North East Cambridge Area Action Plan

Proposed Submission

Smart Infrastructure Topic Paper:
Future Mobility

Greater Cambridge Planning Service

November 2021

Contents

Introduction

The North East Cambridge (NEC) Area Action Plan (AAP) supports a new approach in terms of the way people travel to and around the area. New advances in mobility can support a transformational rethink of road vehicle use breaking the dependency on private cars (particularly sole occupancy) by creating an integrated transport system that is flexible, frictionless, and personalised. Emerging technology can promote easy navigation and transition between sustainable transport modes using density and critical mass to support and sustain public transport solutions. Innovation in the mobility system will support the development meeting the relevant objectives set out in the AAP:

- NEC will provide a new model for low car dependency living, through maximising the use of and integrating with public transport, walking, and cycling infrastructure.
- NEC will be a new walkable district for Cambridge that promotes easy navigation and transition between sustainable transport modes using density and critical mass to support and sustain uses.
- NEC will be demonstrably resource efficient, supporting the transition to zero carbon living that successfully combines low-tech green solutions with high-tech smart city technology to respond positively to the challenges of climate change
- NEC will deliver economic growth and prosperity that achieves social justice and equality.

As well as considering how people and goods move into, out of and around the site the development will support the move away from unnecessary trips by providing future proofed communication networks that will support home working (see Digital Infrastructure Topic Paper), alternative means of accessing goods and services and by providing local co-working spaces.

This new approach to mobility and the removal of the private car from significant areas of the development will impact on land use. Currently in urban areas around 15-30% of land is designated to parking spaces. New mobility models may also reduce the need for road space. This means that land can be reallocated increasing the land area available for development, for pedestrians and cyclists or greening and

public realm, with associated benefits including improved physical and mental health and mitigating the higher temperatures and air pollution of urban areas and helping to create a better place.

Future facing mobility models are starting to drive greater choice in mobility solutions from on-demand shared cars, Demand Responsive Transport, autonomous pods/shuttles, free floating bike, and scooter schemes (Micro mobility), and even augmented reality and digital wayfinding that supports walking and cycling. These new mobility models can support the sustainability of public transport solutions by solving the first/last mile challenge feeding travellers into the higher capacity core transport network, rail and bus creating a door to door transport service to provide a strong level convenience that can incentivise sustainable travel.

Consumers are demanding a much more personalised and flexible public transport system that allows easy booking and payments, good customer experience and flexibility in how they travel. To deliver a seamless experience that can rival the ease of owning a private a car, a concept called 'Mobility as a Service' (MaaS) is emerging to bring different mobility options into one platform, often offering one click payments across a range of options from bus/train/bike/car clubs/hire car/bike hire/taxi/autonomous vehicles (AVs). When residents first move into a new development or employees start a new job it is a key opportunity for behaviour change.[1] A high quality MaaS offer embedded in NEC AAP along with personalised travel advice and potentially incentivised (Mobility credits/loyalty/reward) along with the spatial aggregation of modes (new and traditional), traveller facilities (Electric Vehicle (EVs) charging) and complimentary 'utility' functions (co-working spaces, small-scale retail, pharmacy, parcel lockers) would be a powerful enabler to mode shift away from the private car.

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[1] [Transport Xtra: Changing Travel Behaviour](#)

Key Documents

- National Planning Policy Framework (2021)

- Cambridge and South Cambridgeshire Transport Plan Adopted March (2014)

- Cambridgeshire and Peterborough Combined Authority Local Transport Plan - While a new CPCA Local Transport Plan was adopted in February 2020 for the CPCA area. This supersedes an interim document – an amalgamation of Cambridgeshire County Council and Peterborough City Council's Local Transport Plans – that was adopted by the CPCA in June 2017 as single plan for the whole area

- Cambridge City Council – Electric Vehicle and Infrastructure Strategy (2019)

- Future Mobility Is one of the four grand challenges of the UK's industrial strategy (2019)

- Cambridgeshire and Peterborough Economic Review (2018)

- DfT - Road to Zero - Next steps towards cleaner road transport and delivering our Industrial Strategy (July 2018)

- Future of Mobility: Urban Strategy (Department for Transport)

- Greater Cambridge Autonomous Vehicle Strategy – Published 2020

- Ready for Innovation - The Opportunity for Innovation in Rural Transport – Connected Places Catapult

- Zenzic – UK Connected and Autonomous Roadmap to 2030

- The Future of Mobility foresight report (2019), Government office for science

- The opportunity for Mobility as a Service (Transport Systems Catapult)

- Transport decarbonisation plan (2021)

