

Derby - Nottingham Future Mobility City





Future Mobility Zones Fund Application Form – Final Proposal

This application is for the creation of a single Future Mobility Zone (FMZ). **One application form must be completed for the proposed zone, regardless of how many individual projects it contains.** Please include all relevant information within your completed application form.

Applicant Information

City region name: Derby – Nottingham

Bid manager name and position: Rasita Chudasama, Principal Transport Planner, Nottingham City Council

Contact telephone number: 0115 876 3938

Email address: Rasita.Chudasama@nottinghamcity.gov.uk

Postal address: Nottingham City Council
4th Floor
Loxley House
Station Street
Nottingham
NG2 3NG

Bid published at: www.transportnottingham.com

SECTION A – Name, location and description of the FMZ

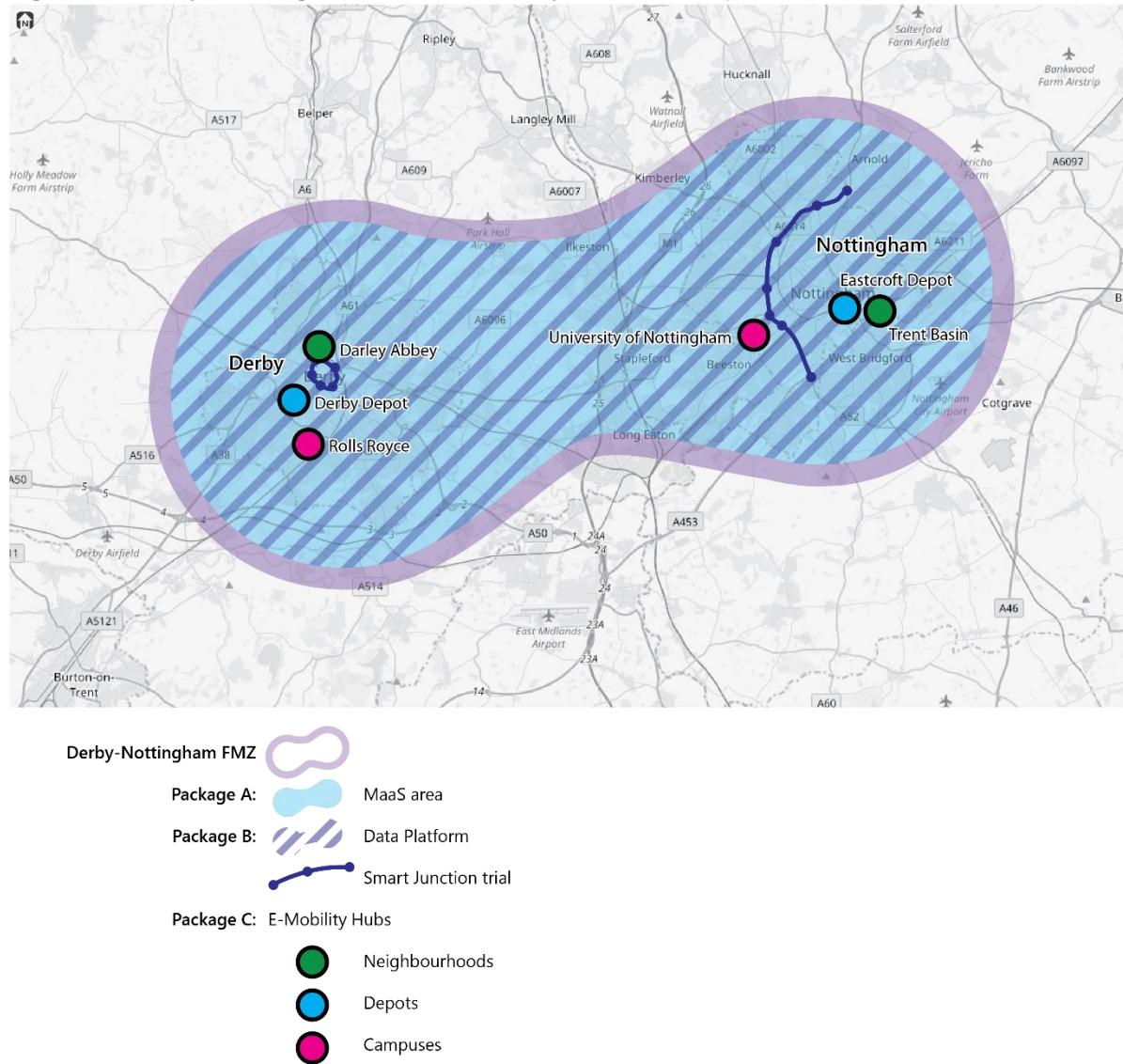
A1. FMZ name and location (if this differs from your outline proposal, please provide a map of the area in an annex):

Derby-Nottingham Future Mobility Zone (FMZ) Scheme

Our FMZ scheme will cover the areas of Nottingham City and Derby City, as well as the surrounding built-up areas. It will extend an open access Mobility as a Service (MaaS) offering and a complementary data platform across the combined Travel To Work Area. The extent of this coverage will also provide an improved connection between the cities by enhancing the consistency of the transport offer, and linking a network of flagship electric mobility hubs at key locations across the Derby and Nottingham area.

A map of the intervention area, setting out the locations of the scheme and projects, is included in Figure 1 below.

Figure 1. Derby-Nottingham future mobility scheme map area



A2. FMZ description

Our scheme builds on our Transforming Cities Fund schemes, knitting them together to pilot innovative approaches to enhancing mobility. This builds on our reputation as a national leader for integrated transport planning and delivery, and position at the forefront of electric mobility and integrated ticketing.

Two FMZ projects (1: Open access MaaS platform and 2: Data platform) will benefit the whole 1,600 Km² area. They will augment and enhance existing mobility services that cover Amber Valley, Ashfield, Broxtowe, Derby, Erewash, Gedling, Nottingham, Rushcliffe, and South Derbyshire local authority areas. These projects seek to integrate information and payment options to support uptake of new and existing mobility services. Uniquely, Derby and Nottingham City Councils will act as coordinators, building on existing multi-operator fare products and fulfilling a ‘trusted data-owner’ role. The MaaS platform’s phased implementation will enable people to learn more about current mobility habits and spending - increasing their awareness and knowledge of MaaS benefits, whilst enabling a growing partnership of mobility service providers to tailor account-based payment and subscription offers that meet individuals’ needs. The aim is to encourage wider uptake of public transport, bike hire, car club, electric vehicle (EV) charging, and other services.

Project 3 will develop and pilot dedicated E-mobility hubs to exploit our rapid rollout of EV charging and Ultra Low Emission Vehicle (ULEV) support services – building on Go Ultra Low City investments completing in spring 2020. Physical hubs will be trialled across local Enterprise Zones and employment growth sites, business parks, university campuses, residential communities, and at council vehicle depots; informed by successful behaviour change learning from our Local Sustainable Transport Fund and Access Fund programmes. As with Projects 1 and 2, the aim will be to develop a set of blueprints from which most successful elements can be replicated elsewhere and act as exportable demonstrators.

SECTION B – The Strategic Case

B1. Background - What are the zone's objectives

The Derby-Nottingham FMZ scheme objectives are:

1. Provide a “customer first” experience using new technologies to facilitate seamless travel

The Midlands Engine identifies Derby-Nottingham as a priority area. It attracts global businesses, with employment growth hubs emerging between the cities driving ~50,000 new homes. Yet, existing mobility services focus on Derby and Nottingham. Our scheme will benefit end-users through improved payment options, virtual transport service integration, and real time insight across the wider Travel To Work Areas.

2. Improve equality of access to transport for lower income and key target groups

Unemployment rates range from 5.7%-0.2% with correlation between higher unemployment areas and fragmented fare/payment systems. Many Nottingham residents do not own or have access to a car (0.76/person), while Derby's higher car ownership (1.06/person) contributes to less public transport use. Significant student numbers also contrast with ageing populations. We will target communities where incomes, mobility and access to opportunities are limited.

3. Deliver clean, green transport network to support air quality and carbon neutral objectives

Both cities have areas exceeding European air quality limits for Nitrogen Dioxide (NOx). Targeted E-mobility hubs and increased use of active/low emission transport will tackle this; building on the Go Ultra Low legacy of electric vehicle initiatives and carbon neutral ambitions, in addition to Derby's prominence in manufacturing.

4. Support the local economy and business by reducing congestion and improving accessibility leading to increased productivity and lower production costs

The workday population is 1.4 million, generating 425,000 daily commutes - forecast to increase by 2033 (+11%), with 55% of trips into/out of Derby and Nottingham. Reducing associated traffic congestion will limit the East Midlands economy's annual £825m cost of lost productivity.

5. Facilitate innovation and investment in new mobility marketplaces, in particular support local industry and academia through new skills and employment opportunities

Increasing supporting services (data) and the sustainable transport customer base stimulates the mobility marketplace and regional innovation. Testing emerging mobility technologies and innovations enables assessment of how they can be delivered to complement existing services while supporting local industries, securing inward investment and developing capacity/skills in an emerging market aligned with our emerging Local Industrial Strategy.

B2. Strategic Case - What does the FMZ contribute to the programme objectives?

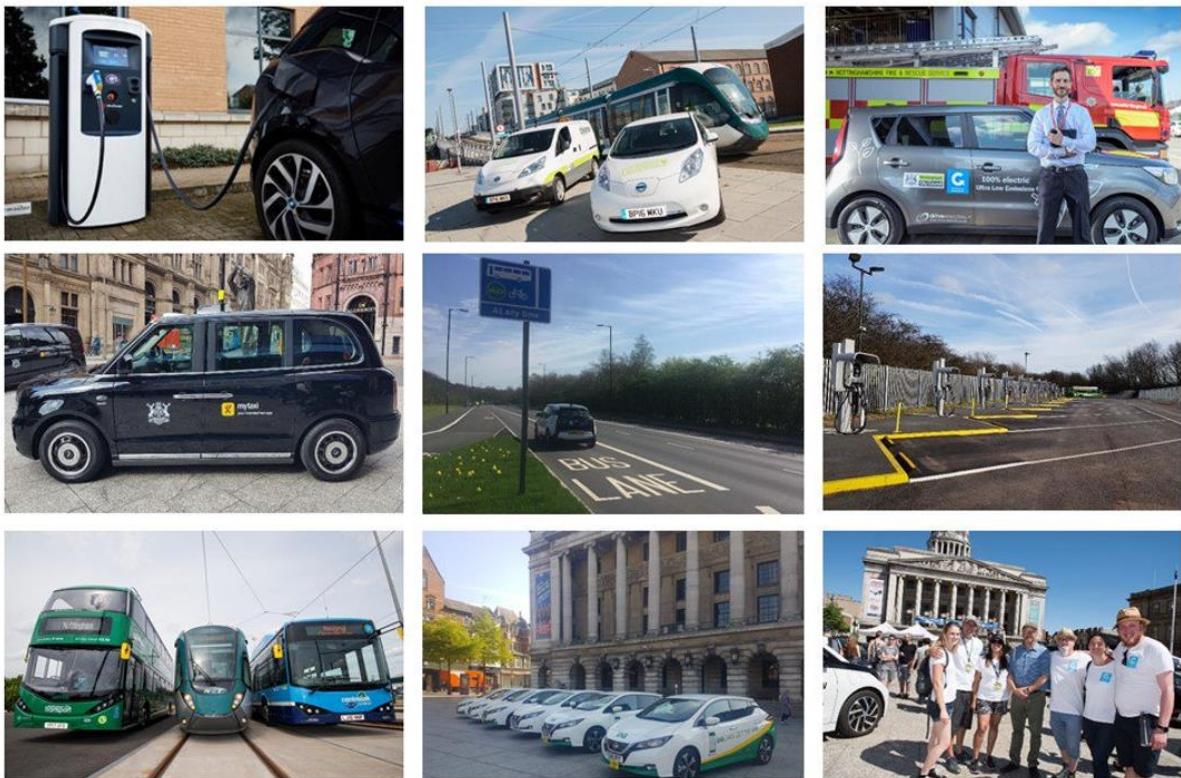
Introducing the Derby-Nottingham FMZ scheme

The area has a longstanding reputation for integrated transport delivery ranging from the implementation of trams, electric buses, integrated ticketing, car clubs, comprehensive business support programmes, alongside the promotion of walking and cycling linked to our travel behaviour change measures. More recently, the area has turned its attention to ULEVs to improve air quality.

Since 2016, the area has been designated one of the Office for Low Emission Vehicles Go Ultra Low Cities with a £6.1m investment in a range of innovative measures to encourage the take up of ULEVs to improve local air quality. Part of the role of our Go Ultra Low City status has been to be an exemplar in ULEV technology innovation and delivery. This resulted in our projects consistently featuring in national strategies, plans and referenced as examples of best practice. This culminated in the Go Ultra Low Programme Manager being invited to attend a BEIS Select Committee on the experiences of EV charging infrastructure deployment in 2018. The area has hosted numerous events and conferences attracting hundreds of national and international delegates whilst supporting our local business community to make the switch to ULEV technologies. Through community engagement, a local EV Drivers Club has been created by (130 and growing) willing volunteers to support the scheme objectives and further the cause. The momentum is building.

Given our leading position in this space and the government's Road to Zero ambitions, we have focussed our FMZ scheme heavily on facilitating the use of ULEVs and associated electric technologies and innovations as a key 'version' of future mobility.

Image 1: Go Ultra Low programme successes

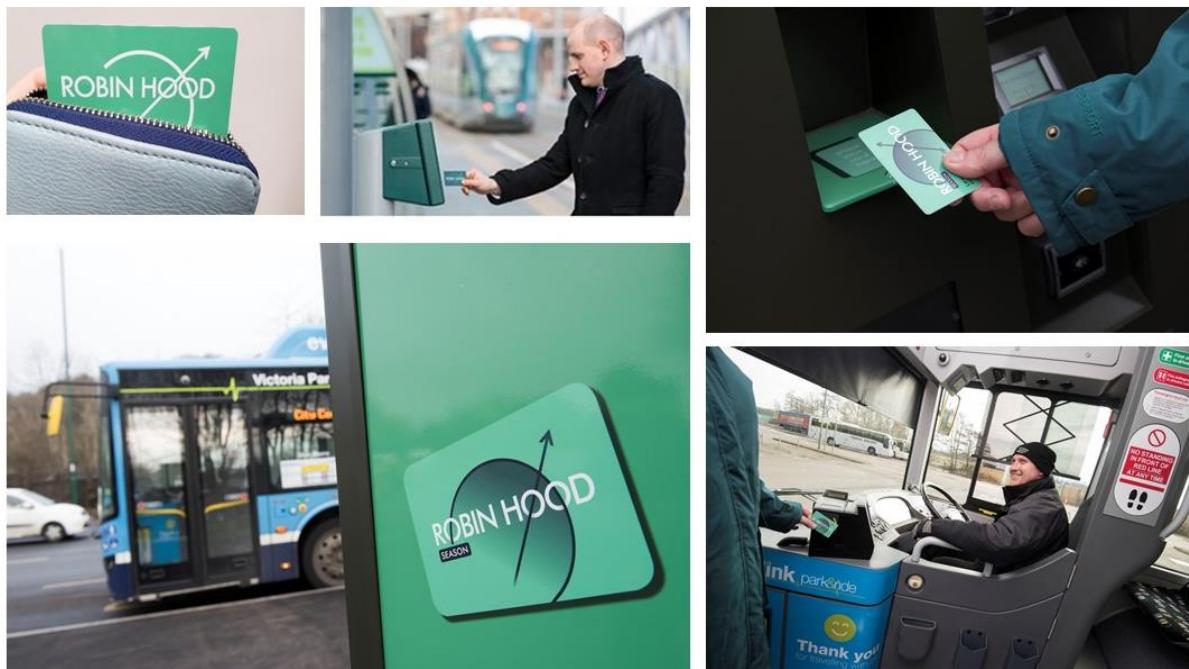


Our success in e-mobility is complemented by a history of innovation in smart public transport ticketing and digital information and will form the cornerstone of our MaaS platform. The delivery of the Robin Hood Card, one of the first smart tickets outside of London, with complex multi-operating fare capping will soon be available through mobile devices via Host Card Emulation. Nottingham contactless, which will also provide complex multi-operator fare capping across Bus and Tram will be delivered in March 2020, providing the next leap forward in simple and accessible payment across public transport locally.

Our digital public transport information estate and back-office systems continue to evolve with powerful new display hardware currently being installed on-street at key interchange points which will heighten the passenger experience by providing increasingly accurate scheduling and disruption information. Richer, more detailed information will be disseminated across a wider array of digital platforms including the new MaaS platform and extensive traffic light priority for late running buses across the region.

Nottingham City Council administers digital public transport information for the entire Nottinghamshire and Derbyshire region, alongside Nottingham's Robin Hood Card. With the existing bus partnership and commercial governance structures in place, the key agreements can be easily expanded to include any new MaaS platform across both ticketing and information. This MaaS "readiness" in public transport in both digital information and ticketing provides the authority with a significant head start, with learning and experience that will be applied to the other mobility sectors that we aim to incorporate into our MaaS offer. This will also offer the template and transferability to Derby, who will follow in our footsteps.

Image 2. Nottingham's integrated ticketing successes



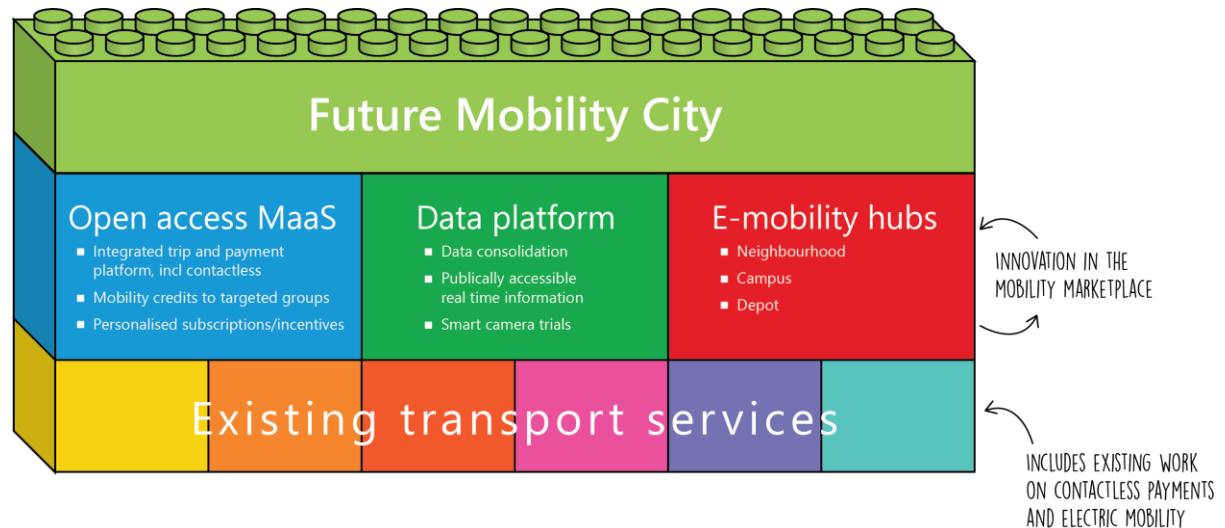
Our core concept incorporates three projects, which work together as building blocks that will deepen the extent of integration across the area's existing transport offer. In summary, these packages comprise:

- 1: Open access MaaS platform** – breaking down the barriers to entry and ensuring an integrated network that provides mobility for everyone.

2: Future mobility data platform – pooling, standardising, and sharing transport data to benefit the councils, operators, businesses and public.

3: E-mobility hubs – enabling users to have access to a combination of transport services; helping interlink sustainable transport provision, and encourage the uptake of alternative travel methods with an emphasis on e-mobility and innovation.

Figure 2. Future mobility scheme building blocks



With all the systems in place, we anticipate the area will be better placed to determine the extent to which innovative and emerging mobility technologies that are sustainable in nature, and support the existing low-emission mobility options available across the local area, can accelerate our delivery of the objectives set out in B1.

The Mobility Marketplace

The [Robin Hood](#) network smart payment card has been in operation in Nottingham since 2015, helping the population travel in a more seamless way, but also helping support transport innovation by overcoming significant commercial barriers to multi-operator travel in a deregulated market. Nottingham has also been supporting the ULEV technology market through its work with OLEV. By increasing its relationship to Derby through the FMZ (and Transforming Cities Fund (TCF)) these lessons can be applied to a wider area, increasing the benefit to the mobility marketplace.

We will broaden the customer base for sustainable transport through the scheme projects; helping to increase the take up of innovative modes linked to its MaaS platform, supporting network coordination and journey planning with a fit-for-purpose data hub, and establishing new physical locations from which to access these services in the form of E-Mobility hubs. We will work with other successful FMZ areas; either collaborating on similar approaches or by sharing lessons learned on different approaches to optimise future iterations.

In addition to this technological expansion, the scheme will attract inward investment opportunities and increase skills through work placements and research opportunities, such as through a Knowledge Transfer Partnership with the University of Nottingham. New business models will be considered and supported as both councils begin to partner with the private sector in new ways.

Recognising the innovative nature of our proposals, our scheme will seek to consider six overarching research questions:

- 1. Can public policy led MaaS achieve greater uptake of greener transport services? –** as outlined in the strategic case the MaaS developed as part of the FMZ scheme will be publicly led, unlike other applications of MaaS, in the West Midlands for example. As this is a unique feature of the package it will require a thorough evaluation.
- 2. How does the future mobility package make electric mobility more accessible?** A key theme of the FMZ scheme is to electrify the transport system.
- 3. How do different parts of a multi-centred region respond to different Future Mobility Zone interventions?** The area covers two medium sized cities with different transport provision and differing economies and also multiple subsidiary centres of economic activity. This provides an important opportunity to learn how FMZ interventions act differently in different settings. Understanding this will increase the transferability of the approach.
- 4. How effective is new technology in delivering the benefits of the Future Mobility scheme?** Testing new transport technologies is inherent in the FMZ fund's objectives and for the FMZ scheme specifically.
- 5. How effective is the Future Mobility Zone scheme approach in constraining congestion?** As a key cost to the economies in urban areas across the world it is important to understand how a FMZ scheme can contribute to mitigating this problem.
- 6. How effective is the Future Mobility Zone approach in enhancing the local economy?** Supporting economic growth is a key objective for both Derby and Nottingham City Councils, the FMZ fund and the FMZ scheme.

These questions were selected with academic support and insight, reflecting our practically focused desire to explore how innovative projects have an impact on the mobility options that people choose, with specific focus on electric and sustainable travel modes. They align with DfT's FMZ objectives, as well as our local objectives, and investigate how people respond to new transport services so as to fill current knowledge gaps around future mobility options.

Our proposed projects are detailed in the following sections.

Project 1: Open access MaaS platform

Introduction

The MaaS concept has been discussed and debated in the transport sector for a number of years, with the largest steps towards an effective offer coming from the private sector, e.g. MaaS Global's Whim concept (trialed in the West Midlands in partnership with Transport for the West Midlands). However, MaaS is yet to make the revolutionary impact that has been predicted by some commentators. The MaaS offering we are proposing in Project 1 seeks to break down some of the barriers to entry that existing schemes have suffered from, namely the cost barrier of subscriptions and a lack of awareness and understanding of the concept by the general public (which has resulted in low take-up).

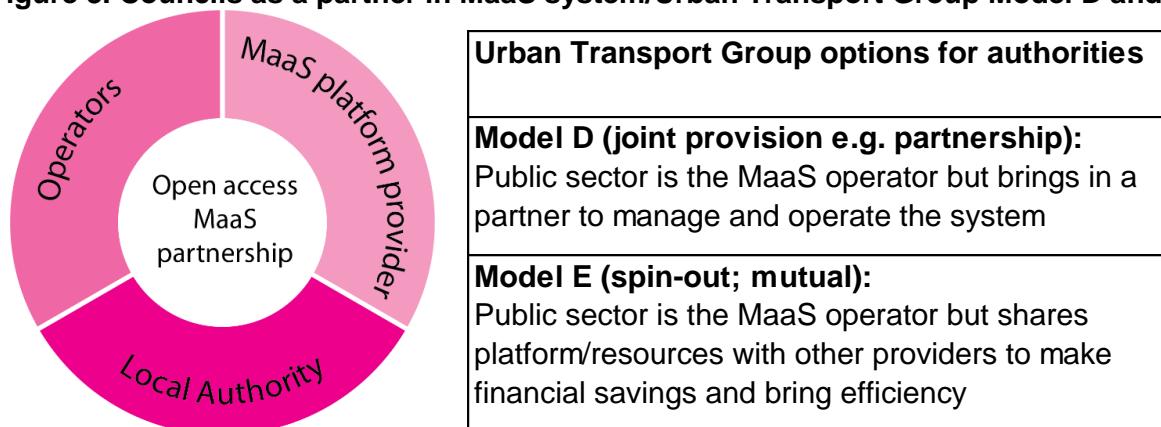
Logic map 4.1, found in **Appendix B**, illustrates our rationale behind the delivery of this new model of MaaS. We are looking to reduce car dependency, and increase the visibility of alternative travel options, to encourage the take up of active travel, public transport, and electric mobility. We envisage MaaS will help achieve these outcomes, and address the FMZ objectives relating to testing new technology, improving access to digital planning, and integrating transport services.

Challenges and opportunities

MaaS systems led by the private sector create a potential inherent risk to the mobility of the general population. By its nature, the private sector will be looking to provide mobility while also making a profit, which will lead to only popular movements or choices being catered for. This exists in the current public transport market (with the public sector assisting through subsidies to provide mobility on non-profitable routes), however the impact can be greater when we consider MaaS, as it is not only part of a network, but potentially the full mobility network of a city/region. In this context, we believe there is a risk that totally private sector-led MaaS offerings may fuel the creation of 'new mobility monopolies' or 'walled gardens' that result in sub-optimal long-term sustainability outcomes (e.g. in respect of transport emissions, impacts on air quality and localised traffic congestion). This could outweigh the value of gains that can potentially be achieved through the aggregation of trips across multiple users.

Our vision is for the Derby-Nottingham area to establish a new MaaS business model by putting public sector authorities in a leading role to facilitate integrated information and payment services. This will ensure the overall inclusivity, interoperability, openness, affordability and sustainability of the MaaS platform – thereby maximising the potential benefits of MaaS for the people who live and work in the area. This approach also leaves the marketplace open for innovation from smaller companies, as they would not be seen as potential rivals to the operator.

Figure 3. Councils as a partner in MaaS system/Urban Transport Group Model D and E



The recently released '[MaaS Movement](#)' paper by the Urban Transport Group, refers to six potential models for MaaS that transport authorities could pursue, depending on what level of involvement they desire. These models range from the public sector having full control, to the private sector having full control. Our proposal is for the MaaS system to be similar to Model D and E referred to in the paper, where the focus is on partnership with the private sector, but the authority maintaining enough of a stake in the operation to be a key player.

Our analysis of the MaaS marketplace and supporting technologies has been informed by existing papers, first hand experiences, and direct contact with existing providers (see Section F). This has led us to understand that the MaaS offering can be simplified into offering two things (or a combination of both): simplified payment through a single transaction (which could be contactless payments), and journey planning. Journey planning is dominated by companies such as Google and Citymapper, who have invested heavily in the development of their platforms, and have seen a great deal of success – if this is measured by individual users. Rather than trying to take on these existing players in journey planning, we plan to use our strengths in ticketing and payments to offer the complementary service of simplifying transactions.

