milton keynes council

Mobility Strategy for Milton Keynes 2018-2036 (LTP4)

Detailed Context and Evidence Base

March 2018

This document has been prepared by
Milton Keynes Council

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1.   Introduction

1.1   The Study

The purpose of this Evidence Base study is to review the performance of the current Local Transport Plan (LTP3) and gather evidence about the existing and future conditions of the transport network in Milton Keynes, to inform a summary of how Milton Keynes is progressing with the current LTP3 and establish a baseline of the issues and opportunities for transport.

This will help to identify potential transport interventions in the Mobility Strategy 2018-2036.

2.   Context

This section provides an overview of Milton Keynes and sets the context for the study in terms of the type of city it is and the type of city it aspires to be. It shows how the Mobility Strategy aligns with national, regional / sub-regional and local policies.

2.1   Connectivity

Milton Keynes is a dynamic city, founded with a concept of mobility at its core. Key to its success is its connections with the rest of the country, with fast and efficient strategic road and rail networks via the M1 and West Coast Main Line running North-South between London, Birmingham, the North of England and Scotland, and bringing inward investment and jobs. Combined with its unique layout, this has enabled easy, convenient and efficient movement of people and goods that has supported expansion and growth for over 50 years.

Fast strategic links are complemented by Milton Keynes' unique grid road system of 'horizontal' and 'vertical' roads that are designed to transport people and good quickly, and a network of Redways providing traffic-free routes for pedestrians and cyclists. Users enjoy reliable, quick journey times and relatively low levels of congestion, with the availability of parking at their destination.

Milton Keynes is the hub for the transformational growth corridor between Oxford and Cambridge, with much needed transport improvements such as the East West Rail and East West Expressway radically expanding travel to work capabilities and enabling ambitious economic and housing growth.

2.2   Growth

Milton Keynes is one of the fastest growing areas in the country. While growth rates in general have slowed across the country, Milton Keynes has overtaken Cambridge in terms of productivity per worker and also topped the jobs ranking with 1.4% employment growth (Table 1). This has been accompanied by Milton Keynes' population growth rate exceeding the average for England – Plan:MK forecasts show the population of the city will grow to over 300,000 by the early thirties and over 400,000 around 2050. Improvements in the local transport system will increase opportunities for work and leisure in this high growth environment.

Table 1 Milton Keynes' economic performance[1]

Criteria	Milton Keynes' Ranking
Business start-up rate	4th
Productivity and innovation	5th
Ratio of private vs. public jobs	5th
Average workplace wage	4th

2.3   Technology

Milton Keynes is at the forefront of technology and innovation. New technologies and service models are personalising the transport experience, empowering users to be informed, multi-modal travellers. Smart, shared and sustainable mobility is just one element of the wider vision which Milton Keynes wants to become realised.

Our population is becoming increasingly used to technology being a central part of everyday life; the connectivity and services that technology can deliver are already shaping and changing behaviours that are having significant impact on transport demand. Research shows 93% of the nation's adult population own / use a mobile phone with 71% of adults using a smartphone[2] and 17% of all retail sales in the UK are now online[3]. This connectivity provides an access to information, location data and social interaction that is changing expectations of transport and how it can be experienced.

New transport providers, such as ride hailing platforms, are the high profile manifestation of these types of change, as are trials of connected travel services and autonomous vehicles which are making significant changes to the way we think about the car. Milton Keynes is leading in this area, with autonomous pods being developed and tested on its streets by the UK Autodrive project. Full autonomy may still be some years away, but we may expect autonomous vehicles to become available to the public within the period covered by this strategy. The transition to electric power will also accelerate during the strategy period and Milton Keynes Council is already a leader in the field, with significant infrastructure already delivered and more investment secured through the government's Go Ultra Low programme.

A key challenge presented by technology is the degree to which it constantly changes. Figure 1 illustrates the scale of change and this plan is structured to allow Milton Keynes to respond more dynamically to that demand.

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[1] Source: http://www.centreforcities.org/wp-content/uploads/2017/01/Cities-Outlook-2017-Web.pdf
[2] https://www.ofcom.org.uk/about-ofcom/latest/media/facts
[3] https://www.ons.gov.uk/businessindustryandtrade/retailindustry/bulletins/retailsales/september2017

Figure 1 The technology landscape
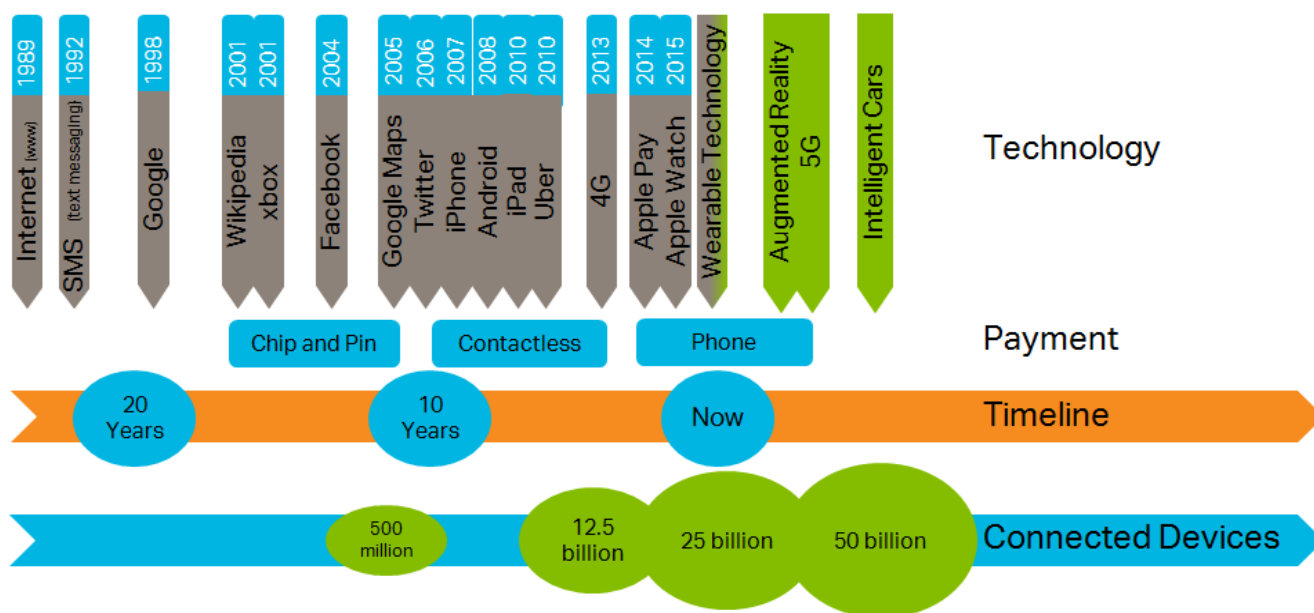
2.4   LTP3 – a strong legacy

LTP3 set out the vision that by 2031 Milton Keynes will have the most sustainable transport system in the country where there will be a real transport choice to encourage more sustainable travel behaviour.

The strategy covers all modes of transport and has a sustainability focus, including making the best use of existing assets, improved provision of sustainable transport to provide a real and attractive transport choice, and promotion of the transport choices available. Notable improvements have been:

- Increasing bus use by 25% between 2009-2014[4]; and

- Improving congestion hotspots through the implementation of targeted infrastructure improvements such as the A421 Kingston Roundabout and dualling of A421.

Since LTP3 was adopted in 2011 the world has moved on: the planning horizon has changed; growth targets have become more ambitious; how transport is and could be delivered has changed as funding arrangements have altered, technology is playing a greater role in transport; and how transport users behave has also changed.

The Milton Keynes Mobility Strategy 2018 – 2036 seeks to build upon the successes of LTP3 and develop a range of initiatives that will help to deliver long term vision and objectives for the future prosperity of the Borough.

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[4] However since 2014 but patronage has declined.

Figure 2 LTP3, MK Futures 2050 and Draft Plan:MK
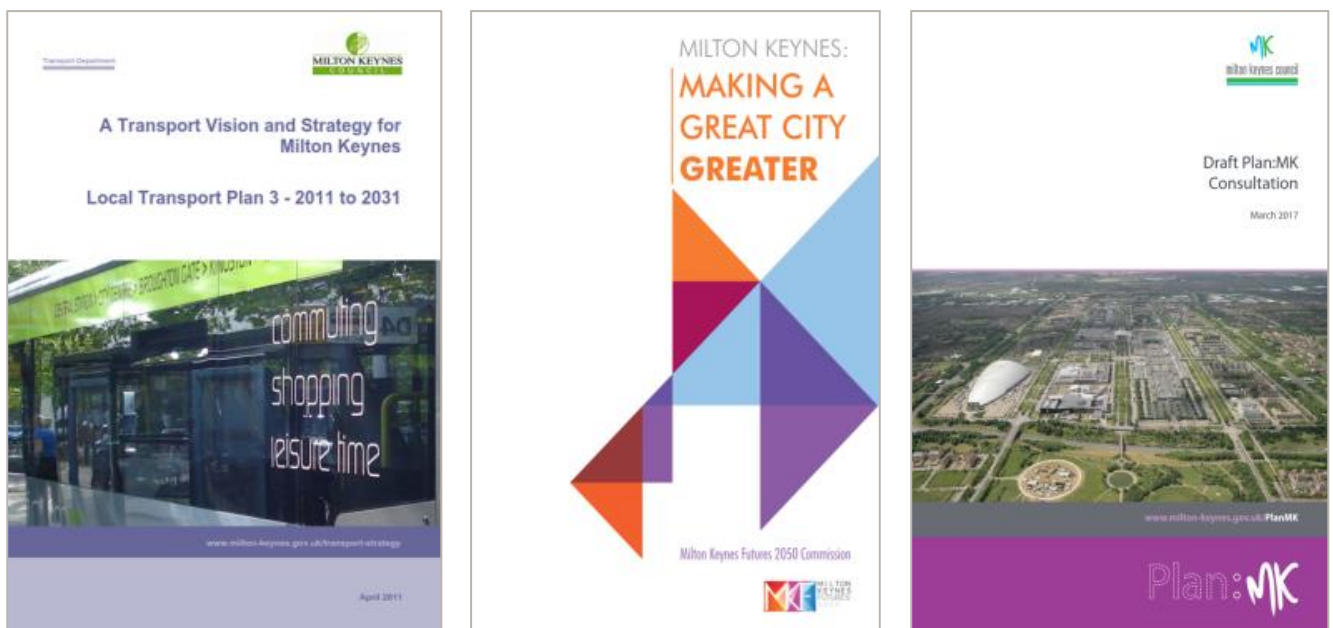
2.5   Strategic and Policy Context

There are a number of relevant local and national policies that have been considered in the context of developing the Mobility Strategy. Of particular importance to the development of a transformative strategy for future mobility for the 2018 – 2036 period for Milton Keynes is the long term aspiration of the MK Futures 2050 Vision and growth ambitions in the current draft of Plan:MK. The Mobility Strategy also accounts for and moves forward the LTP3 and associated sub-strategies, carrying forward objectives from these documents, which are outlined in Section 4.

2.5.1   National Policy

The National Planning Policy Framework (NPPF)

The National Planning Policy Framework defines the UK government's planning policies and how these should be applied. It is the starting point for guidance to local planning authorities in considering future plans. In order to assess all of its relevant Local Plan policies, Milton Keynes Council has produced the Local Plan "2005 and NPPF Conformity Assessment" which outlines where policies do and do not conform to the NPPF Framework.

At the heart of the NPPF is a presumption in favour of sustainable development which should run through all plan making. In the context of planning for transport this means actively managing patterns of growth to make the fullest possible use of public transport, walking and cycling, and focus significant development in locations which are or can be made sustainable. The transport system needs to be balanced in favour of sustainable transport modes, giving people a real choice about how they travel.

National Infrastructure Delivery Plan

The National Infrastructure Delivery Plan replaces the previous National Infrastructure Plan (NIP2014) and sets out a long-term plan for investment in infrastructure in the UK. It outlines how the UK will prioritise, finance and deliver transportation, science and other projects from the £300 billion pipeline, covering the years 2016-2021.

The National Infrastructure Delivery Plan prioritises Smart Motorways, Crossrail, HS2 and Network Rail enhancements including East West Rail. It emphasises the importance of "unlocking" growth and jobs in the Cambridge – Milton Keynes – Oxford Corridor as well as supporting innovative transport systems such as intelligent mobility.

Transport Investment Strategy – Moving Britain Ahead (2017)

The Transport Investment Strategy sets out the Department for Transport's priorities and approach for future transport investment decisions and explains how transport investment can deliver a stronger, fairer Britain. It describes what the government is aiming to achieve through:

- Investment in transport infrastructure;

- Priorities and propositions that will guide future investment decisions;

- Institutional frameworks within which those decisions will be taken; and

- Actions being taken at achieving the ambitions.

The policy document includes a commitment to consult on a new 'major road network' which will complement the Strategic Road Network which is managed by Highways England. It also outlines plans for a new 'rebalancing' measure, which will judge how investment programmes contribute to a more balanced economy.

National Infrastructure Commission: Cambridge – Milton Keynes – Oxford Corridor

The National Infrastructure Commission (NIC) is an independent body set up by the government with the purpose of providing impartial advice on long term challenges.

The NIC was tasked to consider ways in which to maximise the potential of the Cambridge – Milton Keynes – Oxford growth corridor by developing a Joint Plan for providing "sufficient housing, jobs and infrastructure across the corridor and that they also develop credible coherent and co-owned city centre transport strategies".

The commission recommended that plans are made to finalise and deliver the Oxford – Cambridge Expressway as well as the East West Rail project. This is seen as a once in a generation opportunity.

The Commission also places a particular emphasis on improving the "first last mile" element of journeys. When the East West Railway is in service while the main part of a journey for example, Milton Keynes Central to London, Oxford or Bedford or Cambridge, may be fast and efficient, it is often the start and end of that journey, from a traveller's house to the station that can be a problem in terms of a lack of travel options, poor frequency of local passenger transport services, or unreliable journey times giving the perception that the car is the only travel option. Milton Keynes has played its full part in helping devise a fast efficient first last mile approach and this Mobility Strategy includes the strategy devised and submitted to the NIC for a wide variety of travel options including technological solutions such as rapid mass transit and "on-demand" services and autonomous vehicles as well as bike and e-car hire points to ensure travellers can complete their journeys seamlessly.

2.5.2   Regional / sub-regional Policy

South East Midlands Local Enterprise Partnership Transport Strategy

The South East Midlands Local Enterprise Partnership (SEM-LEP) Transport Strategy provides a review of existing evidence to determine the impacts of transport investment and planned developments across the South East Midlands.

Within Section 3 of the report, there is a review of the findings of previous studies; Milton Keynes / South Midlands Transport Strategy (July 2009) highlights the growing pressure on the M1 from longer-distance traffic.

Highways England

Highways England takes responsibility for the Strategic Road Network (SRN) through its Road Investment Strategy 2015/16 – 2019/20 (RIS). Highways England's remit is to ensure strategic roads are more dependable, durable and safe. Its guiding principles to deliver these aims are to ensure the SRN is:

- Free flowing – where routine delays are infrequent and journeys are reliable;

- Safe and serviceable – where no-one should be harmed when travelling or working;

- Accessible and integrated – so people are free to choose their mode of transport and can move safely across and alongside our roads;

Furthermore, Highways England's role is to support economic growth with a modern and reliable road network that reduces delays, creates jobs, helps business and opens up new areas for development, and to ensure its activities result in a long term and sustainable benefit to the environment.

The RIS sets the strategic vision for Highways England and shows how it will achieve that vision through this five year plan which is accompanied by a confirmed funding envelope.

It includes investing in upgrading M1 Junctions 13-19 to Smart Motorway standards. Milton Keynes can influence the decision making process through engagement and lobbying to ensure RIS2 (2019/20 – 2024/25) fully reflects the asks for Milton Keynes and this document helps it do that.

Highways England has also been tasked by the Department for Transport to carry out a route options study in readiness for a new Expressway to carry traffic between Milton Keynes and Cambridge.

Network Rail

Government sets out its plans for rail improvements in a strategy published every 5 years (High Level Output Specification (HLOS)). The current strategy runs from April 2014 – March 2019 and aims to ensure the nation's rail system is fit for purpose against a forecast of further strong average growth of 16% in passenger demand and 23% in freight during that time. A nationwide fund of £16.8bn future investment in the long term already includes £5.2bn of enhancements for the current period (Control Period 5) to reduce crowding, cut journey times, increase efficiency and improve the passenger experience. This includes a commitment to deliver East West Rail between Oxford and Bedford.

The plan for 2019-24 was published in July 2017 setting out how the Government wishes the rail industry to continue to improve the accessibility of the rail network so that it is open to all passengers.

Milton Keynes can influence the decision making process through engagement and lobbying to ensure the high level strategy (HLOS) for this period fully reflects the needs of Milton Keynes.   This can be further enhanced by engaging with Network Rail, Franchise Operators and local Community Rail Partnerships.

2.5.3   Local Policy

Milton Keynes Council Plan (2016 – 2020)

The Corporate Plan provides a framework for the way in which the Council works with its partners. It is a driving factor in delivering the Core Strategy as well as drawing upon existing strategies and research to ultimately set out a short to medium term (2-4 year) plan on delivering substantial improvements.

The Plan sets out three key objectives:

- A Place of Opportunity;
- An affordable Place; and
- A Healthy Place.

A set of sixteen priority themes are identified to deliver these objectives. For transport, the priority themes are:

- 11: We recognise the importance of our road network to the quality of life for citizens and the efficiency and productivity of our businesses. In these times of austerity, we will seek to achieve maximum value from our highways investment.
- 12: Milton Keynes is built on great connectivity and mobility. We want to ensure a transport system fit for the challenges of the future so that our economy can continue to grow and people can move about with ease.

MK Futures 2050

The Milton Keynes Futures Commission Report *Making a Great City Greater*[5] produced a long-term vision for the Borough to 2050 and recommended population growth in Milton Keynes and the surrounding area to at least 400,000 by 2050.

The vision is based upon two central drivers:

- Access to the best education and training opportunities; and
- Milton Keynes must offer sustainable mobility for all.

The vision is underpinned by 'Six Big Projects', which, collectively, the Commission believe are essential in delivering the 2050 vision. It is essential that this mobility strategy provides a very clear foundation to deliver the transport system needed for Milton Keynes to achieve its ambitious long term goals for growth.

- Project One reflects Milton Keynes' strategic position in the East-West technology corridor envisaged by HM Treasury and the National Infrastructure Commission

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[5] http://www.mkfutures2050.com/images/pdfs/reports/MK50-Futures-Report-1-FINAL-SP.PDF

- Project 4 which emphasises the importance of mobility and flexibility in travel mode choices as the enabler for living, working and learning.

A series of research papers to underpin the final MK Futures 2050 report provide a further and more detailed look in to long-term opportunities and threats facing Milton Keynes can be found at mkfutures2050. The two papers that are most relevant to the Mobility Strategy are:

- Transport and Structure of the City – highlights future trends in transportation including the move to de-carbonisation of transport through the use of electric cars as well as the integration of smart technologies e.g. managed motorways, the importance of behavioural strategies, focusing on encouraging multi-modal journeys, including cycling and walking through advances in intelligent and sustainable transport systems.

- Intelligent On-Demand Mobility – considers the challenges facing Milton Keynes related to provision of bus services and improved passenger satisfaction, facilitating walking and cycling, increased use of smarter choices, highway improvements, and parking.

Core Strategy (2013)

The Core Strategy for Milton Keynes was adopted in 2013 and is a Local Plan for Milton Keynes up to 2026. It provides the strategy and objectives for development of the Borough and outlines clear policies which enable and support this. The Core Strategy will be superseded by Plan:MK, which is in development in 2017.

Plan:MK (Draft)

The draft version of Plan:MK sets out the Borough of Milton Keynes' proposed approach and draft policies for growth in the Borough through the period up to 2031. The plan considers and provides the strategy for strategic development and spatial planning, with appropriate referencing and policies relating to the delivery of necessary transport infrastructure. Once adopted, Plan:MK will replace most of the existing policies in the Core Strategy (2013) and Milton Keynes Local Plan (2005). It is due to be adopted in late 2018.

Milton Keynes Economic Development Strategy 2017 – 2027

The Economic Development Strategy seeks to build on the current economic success of Milton Keynes, to capitalise on potential future opportunities and to address the challenges the city faces. The aim of the strategy is to secure strong and inclusive growth which benefits businesses and residents, and to sustain the reputation of Milton Keynes as a prosperous, innovative and culturally vibrant place. The strategy is based on four key priorities, of which the second bears most relevance to this Mobility Strategy:

- Connections – working in local, regional, national and international partnerships to advocate for the city and secure physical and digital infrastructure and other investment to support inclusive growth.

MK: Smart

MK: Smart is an initiative led by the Open University in partnership with MKC and BT and partly funded by the Higher Education Funding Council for England. The initiative manages the development of the 'MK Data Hub', which enables and manages data relating to energy and water consumption, transport data, social media, specialised apps and other data sources.   Additionally MK: Smart is leading in non-technical solutions including education and business / community engagement.

MK Joint Health and Wellbeing Strategy:

Our Joint Health and Wellbeing strategy for Milton Keynes places our community at the heart of our commissioning intentions to improve health and wellbeing and to reduce health inequalities for our population. We care about making a difference in peoples' lives, to help the residents of Milton Keynes to live healthier lives for longer.

The Joint Strategic Needs Assessment (JSNA)[6] is a robust tool that identifies the current and future healthcare needs of Milton Keynes population. Developed by key partners, it provides the evidence to help us inform the commissioning intentions and planning around how organisations can work together to improve the health and wellbeing of the population of Milton Keynes.