NEC Evidence and Topic Papers

- Transport Evidence Base (2020-2021)
- High Level Transport Strategy (2021)
- Transport Topic Paper (2021)
- Smart Infrastructure Topic Paper: Environmental Monitoring (2021)
- Smart Infrastructure Topic Paper: Digital Infrastructure (2021)
- Health Facilities & Wellbeing Topic Paper (2021)
- Environmental Health Topic Paper (2021)
- Climate Change, Energy, Water and Sustainable Design and Construction Topic Paper (2021)
- Community Safety Topic Paper (2021)
- Anti-Poverty and Inequality Topic Paper (2021)
- Internalisation Topic Paper (2021)

National Planning Policy Framework (2021)

The National Planning Policy Framework[2] (NPPF) has a presumption in favour of sustainable development for both plan-making and decision-taking. The NPPF has a requirement for developments which generate significant amounts of movement to be supported by a Transport Assessment or Transport Statement and Travel Plan.

The planning system should actively manage patterns of growth by directing significant new development to locations which are or can be made sustainable, through limiting the need to travel and offering a genuine choice of transport modes. This can help to reduce congestion and emissions, and improve air quality and public health. However, opportunities to maximise sustainable transport solutions will vary between urban and rural areas, and this should be taken into account in both plan-making and decision-making.

Paragraph 104 states that transport issues should be considered from the earliest stages of plan-making and development proposals and that opportunities from

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[2] National Planning Policy Framework

existing or proposed transport infrastructure, and changing transport technology and usage, are realised. Also that;

- opportunities to promote walking, cycling and public transport use are identified and pursued
- the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains

Additionally, paragraph 107 states that there is a need to ensure an adequate provision of spaces for charging plug-in and other ultra-low emission vehicles.

Paragraph 108 states - In assessing sites that may be allocated for development in plans, or specific applications for development, it should be ensured that:

- appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location;
- any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree.

Paragraph 111. Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe.

Paragraph 113. Within this context, applications for development should:

(a) give priority first to pedestrian and cycle movements, both within the scheme and with neighbouring areas; and second – so far as possible – to facilitating access to high quality public transport, with layouts that maximise the catchment area for bus or other public transport services, and appropriate facilities that encourage public transport use;

(b) address the needs of people with disabilities and reduced mobility in relation to all modes of transport;

All developments that will generate significant amounts of movement should be required to provide a travel plan, and the application should be supported by a

transport statement or transport assessment so that the likely impacts of the proposal can be assessed.

Cambridgeshire County Council Business Plan (2020-2021)

The County Council's vision[3] is to make the county 'a great place to call home' with three priority outcomes:

- A good quality of life for everyone – by nurturing healthy communities that can access resources, connect with others, and become sustainable. Improve social and economic equality and encourage people to choose healthy lifestyles.
- Thriving places for people to live – by investing in the environmental, infrastructure and services and building supportive, resilient communities that are great places to live.
- The best start for Cambridgeshire's children.

Mobility is integral in helping to achieve these aims. The County Council is the Highway Authority with responsibility for on-street parking and for maintaining the county's roads. Some of its strategic highway responsibilities have now passed to the Cambridgeshire and Peterborough Combined Authority. In its previous role the County Council put together the Transport Strategy for Cambridge and South Cambridgeshire which covers the NEC AAP area.

Transport Strategy for Cambridge and South Cambridgeshire

The Transport Strategy for Cambridge and South Cambridgeshire (TSCSC) was adopted by Cambridgeshire County Council on 4 March 2014 and ensures that local councils plan together for sustainable growth and continued economic prosperity in the area.

The existing Local Plans for Cambridge and South Cambridgeshire has proposed approximately 44,000 new jobs and 33,500 new homes will be created in Cambridge and South Cambridgeshire by 2031. The TSCSC provides a plan to address the

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[3] Cambridgeshire County Council – Business Plan

rising population and increase in demand on our travel network by shifting people from cars to other means of travel including cycling, walking and public transport.

This transport strategy has two main roles:

- It provides a detailed policy framework and programme of schemes for the area, addressing current problems, and is consistent with the Cambridgeshire Local Transport Plan 2011-26. It is part of how the Council manages and develops the local transport network of the County as a whole
- It details the transport infrastructure and services necessary to deliver this growth

The strategy contains details of the major schemes proposed in the short, medium, and longer term. The programme will be regularly reviewed given the extent of growth and development in the area.

