to complete funding.	L	M

	necessary systems. Could cause operators who do not find scheme affordable to not participate in ToTo project.					
The different suppliers sourced by the bus operators to procure equipment have varied equipment costs, or costs which vary as availability lowers.	Certain operators struggle to procure equipment with the allocated funding.	M	H	Regular engagement with bus companies and equipment suppliers will assist in predicting fluctuations in equipment prices. An optimism bias for the costs of 6% is included with regards to risk costs. Furthermore, additional funding schemes could be sought to complete funding.	L	M

A1. 1: Risk Management & Mitigation Form

Risk	Risk Impact	Likelihood (L / M / H)	Impact (L / M / H)	Mitigation	Cost
Extra ToTo readers need to be installed as the original has been damaged/stopped working.	That particular vehicle will not be able to take part in the area ToTo scheme.	M	H	The fund allocated for risks has a proportion dedicated to equipment replacement.	Budget of £97,000
Extra barcode readers need to be installed as the original has been damaged/stopped working.	That particular vehicle will not be able to take part in the area ToTo scheme.	M	H	The fund allocated for risks has a proportion dedicated to equipment replacement.	Budget of £2,000
ToTo delivery requires extra support due to any unperceived issues.	Dependent on issue but it may possibly delay delivery but potential to cancel it too.	L	H	The fund allocated for risks has a proportion dedicated to delivery support	Budget of £10,000
People may not understand how to use ToTo.	Bus journeys are constantly delayed.	H	M	The fund allocated for risks has a proportion dedicated to marketing which can be used to communicate how passengers can use the new system.	Budget of £6,000
The implementation of the multi-operator phase (Phase 2) has higher than expected costs as current costs for this phase are estimates.	ToTo system can only be used for one operator at a time.	M	M	The fund allocated for risks has a proportion dedicated to support the implementation of Phase 2	Budget of £230,000

A1. 2: Risk Costs

Appraisal Summary Table		Date produced:	11/01/2022	Contact:														
Name of scheme:	West of England Combined Authority Tap-on/Tap-off Contactless Payment Ticketing			Name	Edward Hopkins													
Description of scheme:	Developing a standardised ToTo system for the individual bus operators in the West of England CA and NSC will aid in establishing the integration required between services to facilitate the implementation of multi-operator capping in the future. Implementing a ToTo system will enable will provide customers with the best fares for the journeys made, significantly reduce "dwell time" at bus stops and therefore making journey time savings and drastically simplify the process of using public transport.			Organisation	West of England Combined Authority													
				Role	Integrated Ticketing and Projects Manager													
Impacts		Summary of key impacts		Assessment														
				Quantitative	Qualitative													
				Monetary £(NPV)														
Economy	Business users & transport providers	Local bus operators benefit from the forecast reduction in bus operating hours associated with fewer on-bus cash/contactless(buy ticket) transactions (109,101 bus operating hours saved).	<table border="1"> <tr> <td colspan="2">Value of journey time changes(£)</td> <td>948,115</td> </tr> <tr> <td colspan="3">Net journey time changes (£)</td> </tr> <tr> <td>0 to 2min</td> <td>2 to 5min</td> <td>> 5min</td> </tr> <tr> <td>948,115</td> <td></td> <td></td> </tr> </table>		Value of journey time changes(£)		948,115	Net journey time changes (£)			0 to 2min	2 to 5min	> 5min	948,115			ToTo will support overall public transport network efficiency, benefitting wider regeneration and agglomeration objectives and improving the attractiveness of West of England as a place to live and work.	948,115
	Value of journey time changes(£)		948,115															
	Net journey time changes (£)																	
	0 to 2min	2 to 5min	> 5min															
948,115																		
Reliability impact on Business users	No impact																	
Regeneration	No impact			155,708														
Wider Impacts	Reduction in cash handling costs for local bus operators, resulting from switch to cash-free bus boarding	155,707.63																
Environmental	Noise	Noise reduction as a result of modal shift from car to local bus	4,381.42		4,381													
	Air Quality	Reduction in pollution as a result of modal shift from car to local bus	24,489.64		24,490													
	Greenhouse gases	Reduction in greenhouse emissions as a result of modal shift from car to local bus	<table border="1"> <tr> <td>Change in non-traded carbon over 10yr (CO2e) (Tonnes)</td> <td>185</td> </tr> <tr> <td>Change in traded carbon over 10yr (CO2e)</td> <td></td> </tr> </table>		Change in non-traded carbon over 10yr (CO2e) (Tonnes)	185	Change in traded carbon over 10yr (CO2e)		13,159									
	Change in non-traded carbon over 10yr (CO2e) (Tonnes)	185																
	Change in traded carbon over 10yr (CO2e)																	
	Landscape	No impact																
	Townscape	No impact																
Historic Environment	No impact																	
Biodiversity	No impact																	
Water Environment	No impact																	
Social	Commuting and Other users	Time savings to bus passengers through boarding efficiencies (1,091,005 passenger hours over 10 year appraisal period)	<table border="1"> <tr> <td colspan="2">Value of journey time changes(£)</td> <td>4,654,417</td> </tr> <tr> <td colspan="3">Net journey time changes (£)</td> </tr> <tr> <td>0 to 2min</td> <td>2 to 5min</td> <td>> 5min</td> </tr> <tr> <td>4,654,417</td> <td>-</td> <td></td> </tr> </table>		Value of journey time changes(£)		4,654,417	Net journey time changes (£)			0 to 2min	2 to 5min	> 5min	4,654,417	-		More reliable local transport network for commuters and other users	4,654,417
	Value of journey time changes(£)		4,654,417															
	Net journey time changes (£)																	
	0 to 2min	2 to 5min	> 5min															
	4,654,417	-																
	Reliability impact on Commuting and Other users	Shorter bus dwell times and mode-shift from car trips anticipated to improve overall transport network efficiency and resilience																
	Physical activity	No impact																
	Journey quality	No impact																
	Accidents	Reduction in road accidents as a result of modal shift from car to local bus	64,841.64		64,842													
	Security	Scope for reduced fraud for public transport operators through removal of cash			Reduced cash-related fraud													
Access to services	Potential to improve access to services with integration across bus																	
Affordability	Capping local fares on popular local trip journeys or introducing a flexible scale on capping to account for emerging travel patterns. This will provide customers with the best fares for the journeys made.			Tailored fare products and scope for lower fares (through reduced operating costs)														
Severance	No impact																	
Option and non-use values	No impact																	
Public Accounts	Cost to Broad Transport Budget	Cost of scheme (capex and opex) offset by increased revenues (uncosted) for local bus operators			Increased public transport revenues for local bus and tram operators													
	Indirect Tax Revenues	Loss of fuel duty revenue resulting from mode-shift from car use to local public transport	59,080.54		59,081													