We envisage the dominant user of the MaaS platform will be local citizens making journeys they (think they) know well, meaning the chances of them feeling the need to check a journey planner before making their trip is less likely. However, once they have started using the app, this will create opportunities – driven by individual's clearer insight into their travel patterns and costs – to start changing their behaviour. To date, some of the most successful mass market mobility innovations around smart fares and payment (integrating journeys) has been led by the public sector. For example, over 17 million Oyster Cards are used to travel in London in an average week (daily breakdown of Oyster Card [usage data](#), 2018). Notwithstanding the franchised regulatory environment, this has served to put Transport for London and the Greater London Authority in control of a share of fare revenues (and profits), thereby allowing for higher levels of investment in London's public transport networks and a greater degree of responsiveness to shifting travel trends (e.g. delivery of cycle superhighways in response to higher levels of cycling and road safety impacts).

Our MaaS trial will seek to demonstrate how an open access version could work in a deregulated public transport system (common to many core cities and large towns in England). It will do so in an environment where there is already effective partnership working among local public transport operators, with scope to integrate additional services (car club, public bike hire, EV charging). The data from all providers will be normalised onto the platform to allow for more than one provider for each mode; this will reflect pricing structures and availability of modes, such as bike hire, car club vehicles, or parking spaces. The mobility mix can be paid for through an account and as such will build on a stable platform of existing services and user-based accounts, which is complemented by work done to date by the local authorities on contactless public transport payments (investment in which is already being supported through Tranche 1 of the Transforming Cities Fund). Consequently, we believe that Nottingham and Derby have all the right ingredients to deliver an effective trial of the latest MaaS and data sharing innovations.

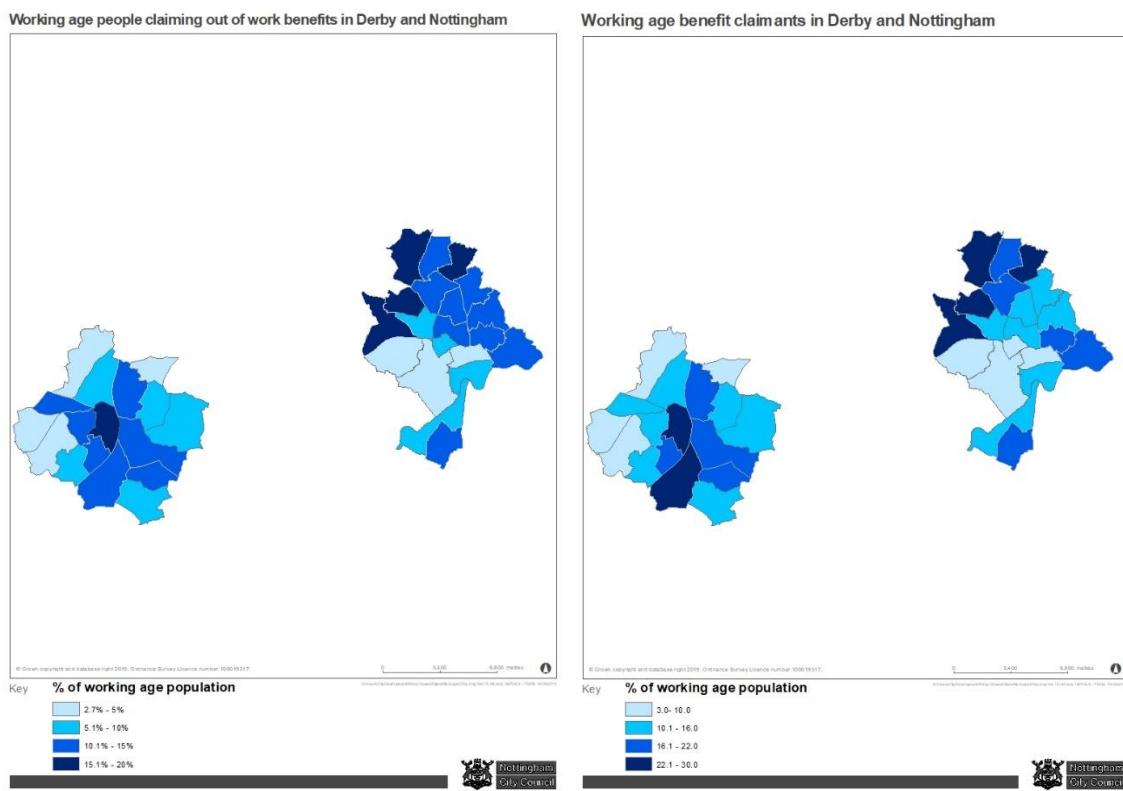
Mobility credits

There are a high number of low income households in the two cities, with 36,200 workless households (defined as households with at least one person of working age where no-one works) comprising 55,700 people across Nottingham and Derby. The five wards with the highest proportions of workless households are in Arboretum in Derby and Aspley, Bestwood, Bilborough and Bulwell wards in Nottingham (24% to 29%), as highlighted in the plan in Figure 4. In 83% of workless households (30,100 households, 45,900 people) residents are economically inactive which means they are out of work and not looking for employment, including those not working due to sickness, caring responsibilities, being a full time student etc. There are 60,800 working age adults in Derby-Nottingham on Out of Work and other DWP benefits of which 25 % (15,420 people) are claiming JSA or related Universal Credit. Young people age 16-24 years comprise 15% (2,386) of JSA (or equivalent) claimants.

It should also be noted that there is a growing gap in inequalities even for working households, between those in permanent employment and those on temporary or zero hours contracts, as evidenced by [Nottingham Trent University research Good Work Nottingham](#) which aims to improve understanding of economic insecurity in order to address the challenges facing working people.

Good Work Nottingham's findings are consistent with the growing dependence on food banks for both working and non-working families, with at least 31 food banks known to be in operation across Nottingham and Derby and a further nine in the wider D2N2 area, see Figure 5.

Figures 4 & 5. Working age people claiming out of work benefits and benefit claimants, Derby and Nottingham



In September 2019 the [Trussell Trust](#) reported that “In areas where Universal Credit has been rolled out for at least a year, food banks in the Trussell Trust’s network have seen a 30% increase in demand. In areas with the new system for at least 18 months this jumps to 40%, and increases again to 48% for food banks in areas with Universal Credit for at least two years.” In 2018-19 there were over 75,000 3-day emergency food parcels issued by Trussell Trust food banks in the East Midlands, an increase of 16% since 2017-18. 33% of people helped by Trussell Trust food banks are given referrals because their income does not cover their essential costs.

Lone parents are another vulnerable group that face particular financial and time pressures and for whom access to transport can be a barrier to accessing work and training, as well as other services that support inclusion and availability to work, such as childcare, leisure and after school activities. In Nottingham and Derby there are currently 19,500 low income lone parents (in and out of work) claiming either Housing Benefit or Universal Credit.

As these figures show, there is a high level of need in the bid area and so it will be important to identify specific target groups within the lowest income areas of each city for whom addressing financial and information barriers to transport options will have the biggest impact. For example, there are currently 284 young people 18 – 21 years registered with Nottingham City Council’s care leavers team, with an estimated 100 young people 16-18 years leaving care each year. On the basis that care leavers can come to the local authority for support up until they are 25 years of age, there is an estimated cohort of circa 2,400 care leavers aged 18-25 in Nottingham alone who could be eligible for a mobility credits package over the FMZ timeframe. This equates to up to 5,000 potential people across the scheme area. Young carers are another key group for whom access to flexible affordable travel options would provide many benefits.

Nottingham City Council's partner Action for Young Carers currently supports 300 children and young people who provide care in the Nottingham area but the true figure for the number of young carers is likely to be much higher.

How will the MaaS platform work?

The MaaS service will be based around a web and mobile phone application (app) that is delivered in three stages, commencing in Nottingham first followed by expansion into Derby:

Stage 1: Trip data linking and recording

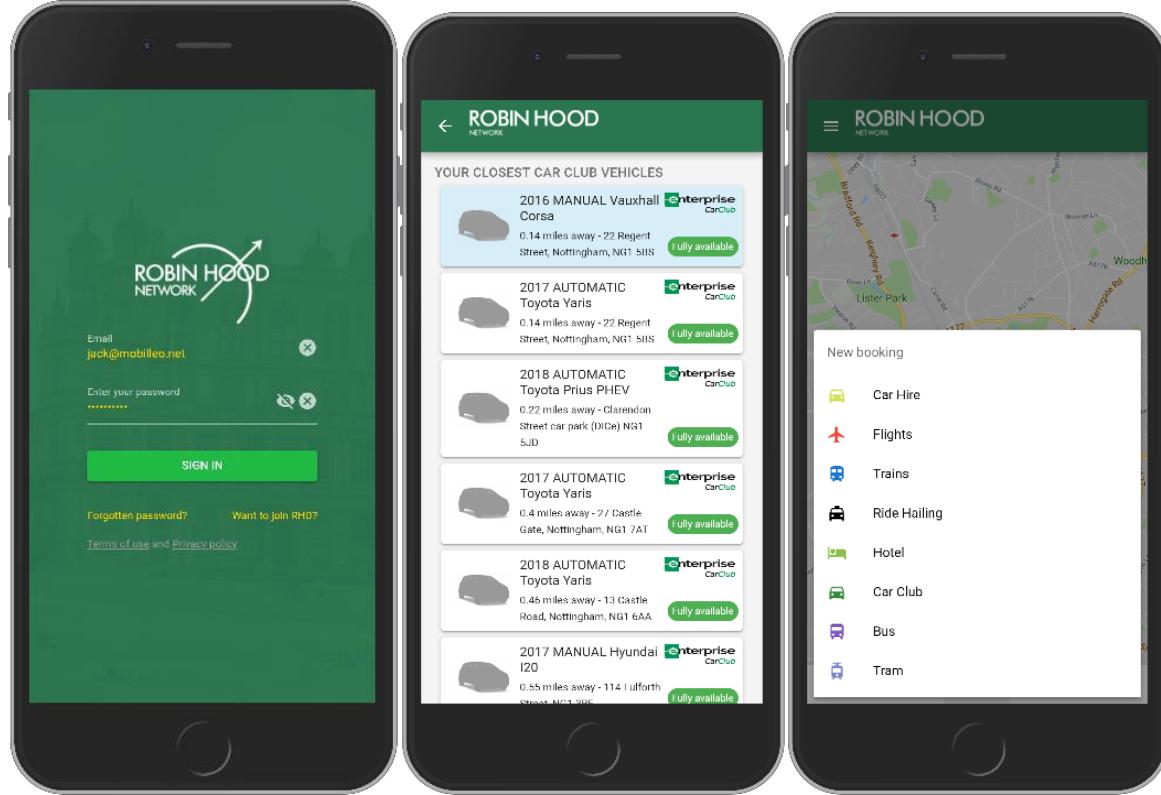
Once developed, the free app would be made available with the main purpose of recording and linking a user's spend on transport, breaking this down by mode and potentially other metrics such as trip purpose, giving the user a single place where they could track and understand the costs of travel. This is similar to the model being used by the rapidly growing [Monzo](#) bank account, which groups together spending on the account making budgeting easier. The MaaS app would be automatically linked to other transport based accounts, such as the Robin Hood Card scheme, reading in the relevant data rather than the user being required to enter it (using an API to pull in the data from all relevant sources). The app would also benefit from being linked into a user's bank account, allowing it to recognise spending on things such as petrol stations, to help complete the picture on travel based spend. This technology is used by companies such as [Quidco](#), which allows you to link your cashback account to your credit or debit card so they can recognise and track when one of the purchases you make relates to any deals they offer, then automatically applying them. This data can be shared with the user both in the app, but also through targeted emails, providing a monthly breakdown of spend, with tips on how this could become more affordable/sustainable/active.

This data, once anonymised, would also be available for the councils to use in order to better understand how the transport networks are being used to complement each other, understand gaps where modes are not being linked, and create detailed trip user profiles to start forming offers, travel bundles and incentives that can be developed in stage 2. By including services that sit on the edge of the traditional bus, rail and light rail offer in both cities (e.g. car club usage, EV charging, public bike hire) the councils and partner operators will be able to identify the nature of linked trips and those using emerging forms of mobility. The area already has a network of existing partners and providers, such as Enterprise and BP Chargemaster, which will make the process of securing the data links, which are essential to the public offering at this stage, a streamlined process (see E1 for further details of partners already committed at this stage). The data could also be used to push messages and notifications through the app that would encourage the uptake of particular modes, and which would highlight any alternative travel options that the user might not have already thought about and can consider for future journeys. These messages could be tailored to the individual, based on the data about their existing travel patterns and which modes they are already using. For example, "you've paid for parking today, but have you considered using a cheaper bus service for this trip next time around?"

Enterprise is an existing partner to Nottingham City Council, providing car club services. As part of our scoping of the MaaS service we have liaised about their [Mobilleo](#) platform; an existing white label tool which would allow the product to reach the market as a quick win and reduce some delivery risks. Using this, or a similar existing platform, would also make it easier to collaborate with other FMZs looking to implement MaaS, potentially providing a greater opportunity to succeed in the MaaS sector where all others have currently come up short. This collaboration would also facilitate wider learning and sharing of outcomes between FMZs, and better understand any knowledge gaps and the best approach to delivering MaaS.

Image 5 is an example of how the Mobilleo platform could appear for the Nottingham area:

Image 5. Example MaaS platform visual based on the Robin Hood brand



Stage 2: Payment, incentives and mobility credits

The second stage of development will introduce in-app payment functionality, allowing fares to be paid for specific trips and providing pre-journey cost estimates. This stage would also include the expansion of contactless payments across sustainable and active modes facilitating a pay as you go (PAYG) ability thus reducing barriers to entry. This builds on existing work Nottingham City Council is undertaking (part-funded through previous National Productivity Investment Fund and Transforming Cities Fund investments), which plans to install contactless payment into all bus and tram vehicles by March 2020. This is a good way of bringing in services that are not already contactless such as bike hire, car clubs, and electric vehicle charging (currently only rapid chargers have contactless functionality). Ideally this will include the ability to pay for the full end-to-end journey in a single purchase, including the first and last mile solutions offered through the platform. Those operators whom are involved with the MaaS platform would pass back their payment data so there is a log of what people have spent money on for different services, with their registered bankcard.

Robin Hood on mobile (public transport smart ticket emulation on mobile devices) could be integrated with the MaaS platform, and the same could apply to an equivalent in Derby, to ensure these payments are linked with the scheme. The ability to pay through the app will also introduce the capability to offer users discounts on trips. Further discussion is needed with operators, but it could drive-up patronage on targeted modes or journeys, and establish scope to offer rewards for using connecting modes – such as bus and bike share – in place of private car trips. Since this will be in the control of the local councils, we can work with mobility service operators to target specific objectives, such as encouraging people who live/work in areas with poor air quality to reduce their car use in favour of low-emission alternatives. Furthermore, the offers available could differ depending on the area in which the user is travelling, since Derby and Nottingham have some differences in their markets (e.g. the tram).

The app would have the ability to display information on journey options and enable users to filter their preferences, allowing them to make informed choices based on price, speed and

mode, potentially learning through these choices over time to offer more tailored suggestions for the specific user. This would also help increase the equality of access to transport services as those with mobility impairments can use the app to suit their needs.

Controlling the payment for mobility through a single platform provides an ideal opportunity to target specific groups, to influence how they travel, but also to increase the ability to travel. Discounts will be made available to people to increase their personal mobility and social inclusion. These targeted mobility credits will be aimed at low income groups with 'low travel horizons,' such as jobseekers, apprentices, young carers, care leavers, single parent families, and families reliant on food banks in order to link people to new employment, training and other opportunities and services that support inclusion and availability to work.

Work has commenced with local networks such as the Nottingham Financial Resilience Partnership, as well as adult services and employment support agencies to identify the right groups for piloting our approach to mobility credits. The best ways of working with those cohorts to improve understanding of their specific travel needs and barriers, in order to develop appropriate and accessible mobility credit packages is also being explored.

Credits to existing and emerging mobility services (e.g. ebikes and escooters) can be offered through the MaaS platform. Support packages will be provided as part of a structured Personalised Travel Planning offer to targeted individuals, building on the expertise developed through the jobseeker travel support offer under the ESF Youth Employment Initiative and Access Fund programmes ('NottinghamGets2Work' and Sustrans' 'Access' projects).

On a broader note, mobility credits offered through the MaaS platform also offer potential to support local businesses eager to encourage their staff to try, and adopt, more sustainable ways of travelling to work. Alongside the MaaS platform and mobility credits, we anticipate offering a series of mobility experiences across the full spectrum of services. This will involve a mix of personalised trials and try-out sessions to debunk myths, remove barriers to take up, and create confidence and trust in the modes of transport, building on our learning from the Go Ultra Low funded ULEV experiences offered to businesses and the public.

Stage 3: Subscriptions and Direct Debit

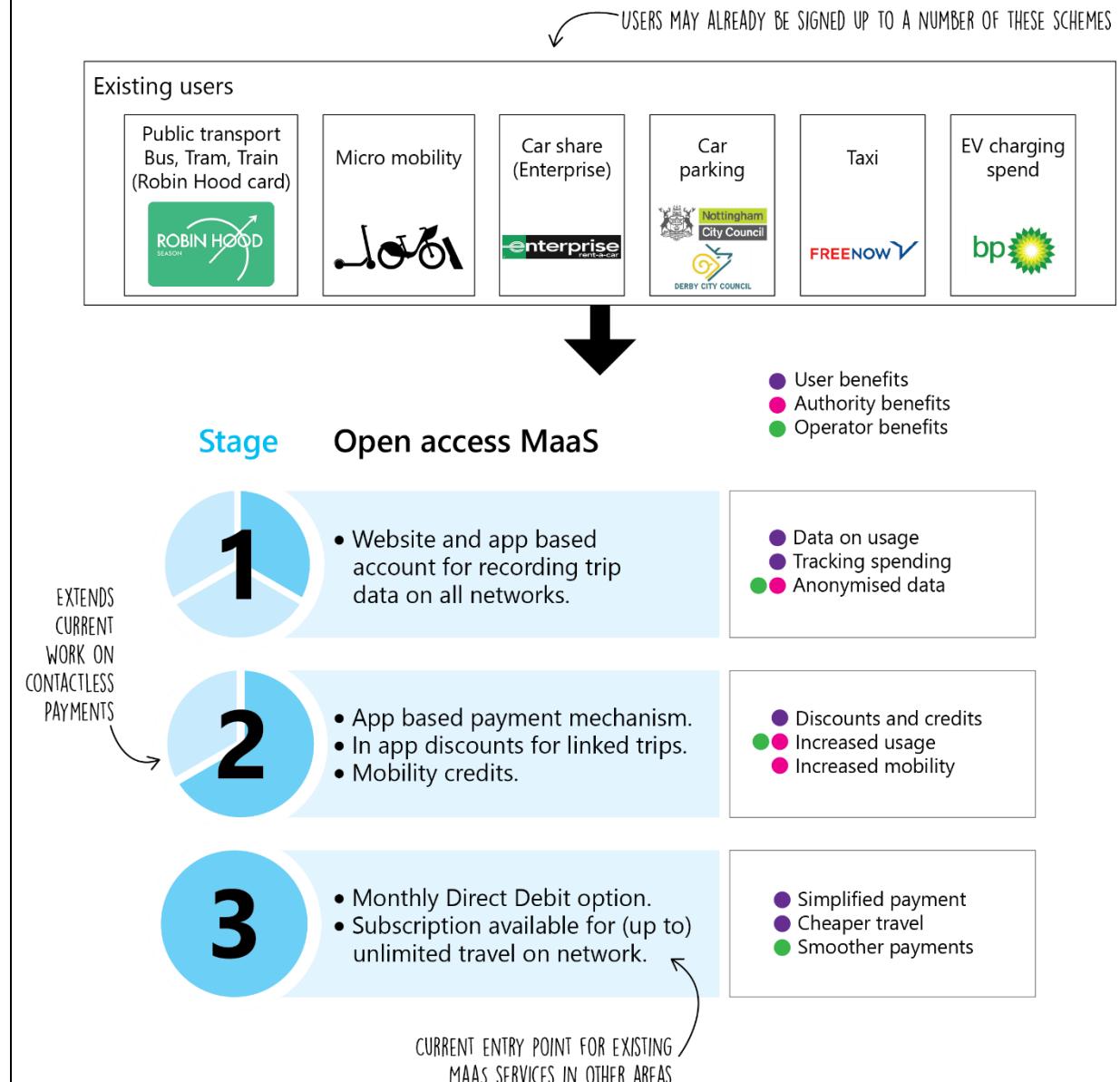
The final stage of development would establish scope for more refined payment options. These could include tailored pre-paid packages of mobility aimed at people's typical monthly work/leisure trips (e.g. XX days of commute, and XX days of leisure trips to specific/open destinations) or a PAYG option offering the ability to pay for a month's transport spending in one go (e.g. by Direct Debit at the end of the week/month). Prepaid options could allow people who are unbanked to pre-pay for their regular journeys by loading-up their account on a micro-payment basis and/or taking advantage of mobility credits issued by the councils, rather than rely on having cash on a given day. This approach could further accelerate the transition towards a cashless on-board public transport system in Derby-Nottingham.

This type of subscription-based offer is where most existing MaaS offerings have initially entered the market – only offering a few options on subscription levels with little tailoring to meet individual's personal requirements. This appears to have been a key barrier to entry for the public, who may end up making a saving on their monthly travel spending – but only if they travel more than they currently choose to. This is not clear, and requires people to have a clear understanding of their existing spending patterns, which many do not. Previous research with jobseekers in Nottingham has shown that people on lower incomes, or in marginal employment roles, will typically pay for their journeys in cash on a daily or weekly basis, and are unprepared/unable to commit to significant (e.g. hundreds of pounds per month) expenditure in a single transaction. Instead many prefer to PAYG with single or return fares and cash payments.

By taking users through the earlier stages of the MaaS platform our hypothesis is that this barrier can be eroded by the greater insight an individual gains into their regular mobility spending. The subscription packages offered can also be highly tailored to the user, as they will already have a trip profile which has been recorded by the app.

Another option will be to adopt a monthly Direct Debit payment, but based on a PAYG model, where each trip is at the standard rate, but only paid for as a single payment at the end of the month. This account-based model will be beneficial to operators and users, as the payments they receive will be fewer large payments, rather than a greater number of smaller ones, potentially reducing admin and transaction processing charges. Tailored discounts could be offered to people who PAYG and spend over a defined threshold to incentivise their continued use of lower-emission mobility services, and include offers to incentivise other complementary travel options such as free cycle repairs or discounts for cycle commuter insurance. These might be coupled with personalised messages (such as those sent to users of smart domestic heating thermostats) that highlight the potential for alternative mobility packages to save them money or have a positive impact on transport-related emissions and local air quality.

Figure 6. Open access MaaS platform diagram



Coverage

Table 1 shows all transport services that are intended to be included as part of the MaaS offer, highlighting which are already in place to be offered at system launch. This will increase as more partners confirm they are on board through the project inception phase.

Table 1. Range of MaaS transport services

	Bus: Multi operator fare products	Bus: Single operator fare products	Rail	Bike hire (inc ebike)	Taxi (Free Now)	Private hire	Parking: Public on street	Parking: public off street	Parking: private off street	Car Club	E-charging payment / fuel	Cycle parking (secure facilities)	Offers / events	Bus: dial a ride / DRT	Mobility credits
Nottingham															
Derby															
Wider metro area															

Research questions

There are several project-specific research questions that the scheme will explore with relation to the MaaS platform, which will address two of the overarching package level research questions:

Can public policy-led MaaS achieve wider uptake of sustainable transport services?

1. What is the take up of MaaS over time and which socio-economic groups are more/less likely to engage?
2. What is the most effective way to market MaaS to maximise take up?
3. How effective is MaaS in eliciting modal shift away from ICE powered private cars?
4. To what extent does MaaS encourage the uptake of active travel including ebikes?
5. What are the most effective ways of working with target low income groups?
6. How does the provision of mobility credits influence travel patterns in target groups and how does this differ across the groups?
7. To what extent does the provision of mobility credits improve access to employment for target groups?
8. What are the beneficial elements of publicly lead MaaS that would not be possible using commercial MaaS products?

How do different parts of a multi-centred region respond to the various scheme interventions?

1. How does the effectiveness of MaaS with regards to meeting the scheme objectives vary across the diverse multi-centred city region comprising the scheme area?
2. How does MaaS impact on Mass transit and public transport ridership in a medium sized city?

How effective is the Future Mobility Zone approach in constraining congestion?

1. How effective is MaaS in eliciting modal shift away from ICE powered private cars?

The research focus is not primarily on the technologies themselves, but rather the impact they may have on different user groups, and how well they ‘fit’ with existing transport systems across the scheme area. The questions also explore whether MaaS can operate within different diverse contexts that are found in Derby and Nottingham, as it will provide a testbed that should cover most scenarios where the approach is likely to be applied in the future. The research behind MaaS would help solve many of the unknowns around making it successful, which would therefore address knowledge gaps and help shape future delivery.

For full details on how MaaS will be evaluated, please refer to section E4 and the Evaluation Plan in **Appendix B**.

Project 2: Future mobility data platform

Introduction

The second project seeks to develop a data platform for pooling and standardising transport data that is owned and collected by the councils, as well as that which will be generated by the MaaS platform, making all of the above available to Open Source platforms via a suite of machine-readable APIs and associated formats. This is key to building future mobility services that are digitally integrated with each other, as well as existing transport networks.

Logic Map 4.2, **Appendix B**, sets out our rationale for choosing to develop a data platform. The scheme objectives we seek to address through the data platform focus upon improving the integration of transport services and access to data collected and processed in real-time. Collation and storage of such data will help both councils make decisions about managing local highway and transport networks – potentially optimising them to ease congestion and accelerate public transport services. The same datasets can also be stored and analysed for longer-term decision making regarding new routes or infrastructure investments. Finally, making the data publicly available will also enable third parties to develop new/expand existing tools that help individuals to make better-informed travel choices for their everyday journeys.

Challenges and opportunities

The flow of data will enable all future transport provision to be optimised, however there will be challenges in developing common formats and standardisation, therefore we would seek to work with the BSI, and other FMZ winners, to further build the data landscape.

Development work for the data platform is already underway. A number of existing projects in both cities are already collecting useful data (e.g. Let’s Keep Nottingham Moving and Derby Connected), and there is an existing pilot project taking place in Nottingham - which is being undertaken in partnership with the University of Nottingham, called the Smart Nottingham Real Time Data Trial (SNRTTD).

The SNRTTD will collect real time traffic count and journey time data in the west of Nottingham using cameras (provided by Vivacity Labs Ltd) and will also utilise floating journey time data from the Ancoris (Google) platform. This will be combined with existing real-time data sources for public transport journeys and departure times to provide a complete travel picture across a network centred on the university’s main campus. This data will then be supplied to students and staff at the university via screens located on site, a website and an app. The impact of this on travel behaviour will then be evaluated with objectives of influencing mode shift away from commuting by car and optimising the operating efficiency of the transport network through an improved customer experience by provision of better, more accessible, travel information.

The data platform intends to expand out this project, increasing both the number of data feeds it is receiving, and the geographic coverage of the camera trial. The overarching aim being to increase the efficiencies in the transport network and therefore enhance customer journey experiences. The councils can interpret the data, as they will own it, and can potentially manage the entire network to relieve congestion on certain arms and junctions.

