2 Strategic Case

We want Norwich to be a city where residents, employees and visitors choose to travel by clean and shared transport modes.

The 'Transforming Norwich' programme offers the opportunity to deliver this step-change in mobility through investment in transport that will enhance access to employment and learning; creating a healthier city, with increasing social mobility and economic growth.

2.1 Introduction

2.1.1 This chapter outlines the Strategic Case for the '**Transforming Norwich**' programme. It sets out the key challenges faced in Norwich and the case for much-needed investment in sustainable transport. Additionally, this chapter summarises how the programme will contribute towards the wider national, regional and more local policy objectives.

2.1.2 The Strategic Case is presented, as follows:

- Section 2.2 – Summary of Strategic Case
- Section 2.3 – The Greater Norwich Region
- Section 2.4 – The Need for Investment – Overall Summary
- Section 2.5 – The Need for Investment – Detailed Analysis
- Section 2.6 – Our Vision and Objectives
- Section 2.7 – Developing the 'Transforming Norwich' Programme
- Section 2.8 – The 'Transforming Norwich' Programme
- Section 2.9 – Strategic Fit
- Section 2.10 – Strategic Benefits and Impacts
- Section 2.11 – Overall Summary of the Strategic Case

2.1.3 This strategic context has been critical to shaping the development of the '**Transforming Norwich**' programme.

2.1.4 At an early stage of preparing our programme, we prepared a Logic Map, setting out the objectives, challenges, inputs, outputs, outcomes and impacts. We shared this with colleagues at the Department for Transport (DfT) at an early stage and have used this throughout the development of our programme. Our Logic Map can be found in Figure 2.

2.2 Summary of the Strategic Case

2.2.1 Norwich is the heart of our regional economy with a work-day population of 280,000, is part of the Fast Growth Cities network (Cambridge, Milton Keynes, Oxford and Swindon) and is identified as a priority place in the East of England for economic development. However, as our fine city grows, a key challenge is unlocking employment and training opportunities and increasing productivity as travel patterns become more dispersed and new developments are harder to connect. The most pressing transport challenges we face are:

- Congestion on our radial transport corridors and in the city centre means bus operators are currently investing simply to stand still because extra buses maintain rather than boost services;
- Buses have insufficient priority on main corridors and although there is a comprehensive bus network, there is the local perception of buses being slow, unreliable and expensive;
- Although bus patronage is growing, this will plateau without significant investment by bus companies, which is dependent on rigorous application of bus priority, including separate space for cycling and the creation of mobility hubs as the places where people can access shared transport services. Park & Ride is not being used to its full potential and is struggling to grow patronage;
- Walking connections in part of the Greater Norwich Region (GNR), such as the East Norwich Regeneration Area, are blighted by traffic;
- Congestion and a reliance on fossil fuels causes poor air quality, with the city centre designated an Air Quality Management Area;
- Key employment centres, such as the Airport Industrial Estate, the Enterprise Zone at Norwich Research Park (NRP) and Broadland Business Park and residential areas in the GNR, are not well connected by bus and rail services;
- Norwich has been designated by the Social Mobility and Child Poverty Commission as being a social mobility 'coldspot', where it is hard for people from deprived neighbourhoods to access employment and training. Better accessibility to key employment centres and training is essential to harness their talent as part of extending the labour market available to businesses to unlock economic growth potential;
- In the morning peak, 85% of vehicles on the main radial roads are single occupancy. This use of the highway network is inefficient and delays the movement of goods and people in and around the city.

2.2.2 We are confident that the case for change in Norwich is strong.

Our solution

2.2.3 Our '**Transforming Norwich**' programme recognises that shaping a future of clean and shared mobility requires large, sustained and targeted investment in public transport, cycling and walking infrastructure to make these modes more competitive than single-occupancy vehicle use in terms of time, cost and convenience.

2.2.4 Our programme will invest in six clean transport priority corridors, in addition to the city centre, that will deliver the maximum impact in terms of:

- improving people's productivity and social mobility by unlocking access to employment and education opportunities across the city region;
- increasing the efficiency of travel and transport and improve the impact transport has on carbon emissions, air quality and public health;
- using emerging technology to prepare the city region for a future of shared and clean mobility.

2.2.5 We are investing in corridors because our transport network in Norwich radiates out from the historic city centre in a hub and spoke arrangement, which has been in place over a considerable time and is the basis on which the current transport network has developed. Some corridors are more developed than others in terms of the provision of bus priority and walking / cycling infrastructure and all have different characteristics in terms of factors such as deprivation, employment, education, demographics, as well as travel behaviours and network usage. The development of our '**Transforming Norwich**' programme has considered which schemes and corridors will deliver the maximum impact within the timescales of the TCF.

Our vision is:

"to invest in clean and shared transport, creating a healthy environment, increasing social mobility and boosting productivity through enhanced access to employment and learning"

2.2.6 Central to delivering this vision has been close partnership working between the County Council, District Councils, Councillors, transport operators / providers, stakeholders, delivery partners and feedback from the public. Through this, we have generated a large evidence base of travel patterns and demand, as well as network performance, which has highlighted areas of particular stress where infrastructure improvements will have the greatest impact. Reallocation of road space to buses, cycling and walking features strongly throughout our programme and delivering this through our '**Transforming Norwich**' programme is the first stage in implementing a much longer-term Transport for Norwich strategy.

2.2.7 We will make this happen through three linked approaches:

- Transforming the **bus network**
- Transforming the **city centre**
- Transforming the **passenger experience**

Transforming the bus network

2.2.8 Transforming the transport network will be achieved by creating six clean transport priority corridors that link key transport hubs (rail station, bus station, airport and mobility hubs), economic growth areas, existing and new homes and educational provision across the GNR. Originally, three corridors were proposed but dividing the three corridors into six radial priority corridors provides the opportunity for more granular appraisal of individual corridors and scheme elements, greater flexibility for bus operators and the wider programme, and the ability to deliver the programme more coherently and with less disruption. On these clean transport priority corridors, we will:

- Promote cleaner vehicle technology through a mixture of zero emission and EURO VI buses on Park & Ride services and the most frequent services with a minimum EURO V emission standard on all corridors;
- Provide a minimum 8-minute daytime service frequency on key corridors, timetable co-ordination between operators and more evening and weekend services;
- Support Park & Ride and other express bus services stopping at mobility hubs and increase capacity of our Park & Ride network;
- Provide dedicated bus priority measures along the clean transport priority corridors and through congested traffic junctions, linking areas of housing development, growth and deprivation with employment and training;
- Provide direct, low-carbon bus corridors into the city centre for residents of the UK's largest urban extension (Broadland Growth Triangle);
- Prioritise buses and cycling to ensure shared and clean modes are competitive with the private car;
- Introduce Sustainable urban Drainage Systems (SuDS) to more effectively manage rainwater on highway and mobility hub schemes;
- Promote shared transport interventions through a sustained and co-ordinated behaviour change programme to reduce single-vehicle occupancy.

Transforming the city centre

2.2.9 Transforming the city centre will be achieved through:

- Delivering a step-change in the quality of infrastructure that supports public transport, walking and cycling in the city centre;
- Redesigning bus stops so that buses can easily access and vacate bus stops without holding each other up and causing unnecessary delay and pollution, ensuring easy access on and off buses for passengers of all abilities;
- Improving walking connections within the city centre to improve access to Norwich rail station, Norwich bus station, main shopping and tourism areas, key employment sites, brownfield development sites and educational establishments;
- Removal of through-traffic from specific areas and providing extra inner ring road junction capacity for displaced vehicles;
- Providing additional bus stop capacity.

Transforming the Passenger Experience

2.2.10 Transforming the passenger experience will be achieved by:

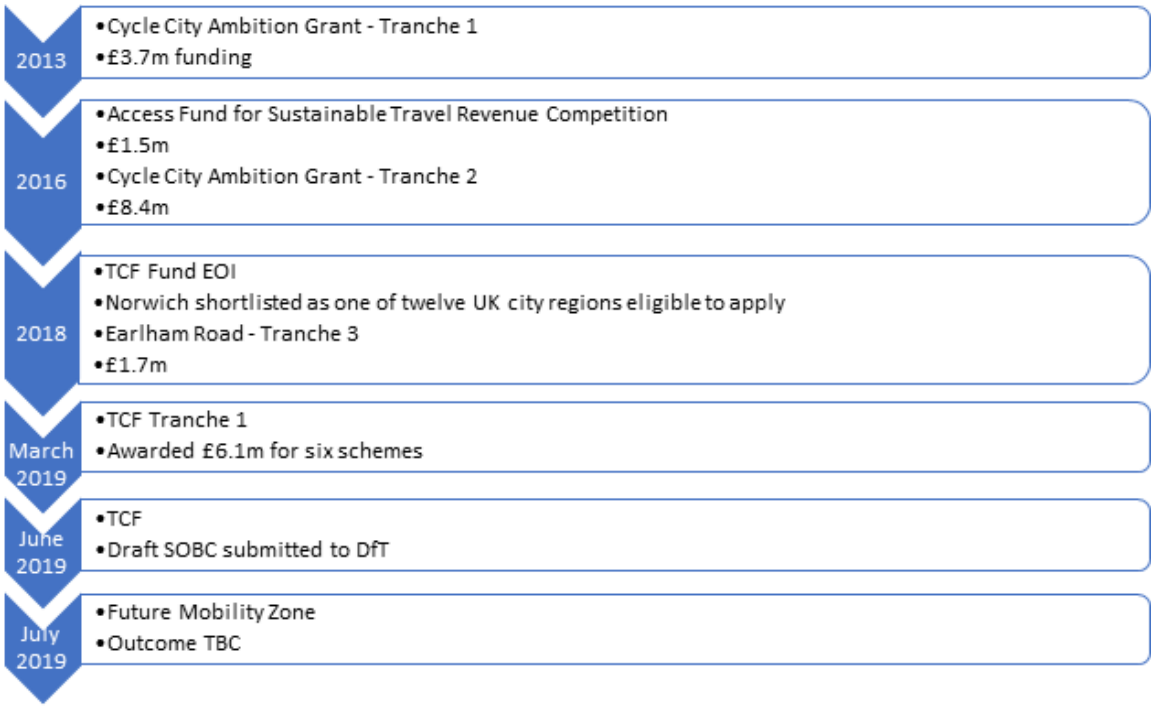
- Rolling out mobility hubs across the GNR, making it easy for everyone to access shared transport services and change between transport modes;
- Enhancing the role of Park & Ride in Norwich by providing faster, more frequent and more reliable services, better integration with scheduled bus services, introducing low and zero-emission buses and provision of onward travel choices at selected sites;
- Expanding the Norfolk Car Club network;
- Improving real-time service information with disruption and punctuality alerts;
- Working with transport providers to promote and increase the use of multi-operator, multi-modal and contactless ticketing;
- Accelerating the delivery of capped ticketing for individual and multiple bus operators and put Norfolk at the forefront of this advancement in ticketing;
- Improving value for money measured through Transport Focus customer satisfaction surveys;
- Significantly improving in vehicle quality and on-vehicle information through investment by our main bus operators.

2.2.11 The '**Transforming Norwich**' programme is a significant opportunity for Norwich to drive up productivity through investment in improved public and sustainable transport options that link new and existing housing with jobs and training, as well as reducing carbon emissions. In addition, our programme will support wider cross-cutting priorities such as:

- Enabling more housing;
- Supporting apprenticeships and improving skills;
- Tackling air pollution;
- Encouraging the use of new mobility systems and technology as part of the Grand Challenge on the Future of Mobility.

2.2.12 The '**Transforming Norwich**' programme will be delivered through the existing Transport for Norwich (TfN) delivery programme, builds on previous successful programmes such as the Cycle City Ambition Grant (CCAG) and is one element of the transport policy work that is currently ongoing across the GNR. The County Council is in the process of preparing its Fourth Local Transport Plan and is undertaking reviews of Area Wide Transport Strategies including the Norwich Area. This work is being undertaken in parallel and uses a shared evidence base. This '**Transforming Norwich**' programme therefore represents the initial delivery of a much longer-term strategy, which is underpinned by Delivery Themes and Guiding Principles that have already been formally adopted.

2.2.13 TfN is a partnership between the County Council, Norwich City Council, Broadland District Council and South Norfolk District Council within the GNR and has a strong track record of successfully delivering large transport programmes. The timeline below shows the delivery of these programmes since 2013 and how the '**Transforming Norwich**' opportunity builds on these achievements.



2.3 The Greater Norwich Region

2.3.1 Figure 3 shows the location of Norwich in the east of England 100 miles north of London and 60 miles north-east of Cambridge. Norwich is an engine of the regional economy and part of the Fast Growth Cities network (Cambridge, Milton Keynes, Oxford and Swindon).

2.3.2 The Greater Norwich Region (GNR), shown in Figure 4 is the focus of the '**Transforming Norwich**' programme and covers the whole urban area of Norwich, the Broadland Growth Triangle (the UK's largest urban extension) and the satellite settlements of Wymondham and Hethersett. It comprises the whole of Norwich City Council's area and part of Norfolk County Council, Broadland District Council and South Norfolk Council areas. The work-day population of the city region was over 280,000 according to the 2011 Census, the most recent data available. However, population growth since 2011 means that the figure will now exceed 300,000.

Transport Context

2.3.3 Norwich's transport network radiates from the historic city centre to suburban neighbourhoods within Broadland and South Norfolk Council areas. There are areas of urban deprivation, largely sited within the central, Norwich City Council area, with key retail and employment sites within the city centre and at the locations on the edge of the urban area.

2.3.4 The **A11** is a major focus of growth providing key strategic access to London, Cambridge and much of the rest of the UK, and forms the basis of the Norwich to Cambridge 'Tech Corridor', which has the potential to enable 26,000 additional jobs and create additional economic value of £2.75bn in real terms. Growth along this corridor has outstripped national and regional averages since 2010. The A11/A47 junction at Thickthorn is identified for improvement in the Roads Investment Strategy and funding has been committed to the scheme.

2.3.5 The **A47** within Norfolk connects to Great Yarmouth in the east and the **A1** at Peterborough to the west for access to the Midlands and north of England. Whilst the A11 is fully dualled, over half of the A47 within Norfolk is single carriageway, resulting in slow and unreliable journeys. Two dualling schemes are included in the Roads Investment Strategy, between North Tuddenham and Easton, just west of Norwich, and Blofield and Burlingham between Norwich and Great Yarmouth.

2.3.6 **Norwich Rail Station** has around 4m passengers each year and is the terminus of the main rail line from London Liverpool Street, as well as lines from Great Yarmouth, Lowestoft, North Norfolk, Cambridge and further afield from the Midlands. The rail station is approximately 1 mile from the city centre. Greater Anglia operates all mainline services and the majority of all other routes and has recently reduced journey times on selected services from Norwich except for the Norwich to Liverpool route and has recently reduced journey times on selected services from Norwich to London to 90 minutes. Greater Anglia is currently replacing every train over the next two years as part of a £1.4 billion investment in 169 new trains and 1,043 new carriages. There is a direct, hourly service to Cambridge, calling at Cambridge North (The Science Park), and these will soon be extended to Stansted Airport. Greater Anglia is fully engaged with TfN as a key stakeholder.

2.3.7 **Norwich Airport** is three miles north of the city centre and handles around 600,000 passengers each year. It is estimated that the airport supports over 1,200 jobs and contributes approximately £70m to the regional economy. The airport is currently producing a masterplan that seeks to increase passenger numbers beyond 1½ million. Key to this will be the adoption of a robust surface access strategy. The airport is also fully engaged with TfN as a key stakeholder.

2.3.8 Within the Greater Norwich area, recent improvements have seen the construction of the **A1270 Broadland Northway** (formerly Norwich Northern Distributor Road), providing a high-quality dual carriageway route to the north of Norwich. This road has taken traffic out of the city centre and the northern and eastern suburbs, allowing reallocation of road space to bus priority, cycling and walking. The County Council is currently progressing a proposed extension known as the Norwich Western Link that will link the western end of the Broadland Northway to the A47 west of the city.

2.3.9 There is a comprehensive, largely commercially-run **bus network** across Greater Norwich with two main operators, First Bus and konectbus (part of Go-Ahead), providing the majority of services, running around 210 vehicles and carrying around 45,000 passengers per day. konectbus are also contracted to operate our Park & Ride network. A Voluntary Quality Partnership (VQP) is in place across Greater Norwich between bus operators and local authorities, as well as multi-operator ticketing (the 'Fusion' ticket), contactless payments across the majority of bus services, a local authority-led smartcard (the 'Holdall' card) and multi-modal ticketing (through 'PlusBus'). There is a Punctuality Improvement Partnership (PIP) in place between the County Council and bus operators, with quarterly meetings arranged to review performance and discuss improvement measures. Bus patronage in Norwich is increasing with First Bus recently announcing annual increases of 5-10% on most services and konectbus also reporting growth within Greater Norwich, bucking the national trend.

2.3.10 Locally, we have a **Voluntary Quality Partnership** (the 'Norwich Bus Charter' – see Annex 1), which was launched during 'Catch the Bus Week' in 2014 for the Greater Norwich area, and covers fares, facilities, safety, accessibility and overall bus operations. Since its launch, it has been

successful in terms of providing a strong foundation for partnership working on joint initiatives between transport operators and local authorities, such as multi-operator ticketing, electronic passenger information systems, punctuality and air quality improvements and a strong focus on accessibility for all. The outcomes of this can be demonstrated through the following:

- Sustained bus patronage increases in Greater Norwich, with First Bus recently reporting annual growth of 5-10% across their services, and konectbus (part of Go-Ahead) also reporting growth on their city services;
- Availability and promotion of the 'Fusion' multi-operator bus ticket;
- Extensive provision of electronic information displays at bus stops, transport interchanges and Park & Ride sites across Greater Norwich, providing live and scheduled public transport information, as well as online access to this information for every stop. Provision of timetable data and working together on resolving issues with data and technical faults is central to this;
- Introduction of accessibility cards across all bus operators for travellers with physical and hidden disabilities, as well as the installation of a tactile and audible map at Norwich bus station and the provision of audible announcements at bus stops through the RNIB React system;
- Joint working on engine switch-off within the Air Quality Management Area in Norwich city centre;
- Joint involvement in a Punctuality Improvement Partnership (PIP), which meets every quarter and reviews bus service performance and ways in which improvements could be made;
- Successful joint applications for funding through the Better Bus Area (2012), which saw £2.8m invested in new bus priority measures, provision of electronic passenger information, smart ticketing and personalised travel planning, as well as £416k funding secured from DEFRA in 2015 for 24 of the worst polluting vehicles retro-fitted with emission reducing exhaust technology. Co-development of our Transforming Cities and Future Mobility Zone applications is evidenced through supporting letters and commitments.

2.3.11 **Park & Ride** has been an integral part of the sustainable transport network in Norwich for many years. There are currently six Park & Ride sites, five of which provide services to Norwich City Centre. The remaining site (Costessey) provides services to the University of East Anglia (UEA) and the Norfolk & Norwich Hospital. The entire Park & Ride service is currently provided by konectbus through a contract from Norfolk County Council, but at zero subsidy to the County Council. Since the start of the current contract in September 2015, passenger numbers have been growing at a slow rate, with around 55,000 cars parked at the sites each month. However, there remains spare capacity across the Park & Ride network and an examination of Park & Ride is under way through the TfN strategy review. The current contract has recently been extended to run to a maximum term of September 2023, but there is the ability to amend the contract accordingly in response to the 'Transforming **Norwich**' programme and the opportunities this presents.

2.3.12 **Norfolk Car Club**, predominantly serving the Norwich urban area, is a well-established car club within the city that was chosen as DfT's first national car club demonstration project and is now the largest independent car club in the UK with 60 cars, doubling in size every two years. Norfolk Car Club helps to reduce car ownership, improve air quality and promote sustainable urban mobility, with nearly half of members disposing of a car and members walking, cycling and using public transport more.

2.3.13 The DfT's **Cycle City Ambition Grant** (CCAG) programme has seen considerable levels of investment in the network of pedalways, our colour-coded strategic cycle routes across Greater Norwich. Our own comprehensive programme of monitoring has highlighted that cycle **use increase across the network by at least 40% overall.** Usage has doubled in some places where cycle infrastructure has been improved.

2.4 The Need for Investment – Overall Summary

2.4.1 **Sections 2.2 and 2.3** provided the Norwich context and outlined key problems and issues. This section provides an overall summary of further analysis that clearly sets out the need for investment. This analysis is aligned with the key words from the TCF core and supporting objectives, as set out in the '**Transforming Norwich**' Tranche 2 guidance published in January 2019:

- Journey time reliability
- Commuting
- Economic growth
- Carbon emissions
- Wider social and economic benefits
- Housing delivery
- Air quality
- Future of mobility

2.4.2 A more detailed analysis of the key issues and problems can be found in **Section 2.5**.

Journey Time Reliability – Overall Summary

Journey Time Reliability

Key Issues:
> Norwich is the 18th most congested of 111 urban areas in the UK. Worsening bus punctuality highlights the impact of this.

Context:
> Consultations and site visits with bus operators have identified key congestion hotspots for buses along corridors and in the city centre.
> Buses have insufficient priority on main corridors and there is the local perception as buses being slow, unreliable and expensive.
> Congestion on corridors and in the city centre means bus operators are currently investing to stand still; extra buses simply maintain rather than boost services.
> Accurate GPS data from buses and mobile phone data shows journey times can be up to 50% longer in peak periods compared to off-peak.
> Although bus patronage is growing, this will plateau without significant investment by bus companies, which is dependent on rigorous application of bus priority, including separate space for cycling and the creation of mobility hubs as the places where people can access shared transport services.