What the Strategy does:

- States the Council's aim for more journeys to be made by bus, train, bike and on foot so that traffic levels aren't increased.
- Ensures extra capacity for traffic to travel round the outskirts of Cambridge, so that road space into and across the city can be prioritised for buses, cyclists, and pedestrians
- Provides additional Park and Ride options on the fringes of Cambridge, to reduce the amount of unnecessary traffic travelling through the city
- Ensures public transport, cycling and walking are the best ways of getting around and across the area, since they will be quicker and more convenient than by car
- Reduces car traffic by using a variety of techniques, which may mean limiting the available road space for cars
- Enables people to use public transport for at least some of their journey into Cambridge or surrounding towns, by creating a frequent, quality service across major route
- Development of local transport solutions with communities, which link to public transport along key routes

What we are doing in Cambridge:

- Encourage more people to walk, cycle and use public transport for journeys into, out of and within the city
- Promote bus routes that connect key economic hub
- Link to the new train station at Cambridge North Railway Station
- Persuade more people to car share
- Prioritise pedestrian, cycle and bus trips across the city and make these methods of transport more convenient than using a car
- Maintain general traffic at current levels

Climate Change and Environment Strategy

The County Council has declared a Climate Emergency and is developing a climate change and environment strategy was meant to go full council in March 2020 but has been delayed due to Covid-19. It sets out a vision to deliver net zero carbon by 2050. Transport is a priority area of the strategy and the county will manage its highways to prioritise walking, cycling and public transport and supporting the uptake of electric vehicles. This will minimise carbon emissions and improve air quality. Active network management will allow all communities to access alternative forms of transport such as autonomous vehicles and electric vehicles.

Cambridgeshire and Peterborough Combined Authority (CPCA)

The devolution deal for Cambridgeshire and Peterborough sets out key ambitions for the combined authority. Most relevant to this topic paper is its ambition to 'deliver outstanding and much needed connectivity in terms of transport and digital links'.

Local Transport and Connectivity Plan

As the CPCA is now the local transport authority with strategic transport powers it is preparing a new Local Transport and Connectivity Plan (LTCP) which will set out its aims and objectives and will replace the TSCSC. The plan will support the CPCA's non statutory spatial framework which looks to align essential infrastructure, housing, and job growth.

The Greater Cambridge Partnership (GCP)

The GCP is the local delivery body for a City Deal with central Government. It provides powers in decision making and investment worth approximately £500 million over 15 years, to crucial infrastructure improvements and projects and supports the creation of 44,000 new jobs, 33,500 new homes and 420 additional apprenticeships. They are seeking to deliver a range of transport schemes, particularly focused on public transport, cycling and walking opportunities.

Cambridge City Council Corporate Plan (2019-2022)

The City Council has a vision to lead a unified city 'one Cambridge fair for all'

Cambridge - a great place to live, learn and work: A city where getting around is primarily by public transport, bike and on foot.

Cambridge - caring for the planet: A city that takes robust action to tackle the local and global threat of climate change, both internally and in partnership with local organisations and residents, and to minimise its environmental impact by cutting carbon, waste, and pollution.

This vision is delivered through a number of policies, plans and strategies.

Cambridge City Council Air Quality Action Plan (2018-2023)

The Air Quality Action Plan 2018-2023 sets out priorities for maintain and improving air quality

The actions fall into three main categories:

- Reducing local traffic emissions as quickly as possible to meet national objectives. Proposals in this area include:
    - lowering emissions from taxis, by increasing the number of electric and hybrid vehicles through incentives and installing more charging points.
    - reducing bus and coach emissions, by working with partners to invest in more environmentally friendly vehicles.
    - reducing HGV emissions in the city centre, by promoting 'greener' methods for making deliveries of goods, such as by cycle.

- Maintaining levels of pollutants below national objectives, including by using planning policies to improve access to sustainable modes of transport.
- Improving public health, including by educating people about the health impacts of poor air quality and encouraging 'greener' lifestyles.

Cambridge City Council Electric Vehicle and Infrastructure Strategy (2019)

The Electric Vehicle and Infrastructure Strategy sets out a plan for how the city council will support the deployment of charging infrastructure and the move to electric vehicles.

Cambridge City Council Climate Change Strategy (2016-2021)

The Climate Change Strategy (2016-2021) sets out a number of key objectives including 'reducing emissions from transport by promoting sustainable transport, reducing car travel and traffic congestion and encouraging behaviour change' This will be achieved through the cities partnership within the Greater Cambridge Partnership which is investing City Deal funding to make improvements to public transport and cycling infrastructure with the aim of tackling congestion, reducing journey times, reducing greenhouse gas emissions and improving air quality and promoting low emission buses and taxis. The City Council have declared a climate emergency with an ambition to be carbon neutral by 2050.

Cambridge Local Plan (2018)

The local plan sets out the way we will meet the development needs of Cambridge to 2031. Over that time the city has plans to grow significantly; supporting the nationally important economic contribution the city makes and the factors that are inseparable from that success, seen in the exceptional quality of life and place that Cambridge benefits from. The local plan is supported by the TSCSC, setting out the transport mitigations for new development. The relevant policies in the local plan are;

Policy 1: The presumption in favour of sustainable development – Future mobility will support the move to more sustainable modes of transport, supporting the economic development of the area and improving quality of life.