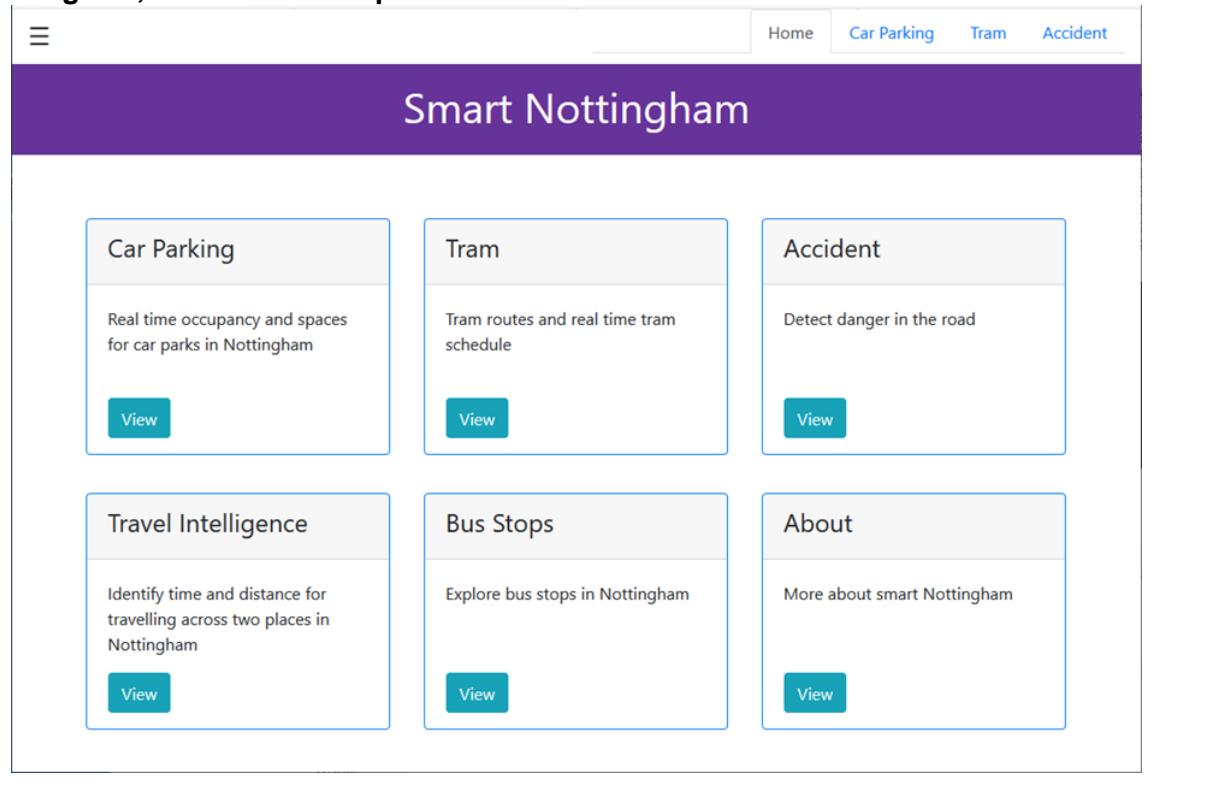
Nottingham City Council has invested in a Parksmart system providing car park occupancy information signs for city centre car parks at key locations on the inbound roads. Other parking information (pricing and locations) is currently held separately on websites and third party websites e.g. Parkopedia.

With Nottingham having a head start on this platform, the intention is for the lessons learnt to be passed on to Derby, mirroring the approach, but tailoring it to the providers in its area. Both areas would be fed by the data collected in the MaaS platform.

How can we use the data platform?

Rather than having data sitting in different parts of the councils websites as it is currently, the data platform will bring all sources of data together and will provide a 'location' in both Derby and Nottingham where this data pooling can take place, and then be fed back out. The data will be openly available in an easy-to-use and customer-friendly format for the public, academic research and developers. The platform will expand on what is already available to the public, such as the location of car parks, by providing greater intelligence that will inform transport choices. Investment in new sensors and cameras will help to expand the level of parking intelligence the councils have and via the use of real-time occupancy information Variable Message Signing (VMS) could be used to communicate to motorists the nearest available parking locations to help improve their experience and improve network efficiency. Furthermore, the information that is collected for the MaaS project will feed into the data platform. The images below illustrate how we envisage the web-based, public-facing data platform could appear.

Image 10, 11 and 12. Data platform visuals



The image shows a wireframe of a web-based data platform interface titled "Smart Nottingham". The top navigation bar includes a menu icon, links for "Home", "Car Parking", "Tram", and "Accident", and a search bar. Below the header, there are six cards arranged in a 2x3 grid, each with a "View" button:

- Car Parking:** Real time occupancy and spaces for car parks in Nottingham.
- Tram:** Tram routes and real time tram schedule.
- Accident:** Detect danger in the road.
- Travel Intelligence:** Identify time and distance for travelling across two places in Nottingham.
- Bus Stops:** Explore bus stops in Nottingham.
- About:** More about smart Nottingham.

This screenshot shows a map of a city area with several bus stops marked by blue icons. Information boxes for four stops are visible:

- Stop code: FO14 Stop name: Frogmore Street
- Stop code: F001 Stop name: Woodborough Road
- Stop code: MA31 Stop name: Huntingdon Street
- Stop code: MA03 Stop name: Huntingdon Street

This screenshot shows a map of Nottingham with parking information overlaid. A callout box for Upper Parliament Street Car Park indicates:

- Parking occupancy: 4.0%
- Current available spaces: 212

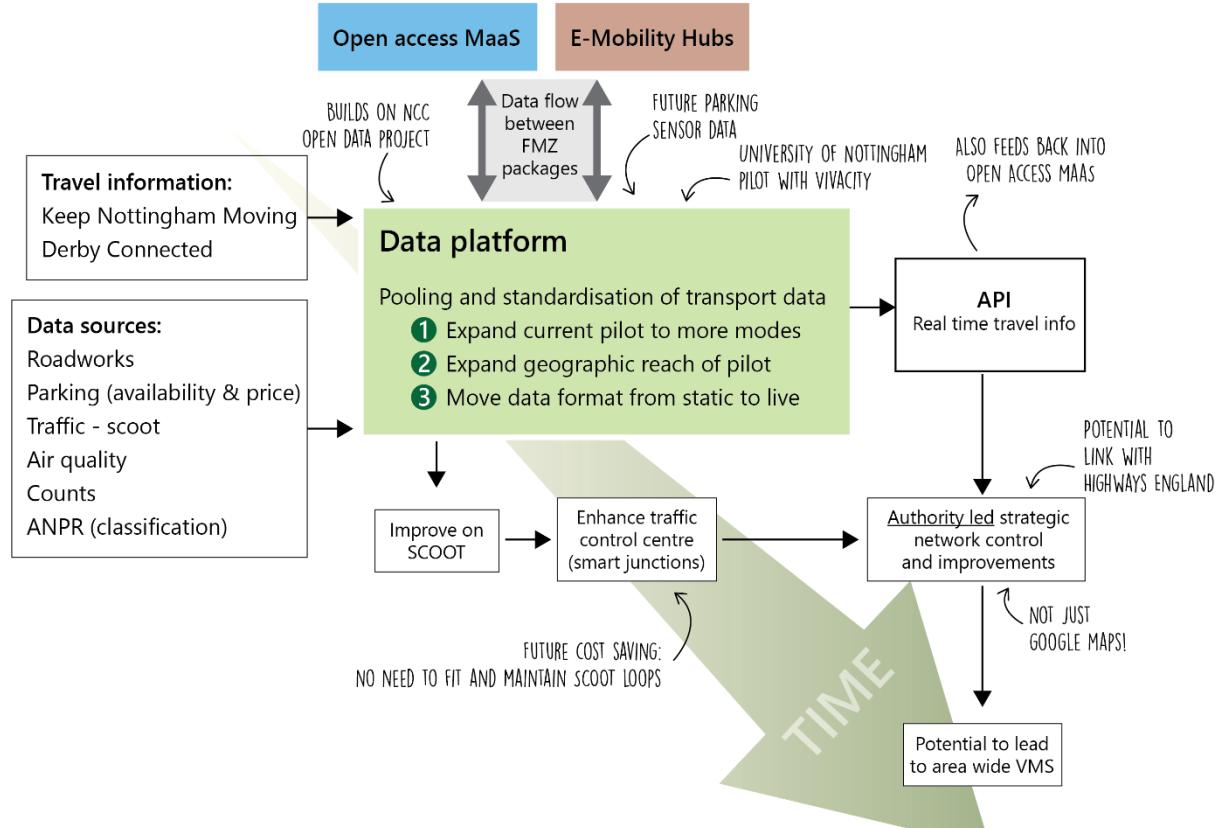
Having full control of the anonymised data pooled by the data platform will enable the councils to be wholly responsible for maintaining data privacy and ensuring the information collected helps to keep the transport network in both cities moving.

The large pool of data from the platform will be used to enhance the performance of one of Nottingham's Urban Traffic Control (UTC) SCOOT regions (initially on the A6005 route) to improve journey times through a number of junctions via the UTC and to develop the concept of smart junctions. Over time this could lead to efficiency improvements in the operation of all junctions in the reach of the control centre, and provide the information required to develop area wide VMS. This would give the local authorities a way to control traffic flows when incidents occur, rather than solely relying on Google maps (and other similar providers) to provide individuals with route options, which may not align with how traffic en-masse should best be moved.

There is also a desire to link the data platform with Highways England to collect information on the wider network. The M1, A52 and the A453 are key routes within the scheme area, and therefore it is desirable to collate data on any congestion issues along these roads that could affect the way people move in and through the area. This would be another way in which the customer experience is enhanced to help with the movement of people and traffic.

By making the pooled data available openly and in standardised formats, this will also attract developments from private companies and academic establishments, further widening the benefit of the lessons that can be learnt. This will be available through an API, learning from the example set by Transport for London and their Unified API allowing the creation of new commercial opportunities for digital businesses. We anticipate working closely with local universities, Nottingham's Creative Quarter businesses, and local tech focused meet-up groups to raise awareness of these new datasets and ensure they are well used and exploited.

Figure 7. Data platform diagram



Coverage

Table 2 shows the data that is already being collected by both councils is shown in the table below. If the table was to have ticks in all boxes, this could demonstrate the type of local authority-owned data feeds that will feature on the completed public-facing data platform.

Table 2: Current data status

Data	Static	Real-time	Historic
Roadworks	✓✓		✓✓
Parking location and availability (inc Park and Rides)	✓✓	✓	
Parking prices	✓✓		
Traffic (SCOOT)			✓✓
Air quality		✓	✓✓
Counts e.g. cyclists, pedestrians	✓✓		✓✓
ANPR		✓	✓✓

(Key: ✓ Nottingham ✓ Derby)

The data platform will also display information from the MaaS scheme, which is provided by external operators. This type of data relates to real-time public transport information, electric vehicle charging point availability, and car club vehicle availability. Whilst this data will sit on both councils websites, with an attractive user interface, our ambition would be to show all of this data via on-street web-based screens or app, which the public can use to help plan their journeys. The information screens would be an element included in the E-mobility hubs and could be expanded out further than this if successful.

Research questions

There will be early deliverables in having a data platform with these functionalities given some of it is happening already, such as the Smart Nottingham Real Time Data Trial. There are a number of project-specific research questions that we'd like to explore in respect of the data platform, which will address two of the overarching package level research questions outlined below:

How effective is new technology in delivering the benefits of the FMZ scheme?

1. How effective is the 'smart junction' approach in addressing real world local congestion issues and delivering an improvement to journey times and reliability?
2. What are the technical barriers to delivering real time transport data across a diverse multi-centred city region?

How effective is the FMZ scheme approach in constraining congestion?

1. Does better information on travel options presented on the website and via other channels promote better access to transport and thus employment in lower income and target groups?
2. How effective is the 'smart junction' approach in addressing real world local congestion issues and delivering an improvement to journey times and reliability?
3. How effective is the website and other digital information in promoting mode switch away from the car to public transport, shared, electric and active modes?

How effective is the FMZ scheme approach in enhancing the local economy?

1. Can the provision of real time transport data be used by business to generate business opportunities?

This data platform aligns with DfT's overarching FMZ objectives to improve the integration of services and increase the availability of real-time data. It is also consistent with the FMZ objectives developed by the respective Councils, such as to support growth and productivity and promote the area as forward-thinking UK cities. Finally, it aligns with objectives and outcomes for the two cities' Local Transport Plans to improve network efficiencies by exploiting new technologies.

For more details on how the data platform will be evaluated and the justification for our proposed research questions, please see section E4 and the Evaluation Plan, **Appendix B**.

Project 3: E-mobility hubs

Introduction

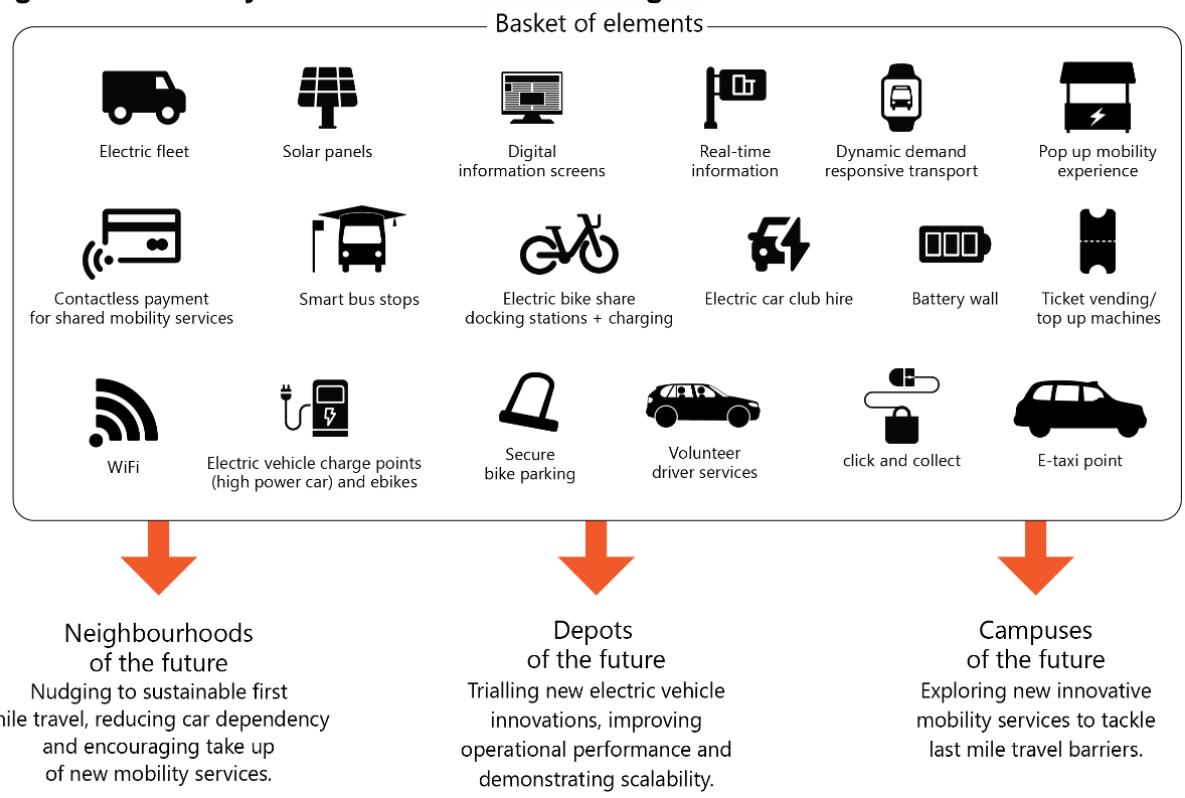
The third project involves offering electric mobility (E-mobility) hubs that enable users to have access to a combination of transport services helping interlink sustainable transport provision and encourage the uptake of alternative travel methods. There would be a number of potential combinations of services that could be offered through this model, but it would start by looking at three main hub types (neighbourhoods, campuses and depots) to prove the concept and applicability in a wide range of settings. There is also the potential for a great deal of partnership working, this is detailed more thoroughly in the Commercial Case (section F). Our hubs provide flexible integrated physical infrastructure to help promote and reflect changing demands, the need to encourage active travel, and demonstrate more alternate use cases.

Logic map 4.3, **Appendix B**, demonstrates our reasons for choosing to develop the E-mobility hubs as part of our scheme. We are seeking to address the DfT's FMZ objectives through these hubs, specifically around improving the integration of transport services, and trialling new mobility modes whilst combining traditional modes.

Challenges and opportunities

The E-mobility hub concept builds on existing ULEV work already undertaken by the councils through the Go Ultra Low programme. This includes the UK's first ULEV corridor and a comprehensive programme of fleet upgrades to lead the charge, including a large scale vehicle to grid demonstrator project taking place in Nottingham. The concept also builds on work undertaken through the Access Fund Personalised Travel Planning project, embedding sustainable and active travel cultures in businesses and communities, and improving access to work and jobs as well as improving air quality.

Figure 8. E-mobility hub basket of elements diagram



These hubs will result in blueprints and evidenced case studies that could be exported and exploited elsewhere as a mobility concept in their own right. Although they will be expanded by project 1 and 2 (and will further offer available in project A), the E-mobility hubs are not critically dependent on the other packages to be successful. This helps to limit the risks that are inherently associated with testing emerging and innovative technologies and approaches.

What is included in the E-mobility hubs?

The Neighbourhoods of the Future

The way people travel and access services is changing. Our neighbourhood hub proposes to put communities at the heart of mobility solutions. The concept will first be launched in a new residential housing development in Nottingham, called Trent Basin. Blueprint, the developer, is widely known for its innovative approaches to delivering sustainable low-energy homes and is building over 300 new homes in the Waterside regeneration area of the city. A second hub is proposed in a lower income area of Nottingham to co-align the delivery of mobility credits and first/last mile transport solutions to test whether the provision of options improves financial independence and greater use. In Derby, the neighbourhood concept will be delivered in an existing residential area with an active local community to prove the concept is also applicable in established residential area (there are currently two potential locations Derby City Council is considering, which will be finalised at project funding award).

Our neighbourhoods of the future build on some international examples e.g. the MobiHubs trials in Bergen and Bremen, but include a strong emphasis on new e-mobility as a version of future mobility available to all, alongside the co-location of traditional modes and commercial possibilities such as cafes. The concept also seeks to prove viability for new housing developments to reduce car dependency and encourage more forms of sustainable travel.

Our ‘neighbourhood of the future’ hubs will provide access to traditional public transport services with increased access to electric modes e.g. car club, taxis, alongside ebike and escooter hire and recharging facilities. Our aspiration is to provide opportunities for wider community benefit e.g. home delivery/collection points, volunteer driving meeting places as well as mobility experiences and active travel offers such as cycle maintenance training, Dr bike, meeting point for led walks/rides etc.

We are in discussions with Enterprise regarding trialling car club ‘back to zone’ or floating bays which reduce the need for Traffic Regulation Orders and offer users more flexibility by returning vehicles into specified zones/areas. This concept will be trialled as part of our neighbourhoods of the future.

All hubs will concentrate on reducing car dependency for residents through the provision of a wide range of mobility solutions, which will include:

Cycling facilities:	Public transport:
Ebike hire (potentially including cargo bikes) Ebike charging Secure bike parking Community track pump	Smart bus stops Ticket vending/top up machines Real-time information Wi-Fi hotspots
Personal mobility:	Wider community facilities:
Electric car club hire Electric taxi bay Dynamic demand responsive transport Electric vehicle charge points	Café/retail vendor Seating area Click-and-collect lockers Delivery hubs for local food schemes Hub location for volunteer driver services (for vulnerable residents) Micro-generation options - on site via battery storage and renewable energy generation

An interesting feature of the hubs is the potential to work with the local communities and key partners to co-design the hubs to ensure they are attractive for all users and offer services that are accessible and encouraging for everyone. This way we can be confident that we are providing transport modes that are going to be used as an alternative to the car, either to complete their full journey or the first and last mile.

The council had a very positive meeting with Blueprint regarding the potential to host a e-mobility hub as part of the Trent Basin development. A Homes and Communities Agency funded access road is being planned to integrate with the development (Phases 3 and 4 of the home building programme) and includes a public realm feature at the head of the basin. It is proposed to locate the e-mobility hub here acting as a central meeting point for residents. Adjacent to the e-mobility hub will be a new Department for Education funded academy, which will be due for completion by March 2022. This provides additional potential to bring the Academy Trust in as a partner to further enhance the use of the hub for school children and parents.

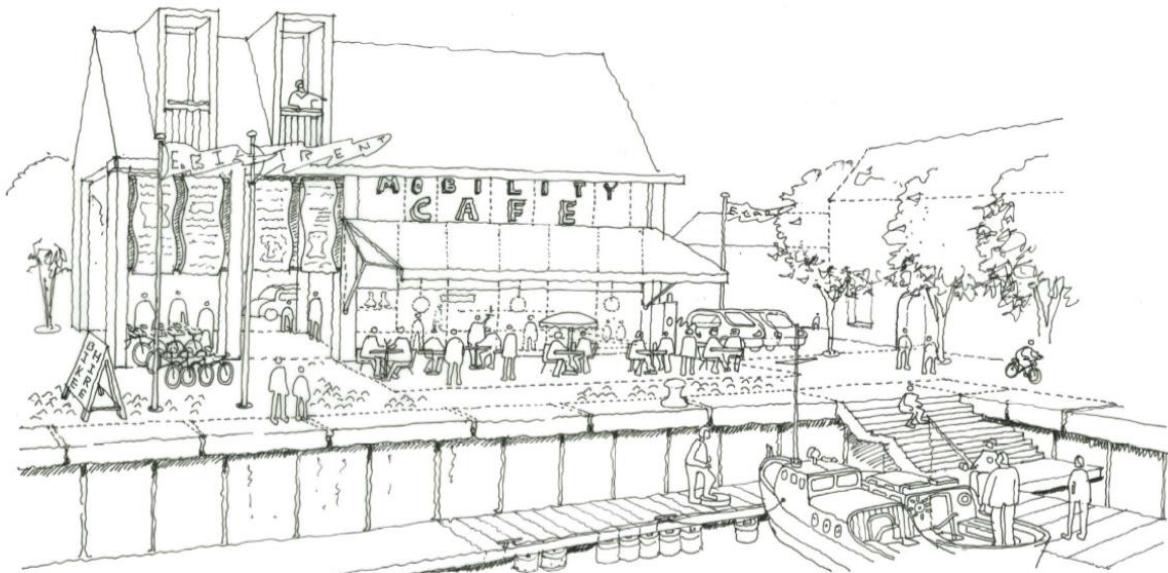
Image 7. Trent Basin new development e-mobility hub location



Image 8. Trent Basin e-mobility site plan



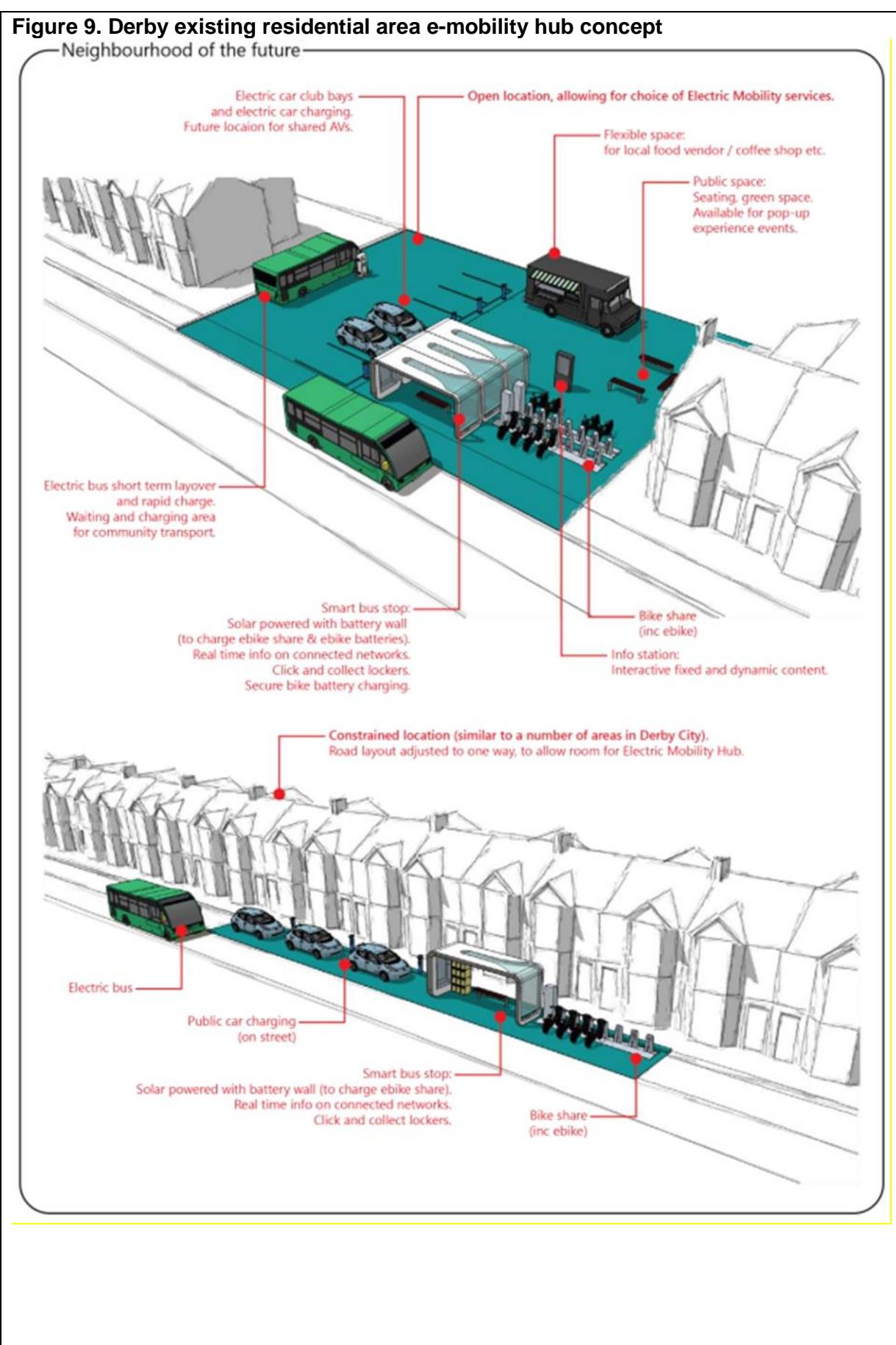
Image 9. Trent Basin e-mobility hub sketch



Courtesy of Blueprint

Derby City Council are currently exploring the viability of two potential residential locations for the Derby neighbourhood of the future. Concept drawings of what the Derby e-mobility hub could look like, depending on whether it is contained on separate land adjacent to homes or placed within a terraced street are illustrated in Figure 9.

Figure 9. Derby existing residential area e-mobility hub concept



The neighbourhood concept would also be applicable in a nature / park setting, creating an e-mobility park, which would focus on facilitating use of new mobility options, such as escooters and ebikes (as a gateway to wider active travel measures). This would provide greater access to large parklands which may not be explored by less active people or those with mobility difficulties. The park hubs could also be used to offer electric vehicle charging, encouraging greater use of e-mobility into rural areas.