Our key health indicators developed from the JSNA to include the views of local stakeholders are:

- Starting Well: Giving every child the best chance in life
- Living Well: Working with communities to live longer and healthier lives
- Ageing Well: Improving outcomes for older people
- The Place: Making Milton Keynes a healthy city

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[6] https://www.milton-keynes.gov.uk/social-care-and-health/health-and-wellbeing-board/health-and-wellbeing-strategies-and-the-jsna/joint-health-and-wellbeing-strategies

2.5.4　　　Development of the Mobility Strategy

The current Transport Vision and Strategy for Milton Keynes, (Local Transport Plan 3) was adopted by the council in 2011 and submitted to Department of Transport. A review of the strategy was carried out in 2012. Government guidance stipulates that local authorities periodically reviews and refreshes it's local transport plan as it sees fit.

With the development of the new local development plan – Plan:MK, and the outcome of Milton Keynes Futures 2050 Commission – the potential offered by new innovations in transport technology to shape the future strategic transport choices, the concept of smart, sustainable shared mobility and the integration of new technologies in transport, it is now appropriate to review and refresh the transport strategy.

2.5.5　　　Challenges for Milton Keynes:

- MK potential to grow from 268,000 to c 400,000 people by 2050,

- Additional 31,000 homes beyond the forecasts in current plans.

- Growth is an expectation for Milton Keynes.

- Mobility to the city a high priority for businesses and local residents.

- Milton Keynes' ambition is to lead the way in transport innovation

- Reliable journey times for all modes of transport

For leading edge growth like this our mobility system needs to:-

1. Support the mobility needs of all residents, visitors and businesses

2. Support the safe and efficient movement of people and goods, and supporting reliable journey times.

3. Engage the commitment of existing road users, and

4. Introduce mobility as a service concept to provide new travel opportunities based on smart, shared sustainable mobility

Where are we now?

- Core Strategy – housing and employment growth up to 2026

- MK Futures 2050 Report 'Making a Great City Greater' endorsed by Council with "Smart, Shared, Sustainable Mobility" as one of six Big Projects.

- New Local Plan (Plan:MK) being developed now for Milton Keynes which will set out a development strategy for Milton Keynes.

- MK multi Modal Model has been updated to inform future infrastructure requirements due to housing and employment growth

- Updating the Local Infrastructure Plan

Current Milton Keynes Context:

- Currently enjoys reliable journey times, however there are significant congestion hotspots at key junctions

- Continues to attract in-ward investment by national and international companies due to the attractive connectivity to London and Birmingham

- Has the lowest bus satisfaction level of authorities who are measured

- Mode share dominated by single occupancy car use, with low levels of cycling, walking and public transport

What are the risks to this future growth?

- Predicted growth in population, employment and housing and inward commuting will place a huge strain at strategic junctions and road drivers and public transport users will experience severe congestion

- Travel demand from aging population will put strains on transport and support services leading to an adverse effect on the efficiency of mobility of residents and visitors on the current peak hour journey times

- Impact on the economic, cultural and social growth of the borough

- Harm residents and visitor through increased pollution

- Without proper mobility and infrastructure investment the current transport system will not support the ambitions of the borough and its people

To accommodate this growth in travel demand, the city needs to:-

1. Stabilise average journey times and ensure they remain competitive while promoting the development of smart shared sustainable mobility for all; to ensure all travellers and highway users continue to enjoy the levels of mobility required to meet their daily needs through congestion reduction measures.

2. Manage parking capacity to support a balance of modes accessing the city centre.

3. Promote the development (and invest where necessary) of smart, shared sustainable, mobility as described in the MK Futures 2050 report such as improved Public Transport, Cycling & Walking as well as promoting our wider Wellbeing and Health objectives.

4. Enable Mobility as Service to flourish within the city , for example mobile journey planning, integrated ticketing and journey arrangements, including shared mobility and approaches such as Demand Responsive Transport to meet growing expectations among younger generations for technology based journey planning rather than vehicle ownership.

5. Further develop and promote future technologies such as autonomous and connected vehicles, advanced mass transit options and a connected highway.

6. Consider how the city's future development can enable new smart, shared sustainable mobility services to succeed.

How do we get there?

- Work is done now to maintain the level of journey time and network accessibility through investment in new technology, sustainable transport initiatives, behavioural change and public transport

- Investment in future technologies and the time is right to bring forward the new mobility services.

- Capacity is built within the future transport system to absorb the growing demand for non-car travel while protecting car travel means for existing and future car users

In this context it is now appropriate to refresh the transport strategy for Milton Keynes and to reflect how new innovations allow us to improve accessibility and mobility for all residents and visitors to MK.

2.5.6 Mobility Strategy Objectives

Taking into consideration the context, wider evidence base of forecasts in travel to 2036 and beyond, it is now appropriate to review and refresh the LTP3. Figure 3 illustrates the relationship between LTP3 objectives and the new Mobility Strategy objectives. It shows that the LTP3 objectives remain valid going forward in the Mobility Strategy, but defining them in a different way will help to deliver a more integrated approach to transport planning and delivery in Milton Keynes.

Figure 3 Relationship between LTP3 Objectives and Mobility Strategy Objectives
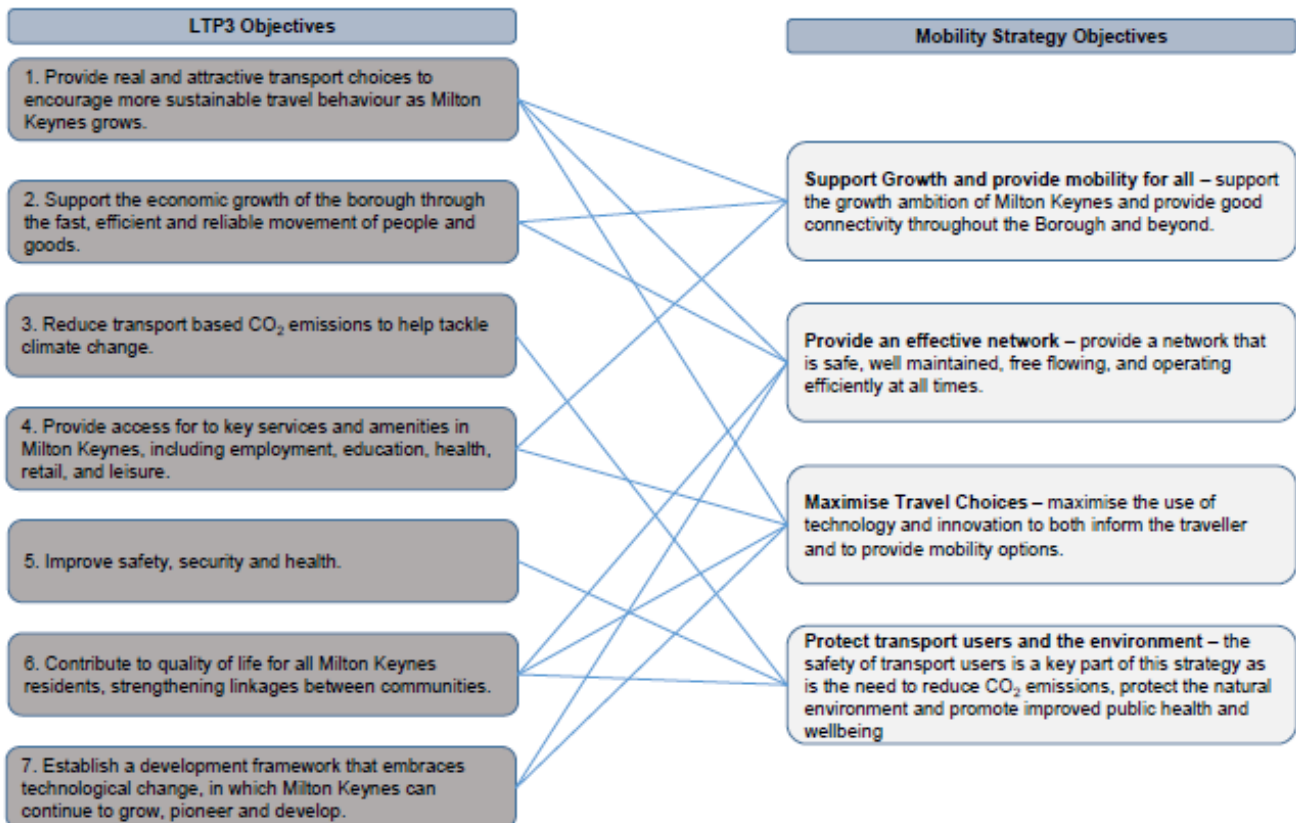
Delivery of each objective rests on achieving a number of outcomes that Milton Keynes will need for its transport system to realise the overall ambition of the strategy, and these outcomes form the focus of the future works programme.

1. **Support Growth and provide mobility for all** – support the growth ambition of Milton Keynes and provide good connectivity throughout the Borough and beyond.
2. **Provide an effective network** – provide a network that is safe, well maintained, free flowing, and operating efficiently at all times.
3. **Maximise Travel Choices** – maximise the use of technology and innovation to both inform the traveller and to provide mobility options.
4. **Protect transport users and the environment** – the safety of all transport users is a key part of this strategy as is the need to reduce transport pollution and CO_2 emissions, protect the natural environment and promote improved public health and wellbeing.

2.5.7 Strategy Outcomes

Support Growth and provide mobility for all:

a. **Reliable journey times** –journey times are good when compared with other similar authorities. For Milton Keynes' to continue its record of high growth it is essential that the comparatively good journey times are maintained and the transport network improved to underpin further growth.
b. **A transport system to support growth** – the layout, extent and overall functionality of the transport network is key to supporting increases in population and expansion of business. Work collaboratively with agencies such as Highways England and Network Rail to shape and influence strategic and local transport connections.
c. **Modern regulatory system** – there are also regulatory barriers that prevent the full integration of travel for which work is needed to encourage new, more open regulatory arrangements between types of transport.

Provide an effective network:

a. **An integrated urban traffic management system** (UTMC) that adapts to changing conditions – technology exists and is improving that enables better management of road junctions for all modes of travel. Where rapid mass transit is used it is essential that this is allowed swift through journeys where conditions allow. This technology can also allow prioritisation of traffic during peak travel periods.
b. **A proactive approach to asset management** – the quality and reliability of existing and new transport infrastructure must be reliable and available to use which supports reliable journey times.
c. **A network that is available, well maintained and safe for all users** – network availability is a part of the Traffic Management Duty on local transport authorities. It is essential that both maintenance works and utility excavations (Streetworks) are kept to a minimum to reduce congestion and maintain short journey times. A well maintained network is one which helps reduce road accidents and casualties.

Maximise Travel Choices:

a. **Integrated journey planning available on a variety of technology platforms** – essential as today's travellers increasingly prefer good connectivity over the car both for journey planning and to stay connected on the move.

b. **Making the most of new innovation in autonomous vehicle technology**. Autonomous vehicles could increase utilisation and significantly reduce the cost of travel while increasing frequency and availability of services.

c. **Exploiting Mobility as a Service (MaaS)** – currently commuting by private car results in significant wasted resource being parked instead of used. New technology is now bringing new transport service models which support better use of on demand transport where vehicles are used "borrowed/hired" only as part of a journey enabling transport to be provided as a service reducing the need for car ownership. This is especially true for multiple car ownership allowing families to manage their budgets better.

d. **Seamless integration between modes** – with single payment ticketing options travellers must be confident that their whole journey can be completed and that interchanges are as seamless as possible.

Protect transport users and the environment:

a. **Supporting and encouraging use of active modes which deliver health benefits** – active travel supports the council's Health and wellbeing Strategy in helping reduce a number of health conditions and is complementary to the aim to increase walking and cycling by improving urban design layouts to bring workplaces, leisure and retail services closer to residential areas where possible.

b. **Supporting and encouraging use of modes which minimise CO2 and other pollutant emissions** – as well as travelling efficiently improved engineering technology plays a part here with Electric Vehicles and other low or zero emission freight and public transportation.

c. **Ensuring the safety of all travellers has been a key part of transport planning** – this is an essential outcome for all parts of the transport process. As well as the obvious need for safety there are proven benefits to the wider health, wellbeing and economic aspects of society in general.

3.   Progress on the current LTP3

The current Local Transport Plan for Milton Keynes (LTP3) was adopted in April 2011. It includes a Vision and Strategy for Milton Keynes for a 20-year period, 2011 – 2031. The strategy covers all modes and has a sustainability focus, including making the best use of existing assets, improved provision of sustainable transport to provide a real and attractive transport choice, and promotion of the transport choices available. There is also a strong emphasis on technology and innovation, fitting with Milton Keynes' role as a leader in transport innovation.

Milton Keynes Council has successfully implemented many initiatives from the LTP3 and has delivered positive outcomes as a result. Many of its interventions remain relevant and will be followed through to this Mobility Strategy.

This chapter details the key achievements from LTP3 interventions and reports on progress against indicators from the LTP3 monitoring plan. It is split into two sections; the first provides a qualitative overview of performance, and the second provides quantitative evidence on past performance

3.1   Overview

Public Transport

Significant progress has been made on many of the planned improvements to public transport, particularly to the bus network. Infrastructure has been improved with Bletchley's Bus Station upgraded, Milton Keynes Rail Station forecourt improved and Wolverton Rail Station re-built. Over 30 bus stops now have improved accessibility, with raised kerbs and shelters. The western section of East West Rail, connecting Oxford, Bedford and Milton Keynes via Bletchley is underway and HS2 was approved in 2017. The outcome of this progress is shown in below:

Figure 4 Bus operations – key performance measures[7]
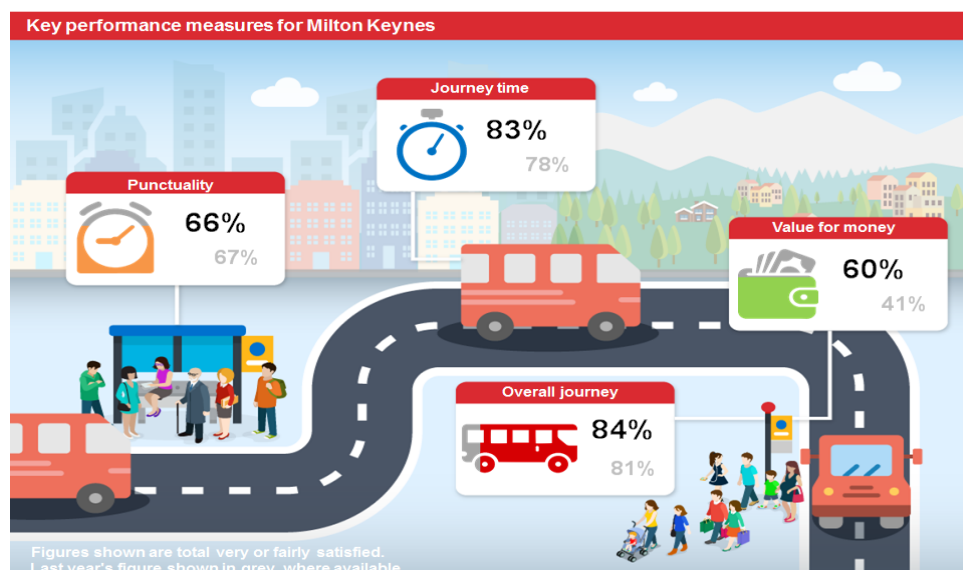
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[7] Source: http://d3cez36w5wymxj.cloudfront.net/wp-content/uploads/2017/03/04160441/Bus-Passenger-Survey-Autumn-2016.pdf

The Better Bus Area Fund has seen significant improvements to buses, including increased promotion of services, integrated ticketing, Real Time Passenger Information (RTPI) boards (*Figure 5*), improved information and wayfinding and bus based personalised travel planning. RTPI can now be found on most bus routes in Milton Keynes and route information available at most stops.

Figure 5 RTPI at Milton Keynes Central

Milton Keynes continues to encourage partnership working, by working with bus operators such as Arriva in the Bus Punctuality Partnership and other operators to improve branding on services. Furthermore, the council is leading the way in innovation by introducing electric buses as part of the Low Emission Bus Scheme.

Improvements are ongoing to the taxi services, with free training now available to all licensed taxi drivers and ensuring all drivers are licensed to carry disabled passengers and qualified to load mobility aids. A safety monitoring programme continues to check taxi vehicles registered in Milton Keynes.

Cycling, Walking and Smarter Choices

A Milton Keynes Smarter Choices brand has been developed and a comprehensive joined up approach to smarter choices (including travel planning) is ongoing. This was given a boost in 2016, when the council was awarded £420,000 revenue funding from the Department for Transport's Sustainable Travel Transition Year (STTY) fund to encourage cycling and walking through revenue based, behaviour change measures. Known as the Get Smarter Travel in MK, the project delivered five key elements:

Figure 6 Shower & Storage facility

- 'Get Smarter Travel' brand focused on marketing and promotion activities 'Get Cycling' provided a range of cycling related activities to encourage participation. A 10 month 'Beat the Street' physical activity challenge was delivered by Intelligent Health targeting 100,000 residents and 42 primary and junior schools in Milton Keynes

- A range of 'Travel Planning' activities took place including a trial scheme to provide personalised travel planning to 5,000 homes.

- Created specifically for the STTY fund, the new 'Get to Work' scheme aimed to increase access to training, education and jobs for the unemployed.

Additionally, infrastructure projects are underway to support cycling and walking, including:

Figure 7 Redway cycle path

- Reopened the newly named 'Get Changed' unit to provide secure cycle parking, shower and changing facilities to cycle commuters in the city centre. Figure

- Redway Super Routes - 13 cross-city Redway routes linking key destinations including sustainable transport hubs and residential, commercial and employment areas have been identified.

- Furthermore, the UK's first privately funded bike hire scheme, sponsored by Santander and operated by Nextbike was launched in July 2016.
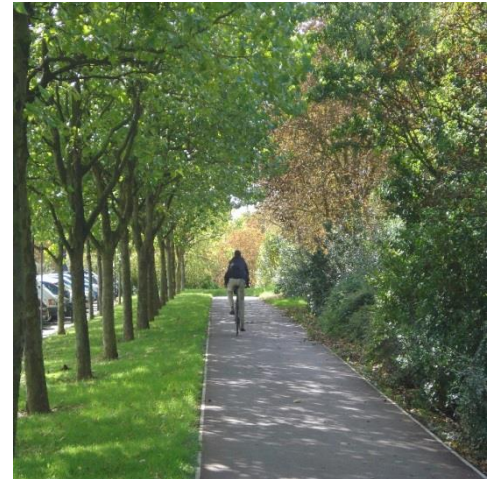
Figure 8 Redway Super Route network
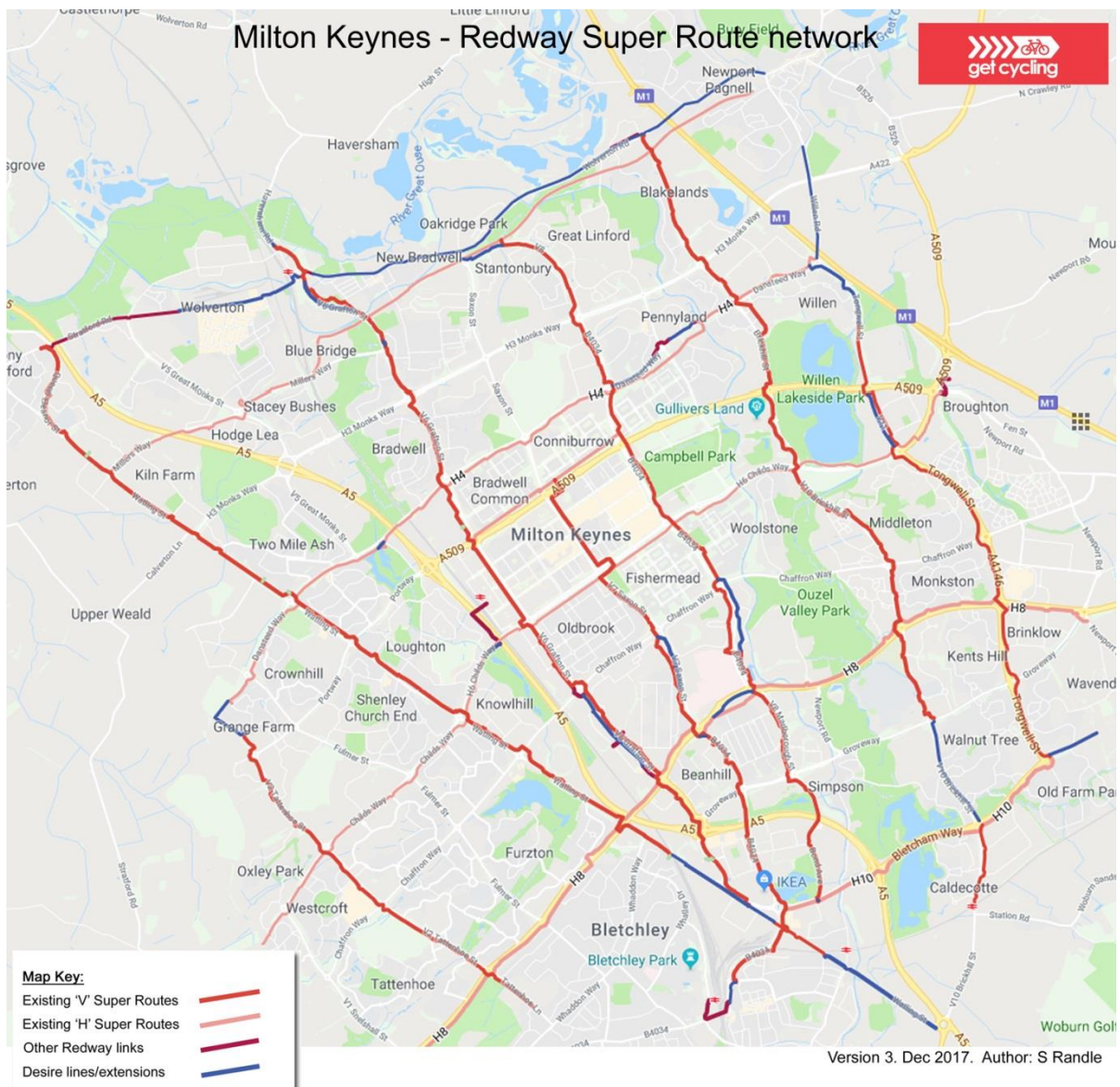
Highways and Traffic Management

Milton Keynes has successfully achieved a number of road capacity upgrades, including the Kingston roundabout capacity improvements, A5130 widening, and A421 dualling. The council was awarded funding from the Local Pinch Point Fund, which was secured on a competitive basis, to deliver some of these improvements on budget and to schedule.