Policy 5: Strategic transport infrastructure – Cambridge City Council will work to support the uptake of sustainable transport by supporting.

1. delivery of local and strategic transport schemes, subject to the outcome of up-to-date, detailed assessments and consultation, where appropriate;

2. promoting greater pedestrian and cycle priority through and to the city centre, district centres and potentially incorporating public realm and cycle parking improvements;

3. promoting sustainable transport and access for all to and from major employers, education and research clusters, hospitals, schools and colleges;

4. working with partners in supporting the TSCSC's aim for a joined-up, city-wide cycle and pedestrian network by addressing 'pinch-points', barriers and missing links;

5. linking growth to the proposed city-wide 20 mph zone; and

6. easing pressure on the air quality management area (AQMA) in the city centre.

Policy 15: Cambridge Northern Fringe East and new railway Station Area of Major Change. Designates the Cambridge Northern Fringe East and the new railway station to enable the creation of a revitalised, employment focussed area centred on a new transport interchange. This formed the basis of the Area Action Plan, which has now grown to include the Science Park and other areas of west of Milton Road.

Policy 28 Carbon Reduction, community energy networks, sustainable design, and water use – focus on promoting patterns of development that reduce the need to travel by less environmentally friendly modes of transport. The sustainability statement should address how the proposals meet policies relating to sustainability including, transport mobility and access.

Policy 36: Air quality, odour, and dust – development will only be permitted if it has adverse effect on air quality in the Air Quality management area (AQMA) or lead to a new AQMA

Policy 80: Supporting sustainable access to development – ensure that development on the edge of the city are supported by high quality public transport linking them to the city centre and major centres of employment and supporting public transport, walking, and cycling to, from and within the development

Policy 81: Mitigating the transport impact of development – Developments will only be permitted where they do not have an unacceptable transport impact.

Policy 82: Parking management - Planning permission will not be granted for developments that would be contrary to the parking standards.

New developments will be favoured where they take a holistic, early and design-led approach to the management of parking for motor vehicles and cycles. Car parking standards are an important means of managing traffic levels in and around a development, especially when combined with measures to increase access to transport alternatives to the private car. The Council continues to promote lower levels of private car parking in order to help achieve modal shift, particularly for non-residential developments where good, more sustainable transport alternatives such as walking, cycling and public transport exist.

Car-free and car-capped development, where new on-street permits are restricted to existing (not new) residents, is supported by the Council where the development will not impact negatively on the surrounding area by displacing car parking. It is therefore important that where car-free development is proposed, the appropriate on-street parking management is in place

The Council strongly supports contributions to and provision for car clubs at new developments to help reduce the need for private car parking. Electric vehicle charging points or the infrastructure to ensure their future provision should be provided within a development where reasonable and proportionate.

The Cambridge Local Plan is currently being reviewed and a joint Greater Cambridge Local Plan with South Cambridgeshire being developed.

South Cambridgeshire District Council

South Cambridgeshire has a vision to put the heart into Cambridgeshire by:

- Helping businesses to grow - Helping to ensure people's homes are close to their jobs and can be accessed by walking, cycling and using public transport
- Building homes that are truly affordable to live in - •Working with partners to provide alternatives to private car travel through new and improved walking, cycling and public transport routes
- Being green to our core - Installing new air quality monitors so that we can track, maintain and improve air quality, Installing electric vehicle charging points at Council offices and incentivising taxi operators and drivers to make the move to electric vehicles
- Putting our customers at the centre of everything we do

South Cambridgeshire has declared a climate emergency with an ambition to be zero carbon by 2050.

South Cambridgeshire Local Plan (**2018)**

The South Cambridgeshire Local Plan sets out the planning policies and land allocations to guide the future development to meets the needs of the district up to 2031. It includes policies on a wide range of topics such as housing, employment, services and facilities, and the natural environment. The policies relevant to future mobility are:

Policy SS/4: Cambridge Northern Fringe East and Cambridge North railway station
c. Ensure that appropriate access and linkages, including for pedestrians and cyclists, are planned for in a high quality and comprehensive manner;
Policy CC/1: Mitigation and Adaptation to Climate Change - Planning permission will only be granted for proposals that demonstrate and embed the principles of climate change mitigation and adaptation into the development. To mitigate climate change, proposals should demonstrate: promotion of sustainable forms of transport, such as using buses, cycling or walking, and reduction of car use (Policy HQ/1 & Transport Policies);

Policy HQ/1: Design Principles - All new development must be of high quality design, with a clear vision as to the positive contribution the development will make to its local and wider context. As appropriate to the scale and nature of the development, proposals must: Achieve a permeable development with ease of

movement and access for all users and abilities, with user friendly and conveniently accessible streets and other routes both within the development and linking with its surroundings and existing and proposed facilities and services, focusing on delivering attractive and safe opportunities for walking, cycling, public transport and, where appropriate, horse riding; Ensure that car parking is integrated into the development in a convenient, accessible manner and does not dominate the development and its surroundings or cause safety issues;

Policy SC/12: Air Quality - Where development proposals would be subject to unacceptable air quality standards or would have an unacceptable impact on air quality standards they will be refused. Larger development proposals that require a Transport Assessment and a Travel Plan as set out in Policy TI/2 will be required to produce a site based Low Emission Strategy. The development promotes sustainable transport measures and use of low emission vehicles in order to reduce the air quality impacts of vehicles.