The Campuses of the Future

The second type of e-mobility hub is our ‘campuses of the future’, which again involves trialling new mobility modes but is far more site-specific. Initial locations for these hubs will be at the University of Nottingham campus, a major business park in Derby, Nottingham Castle, and the University of Derby. Each location will come with its own challenges and mobility solutions:

- University of Nottingham – this campus is also linked to our trial of Vivacity cameras. We will seek to solve the first and last mile travel of students and staff on campus, while providing the most up to date information on all travel options and the introduction of new modes such as autonomous shuttle buses, ebikes and escooters.
- Business park – Serving a major employer in Derby we will seek to further mobility solutions for staff on expansive campuses poorly served by last mile connections. This will encourage fewer people to drive to work and test technologies in a employer environment.
- Nottingham Castle – this tourist location on quiet streets in Nottingham will seek to influence the travel behaviour of visitors to the city, providing e-mobility solutions that have little to no impact on the sensitive built environment.
- University of Derby – As with the University of Nottingham this will be for both students and staff, helping them travel across and between university sites and the city centre using new modes.

These ‘campuses of the future’ provide an ideal location for connected autonomous vehicles as they are contained environments suitable for experimental technology, and require innovative last mile solutions (due to their size) to encourage use of sustainable modes. We have been in early discussion with Navya as a potential provider for autonomous shuttle buses, and believe having a single one of these vehicles, which can be tested in all of the locations would provide an ideal learning base for the potential of the technology and the human responses to it.

The provision of bike parking and community track pump, e-bike charging, e-cargo bike hire, smart bus stops, and electric vehicle charging could also feature at the campus hubs. These would be complemented by ‘pop-up’ Personalised Travel Planning events and Mobility Experiences designed to encourage behavioural change, using the learning from the Access fund Workplace Travel Service and Connected Derby business support programmes.

In addition, the University of Nottingham is seeking to carry out research into consumer attitudes and perceptions around new modes of mobility, specifically understanding trust and perceptions in connected autonomous vehicles. As part of the introduction of the campus hubs there is an interesting research project potential to test user perceptions and attitudes about new mobility solutions prior to their installation and then again during the introduction of the new modes and after to understand how views may have changed. This aspect will be further developed in partnership during the scoping stage of the campus hubs.

Figure 10. University of Nottingham smart campus vision



Figure 11. University of Nottingham smart campus capabilities



The Depot of the Future

The third type of e-mobility hub is our ‘depot of the future’ concept. Nottingham City Council recently won an APSE award in Best Efficiency Initiative for its efforts to transition to electric vehicles. A flagship depot hub will be located at Eastcroft Depot in Nottingham to trial new vehicle innovations. The project will see the purchase of specialist heavy EVs, rolling out vehicle telematics to improve performance and increase data on vehicle operations, and contribute to the creation of the Nottingham Electric Vehicle Services Maintenance and Repair Centre, thus embedding training and skills development opportunities in an emerging sector.

Specialist and heavy fleet vehicles

Nottingham City Council has purchased over 130 electric vehicles since becoming a Go Ultra Low Company in 2016 (and committing to converting a minimum of 5% of its overall fleet to electric by 2020). Starting with small cars and light vans (<3.5tn) the council then expanded into heavier more specialist fleet and bought a number of electric street sweepers and cage tippers for its city centre operations.

Image 10. Nottingham electric fleet



Talks are underway with potential market providers to expand the electrification into the heavy specialist fleets. FMZ funding will help contribute towards the conversion of:

- Refuse collection vehicles: the council currently has 56 refuse collection vehicles, which contribute 52% of the emissions from the entire fleet (Cenex fleet review, 2018).
- Heavy goods vehicles (over 3.5tn): these larger vehicles perform a range of council functions across the city, many of which could be electric e.g. HIABs (lorries with cranes currently work off a diesel powered engine). The council wishes to engage the market to find electric-ready alternatives for 7.5tn lorries and HIABs.
- Mainline sweepers: having been the first authority in the UK to purchase and operate mini electric street sweepers, there is an aspiration to convert the mainline sweeper fleet to electric to operate on main roads.
- Gritters: Our gritters come into use during the winter months to help keep the roads clear. The council wishes to explore the potential to procure an electric utility vehicle that could

be used as a gritter in the winter months and perform other functions during the rest of the year.

Replacing the internal combustion engine (ICE) vehicles with clean and quiet vehicles will help to provide financial and environmental benefits whilst proving the case for other local authorities and fleet operators of the business case for electrification of heavy specialist vehicles.

Shared recharging network

An emerging pressure for the transition to ULEVs, is the need for EV fleet recharging facilities. Charge points are typically placed within depots to serve electric fleets, which then require vehicles to return to base to charge. Wider factors such as land constraints and lack of suitable power supply often place limits on possibilities too. Recharging at base is an ineffective strategy which results in operational inefficiencies and unnecessary down time during service thus constraining the growth in fleet transition for the council and local public sector partners who are on similar journeys. It is proposed to create a 'shared fleet recharging network' in locations owned and managed by public sector partners, including the council's land portfolio, to decentralise the depots. New recharging facilities in satellite locations (e.g. Bulwell, Woolsthorpe and Clifton) will be created to include real time availability of high-power chargers (50kW - 150kW) alongside booking functionality to deliver shared efficiencies in vehicle operation and overcome barriers to charge point deployment. This will allow the trial of a new form of shared charging to maximise land assets as well as deliver increased value for money and take the pressure off the main depots.

Vehicle telematics

Across a large fleet, vehicle telematics are vital for ensuring the right vehicles are being used for the right job in the right way. As the fleet becomes electrified, the need for telematics grows providing opportunities for optimising the way vehicles are driven to conserve range, understand the emissions impact/saving from the fleet and increase the utilisation of the fleet.

The council has been liaising with a few telematics providers and a new specification is currently in development for a solution, which is manufacturer-agnostic and presents the required information to be able to better manage a large electric fleet, in the following ways:

- Deployment of vehicles – how many miles are completed, by vehicle, per shift, in which location?
- Better management the fleet – how was the vehicle driven? Telematics can increase understanding of harsh breaking, harsh cornering, whether a vehicle was in electric mode or regenerative braking was not used, which could lead to sub-optimal use and potentially vehicle wear and tear therefore increasing costs. Telematics feedback of this kind could also be used to improve driver behaviour and provision of training/education.
- Emissions (good and bad) – what impact is the fleet is having on emissions? How many electric miles are being undertaken compared to ICE vehicle counterparts to better measure the impacts and quantify the benefits and build a business case for investment?
- How effective is the fleet utilisation? Do adjustments such as vehicle re-routing, optimising the loads, changing the type or quantity of vehicles improve efficiencies?
- Is the right type of fleet being used for the right job? Could a smaller vehicle be used for the job, which may result in cost savings for instance swapping a refuse collection vehicle for a smaller cage tipper. Telematics data could help evidence fleet reductions, changes in operations to clean vehicles e.g. city centre operations.
- Fleet maintenance – many systems now provide on-board prompts for maintenance needs e.g. warning lights which will provide proactive opportunities to service the vehicles and ensure the vehicles don't end up breaking down. These maintenance plans can be seen with the Nottingham Electric Vehicle Centre staff to ensure issues are responded to promptly.

Figures 12 & 13 provides an example of the telematics dashboard currently on trial from Dennis Connect on a few (diesel) refuse collection vehicles.

Figures 12 & 13. Example Dennis Connect telematics dashboard



Nottingham Electric Vehicle Services (NEVS) Centre

The council has 500 vehicles in its fleet. It purchases all vehicles outright and an in-house fleet technician team carry out all service, maintenance and repair works. Following Go Ultra Low City status, the team of fleet technicians carried out up to Level 4 EV technician training to become accredited with the relevant electrical certifications in order to safely work on electric vehicles. The training was carried out by EMTEC college (an approved electric vehicle training provider, based in Nottinghamshire) Again, due to the size of the fleet, a new dedicated facility is required to work on ULEVs, away from other internal combustion engine vehicles. An existing unused building has been identified in Eastcroft Depot to convert into the Nottingham

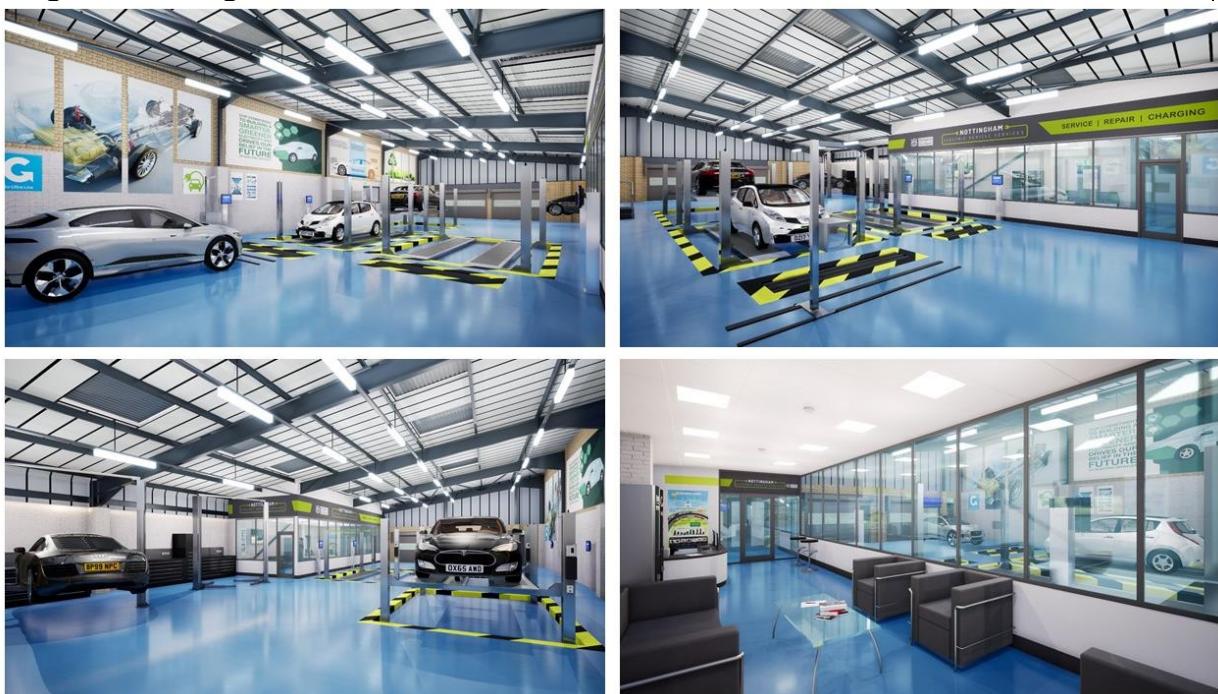
Electric Vehicle Service Centre. A fully operational garage will be created which can be used for the repair, maintenance and MOT of electric vehicles.

The centre will have specialist staff, plant and equipment that will:

- Maintain the council's growing ULEV fleet
- Undertake service, maintenance and repair on local public sector organisation fleets e.g. Nottingham City Homes, Rushcliffe Borough Council, Nottinghamshire Fire and Rescue (Nottingham already conducts this work but there is an opportunity to take on ULEVs)
- Offer an independent facility to service maintain and repair electric taxis, private fleets and individuals' ULEVs (currently there is a distinct lack of competition in the aftercare market with all ULEVs having to be serviced by the manufacturers/affiliated dealers).

The Centre will be the first of its kind in the UK, will provide a gap in the market and stimulate growth in skills in this sector through capacity building and working with the Nottingham Apprenticeship Hub and strengthen links with the training college, EMTEC. The extent of works include the creation of two MOT lanes to DVLA standards, two vehicle maintenance lifts, 20 charge points, a customer waiting area, all associated building work and reconfiguration of the depot entrance to improve the customer experience.

Image 11. Nottingham Electric Vehicle Service Centre visuals



Green number plates

As part of the Road to Zero Strategy it was confirmed that the government would consult on the use of Green Number Plates. Following discussions with the Office for Low Emission Vehicles about the purpose of green number plates to raise awareness of ULEVs and for local areas to incentivise their use, the Derby-Nottingham area seeks to work on implementing a trial of green number plates in partnership with government to provide key learning, attitudes, challenges and benefits for incentives and enforcement. The Nottingham EV Owners Club has put forward 20 private members willing to trial green number plates and ideas include the use of ANPR technology along the ULEV lane to test the readability of plates for enforcement and processing activities, alongside attitudes and perceptions surveying of the plates themselves amongst ULEV owners and non ULEV owners. This will be supplemented by our own fleet vehicles. We propose to undertake this trial as part of the depot of the future project, where the council can facilitate the exploration of the issues, alongside the Nottingham EV owners.

In Derby, a funding bid is being progressed to deliver shared capacity systems through connecting a ring of substations to optimise the use of available power to make the case for rapid charging more commercially viable. To complement the work in Nottingham, Derby plan to focus on hydrogen fuel trials as a key part of their depot linked to a fleet of hydrogen vehicles (secured from Toyota) alongside learning from the deployment of electric vehicles in Nottingham.

All hubs present a skills and training opportunity to offer apprenticeships, industrial placements and graduate opportunities in this emerging field, which will be maximised through the employment Growth Hubs and in collaboration with the academic community and businesses in the area.

Coverage

We are proposing to launch a total of six hubs (four in Nottingham and two in Derby) over the course of the FMZ scheme. The mix of hubs will provide opportunity for learning to not just create these hubs, but how replicable they are in different locations. The first locations of the hubs are included in Table 3:

Table 3. E-mobility hub locations

Type of Campus	Nottingham Location	Derby Location
Neighbourhoods	Primary: New housing development, Trent Basin Secondary: A lower income residential area e.g. The Meadows	Constrained residential area with a higher than city average household income, Darley Abbey, which could include an E-boat link to the city centre Secondary: a lower than average income area. This will be determined after local consultation
Depots	Eastcroft	N/A
Campuses	Primary: University of Nottingham Secondary: Nottingham Castle / Victoria Embankment	Primary: Major business park or academic campus (tbc once further exploration has been done)

Research questions

There are several project-level research questions that relate to the E-mobility hubs, and which address two of the overarching scheme level research questions as set out below:

How does the future mobility scheme make electric mobility more accessible?

1. Do E-mobility hubs increase the uptake and use of EVs?
2. Do E-mobility hubs increase the use of ebikes and escooters?
3. Are ebikes used for journeys that would not normally be undertaken by conventional cycles, e.g. longer-range journeys or by different user groups who would not consider using a normal bike?
4. How effective are the E-mobility hubs in eliciting modal shift away from ICE powered private cars?
5. Does the provision of autonomous shuttle buses within large campuses impact the mode choice for journeys to those sites?

How do different parts of a multi-centred region respond to different interventions?

1. How does the impact of the hubs on mode shift differ between employees and residents and between neighbourhoods, campuses and depots?

How effective is new technology in delivering the benefits of the Future Mobility Zone?

1. Attitudes and perceptions of trust with new technologies?

How effective is the FMZ scheme approach in constraining congestion?

1. How effective is MaaS in eliciting modal shift away from ICE powered private cars?

How effective is the Future Mobility Zone approach in enhancing the local economy?

1. Do e-mobility campuses and e-mobility depots attract inward investment in the e-mobility sector?

Other: These two project level research questions do not relate to any of the six scheme level questions but are still considered important:

1. Is it possible to quantify the impact of e-mobility hubs on local air quality and carbon emissions?
2. Do green number plates help to increase awareness and acceptance of ULEVs?

These scheme level research questions relate largely to the impact it has on mode-shift across different user groups and in which way they respond to electric transport services.

For more details on how the e-mobility hubs will be evaluated, please see section E4 and the full Evaluation Plan included in **Appendix B**.

How the FMZ scheme will help meet strategic transport objectives

The FMZ scheme provides many ways in which the objectives of the DfT FMZ objectives will be addressed. Detailed in each package description above, Table 4 highlights how the scheme objectives are met. Table 25 also demonstrates how the schemes will align with the objectives and outcomes of Local Transport Plans by both authorities.

Table 4: Derby-Nottingham scheme alignment with DfT's FMZ objectives

DfT FMZ Objectives							Description
Trial new mobility services to combine new and traditional modes	Improve integration of services	Increase the availability of real time data	Provide access to digital planning and payment options	Providing mobility credits or other low-cost options	Deliver efficiencies through shared demand responsive transport		
Open Access MaaS	✓✓✓	✓✓✓	✓✓	✓✓✓	✓✓✓	✓✓	<ul style="list-style-type: none"> The delivery of a public policy-led MaaS platform to offer a mobility mix of public transport, car club, public micro mobility solutions, and electric mobility services Stage 1: users can track how much they spend on transport services through an account-based mobile app Stage 2: in-app / contactless payment to allow users to pay for the full end-to-end journey in a single purchase. Mobility credits will also feature to ensure certain target groups can travel Stage 3: offer tailored subscriptions based on how much people travel and the modes that they use.
Data Platform	✓✓✓	✓✓✓	✓✓✓	✓✓	✓	✓	<ul style="list-style-type: none"> Pulling together different data sources into one platform that can be viewed via the web and can feed into the MaaS platform Relieve congestion at junctions and manage the network by expanding on the Smart Nottingham Real Time Data Trial.
E-Mobility Hubs	✓✓✓	✓✓✓	✓✓	✓✓	✓✓	✓✓	<ul style="list-style-type: none"> Offering a combination of transport services at key hubs that will promote different electric mobility options Have three types of hubs: neighbourhoods, campuses, and depots, across Derby and Nottingham, to test the uptake of services in different contexts.

Table 5: Proposed Schemes Alignment with Local (LTP) Objectives

Local Objectives	MaaS platform	Data platform	Electric mobility hubs
Deliver world class infrastructure and connectivity	✓✓✓	✓✓	✓✓✓
Make transport more accessible through electronic information	✓✓✓	✓✓✓	✓✓
Improve efficiency of the network	✓✓	✓✓✓	✓✓
Encourage sustainable alternatives	✓✓✓	✓	✓✓✓
Improve air quality and minimise transport's contribution to climate change	✓✓✓	✓✓✓	✓✓✓

The approach is strongly linked to wider long term plans and spatial strategies around housing, local growth, productivity, carbon reduction and air quality:

- It is consistent with the Government's UK Industrial Strategy and Transport Investment Strategy, given it will greatly improve local transport provision, improve productivity and help to rebalance the UK economy, improve competitiveness and local housing delivery
- It supports the achievement of the Road to Zero Strategy objectives of increasing the takeup of ULEVs and trialling of future mobility solutions
- The programme aligns heavily to the DfT areas of research interest, particularly around harnessing and exploiting data, investigating and deploying technology-based services, understanding changing demand and expectations, and electric vehicle related areas of charging infrastructure requirements, vehicle to grid and understanding charging and driving behaviour
- It supports the Midlands Engine and associated Midlands Connect Transport Strategy in strengthening economic performance by bringing economic activity closer together, and widening access to labour markets, supply chains and customers
- The D2N2 Strategic Economic Plan identifies that investment in infrastructure will help unlock around 20,000 new jobs, 13,000 new homes and around £800m additional GVA by 2023. It also identifies connectivity as one of the key factors differentiating locations for investment.
- The emerging D2N2 Local Industrial Strategy identifies priority infrastructure requirements for the area and identifies opportunities for joining up strategies for manufacturing and skills
- The D2N2 Energy Strategy which states 70% of vehicle miles will be ultra low emission by 2030 and seeks to establish the area as a national pioneer in clean growth and a test bed for world-class energy systems innovation
- The scheme will help accelerate delivery of housing and employment sites set out in local development plans.

The scheme is consistent with objectives for integrated transport set out in our Local Transport Plans, and supports projects contained in the D2N2 Local Cycling and Walking Investment Plan.

In addition, the schemes link to the following plans:

- 2050 Sustainable Development Vision
- Contactless Payment plan
- Public Transport Integration programme
- Advance Quality Partnership Scheme

- Keeping Nottingham Moving / Derby Connected
- Derby and Nottingham Air Quality Plans
- Energy Strategy
- Emerging carbon reduction plans

Derby-Nottingham scheme and innovation

The Derby-Nottingham FMZ scheme builds on current progress being made in the field of local transport delivery. Despite the projects experimental nature, they present a natural evolution of our learning to date and are a good fit to build on our integrated ticketing and e-mobility legacies.

In particular:

- Our unique public sector led approach to MaaS, presents an ideal opportunity to trial “good MaaS” to address a range of factors including introducing a new business model, improve the integration of services, provide access to digital planning and payment options, and explore options for providing mobility credits - specifically to promote social inclusion.
- The data platform is a highly technical, high value project unlocking benefits across a wide range of functions, including the ability for local authorities to plan and better manage their area, produce cost-saving efficiencies and aid in the customer experience of travel. Benefits of the platform extend to mobility service providers and provide academic and commercial opportunities using the published data.
- The e-mobility hubs will introduce the UK’s first at-scale integrated transport solutions in a number of local contexts to demonstrate how travel needs can best be supported whilst providing inspiration and the ‘nudge-factor’ towards the take-up of low emission, active mobility.

SECTION C – The economic case

C1. The economic case – Government funding

This economic case for the Derby-Nottingham FMZ scheme has been prepared in line with co-development guidance received from DfT colleagues. The advice recommended a qualitative, narrative approach be adopted. This recognises the less tried-and-tested nature of many FMZ elements, for which there are few precedents with evidence of costs, outcomes and impacts, and economic benefits. As such, this case discusses the expected economic benefits from the proposed projects. In doing so, it presents the rationale behind each of the three projects, the expected benefits (supported by evidence from experience elsewhere), and the opportunities for new markets and business models presented by the proposals.

Rationale - Open access MaaS platform

As set out in greater detail in the strategic case section, the MaaS concept has gained traction as a result of widespread smartphone ownership and increasingly effective multi-modal journey planning apps. Initial iterations have largely been ‘top-down’ focusing on subscription-based models that require conscious buy-in from users (see [CityLab, 2018](#)). Uptake appears to have been hindered by an initial lack of involvement from some key public transport operators, and a lack of pricing incentives that would attract potential users. Meanwhile, some private sector journey planning operators have begun to partner with private firms to promote specific services, e.g. Citymapper and Uber, alongside the existing public transport offer.

This project will test the hypothesis that Mobility as a Service can ultimately facilitate more seamless use and widespread uptake of sustainable transport options by citizens of Derby and Nottingham if it were publicly-led by the project partners. Both Nottingham and Derby City Councils already have strong working relationships with local public transport operators, and

in some cases manage certain services directly (for example parking, electric vehicle charging, and cycle hubs). Successful, publicly-managed promotion and oversight of MaaS could help ensure the 1.4 million residents and commuters within the Derby-Nottingham area are afforded easier ways of identifying, paying for, and using a more deeply integrated suite of sustainable mobility options. We anticipate that public sector involvement will help to mitigate risks to consumers and transport service operators associated with private sector vendor lock-in, by enabling risks and rewards of growing the market for sustainable travel to be shared between private and public sector stakeholders.

The cost of transport is an increasing proportion of essential household expenditure (£77.70 in the East Midlands comprising 14% of households' 2017/18 average total weekly household expenditure, over £10 a week higher than in 2012). Nottingham Trent University research *Good Work Nottingham* highlights there is economic insecurity even amongst working people. Some families face a stark choice between buying food and paying for transport, which then becomes a barrier to accessing work, training and other services that support inclusion and availability to work locking families into a spiral of poverty. These problems are particularly acute for single parents and young people entering the world of work, with care leavers and young carers facing even greater challenges. Recent Health Foundation research confirms that poor access to transport continues to be a barrier to the building blocks of a healthy life for young people 18-24, and those who are unable to access education, work, youth services or other opportunities, or maintain relationships with friends, family and communities face serious implications for their independence and quality of life. Breaking this cycle through affordable and flexible travel options provided through the e-mobility hubs will support people into jobs that pay a living wage, addressing wider social isolation and mental wellbeing and creating cost savings downstream.

Funding is required to trial approaches to introducing mobility credit packages that are accessible and affordable to low income groups. Previous work with jobseekers in Nottingham has demonstrated those on a low/uncertain income are traditionally locked out of accessing the savings that come with bulk purchase of public transport ticketing or direct debit payments as they are unable to commit to significant upfront expenditure. This results in people being without any affordable transport options or buying older polluting second-hand vehicles. In the East Midlands the purchase of second-hand cars and vans accounted for almost a quarter of household expenditure on transport in 2017/18 whereas just 5% of weekly transport spend was on public transport. For the Future Mobility City programme to achieve an equitable transition to a flexible mix of e-mobility, public and shared transport options, the MaaS workstream needs to provide a twin track approach of supporting those most in need onto the employment ladder by making transport affordable to them in the first place, and exploring different account models, such as Credit Unions, to provide an affordable and more attractive finance model for purchasing travel packages compared to buying a used car, underpinned by a more in-depth understanding of the specific travel barriers faced by our target groups.

Government funding is required to set-up the public sector side of this arrangement; establishing a MaaS platform through a series of virtual integration stages (explained in the strategic case) that link consumer payment mechanisms for each element of Derby and Nottingham's local public transport, cycling, car parking, and EV charging networks.

Rationale - Future mobility data platform

The future mobility data platform will test and quantify the benefits of greatly improved data management and sharing between two neighbouring cities. At present, various transport-related datasets are siloed in disparate systems that are challenging to enquire and analyse. Without FMZ funding things would be likely to remain that way, although some small-scale trials around new forms of data collection (e.g. smart traffic signals) are currently underway. The FMZ funding will complement these by providing a smart repository within which the data generated can be stored and shared in real-time using machine-readable formats.

Receipt of FMZ funding will facilitate development of a comprehensive data platform and set-up of APIs, thereby enabling the local authorities and third parties (through opening up of anonymised city movement network data) to better understand traffic patterns – both historically (to inform scenario-based planning) and in real-time (to inform live traffic management). In particular, the proposed data platform would accommodate data from providers such as Vivacity, Here and Google in addition to sources from Derby and Nottingham's own infrastructure (including UTC/live traffic counts, incident data, and public transport).

Without this funding, these data sources are expected to remain disparate, managed by different stakeholders, and have limited utility in the context of enhancing strategic planning for new mobility services and routes, and traffic and congestion management.

Rationale - E-mobility hubs

Electric mobility hubs will seek to test the hypothesis that offering a convenient 'one-stop' combined offer for low emission (at point of use) travel modes will encourage a step-change in their uptake across the communities and campuses in which they are introduced. Our expectation, based on existing EV Charge network roll-out that is being delivered through the Go Ultra Low City and Access Fund programmes, will result in significant improvements in air quality and reduced traffic congestion from private motorised travel modes, as people are encouraged to switch to low emission and non-motorised travel modes.

In Nottingham, some success has already been achieved at Park and Ride sites, with around 6,500 parking spaces regularly used by motorists transferring to electrically propelled bus or tram services, and/or using EV charging points for their electric vehicles, allowing for all-electric end-to-end journeys. Establishing dedicated 'hubs' in neighbourhoods, campuses, and depots will replicate this success more widely around the Derby-Nottingham area. In doing so, it will target different groups and test the willingness of people to change their travel behaviours based on enhanced and extended EV charging infrastructure which is also co-located with high quality public transport stops on key routes that are well-connected by walking and cycle networks, EV car club parking bays, public bike hire (including ebikes), smart travel information and fare payment terminals, Click & Collect lockers, secure cycle parking and car parking etc. Where possible, these facilities will be co-aligned with complementary 'convenience retail and refreshment' land uses, so as to promote the concept of productive interchange.