***How 'Transforming Norwich' will address the issue*:**
> The 'Transforming Norwich' programme includes measures along the six clean transport priority routes and at key hotspots to alleviate congestion and prioritise clean and shared transport modes to make them more competitive than single-occupancy vehicle use in terms of time, cost and convenience.
> 6.6 miles of new dedicated bus lanes will be provided.
> Bus stops through the main bus thoroughfare in the city centre are being realigned to reduce delays to buses accessing and egressing stops and delaying each other. In total, over 80 bus stops will be upgraded.
> 99 traffic signal-controlled junctions will be upgraded to provide priority for buses.
> Pinch points on the network are being tackled to ensure buses are not held up compared to general traffic.
> General traffic is being re-routed to separate it from buses at key junctions.

Commuting – Overall Summary

Commuting

Key Issues:
> Single-occupancy vehicle use on all key access routes into Greater Norwich is high, with 85% of vehicles containing one person during week-day morning peak periods. This situation is inefficient in terms of how the transport network is utilised.
> Recent investment in rail service and rolling stock is welcomed but needs to be supported by onward connections to both the city centre and key employment centres. Due to its location on the edge of the city centre, connectivity of the rail station is a key challenge.

Context:
> Bus patronage is growing in Norwich, providing a firm basis to build on
> Norwich displays higher-than-average walk and cycle to work trips (compared to surrounding districts and the national picture) and recent data collection shows a continuing upward trend.
> In Norwich, nearly 60% of all commuting trips are less than 5km in length, providing an excellent opportunity to further increase cycling and walking numbers.
> Recent investment in cycling infrastructure has seen significant growth in cycling in Norwich (average of 40%).
> Car use is considerably higher in Broadland (70%) and South Norfolk (70%) than Norwich (46%). Car use is also higher than the East of England (62%) and England as a whole (57%).

***How 'Transforming Norwich' will address the issue*:**
> Our programme is based around the delivery of measures that prioritise clean and shared transport and that connect key employment and educational sites, offering good transport choices to residents and employees.
> The rail station will be better connected to the city through provision of new mobility hub
> New segregated cycle facilities and improved pedestrian facilities will build on the strong existing culture of walking and cycling, particularly associated with the development of mobility hubs.
> A co-ordinated and sustained behaviour change programme delivered in parallel will tackle single car occupancy and encourage a shift to more sustainable modes.

Economic Growth – Overall Summary

Economic Growth

Key Issues:
> There are areas of deprivation within the city, reflecting its designation as a social mobility 'cold spot' - according to 2019 figures, 50% of areas in Norwich are considered to be in the 10% most deprived in the country. There is also economic buoyancy, particularly in South Norfolk.
> There is a lack of public transport connectivity between some areas of population and employment on the edge of the city including the Norwich Research Park, hospital (NNUH) and university cluster; Norwich Airport (including the Airport industrial estate and the International Aviation Academy); and some of the other strategic employment sites like Broadland Business Park.

Context:
> The work-day population of the city region was estimated at just over 280,000 people according to the 2011 census. The most recent resident population growth estimates across the GNR suggests that this figure is now likely to exceed 300,000 and will continue to grow over the next 15 years.
> In order to meet the growth aspirations of Norwich and to improve social mobility, key employment and educational sites need to be well connected by clean and shared mobility.
> Norwich International Airport plays a significant role in the economy. However, in order to meet the growth aspirations of the airport and associated businesses and enable the airport to deliver its potential, more sustainable access to the airport is needed.

***How 'Transforming Norwich' will address the issue*:**
> The six clean transport priority routes have been chosen to link residents with key employment and educational sites.
> Particular focus has been given to areas of deprivation to enable access to economic opportunities. Over 31,000 people living in the most and second most deprived quintiles in the UK will have better access to employment and training.
> Norwich International Airport is located on one of our priority corridors and a mobility hub is proposed to serve the airport.

Carbon emission – Overall Summary

Carbon Emissions

Key Issues:
> In 2016 Norfolk's transport emissions accounted for 39% of Norfolk's overall CO2 emissions.

Context:
> In November 2019, the County Council agreed a new environmental policy and a pledge to achieve net zero carbon emissions by 2030.
> High levels of car dependency in Broadland and South Norfolk provide an opportunity to reduce carbon emissions by encouraging take-up of sustainable modes of transport.
> There is an established and successful car club operating in Norwich but further investment is needed to reduce reliance on personal car ownership as well as embracing clean technologies such as electric cars

***How 'Transforming Norwich' will address the issue*:**
> The six clean transport priority routes will reduce carbon emissions by the introduction of low / zero emission buses by around 1,600 tonnes
> Improved Park & Ride facilities and the development of mobility hubs will enable easy access to shared mobility services – buses, trains, car club vehicles and hire bikes – for onward travel into the city.
> A co-ordinated and sustained behaviour change programme will encourage a shift to low carbon-emitting forms of transport.

Wider Social and Economic Benefits – Overall Summary

Wider Social and Economic Benefits

Key Issues:
> There is an **ageing population**, particularly in the neighbouring local authorities.
> Across Greater Norwich, an average of 19% of people have a **long-term health condition or disability**, which places considerable strain on health and supporting networks.
> Indicators for health could be improved in all areas of Greater Norwich but particularly in South Norfolk and Broadland.

Context:
> Norwich has a comparably higher percentage of population (21.8%) within the 20 to 29 age band, highlighting its 'student city' character with various centres of academic excellence. This provides the **opportunity to trial new mobility options that particularly cater for that group**.
> An ageing population bring specific challenges in terms of accessibility, social mobility and the commercial delivery of transport.
> Investment in walking and cycling infrastructure that improves the quality of the user experience will encourage adoption of these modes.

***How 'Transforming Norwich' will address the issue*:**
> Across all of the cost programmes put forward, younger people and older people will benefit most as a result of the proposed investment in walking, cycling and public transport infrastructure.
> The heart of the city centre will be transformed in its look and feel, creating an environment that is clean, welcoming and accessible for all. 57,000sqm of public realm area will be improved
> A network of 33 mobility hubs will make it convenient for all people, irrespective of their physical capabilities, to reach these places on foot and by bicycle – 53,000 people live within 400m of a mobility hub. Hubs will be well designed so that people feel comfortable, secure and well informed whilst waiting for services to arrive or navigating between them.
> A co-ordinated and sustained behaviour change programme will encourage a shift to more active transport. Public Health will be a key partner in delivering this.

Housing Delivery – Overall Summary

Housing Delivery

Key Issues:
> Major housing and employment growth is planned within the GNR and this will increase the need to travel across the area.
> The Broadland Growth Triangle (BGT) is the largest urban extension in the UK (circa 13,500 homes and 2,600 jobs). The majority of outline planning consents across all the sites that make up the BGT have been approved, but it is the detailed applications from developers that are taking more time to come through.

Context:
> Connecting both existing and new housing with jobs and education will be critical to achieving Norwich's vision of a shared and clean mobility future.
> There is a great desire to accelerate the build out of the BGT and to that extent a significant bid has been submitted to the Housing Infrastructure Fund (HIF) to secure circa £60m to build the up-front infrastructure for two of the largest developments in the BGT known as Beeston Park and North Rackheath.

***How 'Transforming Norwich' will address the issue*:**
> The six clean transport priority routes are connecting new housing developments across the GNR with economic and social opportunities so that this growth is achieved sustainably.
> Clean and shared transport will serve the Broadland Growth Triangle, supported by a sustained behaviour change campaign, to ensure sustainable travel habits are supported as new residents move into the area.
> The benefits of 'Transforming Norwich' will be complimentary to the HIF funding, but will not duplicate them. Furthermore, the proposals would provide alternatives to the use of the private car ahead of developments being built, which is exactly the offer that has historically not been possible.

Air Quality – Overall Summary

Air Quality

Key Issues:
> Road transport is identified as a major source of air pollution.
> Single-occupancy vehicle use on all key access routes into Greater Norwich is high, with 85% of vehicles containing one person during week-day morning peak periods. This situation is inefficient in terms of how the transport network is utilised, contributing to congestion and poor air quality.

Context:
> Norwich has an AQMA covering the city centre but in Broadland and South Norfolk, air quality is generally good with no declared AQMAs.

***How 'Transforming Norwich' will address the issue*:**
> The six clean transport priority corridors will deliver investment in clean vehicle technology and improvements in the city centre will encourage more active modes of transport to be adopted. Air pollution in the most polluted areas in Norwich will reduction by more than 15%
> A co-ordinated and sustained behaviour change programme will encourage a shift to more sustainable transport modes further improving air quality.

Future of Mobility – Overall Summary

Key Issues:
> Norwich already has many elements to build upon to prepare and enable Norwich to be a pioneer in the area of future mobility including its separate transport operating systems, its established and successful car club operating in Norwich, bike share scheme and opportunities in the area of public transport ticketing.

Context:
> Norwich is the UK's first Sharing City and Norwich submitted a proposal for **Future Mobility Zone (FMZ)** funding in September 2019 to realise a vision of Norwich becoming a 'Shared Mobility City', capitalising on technology and new forms of mobility that will enable sharing data, sharing knowledge, sharing mobility and sharing information
>Successful award of Future Mobility Zone funding will further support Norwich's ambitions in the area of future mobility.

***How 'Transforming Norwich' will address the issue*:**
> > The 'Transforming Norwich' programme has a strong synergy with the FMZ, recognising that the future of mobility relies on an evolution of the Norwich transport system rather than a revolution.
> The opportunities presented by future mobility will be utilised through the 'transforming the passenger experience' theme. This includes; using technology to improve bus journey times, improving customer communication at mobility hubs and utilising public transport ticketing technology.

2.5 The Need for Investment – Detailed Analysis

2.5.1 Section 2.3 provided an overall summary of the key problems and issues that demonstrate why Norwich has a strong case for investment. This section provides a more detailed analysis against the same key words from the '**Transforming Norwich**' core and supporting objectives, as set out in the '**Transforming Norwich**' Tranche 2 guidance published in January 2019:

- Journey time reliability
- Commuting
- Economic growth
- Carbon emissions
- Wider social and economic benefits
- Housing delivery
- Air quality
- Future of mobility

Journey time reliability - Detailed Analysis

2.5.2 Norwich is the 18th most congested of 111 large UK urban areas (2017). Drivers wasted an average 26 hours in peak hour congestion, costing £1,300 per driver and £132m to the city[1].

2.5.3 In preparing our '**Transforming Norwich**' programme, we are able to analyse the incidence of congestion in great detail using data from two sources - INRIX, which gathers data from mobile phones of all road users, and First Bus. **The richness of this data gives confidence that we are able to accurately identify where delays and congestion are occurring and identify the likely benefits of investment.**

2.5.4 The First Bus information has been gathered by analysing the real-time data from the ticket machines on their buses, showing arrival, departure and dwell times at every bus stop, for every tracked journey, along with the time and speed taken to travel between stops. It was then compared to other factors such as weather conditions, road works and socio-demographic data. The data shown in Figure 5 - Figure 6 has been gathered over a four-month period and shows the median delay in seconds, per metre, per hour, of a typical weekday on a given section of carriageway at its worst point, compared to a normal time set. We have used this data across all our

[1] INRIX Global Traffic Scorecard, p29 (February 2018)

corridors but for the purposes of this report, we have highlighted this data for one corridor as well as the city centre:

- Dereham Road between Longwater and the city centre;
- City centre.

2.5.5 When looking at Dereham Road in the west of the city, significant variability in journey time is found. Dereham Road is a key corridor linking large-scale existing and future housing (and employment locations) with employment, retail and leisure in the city centre.

2.5.6 Figure 7-9 show estimated travel times west of the city centre on Dereham Road between Longwater Junction (the key access to existing and future housing and employment sites at the edge of the built-up area) and Barn Road (the inner ring road at the edge of the city centre).

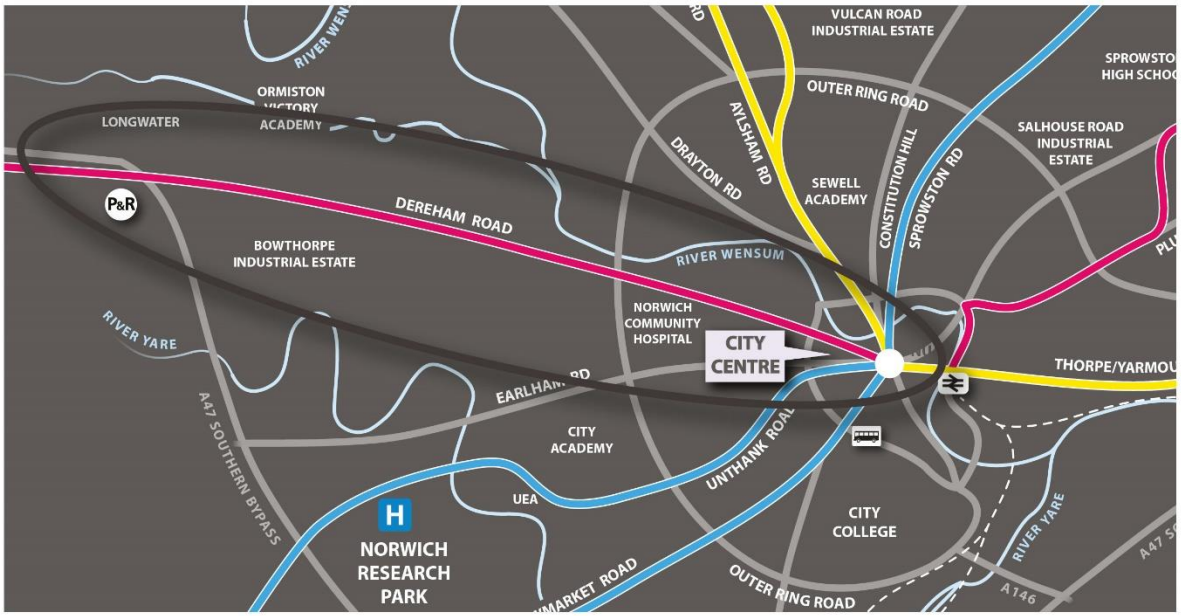


Figure 7: City centre - Longwater Junction

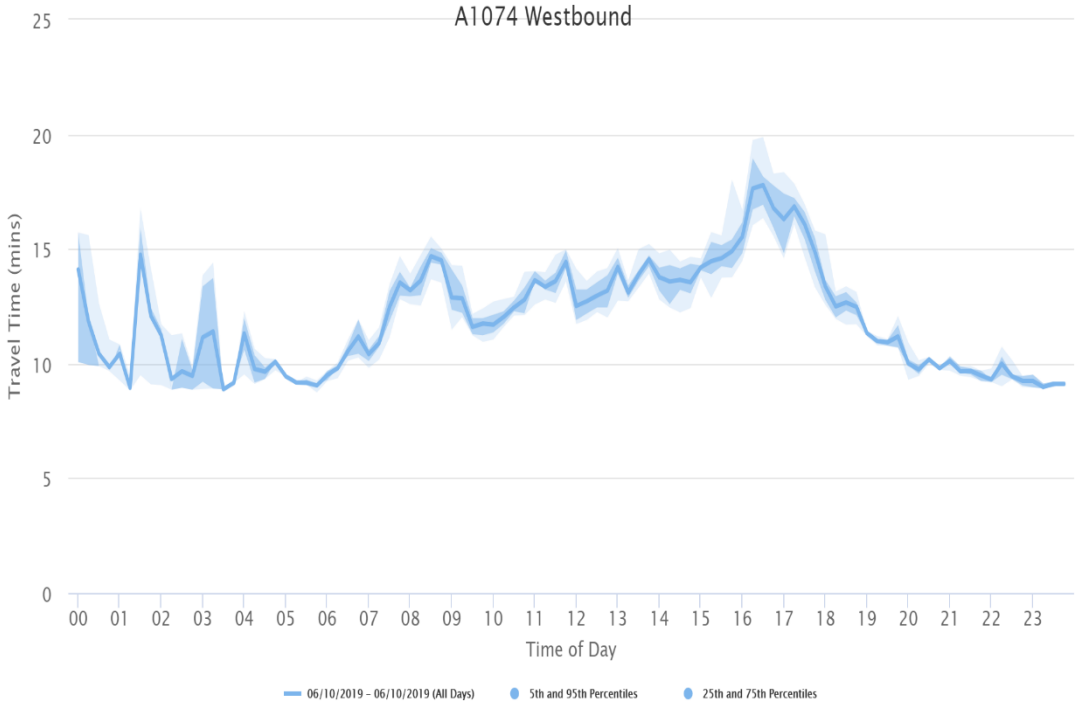


Figure 8: Estimated travel times on Dereham Road between Longwater Junction and Barn Road (Westbound)

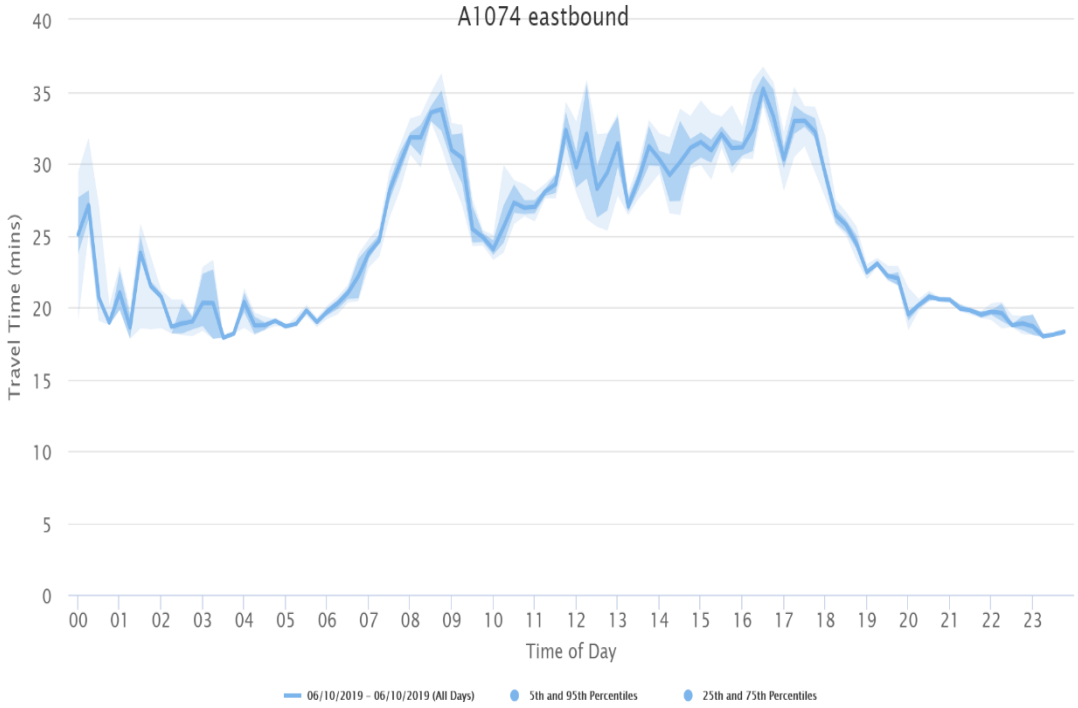


Figure 9: Estimated travel times on Dereham Road between Longwater Junction and Barn Road (Eastbound)

2.5.7 Eastbound travel times on Dereham Road reveal a peak between 8:30 and 9:00 followed by a visible drop in travel times at approximately 10:00. Travel time conditions soon after largely feature an upwards trend, reaching similar morning peak levels at approximately 17:30. Westbound travel times show a steady increase in journey time throughout the day, with **evening peak travel times being up to 50% longer than off-peak travel times**.

2.5.8 The First Bus data reveals that the locations that contribute most towards these delays are the approaches to Longwater Lane, Breckland Road / Wendene, Sweet Briar Road (outer ring road) and Grapes Hill (inner ring road). **This insight has helped to inform the development of our investment programme**.

2.5.9 The data and analysis we have highlighted in this section demonstrates that our proposals for bus priority measures, and the estimates of their benefits, are based on accurate and local information.

Commuting – Detailed Analysis

2.5.10 Table 1 details estimated distance travelled to work, as recorded by the 2011 census. The data is shown for the three local authorities within the '**Transforming Norwich**' programme area, as well as Norfolk, the east of England and England as a whole.

Table 1: Distance travelled to work (2011)

Area	Less than 2km	2km to less than 5km	5km to less than 10km	10km to less than 20km	20km to less than 30km	30km to less than 40km	40km to less than 60km	60km and over	Work mainly at or from home	Other	Average Distance (km)
Broadland	11.0%	18.3%	22.3%	18.1%	5.3%	1.6%	1.1%	2.9%	10.9%	8.6%	14.9
Norwich	27.6%	31.5%	10.6%	5.0%	3.6%	2.4%	1.1%	3.3%	7.7%	7.1%	11.9
South Norfolk	10.6%	9.9%	18.8%	22.2%	7.6%	3.6%	2.1%	3.3%	13.0%	8.9%	18.1
Norfolk	17.5%	16.0%	13.9%	15.2%	7.7%	3.6%	2.3%	3.7%	11.4%	8.8%	17.1
East of England	16.5%	15.4%	12.7%	14.8%	8.4%	4.5%	4.4%	3.7%	10.7%	8.9%	17.3
England	16.6%	18.4%	17.3%	15.3%	5.7%	2.6%	2.3%	3.1%	10.3%	8.5%	14.9

2.5.11 This table outlines the **significant opportunity to promote active travel modes for shorter commuting trips**, particularly in Norwich, with nearly 60% of all commuting trips being less than 5km in length.

2.5.12 Table 2 shows the method of travel to work for each of the local authorities in the GNR against the regional and national averages.