Policy TI/2: Planning for Sustainable Travel - Development must be located and designed to reduce the need to travel, particularly by car, and promote sustainable travel appropriate to its location. Planning permission will only be granted for development likely to give rise to increased travel demands, where the site has (or will attain) sufficient integration and accessibility by walking, cycling or public and community transport, including: Developers of 'larger developments' or where a proposal is likely to have 'significant transport implications' will be required to demonstrate they have maximised opportunities for sustainable travel and will make adequate provision to mitigate the likely impacts through provision of a Transport Assessment and Travel Plan. All other developments will be required to submit a Transport Statement. Where a Transport Assessment / Statement or Travel Plan is required, a Low Emissions Strategy Statement should be integrated.

Policy TI/3: Parking Provision - The Council will encourage innovative solutions to car parking, including shared spaces where the location and patterns of use permit, and incorporation of measures such as car clubs and electric charging points.

Existing Issues

Congestion

Cambridge experiences over 206,000 vehicle movements into and out of the city every day.[4] Issues with affordability of housing (average house price is 15.62 times higher than the average salary) means employees are moving further away from the city and spending more time travelling, significantly impacting quality of life and health as well as creating dependence on the private car. The Greater Cambridge area is growing rapidly with plans to build 33,500 houses by 2031 and to create 44,000 new jobs. This will put increasing pressure on the road network and if nothing is done to address it road traffic will increase by 30% at peak in Cambridge and by 40% at peak in surrounding areas doubling the time travellers will spend in traffic. The amount of traffic is having a significant impact on the operation of the public transport system with buses particularly at peak time being caught in congestion making journey times slow and unreliable.

The Ely to Cambridge A10 Transport Study (2018) considered the transport needs of the Ely to Cambridge corridor as a whole, including the needs of the major developments on the corridor such as the new town north of Waterbeach and North East Cambridge. Currently around 76% of work trips to the North East Cambridge area are made by car. This is significantly higher than many other areas in and around Cambridge, such as the Cambridge Biomedical Campus or CB1 around Cambridge Station. The opening of Cambridge North railway station, and delivery of public transport, cycling and walking improvements mean there is a real opportunity to greatly improve this situation.

The growth of e-commerce / convenience economy is generating traffic. Miles travelled by vans has increased by 56% since 2000, according to a report by the Society of Motor Manufacturers and Traders[5] - vs 9% passenger car miles.

In view of the evidence of existing and future highway constraints, the emphasis is on seeking a very low share of journeys by car to, from and within the area. A trip

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[4] [Cambridgeshire and Peterborough Transport Future Mobility Zone](#)

[5] [SMMT Light Commercial Vehicles Delivering for the UK](#)

budget approach is proposed for managing car trips. This essentially identifies the level of car trips that can be accommodated to and from Milton Road, and to and from Kings Hedges Road, without leading to further impact on the road network.

The Greater Cambridge Partnership has a programme of work to help address issues of congestion and is aiming to get 1 in 4 people out of their cars and using more sustainable modes including walking, cycling or public transport by creating a world class public transport system that is better than the private car. The CPCA's LTP sets out its ambitions relating to tackling congestion (see policy section) and it is in the process of developing a strategy for the improvement of public transport.

Pollution

Without action the levels of congestion will cause a significant worsening of air quality. The centre of Cambridge has been within an Air Quality Management Area since 2004. Air quality has been improving, albeit slowly, in most parts of Cambridge in recent years, but there are parts of the city, including the busy central streets, where levels of nitrogen dioxide (NO_2) continue to be high. The main source of NO_2 in Cambridge is vehicle emissions. Public Health data attributed 257 deaths in Cambridgeshire in 2013 to Particulate Air Pollution, compared with 34 from Road Traffic Accidents; of which 47 deaths were in Cambridge.[6]

Traffic and congestion are also contributing to noise nuisance. In England alone, the annual social cost of urban road noise was estimated in 2010 to be £7–£10 billion. This includes the costs of sleep disturbance, annoyance and health impacts from heart attacks, strokes and dementia.