The council continues to promote partnership working, which is supporting the case for further improvements to capacity on these roads.

Phase one of Bletchley Fixing the Links, a project to improve the environment and links between the station and Bletchley Town Centre, has been delivered on time and on budget. Phase two is now commencing and will be coordinated with a scheme to provide a link from the new development to the station and onwards to the town centre.

The Council continually monitors air quality at various sites, including Olney, where an Air Quality Management Area (AQMA) has been declared. For two years the annual mean concentration of NO_2 has been below the threshold that triggers an AQMA and if this trend continues the AQMA classification can be revoked. Milton Keynes Council continues to monitor air quality and makes available annual air quality monitoring reports.

Electric Vehicle Technology

Milton Keynes is leading the way with promoting and supporting the uptake of alternative fuel vehicles.

The expansion of electric vehicle charging network is ongoing, with currently 170 standard and 56 rapid charge points installed (Figure 8). Additionally, the Go Ultra Low City Scheme to promote low emission transport is being implemented 2016 – 2020, including the opening of the Electric Vehicle Experience Centre in Central Milton Keynes. Funding of £9m has been received towards the scheme from the Office for Low Emission Vehicles (OLEV).

Figure 9 Vehicle charging infrastructure

In 2012 Milton Keynes Council set up a partnership to replace seven diesel buses with electric buses on one of the main bus routes in the town. These vehicles are charged wirelessly using coils embedded into the road surface at certain locations. This five year trail has been set up to demonstrate the impact that electric vehicles can have, and to show that such vehicles are economically viable. Milton Keynes has also introduced free Green Parking Permits for ULEVs using standard (purple) bays.

Infrastructure Management

Milton Keynes invested £50m into the road network which has significantly reduced the number of road defects, through its Asset Management Plan. Resurfacing has taken place on many sections of road (*Figure 10*) and

any potholes that meet its criteria have been repaired. As a result the number of claims received for damage caused to residents' vehicles by potholes has fallen again for the fourth year in a row. In 2016, Milton Keynes received just 46 claims for pothole damage compared to 194 in 2012.

Figure 10 Asset Management in MK

3.2   Progress on outcomes

Overall Milton Keynes is showing positive progress across many of the transport monitoring indicators it set out in the LTP3. Headline outcomes of LTP3 progress are summarised in. Table 2

Table 2 Summary of LTP3 progress

Outcome	Comment
Road Safety	39% reduction in road casualties
Bus use	25% increase in the 5 years to 2014[8]
Bus Satisfaction	84% (2016), and increase from 73% (2012)
Public Transport travel time (average minimum)	15% decrease
Air Quality	Olney Air Quality Management Area emissions remain below the LTP3 target of 40 µg/m^3
Congestion	13% increase in journey time per mile in the morning peak

Source: LTP3 Monitoring Report 2014

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[8] However, since 2014 performance has declined.

This shows that while Milton Keynes has enjoyed continued success there is no room for complacency and MKC has more to do, in transport terms, if it is going to meet its potential and deliver its growth ambition.

3.3 Detailed review

The current LTP3 was submitted to the DfT in April 2011. It included a vision and strategy for Milton Keynes for a 20-year period, 2011 – 2031. The strategy covered all transport modes and has a sustainability focus, including making the best use of existing assets, improved provision of sustainable transport to provide a real and attractive transport choice, and promotion of the transport choices available. There was also a strong emphasis on technology and innovation, fitting with Milton Keynes' role as a leader in transport innovation.

Overall Milton Keynes Council (MKC) has successfully implemented many initiatives within the strategy strands of LTP3, many of which remain relevant and will be followed through to the Mobility Strategy.

Below is a summary of the most recent achievements under each strand, followed by a specific update on each of the LTP3 interventions since the strategy was released in 2011. Most short-medium term interventions have been completed or are underway, with the longer term interventions either in planning stage or yet to commence. The new Mobility Strategy will be a chance to revisit some of the medium-longer term interventions and determine whether they are worth carrying forward.

The table presented under each strategy strand shows the progress of the full implementation plan from LTP3, categorising interventions as **complete**, **in progress**, or **not commenced**.

A review of LTP3 performance was undertaken in both 2012 and 2014. The section below builds on these LTP monitoring reports, with information gathered from discussions with MKC, MKC monitoring reports, and other publically available information.

3.3.1 Public Transport

Rail, bus, interchange, community transport, taxi and private hire future modes of transport (and public transport safety and security)

Significant progress has been made on many of the planned improvements to public transport, particularly to the bus network. Infrastructure has been improved with Bletchley's Bus Station upgraded, Milton Keynes Central station forecourt improved and Wolverton Rail Station re-built.

Over 30 bus stops now have improved accessibility, with raised kerbs and shelters. The western section of East West Rail, connecting Oxford, Bedford and Milton Keynes via Bletchley is underway and HS2 was approved in 2017.

The Better Bus Area Fund has seen significant improvements to buses, including increased promotion of services, integrated ticketing, real time passenger information (RTPI) boards, improved information and wayfinding and bus based personalised travel planning. RTPI can now be found on most bus routes in Milton Keynes and route information available at most stops.

MKC continues to encourage partnership working, by working with bus operators such as Arriva in the Bus Punctuality Partnership as well as other operators. Furthermore, MKC is

leading the way in innovation by introducing electric buses as part of the Low Emission Bus Scheme.

Improvements are ongoing to the taxi services, with free training now available to all licensed taxi drivers and ensuring all drivers are licensed to carry disabled passengers and qualified to load mobility aids. A safety monitoring programme continues to check taxis registered in Milton Keynes.

A full summary against the LTP3 interventions is shown in Table 3.

Table 3 Update on LTP3 interventions – Public Transport

Intervention[9]	Code	Status
Short Term		
'MK Star' Bus Network	Bo1	Commenced.
Semi-flexible, 'dial-a-ride' style bus services covering city estates and off-peak rural bus services	Bo2 & Bo8	Being considered as part of the 'Small Vehicle Transport System' (SVTS) for Milton Keynes (2014 update).
Bus 'hopper' service for CMK	Bo3	No hopper service exists, a bus shuttle service was introduced between Open University and Milton Keynes Rail Station, which now operates as a normal service. Milton Keynes has introduced Milton Keynes Moove, a single ticket fare for daily, one-week or four-week travel to use across all Milton Keynes buses.
Improved interchange facilities	Bo4	Complete. Bletchley Bus Station upgraded and Milton Keynes Rail Station forecourt improved for all mode access at Station Square.
Promotion of long-distance bus and coach services	Bo10	Ongoing, commenced as part of the Better Bus Area Fund Project ("Get on Board" campaign).
Increased promotion of bus services	Bo11	Ongoing, commenced as part of the Better Bus Area Fund Project ("Get on Board" campaign).
Improved information provision, including improved RTPI provision at bus stops and interchanges	Bo12	RTPI roll out is ongoing and bus timetable and maps information updated and available at Civic Office twice a year. Information provision was upgraded at major stops. MKube Travel Centre was opened in May 2011 at Intu MK, which is an Arriva / MK Council initiative to improve availability of bus information.
Journey planning website and 'smart phone' applications for dynamic journey planning	Bo13	Not commenced.
Accessibility improvements to buses and bus infrastructure, particularly in rural areas and	Bo15	Improvements made at Bletchley Bus Station and over 30 stops upgraded with raised kerbs and shelters.

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[9] Note: Names and codes are taken from main LTP3 document rather than the Intervention Plan table (where some names and codes are missing).

Intervention[9]	Code	Status
for people with physical and sensory impairments		
Driver training	Bo16	Not commenced.
Integrated transport and land use planning	Bo17	Ongoing.
Increased partnership working	Bo19	Ongoing, working collaboratively with other local authorities, LEPs and partners, e.g. A428/A421 Alliance, East West Rail and Transport Systems Catapult. Milton Keynes Council have signed a revised Bus Punctuality Improvement Partnership agreement with Arriva with better monitoring of services.
Bus Strategy Refresh	Bo20	Not commenced. Current Bus Strategy is from 2008.
Improved marketing of rail-bus through ticketing	Ro1	Ongoing. PlusBus still running.
Promotion and development of the Marston Vale Community Rail Partnership	Ro2	Ongoing.
Improved station facilities and interchange at Milton Keynes Central, Wolverton and Bletchley rail stations (linked to Bo4)	Ro3	Complete. See Bo4 above. Wolverton Station was re-built in 2011/12, with significantly improved facilities as well as a major renovation of Station Square in 2011/12, improving access for all modes to Milton Keynes Central station.
Continued provision of community transport	CTo1	Ongoing.
Improved partnership working with taxi and private hire operators and drivers, key service providers and venue managers, and the police	Tpo1	Ongoing.
Review the number and location of ranking spaces at key destinations, and signage to ranks, and implement recommendations	Tpo2	Not commenced.
Medium Term		
Park & Ride	Bo5	Partly commenced, 1 site implemented, Milton Keynes Coachway, close to M1 J14. Opened in Dec 2010.
Bus priority	Bo6	Commenced, the A5130 Busways was completed in April 2010. Includes bus lanes to and from Milton Keynes Coachway, Brooklands City Street and Northfield roundabout.

Intervention[9]	Code	Status
Increased frequency for morning and evening peak rural bus services	Bo9	Not commenced.
Integrated ticketing between operators and across modes, including smartcard ticketing	Bo14	Funding allocated (£100,000) to develop this as part of the Better Bus Area Fund Project, all buses in Milton Keynes have smart enabled ticket machines and relevant back office set up. Milton Keynes Continuing to work with operators.
Electric and other alternative fuel buses	Bo18	Ongoing, in 2012 a 5-year collaboration was commenced which committed to replacing 7 diesel buses with all-electric counterparts. In 2016 a grant of £1.8M was received from OLEV for the Low Emission Bus Scheme for 11 wirelessly charged electric buses and supporting infrastructure.
Increased surveillance and supervision at stations and on trains	Ro4	Milton Keynes Central and Wolverton are accredited with the Secure Station Scheme. Wolverton and Bletchley Stations are not staffed at all times.
Increased capacity by lengthening trains	Ro5	Not commenced.
Direct peak services between Wolverton and Bletchley	Ro6	Commenced. 8 min service exists between the stations that stops at Milton Keynes.
More evenly distributed London Midland services towards Northampton and London	Ro7	Complete. Services shown online appear to be more evenly spread.
Longer operating hours	Ro8	Not commenced. The earliest service leaving Milton Keynes for Birmingham International Airport is at 5:37am on a weekday.
Transfer of rail freight paths on the West Coast Main Line to night time	Ro9	Not commenced.
Ultra-low carbon taxis and private hire cars	TPo3	Unclear if any initiatives currently exist, but could be incorporated into MK's Go Ultra Low City Scheme.
Greater efficiency savings in provision of specialist passenger services	HSo1	Not commenced.
Long Term		
Rapid transit	Bo7	Not commenced.
East West Rail and connections to major urban areas and national networks	Ro10	East West Rail is underway with Phase 1 of the Western section complete, and Phase 2 due to open in 2022 (Bicester Village to Bedford) and 2024 (Milton

Intervention[9]	Code	Status
beyond		Keynes to Aylesbury). A solution for the Central section (Bedford to Cambridge) is currently being discussed.
High Speed 2	Ro11	Phase One of HS2 has been approved in February 2017, which will provide a high speed service to Birmingham by 2026. Phase Two would see the service extended to Manchester by 2033.
Direct rail services to London Luton Airport, London Heathrow Airport, ports, and Channel Tunnel	Ro12	Not commenced.
Station reopening feasibility study (Castlethorpe, Hanslope)	Ro13	Not commenced.

3.3.2   Cycling, Walking and Smarter Choices

Infrastructure, promotion and behavioural change techniques:

A Milton Keynes Smarter Choices brand has been developed and a comprehensive joined up approach to smarter choices (including travel planning) is ongoing. This was given a boost in 2016, when the council was awarded £420,000 revenue funding from the Department for Transport's Sustainable Travel Transition Year (STTY) fund to encourage cycling and walking through revenue based, behaviour change measures. Known as the Get Smarter Travel in MK, the project delivered five key elements:

- 'Get Smarter Travel' marketing and promotion focussed on raising awareness of the newly launched Get Smarter Travel in Milton Keynes sustainable transport brand and mode specific brands including Get Cycling, Get On Board, Get Connected etc.

- 'Get Cycling' provided a range of cycling related activities to encourage participation. Around 80 adults received one to one Learn to Ride sessions with free adult Bikeability training and guided rides for families and beginners also on offer to provide entry level, stepping-stone activities.

- A 10 month 'Beat the Street' physical activity challenge was delivered by Intelligent Health targeting 100,000 residents and 42 primary and junior schools in Milton Keynes to encourage active travel. Over 13,000 people took part in the six week game phase, walking, cycling and scooting over 85,000 miles in total.

- A range of 'Travel Planning' activities took place including a trial scheme to provide personalised travel planning to 5,000 homes in relatively new estates in the eastern expansion area.

- Created specifically for the STTY fund, the new 'Get to Work' scheme aimed to increase access to training, education and jobs for the unemployed.

Additionally, infrastructure projects are underway to support cycling and walking, including:

- In 2017 the council reopened the newly named 'Get Changed' unit to provide secure cycle parking, shower and changing facilities to cycle commuters in the city centre. Due to high demand for the existing 156 secure cycle lockers at Milton Keynes Central station, another 40 secure cycle parking spaces have been installed and are fully occupied.

- A Redway Super Route path network has been identified, which consists of 13 cross-city Redway routes linking key destinations including sustainable transport hubs and residential, commercial and employment areas. The routes run parallel to the grid road system and provide direct and efficient cycle links for commuters. The project will enhance and upgrade these identified routes by providing extensions and missing links, resurfacing works, new wayfinding, better maintenance, reinstatement of sightlines and vegetation standards and utilise the latest design concepts and standards from across Europe to improve the coherence, directness, safety, comfort and attractiveness of these routes.

- The UK's first privately funded bike hire scheme, sponsored by Santander and operated by Nextbike was launched in July 2016. In its first year the scheme grew to the second largest dock-based hire scheme in the UK with 50 hire stations and over 500 bikes. By 2017, it had achieved over 70,000 rentals and has 16,000 registered users, enjoying one of the most successful launch periods in the UK and being well received by residents.

Peddling Culture - Pedalling Culture is a 2-year, consortium-led, project funded by the Arts Council England that aims to increase cultural tourism by putting culture at the heart of Milton Keynes' green transport infrastructure. Pedalling Culture will better connect the city's cultural venues and spaces to its existing and new sustainable transport routes and modes, thus ensuring that those living and visiting Milton Keynes will have better access to its cultural offer. The project aims are:

- To raise the profile of cycling, the Redway system and our cultural destinations
- Increase the number of recreational cyclists in Milton Keynes, particularly those visiting our cultural venues, enjoying the arts, heritage, architecture, parks and open spaces.

A full summary against the LTP3 interventions is shown in Table 4 and Table 5.

Table 4 Update on LTP3 interventions – Walking and Cycling

Intervention[10]	Code	Status
Short Term		
Increase promotion, education and training for cycling and walking	CWo1	Bikeability training for children and cycle training for adults is ongoing. In 2014 the initiative was launched, which is travel programme with private sector engagement. It is currently building employer membership in order to encourage sustainable travel habits amongst their employees.
Improved signage	CWo2	Commenced as part of upgrading the Redway network.
Online journey planner	CWo3	Online journey planner and photomap of cycling routes in Milton Keynes is now available.
More direct Redway routes	CWo4	Plans to extend the Redway network onto the road network, unclear whether express routes exist as yet.
Expansion of the Redway network into CMK, new developments, regeneration areas and where possible older towns	CWo5	Redway network existing in CMK, ongoing work required to link to new developments. Upgrades as part of the Super Redways scheme.
Improved maintenance of the Redway network and improve lighting	CWo6/CW07	Ongoing as part of the Super Redways scheme.
Improve pedestrian and cycling access to the public transport network, increased levels of cycle parking at bus stops, interchanges and facilities for carrying cycles	CWo8/CWo9	Ongoing. Cycle parking has been increased, including the provision of cycle lockers at Milton Keynes Central and cycle parking at all key destinations.
More cycle parking, including GearChange at key destinations including workplaces	CWo10	See above, also cycle lockers and a shower and changing facility at Witan Gate / Midsummer Boulevard in CMK.
Medium Term		
Improve walking and cycling links to, and facilities at, rural employment centres and key	CWo10	Ongoing.

[10] Note: Names and codes are taken from main LTP3 document rather than the Intervention Plan table (where some names and codes are missing).

Intervention[10]	Code	Status
services		
MK Waterway Park and development and promotion of cycling and walking corridors	CWo12	Plans to develop this over a 20 year timeframe through a large number of small projects by the Bedford & Milton Keynes Waterway Consortium.
Widening the width of the Redway network	CWo13	Commenced – 13 routes identified to convert to Redway Super Routes aimed at commuters – first route being progressed this year.
Cycle hire	CWo14	Santander cycle hire installed in CMK, currently available 500 bikes 60 docking stations.

Table 5 Update on LTP3 interventions – Smarter Choices

Intervention[11]	Code	Status
Short Term		
Workplace travel plan for Milton Keynes Council	SCo1	Launched in February 2012. Regularly reviewed and updated.
More effective management and enforcement of development-related travel plans	SCo2	MK monitors the
Increased promotion of car sharing	SCo3	MK Council Car Share is currently available to employees in CMK and provides a parking permit for those who share a vehicle for their journey to work for £80 per year, which provides free parking all year.
Increased support for car and other vehicle pooling with developers and commercial operators	SCo4	Not commenced.
Enhancements to the broadband network	SCo5	Ongoing, by 2016 approx. 95% of all properties in Milton Keynes had access to superfast broadband
Continued promotion of Safer Journeys to School programme including school travel planning, walking buses, and expansion of "Walk and Roll" scheme	SCo6	Ongoing.
Increased delivery of travel	SCo7	Ongoing through various activities, mainly

[11] Note: Names and codes are taken from main LTP3 document rather than the Intervention Plan table (where some names and codes are missing).

Intervention[11]	Code	Status
awareness campaigns and promotions.		through the Get Smarter Travel Milton Keynes and business led solutions for smarter/sustainable travel options launched in 2014.
Increased partnership working	SCo8	Ongoing through various initiatives, including Arriva, Open University, Transport Catapult, see also Bo19 above.
Medium Term		
Development of effective travel plans for all stations in Milton Keynes and other key trip generators	SCo9	Ongoing.
Introduction of personalised travel planning	SCo10	Not commenced.

3.3.3 Highways and Traffic Management

The fast and efficient movement of people and goods, congestion, parking, air quality, and driver safety:

Milton Keynes has successfully achieved a number of road capacity upgrades, including the Kingston roundabout capacity improvements and A421 dualling. MKC was awarded funding from the Local Pinch Point Fund, which was secured on a competitive basis, to deliver some of these improvements on budget and to schedule.

MKC continues to promote partnership working, which is supporting the case for further improvements to capacity on these roads.

Phase one of Bletchley Fixing the Links, a project to improve the environment and links between the station and Bletchley Town Centre, has been delivered on time and on budget. Phase two is now commencing and will be coordinated with a scheme to provide a link from the new development to the station and onwards to the town centre.

MKC monitors air quality at various sites, including Olney, where an Air Quality Management Area (AQMA) has been declared. For two years the annual mean concentration of NO_2 has been below the threshold that triggers an AQMA and if this trend continues the AQMA classification can be revoked. MKC continues to monitor air quality and makes available annual air quality monitoring reports.

A full summary against the LTP3 interventions is shown in Table 6.

Table 6 Update on LTP3 interventions – Highways and Traffic Management

Intervention[12]	Code	Status
Short Term		
Develop a Network Management Plan	HTo1	Transport Asset Management Plan completed in 2012.
Peak spreading of traffic through spreading school and business working hours	HTo2	Businesses have become more flexible with working hours and working from home. Schools have not changed.
Lorry Management Strategy Refresh	HTo3	Not commenced.
Improved partnership working for freight	HTo4	Not commenced.
Improved signage and routing for freight, including routing HGV traffic away from estates and rural communities where appropriate	HTo5	A Lorry Route Network has been developed as part of the Lorry Management Strategy, 2009. Need to look at re-establishing freight quality partnership to discuss issues and offer solutions.
Promotion of more sustainable freight movement	HTo6	Not commenced.
Adoption of the Road Safety Audit Policy and Procedures Road Safety Strategy Refresh	HTo7/HTo8	Latest strategy and audit policy was developed for 2013-2018.
Engineering measures to reduce the number of collisions, fatalities and injuries where appropriate and justified	HTo9	Ongoing as part of the highway maintenance and highway infrastructure schemes. Thought the "Comprehensive Review of Personal Injury Collisions Trends in Milton Keynes 2014" has recommended further course of action is needed including engineering interventions.
Ongoing funding for safety education, training and promotion	HTo10	Ongoing.
Refresh of Powered Two Wheeler Strategy	HTo11	Not commenced.
Medium Term		
Urban Traffic Management Control (UTMC) Common Database	HTo12	Will be developed as part of UTMC upgrade.