Table 2: Modal split of programme area against regional and national average (2011)

Area	Method of travel to work[1]										
	Work mainly at or from home	Underground, metro, light rail, tram	Train	Bus, minibus or coach	Taxi	Motorcycle, scooter or moped	Driving a car or van	Passenger in a car or van	Bicycle	On foot	Other method of travel to work
Broadland	6%	0%	1%	5%	0%	1%	70%	5%	4%	6%	1%
Norwich	4%	0%	1%	8%	0%	1%	46%	5%	9%	24%	1%
South Norfolk	7%	0%	1%	4%	0%	1%	70%	5%	3%	7%	1%
Norfolk	6%	0%	1%	4%	0%	1%	64%	6%	5%	12%	1%
East of England	6%	1%	7%	4%	1%	1%	62%	5%	4%	10%	1%
England	5%	4%	5%	8%	1%	1%	57%	5%	3%	11%	1%

[1] The data presented in this table are rounded.

2.5.13 The data reveals that car use is considerably higher in Broadland (70%) and South Norfolk (70%) than Norwich (46%). Car use is also higher than the East of England (62%) and England as a whole (57%).

2.5.14 Norwich performs well in terms of cycle use with an estimated average of 9%, considerably higher than regional (4%) and national (3%) averages. Additionally, averages for 'on foot' travel in Norwich (24%) are distinctly higher than in any of the other areas analysed, including the east of England (10%) and England as a whole (11%).

Walking

2.5.15 The Norwich walking network, as defined through the emerging **Local Cycling and Walking Infrastructure Plan**, consists of primary and secondary routes and two key walking zones in the city centre zone and NRP / NNUH / UEA with priorities for investment that align well with the '**Transforming Norwich**' programme (Figure 11). Figure 12 shows the pedestrian casualties across the GNR, which highlights that these are relatively well spread out. Specific 'hotspots' will be tackled through the delivery of our programme.

2.5.16 Recent evidence shows that the walking network has collaterally benefited from the implementation of the Cycle City Ambition Grant (CCAG) investment programme. For example, a major reallocation of city centre space to encourage pedestrians and improve public realm (e.g. Westlegate) has been completed. It also funded three major improvements to walking and cycling crossings of the inner ring road at St George's Street, All Saints Green and Vauxhall Street that have been completed since 2015/16.

2.5.17 Footfall data, which is collected by the Norwich Business Improvement District has reported that the city centre has performed strongly over the last few years. The information in Figure 10 is based on two representative counting locations within the city centre and shows an overall increase between 2014 and 2017.

2.5.18 Four major improvements to walking and cycling crossings of the inner ring road (St Crispins Road, All Saints Green, Chapelfield Road and Gilders Way) have been completed in total since 2017/18.

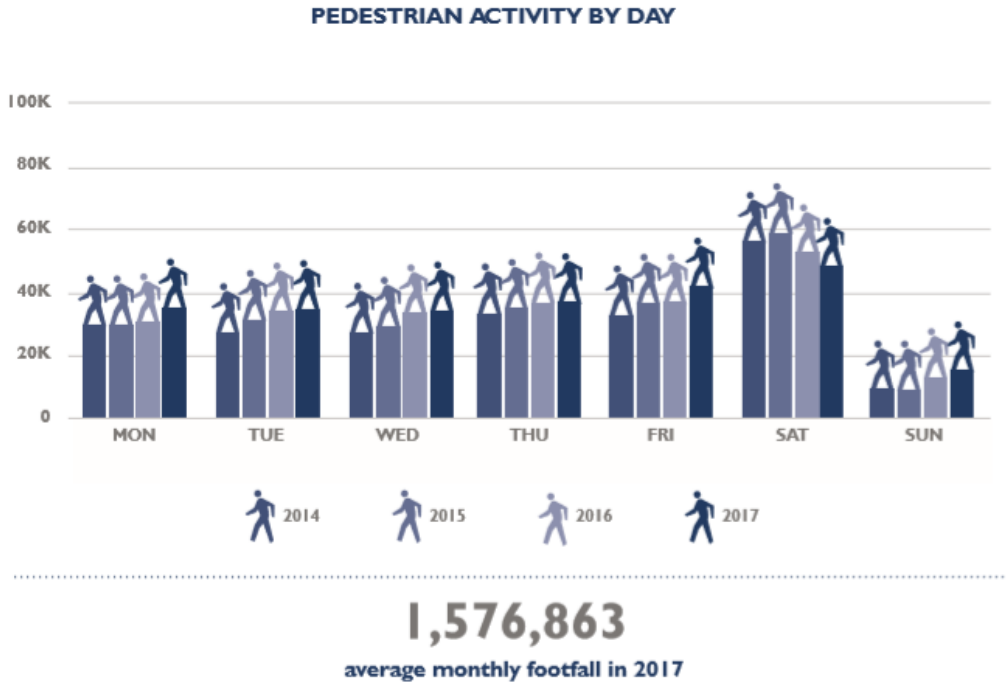


Figure 10: Pedestrian Activity by day

Cycling

2.5.20 Norwich's existing cycle network – Pedalways – was adopted in 2012 and features five colour-coded radial pedalways that meet in the city centre and two orbital pedalways covering over 90km:

Radial routes

- Red pedalway: Drayton to Whitlingham
- Green pedalway: Bowthorpe to Broadland Business Park
- Pink pedalway: Hospital (NNUH) / NRP to Heartsease
- Blue pedalway: Wymondham to Sprowston
- Yellow pedalway: Lakenham to Norwich International Airport

Orbital routes

- Orange pedalway: inner circuit
- Purple pedalway: outer circuit

2.5.21 In terms of **cycling infrastructure design standards**, we recognise that there are numerous sources of best practice. Information on how we ensure appropriate design standards are adopted is outlined further in the Management Case.

2.5.22 Considerable investment has been made in cycle infrastructure through the CCAG programme. Phase one saw £5.7 million of improvements to the pink pedalway and phase two invested £8.4 million into the blue and yellow pedalways. The pink, blue and yellow pedalway routes have been completed with the use of various innovative design elements, including: advance green filters for cyclists, low-level cycle signals, kerb-separated tracks and sections with motion-sensitive lighting. 3.27 km of on-road cycle lanes, 1.1 km of off-road cycle paths and 3.85 km of off-road shared cycle/pedestrian routes have been built.

2.5.23 Figure 13 shows the planned development of the cycle network up to 2028. It includes the extension and re-routing of some pedalways (e.g. yellow and green) and the creation of a new brown pedalway. The percentage change of estimated total number of cycles per year from 2017 to 2018 is also shown. These results derived from automatic cycle counter volumetric data for a selection of monitoring sites. Table 3 summarises the year-on-year change in cycling at all automatic and manual cycle count locations combined since the first CCAG interventions were completed in 2014. In the first years from 2013, we saw quite large gains in cycling and whilst this has slowed, it has remained far higher than when the CCAG schemes began, and locations receiving CCAG funding are still recording rises.

2.5.24 Since 2013, Norfolk County Council has committed to reporting annually to Sustrans on the performance of the CCAG schemes. Monitoring sources include route user surveys, 23 automatic counters with more to follow, annual count points throughout the Norwich area and an active travel

survey. We are committed to continuing this monitoring until the end of the CCAG scheme (2023). Our work with an academic partner, the **Norwich Medical School** at the UEA, ensures we are able to provide robust monitoring and evaluation of our Access Fund programme and other walking and cycling projects.

2.5.25 We regularly report to elected councillors and wider stakeholders through various media outlets.

Table 3: Year-on-year change in cycling at all automatic and manual cycle count locations combined since the first Cycling City Ambition Grant interventions were completed in 2014

Increase in Cycling	2013/14	2014/15	2015/16	2016/17	2017/18
CCA investment specific	36.20%	28.00%	3.40%	1.60%	8.20%
City wide	9.80%	25.00%	5.60%	-0.30%	-3.20%

2.5.26 The locations of serious and fatal collisions involving cyclist casualties between 1st January 2016 and 31st December 2018 are illustrated in Figure 14.

2.5.27 There is a variety of cycle parking available across the city centre. A cycle stand audit completed in 2015 revealed that there were 126 individual cycle stand locations within the city centre with a total capacity of approximately 1,700 bikes.

2.5.28 The audit also provided a snapshot of cycle parking occupancy levels. Results showed that 75%+ occupancy levels at 19 locations with a combined total capacity of approximately 200 spaces. All the remaining locations with an estimated combined capacity of 1,500 spaces recorded less than 75% use.

2.5.29 According to the latest CCAG programme progress report (2019), the city has seen the introduction of 314 cycle parking spaces and the upgrade of 184 spaces across the entire cycle network through the programme.

Public transport: Bus (excluding Park & Ride)

Service provision and infrastructure

2.5.30 Figure 15 illustrates the main bus service provision from and through Norwich city centre showing the strong radial network. Annex 2 outlines a summary of the bus services provided. There are three main operators serving Greater Norwich, with the largest of these being First Bus, who carry approximately 80% of all passengers. Between them, they operate around 210 buses per day.

2.5.31 Buses predominantly operate along radial routes into the city centre, with First Bus providing a significant number of cross-city services. There are few orbital bus movements; these have been tried by bus operators in the past but did not generate sufficient patronage for commercial operation. Public subsidy of a limited number of bus services supports evening and weekend radial services.

Bus Patronage

2.5.32 First Bus, who are the largest bus operator within the programme area, have reported passenger growth of approximately 9.6% from 2017/18 to 18/19. Growth is reported on most routes, particularly key routes serving the city centre, with their services carrying an estimated 45,000 people per week day, equivalent to 13.5 million passengers per year. Patronage data from other bus operators paints a more challenging environment, but specific operational difficulties are cited as being a causal factor in this, such as problems with fleet availability and successful integration of new ticketing equipment.

2.5.33 This overall positive picture for Greater Norwich contrasts with statistics on local bus services across Norfolk as a whole, where passenger journey numbers have been in decline since 2009/10. This position is reflected in many areas across the UK.

Bus ticketing

2.5.34 All three main bus operators utilise the same ticket machine hardware (Ticketer) and accept contactless payment, which has been introduced over the last 6-12 months across Norwich. Take-up of contactless payment has been very good, which is evidenced by First Bus stating that more than 50% of their ticketing transactions in Norwich are now contactless or through their mobile ticketing (m-Ticket). No operators in Norwich operate a flat fare approach to ticketing, with multiple zones and different fares applying.

2.5.35 In Norwich, we have the ‘Fusion’ multi-operator ticket, which was launched in 2010, and is a 1, 3 or 5-day ticket valid travel across Greater Norwich that can be bought on the bus or in advance on the Holdall smartcard. There are between 150-200 Fusion tickets sold each month.

2.5.36 Multi-modal ticketing is available in Greater Norwich through the PlusBus ticket, providing unlimited bus travel on participating operators' services, around the urban area of Norwich, including travel to / from the University of East Anglia.

Bus performance

2.5.37 Figure 16 shows the percentage of buses on time for Norwich since January 2017. A trend line is also displayed. Whilst some variability is to be expected on a month-to-month basis, the overall trend for punctuality has been downwards. The congestion highlighted earlier in this section affects journey time reliability of all modes. Provision of public transport priority will tackle congestion and pollution particularly in cleaner and more modern fleets.

Figure 16: Percentage of buses on time for Norwich 2017 and 2018

Park & Ride

2.5.38 There are currently six Park & Ride sites, five of which provide services to Norwich City Centre – see Figure 17. The remaining site (Costessey) provides services to the University of East Anglia (UEA) and the Norfolk & Norwich University Hospital. The entire Park & Ride service is currently provided by konectbus through a contract from Norfolk County Council, but at zero subsidy to the County Council. Since the start of the current contract in September 2015, passenger numbers have been growing, with around 55,000 cars parked at the sites each month. However, there remains spare capacity across the Park & Ride network and an examination of P&R is under way through the TfN strategy review. The current contract has recently been extended to run to a maximum term of September 2023, but there is the ability to amend the contract accordingly in response to the TCF programme and the opportunities this presents.

Travel information - printed

2.5.39 NCC provide stop-specific printed timetables at over 120 bus stops throughout the county including at major interchanges (Norwich city centre, Great Yarmouth Market Gates, King's Lynn Bus Station), minor interchanges (Norfolk & Norwich University Hospital, Cringleford) bus stations, market towns and high-footfall bus stops. In recent times, a partnership agreement between NCC and local bus operators has seen service providers produce their own stop-specific timetables at over 500 additional locations. Many operators have seen this as a good opportunity to market their own promotional and ticketing schemes and NCC has supported this by purchasing and installing timetable cases where required.

2.5.40 Major interchanges are seen as a significant opportunity to provide enhanced printed travel information and in Norwich City Centre, NCC provides a comprehensive wayfinding system plus a suite of extra printed information to help passengers find their desired bus service and then navigate to the appropriate bus stop. This has proven extremely popular with bus passengers, has brought national recognition and seen a step change in how NCC provides travel information with the focus on simplicity and usability.

Travel information – electronic

2.5.41 NCC provide over 100 electronic Real-Time Passenger Information (RTPI) displays in Norfolk that are either mains or solar powered, with around 60 displays in Norwich. All screens have messaging capabilities that can be content managed by both NCC and bus operators through an online facility. This allows promotions, events, service disruption and publicity to be displayed on any sign, at any time, and has proven an effective way of communicating with bus passengers.

2.5.42 Data management processes are in place to ensure the accurate and timely publication of bus times. The majority of data is supplied directly by bus operators, through the provision of TransXChange, to NCC data broker's Hogia Public Transport Systems who blend the scheduled timetable information with an incoming real-time (SIRI-VM) feed provided by the bus operator's Electronic Ticket Machine suppliers. Once the two feeds, scheduled and real-time, have been reconciled this data is provided to our RTPI screen suppliers Nexus Alpha LPS for publication on the displays.

2.5.43 Tranche 1 TCF funding is being used to develop a voice-interactive bus information system which will be trialled at Norwich Bus Station. The initial system will be fitted to one stop only and will be able to respond to basic enquiries related to bus services. The intention is to prove viability in the context of considerable noise, and to evaluate customer take-up and reaction. If it is well received, it could be developed further to add more complex functionality. Given that this system is purely audio (voice activated, voice response) it could prove a valuable addition to the council's provision to meet the needs of the visually impaired as well as be of use more generally. Of significant interest for the visually impaired is that it does not require the user to have a key fob or an app on their phone. Hence it will

be one option available to the council to provide the right support at any site, but particularly at key transport hubs and where there are concentrations of visually impaired users.

Travel information – online

2.5.44 The vast majority of bus operators in Norfolk provide a comprehensive website publishing their bus services and therefore NCC has taken the decision to utilise this fact opposed to replicate it. The NCC website provides a guide to access these websites for any passengers looking for travel information online. For those operators without a significant online presence, bus passengers are directed to use Traveline whose information is provided by NCC.

2.5.45 The two major bus operators in Norfolk, First Bus and konectbus, also have downloadable apps and these have proven popular with passengers seeking timetable, ticketing and real-time information.

2.5.46 In the Greater Norwich area, NCC has deployed 'self-serve' information in the style of a poster board at those bus stops without either printed or electronic travel information. The boards provide an individual SMS, QR code and NFC link to a stop-specific real-time departure board so passengers can access the information via a mobile device. This scheme has proven very successful with thousands of 'hits' to this facility.

Public transport: National Rail

2.5.47 Key rail services to and from Norwich train station are shown in Table 4.

Table 4: Rail services to and from Norwich train station

Destination	Approximate Frequency	Approximate Journey Time
London Liverpool Street	Half hourly	90-120 minutes
Cambridge	Hourly	80 minutes
Peterborough	Hourly	120 minutes
Great Yarmouth	Hourly (half hourly at peak times)	30 minutes
Sheringham	Hourly	56 minutes

2.5.48 As part of the current Greater Anglia franchise, all rolling stock on this franchise is currently being replaced. This will improve the quality, reliability and capacity of mainline and local services. The operator is also planning to extend the Norwich to Cambridge train services to Stansted. In addition, a limited number of services each day operate between Norwich and London Liverpool Street with a journey time of 90 minutes, calling at Ipswich only. This 'fast' service, which was only introduced in May 2019, has been the subject of lobbying and campaigning by MPs and councils along the route for some time. There is an ambition that this is increased to at least one 90-minute service every hour.

2.5.49 Norwich Station is approximately 1mile east of the primary shopping area. There is no direct public transport link between the station and Norwich Airport or Norwich Bus Station. Recent highway improvement works in the city centre have seen a significant upgrade to the cycle and pedestrian links between the rail station and the city centre via Rose Lane through the introduction of a segregated cycle lane and wider pavements. Further improvement works for cyclists and pedestrians along this same corridor are currently being delivered on Prince of Wales Road. However, the area immediately around the station remains constrained by heavy traffic flows, which results in buses, cyclists and pedestrians being in conflict with general traffic.

Public transport: Accessibility

2.5.50 Figure 18 - 21 illustrates how accessible by public transport major employment centres within the programme area are, by showing access by bus and rail to Norwich city centre, Norwich Research Park, Broadland Business Park and the Airport Industrial Estate respectively on a Tuesday between 7:00-10:00, with a maximum journey length of 60 minutes.