Climate Change

Greenhouse gas emissions: Today, transport is the largest greenhouse gas emitting sector in the UK, accounting for 27% of greenhouse gas emissions. Road transport accounts for 91% of these.

Land Use

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[6] Transport and Health: JSNA

Inefficient use of limited space: There are six cars for every ten people in the UK, but the average car is unused 96% of the time. According to one report, parking spaces occupy around 15-30% of a typical urban area.

Future Mobility Opportunities and Key Issues

Autonomy

- Public Transport applications – these tend to be shuttles/pods and range currently in size from 4 seats to 12. There are a number of companies demonstrating this technology (Navya, Easy Mile and RDM). ICambridge[7] have deployed the UK's first purpose built autonomous public transport vehicle which can run in mixed traffic and it was trialled for 6 weeks in 2021, demonstrating how these vehicles could be used. Operationally they tend to run either at low speeds or on segregated infrastructure providing a first/last mile link into the core network bus/rail. These can take significant space in the public realm and create severance, which need to be mitigated by urban design.

- Autonomous cars – Most experts agree that driverless technologies are coming and their arrival, at scale, is inevitable within the next 30 years. There exists differences of opinion regarding the rate of arrival, and the technical detail of the intermediate steps (For example, there is a huge difference between the idea that some driverless cars will be on our roads and will be able to operate freely under certain conditions, and the idea that all cars will be fully driverless and can operate on the full extent of our road system anywhere, any time, and under any conditions: Connected and self-driving vehicles could enable smoother driving, reduce accident-induced delays and improve overall network management. It has been estimated that even a low (25%) penetration of connected and self-driving vehicles in urban areas could lead to peak journey time savings of 21% and a reduction in journey time variability of nearly 80%.

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[7] Connecting Cambridgeshire: Autonomous vehicles

However, the Lords select committee publication 'Connected and Autonomous Vehicles: The future?' says: "The theoretical potential of CAV to reduce traffic congestion varies depending on the level of vehicle autonomy and the penetration rate. While we cannot say with any certainty what the impact on congestion will be, it is possible to imagine a situation of total gridlock as CAV crawl around city centres. It is important that the right policy decisions relating to CAV are made in order to reduce the likelihood of this occurring. (Paragraph 96)"

Opportunities

- To develop a first/last mile autonomous shuttle offering to feed residents into the core transport network.

- For cars with autonomous parking systems to drop residents off at their destinations and to then park at the edge of the site

- To use autonomous cars to develop an on-demand shared taxis service

- To utilise the technology to address issues of congestion and to support sustainable mobility

Risks

- Uncertainty to the impact of autonomous vehicles and the impact on both the transport network and land use. How will policy respond to the challenge and harness the benefits while mitigating any negative impacts.

New Mobility Models

We are seeing the emergence of a number of new mobility models and existing models that are being transformed by new technologies. These models begin to develop the mobility system in a way that gives residents options other than the private car to travel. This can support residents in not needing a car when they move into a development. These include;

Micromobility – providing access to on-demand scooters, bikes, electric bikes and potentially other devices that come into the market. An example of these are the VOI scooters and electric bikes which are currently being trialled in Cambridge.

Demand Responsive Transport – A flexible service that provides shared transport in response to requests from users specifying desired locations and times of

pickup and delivery. Examples of this are mini-bus services such as Arriva Click or Uber Pool. They are primarily shared vehicles and can support traditional bus services. The Combined Authority will be trialling a DRT service in 2021.

Ride-sharing - Formal or informal sharing of rides between unlicensed drivers and passengers with a common or similar journey route. Ride-sharing platforms charge a fee for bringing together drivers and passengers. Drivers share trip costs with passengers rather than making a profit.

On-demand vehicles – This can allow residents to access a vehicle when needed, because its on-demand this could be a car of varying sizes dependant on use, a van, or some other vehicle.

Opportunities

- Give residents mobility options which support a move away from car ownership which will address issues of congestion and allow land to be re-allocated for alternative uses as car parking and the infrastructure needed to support private car use isn't needed.
- Support economic development and equality by giving access to mobility options.

Risks

- Understand the implications for land use and place making. How do residents' access on-demand transport, do a network of 'mobility hubs' need to be developed. There have been examples where on-demand bikes and scooters have littered pavements and shared spaces; how can this be prevented?
- Potential conflict between users – electric mobility conflicting with pedestrians and giving rise to safe concerns regarding differential speeds.

Advanced Network Management

Management of the network can be split into two areas:

Surrounding road network - the management of the surrounding road network, looking to lessen the impact on travellers coming into the development by giving better information on sustainable choices. Giving residents better network information to inform choices.