This approach will draw on international experience (Bergen, Bremen and Dresden) to greatly improve the convenience of cleaner travel options to people in the UK for the first time. Evidence from Germany suggests that convenience can be the most important driver for uptake ([Shared Use Mobility Centre, 2017](#)), and providing multiple services for first/last or complete journeys at neighbourhood and campus sites will help deliver this.

Without FMZ funding, it will be impossible to manage clean transport services for the benefit of residents, employers and employees. Instead, disparate services installed by the private sector could be expected to only bring modest or incremental mode-shift. These are less likely to be readily integrated with the proposed MaaS platform, which is not itself contingent upon the E-mobility hubs but would mutually benefit from and help to promote their existence.

C2. The economic case – Benefits to transport users and wider society

Key beneficiaries / user segments targeted by the FMZ scheme

A shared industrial history, transport investment and close proximity means Derby and Nottingham have developed economies worth over £30bn pa, which are complementary rather than operating in competition. They have distinct high value sectors; Derby is a UK centre of excellence for transport equipment manufacturing accounting for 30% of its GVA, and Nottingham increasingly grows jobs in niche sectors such as life sciences, digital and FinTech. There are a range of business and professional services, with many in both cities. Lower productivity sectors (e.g. retail, health and care, visitor) provide significant local employment, and jobs growth is forecast over the next decade.

To achieve effective mobility it is important to develop transport infrastructure and systems that build on high quality public transport services; capitalising on planned investments and exploiting new technology, modes of transport and creating new business models.

With increased growth comes the need for more journeys, and more intensive use of the area's transport networks. Our scheme aims to support the delivery of the growth outlined above, and boost productivity, by facilitating the use of new modes of transport and mobility services. Mobility initiatives must join up economic and housing development to improve the existing conditions and unlock transformational growth and productivity, including access to learning and health provision.

A large percentage of residents work, and employees live, in the area. This has created a significant opportunity, and competitive advantage, for influencing the ways people travel and access mobility services.

Pockets of Derby and Nottingham have above average levels of unemployment. With larger numbers of work opportunities arising through Enterprise Zones and business parks, it is crucial we provide the means for these people to access employment. Many people do not have access to a car so facilitating their access to, and stimulating their willingness to use, alternative modes of travel is essential.

Health and life expectancy in the area is below average, with both cities having significantly lower than England averages across all four life expectancy indicators. The 'window of need' gap between life and healthy life expectancy is marked; in Nottingham, males spend an average of 27% and females 30% of their lives in poor health. For each preventable cause, Derby and Nottingham consistently have the highest preventable mortality rates in the East Midlands. These are areas associated with the highest levels of deprivation in the region and people living here are more likely to suffer ill health and die prematurely.

Our scheme will therefore target benefits at the following groups:

- **Existing commuters** within the region who will experience shorter journey times through improved network efficiency and wider mobility choices across all travel modes.
- **Prospective workers** in the region, by providing mobility credits, allowing better access to work opportunities.
- **Young people**, the area's population has a high proportion of young people, in part due to three highly rated universities (76,000 students), who will benefit through measures targeted at campuses and in neighbourhood locations.
- **Lower income households**, improving access to emerging opportunities for communities by making new travel options available and more affordable though targeted mobility credit packages and experiences, with a particular focus on supporting young jobseekers, care leavers, young carers, lone parent families and families reliant on food banks.

- **Owners of electric vehicles**, by offering charging facilities to support their use and integrating their use into the wider transport network;
- **People in poor health** or at risk of poor health, by increasing opportunities for active travel and improving access to work, education, shopping and for leisure opportunities, whilst reducing nitrogen dioxide through reduced carbon emissions.
- **Businesses**, by facilitating new opportunities and public/private collaboration, new manufacturing potential and skills opportunities through training, apprenticeships etc as well as improved productivity by reducing car-borne trips and therefore congestion for freight transport, and better recruitment potential by increasing workforce access to jobs;
- **Bus operators**, by reducing the need for additional peak vehicle requirement (PVR) and increasing revenue through additional patronage.

Open access MaaS platform anticipated benefits

The benefits of Stage 1 of the MaaS platform (smart spend tracking) are predominantly structural, and hence hard to precisely quantify due to the proposal's novel nature. Smarter mechanisms for managing payments and spend-tracking have proved publicly popular: the Monzo spending-tracking app gained around 200,000 users between 2015 and 2017 and has since continued to grow. Looking at transport information services (for example journey planning and public transport payment systems) is also insightful: Citymapper, in large part enabled by the open data approach of Transport for London, now boasts 20 million users worldwide and has launched a 'pass' product to manage ticketing for some journeys.

Smartcard and contactless ticketing has been hugely successful in London where, by 2012, 80% of ticketing was handled through the Oyster cashless product. In Nottingham, the multi-operator Robin Hood fare products are already used by ~60% of public transport travellers (see ITP, 2017), with almost 30% of 536 surveyed users stating that the convenience and lower price of the product has resulted in greater use of public transport. Stage 1 of the MaaS platform will build on the existing local smart fare products and services, as well as complementary investments being implemented through TCF Tranche 1 (extension of contactless payment readers and off-vehicle payment terminals), and tranche 2 proposed measures (back-office integration of existing Robin Hood fare management systems to facilitate the introduction of new fare products and enhanced reporting and journey matching, plus a new Content Management System for the Derby – Nottingham real time information system to facilitate more sophisticated disruption information and messaging across passenger communication channels).

An initial modest mode shift to cleaner public transport and other transport options (car sharing, walking and cycling) is likely to be a key benefit of Stage 1 of the MaaS project, arising from the greater transparency individuals will have in respect of their spending on local transport services. This has potential to benefit all 1.4 million of Derby and Nottingham's working-day population from fewer car trips, with the greatest benefit likely to be focused on users of the MaaS service.

Upon deployment of Stage 2 (account-based payment and mobility credits) improved payment options (including across existing contactless payment infrastructure and via new app-based payments using linked bank/credit cards) for a range of services, coupled with mobility credits targeted at individuals for whom transport affordability considerably limits access to employment and other opportunities, are expected to further encourage mode shift to public transport, clean and active choices. Harmonising payment processing with services for privately operated travel options (in particular parking and EV charging) provides a platform for incentivising cleaner travel to each city, as people begin to use the MaaS platform as a mechanism for paying for the services they use.

For example, ultimately users of all of the 22,000 of the parking spaces operated by the two cities could be targeted with encouragement to use cleaner transport options if paying for parking through MaaS. The system will also offer initial convenience benefits to all drivers paying for parking in this way, by facilitating easier payment.

Mobility credits, targeted at key workers, jobseekers, or those on low incomes offer a 'route into' the MaaS platform, which will ultimately become the best value method of payment for those most concerned about travel spend. Early research into the impact of the Robin Hood multi-modal fare options introduced in Nottingham found that residents earning less than £15,000 accounted for the greatest proportion of the most expensive cash fares (with 35% of respondents choosing this method of payment). Individuals on lower incomes were found to regularly avoid better value subscription or season ticket arrangements, which require up-front financial commitment, due to concerns over the financial commitment relative to their income. Mobility credits could help alleviate these concerns.

Use of mobility credits within the MaaS system should enable these low-income transport users to access better value mobility services, thereby providing a significant economic benefit to these groups. Recent statistics indicate that there are approximately 10,400 unemployment-related benefit claimants in Nottingham and around 5,700 in Derby (4.5% and 3.5% of population respectively in each city - Alternative Claimant Count, 2019). In both cities workless households have a total population of around 55,700 people (source: internal NCC research, 2019). Ticket subsidy schemes have been successful elsewhere. For example, the West Midlands' WorkWise fare scheme had around 13,000 users per year in 2013-2016.

Implementing tailored subscription services, and personalised fare products, is Stage 3 of the MaaS project, which depends upon successful completion of the first two stages. This is expected to deliver considerable benefit for both public transport and active travel users in Derby and Nottingham, by helping them to ensure they are using the most cost-effective travel options for their everyday journeys and giving them sound oversight of the comparative cost of alternative options (which may be more or less sustainable than those they naturally choose). Public transport operators are expected to benefit from increased patronage and revenues, greater certainty over revenues and usage trends, and deeper insight into passenger journeys and route choices – facilitating smarter service planning and operational optimisation.

The anticipated economic benefits, linked to specific inputs, outputs and expected outcomes, have been summarised for each stage of the MaaS project in Table 6:

Table 6. Open access MaaS platform - Economic benefits summary

Project	Input	Output	Outcomes and Impacts	Economic benefits	Beneficiaries	
Open access MaaS platform	Stage 1: insight	<ul style="list-style-type: none"> Website/app and back-office data platform 	<ul style="list-style-type: none"> Better user insight into transport use / spend Council insight into anonymised travel patterns 	<ul style="list-style-type: none"> Optimised personal mode choice / journey planning Data-driven real-time and strategic transport network ops + planning 	<ul style="list-style-type: none"> Small mode shift to PT / walk / cycle / Car Club + associated decongestion benefits. Optimised transport investments. Smarter day-to-day network planning 	<ul style="list-style-type: none"> Primarily MaaS users All road network users Mobility service operators (revenues, size of market)
	Stage 2: payment	As above, with account-based payment	As above, plus: <ul style="list-style-type: none"> Easier payment for wide range of travel modes Targeted discounts and mobility credits Single account for all local mobility payments 	As above, plus: <ul style="list-style-type: none"> Reduced cost of travel for low-income / key worker groups Reduced PT fare payment / dwell (journey time savings) Wider uptake of car clubs + bike hire services Council insight into anonymised local travel spending 	As above, plus: <ul style="list-style-type: none"> Larger mode-shift from private car use + associated decongestion benefits Uptake in new development areas (via PTP) Increase in total sustainable transport revenues 	As above
	Stage 3: subscription	As above with tailored subscriptions	As above, plus: <ul style="list-style-type: none"> Simplified fare products and payments 	As above plus: <ul style="list-style-type: none"> Further uptake in non-car options 	As above, plus: <ul style="list-style-type: none"> Max mode-shift from MaaS PT operator revenue certainty 	As above

Open access MaaS risks and uncertainties

The risks and uncertainties envisaged in relation to the MaaS project are, to some extent, inherent in other MaaS implementations, but mitigated by the coordinating role envisaged for public sector partners. Others are specific to the local context and deregulated environment in which local bus services are provided, as well as the technological nature of the project and uncertainty over consumer appetite for smarter and more tailored payment mechanisms across all modes of travel.

The point of this project, to be delivered using the FMZ funding, is to specifically test and explore these risks to learn how they influence consumer uptake and the impacts and outcomes delivered by an open access MaaS platform. Key risks and mitigating actions, discussed in greater detail in the strategic case section, include:

- Only a partial range of mobility services being presented through the MaaS platform, potentially distorting their pricing and demand for local transport services. This will be overcome by the council maintaining full access to all data processed through the app, and acting as an 'honest broker' that ensures consistent and equal presentation of the range of mobility options, and fares, available to users.
- Absence of open data, appropriate regulatory structures, or buy-in from transport operators resulting in consumers facing a fragmented mobility marketplace with only a partial range of mobility services being included in the MaaS platform. The phased approach to integration across multiple travel modes and services, and its development on top of an established partnership mechanism (the Robin Hood group) should mitigate this risk, while accepting the sovereignty of service providers and their right to use of other channels and mechanisms.
- Deepening of fare and payment integration, and associated revenue sharing arrangements in Stages 2 and 3 will depend critically upon the success of Stage 1, and the willingness of local mobility service operators to allow their fare products to be included in the MaaS platform. While this is expected to be straightforward for standard 'single' and 'return' fare products, multi-operator fares associated with cross-city or cross-boundary journeys are expected to prove more challenging to integrate based on prior experience. Market engagement and collaboration across service providers will be fostered by the local authorities in their role as 'honest brokers' and may necessitate dedicated commercial arrangements associated with collective revenue sharing and apportionment – expanding on existing Robin Hood partnership arrangements. This risk will be specifically tested through the MaaS platform's delivery, with the anticipation that it will serve as a demonstration of what can potentially be achieved (both in terms of fare integration and patronage growth) in de-regulated bus networks where additional mobility services (car clubs, bike hire, EV charging, car parking charges) are also included.
- Consumer appetite remains a significant risk. Existing MaaS propositions do not appear to have been sufficiently compelling (perhaps because they were no cheaper or convenient than conventional alternatives) to attract widespread consumer uptake. The MaaS pilot will seek to mainstream the concept by aligning it with an expansion of the range of services that already make up the existing Robin Hood partnership (which covers most local bus, tram and rail journeys across the Nottingham Urban Area). This will bring a ready-made user base, thereby helping to mitigate the risk that few people choose to use the MaaS platform.

Future mobility data platform anticipated benefits

Transport-related benefits are principally expected to accrue to commuters and regular road users – over 40,000 of whom regularly travel between the two cities each day and 400,000 commute to work across the Derby-Nottingham area as a whole (Metro Dynamics, 2017) – both using private cars and public transport services – across the two cities. Specific current

technologies have been shown to have valuable performance in traffic management (for example, SCOOT optimisation resulting in a 15-20% reduction in traffic delay where installed – University of Leeds, 2013). Meanwhile new technologies, such as Vivacity's traffic counting cameras, use artificial intelligence to reduce the cost of generating significant quantities of real-time data which can be collected for all modes of travel (not possible through induction loops which conventionally inform traffic signal control). The combination of data from these sources is expected to create significant opportunity to better plan future network improvements, and manage them on a daily basis, to benefit all road users in both cities.

The extension of the Smart Nottingham Real Time Data Trial (SNRTTD) trial of better traffic control initially around the A6005 corridor in Nottingham will be supported by Vivacity traffic counters to attempt to test the benefit of open data in managing traffic junctions on a key corridor between the two cities. It has potential to deliver significant traffic decongestion benefits for up to 53,000 university students and staff, 6,300 hospital staff and patients, and Nottingham Science Park tenants and local residents who regularly use this corridor. Building on the existing SNRTTD trial enables interoperability with the proposed data platform, offering opportunities for further research and identifying lessons for wider rollout. Incremental improvement to journey times and decongestion on this corridor will also have significant air quality benefits for people living and working along the A6005 corridor.

As the data platform expands, it is anticipated that anonymised and aggregated public transport patronage (e.g. based on ticket sales/transactions) could be included from the MaaS trial. If made openly available on a corridor-by-corridor basis, then this data offers potential for the Councils and third parties to refine and improve:

- Personal journey planning decision-making; including through real-time journey planning tools that are powered by the data.
- Scenario-based and real-time traffic management and public transport network management (service optimisation) by local transport authorities and the bus/tram operators.
- Strategic network planning and demand analysis by the Councils and public transport service providers; identifying and prioritising where new routes, public transport priority and highway network improvements should be targeted.

Realisation of these benefits is heavily reliant upon the analytical capabilities of the two local authorities and its delivery partners. As noted in respect of 'opportunities' (below) the research potential for academic partners (e.g. behavioural responses to transport network changes) and practical applications (e.g. deep mining of traffic patterns to inform optimised scenario-based network management) is considerable.

The anticipated economic benefits, linked to specific inputs, outputs and expected outcomes, have been summarised for the data platform proposal in Table 7:

Table 7. Data platform - Economic benefits summary

Project	Input	Output	Outcomes and Impacts	Economic benefits	Beneficiaries
Data Platform	Data from: <ul style="list-style-type: none"> • Keeping Nottingham Moving • Derby Connected • Public transport and Open access MaaS 	<ul style="list-style-type: none"> • Flexible open data platform (API) publishing historical and real-time data from all sources in one place • Feeds back into Open access MaaS 	<ul style="list-style-type: none"> • Authorities have better access to their own traffic and PT data in both cities • Third party companies and local residents access data easily, creating new 'transport data ecosystem' 	<ul style="list-style-type: none"> • More efficient management of both cities' transport network leading to reduced congestion • Better travel info. Available • Opportunity for local transport data ecosystem and research 	<ul style="list-style-type: none"> • Commuters (PT and car), business travellers and visitors in both cities • Local authority traffic management staff • Local technology businesses/app developers and researchers
	<ul style="list-style-type: none"> • Vivacity camera data (via SNRTTD) • Google dataset • Area-wide VMS 	Greatly improved multimodal traffic monitoring at trial location (University of Nottingham)	<ul style="list-style-type: none"> • Incremental traffic management improvements on A6005 corridor • Forms evidence base and lessons for wider rollout 	<ul style="list-style-type: none"> • Reduced journey time and congestion at trial location • Improved air quality from traffic management 	<ul style="list-style-type: none"> • Bus and car passengers using A6005 corridor • Neighbourhood and campus residents around trial area

Data platform risks and uncertainties

Anticipated risks and uncertainties associated with the data platform's successful delivery and ongoing maintenance include:

- The ability of the councils to collate and openly share anonymised movement data so that third parties can analyse and exploit it. This should largely be mitigated by the existing GDPR provisions that both authorities have in place, and their experience of developing standard open data portals, which serve primarily as repositories for council publications and reports. Open sharing of data is increasingly common, as necessitated by the Bus Services Act (2017), and likely to form an obligation of participation in the MaaS platform
- Ongoing costs of maintaining the data platform and associated digital infrastructure, which may not be insignificant. The specific aim of establishing the data platform will be to build a business case for the long-term maintenance of what is expected to become critical digital infrastructure for the 21st Century iterations of the cities of Derby and Nottingham. This may include consideration of which sources of data are to be shared openly and freely (as Open Data) and those which may have commercial value due to the analytical insight added to the raw datasets. The business case may also take into account the value of wider economic and environmental benefits resulting from the interventions facilitated by the data platform's existence (e.g. transport network optimisation, targeted road maintenance)
- Unintended consequences associated with optimising highway network performance, which may result in higher levels of private vehicle use and exacerbate existing air quality issues. This risk is mitigated to some extent by other work both councils (e.g. schemes proposed in the TCF) to encourage more widespread uptake of increasingly sustainable and active travel modes
- The appetite that third parties have to consume and use the new open datasets. The extent of this risk critically depends upon the range, volume, quality and relevance of datasets that are shared through the data platform. It is partially mitigated by the inclusion of academic partners and the specific research questions identified in collaboration with them as part of this scheme.

While there is a degree of interdependency between the data platform and the MaaS platform, neither is considered critically reliant upon the other. Both can exist independently (because the MaaS platform has intrinsic value to consumers, and due to existing sources of data that the platform can house and curate), but it is expected that the two interventions will strongly complement each other and be greater than the sum of their constituent elements if they are delivered in combination. The same is true to some extent in respect of the E-mobility hub component of the bid, since it is envisaged that Hub utilisation data (and in particular real-time EV charging point availability data) would be stored and shared from the data platform.

E-mobility hubs anticipated benefits

The most significant benefit of the E-mobility hubs is expected to be through the step-change in uptake of these modes through greater convenience of interchange at key locations.

At neighbourhood hubs, greater numbers of residents will have the opportunity to transfer between (for example) buses and cycling, increasing uptake and allowing trialling of new modes such as ebikes and escooters. Exact numbers of neighbourhood hub users are difficult to predict, as they will be contingent upon specific locations (to be determined through detailed scoping early in the programme delivery workstage) and their benefit will derive primarily from greater multimodal use of diverse mobility services. As an indication, the Derby Road corridor in Nottingham carried nearly 18,000,000 bus trips in 2017-18. It is reasonable to expect that a significant proportion of services like this would experience benefit when transferring to 'last mile' modes at hubs or using other Hub services. For example, high quality real-time information (RTI) for bus departures is estimated to be of equivalent value to around 1.4 minutes' journey time saving per trip (TRL, 2004), which if achieved for every trip on a corridor

represents a significant saving. Though some stops already have RTI on this corridor, it is easy to see that a modest improvement in facilities would be significant if sited appropriately. Furthermore, there could be scope to further increase bus patronage along busy corridors like Derby Road in the event that strategically positioned E-mobility hubs help persuade travellers to use sustainable modes for their first/last mile, or to intercept people making car journeys starting further afield in order to prevent them heading into congested central areas of Derby and Nottingham.

Campus hubs will be selected to both trial new technologies (such as autonomous shuttle buses) and act as demonstrators in which the working public or student populations can experience the cities' clean mobility options. Potential sites such as the University of Nottingham (where around 53,000 students and staff use the two larger campuses) and a major employer in Derby, which are well connected to local road networks, but require further work to encourage use of cleaner modes. Bid partners Enterprise have 19 car club locations in Nottingham, some of which are served by hybrid or electric vehicles or have potential to be.

At the depot hub, fast charging and booking functionality will allow greater investment in EV technology for city and public transport vehicles. At present the Nottingham fleet includes 138 EVs, but better access to bookable fast charging could expand this in the city and encourage wider take up of electric fleets, with consequent fuel cost benefits for operations in both Derby and Nottingham and air quality benefits to residents in each city. For example, further investment in fast charging could increase the Nottingham fleet to 189 EVs, greatly increasing as a proportion of the 274 city vehicles currently managed from the Eastcroft Depot site.

Overall, we anticipate that E-mobility hubs will have a significant impact in promoting cleaner transport within the two cities. Sites where hubs are installed will become the focal point of reduced emissions caused by greater use of clean buses, cycling, and EV car hire. The focus upon seamless interchange between clean modes will have an agglomeration effect within neighbourhoods and campuses, and the services available will fix several specific problems such as last mile infrastructure from public transport and charging for householders without driveways. Many existing 'hub' implementations (for example 15 'mini-hubs' in Bremen) have trialled some of the services proposed, but the E-Mobility hubs will test the hypothesis that a greater mix of services will offer a transformative overall benefit for residents and workers.

The anticipated economic benefits, linked to specific inputs, outputs and expected outcomes, have been summarised for the E-mobility hub proposal in Table 8:

Table 8. Electric mobility hubs - Economic benefits summary

	Project	Input	Output	Outcomes and Impacts	Economic benefits	Beneficiaries
Electric Mobility Hubs	Neighbourhoods of the future	<ul style="list-style-type: none"> Secure cycle parking and e-bike charging Electric vehicle charging Electric car club hire RTI displays Collection / delivery lockers Integration with retail 	<ul style="list-style-type: none"> Opportunity for residents to use bikes/ebikes/EVs regularly, or for first time Accessible EV car club, replacing private ownership Improved utility from combining of facilities 	<ul style="list-style-type: none"> Increase in the use of bikes and ebikes Increase in the use of EVs (private or car-club) Reduced private car dependency due to better public transport RTI 	<ul style="list-style-type: none"> Reduced CO2/NO2/particulate emissions due to increase in use of bikes, ebikes and EVs Greater use of public transport Agglomeration benefit of providing retail/food/collection services alongside charging and PT 	<ul style="list-style-type: none"> Local residents with greater range of clean transport options
	Campuses of the future	<ul style="list-style-type: none"> Wi-Fi hotspots 	<ul style="list-style-type: none"> Better RTI for neighbourhoods and campuses 	<ul style="list-style-type: none"> More clean travel options at major local employment sites (e.g. University of Nottingham) 	<ul style="list-style-type: none"> Reduced private car dependency at campus sites Reduced CO2/NO2/particulate emissions due to increase in use of bikes, ebikes and EVs 	<ul style="list-style-type: none"> Campus users (employees/students) with greater range of clean transport options
	Depots of the future	<ul style="list-style-type: none"> High-capacity chargers Real-time charger availability 	<ul style="list-style-type: none"> Better availability and management of EV bus and authority fleet charging 	<ul style="list-style-type: none"> Increased rollout of EV public transport/utility fleet due to more charging options 	<ul style="list-style-type: none"> Reduced CO2/NO2/particulate emissions supported by more widespread rollout of clean fleets 	<ul style="list-style-type: none"> General public Public transport and city vehicle operators able to rely on cleaner fleets

E-mobility hubs risk and uncertainties

Uncertainties and risks around the successful implementation of different types of Hubs are most closely associated with finding the most suitable location for each one. Careful planning in each case, which will build upon Derby and Nottingham's strong local relationships with employers and other organisations that might host hub sites will mitigate this. Practical risks such as availability of specific modes (for example bike share) or services (for example EV charging) will also be mitigated by early planning of hub locations. In view of timescales, and to mitigate these risks (alongside the need for the availability of power) the location of E-mobility hubs is likely to favour:

- Publicly owned sites, or areas of public realm where key services – both power and mobility – are already co-located
- Existing campus locations with amenable partners who are willing to make space available for an E-mobility hub and bear the ongoing costs associated with maintaining and powering the sites
- Council-owned depots where there is scope for early-adopter trials of new types of electric service vehicles (e.g. refuse disposal and city centre servicing and maintenance vehicles) to be run in parallel.

A final risk relates to the extent of consumer uptake. This will be mitigated through bold marketing, integration into existing communication channels and branding, and promotion through the ongoing Go Ultra Low City programme and proposed MaaS and data platforms.

C3. The economic case – Benefits from new markets and business models

MaaS platform opportunities

The MaaS platform offers the opportunity to:

- Create a 'one-stop' approach to the areas transport, bringing private car users into the same system used to pay for public transport and bike hire and raising their awareness of alternative travel options
- Establish a new mechanism for promoting more sustainable and environmentally-friendly travel choices (notably public transport, park and ride, electric vehicle use, walking and cycling, and car club vehicle hire) through a combination of enhanced personalised information on transport spending, preferential pricing, and the use of targeted mobility credits
- Increase total public transport patronage and revenues, to the benefit of all operators in Derby and Nottingham
- Better understand aggregated and anonymised patterns of movement using private and public transport services in Derby and Nottingham
- Establish a self-funding MaaS platform with a marginal proportion of managed payment revenues being allocated to support the system's maintenance and ongoing development.
- Establish spin-off opportunities linked to journey planning, data mining and travel pattern analyses (in combination with other datasets curated through the Data Platform component of the programme).

Future mobility data platform opportunities

The presentation of traffic and public transport data in a single API is in part inspired by systems such as TfL's Unified API, the deployment of which in London has catalysed significant local innovation (with 2,000 developers signing up for access – [ITPro, 2016](#)) and is now used by established journey planning products such as Citymapper and Waze.

The unified API and its connection to the SNRTTD trial corridor will also lead to research opportunities for local universities and innovators, in particular at the University of Nottingham and other partners along the A6005 corridor.

Finally, and as noted above, both the first stage of the data platform project and the more specific SNRTTD trial will have opportunity to integrate with the Open access MaaS project and the E-Mobility Hubs, thereby maximising the benefit of both to residents of Derby and Nottingham.

E-mobility hubs opportunities

The proposed development of E-mobility neighbourhood and campus hubs will examine whether installation of a wide range of clean transport services, in concert with 'convenience' services, can provide a step-change in uptake of clean transport in places where it is not widely used. Meanwhile, significantly improved services at Eastcroft Depot will allow greater use of clean transport for city fleets and use of newer technologies such as vehicle to grid. The new service, maintenance and repair centre will create new employment and training opportunities for fleet technicians to be trained up to the latest electric vehicle accreditations.

Local opportunities at specific neighbourhood and campus hubs include the possible use of parcel, food, and retail offerings at what will become important interchange points, depending upon exact requirements at each site. Successful hubs could therefore be partly funded, or sustained by retail rental agreements and other income (e.g. public realm advertising) that is indirectly generated as a result of each hub's location.