[12] Note: Names and codes are taken from main LTP3 document rather than the Intervention Plan table (where some names and codes are missing).

Intervention[12]	Code	Status
New Traffic Control Centre	HTo13	As above.
Improve coordination of traffic signals	HTo14	UTMC system exists but is in need of updating. Milton Keynes ITS Strategy plans for this.
ITS for roadside traffic alerts	HTo15	VMS for inner ring road focused around CMK is being developed (2016) and will be expanded to an outer ring as identified in the ITS Strategy.
ITS for parking management, e.g. live parking information	HTo16	Trials of car park sensor technology are planned in the ITS Strategy and longer term deployment and linking to phone apps and online information.
CCTV for traffic monitoring	HTo17	Deployment of CCTV in Milton Keynes has been limited. Existing CCTV is used by Thames Valley Police for crime detection and prevention, not network monitoring. Development of a new CCTV network is planned in the Milton Keynes ITS Strategy
Coordinate ITS with Highways England for management of traffic using the M1	HTo18	Most likely to be provided as part of upgraded UTMC, which will allow systems from different operators to communicate with each other.
Junction capacity improvements	HTo19	Granby roundabout improvements, Kingston roundabout capacity improvements, dualling A421 and a new roundabout at Eagle Farm.
Dualling of the A421 from M1 Junction 13 to the Kingston Roundabout (A5130) and on to M40 in Oxfordshire	HTo20	Ongoing. A428/A421 Alliance supporting the case for the improved capacity on the west side of Milton Keynes up to M40. Working with Central Bedfordshire to deliver improvements to the A421 between M1 Junction 13 and CMK.
Olney Bypass / Bletchley Southern Bypass	HTo21/HTo22	Not commenced.
Provision for freight parking / layover	HTo23	Not commenced.
More co-ordinated delivery/distribution of freight	HTo24	Not commenced.
Long Term		
In-vehicle Dynamic Journey Planning	HTo25	Not commenced. Although there are plans to upgrade the current UTC system in the ITS Strategy which will eventually lead to this in the long term future.

Intervention[12]	Code	Status
Maintain easy access to the M1 Motorway	HTo26	Partly commenced. There have been discussions about a new Junction 14a. The Milton Keynes Coachway near J14 is complete and helps to reduce traffic demand on the M1, by transferring private vehicle journeys to coach services.

3.3.4 Technology

Information provision, web-based technology, future modes of transport, and alternative fuels:

Milton Keynes is leading the way with promoting and supporting the uptake of alternative fuel vehicles.

The expansion of electric vehicle charging network is ongoing, with currently 170 standard and 56 rapid charge points installed. Additionally, the Go Ultra Low City Scheme to promote low emission transport is being implemented 2016 – 2020, including the opening of the Electric Vehicle Experience Centre in CCMK. Funding of £9m has been received towards the scheme from the Office for Low Emission Vehicles (OLEV).

In 2012 MKC set up a partnership to replace seven diesel buses with electric buses on one of the main bus routes in the town.

These vehicles are charged wirelessly using coils embedded into the road surface at certain locations. This five year trail has been set up to demonstrate the impact that electric vehicles can have, and to show that such vehicles are economically viable.

Milton Keynes has also introduced free Green Parking Permits for ULEVs using standard (purple) bays.

A full summary of LTP3 technology based interventions is shown in Table 7.

Table 7 Update on LTP3 Interventions – Technology

Intervention[13]	Code	Status
Short Term		
Development of a multi-modal transport information website portal and smart phone application, with potential linkages to a UTMC database	To1	Not complete, also dependent on HTo12 above. Although residents and visitors have access to Google maps, which offers similar information. There is an online journey planner for cycle trips.
Medium Term		
The promotion of electric and other alternative fuel vehicles (such as hydrogen fuel cell)	To2	Ongoing. Go Ultra Low City Scheme to promote low emission transport is funded until 2020, including the opening of the Electric Vehicle Experience Centre. Also the Low Emission Bus

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[13] Note: Names and codes are taken from main LTP3 document rather than the Intervention Plan table (where some names and codes are missing).

Intervention[13]	Code	Status
		Scheme is underway.
Expanded electric vehicle infrastructure (e.g. parking spaces and charging points)	To3	Expansion of electric vehicle charging network is ongoing, with currently 170 standard and 56 rapid charge points installed. Free Green Parking Permits for ULEVs using standard (purple) bays has been introduced.
Ultra-low carbon taxis and private hire cars	To4	No initiatives currently exist, but could be incorporated into MK's Go Ultra Low City Scheme (see TPo3 above).
Coordinated and adaptable traffic signals making best use of existing fibre optic network	To5	Not commenced. See HT012 - HTo14 above.
Purchase and delivery of an Urban Traffic Management Control (HTMC) common database	To6	Not commenced. As above.
Coordinate ITS and Traffic Control Room operations with Highways England for management of traffic using M1	To7	See HTo18 above. Most likely to be provided as part of upgraded UTMC, which will allow systems from different operators to communicate with each other.
ITS for journey time and congestion monitoring	To8	Not commenced. See HT012 - HTo14 above.
ITS for roadside traffic alerts, event and parking management (e.g. Variable Message Signing)	To9	VMS for inner ring road focused around CMK is being developed and will be expanded to an outer ring as identified in the ITS Strategy. See HTo15 and HTo16 above.
Improved bus Real Time Passenger Information (RTPI) system	To10	RTPI roll out is ongoing. The RTPI system has been expanded and upgraded based on GPRS transmission of the data between bus ticket machines and the displays. As of 2014 there were over 100 RTPI displays, data is also available via the Milton Keynes website and smartphone apps.
Improved broadband coverage across the borough for the increased provision of home working, video conferencing, telecommunications and e-shopping	To11	Ongoing, by 2016 approx. 95% of all properties in Milton Keynes had access to superfast broadband.
Smartcard ticketing	To12	Funding allocated (£100,000) to develop this as part of the Better Bus Area Fund Project, all buses in Milton Keynes have smart enabled ticket machines and relevant back office set up. Milton Keynes is continuing to work with operators (see Bo14). Not currently integrated between rail and

Intervention[13]	Code	Status
		bus.
Long Term		
SmartGrid Integration	To13	Not commenced.

3.3.5　　　Infrastructure Management

Highway, Redway network and other asset management:

MKC invested £50m into the road network which has significantly reduced the number of road defects, through its Asset Management Plan. Resurfacing has taken place on many sections of road and any potholes that meet its criteria have been repaired. As a result the number of claims received for damage caused to residents' vehicles by potholes has fallen again for the fourth year in a row. In 2016, MKC received just 46 claims for pothole damage compared to 194 in 2012.

A full summary against the LTP3 interventions is shown in Table 8.

Table 8　Update on LTP3 Interventions – Infrastructure Management

Intervention[14]	Code	Status
Short Term		
Improve Asset Management System	IMo1	Ongoing. Significant funding has been put towards highway maintenance throughout the strategy period so far and as a result, the claims of against MKC for damage to vehicles due to poor road maintenance is declining.
Improve resilience of the network to winter weather conditions and flash flooding	IMo2/IMo3	Ongoing. Flood alleviation works are ongoing and winter maintenance ongoing, including additional salt storage barns and changing salt type to a more efficient material.
Better maintenance of the Redway network	IMo4	Ongoing as part of the Super Redways scheme.
Refresh Rights of Way Improvement Plan	IMo5	Not commenced.
Medium Term		
Improved lighting on the Redway network	IMo6	See IMo4 above.

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[14] Note: Names and codes are taken from main LTP3 document rather than the Intervention Plan table (where some names and codes are missing).

3.3.6 Development Planning

Integrated transport and land use planning.

A full summary against the LTP3 interventions is shown in Table 9.

Table 9 Update on LTP3 Interventions – Development Planning

Intervention[15]	Code	Status
Short Term		
Develop a Highways Design Guide	DPo1	New Residential Design Guide adopted in April 2012.
Expansion of the grid road and Redway networks into major new developments	DPo2	Part of the Super Redways scheme and DPo1 above.
Define and defend alignments for high capacity transit in new development, including infrastructure for alternative fuel and future mode technology	DPo3	Not commenced.
Appropriate parking standards and distribution across the borough	DPo4	Parking increases supplied where needed, up to 700 spaces to be provided at Milton Keynes Central. High rate of parking per employee when compared to nearby urban centres. Parking Strategy updated in 2013.
Improved partnership working	DPo5	Ongoing.

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[15] Note: Names and codes are taken from main LTP3 document rather than the Intervention Plan table in LTP3 (where some names and codes in the table do not match those in the actual document)

3.3.7   Update on the LTP3 Monitoring Plan

The LTP3 sets out a monitoring plan with a number of performance indicators to track the progress of the strategy's objectives. An update on these indicators are provided in Appendix A along with a comparison to the original LTP3 baseline. Where data is not available for the indicators, similar indicators are presented. Additionally, new indicators have been added that are relevant to the transport strategy and now available to monitor in future.

Overall Milton Keynes is showing positive progress across the indicators when compared to the LTP3 baseline.

Road safety has improved, with a drop of 14% in the number of killed or serious injured casualties, including a decrease in pedestrian and cyclist casualties.

Bus performance has made a significant improvement, with journey numbers increasing by 6% (however since 2014 the bus use has wavered) and the proportion of customers satisfied with the overall service increasing. Bus punctuality is also increasing, now up to 90% of non-frequent buses running on time. Average minimum travel times by public transport to key services for Milton Keynes' residents has dropped by 15%, however some work will need to go towards making public transport journey time more competitive with car journey time, with the majority of car journeys to key urban centres nearby Milton Keynes still faster than public transport.

Cycle trips are increasing, which may be attributed to the Get Changed and Get Cycling initiatives, the introduction of a cycle hire scheme, increased cycle parking, and a cycle journey planner tool now available online. More cycling & PT usage brings in the to the opportunity to make better use of existing network and relieve congestion through mode shift. Any shift in the overall mode share for walking, cycling and PT will not be known until the next round of journey to work census data is collected in 2021. Although other data sources with smaller sample sizes are likely to be available before then.

There has been a decline in the air quality at all measured sites, in terms of nitrogen dioxide emissions, which may be attributed to the rise in traffic flow, particularly HGVs and LGVs. Although most levels still remain below the 40 µg/m3 limit, except for the Wolverton Road site, which breached this in the most recent air quality results.

Generally traffic flow is increasing, as is congestion, which has risen by 13% in terms of journey time per mile in the morning peak. This is most likely attributed to the rise in population of 9% and increase in online shopping and therefore LGV deliveries, as well as HGV traffic increases associated with growth and development in Milton Keynes.

4. Review of Local Context

The following chapter sets out the local context of Milton Keynes. Local demography, population and employment distributions, local transport infrastructure and use and community travel patterns are all covered to add context to this study.

4.1 Demography of Milton Keynes

The following statistics are taken from the 2016 / 2017 Milton Keynes Population Bulletin[16]. This document provides a detailed breakdown of demographic information for Milton Keynes as well providing population projections based upon mid-year estimates from the Office of National Statistics for 2011-2015.

In 2015 there were approximately 261,000 people residing in Milton Keynes of which 55% are of the ages 25-64. This is 2% higher than the proportion for all of the UK.

Figure 11 and Figure 12 demonstrate that from age 64+, there is a lower proportion of people within this age group when compared to the UK suggesting that Milton Keynes attracts a younger age profile. We also see a higher proportion of people aged 0-16 in Milton Keynes, suggesting many young families live here.

Figure 11 Milton Keynes population by Proportion of Age Group, 2015[17]

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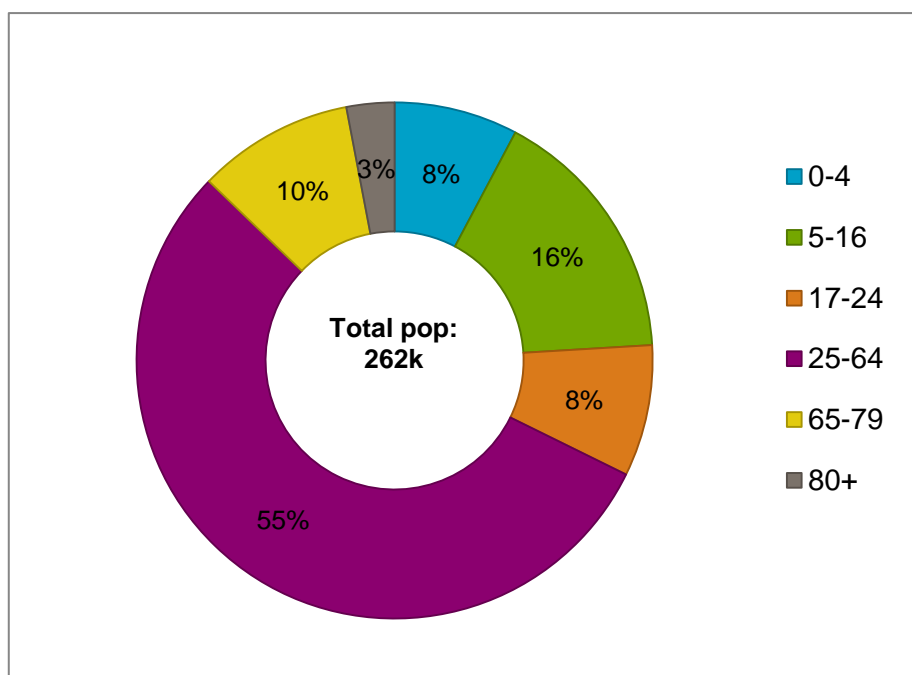
[16] *2015/2017 Milton Keynes Population Bulletin,* Corporate Core, January 2017.

[17] *Source: Office for National Statistics Population Data for MK*

Figure 12 National Population by Proportion of Age Group, 2015[18]
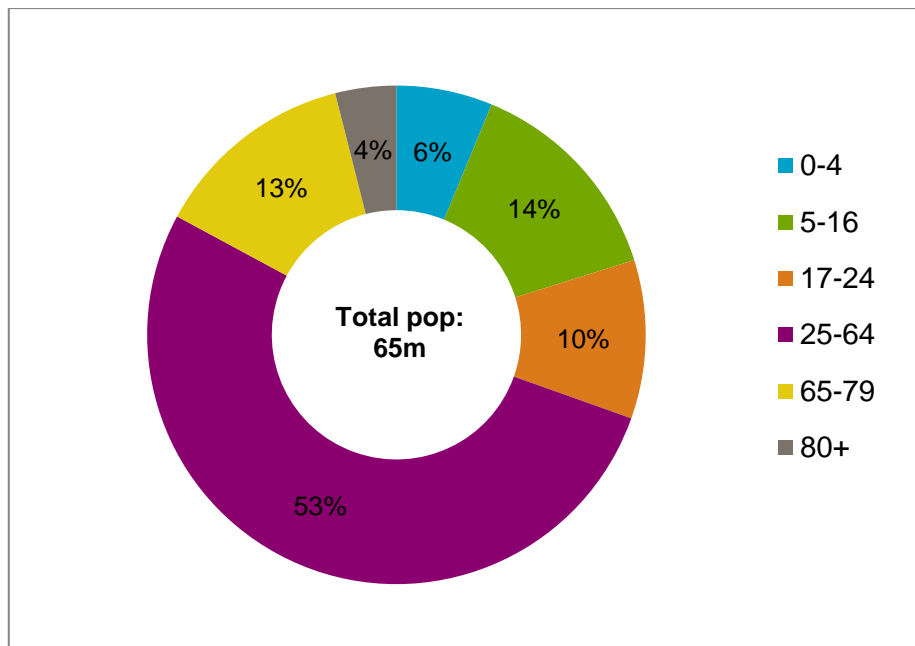
4.2   Population Distribution

The population density distribution map of the output areas within the borough of Milton Keynes is displayed in *Figure 13*. This is based on data from the last UK Census (2011) and gives an indication of the spatial distribution of population within Milton Keynes.

Figure 13 Population density – per HA[19]

The map shows that at the time of the last census in the UK, the areas of higher density population are surrounding Central Milton Keynes (CMK), Bletchley and Olney.

4.3   Employment Distribution

Employment density is a measure of employment (employees) per hectare. It helps visualise what areas are likely to attract trips in the peak periods and also shows where built up employment areas are. In some cities employment areas represent a major part of built-up areas, but include almost no residential population. Most of Milton Keynes' employment, however, is within the same areas as it is higher density population areas. Employment distribution is shown in *Figure 14*.

Figure 14 Workplace population density – per HA[20]
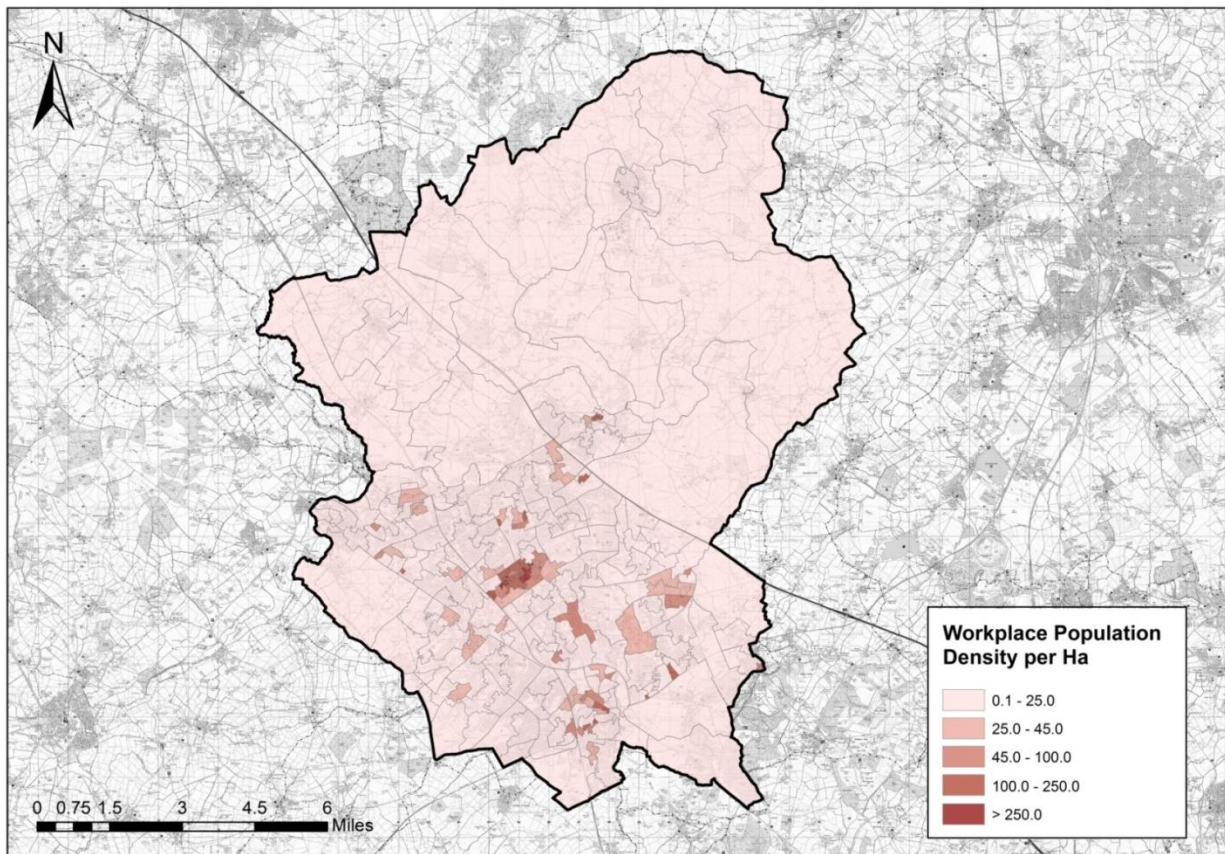
4.4   Car Ownership

The car ownership per household in the Borough is highlighted in *Figure 15*. It shows the spatial distribution of car and van vehicles per household across the borough at the time of the last census (2011).