A1. 3: Appraisal Summary Table

Analysis of Monetised Costs and Benefits		
Noise	4,381	(12)
Local Air Quality	24,490	(13)
Greenhouse Gases	13,159	(14)
Journey Quality		(15)
Physical Activity		(16)
Accidents	64,842	(17)
Economic Efficiency: Consumer Users (Commuting)		(1a)
Economic Efficiency: Consumer Users (Other)	5,243,636	(1b)
Economic Efficiency: Business Users and Providers	953,666	(5)
Wider Public Finances (Indirect Taxation Revenues)	59,081	- (11) - sign changed from PA table, as PA table represents costs, not benefits
Present Value of Benefits (see notes) (PVB)	6,245,093	$(PVB) = (12) + (13) + (14) + (15) + (16) + (17) + (1a) + (1b) + (5) - (11)$
Broad Transport Budget	1,893,614	(10)
Present Value of Costs (see notes) (PVC)	1,893,614	$(PVC) = (10)$
OVERALL IMPACTS		
Net Present Value (NPV)	4,351,479	$NPV = PVB - PVC$
Benefit to Cost Ratio (BCR)	3.30	$BCR = PVB / PVC$
<p>Note : This table includes costs and benefits which are regularly or occasionally presented in monetised form in transport appraisals, together with some where monetisation is in prospect. There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.</p>		

A1. 4: Analysis of Monetised Cost and Benefits

Economic Efficiency of the Transport System (TEE)