More widely, the successful implementation of hubs, the most important elements from the 'basket' of clean mobility options, and the opportunity to reuse lessons learned in core cities outside Derby and Nottingham should inform widespread reproducibility to improve sustainable travel facilities and opportunities in towns and cities across the UK.

SECTION D – The financial case

D1. Financial case – Scheme costs

The Derby-Nottingham scheme projects are all expected to commence in the 2019/20 financial year, through preparatory and development costs incurred. Delivery builds in 2020/21 with full delivery achieved thereafter.

The breakdown of the scheme costs are:

Total scheme cost (£m): £25.997m

Total DfT (FMZ) funding contribution (£m): £20.000m (scalable)

Total public sector contribution (£m): £1.850

Total local and/or private contribution (£m): £4.127m

A full breakdown of the costs for each project and their elements is set out in Table 9 below.

Table 9. Derby-Nottingham FMZ scheme costs

Scheme Measures	2019/20	2020/21	2021/22	2022/23	Total Cost
Open access MaaS platform					
A. Creation of open access Maas (integrated trip and payment platform including contactless payments)*	0.100	0.500	0.900	0.900	2.400
B. Personalised incentives and subscriptions*	0.000	0.200	0.600	0.600	1.400
C. Mobility credits for key target groups*	0.100	0.800	1.200	1.200	3.300
Future mobility data platform					
A. Data integration and sharing incl public facing websites	0.100	0.100	0.100	0.100	0.400
B. Real time data sensors rollout*	0.100	0.300	0.350	0.350	1.100
C. Smart junctions trials (in Derby and Nottingham)*	0.100	0.300	0.300	0.300	1.000
E-mobility hubs					
A. Neighbourhoods of the Future x3*	0.100	1.000	1.900	1.500	4.500
B. Campuses of the Future x3*	0.000	1.000	1.100	1.100	3.200
C. Depots of the Future x1	0.300	0.600	0.650	0.650	2.200
Programme coordination and evaluation					
Programme coordination (Future Mobility Zone Manager), programme evaluation and dissemination activities	0.125	0.125	0.125	0.125	0.500
TOTAL (DfT funding sought)	1.025	4.925	7.225	6.825	20.000

*scalable elements which can be reduced or scaled back. This is displayed in Table 11.

Level of cost certainty

Costs provided in Table 9 are based on experience of similar previously funded projects. For many of the projects, indicative costs are known. Different projects have a different level of certainty e.g. having not implemented an open access MaaS platform the costs carry a moderate level of uncertainty (these have been mitigated through engagement with market providers and taking learning from the public transport contactless project). Similarly, for the e-mobility hubs, the costs relating to power supply to the proposed sites are currently unknown therefore adding a moderate degree of uncertainty (however experience of renewable energy and electric vehicle charge points has been used to inform costings):

Open access MaaS platform:

- Taking learning from Robin Hood on Mobile / ITSO Host Card Emulation and EMV account based ticketing back office development costs
- Experience of EMV contactless hardware previously purchased for public transport
- Through market engagement with MaaS platform providers
- Mobility credit costs have been based on previous experience of delivering similar schemes and in discussion with Mobileo.

Future mobility data platform:

- Taking learning from costs incurred to date through the ongoing data projects
- Through market engagement with data platform providers.

E-mobility hubs:

- Costs are known for many individual elements which will feature in the hubs e.g. real-time displays, charge points and micro mobility solutions
- Power supply to sites where the hubs will be located have been estimated based on experience on previous solar/electric vehicle charging point installations
- Costs relating to the depot hub have been based on quotations received and market engagement with vehicle manufacturers and equipment providers.

The deliberately experimental, and investigative nature of many components of the scheme, coupled with their technological focus, means they should attract a relatively high level of optimism bias. We have built this into the scheme costs presented in Tables 9 and 11, based on the following assumptions:

- IT system development projects (MaaS platform and the data platform) incorporate the 200% optimism bias uplift recommended in Table 8 of TAG Unit A1.2. Our initial soft market testing with potential service providers suggest that the total values are realistic in respect of the stated aims of these projects, and given they also involve delivery of tangible hardware (e.g. real time sensors) for which costs are well understood
- The E-mobility hubs incorporate an optimism bias uplift of 44%, consistent with Stage 1 roads schemes in Table 8 of TAG Unit A1.2. In practice, the Hubs all constitute previously implemented components, with the chief novelty being their combined delivery in key locations. Derby and Nottingham's experience of delivering EV Charge points and associated service infrastructure has particularly helped to inform these cost estimates
- In the event of cost-overruns (considered most possible in respect of the MaaS platform and data platform) then all package elements could be scaled according to available budgets (see information provided later in this section) and/or re-prioritised through ongoing discussion with DfT colleagues
- Scheme costs will be firmed-up through the scoping stage designed-in to the Derby-Nottingham work programme.

Match funding contributions

The Derby-Nottingham scheme benefits from £5.977m confirmed match funding from a variety of key local and private sector partners alongside public sector match. The confirmed match funding is set out in Table 10 below.

Table 10: Derby-Nottingham FMZ scheme match contributions

Match funding	2019/20	2020/21	2021/22	2022/23	Total
Total public sector contribution					
NCC Vehicle Replacement Programme (Upto £3m per annum)	0.250	0.250	0.250	0.250	1.000
NCC EU Vehicle to Grid project contribution	0.200	0.250	0.000	0.000	0.450
Cenex EU Shared Sustainable Mobility project match	0.100	0.100	0.100	0.000	0.300
NCC Local Transport Plan Smart Data Trial contribution	0.100	0.000	0.000	0.000	0.100
Total local/private sector contribution					
University of Nottingham campus power upgrades	0.000	1.500	0.000	0.000	1.500
Nottingham City Transport match investment	0.000	0.650	0.650	0.000	1.300
Enterprise car club vehicles (target of 40 vehicles @ £20k up to 2023) plus marketing contribution	0.417	0.200	0.200	0.030	0.847
BP Chargemaster concession contract match funding	0.000	0.200	0.200	0.000	0.400
Blueprint developer land value	0.000	0.000	0.050	0.000	0.050
Loughborough University 50% funding contribution for PhD student	0.000	0.010	0.010	0.010	0.030
TOTAL (match funding)	1.067	3.160	1.460	0.290	5.977

Match funding has been confirmed from a number of council partners:

- **University of Nottingham** (£1.5m): The university has historically collaborated with Nottingham City Council over a number of smart city, transport, energy and mobility projects. The council also works with the university's Faculty of Engineering to host an Industrial Placement undergraduate during their year in employment and have expressed a willingness to do so to support the FMZ programme. The university is making an investment into upgrading the power supply to their campus, which will directly benefit the e-mobility campus hub installation.

- **Nottingham City Transport** (£1.3m): Nottingham City Transport is the biggest transport operator in Nottingham, with 330 buses providing a comprehensive network of services across the city, 7 days a week, carrying 49m passengers a year. Multi-Award winning, the company has been crowned UK bus operator of the year four times. Through continued investment in modern, fully accessible buses and increasing frequencies on core routes throughout the City, the company continues to buck the national trend of bus passenger decline and operates the world largest fleet of low carbon BioGas buses. EMV contactless payment will be rolled out by the operator in Spring 2020 and exciting plans are in place to begin the electrification of their midi bus fleet from 2022 onwards.
- **Enterprise** (£847k): Enterprise is the incumbent car club operator in Nottingham and is in talks with Derby City Council. The company is contracted to deliver 40 car club vehicles over the duration of their contract and having already expressed an interest in expanding the electric car club offer, have deployed an additional five EV's in 2019/20. Enterprise have also expressed a willingness to help with the provision of mobility credits for low income users, potentially through their MaaS platform, or in collaboration. Enterprise's match funding covers the provision of 40 vehicles, many of which will be deployed as part of the e-mobility hubs and marketing activities.
- **BP Chargemaster** (£400k of £1m total): BP Chargemaster are the contracted concessionaire to provide publically accessible charge points on behalf of the D2N2 local authorities, including back office services and maintenance. BP Charemaster are a willing partner to continue the rollout of charge points as part of the e-mobility hubs, including higher power charging, real-time charge point availability and smart booking functionality. A proportion of the £1m match funding will be used to cover the cost of charge point provision, installation and maintenance.
- **Blueprint** (£50k): Blueprint (part owned by igloo Regeneration and Nottingham City Council) are an award winning Nottingham based developer specialising in low energy sustainable homes and workplaces. Blueprint has adopted igloo's Sustainable Investment policy, '[Footprint](#)'®. Recognised by the United Nations as market-leading, Footprint ensures Blueprint's developments are sustainable, in the widest sense: that they are well designed, that they are kind on the environment, and that they create great places for people to enjoy, both now and in the future. Blueprint are contributing £50,000 towards the FMZ scheme as part of the land value where the neighbourhood e-mobility hub will be situated in its flagship Trent Basin development.
- **Loughborough University** (£30k): Nottingham City Council have developed a strong partnership with Loughborough University as a result of the evaluation of the innovative Workplace Parking Levy, which was part funded by University through a PhD. A further PhD has been jointly funded for a PhD student to evaluate the Go Ultra Low programme. This approach will be transferred to the FMZ scheme to provide academic research papers and overall evaluation.

The local/private sector confirmations are set out in the letters of support supplied in **Appendix A**.

New procurement opportunities will all seek market contributions as part of the tendering process.

Contributions in kind

In addition to the match funding, the scheme benefits from the following contributions in kind:

- Public transport operators own investment in service operation, marketing and delivery
- MaaS platform and mobility credits development staff time and own investment by Enterprise and Mobiléo
- University of Nottingham smart campus activities and Industrial Placement recruitment support
- Public electric vehicle events support via BP Chargemaster concession agreement.

Both councils have existing arrangements in place via concession contracts and service level agreements to maintain services or undertake them inhouse e.g.

- Robin hood card back office is managed inhouse
- Real-time public transport information displays are maintained inhouse
- Urban traffic control and current data feeds
- Park and rides, council owned car parks and onstreet parking provision
- Electric fleet vehicles are serviced and maintained inhouse
- Charge point equipment and back office maintenance is built into the concession contract with BP Chargemaster
- The car club service is the responsibility of the current contracted provider, Enterprise (in Nottingham)
- New services e.g. ebikes, escooters and autonomous vehicles maintenance will be built into the terms and conditions in the new tender opportunities.

Finally, other in kind support has also been made available by other partners not listed here.

Revenue implications

Some of the elements of our scheme are reliant on revenue funding. It is proposed to address the lack of revenue by:

- Seeking Access Fund 2020/21 extension funding for some of the supportive measures linked to capital investment
- Work with NCT to utilise their match funding
- Explore the potential to find other council sources e.g. Workplace Parking Levy
- Build in behaviour change and supportive measures through the tendering process.

Reduced package details

At DfT's request, costings have been supplied if it was not possible to fund the Derby-Nottingham FMZ scheme, as proposed, in its entirety.

This reduces the overall scheme to £20m, with a total of £14m DfT funding sought. It is felt this is the minimum level of investment required to fund the measures, whilst achieving impact and delivering value for money. Table 11 includes the full breakdown.

Table 11. Derby-Nottingham FMZ scheme minimum scheme costs

Scheme Measures	2019/20	2020/21	2021/22	2022/23	Total
Open access MaaS platform					
A. Creation of Open access Maas (integrated trip and payment platform including contactless payments)	0.100	0.600	0.600	0.600	1.900
B. Personalised incentives and subscriptions	0.000	0.100	0.400	0.400	0.900
C. Mobility Credits for key target groups	0.100	0.400	0.700	0.700	1.900
Data platform					
A. Data integration and sharing incl public facing websites	0.100	0.100	0.100	0.100	0.400
B. Real time data sensors rollout	0.000	0.200	0.250	0.250	0.700
C. Smart junctions trials (in Derby and Nottingham)	0.000	0.200	0.250	0.250	0.700
E-mobility hubs					
A. Neighbourhoods of the Future x2	0.100	0.500	2.000	0.400	3.000
B. Depots of the Future x1	0.300	0.500	0.500	0.500	1.800
C. Campuses of the Future x2	0.000	0.700	1.000	0.500	2.200
Programme coordination and evaluation					
Programme coordination (Future Mobility Zone Manager), programme evaluation and dissemination activities	0.125	0.125	0.125	0.125	0.500
TOTAL (DfT funding sought)	0.825	3.425	5.925	3.825	14.000

The costs have been reduced in each project by:

- Reducing the scope e.g. making the mobility as a service project a trial only and reducing the rollout of the mobility credits (fewer people supported or less financial incentive provided)
- Scaling back the data project trials e.g. the number of sensors purchase and the number of cameras and location/coverage of the trial
- Reducing the overall number of e-mobility hubs to five in total and eliminating elements from the depot hub (all other hub costs remain fixed to ensure their presence is impactful)

Alternatively, should DfT decide certain elements of the bid are less attractive, the overall funding profile could be adjusted accordingly. In this case the local match funding contributions would reduce in line with the value of the bid.

D2. Financial case – Risk

A number of financial risks have been identified and summarised below. These are also contained in the full risk register included in Table 12. Risks will be managed in accordance with the risk management framework, which is detailed in Section E1.

Short term risks:

- Withdrawal of match funding – to be mitigated through ongoing communication with partners and confirmed in writing for this bid.
- Unforeseen costs – built contingency into the cost profile.
- Lack of revenue funding to support behavioural change measures – seek local revenue funding sources and/or build into the tendering process for new procurements.

Long term risks:

- Mobility credits fail to have an impact in increasing financial independence of key target groups – work with the Financial Resilience Partnership and associated networks to identify suitable candidates and tailor support to achieve best outcome.
- Maintenance/sustainability e.g. data platform/MaaS platform – incorporate as part of existing arrangements and/or build into the tendering process for new procurements.

SECTION E – The management case

E1. Management case – Delivery and risk management

Track record in delivery

The area has been punching above its weight for over a decade, bringing forward creative +solutions to support integrated transport and this approach will be utilised to pioneer the Derby-Nottingham scheme. As lead authority, Nottingham City Council will provide a clear and coordinated strategic approach to the management and delivery of the programme using PRINCE2 project management processes and act as the central budget holder responsible for financial management. **Nottingham is an award winning authority** (City of the Year, Fleet Heroes 2018). We have learnt skills in designing, testing and implementing a range of highly innovative transport solutions all within tight delivery timescales and meeting funding requirements, as demonstrated by the successful and effective delivery of these DfT-funded and other-funded programmes. In particular, the city has developed an enviable reputation in delivering innovative measures to encourage the takeup of electric vehicles amongst public sector, businesses and individuals through the Go Ultra Low programme.

Following the delivery of the Go Ultra Low and Access Fund programmes across Derby-Nottingham, both councils have developed a strong partnership and a project delivery team comprising transport planners/project managers are in place with specialist skills to deliver this scheme. This is supplemented with procurement, finance and legal colleagues who have developed a clear understanding of transport, smart ticketing, electric mobility, and behaviour change.

In addition to the match funded partners (described in section D1) there are additional partners who will support the delivery of the scheme. These are listed in Table 12 below.

Table 12. Wider partners and their involvement in the FMZ

Partners	Involvement
Public Transport Integration Board (PTIB)	Nottingham City Council facilitate the coordination of the PTIB, which is made up of the local bus and tram operators including NCT, trentbarton and Tramlink. The purpose of the group is to coordinate public transport provision and support the delivery of integrated ticketing, services and interchange of modes.
Nottingham Financial Resilience Partnership	The Nottingham Financial Resilience Partnership (NFRP) is an independent, multi-sector partnership seeking to maximise opportunities and the financial wellbeing of our most vulnerable citizens. It has some twenty five members from a wide range of services, from all sectors, that have a role supporting people on low incomes/financial difficulty. The partnership welcome the mobility credit proposals to improve self-sufficiency of key vulnerable members of society.
Nottingham EV Owners Club	Following the award of the Go Ultra Low City funding, a number of EV drivers have gradually reached out to support initiatives and participate in organised vehicle showcases. As a result a number of drivers have formed a EV Owners Club currently with over 130 members with the aim of organising events, meet ups and encouraging the growth of EV ownership. The Owners Club have expressed an interest in supporting the FMZ, in particular the trial of green number plates.

Connected Places Catapult	The Connected Places Catapult, CPC is an independent and neutral organisation (funded by Innovate UK). The CPC has expressed an interest in supporting the scheme by providing unique insight and experience to develop and deliver a compelling proposition. The primary objective of the CPC is the creation of UK jobs and economic growth through supporting UK industry and academia to bring innovative products and services to market. Key initiative areas include Connected & Autonomous Transport, New Mobility Services and Open Data Platforms.
Cenex	Cenex are the UK's leading not for profit independent low emission mobility research and technical support organisation. Cenex supported the development of the electric charging point network, provide support to local businesses and have assisted in the creation of CPD accredited learning programmes. Cenex will be providing match funding through two key projects (Shared Sustainable Mobility and InclusivEV) providing expertise and opportunities for dissemination which will benefit the FMZ scheme.
LEVEL	The Low Emission Vehicle Enterprise and Learning network has been delivering ULEV-related conferences, workshops and e-learning courses since 2016. The network has organised 16 major conferences attended by over 1,300 industry delegates. As the incumbent contracted dissemination partner, LEVEL can build on its significant industry and academic partners to support the knowledge share of the FMZ scheme nationally and internationally.

Letters of support from these partners are included in **Appendix A**.

Key milestones linked to successful delivery

Table 13 includes a list of key milestones.

Delivery of open access MaaS platform

It is proposed to develop a MaaS partnership pulling in the Robin Hood partnership alongside active travel and shared mobility partners to facilitate the development of the MaaS platform to be rolled out initially in Nottingham. This learning will then inform the second phase of development and implementation across Derby. The area is in the fortunate position to learn from the investment and learning taking place on the development of the Robin Hood integrated smartcard ticket, and benefits from the endorsement and cooperation of local bus, rail and tram operators.

Further exploration is needed around delivery of the mobility credits. The aspiration is to deliver mobility credits through the MaaS platform and therefore the rollout of the mobility credits offer will be linked to the MaaS platform timescales, but not dependent on it. However, first there is a key development phase required for the mobility credits package to better understand the particular travel barriers and needs of the specific low income groups the councils are seeking to support, and so mobility credits will be initiated as a separate workstrand to the MaaS platform. It likely delivery will be done via a series of pilot projects working with different groups in each city, which can then be expanded and added to the MaaS platform once the offers and the eligibility criteria for accessing the offers have been tested, and the platform is ready. Learning will be used to help triage support to those most in need and improve recipients' knowledge about travel options, ticketing and how to get to key places, ensuring a level of self-sufficiency for beneficiaries beyond the life of time-limited travel discounts provided by mobility credits.

Data platform

Much of the delivery of the data platform can be managed inhouse, utilising highway metrics, transport planning, traffic management, parking services resources, alongside academic input. The current data projects are being managed this way. Contracts will be required with

commercial providers of the cameras, sensors and customer-facing websites. This is discussed further in the commercial case in Section F.

E-mobility hubs

Delivery of the e-mobility hubs will be managed inhouse and via procuring external support as necessary e.g. for new mobility mode providers. The existing Go Ultra Low and Access Fund team will have a role in ensuring the e-mobility components are integrated together as envisioned in liaison with various service providers and the hosts.

Table 13. Key milestones for delivery

Activity	Implications	Milestone
Final bid submission	<ul style="list-style-type: none"> Derby-Nottingham FMZ bid submitted to DfT 	September 2019
Future Mobility Zones announcement	<ul style="list-style-type: none"> Confirmation of funding Project initiation activated 	October 2019
Programme initiation		
Nottingham City Council Executive Board Approval	<ul style="list-style-type: none"> Formal acceptance of funding and procurement arrangements 	November 2019
Meeting with DfT and other FMZs (if required)	<ul style="list-style-type: none"> Programme inception 	November 2019
Meeting of Joint Mobility Programme Board	<ul style="list-style-type: none"> Derby-Nottingham Joint Mobility Board Commitment of staff resources Approve initiation of projects 	November 2019
Procurement planning	<ul style="list-style-type: none"> Workshop to coordinate procurement approach and timescales 	December 2019
Commence delivery of quick wins	<ul style="list-style-type: none"> Through agreements in place with existing suppliers 	December 2019
MaaS platform		
Project scoping	<ul style="list-style-type: none"> Engagement with existing mobility providers including public transport operators Citizen engagement 	November – December 2019
Technical support	<ul style="list-style-type: none"> Gathering of independent intelligence of MaaS systems 	December – June 2020
Potential trial phase (Stage 1)	<ul style="list-style-type: none"> Explore option to use existing providers e.g. Init or Mobileo 	January – June 2020
Market engagement	<ul style="list-style-type: none"> Soft market testing, where required Liaison with other local authorities Project specification of MaaS platform and contactless readers 	January – March 2020
Procurement	<ul style="list-style-type: none"> Competitive procurement activities 	July – December 2020
Contract award	<ul style="list-style-type: none"> Contract signing 	January 2021
Commencement	<ul style="list-style-type: none"> Project inception 	February 2021
Mobility credits		
Partner engagement	<ul style="list-style-type: none"> Define key target groups/counter groups Develop partner links with support agencies 	December – March 2020
Hold focus groups	<ul style="list-style-type: none"> Establish travel needs and barriers for each cohort 	January – March 2020
Procurement	<ul style="list-style-type: none"> Competitive procurement activities 	April – September 2020
Contract award	<ul style="list-style-type: none"> Contract signing 	October 2020
Commencement	<ul style="list-style-type: none"> Project inception 	November 2020
Pilot trial	<ul style="list-style-type: none"> Testing of concept with target groups Refinement of offer (as necessary) 	November – January 2021

Activity	Implications	Milestone
Full rollout	<ul style="list-style-type: none"> • Formal launch • Delivery commences 	February 2021
Data platform		
Smart data trial	<ul style="list-style-type: none"> • Commence University of Nottingham trial 	January – June 2020
Results	<ul style="list-style-type: none"> • Dissemination of trial results • Refinement of specification 	June – July 2020
Market engagement	<ul style="list-style-type: none"> • Soft market testing • Liaison with other LA's e.g. TfGM • Project specification of data platform 	January – May 2020
Procurement	<ul style="list-style-type: none"> • Competitive procurement activities, including public facing data platform, sensors and cameras 	July – December 2020
Contract award	<ul style="list-style-type: none"> • Contract signing 	January 2021
Commencement	<ul style="list-style-type: none"> • Project inception • Site investigation and approvals • Design and implementation • Testing and customer feedback 	February 2021
E-mobility hubs		
Project scoping	<ul style="list-style-type: none"> • Review current examples e.g. Bremen • Assess land and power constraints • Confirm locations 	December – March 2020
Engagement	<ul style="list-style-type: none"> • Co-design with residents, businesses and academia • Identify menu of services in each hub 	January – March 2020
Testing perceptions	<ul style="list-style-type: none"> • Green number plates (subject to OLEV timescales) • Work in partnership with University of Nottingham on key research areas e.g. autonomous transport 	April 2020 onwards
Procurement	<ul style="list-style-type: none"> • Competitive procurement activities e.g. hub facilities and new mobility solutions, telematics etc 	April – October 2020
Market engagement	<ul style="list-style-type: none"> • Specialist heavy ULEV vehicle suppliers • Host fleet roadshow 	January 2020 onwards April 2020
ULEV centre construction	<ul style="list-style-type: none"> • Creation of dedicated facility • Launch 	January – June 2020
Contract award	<ul style="list-style-type: none"> • Contract signing 	November 2020
Commencement	<ul style="list-style-type: none"> • Project inception 	December 2020
Programme coordination		
Baseline monitoring completion	<ul style="list-style-type: none"> • To establish baseline monitoring and evaluation plan 	November 2020
Recruitment of PhD student	<ul style="list-style-type: none"> • Recruitment in partnership with Loughborough University • Refine research areas 	November – March 2020
Financial reporting to DfT	<ul style="list-style-type: none"> • To activate efficient release of payments 	Quarterly/Annually – subject to DfT
Progress reports	<ul style="list-style-type: none"> • To provide update on scheme/project delivery 	Quarterly/Annually – subject to DfT
Programme completion	<ul style="list-style-type: none"> • Cessation of Future Mobility Zone activities 	March 2023
One year after evaluation (main evaluation)	<ul style="list-style-type: none"> • Evaluation and dissemination 	October 2024
Final evaluation	<ul style="list-style-type: none"> • Final evaluation activities to support impacts/legacy (subject to funding) 	March 2028

Risk management

Risks are tracked in accordance with the council's corporate risk management principles, which draw upon the PRINCE2 methodology. They are categorised by type (comprising five kinds: reputational, delivery, financial, technological and legal). The corporate risk strategy requires the identification and recording of risks, an evaluation of their likelihood and any mitigation actions. This approach ensures that all risks are captured and processed in a consistent manner.

A risk log for the Derby-Nottingham scheme is included in Table 14. Without mitigation, these could result in increased costs to the scheme, reductions in the quality of outputs and slippages in timelines, all impacting the overall benefits and outcomes the bid seeks to deliver. Given the experimental nature of the projects, there are many delivery risks associated with the MaaS platform that will need managing. In particular getting public transport operators and other mobility providers to work together to share data and overcome difficulties in integrating different payment structures will be fundamental to the success of the project, alongside issues relating to privacy and compliance with GDPR regulations. Risks related to the data platform particularly relate to induced demand and transport providers being unwilling to share their data and the integration of data feeds. We understand that there are risks to delivering the e-mobility hubs, particularly with regards to their location and the services they encompass and the response from the local community which will be mitigated through co-design.

Ownership of the risk register falls with the Programme Manager, with project specific risks assigned to the relevant Project Managers. These risks will be subject to on-going monitoring and mitigated through effective governance (referred to in section E2).