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[20] Source: Office for National Statistics

Figure 15 Car ownership – per household[21]
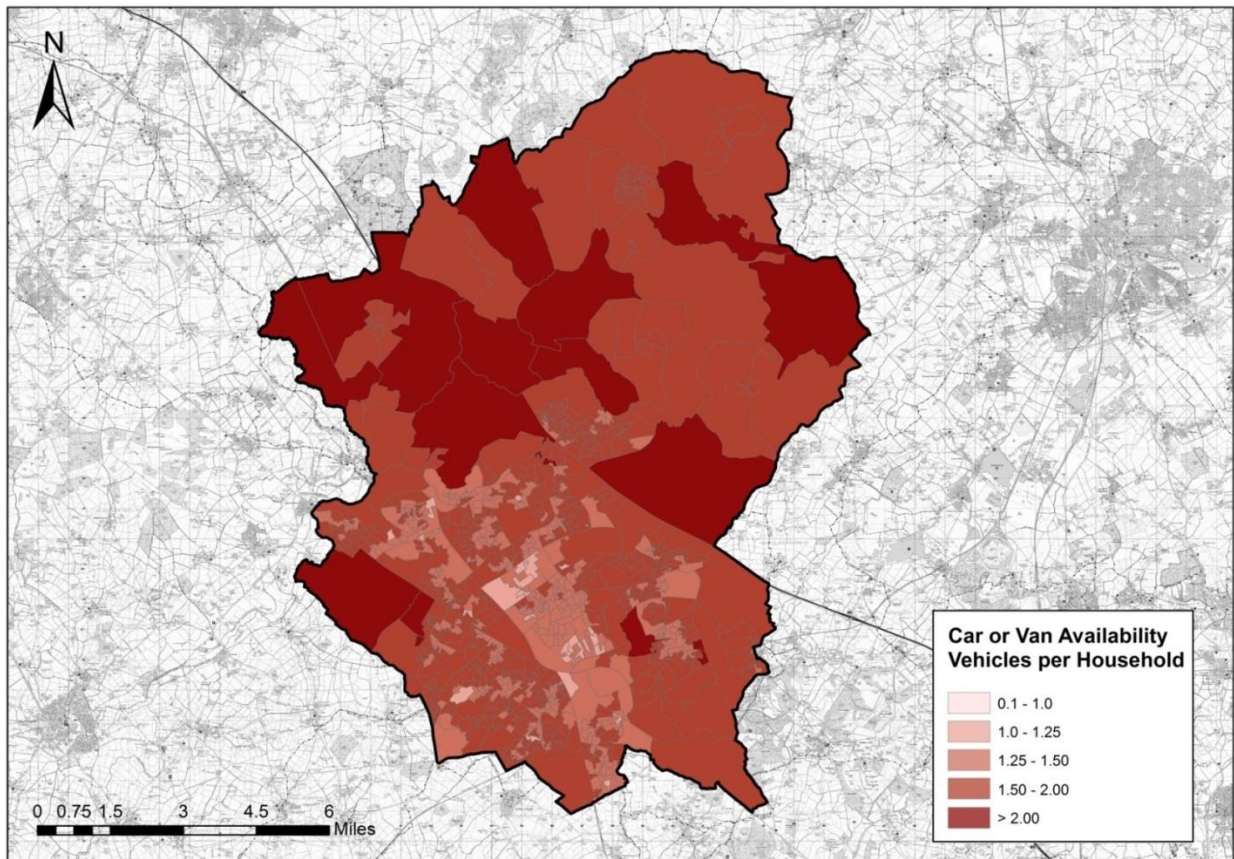
As expected, car ownership is sparser within CMK, where amenities are within walking or cycling distance and where there is access to more public transport options. Rural areas to the east and west of the Olney corridor show the highest car ownership per household, where public transport is least accessible, as can be seen later in Figure 18.

It is worth noting that within CMK there is still a high level car ownership, averaging between 1.0 – 1.5 per household, even in areas where there is good access to public transport and with local amenities within walking / cycling distance.

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[21] Source: Census, 2011

Figure 16 Indices of Multiple Deprivation in Milton Keynes
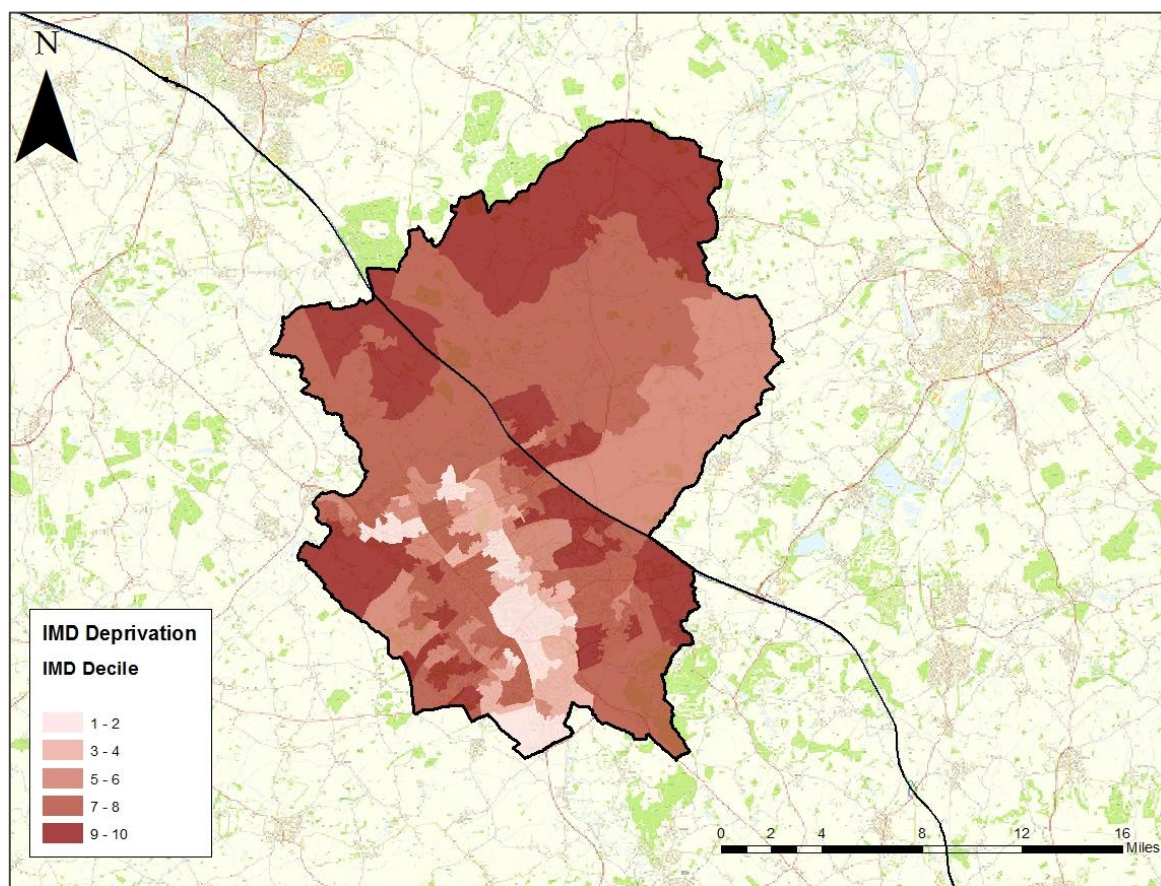
Figure 16 demonstrates indices of multiple deprivation ranging from one being the most deprived in the country to 10 being the least deprived. It is important to ensure that these areas are well connected by alternative modes, including bus, walking and cycling.

4.5   UK Drivers Licence and Mobile Phone Ownership

In 2016 under half the population (42%) aged 17-24 in Great Britain held a full driving license. In contrast 85% of people aged 25-65 hold a full driving license[22]. There has been a reduction in the number of young men holding a driving license since 1975/76 and for women since 1995/96. This could be indicative of a younger generation using alternative methods of social interaction to face-to-face interaction, and a greater willingness to use alternative modes of transport to the private car.

In the context of a global mobile consumer survey, it was found that 91% of UK adults aged 18-44 now own a smart phone[23]. Smart phones are increasingly being used to access a wide range of services and information and serve as a go-to resource for wayfinding, travel information, conducting transactions and keeping up to date with news / social media.

The emphasis on this technology is significant and will only increase as businesses learn how to best use the technology. The DfT has highlighted the importance of "Intelligent Mobility", which is essentially using technology and data to connect people across all transport modes. Smart phones will play a key role in this, with apps such as Citymapper

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[22] Driver and Vehicle Licensing Agency (DVLA)
[23] Deloitte – Global Mobile Consumer Survey 2016

and Google Maps making it easier to plan seamless journeys across multiple modes of transport.

4.6   Parking Availability

There are approximately 21,000 publicly available spaces within CMK with an additional 4,000 private spaces belonging to businesses which are used by employees and visitors.

- According to the LTP3 Progress Report from 2014, there are currently more parking spaces than what is needed for current demand across CMK.

- Parking charges in Milton Keynes are lower than neighbouring, similar size towns.

- The average occupancy rate of parking is approximately 73%[24].

Table 10 compares the parking capacity for CMK with neighbouring towns[25]; both public (in the centres only) and park and ride spaces. Milton Keynes has the highest parking supply per capita and per job.

Table 10 Parking capacity

	2015 Total Jobs	2015 Population	Public Car Spaces*	Park and Ride	Parking Spaces per Job
Milton Keynes	**166,000**	**261,800[26]**	**21,000****	**350**	**0.13**
Northampton	124,000	212,100	4,000	-	0.03
Oxford	120,000	159,600	2,250	5403	0.02
Peterborough	105,000	193,700	7,000	-	0.07
Cambridge	100,000	130,900	3,300	5393	0.03
Luton	87,000	214,700	4,000	-	0.05

*Represents parking in the town centres only. Figures shown do not include private parking.

**This figure does not include the additional 700 spaces to be added at Milton Keynes Central.

Milton Keynes has the highest supply of parking spaces per job, with a rate at least double or than other towns.

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[24] Milton Keynes Parking Utilisation Survey
[25] Parking data for Milton Keynes, Northampton, and Peterborough is obtained through the Milton Keynes: Intelligent on Demand Mobility Strategy.   Cambridge parking data is collected from Cambridge Council Website.   Oxford parking data is taken from the Oxford Transport Strategy (+ estimated on street parking).   All population and employment data is taken from the Cities Outlook Report 2015.
[26] MKInsight, 2017.

4.7   Parking Cost

A comparison of parking charges in CMK and nearby towns is shown in Table 11.

Table 11 Parking charges

	Standard Tariff (£ per hour)	Premium Tariff (£ per hour)	Long stay Tariff (All Day)
CMK[27]	0.50	2.00	10.00
Northampton[28]	0.00	N/A	7.00
Oxford[29]	3.50	4.00	25.00
Peterborough[30]	1.00	1.50	6.00
Cambridge[31]	2.00	2.30	24.00
Luton[32]	0.90	2.40	N/A

A full-time employee parking permit currently costs £630 per annum which equates to £2.80 per day, based on a 225 day working year. This represents nearly a 50% reduction on the daily cost of parking. By way of comparison of travel costs, Table 12 lists the cost (per day) of travelling by bus either locally within Milton Keynes or from neighbouring Aylesbury, Bedford, Luton or Northampton.

This and previous sections show that there is a cheap and good supply of parking in Milton Keynes. This encourages the use of private vehicles for journeys into CMK.

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[27] Milton Keynes Council – Parking Charges and guidance notes, 2017
[28] *Parking Charges - Multi-storey Car parks,* Northampton. Gov.uk, 2017
[29] *Gloucester Green Car Park,* Oxford City Council, 2017
[30] *Parking Charges,* Peterborough City Council, 2017
[31] *Grafton East car Park,* Cambridge City Council, 2017
[32] *Parking Charges in Luton,* Luton.gov.uk, 2017

4.8   Public Transport

Bus Travel

Table 12 lists the cost per day for commuting to CMK using the bus network[33]. This takes in to account a discount given when purchasing a one month ticket.

Table 12 Bus Operator Charges – Fees are as of July 2017

Service	Bus Operator	1 month ticket	Cost per day*
Local Service	MK Moove	£60	£3.00
Local Service	PlusBus	£35	£1.75
Local Service	Arriva Milton Keynes	£52	£2.60
Local Service	Red Rose Travel	£44	£2.20
Local Service	Redline Buses	£44	£2.20
Local Service	Z&S Transport	£50	£2.50
Bedford to CMK	Stagecoach	£134.50	£6.75
Northampton to CMK	Stagecoach	£115	£5.75
Luton to CMK	Arriva	£82	£4.10
Aylesbury to CMK	Arriva	£88	£4.40

*Based on 20 working days

The average cost of travelling within Milton Keynes is £2.38 per day. The average cost of travelling by bus from neighbouring towns is £5.53 when purchasing a monthly ticket. As the previous sections have shown, there is a good supply on parking in Milton Keynes and competitive pricing, particularly for an employee permit, makes driving an attractive option. This combined with higher public transport costs, results in there being little incentive for journeys to be made using public transport.

There also exists the option of a Plusbus ticket for bus travel, which is offered to rail passengers using Milton Keynes Central, Bletchley and Wolverton rail stations. They can add a Plusbus ticket to their rail ticket when purchasing online for participating bus operators within the area shown in *Figure 17*. On this ticket, passengers can take unlimited bus travel for £2.20 / day for adults and cheaper for children and students, with weekly, monthly and annual discounts offered. Tickets are only valid for purchase with a rail ticket.

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[33] All prices are that listed on bus operator websites as of July 2017.

Figure 17 Coverage area of Plusbus ticket for Milton Keynes

Public Transport Accessibility and Journey Time

Access to public transport and journey time analysis has been undertaken using Visography TRACC. Visography TRACC calculates journey times based upon publicly available transport timetable data, road network information and a range of user-defined parameters. The calculations can be applied to any destination as the centre of the study area and for the purpose of this exercise; the junction of Midsummer Boulevard and Saxon Gate is used as this is roughly equidistant distance between retail and office-based employment areas within CMK.

When calculating accessibility for public transport, the software takes into account walk time to the stop / station, wait time for the service, in vehicle travelling time, walk time to the destination and day / time period. *Figure 18* represents a typical weekday accessibility in Milton Keynes during the AM peak.

Figure 18 Milton Keynes accessibility
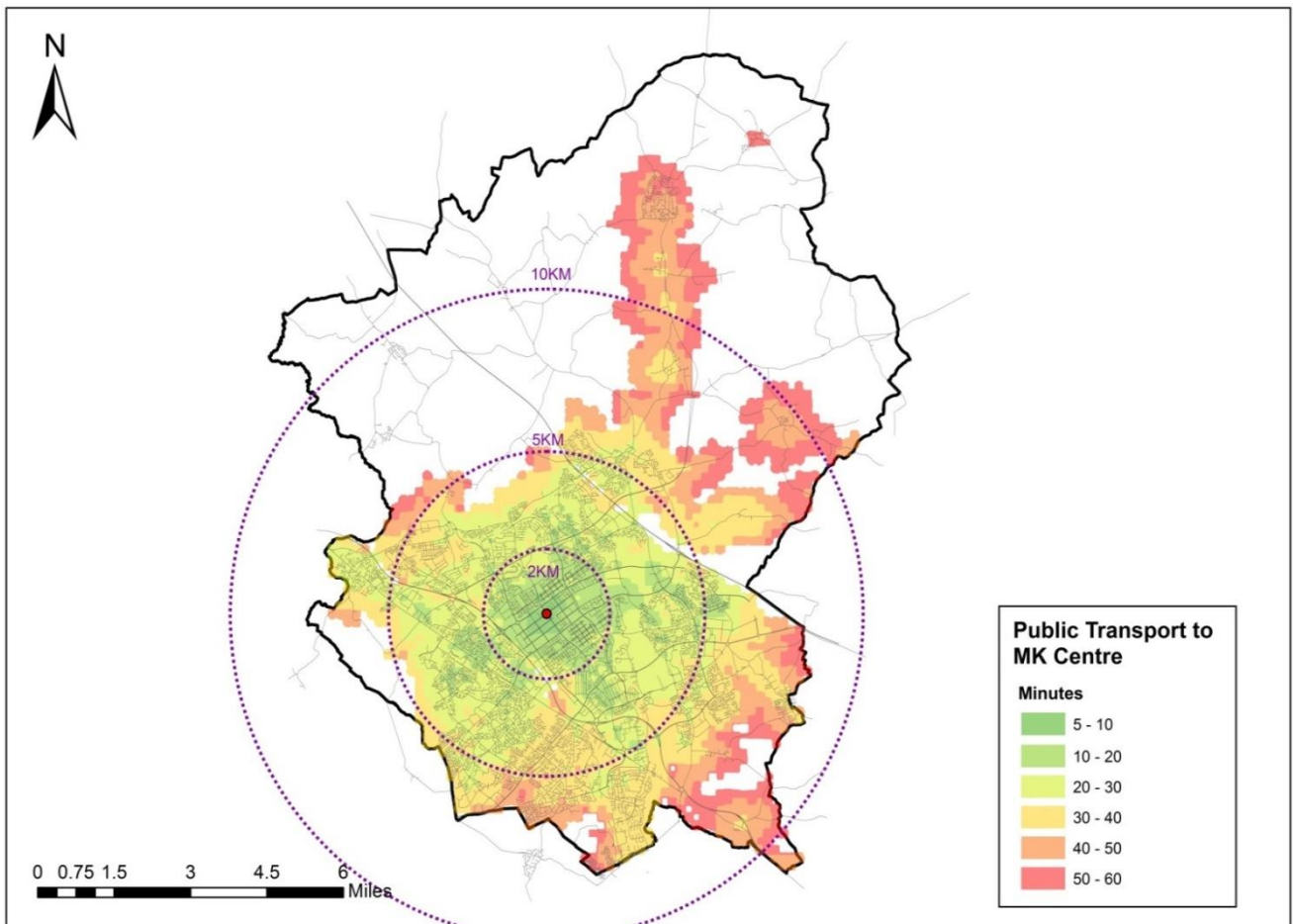
The software allows for interchange between services and modes such as bus and rail and includes a five minute interval between changes of services. Parameters have been set to define the maximum walk distance to access a public transport stop as 2km. Anything outside of this as well as journey times over one hour appear as white.

Figure 18 shows that within a 2km radius of CMK there is good accessibility to public transport, with roughly a 5 to 20 min journey time. Journey times do however increase up to 30 mins (and in some small residential pockets up to 40 minutes) for journeys within a 2 – 5km radius which make public transport a less viable option. It is worth noting that only 25% (approximately) of local services run more than one an hour.

Some rural areas, particularly around Eakley and Weston Underwood are poorly serviced by public transport and it can also be seen that both east and west of the Olney corridor are also poorly served to CMK.

4.9 Public Transport Use and Perception

Bus

Table 13 below lists the total passenger journeys on local bus services within Milton Keynes each year. From 2011 there has been a year on year increase in usage.

Table 13 Bus passenger journeys[34]

Year	Passenger journeys (Million)	% increase from base
2011/12	8.84	Base
2012/13	8.98	1.58
2013/14	9.59	8.50
2014/15	9.66	9.32
2015/16	10.03	13.48

In a 2016 Bus Passenger Survey completed by Transport Focus[35], Milton Keynes scored 84% for overall satisfaction. This is the fourth lowest score out of 21 surveyed authorities and 3% under the average. The survey discovered that 66% were satisfied with the punctuality of services and only 60% with value for money.

According to the DfT Public Attitude to Buses Report[36], users are more likely (than non-users) to agree that they would travel more by bus if aspects of the bus service were improved. These include:

- Faster journey times;

- More frequent services; and

- Reduced ticket cost.

According to the "Door to Door" report completed by the TRL (Transport Research Laboratory) Ltd[37], passengers require the following information and ticketing options if public transport is to be an attractive alternative to the car:

- Information on the fares, times of departure and arrival before travelling, and the ability to compare different ways of reaching the same destination;

- Real-time information about their journey;

- Simple fares that are flexible;

- Simple ticketing options (e.g. zonal fares); and

- Through ticketing – origin to destination ticketing via multiple service providers on a single ticket.

There are currently over 50 different bus routes serving Milton Keynes, including urban, rural, school, college, shopping and leisure routes. These routes are operated by approximately

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[34] Department for Transport (BUS0109a) 2016
[35] Travel Focus - Bus passenger survey 2016
[36] Department for Transport Public Attitude to Buses, 2013
[37] *"Door to Door",* Transport Research Laboratory Ltd, June 2011.

seven different operators, each with their own price and payment structure which adds an additional level of complexity to using public transport which can be a deterrent to potential users. Milton Keynes is trying to improve upon this through integrated ticketing through the Better Bus Area Fund.

For all bus services in Milton Keynes, timetables are available via the MKC website, however there is no single online point of contact for journey planning and purchasing tickets. Users are instead advised to use Traveline South East & Anglia, which although can provide timetabling information, does not have the facility to give journey cost(s).

Rail

Milton Keynes Central is located on the West Coast Main Line and is served by Virgin Trains, London Midland and Southern regional services.

Table 14 lists the annual passenger usage for Milton Keynes Central. The annual estimates are based on sales of tickets which end or originate at Milton Keynes Central.

Table 14 Annual Passenger Usage for Milton Keynes Central Station[38]

Year	Annual rail passenger usage (Million)	% increase from base
2011/12	5.558	Base
2012/13	6.030	8.49
2013/14	6.286	13.10
2014/15	6.649	19.63
2015/16	6.836	22.99

Table 14 shows that there is a general increase in passenger trips year on year, which is aligned with the national trend of increasing rail journeys.

At Milton Keynes Central there is a large bus interchange, taxi rank and extensive cycling and private vehicle parking. The car park currently provides over 900 parking spaces, with an additional 700 spaces to be added, enticing more car travel to the station. It offers discounted parking for eco-friendly vehicles.

Advice on the Milton Keynes Central station car park website is that the carpark is often full by 8am on weekdays, and a parking survey from June 2015 shows that parking in the vicinity of the station is almost or at capacity in the on a weekday from 8:30am onwards.

There is a large station forecourt, containing the bus interchange, taxi rank, outdoor seating, up to 30 cycle lockers along with a sheltered two-tiered cycle parking facility with capacity for up to 90 bicycles, a cycle hire station and CCTV coverage. Feedback from stakeholders is that the two-tiered cycle parking system is difficult to use. The cycle parking at the station is pictured in Figure 19.