Non-business: Commuting	ALL MODES	ROAD	BUS and COACH	RAIL	OTHER	
<u>User benefits</u>	TOTAL	Private Cars and LGVs	Passengers	Passengers		
Travel time	-					
Vehicle operating costs	-					
User charges	-					
During Construction & Maintenance	-					
NET NON-BUSINESS BENEFITS: COMMUTING	- (1a)					
Non-business: Other	ALL MODES	ROAD	BUS and COACH	RAIL	OTHER	
<u>User benefits</u>	TOTAL	Private Cars and LGVs	Passengers	Passengers		
Travel time	5,243,636	589,219	4,654,417			
Vehicle operating costs	-					
User charges	-					
During Construction & Maintenance	-					
NET NON-BUSINESS BENEFITS: OTHER	5,243,636 (1b)	589,219	4,654,417			
Business		Goods Vehicles	Business Cars & LGVs	Passengers	Freight	Passengers
<u>User benefits</u>						
Travel time	-					
Vehicle operating costs	-					
User charges	-					
During Construction & Maintenance	-					
Subtotal	- (2)					
Private sector provider impacts				Freight	Passengers	
Revenue	-					
Operating costs	953,666			953,666		
Investment costs	-					
Grant/subsidy	-					
Subtotal	953,666 (3)			953,666	-	-
Other business impacts						
Developer contributions	(4)					
NET BUSINESS IMPACT	953,666 (5) = (2) + (3) + (4)					
TOTAL						
Present Value of Transport Economic Efficiency Benefits (TEE)	6,197,302 (6) = (1a) + (1b) + (5)					

Notes: Benefits appear as positive numbers, while costs appear as negative numbers.
All entries are discounted present values, in 2010 prices and values

A1. 5: Economic Efficiency of the Transport System (TEE Table)

Public Accounts (PA) Table

	ALL MODES	ROAD	BUS and COACH	RAIL	OTHER
Funding	TOTAL	INFRASTRUCTURE			
Revenue					
Operating Costs					
Investment Costs					
Contributions					
Grant/Subsidy Payments					
NET IMPACT	£0 (7)				
Transport					
Revenue					
Operating costs					
Investment Costs	£1,893,614			£1,893,614	
Contributions					
Grant/Subsidy Payments					
NET IMPACT	£1,893,614 (8)				
Transport					
Indirect Tax Revenues	-£59,081 (9)				-£59,081
TOTALS					
Budget	£1,893,614 (10) = (7) + (8)				
Wider Public Finances	-£59,081 (11) = (9)				
<p>Notes: Costs appear as positive numbers, while revenues and 'Developer and Other Contributions' appear as negative numbers. All entries are discounted present values in 2010 prices and values.</p>					

A1. 6: Public Accounts (PA) Table

Year	Passenger time saving			Operating cost					Traffic decongestion benefits associated with mode shift							Totals
	Firstbus 1a	Firstbus 1b	Other Operators 1c	Cash Handling	Firstbus 1a	Firstbus 1b	Other Operators 1c	Third party operating costs	Congestion	Infrastructure	Accident	Local Air Quality	Noise	Greenhouse Gases	Indirect Taxation	Totals
2023	£298,904	£105,465	£136,713	£19,915	£66,988	£23,636	£30,639	£0	£24,277	£88	£2,597	£1,182	£193	£635	£-3,511	£707,721
2024	£296,164	£100,892	£130,786	£18,814	£63,285	£22,329	£28,946	£0	£46,566	£168	£4,982	£2,267	£371	£1,218	£-6,735	£710,055
2025	£286,879	£96,716	£125,373	£17,777	£59,797	£21,099	£27,350	£0	£75,086	£280	£8,458	£3,197	£564	£1,718	£-8,104	£716,190
2026	£284,940	£92,587	£120,020	£16,769	£56,407	£19,902	£25,799	£-25,383	£70,829	£264	£7,978	£3,016	£532	£1,621	£-7,644	£667,637
2027	£274,238	£88,630	£114,891	£15,818	£53,209	£18,774	£24,337	£-23,943	£66,813	£249	£7,526	£2,845	£502	£1,529	£-7,211	£638,206
2028	£262,915	£84,842	£109,980	£14,922	£50,192	£17,710	£22,957	£-22,586	£63,025	£235	£7,099	£2,684	£473	£1,442	£-6,802	£609,088
2029	£252,057	£81,203	£105,263	£14,076	£47,346	£16,706	£21,655	£-21,305	£59,452	£222	£6,697	£2,532	£446	£1,360	£-6,416	£581,293
2030	£241,190	£77,702	£100,724	£13,278	£44,662	£15,758	£20,428	£-20,097	£64,653	£225	£6,885	£2,388	£459	£1,283	£-4,468	£565,069
2031	£230,730	£74,332	£96,356	£12,525	£42,130	£14,865	£19,269	£-18,958	£60,988	£212	£6,494	£2,253	£433	£1,210	£-4,215	£538,625
2032	£220,674	£71,092	£92,157	£11,815	£39,741	£14,022	£18,177	£-17,883	£57,530	£200	£6,126	£2,125	£408	£1,142	£-3,976	£513,351
Total	£2,648,692	£873,461	£1,132,264	£155,708	£523,757	£184,801	£239,557	£-150,156	£589,219	£2,142	£64,842	£24,490	£4,381	£13,159	£-59,081	£6,247,235