Within the development – how to manage the kerb. The NEC AAP sets out a development with low car dependency. That gives an opportunity to re-purpose land to create better places. The land that is allocated to vehicles, parking, deliveries, and space for new mobility needs to be managed carefully. The 'Kerb' can be managed in a much more dynamic way, changing the way its use by time of day or demand e.g., used for deliveries out of hours or by prioritising sustainable freight movements, pick up and drop of for share autonomous cars, community uses. Even road space could be used dynamically, allocated to different user's dependant on demand. Parking can now be managed by using real-time data, to give availability, support booking and frictionless payments.

Opportunities

- To reallocate land to be used for people, development or community uses
- Support the move away from the private car
- Support the sustainable movement of freight into and out of the development
- Manage the amount of vehicles that enter the development

Risks

- Ensure that more efficient managing of parking spaces doesn't encourage trip generation
- Reliance on the availability of suitable technological / smart solutions

Freight

Deliveries – Technology has a role to play in managing deliveries particularly the last mile. Cambridge has seen the first drone delivery by Amazon and is beginning to see companies look at autonomous delivery vehicles. Companies like Starship are carrying out autonomous deliveries of small items and have operated in Cambridge for the co-op. Cambridge has been a pioneer in cycle deliveries with a consolidation centre at the edge of the city that disaggregates parcels on to smaller cycle-logistic bikes. The NEC is an opportunity to develop a consolidation hub that would enable smaller electric vehicles and bikes to serve the development.

Opportunities

- To create better places and lower emissions by creating a system of low carbon delivery vehicles

- Prevent large delivery vehicles from entering the site

- Potential for land savings as you need less space for deliveries.

- Consolidation of deliveries into a reduced number of trips with vehicles entering the development and conflicting with people.

- More consumer friendly, flexible, and agile system, enabling the selection of a delivery slot to avoid repeat deliveries.

Risks
- Unable to service business in an economic and timely manner
- A consolidation hub requires delivery by a private enterprise

Travel Behaviour

Travel consumers are demanding a much more personalised and flexible public transport system that allows easy booking and payments, good customer experience and flexibility in how they travel. To deliver a seamless experience that can rival the ease of owning a private a car, a concept called 'Mobility as a Service' is emerging to bring different mobility options into one platform, often offering one click payments across a range of options from bus/train/bike/car clubs/hire car/bike hire/taxi/AV. When residents/ employees first move into a new development it is a key opportunity for behaviour change. A high quality MaaS offering embedded in NEC AAP would support a cultural shift from private car to more sustainable modes. This can be combined with travel packs for residents moving into new developments which raises awareness of options (cycle map) / timetable information / discounted travel and to help guide residents through mobility options. When residents or new employees move into the development or new jobs it is a key opportunity to shift behaviours.

Opportunities
- Shift behaviours and embed a culture of using more sustainable modes
- Create a user experience that is better than the private car
- Reduction in the land take for private vehicles which can be repurposed for development or community uses

Risks
- A poor customer experience, lack of availability of sustainable transport or mobility options doesn't support a move to other mobility options

- Business case makes MaaS unaffordable.

- Reliance on the availability of suitable technological / smart solutions.

- Short term subsidy of travel may not offer long-term solutions once subsidy ceases.

Support the need not to travel

Future proofed digital infrastructure (see Digital Infrastructure Topic Paper) will support home working which reduces the need to travel. This can be supported by co-working spaces where residents need a workspace outside of the home and can access on-demand. An example of these are companies like We-Work and Regis.

Opportunities
- Reduce the number of trips needed particularly at peak times

- Better quality of life

- Increased demand for local facilities.

Risks
- How to future proof digital infrastructure

- Creating space that can flex with the demand and potential uses.

Electric Vehicles

Government have set the direction for the electrification of motor transport by banning sales of internal combustion engine cars by 2040 to deliver cleaner air and reduce carbon emissions, as set out in the 'Road to Zero' policy document, and the support for EV in the government's industrial strategy. As a result, demand for electric vehicles and charging infrastructure is growing daily. The move to ultra-low emission vehicles is necessary to meet the local climate change commitments to be net zero carbon by 2050 and to meet air quality objectives set out in the Cambridge Air Quality Action Plan. Infrastructure will need to be provided to support electric vehicles and thought needs to be given as to where these are located and managed. Cambridge has significant challenges with its grid capacity and this needs to be factored when considering the deployment of infrastructure. However, there is also a significant opportunity for vehicles to become part of the energy grid and to act as battery storage.

Opportunities

- Support the move to electric vehicles by providing the infrastructure needed

- Contribute to climate change targets and to reduce air pollution

- Vehicles to become an integral part of the power infrastructure supporting localised storage and contributing to addressing issues of grid capacity.