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[38]   Source: Office of Rail and Road Statistics

Figure 19 Cycle parking at Milton Keynes Central
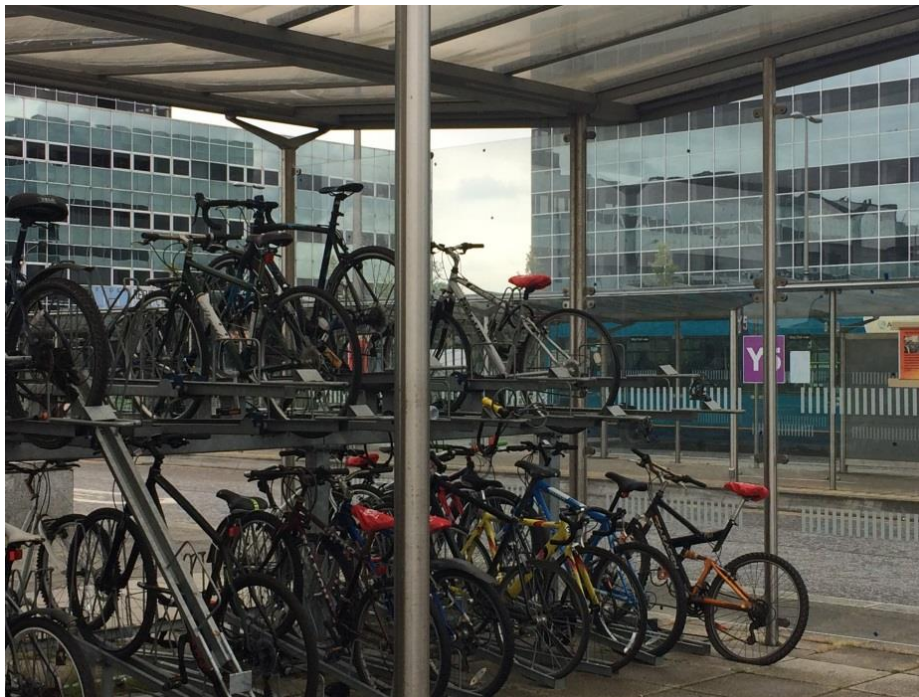
At Bletchley station there is unsheltered cycle parking for up to 58 bicycles and over 600 private vehicle spaces in the car park. At Wolverton there is also unsheltered cycle parking for up to 48 bicycles and over 200 private vehicle spaces. It is noted that there is no step-free access at this station.

Bletchley and Milton Keynes Central stations are both on the planned East West Rail line, which is a developing east-west connection between Oxford and Cambridge, using both existing and new rail infrastructure. The future line is divided into a western, central and eastern section, with Milton Keynes and Bletchley located within the western section. *Figure 20* shows the planned route. The western section route is on existing lines between Bedford and Oxford, Milton Keynes and Aylesbury Vale.

Oxford to Bicester Village formed Phase 1 of the project and has been significantly upgraded by Chiltern Railways and Network Rail and delivered in December 2016.

Phase 2 of the Western Section covers the route from Bicester Village to Bedford, and Milton Keynes to Aylesbury Vale and Princes Risborough. The line East of Bicester to Claydon Junction that is currently only used by freight trains will be upgraded for fast passenger services. The section of rail track between Claydon Junction and Bletchley has been out of use and 'mothballed' since the early-1990s and will be rebuilt. A new station will be provided at Winslow. Train services on the East West Rail line will then follow the existing Marston Vale Line from Bletchley to Bedford. New high-level platforms will be provided at Bletchley, which connects with West Coast Main Line, allowing East West Rail trains to run to MK.

The Western Section will also provide train services between Milton Keynes and London Marylebone, via Aylesbury. The line between Aylesbury and Claydon Junction will be upgraded to a double track for fast passenger services as part of the East West Rail scheme. This will provide major improvements to east-west public transport connections for Milton Keynes to Oxford, Bedford, Aylesbury and Cambridge, which provides opportunity for commuting trips by rail between these centres and a reduction is private vehicle trips on the surrounding road network.

To take advantage of these service improvements, development should be increased around both Milton Keynes and Bletchley rail stations, where possible, and also any plans for a priority transit network in Milton Keynes, such as BRT or LRT, should be linked with these stations.

Figure 20 East West Rail route
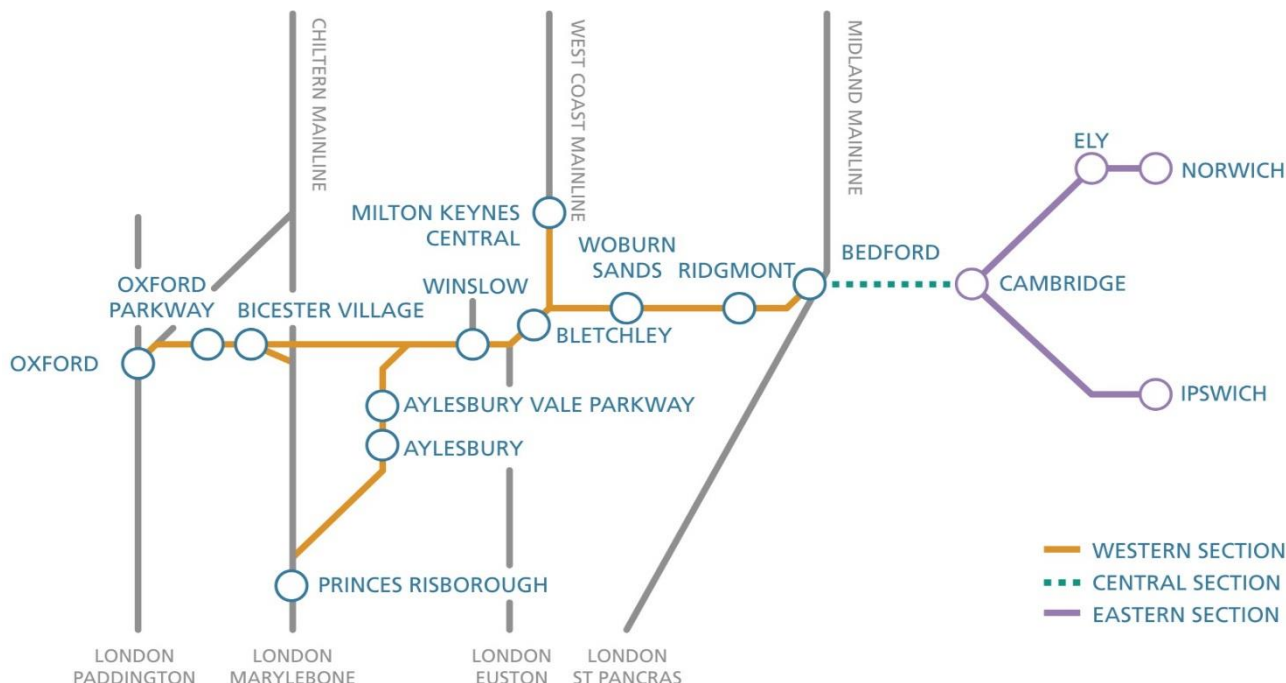
4.10   Commuting Patterns

Journey to Work (JTW) data is collected as part of the Census and describes aspects of commuting behaviour. This data provides a valuable insight in to the mode choice of both residents and commuters in and out of Milton Keynes.

Mode Share

For the purpose of this exercise trips to / from London have been excluded as they are mainly by public transport (rail). Sustainable trips include those taken by train, bus, as a passenger in a car, bicycle or on foot. Table 15 shows the modal split for journeys to work in Milton Keynes.

Table 15. Journey to work[39]

Method of travel to work	All persons	%
Driving a car or van	79,474	65
Work mainly at or from home	12,598	10
On foot	9,150	7
Passenger in a car or van	8,084	7
Bus, minibus or coach	7,065	6
Bicycle	3,611	3
All other methods of travel to work	2,693	2
Total	**122,675**	**100**

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[39] Method of travel to work, Census 2011, ONS

The proportion of trips by different modes from the 2011 Census are shown in *Figure 21*. It can be seen in the mode share proportions shown below that there is a clear dominance of car trips. This can be attributed to cost, habit, comfort, travel time and convenience.

With roughly 21,000 public and 4,000 private parking spaces available at a competitive cost within CMK, accompanied with reliable journey times, and in spite of reasonable accessibility by public transport, car use remains the most attractive option for commuters travelling within the Borough and also to / from neighbouring towns.

Figure 21 Modal split of trips

Live and work in the urban area

65%

35%

Live in the Borough and work in the urban area

80%

20%

Live outside the Borough and work in the urban area

83%

17%

Live in the urban area and work outside the Borough

85%

15%
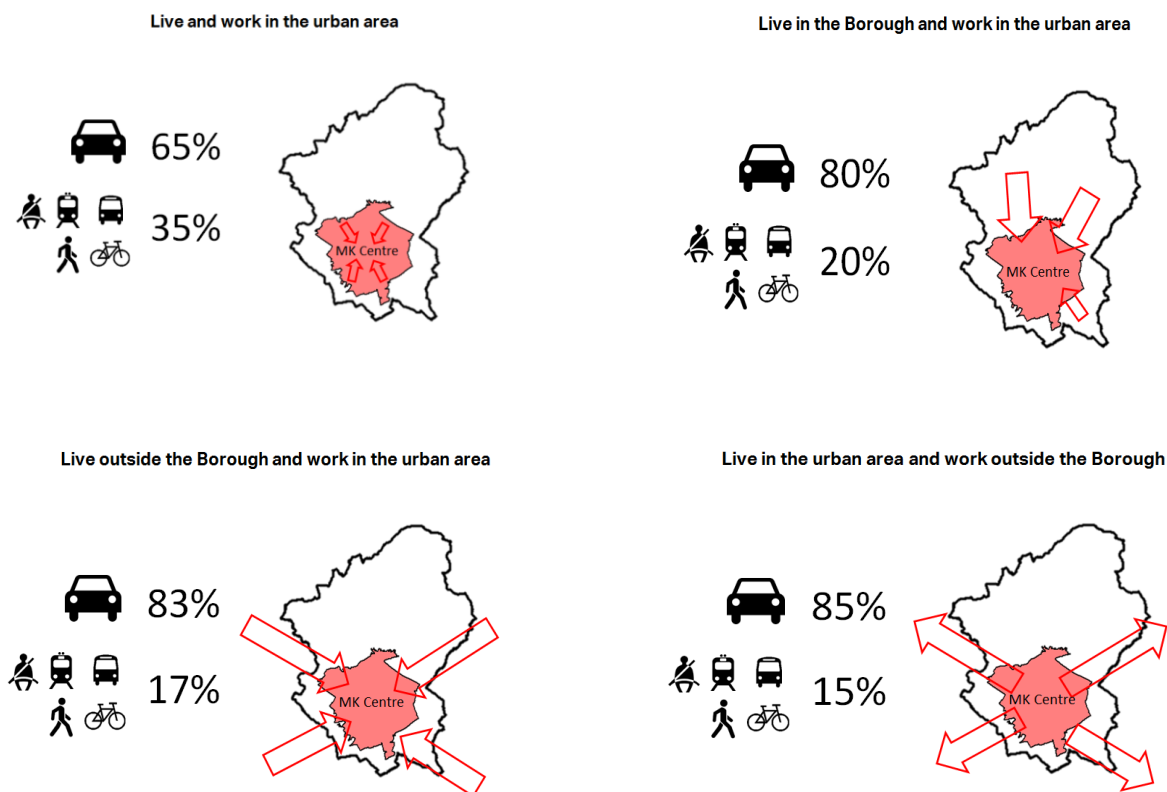
Within CMK approximately 7% of JTW trips are made by foot, 3% are made by bicycle and 6% are made by public transport with 10% working mainly at or from home. These numbers are particularly low given the extensive Redway network available for residents as well as accessibility by public transport.

As can be seen in *Figure 18* journey times by public transport vary within CMK, with some locations (within 5km of the city centre) taking up to 30 mins to reach the destination. It is worth noting that within Northampton and Peterborough on average 21% of trips to work are made by foot or bicycle and on average only 57% of trips are made by car. In Cambridge residents made less than 40% of trips within the city car in 2011, and less than 70% of residents of South Cambridgeshire accessed the city by car in the same year[40].

Approximately 5% of JTW trips from outside of CMK are made by public transport. This suggests more reliance on car travel within the rural areas as well as infrequent or poorly routed public transport networks coupled with the ease and convenience of driving to CMK.

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[40] Transport Strategy for Cambridge and South Cambridgeshire (2014).

Approximately 8% of JTW trips are made by either bus or train which again shows a clear dominance of car as the preferred mode of transport. Approximately 7% of JTW trips from CMK to neighbouring towns (listed above) are made by either bus or train. Again this highlights the dominance of car as the preferred mode of transport.

Journey to Work Destinations

Origin – destination data was taken from the JTW Census data and mapped to determine the top origins and destinations within Milton Keynes for commuting patterns. *Figure 22* shows the main origin and destinations by middle layer super output areas (MSOA). The main destinations are centred on CMK.

Figure 22   Journey to work top 10 origins and destinations
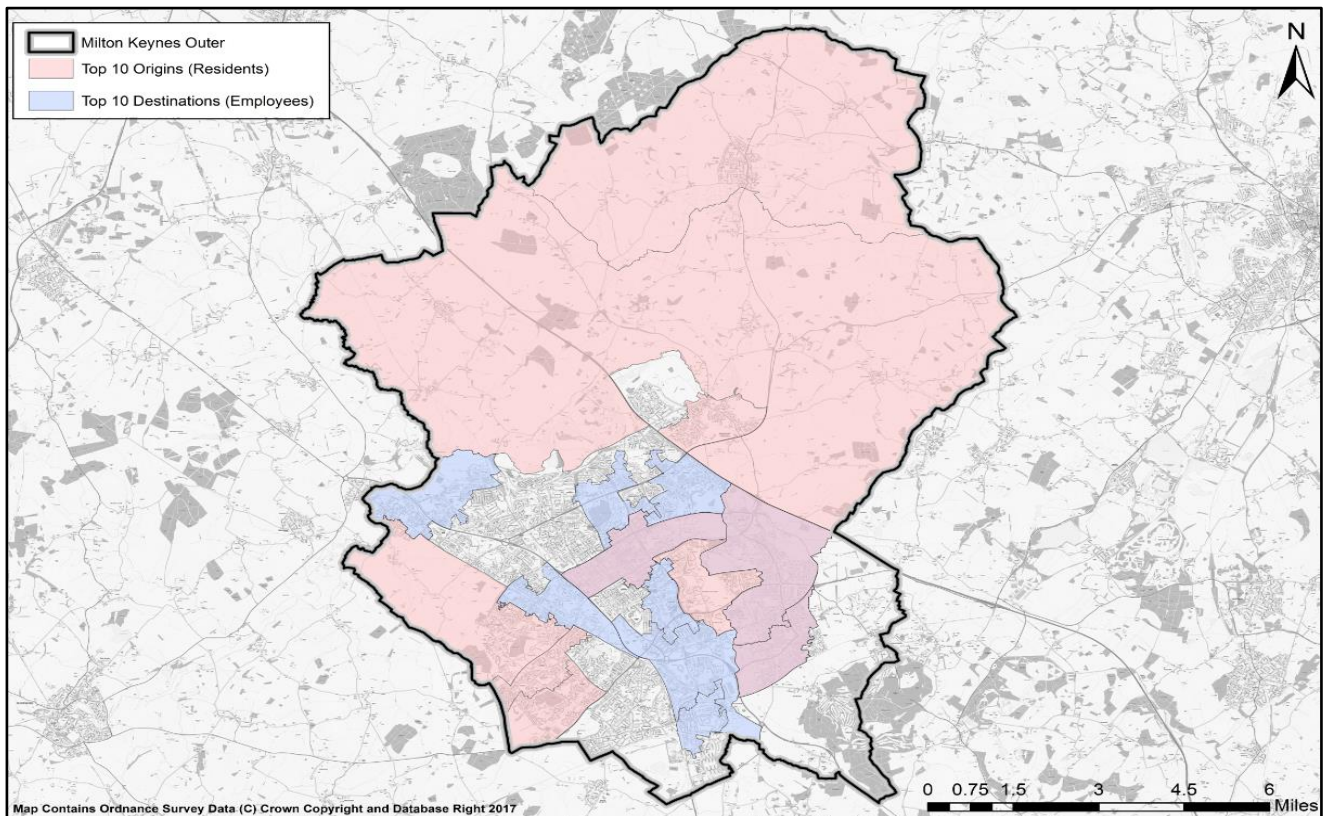
4.11   Land Use

Milton Keynes is an area of mixed land use with key employment and housing areas. *Figure 23* outlines the land use of Milton Keynes and future proposed sites, there is a distinctive split between urban and rural areas and rural growth with the majority of new housing being planned in or adjoining urban areas[41]. Within the city there are a number of undeveloped pieces of land, these are mainly employment sites such as Walton and Shenley Wood (shaded dark purple in *Figure 23*).

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[41] *Plan:MK Topic Paper- The Way Forward; preparing a Vision and Development strategy for Plan:MK,*

Figure 23 Land Use of Milton Keynes[42]
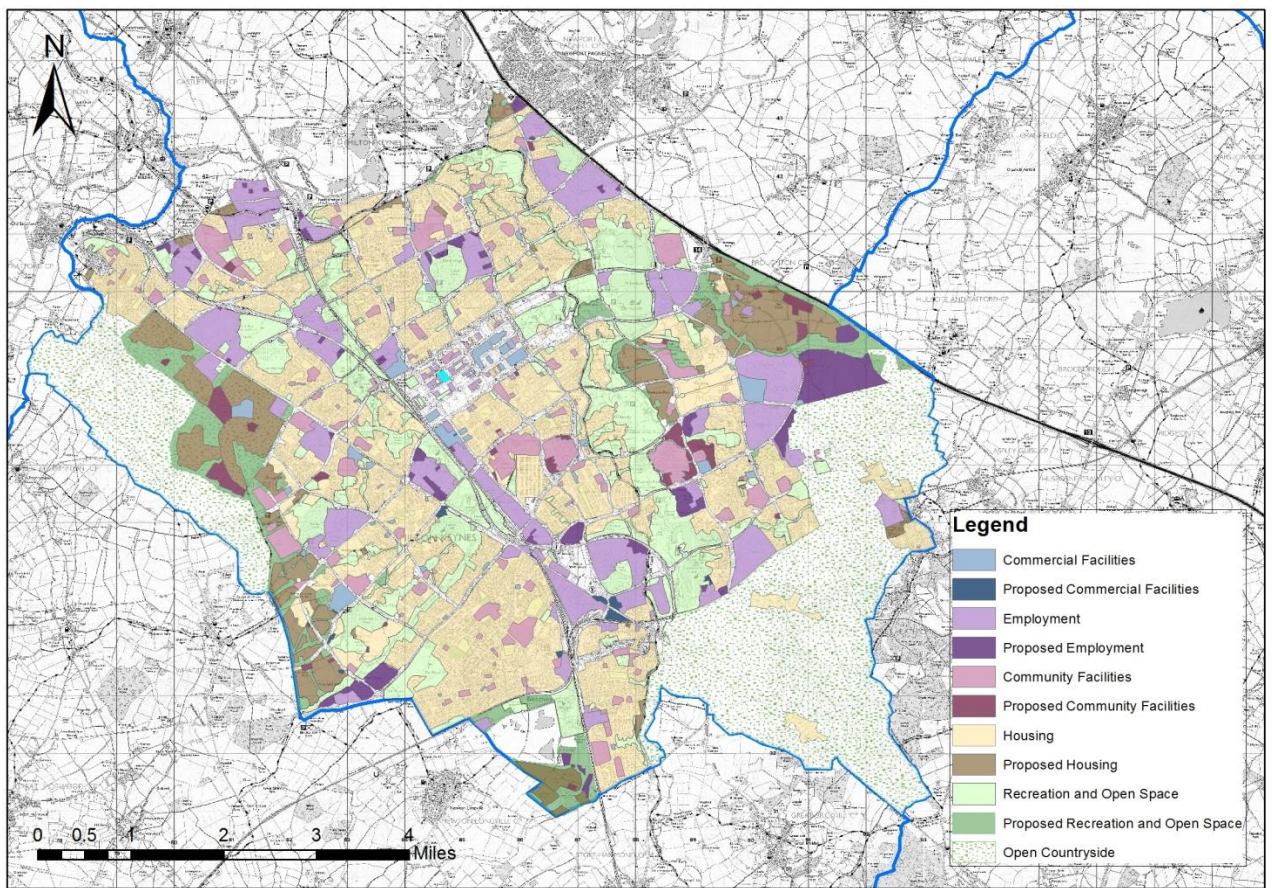
Throughout the city there is a network of well-defined open spaces and parks many of which follow local networks and streams, proposed recreation and open spaces look to enhance this structure. Many of the housing areas have provision for community facilities and limited commercial facilities.

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[42] *Milton Keynes Local Plan,* Available at: http://www.cartogold.co.uk/miltonkeynes/Milton_Keynes.htm

5. Review of Current and Future Transport Conditions

This section aims to identify and discuss the characteristics of the existing network of Milton Keynes, and the forecast future network conditions based on outputs from the Milton Keynes Multi-Modal Model.

5.1 Existing Network Characteristics

5.1.1 Road Network

The urban area is centred on a grid network of roads and mainly roundabout junctions, which in general does not suffer from significant congestion. However, there are heavy flows of traffic leading to and from the major gateways, such as the M1 junctions 14 and 13 and to and from CMK on the B4034 and A422.

Figure 24 is an output from the Milton Keynes Multi Modal Model (MKMMM), it shows congestion hot spots on links and junctions and can be used to help make decisions on future development and management of transportation systems. MKMMM is used to forecast future travel patterns and can also be used to test various schemes, such as increasing capacity at junctions, road layout improvements and new road links.

It can be seen in the screenshot that the B4034 and A422 experience significant congestion at junctions in the AM peak. Standing Way junctions with Watling Street, Grafton Street and A4146 also experience congestion. This indicates that currently, traffic flows from the north east and south east and the M1 are resulting in congestion into Milton Keynes.