Figure 18: 60-minute public transport accessibility to Norwich city centre

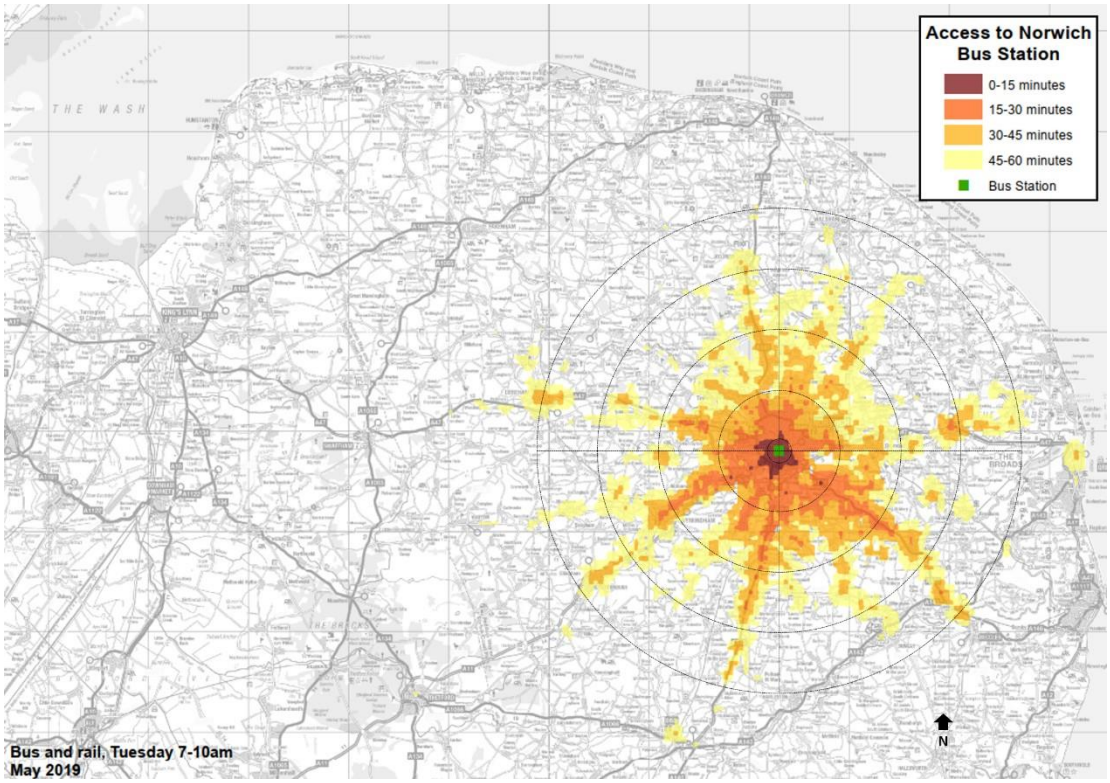


Figure 19: 60-minute public transport accessibility to Norwich Research Park

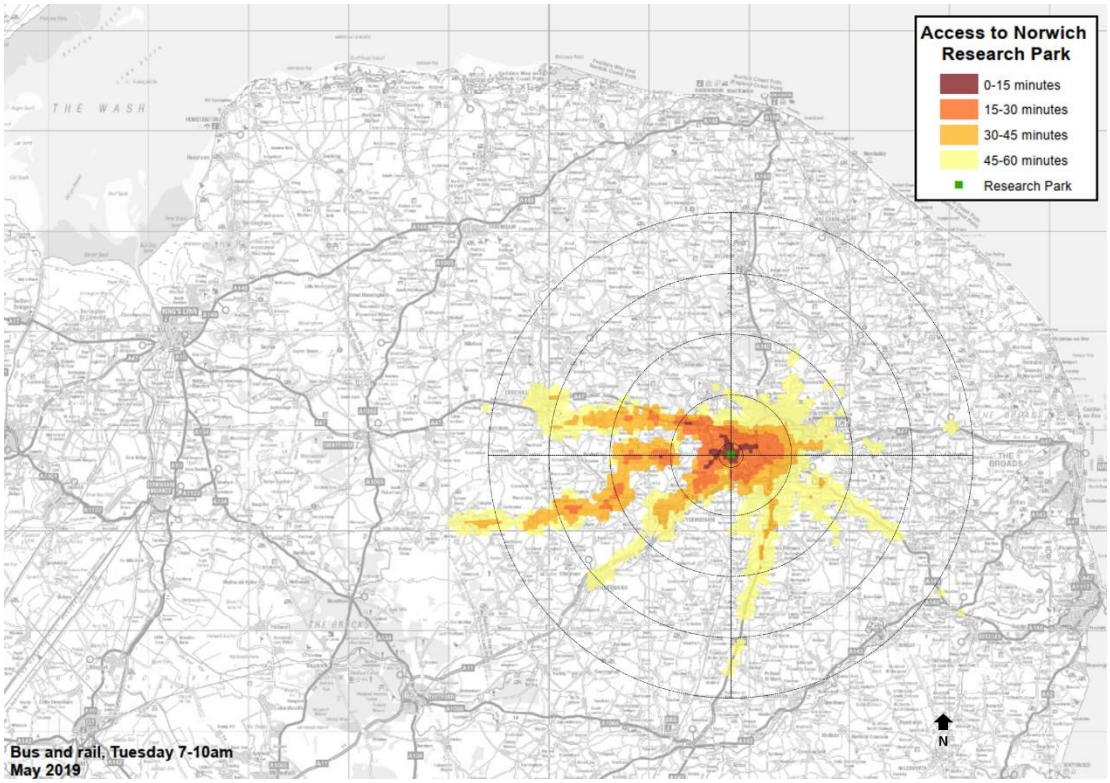


Figure 20: 60-minute public transport accessibility to Broadland Business Park

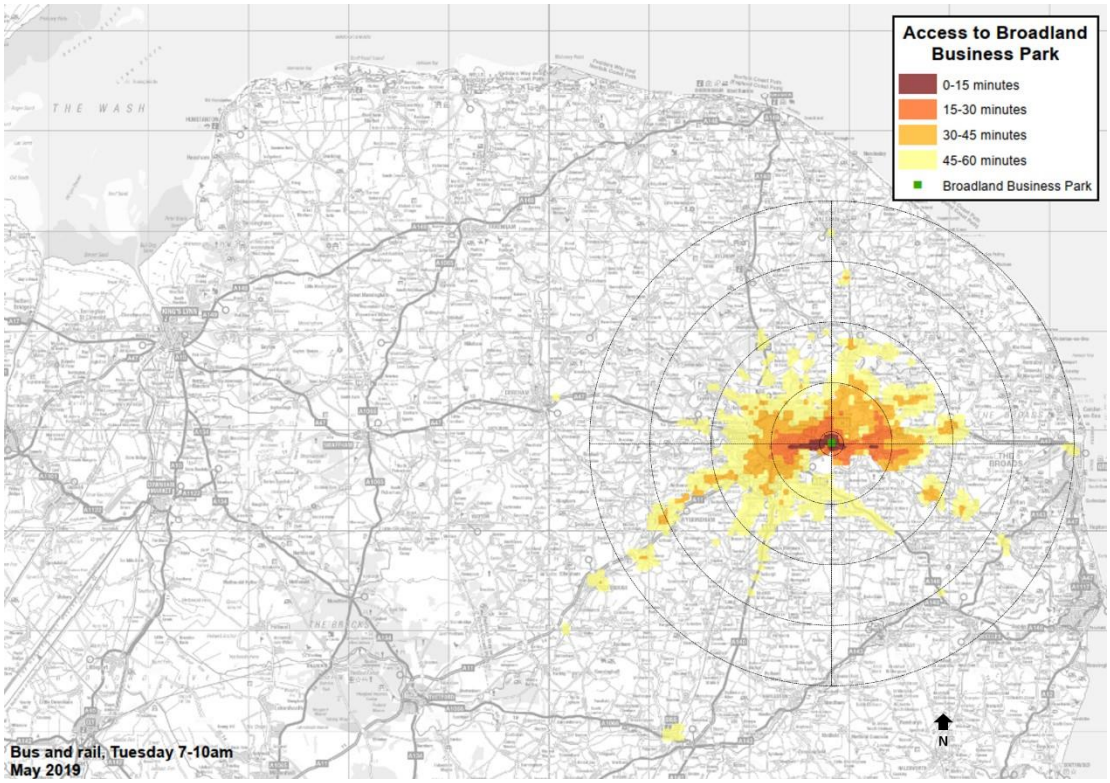
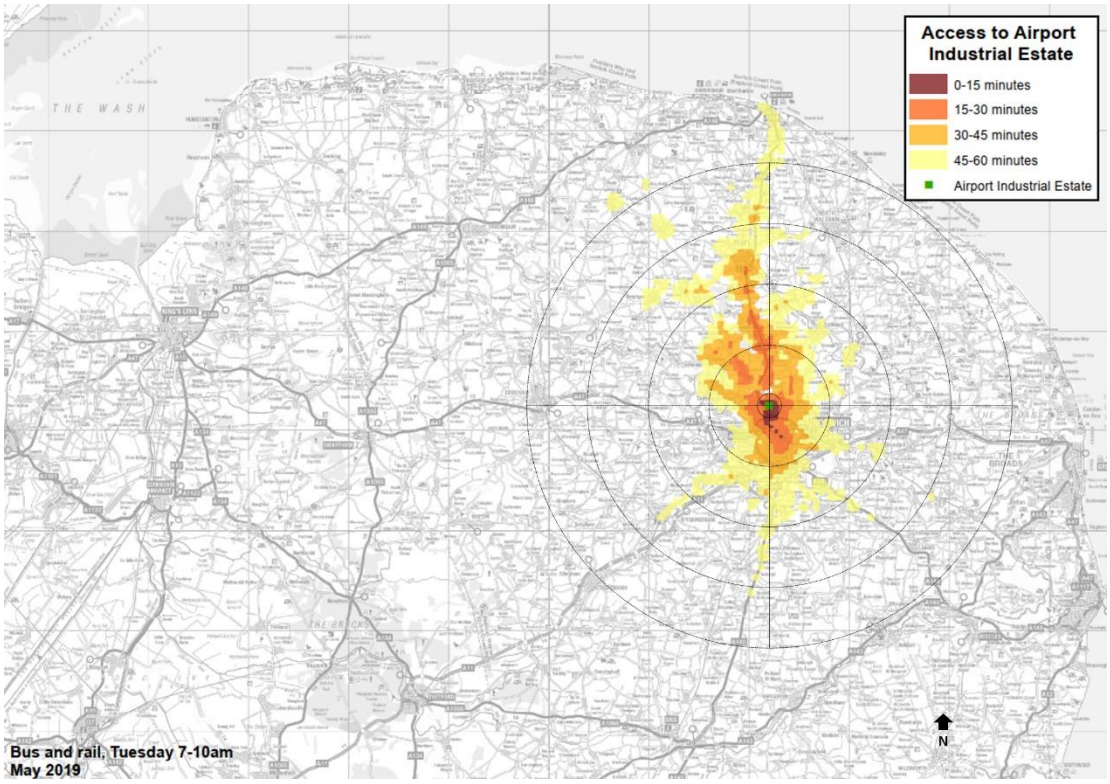


Figure 21: 60-minute public transport accessibility to Airport Industrial Estate



2.5.51 Overall, accessibility by public transport is better for journeys into the city centre. Conversely, poorer public transport accessibility is evident for the three major employment centres. Key points to note are the following:

- Whilst the NRP is an internationally renowned science and business park with around 12,000 employees including 3,000 scientists and over 50 innovation science and IT-based businesses, there are relatively poor connections to train, bus and air services.
- Whilst the Airport industrial estate and International Aviation Academy offer advanced manufacturing and training, there is currently no direct bus service to Norwich rail station and limited services to the Norwich Airport terminal and adjoining industrial estate.

2.5.52 Car Travel (Table 5) shows indicative car ownership levels for the GNR against regional and national averages.

Table 5: Car ownership levels by local authority (2011)

Area	No cars or vans in household	1 car or van in household	2 cars or vans in household	3 cars or vans in household	4 or more cars or vans in household
Broadland	11.4%	44.4%	33.5%	7.8%	2.9%
Norwich	33.4%	47.6%	15.8%	2.5%	0.7%
South Norfolk	11.7%	42.4%	34.3%	8.4%	3.3%
East of England	18.5%	42.9%	29.1%	6.9%	2.6%
England	25.8%	42.2%	24.7%	5.5%	1.9%

2.5.53 The data reveals that the number of households with no cars or vans is lower in Broadland and South Norfolk than the regional and national averages (11.4% and 11.7% against 18.5% and 25.8% respectively). In contrast, levels of households without cars or vans are distinctly higher in Norwich compared to both the regional and national levels (33.4% against 18.5% and 25.8%).

Vehicle occupancy data

2.5.54 Vehicle occupancy data was collected in October 2018 on key radial routes into the city centre. Figure 22 illustrates car occupancy levels of inbound flows for a weekday between 07:00 and 10:00.

Car occupancy	1 Person	2 People	3 People	≥ 4 People
Aylsham Road	91.3%	8.1%	0.7%	0.0%
Sprowston Road	93.5%	6.0%	0.5%	0.0%
Yarmouth Road	98.0%	2.0%	0.0%	0.0%
Bracondale	95.6%	3.8%	0.5%	0.0%
Ipswich Road	86.6%	12.3%	1.1%	0.0%
Newmarket Road	68.4%	30.0%	1.5%	0.1%
Dereham Road	88.5%	11.4%	0.1%	0.0%
Drayton Road	98.1%	1.9%	0.0%	0.0%
Inbound average	**89.6%**	**9.9%**	**0.5%**	**0.0%**

Figure 22: Car occupancy of inbound flows between 07:00 and 10:00

2.5.55 Vehicle occupancy data reveals an estimated average of 89.6% single vehicle occupancy for inbound flows between 07:00 and 10:00.

Parking

2.5.56 Norwich city centre offers 3,080 off-street parking spaces on 14 council-owned car parks and 5,291 privately-owned car parking spaces for use by the public, amounting to 8,371 off-street parking spaces. In addition, on-street parking is available along some of the corridors.

2.5.57 Park & Ride provides a total of 4,804 parking spaces as follows:

- Thickthorn: 726 spaces
- Postwick: 552 spaces
- Airport: 620 spaces
- Sprowston: 792 spaces
- Harford: 1,014 spaces
- Costessey: 1,100 spaces

Economic Growth – Detailed Analysis

Productivity

2.5.58 Figure 23 shows indexed regional Gross Value Added (GVA) per head (income approach) growth by the three local authorities, east of England and England. (Sourced from the Office for National Statistics website).

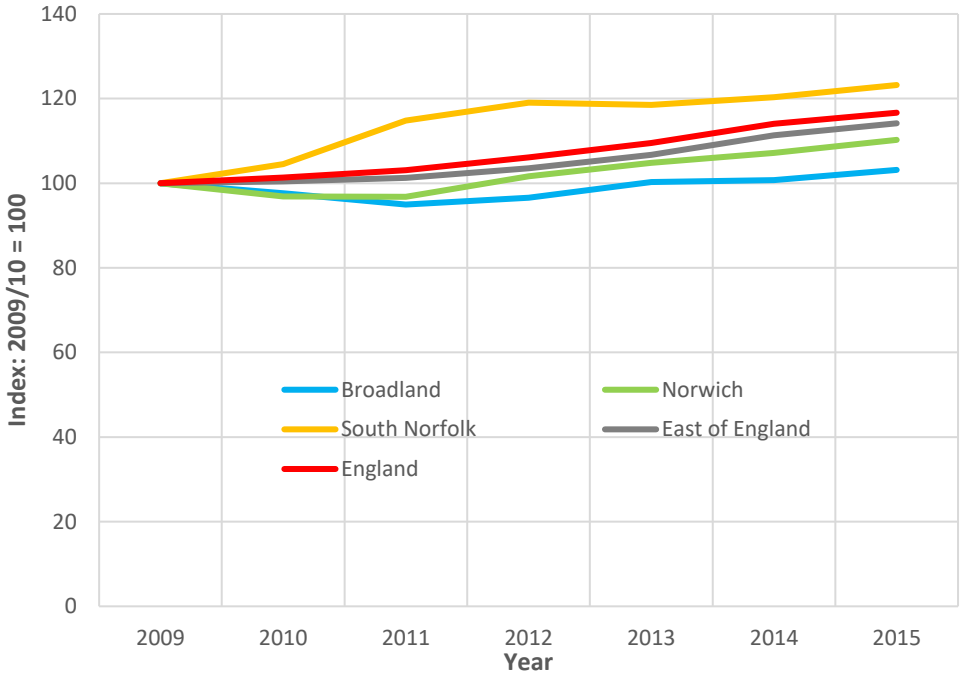


Figure 23: Regional Gross Value Added per Head (Income Approach) Growth 2009/10-2015/16

2.5.59 GVA per head growth for 2015 is above the reference year (2009) for all regions. However, Broadland has the slowest pace of growth and South Norfolk the fastest (23%), a rate also significantly higher than the wider region and country.

2.5.60 Major employment centres are located within the city centre, Broadland Growth Triangle, Airport Industrial Estate and Norwich Research Park (NRP) enterprise zone. The NRP, which encompasses the UEA and the

hospital (NNUH) is recognised as Europe's largest site for research in food, health and life sciences; hosting over 80 businesses and 12,000 employees.

2.5.61 Figure 24 depicts these and other major employment centres and education facilities in the programme area.

2.5.62 Most sectors identified by New Anglia LEP as having high growth potential have a strong presence in the area, including advanced manufacturing and engineering, agri-tech, health and life sciences at the NRP; and ICT and digital culture in the city centre. The Norwich to Cambridge 'Tech Corridor' has the potential to enable 26,000 additional jobs and create additional economic value of £2.75bn in real terms. Growth along this corridor since 2010 has exceeded national and regional averages. Other particular strengths of the GNR are health sciences, financial services, tourism, retail, media and arts. To support retail and the arts, in particular, there is a need to extend the transport offer later into the evenings and during the weekend.

Social mobility

2.5.63 Figure 25 shows the location of the most deprived lower super output areas within the city region.

2.5.64 Deprivation is apparent within a number of areas within the city, including Larkman, Marlpit, West Earlham, Mile Cross, Catton Grove, Sewell, Heartsease and the city centre. We know that it is particularly hard for people from deprived neighbourhoods to reach employment and vocational training - e.g. at Broadland Business Park and the NRP. Reducing inequality target areas have been designated in some of these areas, as shown on the overview map in Figure 28, and helping people to affordably reach jobs and training is an important component in tackling this.

2.5.65 Unemployment figures from the 2011 census are shown in Table 6. Norwich had a higher unemployment rate than the other two neighbouring local authorities and a higher rate than the Norfolk, East of England and England averages.

Table 6: Unemployment (2011)

Area	Unemployment Rate
Broadland	3.6%
Norwich	7.4%
South Norfolk	3.9%
Norfolk	5.6%
East of England	5.3%
England	6.3%

Norwich Airport

2.5.66 Norwich Airport is in the north of the city, offering direct connections to Aberdeen, Amsterdam, Edinburgh and Manchester. There are direct flights to holiday destinations in the summer and winter months. It also serves the offshore industry with several helicopter companies operating out of Norwich Airport. During 2018, 600,000 passengers were recorded with just over 34,000 aircraft movements.

2.5.67 Norwich Airport contributes approximately £70 million to the regional economy and supports more than 1,200 jobs, offering valuable opportunities for the region, with many businesses choosing to locate in the Norwich area due to the presence of the airport; either because they benefit from connections to markets and suppliers, or because they are an aviation-related industry (e.g. maintenance), or in the supply chain. In addition, an International Aviation Academy (IAA) has recently been opened near the airport that will train the local labour force and the wider aviation industry.

2.5.68 There is a draft masterplan that provides a framework for Norwich Airport's longer-term aspirations. It outlines options for the airport to grow in a sustainable way over the next 30 years to respond to an estimated increase in annual passenger demand of 1.4 million by 2045. Emphasis is given to the implications of road traffic and the impact of the airport's activities on the environment and the local road network and opportunities linked to the completion of the Broadland Northway.

2.5.69 Norwich Airport is located at the end of one of our priority investment corridors.

Carbon Emissions – Detailed Analysis

2.5.70 As described by the UK Greenhouse Gas Emissions National Statistics (2019), the transport sector was the largest emitting sector in 2017, contributing 27% of the emissions. This consists of emissions from 'road transport, railways, domestic aviation, shipping, fishing and aircraft support vehicles', with the main contributors being the use of petrol and diesel in road transport. Regional data published in 2018 from the UK's Greenhouse Gas Inventory shows that in 2016 Norfolk's transport emissions accounted for 39% of Norfolk's overall CO2 emissions. In terms of a breakdown by local authority district within our programme area, this information is shown in Table 7 (it should be noted that only part of the South Norfolk and Broadland districts are within the GNR).

Table 7: Transport emissions from local authority districts within our programme entry

Local Authority Area	CO_2 emissions (kt CO_2) (2016)	Transport emissions as a % of total CO_2 emissions (2016)
Norwich City Council	132.3	24.6
Broadland District Council	247.8	32.7
South Norfolk Council	424.6	50.3
Norfolk (overall)	**1,973.2**	**39.0**
National (UK)	**128,052.7**	**35.8**

2.5.71 In 2016, Norfolk's transport emissions accounted for 39% of Norfolk's overall CO2 emissionsIn 2016, the biggest emitting local authority area for road transport in the programme area was South Norfolk at 425 kilotonnes of CO2 emissions by end user, far higher than 248 kilotonnes for Broadland and 132 kilotonnes for Norwich. Findings derived from analysis earlier in this section highlighted higher levels of car use in Broadland and South Norfolk, providing a major opportunity to reduce carbon emissions by encouraging trip-makers to shift from passenger cars to less fuel-intensive modes of transport.

Wider Social and Economic Benefits – Detailed Analysis

Population and age distribution

2.5.72 The work-day population of the city region was estimated at just over 280,000 people according to the 2011 census. However, the most recent resident population growth estimates across the GNR suggests that this figure is now likely to exceed 300,000[2] and will continue to grow over the next 15 years.

2.5.73 Figure 26 shows a breakdown of the estimated resident population for the GNR by local authority area. It should be noted that only part of Broadland and South Norfolk's resident population are within the GNR.

[2] Mid-year population estimates for the residential population of Norwich City Council's area grew by 7% between 2011 and 2016, NOMIS

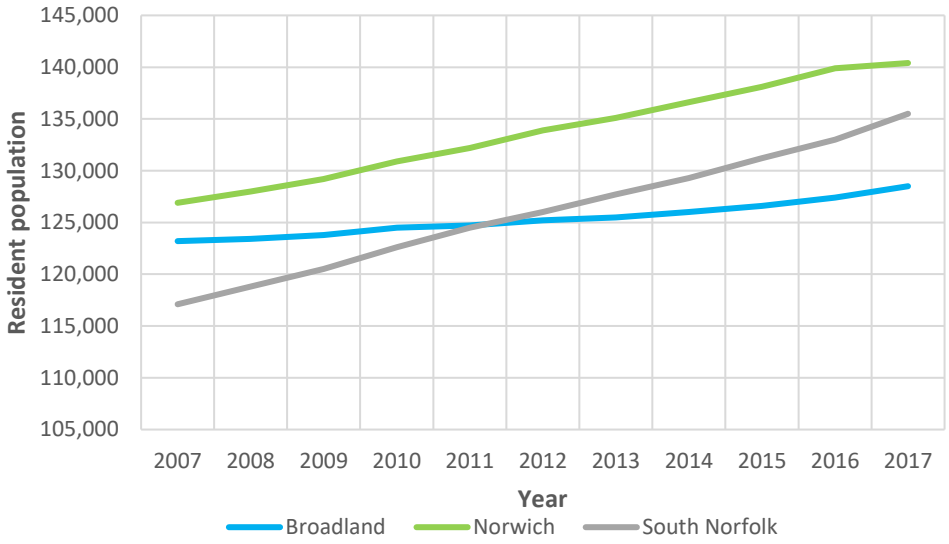


Figure 26: Estimated resident population in Broadland, Norwich and South Norfolk between 2007 and 2017

2.5.74 The rates of population growth in Norwich and South Norfolk are similar but with some divergence in trends post 2016 with Norwich's rate slowing and South Norfolk's showing signs of a slight increase. Broadland has a lower rate of growth. However, with the planned expansion of the Broadland Growth Triangle this figure is expected to rise. Our transport network needs to meet this growth in a sustainable way.

2.5.75 Figure 27 sets out the age structure of the population based on population estimates from the 2011 census. Values shown in this table are provided as estimated percentages of the total population.

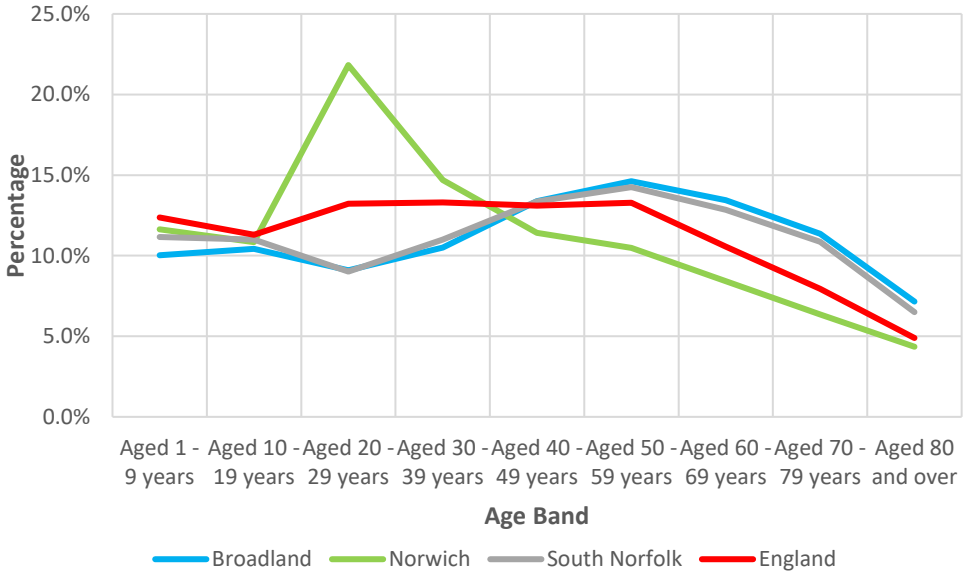


Figure 27: Age structure of local authorities in the programme area against national average (2017)

2.5.76 Norwich reveals a comparably higher percentage of population (21.8%) within the 20 to 29 age band, highlighting its 'student city' character with various centres of academic excellence. The estimated proportion of the population in the over-65 age categories is increasing for Broadland and South Norfolk, revealing an ageing population. This brings specific challenges in terms of accessibility, social mobility and the commercial delivery of transport. It also presents opportunities to consider new modes of transport that will better serve these population groups.