Table 14. Risk Register

Risk	Category	Probabi- lity 1=Low 10=High	Impact	Effect	Strategy	Risk Resolution Plan	Person / Team in Charge	Time-scales
Projects fail to have desired Impact	Reputation	6	8	Project failure	Co-design and pilot development	<ul style="list-style-type: none"> Pilot stages to tailor and inform final solutions Co-development of measures with end users where possible Process evaluation to ensure lessons are learnt 	Programme Manager	2019/20 – 2022/23
Unforeseen cost rises	Financial	6	8	Elements potentially become unaffordable	Develop scalable proposals	<ul style="list-style-type: none"> Build contingency into the cost profile Early engagement with the market Seek additional funding opportunities 	Programme Manager	2019/20 – 2020/21
Commercial and data sharing agreements with mobility providers not secured	Delivery	6	8	Inability to share data for the purposes of the MaaS platform	Develop data sharing agreements	<ul style="list-style-type: none"> Develop GDPR compliance approach to share customer data and payment information Explore potential need for Non-Disclosure Agreements between parties involved 	Project Manager	2019/20 – 2022/23
Impact of mobility credits fail to achieve financial independence for target groups	Financial	6	7	Key target groups remain socially excluded	Work with Financial Resilience Partnership	<ul style="list-style-type: none"> Complete scoping stage with partner networks to identify target groups Tailor support to achieve maximum outcome 	Project Manager	2019/20 – 2022/23
Lack of legal expertise in developing tender contracts	Legal	6	7	Inability to meet delivery time-scales and/or stifles innovation	Early engagement with legal services	<ul style="list-style-type: none"> Involve in procurement workshop Seek external expertise if required 	Programme Manager	2019/20 – 2020/21

Risk	Category	Prob-a-bility 1=Low 10=High	Impact	Effect	Strategy	Risk Resolution Plan	Person / Team in Charge	Time-scales
Regulatory aspects with new mobility modes e.g. autonomous vehicles and escooters is unknown	Delivery	6	6	Lack guiding framework affecting ability to deploy new modes	Work with DfT	<ul style="list-style-type: none"> Continued engagement with DfT colleagues 	Programme Manager	2019/20 – 2020/21
Lack of revenue funding to provide supportive measures to capital investment	Financial	6	6	Inability to deliver the behaviour change activities	Early identification of revenue sources of funding	<ul style="list-style-type: none"> Seek to secure continuation Access Fund contributions to fund revenue items Identify revenue funding sources through council budgets e.g. WPL Build service components and mobility credits into tendering process for new procurements e.g. concession contracts 	Programme Manager	2019/20 – 2022/23
Synergy of mobility credits with the MaaS platform	Delivery	6	5	Inability to deliver mobility credits through the MaaS platform	Utilise pilot stage to test best approach	<ul style="list-style-type: none"> Early scoping work to identify how credits can be assimilated into the platform Explore separate delivery mechanism as a backup alternative 	Project Manager	2019/20 – 2020/21
Procurement not coordinated resulting in lack of integration across measures	Delivery	5	6	Scheme delivery delayed or opportunities for coordination are missed	Develop procurement plan	<ul style="list-style-type: none"> Plan a procurement workshop Explore shared procurement opportunities 	Programme Manager	2019/20 – 2020/21

Risk	Category	Prob-a-bility 1=Low 10=High	Impact	Effect	Strategy	Risk Resolution Plan	Person / Team in Charge	Time-scales
Systems are hackable affecting data security	Technol-ogy	5	5	Potential breach of GDPR or leak of data leading to unintended consequences	Develop data security policy	<ul style="list-style-type: none"> • Complete Data Protection Impact Assessments • Ensure use of encryptions • Work with partners e.g. BSI group, to identify appropriate standards 	Project Manager	2019/20
Longer term sustainability and maintenance	Delivery	4	6	Projects end in March 2023 due to lack of continuation funding	Explore business models	<ul style="list-style-type: none"> • Work with partners and market providers to understand commercial business models • Build into tendering process for new procurements e.g. concession contracts 	Programme Manager	2019/20 – 2020/21
Host emulation project/Robin Hood card integration with MaaS platform	Technol-ogy	4	6	Incompatibility of public transport offering and MaaS platform	Coordinate across work programmes	<ul style="list-style-type: none"> • Early engagement of public transport operators • Seek external technical input to ensure interoperability • Futureproof robin hood specifications 	Project Manager	2019/20 – 2020/21
Not finding suitable sites for e-mobility hubs that meet all necessary criteria	Delivery	3	6	Hub sites provide poor/reduced outcomes	Early stage evaluation and assessment of sites across scheme area	<ul style="list-style-type: none"> • Utilise local knowledge from each local authority to help select suitable sites during scoping stage • Work with potential land owners to agree hosting the e-mobility hubs • Engage key stakeholders and communities in design of the elements 	Project Manager	2019/20
Lack of data density	Delivery	4	4	Data platform may not be effective	Utilise pilot stage to test best approach	<ul style="list-style-type: none"> • Identify best camera locations • Use learning from pilot to identify best locations • Use floating data to supplement 	Project Manager	2019/20 – 2020/21

Risk	Category	Prob-a-bility 1=Low 10=High	Impact	Effect	Strategy	Risk Resolution Plan	Person / Team in Charge	Time-scales
Reduced funding awarded from DfT	Financial	4	4	Inability to roll out complete programme	Ensure business case is articulated in the bid and work with DfT through co-development if further information is requested	<ul style="list-style-type: none"> • Scheme designed to be scalable – submit reduced package costs in final bid • Prioritise strongest projects in discussion with DfT if successful award 	Programme Manager	2019/20
Compatibility of data with current UTC systems	Technology	4	3	Limited usefulness of data streams into management of the network	Test compatibility during pilot/scoping stage	<ul style="list-style-type: none"> • Learn from the trial in Manchester • Use learning from the camera trial and beta software designs to further define data compatibility requirements • Work with technical experts to specify appropriate formats and standards 	Project Manager	2019/20 – 2020/21
Withdrawal of match funding	Financial	3	5	Inability to achieve full potential of the scheme	Ongoing communication with partners	<ul style="list-style-type: none"> • Match funding confirmed in writing as part of final bid submission 	Programme Manager	2019/20 – 2020/21
Integration of data with MaaS platform	Technology	3	5	Limited benefit to customers for journey planning	Utilise pilot stage to test best approach	<ul style="list-style-type: none"> • Ensure appropriate data and integration formats e.g. Open API's, JSON, Excel • Work with BSI group and other partners 	Project Manager	2019/20 – 2020/21
Green number plates not forthcoming in the funding timeline	Delivery	5	3	Inability to trial green number plates as part of e-mobility hubs	Work with OLEV colleagues	<ul style="list-style-type: none"> • Continued engagement with DfT colleagues 	Programme Manager	2019/20 – 2022/23

E2. Management case – Governance

Do you have governance processes in place to deliver the scheme?

Yes No

Newly established joint governance arrangements

Building on existing governance arrangements, a refreshed Joint Nottingham Derby Mobility Programme Board has been established to oversee the Transforming Cities Fund programme along with the FMZ scheme. It will also provide a forum for reporting progress on ongoing jointly promoted initiatives such as the Access Fund and Go Ultra Low programmes.

At a strategic level, the Joint Nottingham Derby Mobility Programme Board will provide a steer for all projects within the programme and will provide coordination between the projects to give delivery confidence and facilitate decision making. The Board will facilitate consultation between the individual projects, the relevant Portfolio Holders and Executive Boards at each Authority, the D2N2 (LEP) Officer Group and the Metro Delivery Board.

Joint mobility board terms of reference

The Joint Nottingham Derby Mobility Programme Board can make decisions and allocate resources as long as these are consistent and within the Executive Board Approval (secured through each councils approval process) for the programme. Any changes proposed that are beyond the approval already given would need to be referred back to the Executive Board or to the Corporate Director for Development and Growth (NCC) as the delegated authority.

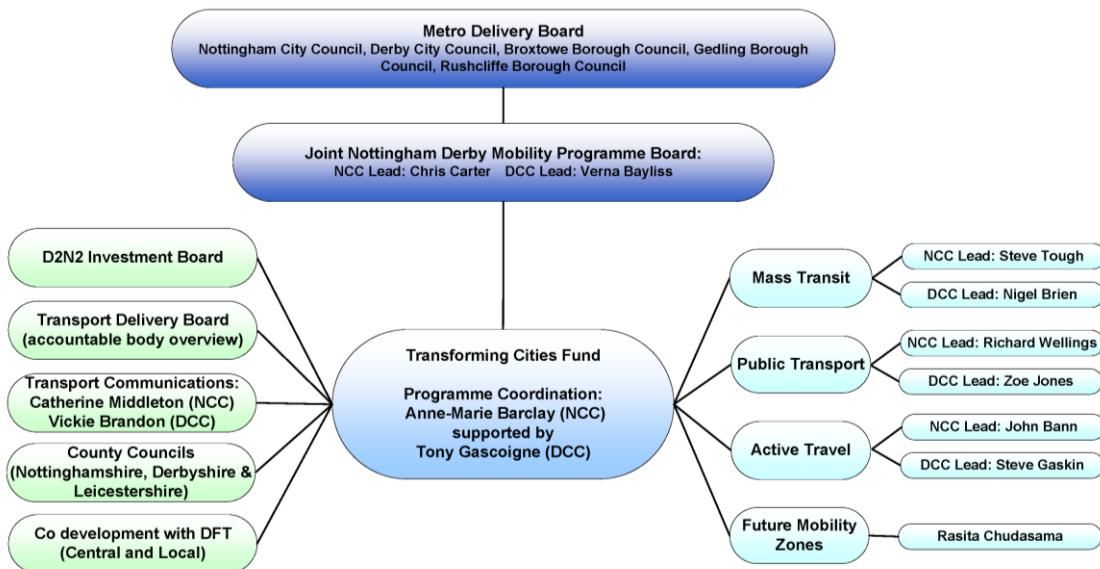
The remit of the Programme Board will be to:

- Ensure commitment to the programme from Members and Corporate Leadership
- To coordinate responses to DfT
- To give direction and provide a steer on all of the projects within scope and ensure successful delivery in line with the approved business case
- To ensure a robust escalation process is in place, and to present to Metro Delivery Board/Internal Governance as required
- To provide guidance on the inter-dependencies within the programme
- To ensure integration with key policies and objectives and provide a link to corporate governance
- To receive monitoring reports for the programme with exception reports to highlight key issues
- Review and monitor the programme budget
- To consider reports/presentations on strategic issues, and advise on any change to project scope
- Oversee project team resource requirements, roles and responsibilities
- Provide sign off to projects at key stages, and seek assurance on projects as appropriate
- To manage risk within the programme and ensure risk registers are maintained at project/programme level
- To ensure that full and comprehensive evaluation is undertaken.

The **Senior Responsible Owner** (Chris Carter, Head of Transport Strategy, Nottingham City Council) will have overall decision-making responsibility for ensuring the Derby-Nottingham future mobility scheme meets its wider objectives and delivers against the desired outcomes. Overseeing the programme to time, budget and quality, the Senior Responsible Owner is responsible for the success of the proposals and owns the business case, provides leadership, manages relationships with partners/stakeholders and recommends opportunities to optimise cost and benefits.

An organogram of the Joint Mobility Programme Board is provided in Figure 14.

Figure 14. Joint Nottingham Derby Mobility Programme Board organogram

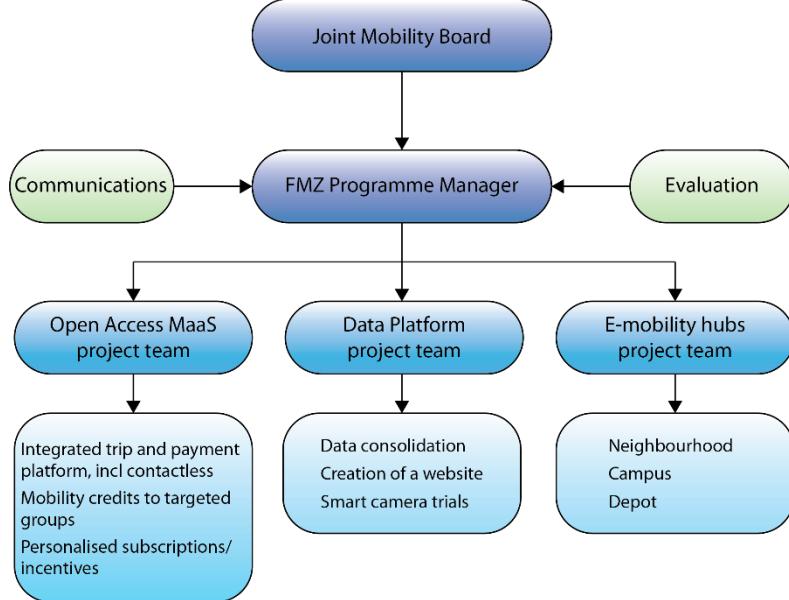


A nominated future mobility **Programme Manager** (based within the client team in Transport Strategy, Nottingham City Council) will manage the day to day delivery of the scheme on behalf of the mobility board, ensuring it delivers to the required quality standards and within the specified tolerances of time, costs and resources. The Programme Manager will oversee the change control and risk management functions, is responsible for commissioning activities, both internally and other external contractors, financial monitoring, reporting of progress to the Board and other stakeholders, coordinating communications activities and ensuring evaluation activities are undertaken as required.

At the project level, regular meetings will be led by the Programme Manager with **project delivery teams**. The project delivery teams will consist of specialist skilled staff responsible for the delivery of the specified projects and of reporting project deliverables and other outputs to be fed into the overall evaluation activities. For significant divergences to timescales, costs or any other variations, these changes are captured by the Programme Manager, and where necessary escalated to the mobility board and/or SRO for resolution.

A more detailed scheme level organogram is included in Figure 15.

Figure 15. Derby-Nottingham FMZ scheme organogram



Reporting schedule

All projects within the Transforming Cities and FMZ programmes will complete a monthly monitoring report to update on progress and current spend, alongside a RAG rating for project's progress in terms of time, cost and scope. This information will be consolidated into a programme report, which will be circulated to Board members and the project management office each month.

In the event of an exception occurring the Programme/Project Manager will produce an exception report to provide information about any issues or risks that could affect the delivery of the programme or reputation of the councils. Any change will need to be considered in terms of its impact on time, cost and quality, and its effect on other interdependent projects within the programme. The report will be tabled at the Programme Board and depending on the scale of the exception; these reports may be escalated to the Metro Delivery Board or Council Transport Delivery Board(s)/Executive Board(s) as appropriate.

E3. Management case – Monitoring

A monitoring report should be prepared following the completion of each year of the scheme. The Department will work with successful bidders on the exact format of the report to ensure a consistent approach.

Do you agree, in principle, to undertake monitoring for each project in the FMZ scheme?

Yes

E4. Management case – Evaluation

Process and impact evaluation will be a cornerstone to our scheme, as the way in which the projects fit together and are evaluated will determine the learning, legacy and real-world large-scale replicability.

A comprehensive evaluation plan is provided in **Appendix B**.

The following is a brief summary of this plan but for a full understanding of the evaluation proposals the reader is encouraged to read the full plan in the above appendix.

Nottingham City Council has a proven in-house monitoring and evaluation capability, which will deliver the evaluation for this scheme. The council has been responsible for numerous evaluation projects including major evaluations for the Workplace Parking Levy and the Nottingham Ring Road Improvement (NRIS) and the Go Ultra Low programme, which utilises a Realistic Evaluation approach. The evaluation approaches were tailored for the individual schemes.

The WPL evaluation was based around a hybrid Theory of Change/Realistic Evaluation² approach, but also used quasi experimental components and was conducted in partnership with Loughborough University with oversight from the DfT.

The NRIS evaluation conformed to the DfT's Standard Monitoring as mandated for schemes of this value and outlined in the 2012 DfT Guidance, Monitoring and Evaluation Framework for Local Authority Major Schemes, published in September 2012. The ongoing evaluation of the Go Ultra Low Package is based on Realistic Evaluation. Thus, the council has a proven track record in delivering complex evaluations using a variety of different approaches.

Loughborough University (LU) has indicated via a letter of support that it will act as academic partners in the evaluation of the Future Mobility City (Derby – Nottingham) including providing a PhD student to carry out a relevant PhD project which will contribute to this evaluation. This builds on the previous successful partnership in similar evaluations. Dr Matthew Frost will lead the project for LU.

The FMZ scheme objectives as described in Section B1 of this document are:

1. Provide a “customer first” experience using new technological solutions to facilitate seamless travel.
2. Improve equality of access to transport for lower income and key target groups.
3. Deliver a clean, green transport network to support air quality and carbon neutral objectives.
4. Support the local economy and business by reducing congestion and improving accessibility leading to increased productivity and lower production costs.
5. Facilitate innovation and investment in new mobility marketplaces, in particular support local industry and academia through new skills and employment opportunities.

The above FMZ scheme objectives are related to both FMZ fund programme objectives as well as local LTP objectives. While how each project facilitates the programme and local LTP objectives is discussed comprehensively in the strategic case it is useful to understand how achieving the FMZ Scheme objectives will contribute to the FMZ Programme objectives and relevant local LTP objectives and a discussion of this issue can be found in Section 1.2 of the Evaluation Plan.

With these five FMZ scheme objectives in mind the following over-arching research questions have been developed to cover the main topics addressed by the FMZ scheme and the objectives of the Future Mobility Zones Fund:

P1 - Trial new mobility services to combine new and traditional modes: the FMZ scheme objectives O1 and O5 correlate with this programme objective. O1 will require innovation in the field of automated data collection and processing and the development of the MaaS in order for the objective to be fully achieved. O5 identifies this innovation as an objective in its own right.

P2 - Improve integration of services: The programme objective will be facilitated by achieving the FMZ scheme objective O1 through the provision of MaaS.

P3 - Increase the availability of real time data: As noted in the strategic case, the Data platform meets this objective, it is also implicit in achieving the FMZ scheme objective O4 as this increased availability of data facilitates the congestion constraint measures and provides opportunities for business and academia.

P4 - Provide access to digital planning and payment options: This programme objective is directly aligned with the FMZ scheme objective O1 through the provision of the MaaS project.

P5 - Providing mobility credits or other low-cost option: This objective is directly aligned with the FMZ scheme objective O2 through the provision of mobility credits for low income and other target groups via the MaaS project.

P6 - Trial new mobility services to combine new and traditional modes: FMZ scheme objectives O5 and O1 align to this programme objective through the provision of MaaS as a new mobility service and the E-mobility hubs, which provide innovative solutions in combining new and traditional modes as well as trialling new ones such as the autonomous shuttle buses on the campuses.

The following discusses how the LTP objectives will be facilitated by the FMZ scheme objectives being met:

L1 - Deliver world class infrastructure and connectivity: The FMZ scheme will contribute to this broad objective by achieving O1, O2 and O3 by providing better access to the transport system, especially for low income groups and increasing the use of non-car and electric travel options.

L2 - Make transport more accessible through electronic information: This is directly aligned with the FMZ scheme objective O1, which aims to increase access to transport via the MaaS and the enhanced council transport websites providing better visibility of options and more convenient ways of paying and accessing these.

L3 - Improve efficiency of the network: FMZ scheme objective O4 will contribute to this by reducing/constraining congestion while the innovative solutions required to meet O5 will also increase efficiency.

L4 – Encourage sustainable alternatives: The FMZ scheme will contribute to this broad objective by achieving O1, O2 and O3 by promoting mode switch away from private ICE powered cars to electric vehicles, public transport and active travel modes.

L5 - Improve air quality and minimise transport's contribution to climate change: This is directly related to FMZ scheme objective O3.

With these five FMZ scheme objectives in mind the following over-arching research questions have been developed to cover the main topics addressed by the FMZ scheme and the objectives of the Future Mobility Zones Fund:

1. Can public policy led MaaS achieve greater uptake of greener transport services?

As outlined in the strategic case the MaaS developed as part of the FMZ scheme will be publicly led, unlike other applications of MaaS, in the West Midlands for example. As this is a unique feature of the package it will require a thorough evaluation.

2. How does the future mobility package make electric mobility more accessible? A key theme of the FMZ scheme is to electrify the transport system.

3. How do different parts of a multi-centred region respond to different Future Mobility Zone interventions? The FMZ area covers two medium sized cities with different transport provision and differing economies and multiple subsidiary centres of economic activity. This provides an important opportunity to learn how FMZ interventions act differently in different settings. Understanding this will increase the transferability of the approach.

- 4. How effective is new technology in delivering the benefits of the FMZ? –** testing new transport technologies is inherent in the FMZ fund's objectives and for the FMZ specifically.
- 5. How effective is the Future Mobility Zone approach in constraining congestion? –** as a key cost to the economies in urban areas across the world it is important to understand how a FMZ can contribute to mitigating this problem.
- 6. How effective is the Future Mobility Zone approach in enhancing the local economy? –** supporting economic growth is a key objective for both Derby and Nottingham City Councils, the FMZ fund and the FMZ scheme.

The Impact Evaluation has been designed to address these questions and test whether the FMZ scheme has met its stated objectives. A suite of scheme level research questions will support these package level questions and have been developed as part of the logic mapping and Theory of Change evaluation approach. These are discussed in the Evaluation Summary Panels in the Evaluation Plan (Section 4.9.1 and in Tables 4.7 to 4.9 also in Section 4.9.2). Table 4.10 illustrates how the Package Level research questions relate to the scheme level questions.

Proposed evaluation approach

A theoretical approach is proposed for the Future Mobility Zone (Derby – Nottingham) impact evaluation based on a hybrid Theory of Change (ToC) evaluation approach, which also contains aspects of Realistic Evaluation. This approach will fully document the mechanisms which acted to achieve the desired outcomes and impacts and how the effectiveness of these were influenced by national and local context.

The FMZ scheme is similar to the WPL in being highly innovative and untested prior to its implementation in Derby - Nottingham. Such interventions are highly suited to Theoretical Evaluation approaches. The approach taken builds on the traditional application of the ToC approach and enhances it by inserting individual mechanisms of change into ToC logic maps at key points to explain why particular linkages occur. A ToC will show each step on the causal pathway from scheme implementation to eventual desired impacts, these mechanisms explain how progress from one step to the next is to be achieved.

This stage in the evaluation is crucial in terms of the provision of an exportable template (once fully tested) for the interventions trialled by the FMZ, because it provides a more detailed explanation of change. The ToC will then be tested by a range of relevant indicators and refined as necessary. Contextual differences could make exporting the approach more or less effective than that demonstrated in Nottingham and Derby and thus an understanding of the interaction of the mechanisms by which change is achieved and the impact of context on their effectiveness is crucial in the design of future similar zones.

Process used to identify the Theory of Change for the Future Mobility Zone

The FMZ scheme ToC has been developed by consulting with key internal and external stakeholders to arrive at a consensus as to how the FMZ will achieve its stated objectives. Initially, the ToC, including the logic maps and supporting tables, was drafted by the council evaluators and then subsequently refined by other key internal stakeholders. The ToC has subsequently been shared with the DfT Centre of Excellence for Evaluation and NCC's academic partners in this evaluation at Loughborough University who have both now input into the ToC. The ToC has also been circulated to the Connected Places Catapult and the British Standards Institute who will comment in due course, but possibly not prior to the final submission of the bid.

The FMZ ToC has been strengthened by individual mechanisms of change inserted into the ToC logic maps at key points to explain why particular linkages occur. The details of the Future Mobility City (Derby – Nottingham) ToC is fully described in the Evaluation Plan in

Tables 4.1 to 4.4 which identify these mechanisms for change and itemises the exogenous contextual factors which could impact on the efficiency of the mechanisms. Figures 4.1 to 4.3 present the FMZ ToC logic maps. The maps are chronological in nature and identify the stages and linkages flowing from the initial context to the inputs, outputs, outcomes and eventual longer term impacts. They also show which outcomes and impacts contribute towards the FMZ objectives. The mechanisms for change are integrated into the FMZ ToC logic maps.

It is also important to note that the above is an initial approach and that, upon scheme approval, the logic maps will be reviewed, redeveloped and optimised, and the data collection methodologies validated, if necessary, to give the appraisal key focus. The ToC is complex and it is important to focus the available evaluation resources on the more medium term outcomes and important mechanisms that facilitate these because, not only are they the most important elements in the ToC, but also because it will be possible to generate robust evaluation conclusions for these aspects of the ToC by effectively attributing observed change and accounting for contextual change. Therefore in recognition of this 3 evaluation Summary Panels have been developed and these are presented in the Evaluation Plan in Section 4.9, Tables 4.7, 4.8 and 4.9.

The FMZ ToC will be then be tested using a battery of indicators will identified as capable of monitoring progress towards each FMZ objectives A baseline for these will be established and the indicators tracked throughout the evaluation period where appropriate. This monitoring framework is detailed within the Evaluation Plan in tables 4.5 and 4.6. The data collection methodologies are presented in Sections 4.4-Table 4.6, 4.5, 4.6, 4.7 and 4.8 of the Evaluation Plan.

It will be important to estimate actual changes in productivity based on available time series data and the evaluation team will work with the DfT to determine the most appropriate method to achieve this. The indicators will also be analysed with a view to assessing Value for Money of the scheme. This will include an analysis of the outturn costs.

An evaluation requires an assessment of to what extent the change observed in the indicators can be attributed to the intervention, which is being evaluated.

The change observed in the indicators will, therefore, be subject to further research to take into account exogenous changes which could impact the ability of the scheme to meet its objectives and thus to determine if the observed changes can truly be attributed to the scheme. While this will need to be considered more carefully in conjunction with our academic partners and as part of the post submission co-development with the DfT Evaluation Centre of Excellence, it is expected that the following methods will be employed to achieve attribution:

1. A quasi experimental approach whereby indicators in the area subject to the scheme are compared to those from other similar urban areas. For example, this would be appropriate for indicators such as the take up of EVs in the Travel to Work areas of Derby and Nottingham benchmarked against other urban areas.
2. An experimental approach whereby the impact of the FMZ measures on a randomly assigned group are compared to the outcomes for a similar randomly assigned control group. This approach could be suitable for testing the impact of mobility credits on low income groups.
3. Time series analysis – subject to data ability it could be possible to use a simple time series model to establish a statistical link between a relevant dependent variable and other independent variables, including one, which acts as an intervention variable.
4. Direct interview surveys of stakeholders where they are asked if they have changed their travel behaviour over the evaluation period and why. These surveys are detailed in Section 4.5. They will form an integral part of this evaluation, but will be augmented by indicators.

5. A comparison of actual change with change expected according to the logic map.

The evidence from one or more of the above research methods, together with the changes to the indicators will be triangulated to generate robust conclusions as to whether the scheme has met its objectives.

Process evaluation

For the FMZ scheme a robust process evaluation will be particularly important due to the previously untested nature of the interventions with regards to their deliverability, especially the technological aspects of these.

Data will be collected and analysed during the implementation stages to offer real-time feedback, which can contribute to continuous improvement in delivery. This fits particularly well with the staged provision of MaaS. It will also gather evidence which contributes to the analysis and interpretation of the impact and economic evaluations.

The process evaluation will use a range of qualitative and quantitative research methods, drawing on data on performance and financial management, and feedback from the project management team, delivery team and wider stakeholders.

A series of research questions have been developed to assist in the process evaluation for the FMZ scheme. These are as follows:

- **How was the scheme delivered?** An account of the methods used to deliver the scheme are important in transferability especially when combined with the following question
- **What lessons need to be learnt to improve future delivery of similar FMZ schemes? What worked well and what didn't?**
- **What are the technical barriers to delivering real time transport data across a diverse multi-centred city region?** This question tests the assumption that this is possible/practical. The diverse nature of the FMZ scheme provides a test bed that should cover most scenarios where the approach is likely to be applied in the future in other locations.
- **What were the experiences of FMZ service users, delivery partners, service providers, local businesses, and other stakeholders?** Addressed through stakeholder surveys, but also need feedback from delivery partners and service providers.
- **How complete are current data collection processes?** Are the issues to be considered likely to need tailored data collection? Addressed through specific survey design, e.g. stakeholder surveys, supplemented by existing monitoring data in the FMZ.
- **Which aspects of the delivery process are innovative or untested?** The process evaluation will need to highlight these aspects of the FMZ delivery process and how successful they were.

Table 3.1 in the Evaluation Plan illustrates the evidence that will be collected for process evaluation of the FMZ scheme. This helps to set out the distinction between the sets of activities, but also highlights how they can complement each other. This monitoring framework should provide evidence to address the above research questions.

SECTION F – The commercial case

F1. Commercial Case

Building on established arrangements and level of market engagement

The Derby-Nottingham area has a proven track record for delivering integrated transport schemes, not limited to mass transit, Workplace Parking Levy, cycling, road space transformation, ULEVs and behaviour change programmes.

The area has taken the initiative to deliver innovative contracts, such as the UK's first charge point concession framework (awarded to BP Chargemaster in 2018) and similar frameworks in related fields. The team has developed the skills and market know-how to understand different business models and the value they bring, secure commercial returns from the private sector via revenue shares and capital investment.