Figure 24 Congestion hot spots – 2016 Base AM Peak link and junction v/c over 85%
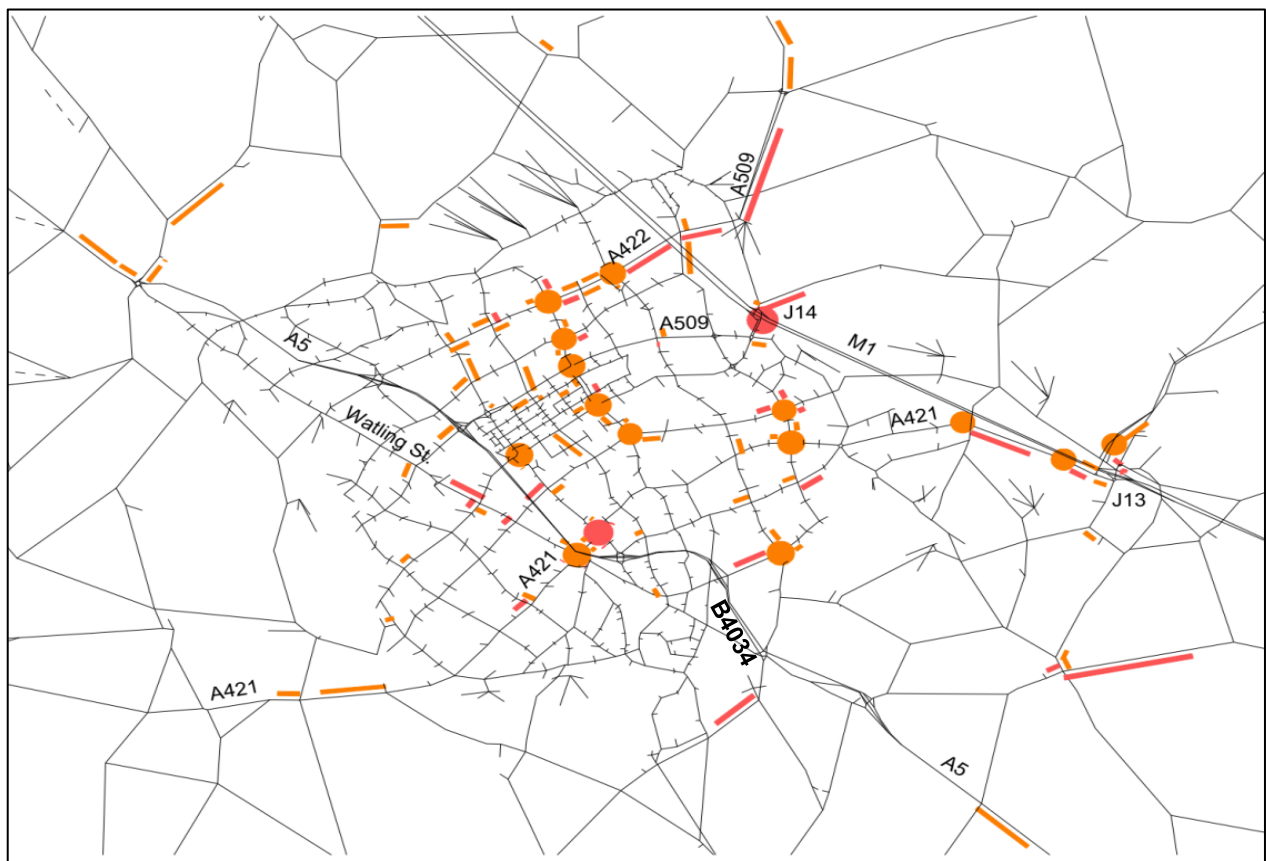
The speed limit restrictions for the Milton Keynes road network are shown in Figure 25. What differentiates CMK from other town / city centres within the UK is the use of a unique grid road system which has a speed limit of 60 / 70 mph. Generally the traffic entering CMK can do so at a higher speed limit to other town centres, most likely due to the grid road configuration.

The speed limit within CMK is predominately 30 / 40mph and there are approximately 14 intersections (all roundabouts, four of which are signalised) with the surrounding grid road network. This in turn provides virtually straight, high speed and continual connectivity to the A5 and the M1.

Whilst the grid road network provides below average journey times compared to other cities in the UK, journey times in Milton Keynes have increased by 12.1% in the period 2009 to 2015. The average journey time during the weekday morning peak on 'A' roads is 1.95 minutes per mile compared to 1.74 minutes per mile in 2009. Traffic flows within Milton Keynes and into Milton Keynes have also experienced increases. Average annual traffic flows have seen a 6% increase in the period 2009 – 2015. Similarly, there has been a 4.9% increase in car journeys into CMK during 7am – 10am weekdays since 2009.

As well as increased journey times, average vehicle speeds along major roads during the weekday peak have decreased. In 2009 the average vehicle speed across all major roads was 35.4 mph. In 2015, this average had decreased to 31.5 mph. It is evident that the road network is performing well compared to other cities In the UK, however increases in traffic flows have already and will continue to have an impact on journey times and vehicle speeds and will threaten Milton Keynes' unique journey time reliability in the future.

Figure 25 Maximum speed limits in Milton Keynes
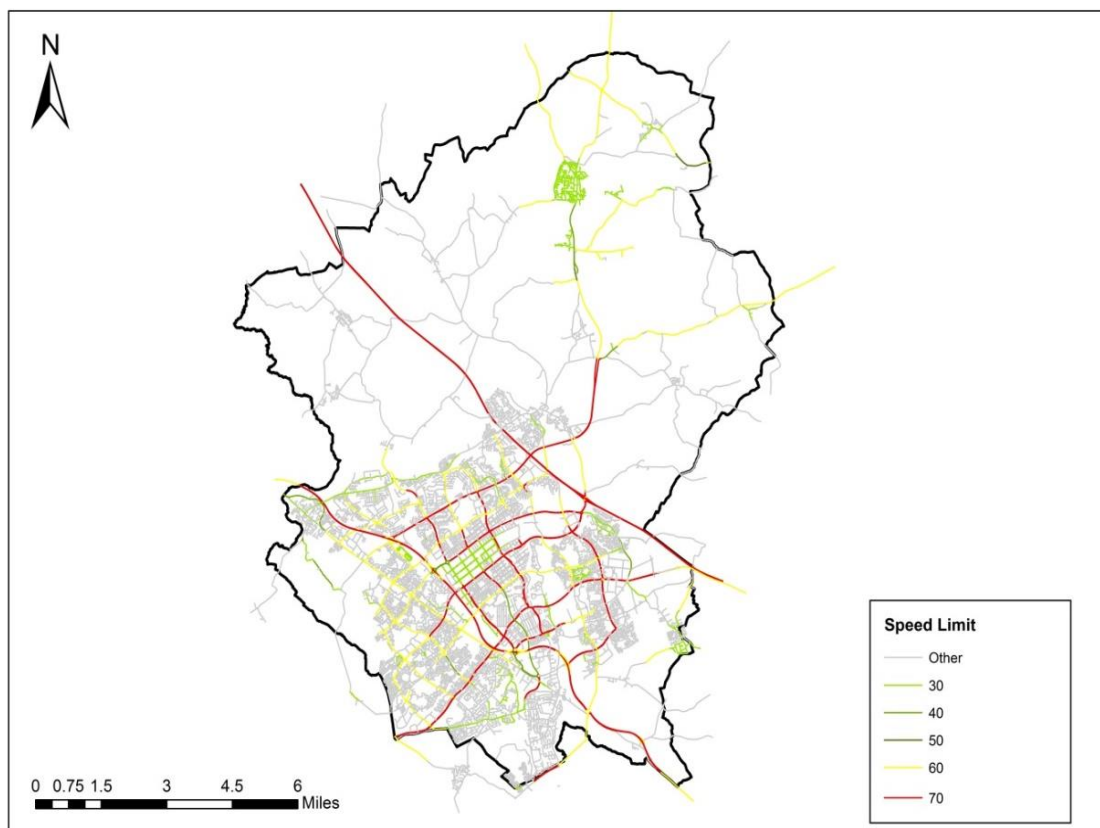
5.1.2   Redway Network

The Milton Keynes Redway network is approximately 320km in length. Both pedestrians and cyclists are free to use the network which is spread across CMK and its surrounding areas and is aligned either next to grid roads or off-road.

It is clear from discussion with internal council officers attending the Task 3 workshop and JTW data that the Redways are currently under-utilised and cycling does not currently have a large mode share. According to the Active People Survey (2014/15) for DfT, only 15% of adults in Milton Keynes cycle at least once per month for any purpose. Secondly, cycling accounts for only 4% of journeys to work within Milton Keynes which equals that in neighbouring Bedford (4%) and is less than neighbouring Aylesbury Vale (5%).

The Milton Keynes Smarter Choices Strategy states that cycling routes are "perceived to be indirect and unsafe", with the following barriers listed:

- Low levels of lighting;
- Maintenance issues; and
- Poor wayfinding.

However, MKC is currently aiming to address these issues through the Super Redways scheme, discussed in the LTP3 review.

The 2015 British Social Attitudes Survey[43] states that nationally, men are more likely to switch to cycling for short journeys than women (50% compared to 33%). This may reflect lower levels of cycling amongst women and higher safety concerns, or that more of the journeys undertaken by women are less practical with a bicycle than with a car. Additionally, for short journeys made by car, cyclists are more likely to agree that they could switch to cycling than non-cyclists (57% compared to 35%).

This shows there is a need to address barriers facing cyclists as well as encourage mode shift from the car to sustainable transport, such as walking and cycling.

5.1.3   Road Safety

Figure 26 displays the number of reported casualties killed or seriously injured for each method of travel by year. The information summarised is taken from the DfT STATS19 report which is published annually by the DfT.

Since 2006 there has been a decline in total number of casualties killed or seriously injured with a spike in 2013 causing the total number to increase again. In 2014 49% of casualties reported were car occupants, which is 4% higher than the national split of that year.

In 2014 the total number of casualties fell again, with motorcycle numbers reaching the lowest recorded rate in 10 years and car occupants making up nearly half of the total. Pedestrians make up 24%, cyclists 11%, motorcyclists 13% and car occupants 46%.

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[43] *British Social Attitudes Survey 2015: Public Attitudes towards Transport,* January 2017

Figure 26 Milton Keynes Reported Road Casualties Killed or Seriously Injured[44]
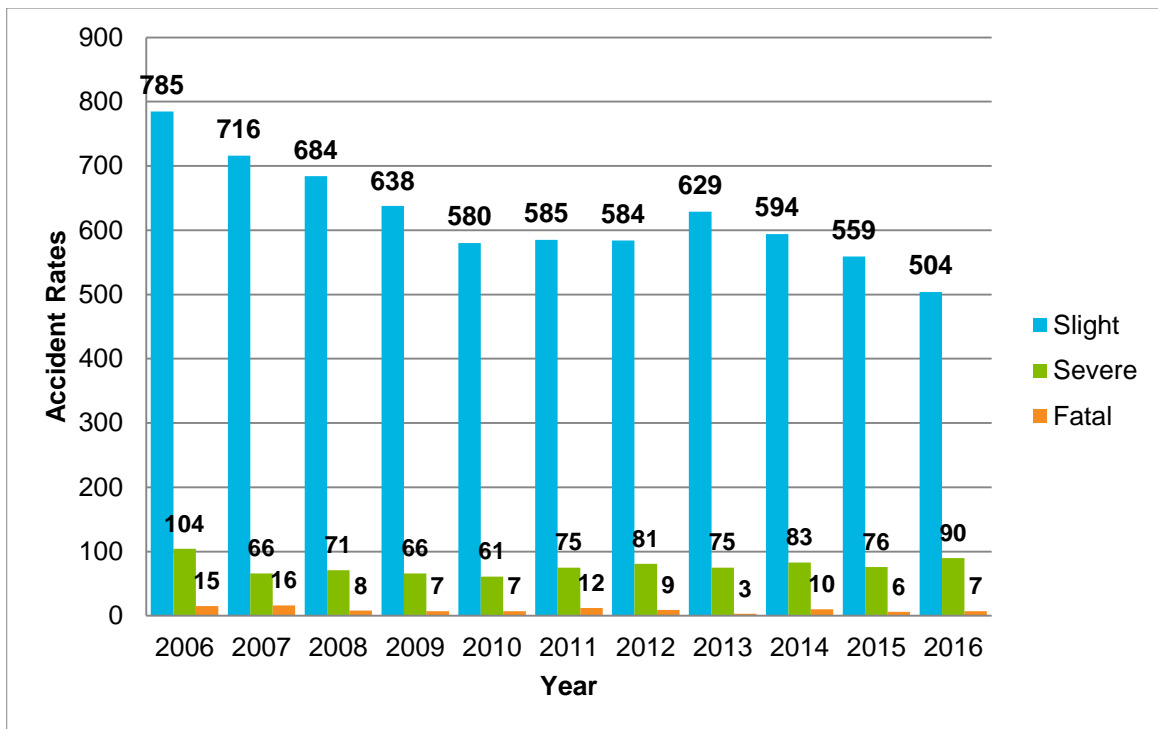
5.1.4   Freight Movements

Within the UK, freight is primarily moved via roads. In 2016 nearly three quarters (76%) of all goods were moved via roads, with the remainder by water (15%) and rail (9%)[45].

When approaching Milton Keynes the A421 experiences a significant amount of freight traffic as does as the A5 which passes close to CMK[46]. Milton Keynes is home to distribution centres for a number of major national freight companies and has the M1 running directly through it. Because of this Milton Keynes experiences a high proportion of both passing freight and also freight with origins or destinations within Milton Keynes, such as the distribution centres, commercial centres or retail areas.

According to the Rail Freight Study (published by Network Rail in 2017) we can expect to see an overall growth rate in rail freight of 2.9% per year (in total tonne kilometres) from 2011 to 2043. If HS2 goes ahead, it will alleviate much of the demand on the WCML and allow for an increase in freight capacity.

5.2   Future Year Growth

Household growth that has been captured in the current future 2031 scenario of the MKMMM is shown in Figure 27. It shows that most of the growth is focused around the periphery of MK, and up to 500 new homes in the north. Additional growth is expected to come from Plan:MK, which is in the process of being drafted at the time of writing this report, therefore these growth scenarios have not yet been captured in future 2031 scenario.

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[44] Source: DfT STATS19 Report
[45] Domestic Road Freight Statistics 2016
[46] DfT – Milton Keynes Traffic 2016 Count Data

Figure 27 Household growth 2016 – 2031
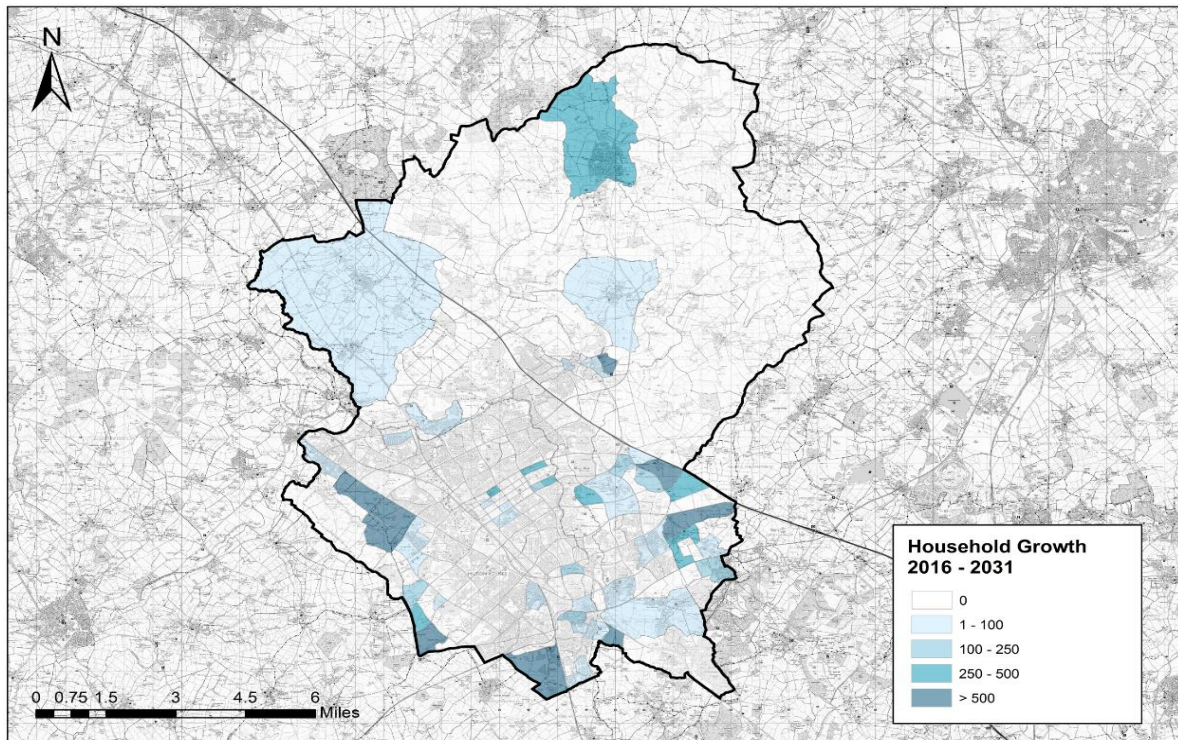
Additionally, Figure 28 shows employment growth, which is concentrated in CMK as well as to the east and west of the city centre.

Figure 28 Employment growth 2016 – 2031
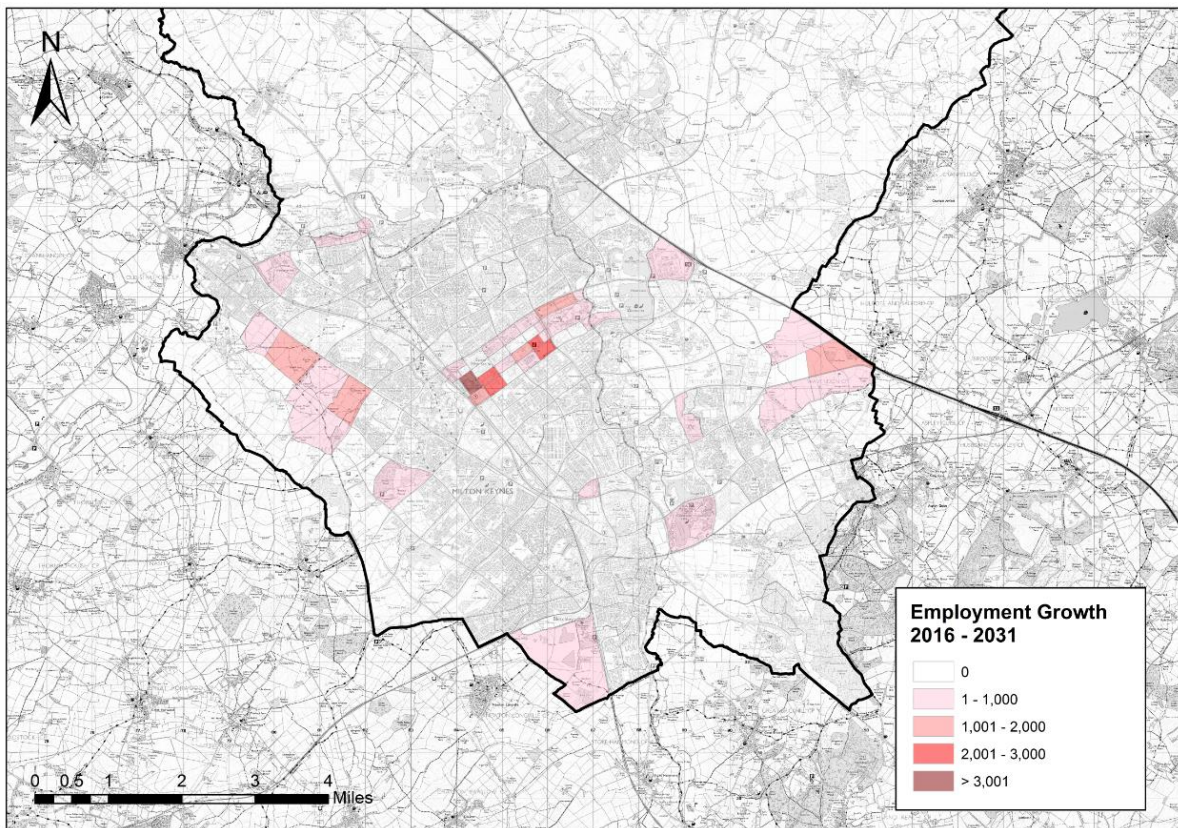
In the wider region beyond the borough's border, significant growth is also expected to take place in Central Bedfordshire, Aylesbury, Luton, Northampton, Oxford and Cambridge. Impacts of this growth will mean additional pressure on the transport network in Milton Keynes, for those accessing employment in the area and new housing.

Comparing this growth to the current top JTW origins and destinations, this will help to understand where future demand for trips will be. The map from earlier in the report, *Figure 22*, has been overlaid with future sites of employment to understand future commuting trip demands in *Figure 29*. It can be seen from this that the main employment destinations will remain relatively similar, with some additional trip demand to the west, and comparing the current top origins to the future household growth in *Figure 27*, there may also be additional origin trips from new growth areas to the west of CMK.