Public Health

2.5.77 There are a number of areas where the health of Norfolk residents compares well to people in other areas of the country but there are also a number of areas where we should improve.

Source: Norfolk's Living Well, A Public Health Strategy for Norfolk, 2016-2020

2.5.78 When considering wider determinants of health, it is clear that there are significant differences between the district council areas within our programme area. Norwich performs very well in terms of the percentage of adults walking (32.5%) and cycling (13.0%) for travel at least three times per week compared to Broadland (14.2% and 3.6% respectively) and South Norfolk (15.3% and 4.7% respectively). Therefore, there are clear opportunities to build on these strengths in Norwich and address these lower values in Broadland and South Norfolk. However, it should be remembered that the Broadland and South Norfolk values represent the district council area as whole, whereas only part of the district council areas are in the programme area.

Indicator	Period	England	Norfolk	Breckland	Broadland	Great Yarmouth	King's Lynn and West Norfolk	North Norfolk	Norwich	South Norfolk
Transport										
Percentage of adults walking for travel at least three days per week	2016/17	22.9	18.6	16.6	14.2	13.6	16.3	20.1	32.5	15.3
Percentage of adults cycling for travel at least three days per week	2016/17	3.3	5.0	2.5	3.6	4.9	2.7	3.2	13.0	4.7
Killed and seriously injured (KSI) casualties on England's roads	2015 - 17	40.8	45.2	53.2	41.9	34.0	46.6	42.5	43.6	50.6

Source: Public Health England, Wider Determinants of Health. https://fingertips.phe.org.uk

2.5.79 'Norfolk's Living Well' is the public health strategy for Norfolk covering the period 2016-2020. This has the vision to:

"Help the people of Norfolk live in healthy places, promote healthy lifestyles, prevent ill-health and reduce health inequalities"

2.5.80 The strategy aims to prioritise public health actions which will:

- Promote healthy living and healthy places
- Protect communities and individuals from harm
- Provide services that meet community needs
- Work in partnership to transform the way we deliver services

2.5.81 Implementing this strategy will bring significant benefits to Norfolk people in terms of increased quality of life and better health. This will also support the NCC's priorities outlined in our Together for Norfolk strategy (2019 – 2025) which include; improved social mobility, having a growing economy full of thriving people and reducing our impact on the environment.

Housing Delivery – Detailed Analysis

2.5.82 The local planning authorities are planning for a doubling of homes within the areas of growth close to our '**Transforming Norwich**' investment corridors. The Joint Core Strategy (JCS) for Greater Norwich plans for a minimum of 27,000 dwellings there (Figure 28), a majority of the 37,000 across the wider Norwich area.

2.5.83 The JCS looks to the transport strategy to deliver the interventions required to support the delivery of the planned growth. The '**Transforming Norwich**' programme will put in place the interventions on growth corridors to provide sustainable access to the city and strategic employment areas.

2.5.84 The Broadland Growth Triangle (BGT) is the largest urban extension in the UK (circa 13,500 homes and 2,600 jobs). The aspirations are to build new communities where people can live, work and enjoy their leisure time. The majority of outline planning consents across all the sites that make up the BGT have been approved, but it is the detailed applications from developers that are taking more time to come through. There has been an upward curve in the submission, consideration and approval of some of these sites over the last 2-3 years and a number of the sites are now under construction.

2.5.85 The BGT is expected to make the biggest contribution at 13,500 new homes, equivalent to 50% of the total number planned. No buses currently serve the centre of the BGT on Salhouse Road. The city centre is planned to accommodate 7,000 new homes, almost doubling the stock and representing 25% of the total in growth areas close to our investment corridors. All this city centre development is on brownfield sites.

2.5.86 There is a great desire to accelerate the build out of the BGT and to that extent a significant bid has been submitted to the Housing Infrastructure Fund (HIF) to secure circa £60m to build the up-front infrastructure for two of the largest developments in the BGT known as Beeston Park and North Rackheath. This would be of significant benefit to those two areas, but these make up just an element of the BGT.

2.5.87 The JCS for Broadland, Norwich and South Norfolk was adopted in March 2011, with amendments adopted January 2014. This strategy is currently being reviewed with the replacement Greater Norwich Local Plan (GNLP) scheduled to be adopted in September 2021. This plan extends the JCS planning period from 2026 to 2036. The JCS plans for 37,000 new homes and 27,000 new jobs across the area while the GNLP intends to provide sites for close to 43,000 new homes. Considering those already allocated, sites for an extra 7,200 homes will be identified. This is an increase on those figures shown in Figure 28.

Air Quality – Detailed Analysis

2.5.88 The area encompassing the centre of Norwich, which mostly follows the inner ring road, was declared as an Air Quality Management Area (AQMA) in November 2012 for exceeding the annual mean nitrogen dioxide (NO_2) objective. The major pollutant source in the city is road traffic. Source apportionment exercises identify oxides of nitrogen from road traffic to be the most significant source of NO_2 and, more specifically, buses and taxis to be the main contributors. In 2015, Norwich City Council produced an updated Air Quality Action Plan that sets out measures to be taken in order to work towards achievement of the air quality objectives.

2.5.89 Figure 29 shows the Central Norwich AQMA. Overall, NO2 concentrations are falling. In 2012, ten of the diffusion tube monitoring locations exceeded the annual mean objective of 40mg/m^3. This steadily reduced to six in 2015 despite an additional site being added in 2013 on Chapel Field North. In 2016, the number of locations exceeding the annual mean objective increased to seven sites but three of these by only 1mg/m^3. In 2017, the number of sites dropped back down to six. The site that exceeded in 2016 but fell below the objective level in 2017 is Chapel Field North, which has shown a fairly consistent decline in NO_2 levels since the introduction of new traffic management arrangements in 2014. There are not considered to be any major new sources of pollution. Although there are still challenges to reduce pollution levels in Norwich when taken as a whole, the levels are promising as they show a downward trend as a result of previous action to reduce levels of traffic in the city centre.

2.5.90 Air quality in Broadland is generally good, mainly because it is not densely developed or industrialised and includes large rural areas. Air pollution in the Broadland District Council area is mainly associated with road traffic and, in particular, with queuing traffic on busy roads that are mostly in the suburbs of Norwich. There are no AQMAs in Broadland. Air quality in South Norfolk is generally good with no recorded breach of air quality objectives. There are no declared AQMAs within the district.

Future of Mobility

2.5.91 The Future Mobility Zone (FMZ) opportunity that arose during 2019 has opened up the opportunities that future mobility presents to Norwich. In September 2019, Norwich submitted a proposal for FMZ funding to realise a vision of Norwich becoming a 'Shared Future Mobility Zone'. TfN developed an FMZ bid that built on the strengths of Norwich; capitalising on existing technology and new forms of mobility already present in Norwich that will enable sharing data, sharing knowledge, sharing mobility and sharing information. We await the announcement of funding.

2.5.92 Technology has a key role to play in the future mobility of Norwich and its vision of investing in clean and shared transport.

2.5.93 Norwich has many strengths to build on. Existing and emerging technology in the GNR includes:

- Pioneering use of technology using intelligent transport systems (Urban Traffic Management Control and Public Transport Data Management) as well as Norfolk County Council's award-winning data warehouse solution system called 'GRID' which plays a significant role in the dynamic integration of information across council and stakeholder systems and ensures Norwich is at the forefront of data connectivity and analytics. Norfolk recently launched a mobility platform, 'Pushing Ahead', funded by DfT through the Access Fund which incorporates a journey planner and an incentivisation scheme to encourage its 1,500 users to use sustainable modes;
- First Bus and konectbus have developed their own app and ticketing system. First Bus, konectbus and Sanders Coaches all offer contactless ticketing.
- Norwich Cycle Share Scheme (TCF programme - Tranche 1) which will see a new 600+ bike share scheme launched in March 2020 with a mix of standard and e-assist bikes. This will enable cycle journeys to be accurately tracked, providing a clear picture of cycle demand and movement which will help shape future infrastructure investment.
- There are 25 Electric Vehicle (EV) charging points located across the city, six of which are owned by the city council and are located in Rose Lane Car Park. Further details of these can be found on Zap-Map.
- Norfolk Car Club who are currently investigating free floating or return to zone car-share mobility solutions in order to enable maximum use of fleet as well as electrifying their fleet;

- Zedify operates in Norwich using eCargo bikes to tackle the last mile of deliveries from city centre depots to homes and businesses. Improvements in electric bike technology mean that Zedify's couriers can transport 250kg of cargo with relative ease.

2.5.94 In addition, Norwich is the first UK city to formally become part of the global Sharing Cities Alliance (https://sharingcitiesalliance.com). It joins the likes of Amsterdam, Malmo and New York as a city committed to encouraging its residents to maximise the opportunities afforded by the sharing economy and digital platforms, and it shares best practice globally. Norwich is also home to award-winning shared mobility companies, Liftshare and Norfolk Car Club, both of which have worked in partnership with the Greater Norwich local authorities.

2.5.95 Norwich has many core future mobility elements and enormous potential to use the '**Transforming Norwich**' programme to build from these existing strengths. If successful, the Norwich Shared Future Mobility Zone bid will further add to this capability of utilising technology and changing cultural values around sharing to prepare the GNR for a future of shared and clean mobility.

2.5.96 Table 8 below shows the future mobility measures that will be delivered through '**Transforming Norwich**' and FMZ.

Table 8: Future Mobility Measures

Transforming Cities Fund	Future Mobility Zone
Use of Public Transport Demand Management system to prioritise buses at key junctions. Expansion of the Norfolk Car Club network. Real-time service information with disruption and punctuality alerts. Multi-operator, multi-modal and contactless ticketing. Accelerating the delivery of capped ticketing for single and multiple bus operators and put Norfolk at the forefront of this advancement in ticketing.	Future Mobility Partnership comprising of key stakeholders; NCC, districts, transport operators, future mobility advisors. Project 1: Data sharing platform using inputs from UTMC, PTDM and aggregating in GRID. Project 2: Knowledge sharing using Sharing Cities Alliance and UK future mobility expertise. Project 3: Mobility sharing including; behaviour change campaign, new mobility modes e.g. e-bikes and e-scooters, electrification of Norfolk Car Club fleet, car sharing, electrification of the Park & Ride fleet, e-cargo bikes.

Transforming Cities Fund	Future Mobility Zone
Mobility hubs as key places to integrate existing and new forms of transport and communicate with users.	Project 4: Information sharing (journey planner platform that evolves to Mobility as a Service).

2.6 Our Vision and Objectives

Our vision is to invest in clean and shared transport, creating a healthy environment, increasing social mobility and boosting productivity through enhanced access to employment and learning.

2.6.1 In addition to the extensive evidence gathered in the Need for Investment sections 2.4 and 2.5, the context behind this vision is as follows:

- In November 2019, the County Council agreed a new environmental policy and a pledge to achieve net zero carbon emissions by 2030;
- A recent report by the Commission on Social Mobility highlighted that many people living in Norfolk are amongst the least socially mobile in the country. The districts of Norwich were amongst the worst 10% nationally;
- A recent report by the Commission for Travel Demand on shared mobility stated that in the future shared transport must become an integral element of transport delivery. This requires large, sustained and targeted investment in buses, cycling and walking to make shared mobility options competitive with the private car in terms of time, cost and convenience;
- Norwich has many strengths to build on to deliver a successful TCF programme based on this vision. We have already made excellent progress towards this vision through increases in cycle and public transport use. Norwich is home to award-winning shared mobility transport operators (Liftshare and Norfolk Car Club) and a new cycle share scheme is being launched in Norwich with 600 bikes, funded through Tranche 1 of TCF.

The Objectives of the 'Transforming Norwich' Programme

2.6.2 To deliver this vision, three objectives have been set for the '**Transforming Norwich**' programme:

1) **Improve people's productivity and social mobility by unlocking access to employment and education opportunities across the GNR;**
2) **Increase the efficiency of travel and transport in the GNR and improve the impact transport has on carbon emissions, air quality and public health;**
3) **Use emerging technology to prepare the GNR for a future of shared and clean mobility.**

2.6.3 These objectives have been developed based on the analysis in the Need for Investment sections of this SOBC and is summarised in Table 9.

Table 9: Objectives and evidence

Transforming Norwich Objectives	Evidence from Section 2.3
Improve people's productivity and social mobility by unlocking access to employment and education opportunities across the GNR	Commuting Economic growth Housing delivery Wider social and economic benefits
Increase the efficiency of travel and transport in the GNR and improve the impact transport has on carbon emissions, air quality and public health	Journey time reliability Carbon emissions Air quality Wider social and economic benefits
Use emerging technology to prepare the GNR for a future of shared and clean mobility	Future of mobility

2.6.4 These objectives also align with the emerging work on the TfN Strategy, including consultation work carried out for the TfN strategy review, and '**Transforming Norwich**' objectives. Figure 30 below, illustrates how the '**Transforming Norwich**' objectives are aligned to the TCF objectives, as set out in the Tranche 2 guidance (January 2019).

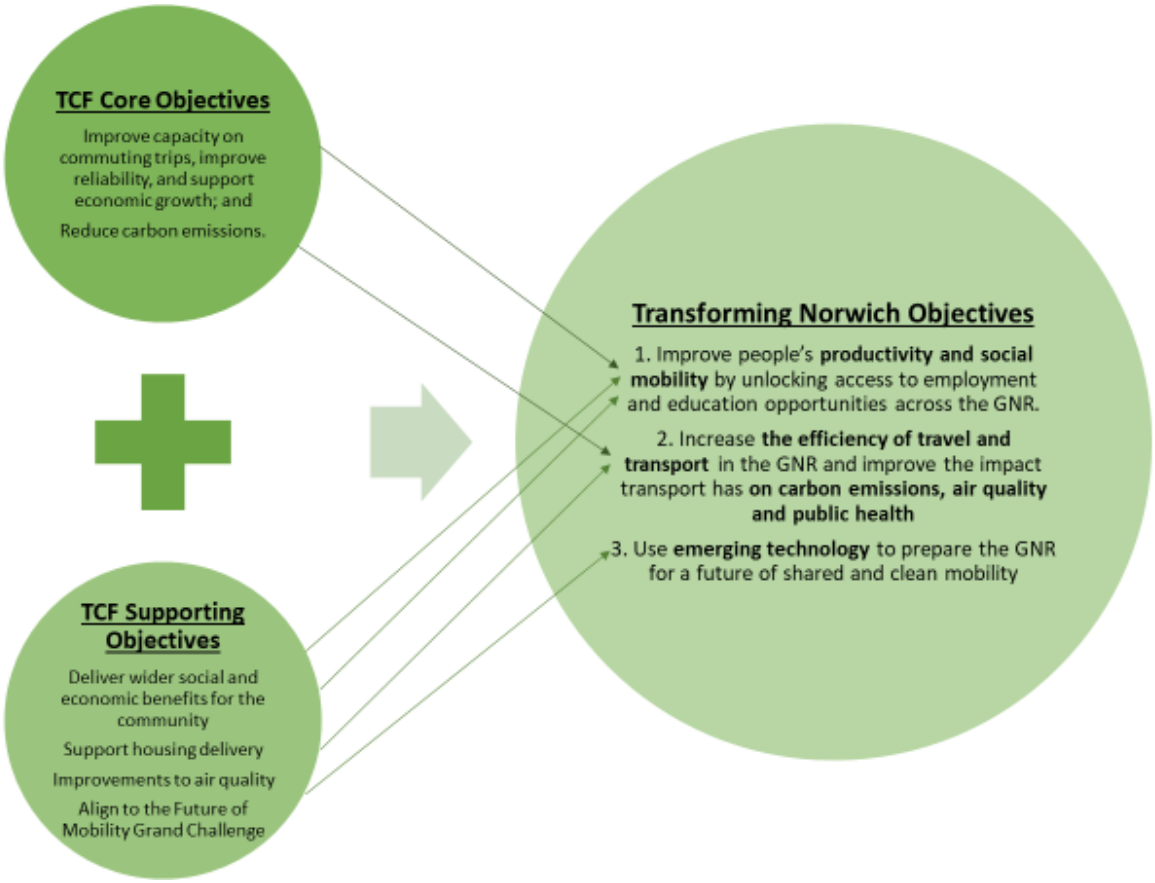


Figure 30: How the Transforming Norwich objectives align with the Transforming Cities Fund programme objectives

2.7 Developing the 'Transforming Norwich' programme

Process Overview

2.7.1 The emerging TfN Strategy identifies a set of Guiding Principles and Strategic themes (set out in the Strategic Fit section), which were adopted by Norfolk County Council prior to submission of the '**Transforming Norwich**' expression of interest. From these, a corridor-based approach to focus public transport connectivity improvements was derived. A programme of potential interventions was drawn up based both on evidence and in consultation with stakeholders and potential interventions subsequently assesses using the Investment Sifting and Evaluation Tool (INSET).

2.7.2 INSET is an Excel-based multi-criteria analysis tool developed by Mott MacDonald that enables individual schemes to be scored, based on their performance against key criteria. The project team held discussions with DfT about the potential to use INSET for the project and this was approved.

2.7.3 Before the appraisal could be undertaken, regular meetings were held with the Transforming Norwich Working Group to understand the targets and aspirations on a strategic level for the '**Transforming Norwich**' programme and how it fits with existing policy actions. This approach enabled specific objectives to be defined and themes that could be used as the basis for the INSET appraisal. INSET operates through a number of sequential stages, outlined below in Figure 31.

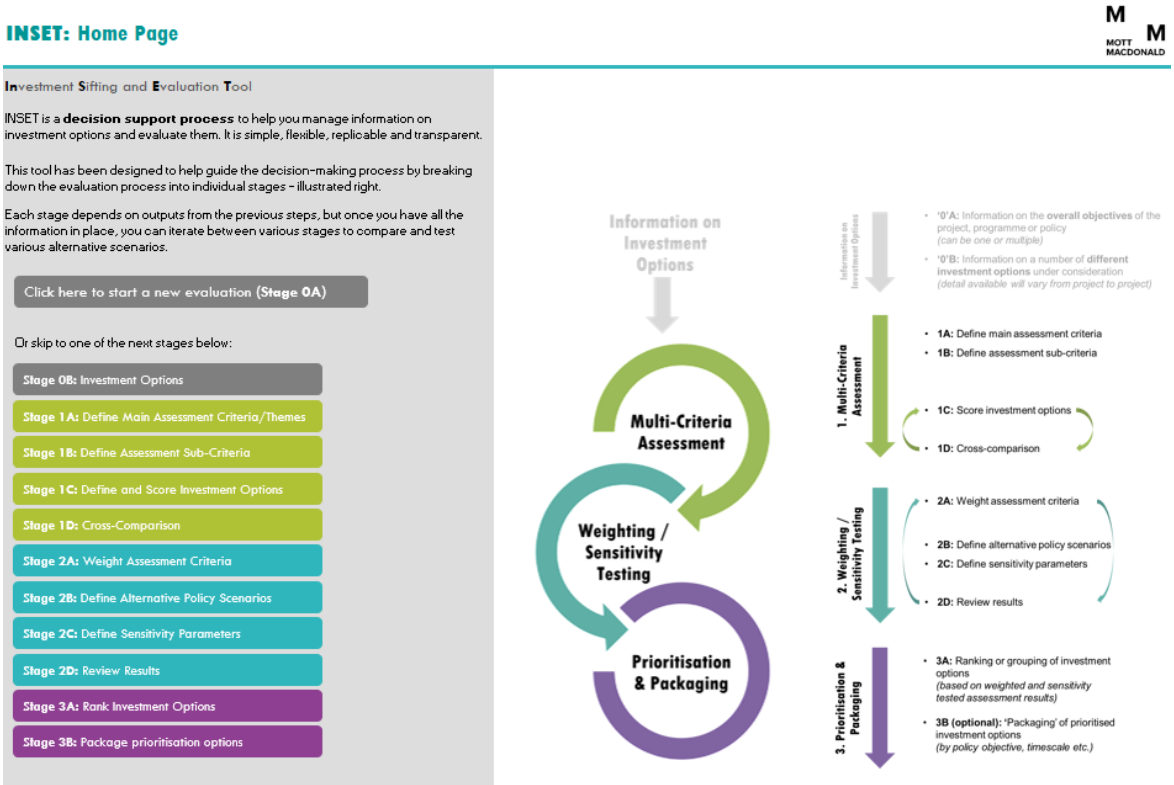


Figure 31: The Investment Sifting and Evaluation Tool (INSET) Process

Stage 0: Investment Options (Generating a Long List of Options)

2.7.4 Stage 0 was undertaken through engaging with the various stakeholders and a wide network of partners, a long list of potential interventions was developed. Strategic stakeholders who were involved in developing this list are listed below:

- Norfolk County Council (officers and councillors);
- Norwich City Council (officers and councillors);
- Broadland District Council (officers and councillors);
- South Norfolk Council (officers and councillors);
- Feedback from Parish / Town Councils;
- First Bus / konectbus / Sanders Coaches / Simonds Coaches;
- Greater Anglia (rail);
- Norwich Business Improvement District;
- Chamber of Commerce;
- Norfolk Bus Forum / Bus Users UK;
- New Anglia Local Enterprise Partnership;
- Highways England;
- Disability and other transport interest groups.