Risks

- Lack of infrastructure limits the opportunity for electric vehicles

- Interoperability between different charging systems

- Results in a switch from combustion engine to electric vehicles, with no benefit to levels of congestion or in terms of land take for parking

Data

Data is integral to the development and deployment of future mobility solutions, whether its feeding real time and static mobility data into travel apps, understanding what is happening in the road network to the kerbside, understanding the impact of development of movement, or understanding the role an electric vehicle can play to support the grid. Consideration needs to be given to how data is collected, stored, and used on the development. How can this data support both the development process, managing movement and supporting residents?

Opportunities

- Support more sustainable travel and a better customer experience

- Better manage mobility by matching supply and demand

- Better understanding of the impact of the development on mobility, movement, and the network.

- Begin to integrate mobility into other city systems such as energy

- Data, well presented, is a way of engaging with residents

Risks

- Lack of data slows the deployment of new mobility models

- No thought given to systems and standards can impact on interoperability

- There could be ethical issues with collection of some data sets

Preferred Approach

That the NEC become a testbed for future mobility innovations

- The creation of a suitable governance structure for NEC that embraces the opportunity to enhance personal mobility working with academia, developers, and operators to embed mobility innovations in the neighbourhood.
- Create a testbed that supports the testing and trialling of innovative new solutions
- Supports the development of a data infrastructure that supports mobility, including Mobility as a Service and demand responsive solutions
- Develop a framework for 'future mobility' that allows the system to flex and adapt as new technologies are developed

The NEC should use mobility innovation to support the better use of space

- Dynamic management of the kerb for deliveries of goods and for mobility purposes
- Encourage the use of sustainable modes of transport and move away from the need for car parking
- Better manage any on/off street parking that is available
-

Ensure future mobility puts needs of people walking and cycling first

- Walking and cycling should be the primary choice of travel. No innovation should de-incentivise or inhibit active travel movements in the neighbourhood or accessibility in the public realm

Develop a strategy for freight and deliveries

- That minimises the impact of commercial freight deliveries on the network and the public realm but supports the economic vibrancy of the area
- Supports home deliveries but minimises the impact on the network and the public realm

Reasons for preferred approach

A) Embedding innovation in NEC

Enabling NEC to become a location for future mobility experiments will ensure new innovations are tested and piloted in situ to ensure that new developments can benefit from new transport.

B) Carbon reduction

New mobility solutions can reduce reliant on car travel and increase the uptake of sustainable modes and active travel to support the councils' response to their declared climate emergencies.

C) Place making and social equity

Future mobility can improve the ability of all residents, visitors, and workers to move around, while providing potential for improvements in streetscape, greening, and road safety.

D) Improved connectivity

Future mobility integration at NEC can enhance intra and inter-Area Action Plan mobility enabling people to move around the site using sustainable modes and improving its overall integration with Cambridge.

E) Significant reduction in vehicle trips

Future mobility improvements aim to enhance the potential for the site to meet its trip budget by providing alternatives to car use that are both time efficient and accessible.

F) Minimise the impacts of pollution, particularly air quality

Future mobility can help with the reduction of pollution including noise and air pollution by supporting modal shift towards active and sustainable travel modes.

Governance

Different governance structures for NEC should be explored to support the implementation and future management of these initiatives.

Appendix: Definitions

Autonomous/Automated Vehicles

The use of autonomous vehicles refers to vehicles which form part of the public transport system that are capable of operating without a driver, initial deployments are likely to have a safety driver on-board.

Mobility as a Service

Describes a shift away from personally owned modes of transport towards the integration of various modes of transport along with information and payment functions into a single mobility service. Recent services that allow customers to purchase monthly subscription packages giving them access to public transport and private taxi and bike hire schemes are an example.

Demand responsive transport

A flexible service that provides shared transport in response to requests from users specifying desired locations and times of pickup and delivery. Dial-a-ride services scheduled through next day or advance bookings are a traditional example.

Dynamic demand responsive transport

More recent applications of demand responsive transport seek to work dynamically, adjusting routes in real time to accommodate new pickup requests often made minutes in advance.

Shared mobility

Transport services and resources that are shared among users, either concurrently or one after another. Public transport, or mass transit, as well as newer models such as car-sharing, bike-sharing and ride-sharing, are all types of shared mobility.

Ride-hailing

Ride-hailing services use smartphone apps to connect paying passengers with licensed taxi drivers or private hire vehicle operators who provide rides for profit.

Ride-sharing (sometimes known as car-pooling): Formal or informal sharing of rides between unlicensed drivers and passengers with a common or similar journey route.

Ride-sharing platforms charge a fee for bringing together drivers and passengers. Drivers share trip costs with passengers rather than making a profit.

Micromobility

The use of small mobility devices, designed to carry one or two people, or 'last mile' deliveries e.g., scooters both electric and non-electric, on-demand bikes, cargo bikes, e-bikes, and other personal travel devices such as skateboards.