The area has successfully forged effective partnership working with a wide range of organisations across the public, private and third sectors whilst leveraging other public and private sector investment. Following the submission of the Derby-Nottingham scheme stage 1 application form, there has been an enthusiastic response from the market (existing and potential suppliers) and partners (strategic bodies, academia and beneficiaries) to our proposed measures, validating our approach and expressing a keen interest to participate in their development. Our partner letters of support are included in **Appendix A**.

The longstanding active partnerships across all three project areas will form the basis from which to develop the proposals further and determine where new procurements will be necessary:

Open access MaaS platform

Critical to our approach will be taking learning from our existing multi-operator public transport ticketing investment comprising £15m in smart ticketing and £2.4m in Eurocard Mastercard Visa (EMV) contactless payments. The council has a number of longstanding commercial and indirect partnership relationships in the digital and smart ticketing field, which alongside key stakeholders will be levered into the delivery of the MaaS platform.

The Robin Hood partnership has developed over the past five years and incorporates all local bus operators, the tram and the suburban rail operators. All of the commercial agreements that sit behind the Robin Hood ticketing scheme will simplify the route to the inclusion of public transport ticketing in the MaaS platform.

Many of the key ingredients, which will form the foundation of the platform, are in place following work with Rambus, Init, Smart Citizen, Cammax and ECEBS, which delivered "Robin Hood" – one of the first multi-operator pay-as-you-go smart ticket with complex day capping products outside of London. Robin Hood now facilitates circa 8 million trips across Nottingham's deregulated public transport network. Work is also underway with Ticketer to ensure Robin Hood compatibility with their ticket machines when one of our major bus operators makes the switch from Init in March 2020.

This will open up the possibility for the scheme to be expanded across a wider geographic area by allowing for the incorporation of "Non-Init" operators into the scheme. The delivery of a Host Card Emulation project funded via the Transforming Cities Fund will deliver all the current functionality of the Robin Hood smart card on mobile devices and will be futureproofed to ensure that it can be seamlessly integrated into any future MaaS platform.

In terms of EMV, "Nottingham Contactless", part funded via the National Productivity Investment Fund, is due to go live in March 2020 delivering multi-operator capping and account based ticketing across Nottingham City Transport (bus), Nottingham Express Transit (tram) and Nottingham City Council contracted bus services.

Along with the delivery of single operator fares on the key Derby-Nottingham inter-urban operator – trentbarton’s bus services, the project is being delivered in partnership with our local public transport operators with hardware and back-office systems provided by Init and Ticketer. The council is funding operators to deliver the required hardware and multi-operator back office. Merchant acquirer services are being provided by Barclaycard who have been procured via a Crown Commercial Services framework by the council on the behalf of the “Nottingham Contactless” scheme participants. NMI Creditcall have been appointed as the payment service provider for this project.

These existing commercial and partnership relationships will be key to delivering a successful mobility project locally.

As part of the development of the broader open access MaaS platform, the councils have spoken with Init, Mobileo and Citymapper regarding their products. In the short term, we have been offered the opportunity to trial the first stage of the MaaS platform with for example Mobileo or Init. It is felt due to the complexity of the project, the evolving nature of the market plus their diverse offering and the need to demonstrate value for money, a new OJEU procurement will be carried out to secure a platform and mobility credits provider to collaborate with.

In order to rollout contactless readers onto shared and active transport modes, the council will seek to procure equipment, either through the Crown Commercial Services framework or develop its own tender.

Building strong relationships with partners, stakeholders, and the client groups themselves, will be key to successful delivery and development of mobility credits packages that really make a difference to the key target groups we are trying to support. Engagement has started with the Nottingham Financial Inclusion Partnership, and the equivalent stakeholders in Derby need to be identified, as these will be key allies in this process. The aim is to commence rollout of the mobility credits offer from October 2020 onwards, following a new procurement of specialist service providers or a decision to deliver via in-house resources.

Based on experience of similar projects that have been implemented in the past, it is felt an element of personalised travel planning support will be required alongside issuing the mobility credits. It will be critical to agree the most effective way to provide the personalised travel planning (PTP) component to the mobility credits package, either in-house or via externally commissioned provider as per the current jobseeker support offer in the Nottingham Derby Access Fund programme. The PTP component will draw on the learning from previous jobseeker support offers under LSTF, Youth Employment Initiative and Access Fund.

The eventual service providers will become the face of the offer and so will need to establish trust amongst the communities the councils are seeking to support. Therefore the procurement and recruitment stage will need to be carefully timed to balance having sufficient information from the development stage to inform the preparation of a comprehensive service specification, against the benefits of directly involving the delivery partner in the development stage itself to support relationship building with community partners.

Data platform

The councils have arrangements in place with existing suppliers that provide urban traffic control and highway management related services. Both councils have contracts with Siemens for all its traffic signals activities and Nottingham City Council has arrangements with Inside Out for traffic cameras. Recently, Nottingham City Council has partnered with Vivacity on the real world trial of their smart camera technology around the University of Nottingham campus. The council is also working with the University of Nottingham to develop a “smart Cambridge” style website (currently in its Beta stage) and smart panel digital displays for public use following a visit to Cambridgeshire County Council. A conference call was held with Alchera to discuss their public facing data platform and the potential role a commercial provider could play alongside our academic partners in helping to develop our data platform in a scalable, accessible way.

Nottingham City Council already manages the back office system for real-time public transport information across Derby, Nottingham, Derbyshire and Nottinghamshire local authority areas. Over the past 15 years circa £15m has been invested in the system. The core supplier for the back-office control system is Init along with some input from Procyon and Trapeze. With on-street displays provided by Daktronics (LED) and 21st Century (LCD/TfT). A data broker system has been developed with 21st Century to expand the scope of the real-time system beyond the acceptance of data feeds from Init only ticket machines, which will enable further regional expansion of the availability of real-time public transport information in areas where currently only scheduled information is able to be provided. Plans to deliver a single content management system for the real-time system are being brought forward as part of the Tranche 2 bid into the Transforming Cities Fund. The system will enable real-time feeds to be delivered through one gateway to various digital platforms, rather than the multiple content management systems that have to be updated at present.

The Robin Hood App, which includes a multi-operator journey planner is highly rated on Google play and has been delivered by market leader Passenger. It will also be integrated with the Robin Hood host card emulation application. Progress in the delivery of regional real-time information across the Derby-Nottingham area and the existing regional real-time partnership provide a strong foundation in incorporating journey planning into the MaaS platform and digital displays for the public. Well developed partnerships are already established between stakeholders and suppliers and a number of Service Level Agreements and contracts in place. This is complemented with established procurement routes via both Crown Commercial Services and local frameworks.

With regards to managing parking, Nottingham City Council has a number of existing arrangements in place. The council currently manages 1,500 on street parking bays and approximately half the off-street parking provision; Skidata supplies the off-street pay on foot ticket machines and barriers. Payments for many of the car parks and all on-street parking can be made by mobile phone via our contract with RingGo. There is a commitment to enable contactless payment for both on-street and off-street parking.

There is an existing Parksmart system that identifies available spaces in our off-street car parks. A state-of-the-art 1400 space off-street multi-storey car park is currently under construction, due to open in 2020. This Broadmarsh car park will include provision for electric vehicle charge points in 5% of bays. FMZ funding will allow for the introduction of new technology to notify users of available spaces and status of charge points on each floor.

New OJEU procurement exercises will need to be undertaken to secure commercial providers around the data services and new cameras/sensors required. In addition, strategic partners such as the BSI group and Connected Places Catapult will be vital in helping to shape the specifications of these tenders and ensure appropriate standards of software and their interoperability with different hardware equipment.

E-mobility hubs

Given progress to date with the delivery of the Go Ultra Low and Access Fund programmes, many suppliers/routes to market are in place to benefit the creation of the various e-mobility hubs in neighbourhood, campus and depot contexts.

Neighbourhood hub

The area has identified two potential locations for the neighbourhood hubs to be hosted, and is working on options to finalise the third site. Blueprint (a sustainable housing developer, part owned by Nottingham City Council) has offered to host an e-mobility hub in their flagship Trent Basin development, Nottingham. The area benefits from an active local community and residents association. In Derby, the desire is to work with an established residential community around a collection of streets. Derby City Council will identify the land on which to host the e-mobility hub. The third hub location will be in Nottingham and set in an existing residential area that includes lower income wards to provide the intensive support linked to the mobility hubs. The location will be decided upon following further work with the Financial Resilience Partnership.

Many of the features of the e-mobility hub have already been procured e.g. BP Chargemaster is providing the publically accessible charging infrastructure network across the sub-region. Currently 325 charge points have been installed, rising to almost 400 by March 2020. BP Chargemaster are investing their own funding as part of the contract to install a further number of rapid (50kW) and higher power chargers (150kW0 across the area. The council has routes to market to procure solar panels and micro generation equipment. The council also has existing arrangements for procuring real time public transport information displays, bus stops and ticket machines.

To fully realise the vision of our e-mobility hubs, additional procurements will need to be carried out to create the complete design and identity of the hub alongside the purchase of new mobility solutions e.g. ebikes, and escooters.

Campus hub

The campuses the scheme will focus on are well served by public transport services to the fringes of the campuses. Last mile travel is what we would like to explore as part of the campus hubs delivery. This will trial new modes, such as ebikes, escooters and autonomous vehicles, all of which will need to be procured.

It is anticipated the new mobility solutions will be procured to be deployed in multiple hubs to ensure consistency of products and achieve value for money. The council has spoken with a variety of ebike providers and Navya (autonomous shuttle manufacturer) as part of the market engagement during the summer.

Depot hub

The depot hub will be tested at the Eastcroft Depot in Nottingham to address how largescale diverse fleets can be electrified. The council has created a series of partnerships with electric vehicle manufacturers e.g. Nissan, Renault, Boshung, Turborg/Dennis Eagle, LDV and LEVC following the procurement of vehicles since 2016. Taking learning from converting its own fleet conversion, the council is in the process of developing a UK-wide public sector authority framework for ULEV vehicles and infrastructure, which will ensure early delivery of the depot hub elements. This is to address the gap in suitable routes to market to procure these items, which is often a barrier to other local authorities lacking resources and expertise in this area. Similar to this is the need for vehicle telematics to offer the intelligence of how vehicles are performing and how best to optimise their range and energy consumption. A new procurement will need to be carried out to secure a telematics provider that is vehicle agnostic and provide vehicle by vehicle data through a digital dashboard.

It is proposed to work with BP Chargemaster to create a shared fleet network of rapid chargers for fleet use across a number of fleet locations in the city.

Linked to the vehicle conversion, has been the need to train and re-skill fleet technicians so they have the necessary qualifications and accreditations to repair and maintain our diverse fleet. This has resulted in the concept surrounding the ULEV Service, Maintenance and Repair Centre. This will be the UK's first local authority run aftercare centre dedicated to ULEVs. The tender for construction works is in progress to facilitate centre works and improvements to the Eastcroft Depot to allow for the opening by summer 2020.

Procurement strategy

The project team holds significant knowledge and expertise in delivery of both large scale infrastructure and specialist, innovative improvements. This includes legal, finance and procurement expertise who will be vital in helping to deliver the procurement strategy. This has been employed on a number of innovative Go Ultra Low programme funded projects including the creation of a UK-wide public sector ULEV vehicles and infrastructure framework, as well as the cutting-edge Robin Hood multi-operator public transport ticketing products.

As the accountable body, Nottingham City Council will lead on relevant procurement activities on behalf of the area – with all new procurements open to Derby City Council, (potentially other local authorities and public sector bodies) to use our contracts and frameworks. The council has a commitment to ensure its procurement will be fair, open and transparent. New procurement to be undertaken will comply with all relevant legislation, including European and UK Procurement Regulations and will be in accordance with the council's Financial Regulations and Contract Procedure Rules.

To achieve this, the council will:

- Follow robust governance procedures to ensure accountability and compliance,
- Work in an inclusive way, valuing diversity and actively promoting equality, diversity and equity
- Implement consistent, open, transparent, proportionate and accessible processes and systems to enable the full participation of all potential suppliers,
- Ensure a level playing field for all supplies and that third sector, small and medium sized organisations, or start-ups are not disadvantaged by the council's processes.

The councils have taken the opportunity to talk to many market providers and our current partners to test our approach and refine our ideas. In essence, the scheme has commenced soft market testing with gaining insight and feedback from potential market providers on how best to develop specifications for our projects and partners to build on lessons learnt from projects already underway. These discussions will continue through the commencement of the scheme funding in order to refine our approach further.

Overarching procurement strategy

Our scheme comprises of three interconnected projects. Therefore, the procurement must consider the alignment and synergy between projects as part of specific procurements that may then be pursued. It is proposed to hold a procurement planning workshop post funding award to further scope the procurement approach, determine critical dependencies and identify the order within which to proceed. The opportunity to group elements together into single procurements will also be explored with relevant project leads and partners, taking input from legal and procurement experts.

For the purposes of this bid, our procurement approach for each project and element is set out in Table 15 below:

Table 15. Procurement summary

Project/Element	Procurement approach	Value	
Open access mobility as a service platform			
MaaS platform	Potential to partner with a MaaS provider for the trial e.g. Mobelio or Init. Post trial a provider will be sought via external OJEU procurement exercise	2.000	
Contactless readers for shared mobility/active travel	Either via Crown Commercial Services framework or new procurement exercise	0.400	
Mobility credits	Potential to partner with Enterprise's MaaS provider, Mobellio (for the trial) however longer term via external competitive procurement exercise	3.300	
Data platform			
Public facing data website	New procurement exercise	0.400	
Improvements to SCOOT, area-wide VMS and other sensors e.g. parking, cycling readers	New OJEU procurement exercise for parking and other sensors. Urban Traffic Control System upgrades, SCOOT detection equipment and area wide VMS can be procured via the councils' existing framework with Siemens, enabling all orders for works to be placed	1.100	
Smart cameras	New OJEU procurement exercise for real-time traffic cameras	1.000	
E-mobility hubs - key list of features			
Hub signage, identity, waiting and communal facilities e.g. benches and seating	New procurement exercise	4.500	
Cycling facilities:			
Covered secure cycle parking/ebike docking stations	Delivered internally via inhouse DLO/framework contracts		
Ebikes and recharging facilities	New procurement exercise - already commenced linked to proposed framework		
Electric scooters	New procurement exercise		
Public transport:			
Real time information displays	Displays and Data Feed Brokerage system can be procured from an existing Nottinghamshire County Council framework which the Councils' are able to call upon - new tender launched 23 September		
Smart bus stop, Robin Hood Card ticket/top up machines	Utilise existing contract with JC Decaux and Cammax (covering supply, installation and maintenance)		
Personal mobility:			
Electric car club hire	Utilise existing contract with Enterprise Car Club in Nottingham (covering vehicle supply, signage and marketing) New procurement required in Derby		
Electric vehicle charging points for public and shared transport use	Utilise existing contract with BP Chargemaster (covering civils works, back office, charge point and maintenance)		
Wider community facilities:			
Digital information displays (fed via data platform) and wifi hotspots	New procurement exercise or utilise digital services contract already in place		
Other first/last mile services e.g. collection/delivery lockers and e-cargo bikes	New procurement exercise		
Pop-up mobility experiences and behaviour change activities/services	Link with existing service providers		
Micro generation options	New procurement exercise - already underway to create a UK wide ULEV infrastructure framework contract		

Project/Element	Procurement approach	Value
Depot hub features (in addition to the above):		
Electric fleet vehicles	New procurement exercise - already commenced using the emerging ULEV vehicles framework	0.650
Shared fleet recharging network, including higher power chargers and micro generation	Utilise existing frameworks and contracts	0.550
ULEV Centre and car park reconstruction works	New procurement exercise - already commenced. Civils works to be carried out via internal DLO/existing frameworks	0.600
Vehicle telematics for ULEVs	New procurement exercise - already commenced	0.400
Campus hub features (in addition to the above):		
Autonomous shuttle bus	New procurement exercise	3.220
Selected items from list above	Various	

Opportunities for collaboration

Due to the innovative nature of the projects and taking feedback from existing partners and market providers, there looks to be a great degree of collaboration potential. The Derby-Nottingham authorities confirm a willingness to work with others and share learning in particular with DfT, other local authorities, and the other FMZ and Transforming Cities areas. For example, cross-working to develop the specifications of hardware and software platforms and co-development of project design and delivery would be valuable. In particular, Derby-Nottingham would like to:

- Explore opportunities for joint procurement of the MaaS platform with Transport for Greater Manchester (following initial discussions we had in the summer)
- Benefit from learning by Transport for West Midlands on the development of integrated ticketing and their experiences with their smart ticketing product
- Continued work with Cambridgeshire County Council on the data platform

Emerging international partnership

Yixing, a Chinese company, have established a joint venture company in Derby alongside Yixing Traffic Transportation Group. The company is very interested in the FMZ scheme and potential opportunity for collaboration over the duration of the project through the supply and deployment of innovative electric vehicles and associated charge point infrastructure. The partnership also presents an opportunity to provide exportability to China.

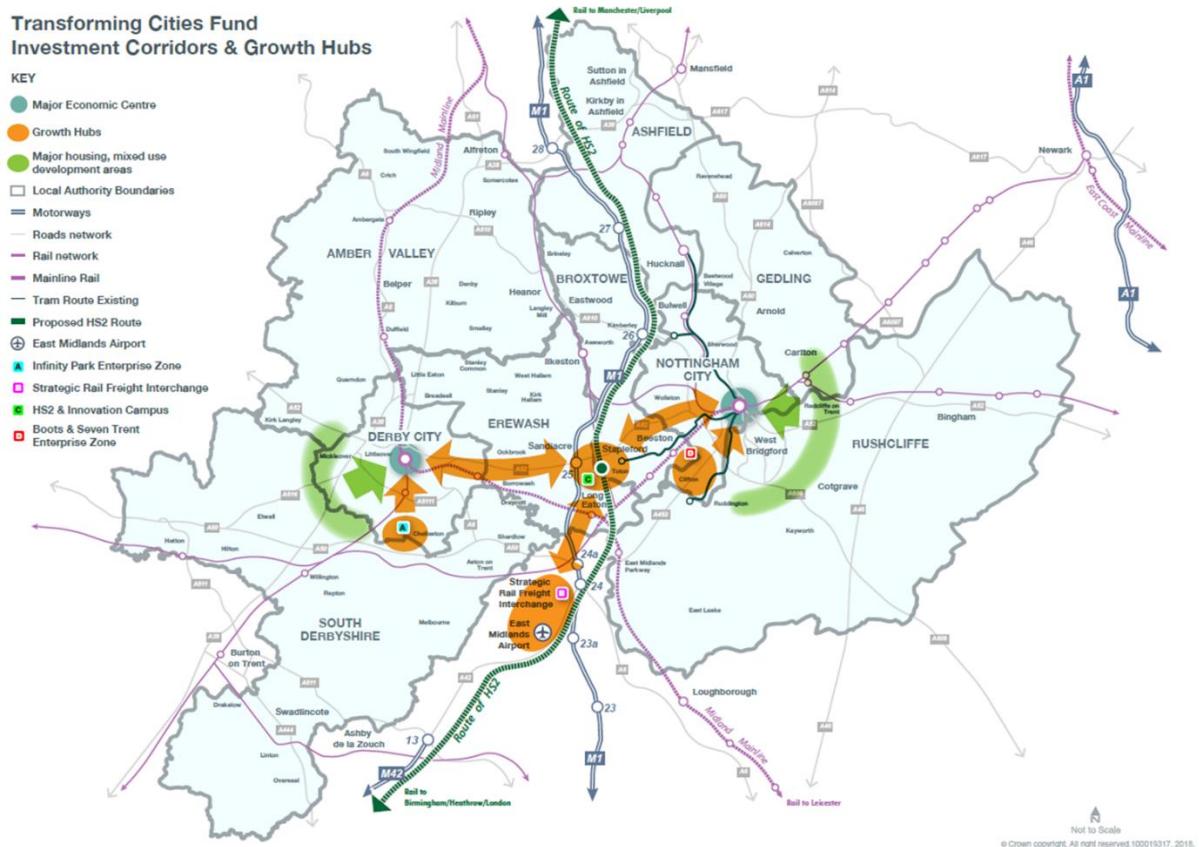
SECTION G – Additionality

G1. Additionality

With a strong corridor focus, the schemes proposed under the Transforming Cities Fund (TCF) programme largely aim to link the growth areas around the cities, with the city centres, enhancing both intra and intercity connectivity. Similarly, the FMZ projects aim to support growth and productivity and promote social inclusion via innovative mobility solutions. Whilst there is some overlap in the objectives of the schemes in both programmes, predominantly enhancing connectivity into, around and between both cities, the way in which these objectives are achieved differs between the two funding strands.

Figure 16 illustrates where the investment and growth hubs will take place across Derby and Nottingham, and shows how some of the FMZ projects overlap with these areas, such as the smart junction trial and the electric mobility hubs.

Figure 16. Transforming Cities Fund investment area



Complementing FMZ and Transforming Cities Fund schemes

Contactless payments

The implementation of an app-based payment system through the FMZ MaaS scheme will build on the contactless payment system under TCF. The two are aligned by removing the need to use cash to pay for transport services and together they can offer more in the way of digital payment options.

Whilst public transport operators in Nottingham will have contactless payment onboard their services by Spring 2020, TCF will expand the roll-out of contactless payment across bus services in Derby too, to provide a wider zone of travel. This system will allow people to use multiple operators' services across the Derby-Nottingham area, and the infrastructure provided by the TCF contactless payment service can be used to enable app-based payments too. This will support Stage 2 in the delivery of MaaS under FMZ, as passengers can use the app to either monitor how much they've spent using the contactless payment service or use the app as another option to pay for their travel. Since TCF is providing the necessary infrastructure to allow for one cashless payment for all journeys under the MaaS project, the Notts-Derby FMZ will be dependent on initial funding from TCF.

Improving the availability of real-time data

There will be investment in improving the back-office system for real time information, and the integration of Ticketer and init systems, under the Transforming Cities Fund. This enhanced passenger information could feature within the electric mobility hubs under FMZ, and will feed into the data platform to will play an important role in enhancing traffic control centres and enable schemes such as smart junctions. The collection of real time information and sharing it to said platform will allow companies to access it and use it to support the

movement of people and services. Therefore, investment in improving the real time information (RTI) back office under TCF will help support the digitisation and sharing of transport data of the FMZ scheme.

Local connectivity

Looking at the regeneration and growth corridors for Nottingham and Derby under TCF, improvements to infrastructure and services will connect key developments in and around the cities. This includes the southern growth corridors running east to west (taking account of Boots Enterprise Zone and established communities such as Colwick and Netherfield), and the northern growth corridor which includes Top Valley and Bestwood. Regeneration and growth corridors in Derby include Mickleover to Mackworth, Pride Park to Chaddesden and Spondon, and Pride Park to Infinity Park and Derby South. Improvements to these corridors will provide transport infrastructure on which the basis of the FMZ schemes can build and expand. TCF schemes can feed into the electric mobility hubs by ensuring the hubs are served by well-connected walking and cycling routes, and public transport priority. This will be an important part of the development of electric mobility hubs, as it is recognised that sound infrastructure along corridors, particularly relating to walking, cycling, and public transport, will help facilitate uptake of electric mobility hub services. Furthermore, mobility credits offered through the MaaS scheme under FMZ will support the focus of connecting people with employment opportunities under TCF; demonstrating that the objectives align, even though the approaches used to achieve them differ.

The ebike expressway that falls into TCF will link the city centres. This scheme will have ebike stations situated at different locations along the corridor, such as at Long Eaton train station, which complements the creation of electric mobility hubs under the FMZ scheme. The electric mobility hubs, particularly 'neighbourhoods of the future', will have e-bike charging and parking facilities, as well as infrastructure for other transport services. Therefore, the electric mobility hubs will expand the overall e-bike network by providing additional charging facilities to the e-bike expressway stations collectively facilitating the uptake of active travel.

Differences between Transforming Cities Fund and FMZ

The schemes that fall within TCF focus on connectivity between housing growth areas, employment, and the cities, particularly the city centres. Whilst this is important for the schemes under FMZ, trialling new models, such as the unique MaaS platform, and innovative mobility services, such as electric mobility hubs, are the main concentration. TCF schemes provide the initial infrastructure and means to support the trial of innovative mobility solutions under FMZ.

Innovative Transport Services

Electric Mobility Hubs

The collection of electric mobility hubs under FMZ will bring together different transport services; functioning as a key transport node for active travel, public transport, car sharing, and electric mobility, as well as supporting the collection and utilisation of transport data. This is a novel approach to transport provision that Nottingham and Derby are confident can be showcased as a first-class exemplar to other authorities in the UK and internationally. TCF schemes will feed into these hubs by providing infrastructure that supports access to the hubs, but the delivery of these hubs is new – again demonstrating that TCF is focussed on connectivity, but FMZ concentrates on trials of innovative approaches.

MaaS platform

Whilst contactless payment infrastructure funded through TCF will support FMZ schemes, having a platform that allows users to track their spend on different services as a result of rolling out contactless payment is a unique feature that has never been done previously in

the context of MaaS. Our approach to the delivery of MaaS is a new and untried concept that demonstrates the focus on trialling innovative approaches to transport.

Shuttle Buses

A shuttle bus feeder service operating from East Midlands Parkway train station, to East Midlands Gateway and on to East Midlands Airport, will provide a new link between key destinations proposed within the TCF programme. This bus will be a more conventional way of delivering a shuttle service and improving the links between key destinations. Yet the trial of an autonomous shuttle bus operating under the FMZ programme would be a forward-thinking delivery approach to achieving these outcomes. The autonomous bus is a way of testing how people will respond to this type of transport service, whereas we are already familiar with how people use the more conventional buses.

Evaluation

The FMZ schemes will have a strong, robust evaluation plan to assess how new mobility services have addressed the objectives. Due to the trial of new and innovative transport services, it is crucial to have a comprehensive and structured evaluation approach. A PhD student from Loughborough University will conduct the evaluation into FMZ with assistance from an industrial placement student from University of Nottingham.

Academic partnership working

In consultation with our academic partners, we have identified key areas of research, which include:

- FMZ evaluation via PhD academic partnership with Loughborough University
- Align research programmes e.g. autonomous transport, public policy and perceptions research
- Masters/undergraduates student projects
- Undergraduate, graduate and apprenticeship placements
- Knowledge transfer partnerships (KTPs) for specific areas e.g. data mining, analysis and privacy
- Shared learning across the Connected Places Catapult work programme and Community of Practice (TCF and FMZ areas).

Additional learning to be gained that will inform the development of future schemes
The Low Emission Vehicle Enterprise and Learning (LEVEL) initiative will share insights and experiences gained from these schemes with local authorities, enabling for the dissemination of best practice from the Derby-Nottingham case studies. LEVEL will also seek to explore opportunities to develop collaborative training projects with the Nottingham Electric Vehicle Service Centre and training providers on a UK franchise basis, and create a LEVEL 'future mobility' e-learning accredited training course. The intention is to 'white label' the courses so different cities and local authorities can, for a fee, customise and add their own branding to create their own bespoke offer. Other income streams will include delegate fees for non-local authority participants attending workshop sessions. Further income, enabling the project to move from grant dependency to self-sufficiency, will be generated by having access to an archive of training materials, which can be used in delivering commercial training courses.