2.7.5 Potential schemes were selected through an objective-led approach and through workshops with representatives from the four constituent local authorities.

2.7.6 Four site visits were completed that were attended by a wide range of the stakeholders listed above, which covered all our transport corridors and the city centre. Site visits enabled stakeholders to explore and examine previously suggested schemes and to identify potential additional schemes that could be assessed through INSET.

Stage 1: Multi-Criteria Assessment Methodology

2.7.7 This first stage assessed the potential investment options so that they were rated against one another quickly and efficiently. To structure the process, the INSET assessment asked a series of questions based around **four key themes**, containing main criteria and sub-criteria. The main-criteria and sub-criteria were directly related to the logic map (see Figure 2).

2.7.8 Three of the four themes used for this stage were based on the '**Transforming Norwich**' programme objectives, which are fully aligned to '**Transforming Norwich**' core and supporting objectives, with the fourth theme offering a view on obstacles to delivery, covering other important aspects of all schemes.

2.7.9 The four themes all schemes were tested against were:

A) Improving people's productivity and social mobility by unlocking access to employment and education opportunities across the GNR.

- This assessed each scheme and its impact on improving connectivity to and from key employment locations, improving interchanges and connections, and improving access to and from deprived neighbourhoods to employment and training.

B) Increasing the efficiency of travel and transport in the GNR region and improving the impact transport has on carbon emissions, air quality and public health

- This assessed each scheme and its impact on the environment and public health. These criteria included air quality, impact on heritage assets and landscape, safety of sustainable transport and the number of single-occupancy car journeys.

C) Using emerging technology to prepare GNR for a future of shared and clean mobility

- This assessed each scheme against its ability to provide shared and clean mobility outcomes.

D) Deliverability

- This assessed each scheme against the deliverability of the proposed interventions. These included assessments of the readiness of the scheme, funding availability, planning consent, political viability and cost.

2.7.10 It should be noted that the assessment needed to assess a range of proposed schemes at varying stages of development and consequently it needed to be proportionate to the level of detail available to allow the interventions to be sifted.

The scoring for Themes A, B and C was completed on a three-point scale:

- Positive impact
- No impact
- Negative impact

Theme D was completed on a five-point scale from 0 to +4 for each of the assessments. For example, assessment of political or public acceptability was based around:

- Significant risk of public or political opposition
- Moderate risk of public or political opposition
- Not known or neutral
- Likelihood of public or political support
- Significant likelihood of public or political support

2.7.11 In order to inform the appraisal of the scheme options using INSET and to increase the project team's understanding of the relative benefits and deliverability of the options, an iterative approach was adopted.

2.7.12 A number of discussions were held with officers from NCC, Norwich City Council, Broadland District Council and South Norfolk Council to agree the themes, main criteria, sub-criteria and scoring. The scoring was completed by NCC, and then verified by Mott MacDonald and the other councils. Suggested changes were put to the Transforming Norwich Working Group before being confirmed with Mott MacDonald to complete the INSET inputs.

2.7.13 INSET offers the ability to disaggregate deliverability by themes and the Working Group opted for a more detailed testing of deliverability to identify specific deliverability issues before a 'Yes / No' decision on deliverability was reached.

Stage 2: Weighting and Sensitivity Test

2.7.14 Following the scoring, the weighting of themes, main criteria and sub-criteria was altered. Firstly, criteria relating to the '**Transforming Norwich**' objectives were weighted more heavily than criteria not related to the '**Transforming Norwich**' objectives. Other scenarios were created, and used as sensitivity tests, with heavier weightings on criteria such as deliverability, air quality and sustainable travel. The weightings were decided in consultation with officers from the councils. The results were reviewed to evaluate if the schemes performed to expectations and to see what could be altered in schemes to improve their scoring.

Stage 3: Prioritisation and Packaging

2.7.15 This stage resulted in a shortlist of the most favourable schemes potentially going forward for the working group to be finalised. Schemes not taken forward for shortlisting were rejected on the basis of the following:

- Not being well aligned with the TCF objectives
- Not being well aligned with wider TfN objectives
- Where multiple options were considered for a particular scheme, only the 'best' scheme was taken forward to the next stage of shortlisting
- Not having a sufficient level of political support to proceed for further assessment
- High likelihood of scheme delivery extending beyond the timeframe for TCF (beyond 2022 / 23), such as due to statutory processes and land acquisition

2.7.16 In total, 180 potential investment options were identified. Annex 3 provides a summary of the main schemes that were rejected and not taken forward for further development within this programme.

2.7.17 Schemes that remained following the sifting outlined above were taken forward for the next stage of shortlisting through a process of prioritisation and packaging based on the requirement to present packages based on low, medium and high funding levels.

2.7.18 Schemes were broken down into five discrete, but complementary investment types as shown in Table 10:

Table 10: Transforming Norwich programme - investment types

Investment Type	Investment Option
Cycling and walking infrastructure	Pedestrian infrastructure improvements and wayfinding
	Segregated cycle track
	Improved cycle conditions
Improvements to the public transport network	Bus priority, including contraflow bus lanes, bus-only approaches to junctions, bus gates and traffic signal priority for buses
	Improvements to bus stop accessibility, both for users accessing buses and for buses accessing stops
	Improved and new transport interchange facilities
	Park & Ride: Expansion of existing sites, new sites, low or zero emission vehicles, increased frequency and longer hours of operation, review of ticketing and payment systems and improved site facilities
Shared and clean mobility	Expansion of existing Car Club provision, including low or zero emission vehicles
	Facilitation of car sharing
Digital connectivity and smart technology	Integrating and smart ticketing
	Customer communication
Improved area-wide connectivity and accessibility	Creation of a network of Mobility hubs

2.7.19 Once the results of INSET were available, outline funding packages were created to consider the three different funding scenarios; high, medium and low.

2.7.20 Our low and medium funding scenario includes a programme of schemes that are strongest in terms of meeting the TCF objectives and those of the wider TfN programme.

2.7.21 Our high funding scenario represents the package that includes all of our shortlisted schemes and shows our ultimate aspiration in terms of delivering a complete package.

2.7.22 Medium and low-cost packages have been developed on the basis of removing investment on corridors, whilst aiming to maximise benefit in each package. Core schemes are presented in all funding scenarios, namely those in the city centre and those on corridors, where benefits against TCF are the highest.

Programme Common Threads

2.7.23 Productivity is a major theme within the TN programme, from the logic map through to the INSET assessment. Schemes were scored against main criteria such as 'improving access to and from key employment locations' and 'improving access to and from deprived neighbourhoods to employment and training'. These main criteria contained sub-criteria such as 'How does the scheme impact the size of the labour market able to connect by public transport, walking and cycling?'.

2.7.24 Carbon reduction is another major theme and DfT objective. This has been covered by the theme of 'Increased efficiency of travel and transport in the GNR region and improve the impact transport has on carbon emissions, air quality and public health' within INSET and then 'environmental impact' as a main criterion. Furthermore, the sub-criteria relate to the impact a scheme would have on air quality and carbon emissions.

Schemes Short Listed

2.7.25 In developing this Strategic Outline Business Case (SOBC) for the '**Transforming Norwich**' programme, we have reviewed and considered updated guidance from Government on the development of Business Cases. The programme development team have considered and begun applying the Rebalancing Toolkit to the emerging programme to enable the Partnership to have an understanding as to how the potential '**Transforming Norwich**' schemes will support equitable investment in the most deprived parts of Norwich and in those communities, who will benefit most.

2.7.26 Our prioritisation process, INSET, has been aligned to the requirements of the rebalancing toolkit to enable the partnership to have confidence that the scheme selection process captures the appraisal criteria outlined in the toolkit for programme development. As the composition of the programme has evolved and appraisal of the schemes Level 1, 2 and 3 benefits undertaken, the programme development team has continually referred back to the toolkit to ensure that scheme appraisal and selection considers and evaluates the way in which selected schemes contributing to the overall programme provide benefits across Greater Norwich.

2.7.27 Annex 4 provides information on the schemes that have been shortlisted into our three proposed funding programmes. Section 2.8 details the '**Transforming Norwich**' Programme.

Impact on other transport networks

2.7.28 The '**Transforming Norwich**' programme has interactions with the strategic road network (SRN) as well as the national rail network and engagement has taken place with both Highways England (SRN) and Greater Anglia / Network Rail.

2.7.29 The SRN in our programme area relates to the A11 and A47 trunk roads and we have considered a number of schemes that have a direct interaction.

Thickthorn Park & Ride (Highways England)

2.7.30 Highways England are developing their A47 Corridor Improvement Programme under the Road Investment Strategy. The A47/A11 junction improvement is one of six schemes being promoted, with a start of works in 2021 being planned.

2.7.31 In developing our '**Transforming Norwich**' programme, we considered the construction of a new slip road directly from the A11 into the existing Thickthorn Park & Ride site. However, Highways England identified that this scheme is not compatible with their preferred scheme for Thickthorn junction so this has not been taken forward.

2.7.32 We are including a scheme to expand the parking capacity at the Park & Ride site and provide a mobility hub there that features in all our cost programmes. The land we need for these works is also required temporarily by Highways England to act as their construction compound for their works. In order to help Highways England's delivery, we have delayed our works as much as possible to fit into the funding window. More detail on this is outlined in the Management Case.

Longwater Junction (Highways England)

2.7.33 We have considered various options for improving bus, pedestrian and cycle links at the A47 Longwater junction. While there are no specific plans by Highways England to undertake works at this junction, plans are being put forwards by housing developers regarding nearby sites. We are promoting a new cycle/pedestrian bridge across the A47 near to the Longwater Junction in our High funding programme. Discussions with Highways England and developers are ongoing to better understand how such works can align with other programmes of investment.

Wymondham rail station (Network Rail and Greater Anglia)

2.7.34 A new mobility hub and the provision of ramped access to the Cambridge platform is proposed at Wymondham rail station in all of our cost programmes. Negotiations are ongoing between Network Rail, Greater Anglia, housing developers, South Norfolk Council, Norfolk County Council and the local MP regarding the necessary works that would need to be completed. Good progress has been made and a design is in place. Funding towards the scheme is being sought by Greater Anglia through the Station Access Fund, through Transforming Cities and local funds.

Norwich Rail Station (Greater Anglia)

2.7.35 A new mobility hub at Norwich rail station is proposed in all of our cost programmes. Greater Anglia are a stakeholder on our stakeholder group

and are actively involved in discussions with the County Council on options to take these proposals forward.

New East-West link at Rackheath (Network Rail)

2.7.36 A new highway access across the existing rail line at Rackheath that will support bus access, as well as enabling local roads linking to the Broadland Business Park to be made pedestrian and cycle access only, is included in our High funding programme. Discussions are underway between the housing developer, Network Rail and the County Council regarding the necessary delivery works. Delivery of this scheme within the TCF timescales will be very challenging, hence the inclusion of this in our High funding programme.

Adding Resilience to the 'Transforming Norwich' Programme

2.7.37 The world of mobility has been changing in the last 20 years and there is significant uncertainty about how mobility will evolve and the future scenarios within which we must plan. We acknowledge the need to account for this uncertainty in developing our '**Transforming Norwich**' business case.

2.7.38 For the Future Mobility Zone (FMZ) outline proposal, the FMZ Partnership undertook some initial scenario planning that took account of future uncertainty. Figure 32 shows a set of possible future scenarios for Norwich that were identified.

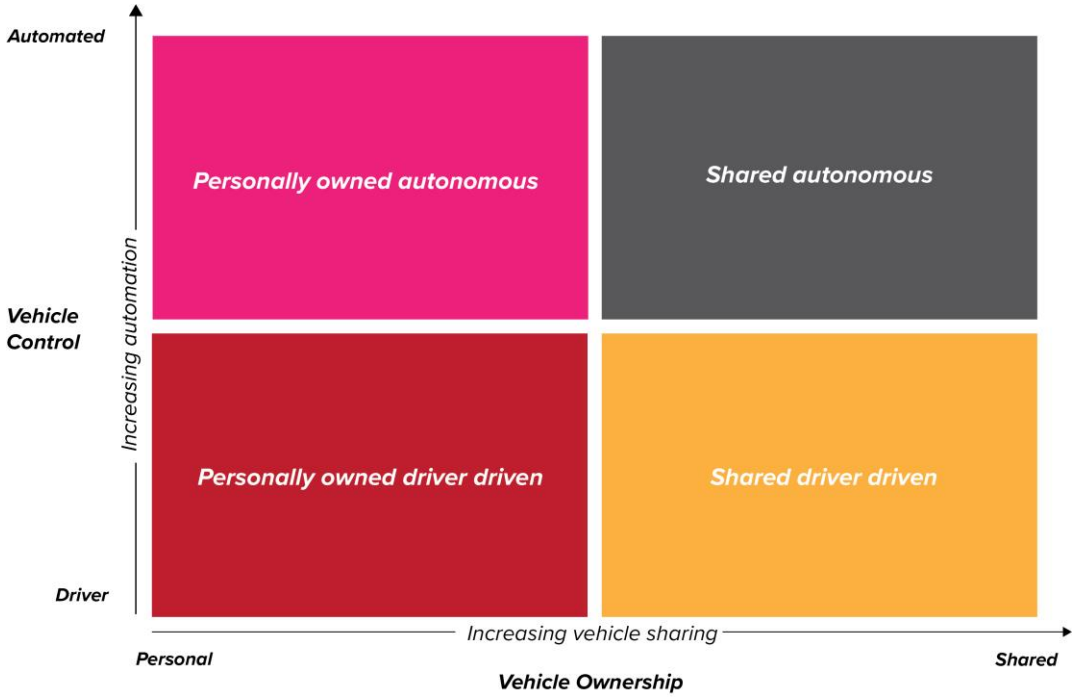


Figure 32: Possible future scenarios for Norwich

2.7.39 The FMZ Partnership identified a preferred future where Norwich is characterised by 'shared' (and potentially autonomous) mobility and an alternative, dystopian future focused on 'personally owned' mobility where sharing is not the norm. This discussion resulted in an FMZ vision that plans for, and delivers, shared mobility. This FMZ vision has been integrated into the 'Transforming Norwich' vision 'To invest in clean and shared transport creating a healthy environment, increasing social mobility and boosting productivity though enhanced access to employment and learning'.

2.7.40 The '**Transforming Norwich**' programme will be stress-tested against these future scenarios to identify where the programme needs to be adapted and strengthened to add resilience and enable strong planning to direct the future mobility of the GNR.

	Possible Future Scenarios for Norwich			
	Personally owned driver driven	Shared driver driven	Personally owned autonomous	Shared autonomous
Cycling and walking infrastructure				
Improvements to the public transport network				
Shared and clean mobility				
Digital connectivity and smart technology				
Improved area-wide connectivity and accessibility				

2.7.41 Stress testing against these scenarios has demonstrated the challenge of improving the public transport network, investing in shared and clean mobility and improving area-wide connectivity if 'personally owned' scenarios dominate in the future. However, Norwich has chosen to 'decide and provide' its future by visioning for a future of shared and clean mobility. Therefore, in order to improve the resilience of the '**Transforming Norwich**' programme and to ensure the realisation of the preferred future the following adaptations have been made since June 2019:

- Travel behaviour change campaign (funded by NCC to promote shared and clean mobility);
- Development of mobility hub concept to ensure they are fit for future purpose e.g. minimal car parking, attractive and accessible for all;
- Developed rationale for a 'public-sector led' mobility as a service offer through FMZ funding to ensure an equitable mobility system evolves in Norwich.

2.7.42 Our '**Transforming Norwich**' programme is the first stage in implementing a much longer-term Transport for Norwich strategy. The delivery themes and guiding principles of the strategy underpin the programme. '**Transforming Norwich**' will provide the first decisive step as we move towards a cleaner, more sustainable transport network within the city region.

2.8 The 'Transforming Norwich' Programme

2.8.1 To achieve the '**Transforming Norwich**' vision of clean and shared mobility, investment is needed to ensure sustainable transport modes are a viable choice for employees and residents when compared to the private car. The '**Transforming Norwich**' programme will adopt three transformative approaches to achieve the vision and objectives:

- Transforming the network
- Transforming the city centre
- Transforming the passenger experience

Transforming the Network

2.8.2 Transforming the transport network will be achieved by creating **six clean transport priority corridors** that link key transport hubs (rail station, bus station, airport and mobility hubs), economic growth areas, homes and educational provision across the GNR. Originally, three corridors were proposed but dividing the three routes into six radial priority corridors provides the opportunity for more granular appraisal of individual corridors and scheme elements, greater flexibility for bus operators and the wider programme, and the ability to deliver the programme more coherently and with less disruption.

2.8.3 On these clean transport priority corridors, we will:

- Promote cleaner vehicle technology: mixture of zero emission and EURO VI buses on Park & Ride services and the most frequent services with a minimum EURO V on all corridors;
- Provide a minimum 8-minute daytime service frequency on key corridors, timetable co-ordination between operators and more evening and weekend services;
- Support Park & Ride and other express bus services stopping at mobility hubs and increase capacity on our Park & Ride network;
- Provide dedicated bus priority measures along the clean transport priority corridors and through congested traffic junctions, linking

areas of housing development, growth and deprivation with employment and training;

- Provide direct, low-carbon bus corridors into the city centre for residents of the UK's largest urban extension (Broadland Growth Triangle);
- Prioritise buses and cycling to ensure shared and clean modes are competitive with the private car;
- Introduce Sustainable urban Drainage Systems (SuDS) to more effectively manage rainwater on highway and mobility hub schemes;
- Promote shared transport interventions through a sustained and co-ordinated behaviour change programme to reduce single-vehicle occupancy.

2.8.4 Figure 33 shows the six clean transport priority corridors that will transform the transport network.

Transforming the City Centre

2.8.5 **Transforming the city centre** will be achieved through:

- Delivering a step-change in the quality of infrastructure that supports public transport, walking and cycling in the city centre;
- Redesigning bus stops so that buses can easily access and vacate bus stops without holding each other up and causing unnecessary delay and pollution, ensuring easy access on and off buses for passenger of all abilities;
- Improving walking connections within the city centre to improve access to Norwich rail station, Norwich bus station, main shopping and tourism areas, key employment sites, brownfield development sites and educational establishments. Figure 34 shows a diagram of walking improvement areas within the city centre and their relationship with major development sites;
- Removal of through-traffic from specific areas and providing extra inner ring road junction capacity for displaced vehicles;

Transforming the Passenger Experience

2.8.6 **Transforming the passenger experience** will be achieved by:

- Roll-out of mobility hubs across the GNR, making it easy for everyone to access shared transport services and change between transport modes;
- Enhancing the role of Park & Ride in Norwich by providing faster, more reliable services, better integration with scheduled bus services, introducing low and zero-emission buses and provision of onward travel choices at selected sites;
- Expansion of the Norfolk Car Club network;
- Improved real-time service information with disruption and punctuality alerts;
- Working with transport providers to promote and increase the use of multi-operator, multi-modal and contactless ticketing;
- Accelerating the delivery of capped ticketing for individual and multiple bus operators and put Norfolk at the forefront of this advancement in ticketing;
- Improved value for money measured through Transport Focus customer satisfaction surveys;
- Significant improvements in vehicle quality and on-vehicle information through investment by our main bus operators.

Development of our cycle network

2.8.7 Enhancements to the cycle network forms a key element of transforming the network and city centre. Recent years has already seen significant investment in the pedalway network of cycle routes, and the '**Transforming Norwich**' programme will build on this. Figure 35 shows both the existing and proposed investment in the cycle network.

Defining Mobility Hubs in the Norwich Context

2.8.8 A key feature of the '**Transforming Norwich**' programme is the delivery of 33 mobility hubs. They will be located along the six clean transport corridors and within the city centre. Their role will be to transform the passenger experience in terms of how they access transport and interchange between modes.

2.8.9 Public transport users need confidence that there are key places within the city where they can access shared mobility services – buses, trains, club cars and hire bikes. They will be called mobility hubs. These places will be well designed so that people feel comfortable, secure and well informed whilst waiting for services to arrive or navigating between services.

2.8.10 Buses will be able to pull up alongside the kerb in the right place and at the right angle so that passengers with mobility problems can board and alight easily. Express buses will serve these locations. It will be easy for people to reach these places on foot and by bicycle, and land will be developed more intensively nearby due to its good accessibility. Some hubs are more important than others and will have extra facilities.

2.8.11 We will invest in the design of the hubs, the walking and cycling routes to them and use the planning system to encourage development that enjoys good access to sustainable transport services and generates patronage for them. Figure 36 shows an option for the brand identity of the hubs and how it can be employed across different media, Figure 37 shows an artist's impression of the facilities at a hub and Figure 38 shows the location of the planned mobility hubs.

Figure 36: Potential brand identity for the mobility hubs

Taking forwards ticketing in the Norwich Context

2.8.12 Discussions have been held with the three main bus operators serving Greater Norwich to identify their current roll-out of ticketing options and payment, their future plans regarding ticketing and what opportunities there may be for the Transforming Cities programme to accelerate plans and/or add further value.

Contactless and capped ticketing

2.8.13 All three bus operators utilise the same ticket machine hardware (Ticketer) and accept contactless payment, which has been introduced over the last 6-12 months across Norwich. Take-up of contactless payment has been very good, which is evidenced by First Bus stating that more than 50% of their ticketing transactions in Norwich are now contactless or through their mobile ticketing (m-Ticket).

2.8.14 The introduction of capped tickets for individual operators is the next logical development, followed by the capping of fares for journeys made on multiple operators. This latter development is outlined in the new strategy 'Moving Forward Together' launched by the Confederation of Passenger Transport (CPT) in September 2019 that seeks to introduce price-capped daily and weekly tickets across multiple operators in urban areas by 2022.