A1. 7 Benefits by category per year

Indicator	(a) Appraisal output criteria	(b) Potential impact (yes / no, +ve/-ve if known)	(c) Qualitative Comments	(d) Proceed to Step 2
User benefits	The TUBA user benefit analysis software or an equivalent process has been used in the appraisal; and/or the value of user benefits Transport Economic Efficiency (TEE) table is non-zero.	No	The calculation of user benefits is a global value based upon the west of England wide impact. No TUBA assessment has been completed and it is not possible to ascertain the groups or locations which will benefit	No
Noise	Any change in alignment of transport corridor or any links with significant changes (>25% or <-20%) in vehicle flow, speed or %HDV content. Also note comment in TAG Unit A3.	No	Slight change in traffic as a result of modal shift, but not significant	No
Air quality	Any change in alignment of transport corridor or any links with significant changes in vehicle flow, speed or %HDV content: <ul style="list-style-type: none"> • Change in 24-hour AADT of 1000 vehicles or more • Change in 24-hour AADT of HDV of 200 HDV vehicles or more • Change in daily average speed of 10kph or more • Change in peak hour speed of 20kph or more • Change in road alignment of 5m or more 	No	Slight change in traffic as a result of modal shift, but not significant	No
Accidents	Any change in alignment of transport corridor (or road layout) that may have positive or negative safety impacts, or any links with significant changes in vehicle flow, speed, %HGV content or any significant change (>10%) in the number of pedestrians, cyclists or motorcyclists using road network.	No	No changes to alignments or significant changes to vehicle compositions	No
Security	Any change in public transport waiting/interchange facilities including pedestrian access expected to affect user perceptions of personal security.	No	No changes to waiting facilities	No

Indicator	(a) Appraisal output criteria	(b) Potential impact (yes / no, +ve/-ve if known)	(c) Qualitative Comments	(d) Proceed to Step 2
Severance	Introduction or removal of barriers to pedestrian movement, either through changes to road crossing provision, or through introduction of new public transport or road corridors. Any areas with significant changes (>10%) in vehicle flow, speed, %HGV content.	No	No changes predicted	No
Accessibility	Changes in routings or timings of current public transport services, any changes to public transport provision, including routing, frequencies, waiting facilities (bus stops / rail stations) and rolling stock, or any indirect impacts on accessibility to services (e.g. demolition & re-location of a school).	No	No changes to routes, timings or frequencies of services.	No
Affordability	In cases where the following charges would occur; Parking charges (including where changes in the allocation of free or reduced fee spaces may occur); Car fuel and non-fuel operating costs (where, for example, rerouting or changes in journey speeds and congestion occur resulting in changes in costs); Road user charges (including discounts and exemptions for different groups of travellers); Public transport fare changes (where, for example premium fares are set on new or existing modes or where multi-modal discounted travel tickets become available due to new ticketing technologies); or Public transport concession availability (where, for example concession arrangements vary as a result of a move in service provision from bus to light rail or heavy rail, where such concession entitlement is not maintained by the local authority[1]).	Yes	Bus fares are likely to change as an outcome of the scheme due to the introduction of fare capping and new ticketing offers including in the development of multi-operator ticketing. The response of individual operators to the new ticketing possibilities offered by this technology cannot be determined at this time and therefore it is not considered possible to ascertain the precise nature of the changes in affordability for different routes and user groups. The introduction of capping should increase affordability and as bus travel is skewed towards lower income groups this should benefit these groups particularly.	No

Appendix 2 – Director sign off



17 January 2022

West of England Combined Authority

On bus 'Tap on/ Tap off' project - Full Business Case submission

This letter is to confirm that I have approved submission of this Full Business Case to the Committee in line with the West of England Combined Authority's Full Business Case submission and approval requirements – and also confirm the following:

- *That following Committee approval all relevant financial approvals and funding will be in place to deliver the project as set out in the Full Business Case.*
- *That I am responsible and accountable for ensuring that the project delivers good value for money in the use of public resources, that being the suitability and effectiveness of the project as well as the economic growth and wider societal outcomes achieved in return for the public resources received.*
- *That I have reviewed and endorse the Value for Money statement within the Business Case.*

Your sincerely

A handwritten signature in black ink that reads 'K m Vowles'.

Kathryn Vowles

Interim Director of Infrastructure