2.8.15 Discussions with First Bus and konectbus have highlighted that they are closely following developments within their larger transport groups on various trials and testing of single and multiple operator capping of fares and are committed to capped ticketing being introduced in Norwich. Capped fares work well with simple and more complex fare structures but where zonal fares are applied, there is the need for bus users to 'tap out' as well as 'tap in'. No operators in Norwich operate a flat fare approach to ticketing, with multiple zones and different fares applying, therefore a '**tap in / tap out**' approach would be needed in Norwich. An important consideration is that 'tapping out' does not add to egress time and disbenefit customers, which could be the case if only one reader is used. Additionally, while use of a middle set of doors for exiting a bus is likely to facilitate a quicker egress, this would reduce seating capacity and there are currently no middle-door operation vehicles in Greater Norwich.

2.8.16 Discussions with bus operators in Greater Norwich has highlighted that a successful Transforming Cities application will accelerate the speed at which capped ticketing is delivered in Norwich, to as early as 2020 instead of 2023. The immediate opportunity is around single operator capping but we would seek to introduce multi-operator capped ticketing at the earliest possible opportunity through funding to provide additional hardware needed to support 'tap in / tap out' for all participating operators through the provision of additional card readers for each bus. Bus operators will cover the additional operational costs of the equipment.

2.8.17 First Bus has stated that "the ticketing proposals adopt a step-by-step approach that maximises the customer benefit as early as possible. It will use contactless EMV technology to provide day and weekly capping, initially

on bus, which can be rolled out at First during 2020 (provided the exit readers are available)."

Multi-operator Fusion ticket

2.8.18 In Norwich, we have the 'Fusion' multi-operator ticket, which was launched in 2010, and is a 1, 3 or 5-day ticket valid travel across Greater Norwich that can be bought on the bus or in advance on the Holdall smartcard. There are between 150-200 Fusion tickets sold each month. More information can be found at https://www.norfolk.gov.uk/roads-and-transport/public-transport/buses/fusion

2.8.19 Through the '**Transforming Norwich**' programme, it is likely that the introduction of capped multi-operator ticketing will largely replace this specific ticket but we are committed to retaining this in the meantime and will work with the Fusion Ticket Board (representing local authorities and bus operators) with the aim of increasing levels of multi-operator travel.

Multi-modal PlusBus ticket

2.8.20 Multi-modal ticketing is available in Greater Norwich through the PlusBus ticket, providing unlimited bus travel on participating operators' services, around the urban area of Norwich, including travel to / from the University of East Anglia. Through the Behaviour Change programme that supports our '**Transforming Norwich**' application, we will seek to raise awareness and consequently usage of PlusBus ticketing.

Behaviour Change

2.8.21 There are many reasons why individuals do not currently opt for active modes of travel. Improvement in infrastructure can address some of these factors, but it cannot bring about modal change at scale on its own. As a council, we recognise that investment in our infrastructure needs to be supported by an appropriate behaviour change strategy and integral to this will be the role of, and engagement with, Public Health.

Engagement with Public Health

2.8.22 In October 2019, the Cabinet of Norfolk County Council agreed to support Public Health's proposed change of strategic approach to adult health improvement, which includes increasing levels of activity in the population. The approach states that, "*Our vision is to embed prevention within local communities and organisations so that residents can reach their full potential to health and wellbeing. We want Norfolk adults to be able to make healthy choices, and for healthy choices to be the normal choice*". The Council's new approach is grounded in behaviour change theory, using the COM-B model.[3] This model includes Environmental Restructuring to

[3] Michie S, Atkins l and West R (2014) The Behaviour Change Wheel: A Guide to Designing Interventions. London: Silverback Publishing. www.behaviourchangewheel.com.

increase individuals' capability of engaging in a behaviour, such as utilising an active mode of travel.

2.8.23 The proposals from Public Health include investment in behaviour change training across the wider system of frontline workers. This means that a much larger proportion of the adult population will be exposed to conversations supportive of making behavioural changes that will improve their health, including increasing levels of physical activity. One of the (draft) objectives for Public Health's programme of work relating to physical activity is to raise the awareness of active travel, with potential interventions including evidence-based campaigns and links with community level activities. Interventions will utilise Behavioural Insights and the EAST Framework[4].

2.8.24 This strategic approach by Public Health to health-related behaviours means that the improvements to infrastructure within the '**Transforming Norwich**' programme will form part of a wider programme of work being co-ordinated by Public Health in Norfolk around behaviour change and will be based on a solid understanding of the existing barriers to, and facilitators of, sustainable and active travel

Engagement on active travel that 'Transforming Norwich' will continue to deliver

2.8.25 The partners in '**Transforming Norwich**' are currently engaged in a system-wide approach to promote active travel through a host of innovative programmes providing a solid foundation for the development of further interventions to impact on behaviours capitalising on the infrastructure changes that a successful '**Transforming Norwich**' bid would bring. Our current approach means that we have scope to pool budgets from across the authority to fund such initiatives, whilst seeking a range of additional support from external sources for activities integral to our overall strategy.

2.8.26 Current activity includes 'AtoBetter'[5], a scheme which is fully funded through private sector housing development and which aims to make sustainable travel as easy as possible and enable more journeys to be made by foot, bike, public transport and car sharing. The scheme uses a variety of tools and innovations to change behaviours and address barriers to sustainable and active travel. While initiatives under the A to Better scheme have a specific focus on residents in new housing developments there is scope to replicate elements of the approach to effect behaviours in established residential areas. AtoBetter is currently delivering residential travel plans at 28 sites across Norfolk with 11 active sites in the Greater Norwich area. Of the active sites where baseline and subsequent travel surveys have been conducted, we have already found an average increase in walking and

[4] The Behavioural Insights Team. EAST: Four simple ways to apply behavioural insights. Online at https://www.behaviouralinsights.co.uk/wp-content/uploads/2015/07/BIT-Publication-EAST_FA_WEB.pdf

[5] https://www.norfolk.gov.uk/roads-and-transport/atobetter

cycling of two to three percentage points and a 5 percentage points reduction in single car occupancy.

2.8.27 The 'Pushing Ahead'[6] programme encourages modal shift by utilising evidence informed behaviour change approaches to promote the benefits of walking and cycling based on positive impacts to personal health and to the environment. Examples of programmes under this initiative are the Better Points rewards app and the Spring into Action Workplace Challenge. These work to create the opportunity and provide motivation for active travel behaviour change. The Better Points app encourages residents to walk, run or cycle by logging points, which can be donated to charity or exchanged for rewards. This scheme currently achieves an average of over 600 active users per month - and when run in tandem with campaigns targeted at specific groups, Better Points can be utilised as an effective behavioural change tool to increase levels of walking and cycling and drive modal shift across the city.

2.8.28 The "Spring into Action" workplace challenge run earlier this year is a great example of how this can work in practice (creating nearly 500 additional users in just one month) and there is scope for further campaigns targeting employers, schools, community groups etc.

2.8.29 Norfolk County Council's Public Health department works closely with these and other partnerships in the development and delivery of active travel interventions. In practical terms this includes promotion events around the city and Great Yarmouth, and the School Champions Project, delivered by the Road Safety Team[7] (hosted in Public Health). The Schools Champion project is designed to promote sustainable hubs in the community and is being independently evaluated to assess impact.
The team have also supported families to adopt alternative modes of transport to schools through the 'walk, bike, scoot' initiative. Such interventions build capability and confidence through education and training as well as providing the opportunity and motivation to change. In order to co-ordinate the progress towards outcomes for Public Health's programme using existing transport projects such as A 2 Better and Pushing Ahead, it is anticipated that a joint strategic framework is developed which will form the basis for shared governance. This will provide an appropriate structure within which the behaviour change elements of Transforming Cities work would be overseen.

2.8.30 Our County Sports Partnership, Active Norfolk[8], is fully committed to the health benefits of an active lifestyle and the role of active transport in facilitating this. While its activity finder acts as a one-stop shop for the

[6] https://www.pushingaheadnorfolk.co.uk/

[7] https://www.norfolk.gov.uk/roads-and-transport/roads/road-safety

[8] https://www.activenorfolk.org/

promotion of all sports and activities in the local area, including walking and cycling, its work at a strategic level on planning and transport contributes to addressing the physical and social constraints active travel. One of Active Norfolk's main drivers is to widen participation and tackle inequalities in participation, with a focus on vulnerable groups, such as older residents and people with disabilities, as well as delivering targeted initiatives in areas of deprivation.

2.8.31 Our current programme of regular ParkRide events (renamed Family Cycle Fun Days) held in Norwich and Great Yarmouth have been attended by almost 1,400 people and of the 223 surveyed at one event, 76% of people said that attending the event had increased their desire to cycle and the likelihood of them cycling more. 83% of children said it had increased their confidence in cycling and 86% of adults said they were confident that they would cycle more in the future. We are also seeking to increase the uptake of cycling through the weekly park pedal at Whitlingham Broad on the edge of Norwich, and other ad hoc cycling events, in addition to our Norfolk Trails initiative which promotes walking and cycling routes across the county to residents and visitors alike.

2.8.32 Our Norwich 'Try before you Buy' Cycle Loan scheme has loaned 341 bikes and we have engaged over 10,000 people through park pedals and one-off events such as the Norwich Cycling Festival and Royal Norfolk Show.

2.8.33 We were successful in bringing the 2019 National Road Championships to Norfolk this summer as part of the Great British Cycling Festival which facilitated the opportunity to promote the uptake of cycling to new audiences across the region on a mass scale through family and mass participation rides and a host of spin-off events.

2.8.34 Collectively through these activities over the last two years we have produced nearly 1,000 Personal Journey Plans, attracted 672 new members to the Norfolk Car Club and trained 464 Health Clinicians to promote active travel to patients across Norwich and Great Yarmouth.

Sustainable Urban Drainage Schemes

2.8.35 Incorporating the water cycle into urban design provides the opportunity to create successful and resilient places. The relationship between water, including clean water, wastewater, and rain water, and our urban areas will be given a higher priority to help provide integrated solutions to flood risk management, sustainable water use and supply, and the improvement of water quality.

2.8.36 Sustainable drainage systems (SuDS) are designed to maximise the opportunities and benefits that can be secured from surface water management. Figure 39 shows an overview plan of flooding and drainage in Greater Norwich, which demonstrates a large area is affected. We will seek to incorporate SuDS within all our infrastructure works.

2.9 Strategic Fit

2.9.1 This section outlines the main aspects of the policy context and sets out how '**Transforming Norwich**' aligns with national, regional and local policies, as well as how the programme sits within the context of developing local transport policy within the area. Table 11 identifies the policies and key plans that have been reviewed.

Table 11: Key national, regional and local policies

National Policies	Regional Policies	Local Policies
Industrial Strategy: building a Britain fit for the future National Planning Policy Framework Transport Investment Strategy Climate Change Act 2008 Air Quality Action Plan	New Anglia Local Enterprise Partnership Economic Strategy for Norfolk and Suffolk (and emerging LIS) 2019-2025 THE>EAST: Integrated Transport Strategy for Norfolk and Suffolk	Together, for Norfolk. An ambitious plan for our county Connecting Norfolk - Norfolk Transport Plan for 2026 Transport for Norwich Strategy Norfolk County Council Environmental Policy 2019 Norwich 2040 City Vision

Industrial Strategy, Building a Britain Fit for the Future (2017)

2.9.2 The aim of the Industrial Strategy is to boost productivity by backing businesses to create good jobs and increase the earning power of people throughout the UK with investment in skills, industries and infrastructure. The Industrial Strategy outlines five foundations of productivity. These are: ideas, people, infrastructure, business environment and places; and they are aligned with the UK four Grand Challenges, which comprise:

- putting the UK at the forefront of the artificial intelligence and data revolution;
- maximising the advantages for UK industry from the global shift to clean growth;
- being a world leader in shaping the future of mobility; and
- harnessing the power of innovation to help meet the needs of an ageing society. In line with the Industrial Strategy and the objectives of the '**Transforming Norwich**' programme, productivity is a key concept at the heart of the ''**Transforming Norwich**' programme.

2.9.3 The New Anglia LEP is working with government to develop a Local Industrial Strategy for Norfolk and Suffolk (LIS) and the '**Transforming**

Norwich' programme will align with the emerging LIS as both are developed concurrently.

National Planning Policy Framework

2.9.4 At the heart of the framework is a presumption in favour of sustainable development. Amongst various key national policy aims, planning policies and decisions should seek to build a strong, competitive economy; ensure the vitality of town centres; promote healthy and safe communities; promote sustainable transport; achieve well-designed places; and meet the challenge of climate change, flooding and coastal change.

Transport Investment Strategy

2.9.5 In July 2017 the Government issued the Transport Investment Strategy, which 'sets out the DfT's priorities and approach for future transport investment decisions'. Government set out that investment decisions must seek to create a more reliable, less congested, and better-connected transport network; build a stronger, more balanced economy; enhance Britain's global competitiveness and support the creation of new housing.

2.9.6 Investment in transport infrastructure should create a network that is better able to meet these challenges and thereby deliver a strong, resilient and fair economy. In this document, we set out what this will mean in practice for our investment priorities, and the way we make decisions.

Climate Change Act 2008

2.9.7 As defined by the Climate Change Act 2008, 'it is the duty of the Secretary of State to ensure that the net UK carbon account for the year 2050 is at least 80% lower than the 1990 baseline'. In 2019, this was amended to 100% lower.

2.9.8 Whilst under the coverage of the Climate Change Act, the UK was reported to have met the second carbon budget, the net carbon account in 2017 also revealed a 3.4% increase compared to that reported in 2016. Evidence briefly discussed in the Climate Change section shows an undesirable upwards trend for greenhouse gas emissions and the need to reduce emissions linked to road transport.

Air Quality Government Strategies

2.9.9 Government's Clean Air Strategy (2019) and Road to Zero (2018) show an increased emphasis on reducing air pollution. Some key elements in this plan include: (i) Ending the sale of new petrol and diesel vehicles by 2040; (ii) Increase in HGV Road User Levy from February 2019 for non-Euro VI HGVs; Road Investment Strategy to deliver 95% of the network with charging points every 20 miles; and (iv) Work to reduce particulate matter produced from brakes and tyres.

2.9.10 The Road to Zero expects a significant increase in charging infrastructure on streets, lighting columns and within residential development. The Clean Air Strategy has also set targets for the reduction of pollutants from a 2005 baseline to 2020 and 2030.

New Anglia Local Enterprise Partnership Economic Strategy for Norfolk and Suffolk

2.9.11 As set out by this economic strategy (2017) the aspiration is that Norfolk and Suffolk will be:

- A place where high-growth businesses with aspiration choose to be
- A well-connected place
- A high-performing, productive economy
- An international-facing economy with high-value exports
- An inclusive economy with a highly-skilled workforce
- A centre for the UK's clean energy sector
- A place with a clear, ambitious offer to the world

2.9.12 The Local Industrial Strategy (LIS) is the next stage in the evolution and implementation of the Norfolk and Suffolk Economic Strategy. It will build on the Economic Strategy but be a deeper and more focused piece of work, taking full account of the UK's Industrial Strategy (2017). The emerging LIS will therefore lead the region towards greater productivity growth and have strong synergies with the '**Transforming Norwich**' programme. The LIS will look in detail at the competitive strengths of the region, setting out a long-term plan to boost the productivity and earning power of Norfolk and Suffolk. Stakeholder engagement events are currently taking place to ensure a THE>EAST: Integrated Transport Strategy for Norfolk and Suffolk.

2.9.13 The strategy sets out the ambition and collective goals of the New Anglia LEP and its Local Transport Board partners. The GNR is identified as a "priority place" - an area where significant opportunities and commitment for continued growth exist. Whilst the strategy looks ahead to the 2040s, it focuses on key actions to advance improvements of the transport network over the first five years.

2.9.14 The following priority transport themes are defined by the strategy:

- Competitive clusters close to global markets;
- Driving business growth and productivity;
- Driving inclusion and skills;
- Collaborating to grow.

Together, for Norfolk. An ambitious plan for our County 2019-2025

2.9.15 This corporate plan provides an inclusive plan for Norfolk that is not restricted by organisational boundaries and puts people at the centre of its actions. It has a strong emphasis on 'inclusive growth and improving social mobility, investing in improving people's lives and delivering outcomes that will create the impetus for our future economic and social wellbeing'.

2.9.16 The plan promotes a county that stands out for good connectivity and strong infrastructure. It embraces the delivery of critical planned infrastructure investment including sustainable transport schemes in the GNR through the '**Transforming Norwich**' programme.

Norfolk County Council Environmental Policy 2019

2.9.17 Norfolk County Council adopted its environmental policy in November 2019. environmental strategy sets out an environmental vision and priorities for the city through to 2019. The policy is a key step in demonstrating the county council's leadership role in addressing climate change. The policy sets out the council's ambition to work towards carbon neutrality by 2030.

Connecting Norfolk - Norfolk Local Transport Plan for 2026

2.9.18 As defined by the Norfolk Local Transport Plan (2011), Norfolk's transport vision is:
A transport system that allows residents and visitors a range of low-carbon options to meet their transport needs, and attracts and retains business investment in the county.

2.9.19 This vision is underpinned by the following six strategic aims:

- Maintaining and managing the highway network;
- Delivering sustainable growth;
- Enhancing strategic connections;
- Reducing emissions;
- Improving road safety;
- Improving accessibility.

2.9.20 The Local Transport Plan is currently being reviewed. The revised plan will be updated to look forward to 2036, consistent with local plans. County Council Members have agreed that the existing six themes should be retained. The review is programmed to be completed, with a new plan adopted by the County Council, at the end of 2020.

Transport for Norwich Strategy

2.9.21 There has been a Norwich Area Transportation Strategy (NATS) for many decades. The current version was adopted in 2004, and its implementation plan in 2010.

2.9.22 The strategy is currently being reviewed with the purpose of enhancing the relationship between transport-specific solutions and the wider growth and development plans. Local authorities, working together under the TfN brand, have made significant progress in the review of the strategy, which will address current and future challenges and respond to regional challenges. A set of Guiding Principles and Delivery Themes has been adopted. These set the context for the revised strategy, which will be adopted in 2020.

2.9.23 **Error! Reference source not found.** illustrates guiding principles defined by the emerging TfN Strategy. The '**Transforming Norwich**' programme and the emerging investment options are aligned with these principles.

Table 12: Guiding principles associated to the emerging Transport for Norwich Strategy

Guiding Principle	Ambition	Key considerations
Strengthening Norwich as the regional capital	Enhancing the long-term vitality and health of the city	● Supporting and developing the local economy ● Protecting and improving the physical and mental health of the city and its users ● Preserving the historic identity of Norwich
Access for all	A transport system for all that gets people where they need to go	● Geographical availability of transport ● Social accessibility of transport ● Access for those with lower mobility
Keeping people moving	Making journeys reliable and reducing congestion	● Transport reliability ● Allowing people to make transport choices which contribute less to congestion ● Emphasis is on moving people

2.9.24 As shown in Table 13, delivery themes also associated to the TfN Strategy have been established, recognising the uniqueness of the city.

Table 13: Delivery themes associated to the emerging Transport for Norwich Strategy

Delivery themes	Key considerations
Balancing the needs of the city and its users	● Identify priority routes and areas for different users to inform what we do and where ● Balance the competing travel needs of residents, businesses and others
Collaboration to provide cost-effective and efficient transport	● Build strong partnerships with transport service providers and users ● Develop opportunities for private sector investment ● Sharing responsibility for positive change
Embrace new technology	● Encouraging and trialling new means of travel ● Informing travel choices ● Optimising and evolving our existing network

2.9.25 Consultation on the TfN strategy review was carried out from January to March 2018. This ran alongside the Greater Norwich Local Plan (GNLP) consultation and was the first stage in putting together our updated Transport for Norwich strategy. We had a great response with more than 1,500 people sharing their views, with investment in public transport emerging as the number one priority with nearly 90 per cent of those who took part rating this as “important” or “very important”. The second priority identified was putting in place measures to tackle congestion, with 87 per cent rating it as “important” or “very important”. Other issues that ranked among the top five areas were maintaining existing infrastructure, reducing the impact transport has on air quality, and encouraging people to walk and cycle. As part of the development of our Transport for Norwich Strategy, we will be undertaking further consultation with stakeholders and the public during Spring 2020.

2.9.26 The ‘**Transforming Norwich**’ programme will form early delivery of the revised TfN Strategy. Whilst ‘**Transforming Norwich**’ provides a positive set of delivery mechanisms to encourage public transport, walking and cycling, the strategy review will consider the use of complementary policy measures to reinforce behaviour change, although these can only be committed to when the revised strategy is formally adopted.

2.9.27 Through partnership, the programme seeks to improve accessibility, actively encourage the use of sustainable modes of transport and explore progressive methods to mitigate the adverse impacts of excessive traffic congestion. Further detail on the emerging TfN Strategy is detailed below in the section on ‘Fit with Promoting Organisations Aims and Objectives’.

Norwich 2040 City Vision

2.9.28 Norwich City Council published a city vision in early 2019 that was the outcome of a collaborative exercise with an array of local organisations. The

remit of the vision covers all aspects of city life with some specific references to transport and connectivity. It acknowledges that '**Transforming Norwich**' can help make Norwich a fairer, more liveable, dynamic and connected city (being a great city for walking and cycling; having a clean, affordable and integrated transport system; and creating spaces for people to come together, understand and share).

Programme Fit in the Context of Policy

2.9.29 To demonstrate policy alignment, the '**Transforming Norwich**' programme identified the following themes linked to proposed investment types:

- Cycling and walking infrastructure;
- Improvements to the public transport network;
- Shared and clean mobility;
- Digital connectivity and smart technology;
- Improved area-wide connectivity and accessibility.

2.9.30 Table 14 sets out a Red/Amber/Green (RAG) assessment, rating the overall '**Transforming Norwich**' programme and its fit against the national, regional and local policies described earlier in this section, as well as identifying high-level policy contributions to individual investment types.

Key: **Investment Types**

① Cycling and walking infrastructure
② Improvements to the public transport network
③ Shared and clean mobility
④ Digital connectivity and smart technology
⑤ Improved area-wide connectivity and accessibility

Table 14: Red/Amber/Green assessment of the 'Transforming Norwich' programme fit against policy and policy contribution to investment types

Policy	Scope	TN programme fit against policy	Indicative policy contribution for investment types				
		Appraisal Score	①	②	③	④	⑤
Industrial Strategy, building a Britain fit for the future	National	■	✓✓	✓✓	✓✓	✓	✓✓
National Planning Policy Framework	National	■	✓✓	✓✓	✓✓	✓	✓✓
The Government's Transport Strategy	National	■	✓✓	✓✓	✓✓	✓✓	✓✓

Policy	Scope	TN programme fit against policy	Indicative policy contribution for investment types				
Transport Investment Strategy	National	■	✓✓	✓✓	✓✓	✓✓	✓
Climate Change Act 2008	National	■	✓✓	✓✓	✓✓	✓✓	✓✓
Air Quality Action Plan	National	■	✓✓	✓✓	✓✓	✓✓	✓
New Anglia Local Enterprise Partnership Economic Strategy for Norfolk and Suffolk	Regional	■	✓	✓	✓	✓✓	✓
Connecting Norfolk - Norfolk Transport Plan for 2026	Regional	■	✓✓	✓✓	✓✓	✓✓	✓✓
Together, for Norfolk. An ambitious plan for our County 2019-2025	Regional	■	✓✓	✓✓	✓✓	✓✓	✓✓
THE>EAST: Integrated Transport Strategy for Norfolk and Suffolk	Regional	■	✓✓	✓✓	✓✓	✓✓	✓
Norwich City Council Environmental Strategy	Local	■	✓✓	✓✓	✓	✓	✓
(Emerging) Transport for Norwich Strategy	Local	■	✓✓	✓✓	✓✓	✓✓	✓✓

✓✓ Major contribution to investment type
✓ Supporting contribution to investment type

The Developing Local Transport Policy Context

2.9.31 The '**Transforming Norwich**' programme will sit within the wider Local Transport Plan and Transport for Norwich programmes. '**Transforming Norwich**' is a short-term programme with funding for three years and will form the first stage of delivery of the revised TfN strategy. There will be wider and longer-term impacts for the implementation of the programme and wider behavioural change work that will be taken forward through TfN.

2.9.32 The appraisal and analysis undertaken for '**Transforming Norwich**' will prove invaluable in informing the TfN strategy review. The review will need to consider how to address some of the impacts being found from delivery of the '**Transforming Norwich**' programme as well as how to build on the direction being set through delivery of the TCF programme. Overall, our appraisal results, using standard DfT appraisal methodology, show that the

'**Transforming Norwich**' proposals are likely to have an adverse impact on private vehicles on the highway network. However, this is an expected outcome given that many of the measures remove highway capacity or require traffic to reassign to longer routes. However, it should be noted that these disbenefits are outweighed by the benefits to public transport, walking and cycling.

2.9.33 The TfN review will set out an action plan for how some of the negative impacts on vehicular traffic might be addressed, taking account of the clear direction of travel being set by delivery of the '**Transforming Norwich**' programme. Whilst matters such as enhanced bus partnerships and imposition of demand management measures, or clean air zones, are not part of our '**Transforming Norwich**' programme (due to the short delivery timetables) they will need to be addressed in the longer-term TfN strategy.

Bus Services Act

2.9.34 In terms of our approach to the delivery of public transport in the GNR, we have carefully considered the opportunities presented by the **Bus Services Act 2017** and how these could be used to maximise our investment in public transport infrastructure delivered through the '**Transforming Norwich**' programme, recognising that the Act focuses on partnership working, passenger information, ticketing arrangement and the possible introduction of franchising powers at a local level.

2.9.35 We are committed to reviewing and refreshing the existing Norwich Bus Charter and aim to complete this during Spring/Summer 2020, coinciding with the development of our emerging Transport for Norwich Strategy. All operators are currently engaged in the Norwich Bus Charter and we will look to ensure this continues throughout this review and beyond.

2.9.36 Discussions with our bus operators have focused on which tools within the Bus Services Act 2017 (Advanced Quality Partnerships [AQPS], Enhanced Partnerships [EP], Franchising and Advanced Ticketing schemes), if any, will best improve local services across Greater Norwich. We recognise that the success of any bus partnership arrangements depends on good working relationships between the local authority and bus operators and that no legislation can ensure that the trust and consensus required to develop a successful partnership is achieved.

2.9.37 Franchising powers are only available automatically to Mayoral Combined Authorities and could potentially expose the County Council to significant financial risks. This is not something we are seeking to progress at the present time. In terms of an AQPS and EPS, we have concluded that much of what can be specified and delivered through these arrangements is already being delivered, or could be incorporated within our existing voluntary agreement, avoiding the need to invest time and funding to put a legal framework in place around an arrangement that is already working well.

2.9.38 In terms of using the Bus Services Act 2017 to introduce 'Advanced Ticketing Schemes', we feel we already in a 'good place' in terms of

ticketing, as is evidenced by all three main bus operators already supporting contactless bank card payment (introduced 2019), and our two largest bus operators also providing mobile ticketing through their own apps. Additionally, we have a multi-operator 'Fusion' ticket available across Greater Norwich, which is overseen by a management board that has bus operator and local authority representation and which reviews and sets fares. A 'PlusBus' ticketing arrangement is in place in Norwich providing combined bus/rail ticketing, and discussions, facilitated by the New Anglia Local Enterprise Partnership (LEP), are currently under way between First Bus and Greater Anglia regarding opportunities to better integrate bus and rail tickets, with a focus on mobile ticketing options. Through '**Transforming Norwich**', we are seeking to accelerate the delivery of capped ticketing for single and multiple bus operators and put Norfolk at the forefront of this advancement in ticketing. Our Future Mobility Zone application has committed to the development and roll-out of a mobility platform 'app' that incorporates integrated ticketing and journey planning.

Norwich Western Link

2.9.39 NCC is supporting work on development of a business case for the **Norwich Western Link**, which will connect the newly-constructed Broadland Northway (previously known as the Norwich Northern Distributor Road) to the A47 trunk road west of Norwich, creating a direct link to Norwich Airport from the west and overcoming a number of traffic and transport-related issues on the current network. Work also continues on the improvements between the rail station and the city centre to create better walking, cycling and bus links, and to provide enhanced links to the city centre.

Local engagement and feedback to proposals

2.9.40 There has been engagement with stakeholders throughout development of our '**Transforming Norwich**' programme through our Stakeholder group, as well as with the media and general public, through events such as the Norfolk Bus Forum, which is chaired by Bus Users UK, with the latest one being on 9 November. The media has provided extensive and positive coverage of our proposals and details of this can be found in Annex 5. Overall, this engagement has highlighted a strong level of support overall.

2.9.41 In terms of individual schemes included in our proposals, there has been an element of consultation and feedback on several of these.

Tombland and Upper King Street

2.9.42 Our proposals to improve walking and cycling links, accessibility and public transport access in the Tombland and Upper King Street area has been formally consulted on and were approved at the Transforming Cities Fund Joint Committee in August 2019, following strong support for the scheme.

Cross Valley Link

2.9.43 In terms of our proposal for a proposed Cross Valley Link, which would see a new public transport route at the Norwich Research Park, concerns have

been raised by a local District Councillor on the grounds of the environmental impact of this scheme – details of this can be found in Annex 5. Wider concerns on this scheme have not been raised and should funding be awarded, the Cross Valley Link will be subject to extensive public and stakeholder engagement.

2.10 Strategic Benefits and Impacts

Introduction

2.10.1 An economic appraisal has been carried out that assesses the economic, environmental, social and distributional impacts the '**Transforming Norwich**' programme is expected to have, and the resulting value for money.

2.10.2 There are three levels of analysis:

- Level 1 benefits are the transport user benefits that include impacts which assume fixed land use excluding wider economic impacts.
- Level 2 includes wider economic impacts which assume fixed land use (connectivity impacts) or do not require land use change to be explicitly quantified.
- Level 3 includes analysis in which either land use change is explicitly quantified (structural impacts) or supplementary economic modelling has been conducted.

2.10.3 In addition, to demonstrate alignment with '**Transforming Norwich**' and Norwich's objectives, we have undertaken further assessment to understand the benefits and impact on:

- Carbon and air quality;
- Equality (through an Equality Impact Assessment (EqIA)).

Level 1 Benefits

2.10.4 The Level 1 benefits of a transport scheme cover the benefits to transport users. Impacts on transport users and for providers typically make up the majority of benefits for transport business cases.

2.10.5 The benefits of a scheme will vary according to the type of scheme. For the '**Transforming Norwich**' programme, there are three types of scheme:

- Highway schemes;
- Public transport improvements;
- Walking and cycling measures.

2.10.6 Transport users will benefit from a highway scheme in a number of ways. The main user benefits will come from the following sources:

- User travel time;
- Vehicle operating cost;
- Maintenance;
- Accident;
- Air quality;
- Noise;
- Greenhouse gases.

2.10.7 The major benefit of a highway scheme is likely to be a reduction in the time taken to travel between two points, such as a user's home and work or a user's home and the shops. The reduction in travel time is perceived as a benefit by transport users and can be quantified using the value of time savings published in the DfT's Tag Data Book[9].

2.10.8 Vehicle operating costs represent the cost to the user of operating a vehicle. The main cost is the cost of fuel, but there are other non-fuel costs such as oil, tyres, vehicle maintenance and mileage-related depreciation.

2.10.9 Other costs of highway schemes will be external costs, which are not borne by the user but by others. For car use, these external costs include congestion, air pollution, noise and accident costs.

2.10.10 Overall, our appraisal results for transport user benefits in Table 15 show that the '**Transforming Norwich**' proposals are likely to have an adverse impact on private vehicles on the highway network. This is an expected outcome given that many of the measures remove highway capacity or require traffic to reassign to longer routes. However, these disbenefits are outweighed by the benefits to public transport, walking and cycling.

[9] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/806342/tag-data-book.xlsm

Table 15: Level 1 benefits (£000s. 2010 prices discounted to 2010)

Present Value of Benefits by mode	Low programme	Medium programme	High programme
Highway	-94,072	-91,583	-91,541
Public transport	91,299	105,680	94,705
Active modes	114,735	116,940	127,982
Total	111,962	131,037	131,146

Level 2 wider economic impacts

2.10.11 Level 2 includes wider economic impacts which assume fixed land use (connectivity impacts) or do not require land use change to be explicitly quantified. These level 2 benefits are:

- Agglomeration. A transport scheme can improve productivity by increasing agglomeration, which is a measure of concentration of economic activity over an area. An increase in agglomeration leads to higher business productivity due to improved connections to other businesses and to potential employees thus improving interaction, knowledge exchange and access to markets, including labour markets.
- Labour supply impacts. Transport can have an impact on labour supply by affecting the overall costs and benefits to individual workers. An individual will weigh the cost of travel against the wages of a job travelled to. Changes in transport costs are likely to have an impact on the incentives of individuals to work and hence have an impact on the overall level of labour supplied in the economy.
- Output change in imperfectly competitive markets. Reductions in transport costs allow for an increase in production in the goods and services that use transport, reducing costs so that businesses can make more profit or pass on the saving to customers, so they can be more competitive.

2.10.12 Within the context of the '**Transforming Norwich**' programme for Greater Norwich, we have undertaken proportionate analysis and have assessed labour supply impacts, in line with the objectives of the programme.

Table 16: Level 2 benefits

Route	Population within 400m of a bus stop 30 minutes from the City Centre – 2030 Do Nothing AM Peak	Population within 400m of a bus stop 30 minutes from the City Centre - 2023 Do Something scenario - AM Peak	Additional number of workers who can access a stop 30 minutes journey from the city centre
Broadland	18,014	18,378	364
Wymondham	23,861	25,181	1,320
Easton	27,479	27,482	3

2.10.13 In total, the '**Transforming Norwich**' programme allows an additional 1,683 workers to access jobs in the city centre (see Table 16).

Level 3 Supplementary economic appraisal

2.10.14 A key purpose of the '**Transforming Norwich**' programme is to support the continued economic growth of Greater Norwich by providing new transport infrastructure that will provide effective links to key development sites, supporting housing and employment growth. Therefore, we have assessed how the programme supports economic growth in Greater Norwich.

2.10.15 Level 3 supplementary wider economic benefits can cover the following areas:

- Land utilisation benefits;
- Access to more productive jobs;
- Reductions in spatial inequalities and structural unemployment;
- Land Value Uplift (LVU) assessment;
- Transport External Costs;
- Option and non-use values (if appropriate).

2.10.16 For the '**Transforming Norwich**' programme, we have responded proportionately and have assessed the impact of the programme on land use, specifically the extent to which it enables residential and employment development.

2.10.17 At a Greater Norwich level, the gross economic impacts of the programme are anticipated to be within the range of 1,076 total net jobs, 16,278 housing units and £51.0 million of GVA per annum (once all sites are fully built out).

Carbon and Air Quality Assessment

2.10.18 A core objective of the '**Transforming Norwich**' programme is to reduce carbon emissions. A supporting objective is to make improvements to air quality. In addition, one of Greater Norwich's '**Transforming Norwich**' objectives is to increase the efficiency of travel and transport in the GNR

and improve the impact transport has on carbon emissions, air quality and public health. Based on the importance of greenhouse gas emissions and air quality to both DfT and Greater Norwich, an assessment has been undertaken. A summary is given below (see Appendix 1 for the full assessment).

2.10.19 The '**Transforming Norwich**' programme could give the following indicative benefits to air quality and greenhouse gas emissions in the city:

- Reduce air pollution (nitrogen dioxide) in Castle Meadow, the most polluted area of the city, by up to eight micrograms per meter cube, or 15% of the current level (annual average NO2 in 2018);
- Reduce air pollution (nitrogen dioxide) at Norwich Station by up to six micrograms per meter cube or 15% of the current level (annual average NO2 in 2018), and on Chapel Field by up to five micrograms per meter cube, or 13% of the current level;
- Reduce greenhouse gas emissions by around 1,300 tonnes of carbon dioxide equivalent, equal to 1.1% of the emissions from road transport in the Norwich Council area;
- Reduce greenhouse gas emissions by Park & Ride buses by 64%. The remaining 36% would come from production of electricity (as of 2019), and are expected to reduce further as energy production becomes cleaner and less carbon-intensive.

Equality Impact Assessment (EqIA)

2.10.20 A supporting objective of the '**Transforming Norwich**' programme is to deliver wider social and economic benefits for the community. Similarly, an objective of the '**Transforming Norwich**' programme is to improve people's productivity and social mobility by unlocking access to employment and education opportunities across the GNR. Therefore, an EqIA has been produced to demonstrate the impact the '**Transforming Norwich**' programme will have on the community and social mobility. A summary is given below (see Appendix 2 for the full EqIA document).

2.10.21 Protected characteristic groups most likely to benefit from the '**Transforming Norwich**' programme are young people, older people, disabled people, BAME communities and people living in deprived areas.

- This is because of reduced journey times, improved pedestrian and cycle infrastructure, and the socio-demographic profiles of the corridors that have been identified for improvements;
- More generally, improvements planned to the network such as mobility hubs, more accessible bus stops and road crossings will have a positive impact on a range of people;
- The corridors all link areas of deprivation, often with high numbers of BAME residents and disabled residents, with areas of employment and the city centre. This will have a positive impact. In particular, the

provision of high-frequency bus services with increased hours is highly beneficial to these groups.

2.11 The Impact of Not Changing

2.11.1 Without '**Transforming Norwich**' funding, the step-change in accessibility to employment and education across Norwich would not be achieved as current levels of funding are insufficient. Therefore, all the benefits derived from improved access to employment and education, improved bus services, increases in walking and cycling and building on current strengths in the area of future mobility would not be delivered. In addition, the programme is pioneering in its goal of investing in buses, cycling and walking to make them more competitive than single-occupancy vehicle use in terms of time, cost and convenience. This could lead to a significant modal shift and provide a model for other cities to follow.

Productivity and social mobility

2.11.2 Norwich is designated a 'Fast Growth City' with significant housing and employment growth predicted. The '**Transforming Norwich**' programme presents an opportunity to invest in transport in the region at a critical time. No investment will result in missed opportunities of growth leading to reduced productivity in the region. For example, work by AECOM has shown that the road network around the Norwich Research Park will be saturated in two years at current build rates and unless major investment is made in sustainable transport, the ability to create further accommodation will be blocked. Avoiding stifling businesses that export goods and services is particularly important as the future of the UK's relationship with the EU continues to be defined.

2.11.3 Enhancing accessibility to key employment centres and training for some of the most deprived communities is a critical part of this programme and will not happen without the investment by bus companies in better bus services that will result from bus priority with separate provision for cycling and the creation of mobility hubs as the places where people access shared transport services. It is recognised that neglecting opportunities to enhance access to Park & Ride services is likely to affect not only the most deprived communities but also the success of future Park & Ride contracts.

2.11.4 The programme also supports the city centre through a tough time for high streets. Norwich city centre has many assets and is doing well by comparison with many other cities but this success as a visitor destination and shopping centre has been bolstered by investment made recently in the quality of spaces and ease of movement on foot. Failing to progress an integrated response to placemaking, new cultural spaces and the evening economy and mobility in the city centre through the '**Transforming Norwich**' programme will leave us exposed to the forces assaulting the health of the high street.

Efficiency of travel and environmental impact

2.11.5 Failing to invest in cycling and walking infrastructure and delivering improvements to the public transport network will prevent the city region from continuing to harvest the long-term benefits associated with more sustainable modes. Evidence presented in Sections 2.4 and 2.5 demonstrates that there is considerable scope to continue promoting a more sustainable and integrated path through TfN that will encourage a shift from car use to more space-efficient means of travel within the GNR. This is particularly important within the geographical scope of the programme area in order to respond to high levels of work-based single vehicle occupancy into Norwich city centre (potentially switchable private vehicle trips).

2.11.6 Due to increasing congestion, bus operators are currently investing in vehicles and resource simply to retain existing service provision and not bring about significant improvements. Failure to invest in infrastructure that provides priority for buses enabling bus journey times to be reduced and made more reliable, will worsen this situation and further reduce the likelihood of positive investment and service improvement.

2.11.7 Targeted bus network investment is required to respond to the needs of an ageing society and produce reductions of carbon emissions in South Norfolk and Broadland. This is critical in order to meet the UK carbon emission targets by 2050 and mitigate air quality issues at a more local level.

2.11.8 Making walking and cycling more appealing, particularly for short commuting trips of less than 5km within Norwich, requires the provision of street environments that encourage both walking and cycling, as safe and more attractive travel options.

2.11.9 Taking into account the current rates of population growth, promoting active travel as a way to keep the workforce physically active will help to increase productivity and reduce absenteeism and the burden on NHS services.

Emerging technology

2.11.10 In line with the work undertaken as part of the FMZ, planning for uncertainty requires a flexible and open approach.

2.11.11 As new technologies emerge, it is critical that new approaches to transport services are also considered so that Norwich can capitalise on the benefits. Investing in emerging technology now will enable a strong public sector-led approach that works towards the goals of economic prosperity, wellbeing, social equity and environmental sustainability.

2.12 Summary of the Strategic Case

Summary of the Key Issues	How this has formed our programme objectives	How our programme responds to these objectives	Identified benefits of the programme
- Major housing and employment growth is planned within the GNR - There are areas of deprivation within the city - There is a lack of public transport connectivity to some areas of the city, particularly key employment areas on the edge of the city - Bus patronage is growing but bus operators are simply investing to stay still - Cycling is growing in Norwich, providing the opportunity to build on this momentum. - There is an ageing population, particularly in the neighbouring local authorities, as well as a significant student population in Norwich. - Road transport is identified as a major source of carbon emissions and pollution. - Norwich displays higher-than-average walk and cycle to work trips and more households do not own a car in Norwich than South Norfolk and Broadland. - Worsening bus punctuality highlights the impact of congestion on journey time reliability. - Due to its location on the edge of the city centre, connectivity of the rail station is a key challenge. - Single-occupancy vehicle use on all key access routes into Greater Norwich is high (85%) - Norwich International Airport plays a significant role in the economy but needs improved surface transport access. - There is an opportunity to utilise existing transport operating systems to capitalise on future mobility opportunities	- Scheme objective 1: Improving people's productivity and social mobility by unlocking access to employment and education opportunities across the city region; - Scheme objective 2: Increasing the efficiency of travel and transport and improve the impact transport has on carbon emissions, air quality and public health; - Scheme objective 3: Using emerging technology to prepare the city region for a future of shared and clean mobility.	- Transforming the network - Transforming the city centre - Transforming the passenger experience	- Unlocks access to employment and education opportunities across the GNR – 31,000 people in the most deprived areas will have better access to employment and training. - Reduces greenhouse gas emissions by around 1,300 tonnes of carbon dioxide equivalent, or over 1% of road transport emissions in the Norwich Council area - Reduces air pollution by 15% of the current NO2 averages in some of the most polluted parts of the city - Reduces greenhouse gas emissions by Park & Ride buses by nearly 2/3rds. - Particularly benefits young people, older people, disabled people, BAME communities and people living in deprived areas - Supports emerging technologies for a future of shared and clean mobility - Is Value for Money. Using standard DfT appraisal methodology alone the Benefit to Cost Ratio is 1.65 for the low programme, 1.55 for the medium programme and 0.90 for the high programme. "High" Value for Money for all walking, cycling and public transport schemes