Figure 29 JTW Origins and Destinations and Future Employment sites
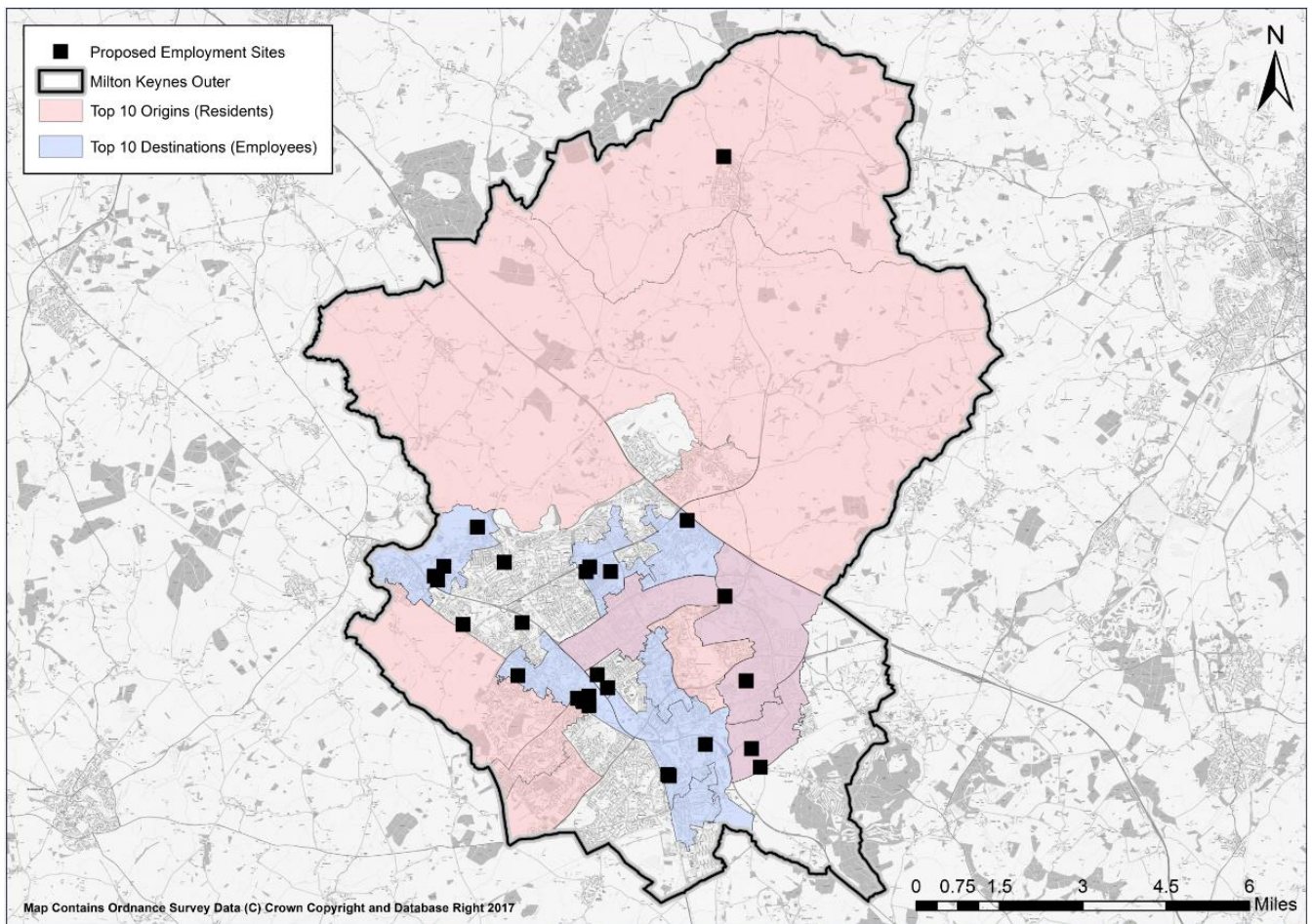
5.3   Future Transport Investment

Within the strategy period there are already a number of transport schemes committed or proposed (Figure 30). They consist of those that are already under construction, or committed to proceed or proposed schemes. They consist mainly of highway capacity improvements and larger strategic transport schemes, such as East West Rail. The map below presents future committed schemes that are included in the current future reference case scenario of the MKMMM.

Figure 30 Future transport developments
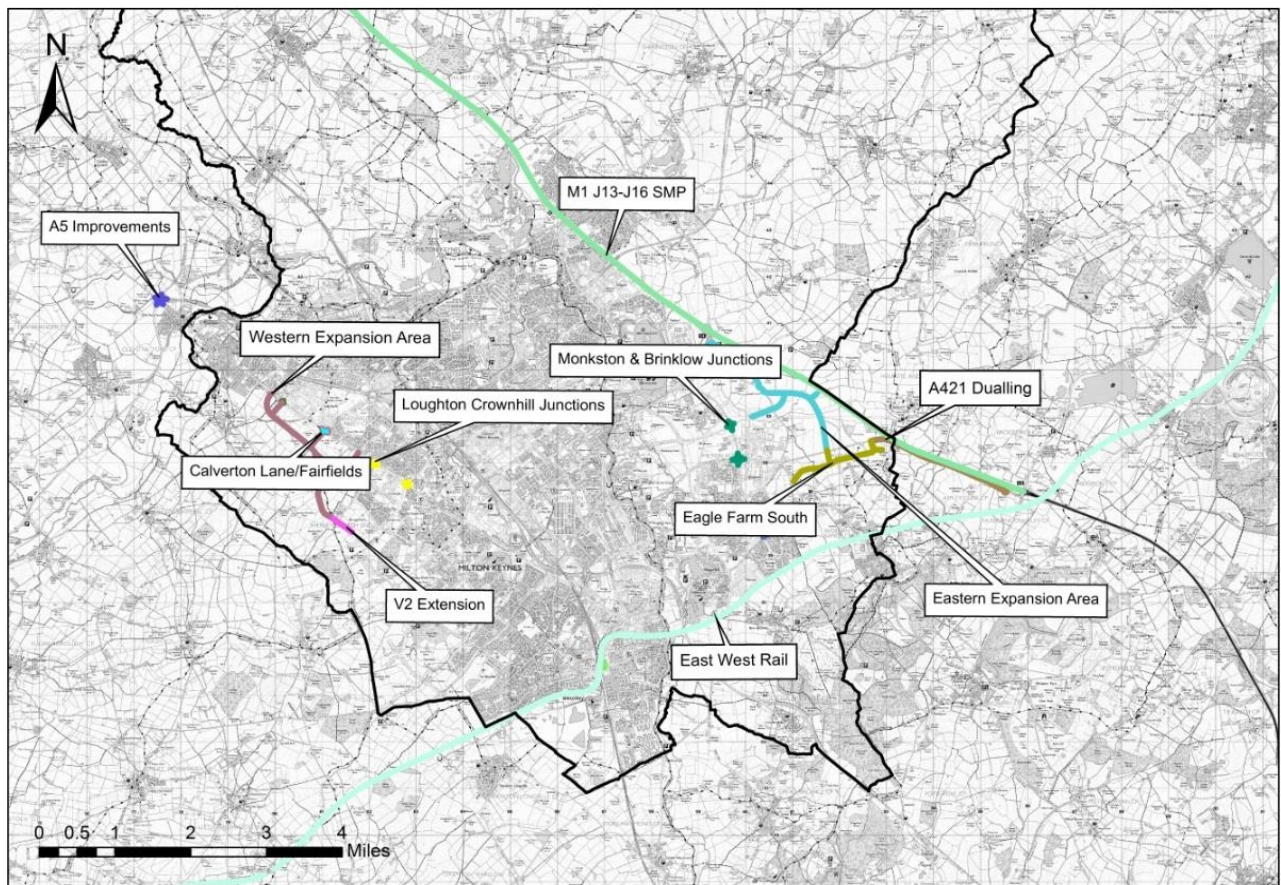
5.3.1   Future Network Conditions

The MKMMM was used to test the impact of growth in housing and employment, as identified earlier in this chapter, on the road network.

The future growth and transport interventions have been integrated into the reference forecast year of the MKMMM, 2031. This helps to predict what the future impacts will be to the road network and travel patterns. *Figure 31* shows the percentage increase in highway trips to, from and within MK, when comparing the 2016 base case to the 2031 reference case.

It shows that by 2031 there will be a significant increase of 20-32% in trips over current levels.

Figure 31 Percentage Increase in Highway Trips to, from and within Milton Keynes 2016 base to 2031 Reference Case
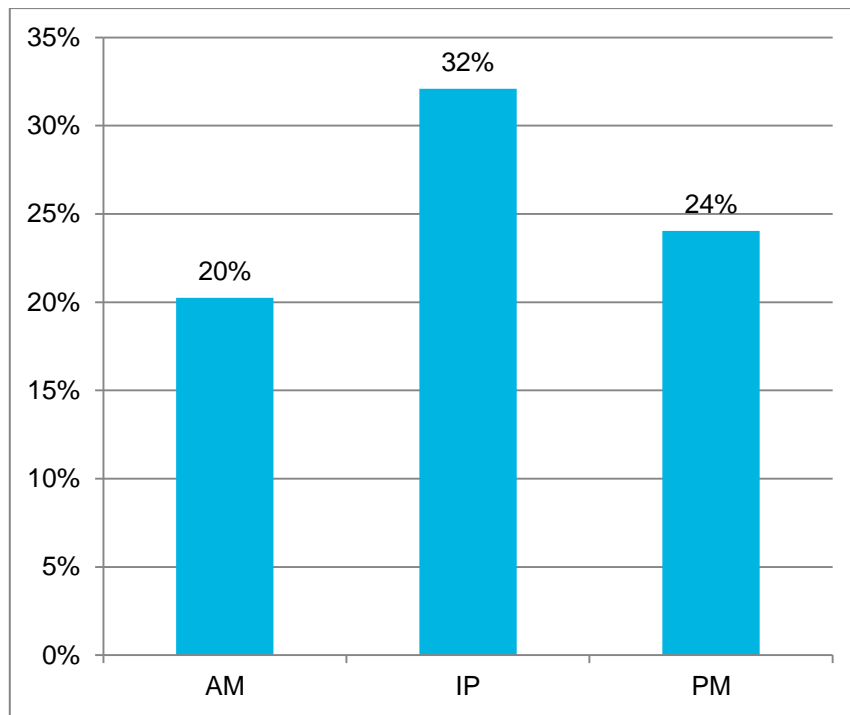
This in turn will also impact total travel time as shown in *Figure 32* and consequently network speeds; with the highest traffic volumes being in the AM and PM peaks, the greatest impact of this growth in trips will be felt in these periods. With Milton Keynes currently experiencing relatively stable and quick journey times, the challenge will be to manage the level of traffic growth so that the increases shown in the table below do not become a reality in the future.

Figure 32 Overall increase in Journey Times from 2016 to 2031 Reference Case
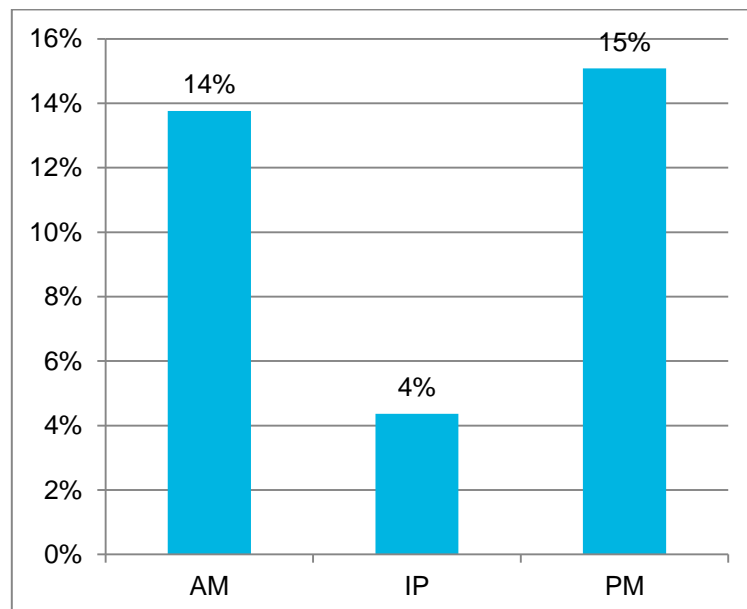
Table 16 Percentage Change in Simulation Network Performance from 2016 base to 2031 Reference Case

	AM Peak	Inter-Peak	PM Peak
Total Distance Travelled	19%	31%	23%
Total Travel Time	33%	36%	35%
Average Network Speed	-10%	-4%	-8%

Considering specifically car trips to CMK and their impact, the current future scenario predicts a 25% increase in car trips from Milton Keynes to CMK and a 42% increase from outside Milton Keynes to CMK during the AM peak hour. Therefore it appears from the MKMMM that the largest impact on car volumes will be from journeys originating outside MK. The challenge will be to capture these journeys using alternative modes, possibly through schemes such as East-West Rail, park and ride sites, improved bus network coverage, Mobility as a Service and car-pooling.

Figure 33 is the AM peak 2031 Reference Case scenario for CMK, those junctions and links which are highlighted in red show where the volume of traffic flow rises above 85% of the road or junction capacity. These are considered the potential congestion hotspots of the future if this predicted traffic growth occurs. It shows that there will continue to be congestion issues in the north-west and south-east, and additionally in the north-east.

Figure 33 Congestion hot spots – 2031 AM Peak link and junction v/c over 85%
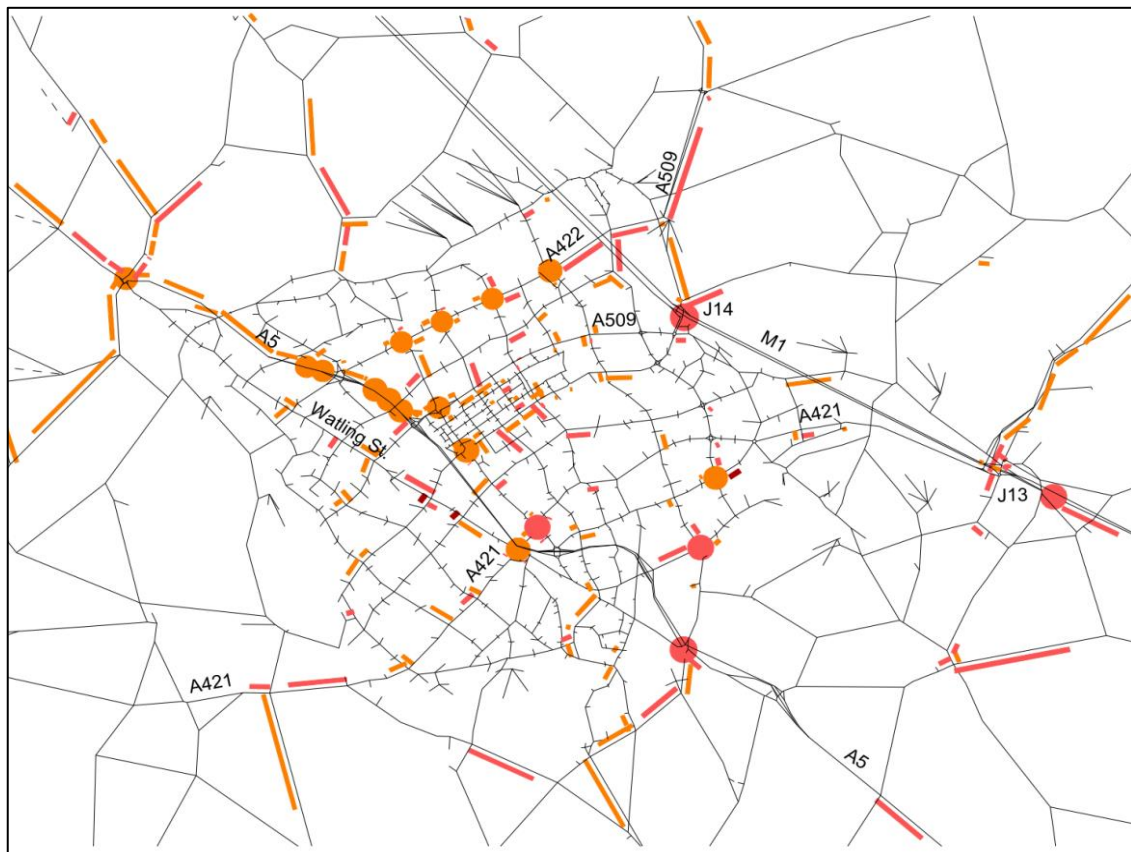
The entry points into Milton Keynes are generally more 'stressed' than in the Base 2016 Model alongside the internal Milton Keynes Central network due to the greater level of in-commuting from outside of Milton Keynes. Of the entry links and in comparison to the Base Model:

- The A421 junctions are more overloaded.

- The A5 links and junctions show congestion issues in part because traffic seeks alternative options into Milton Keynes as well as the general growth in traffic on the network. The southern entry links are also starting to become more congested.

- The A509 from Chicheley Hill Roundabout and down to M1 Junction 14 are more overloaded and more junctions along the A422 are showing over capacity issues.

- M1 J14 in particular shows a greater level of congestion than in the model Base Year of 2016 with increased congestion forecast at Northfield Roundabout, the next junction towards central Milton Keynes.

- The Child's Way junction on Watling Street is overcapacity in both the AM and PM Peak (in addition to the A421 – Elfield Park Roundabout - already over capacity in the Base year).

More of central Milton Keynes links and junctions, particularly on its perimeter, are over capacity and there is a notable reassignment of traffic around central Milton Keynes resulting forecast growth.

The junctions and corridors that are forecast to show stress are:

- A5 North;

- A422 Corridor;

- A421 Corridor;

- M1 J14 / Northfield Roundabout;

- CMK – including Marlborough Street (base), Grafton St/Station;

- A4146 (Willowbridge – A5); and

- Western Expansion Area / Watling Street.

5.3.2 Future public transport forecasts

Significant growth in the use of public transport occurs in all three time periods at 18%, 33% and 27% growth for AM, Inter-peak and PM respectively in the 'MK Urban Area'. The percentage increases of public transport usage by time and distance can be seen in Table 17.

Table 17 Public Transport Percentage Increase from 2016 base to 2031 Reference Case – 'Internal Area'

	AM Peak	Inter-Peak	PM Peak
Passenger Hours	9%	22%	16%
Passenger Km	9%	20%	14%

5.3.3 Electric Vehicle Use and Future Technology

As the emphasis of vehicle production moves away from petrol / diesel and looks towards environmentally and financially sound electric vehicles, it is important to consider the impact electric vehicles will have upon Britain's roads. According to research published by Bloomberg New Energy Finance; by the year 2030 one in every 12 vehicles sold will be electric, with only one in every 200 being sold today.

Although conventional cars are currently cheaper to run and purchase, by 2022 the cost comparison is likely to switch and make electric cars the more favourable choice. By the year 2040 the report estimates that 54% of all new car sales will be electric.

Both France and China have publicised ambitious electric vehicle targets and with Britain to ban petrol / diesel by 2040, it is very clear that big changes are on the horizon.

- If electric vehicles are likely to cost less to run and purchase, will car ownership increase? In turn this will likely increase demand on the road network and parking infrastructure.

- Improvements in car-to-car communication and other technologies (such as autonomous vehicles) could potentially see an improvement in journey time and safety. Self-navigation for example will optimise route choice and journey time. Will this in turn lead to a reduction in demand on the network as self-navigation optimises journeys? Or will it see an increase as autonomous vehicles will remain on the road for significantly longer than conventionally operated cars.

6.   Impact of Plan:MK Scenario 1

This chapter discusses the impacts of Plan:MK Scenario 1 growth on the highway and public transport networks. To assess the impacts of the scenario, results from the Plan:MK Scenario 1 model run are compared against the 2031 'Reference Case' scenario.

The 2031 reference case scenario includes the current committed growth in Milton Keynes up to 2013 which includes in the region of 22,000 dwellings and 29,000 jobs with infrastructure that is expected to be in place by 2031. Plan:MK Scenario 1 includes the same growth as the Reference Case plus an additional 5,620 dwellings (5,435 Households) and an additional 4,254 additional jobs.

It is important to consider the relative growth of Plan:MK Scenario 1 and the size of additional growth compared to the 110,000 dwellings and jobs already in Milton Keynes borough. The reference case increases dwellings by 20% and jobs by 17%, whereas Plan:MK Scenario 1 growth accounts for an additional 4% increase in dwellings and a 2% increase in jobs compared to total dwellings and jobs expected in the 2031 Reference Case.

6.1   Future network conditions

There is a slight increase in trips over all three time periods when comparing reference case trips and Plan:MK Scenario 1 trip totals, this is outlined in Table 18. The impact of this is slight compared to the growth between 2016 and the reference case. Even though there is a slight increase in demand changes in network speed are negligible. It is also worth noting that the jobs growth in Plan:MK Scenario 1 is outside the CMK cordon so jobs within the cordon remain the same as the in the Reference Case resulting in little change in the total trips crossing into CMK in the AM and out in the PM.

It is clear that Plan:MK Scenario 1 has little additional impact on the total distance travelled within the simulation area over the impact seen in the reference case, with the percentage changes for car, bus and rail all around 1%. In terms of traffic flow Plan:MK Scenario1 has limited additional impact on traffic flows in Milton Keynes. The growth in traffic flows is focussed on Tongwell Street between H9 and H10 and the A5 between H9 and Kelly's Kitchen Roundabout.

Table 18 Highway Matrix totals (Car, excluding through trips)

	Reference Case demand	Plan:MK Scenario 1 demand	% increase between Ref and Scenario 1
AM	66,688	67,725	1.6%
IP	44,288	44,733	1.0%
PM	72,018	72,912	1.2%

This reflects the additional 1,000 dwellings in the Strategic Expansion Area South East accessing the network via the H10 extension and 4,254 jobs in South Caldecotte. The flow difference for the AM peak period is displayed below.

Figure 34 Change in modelled flow, Plan:MK Scenario 1 – Reference Case AM
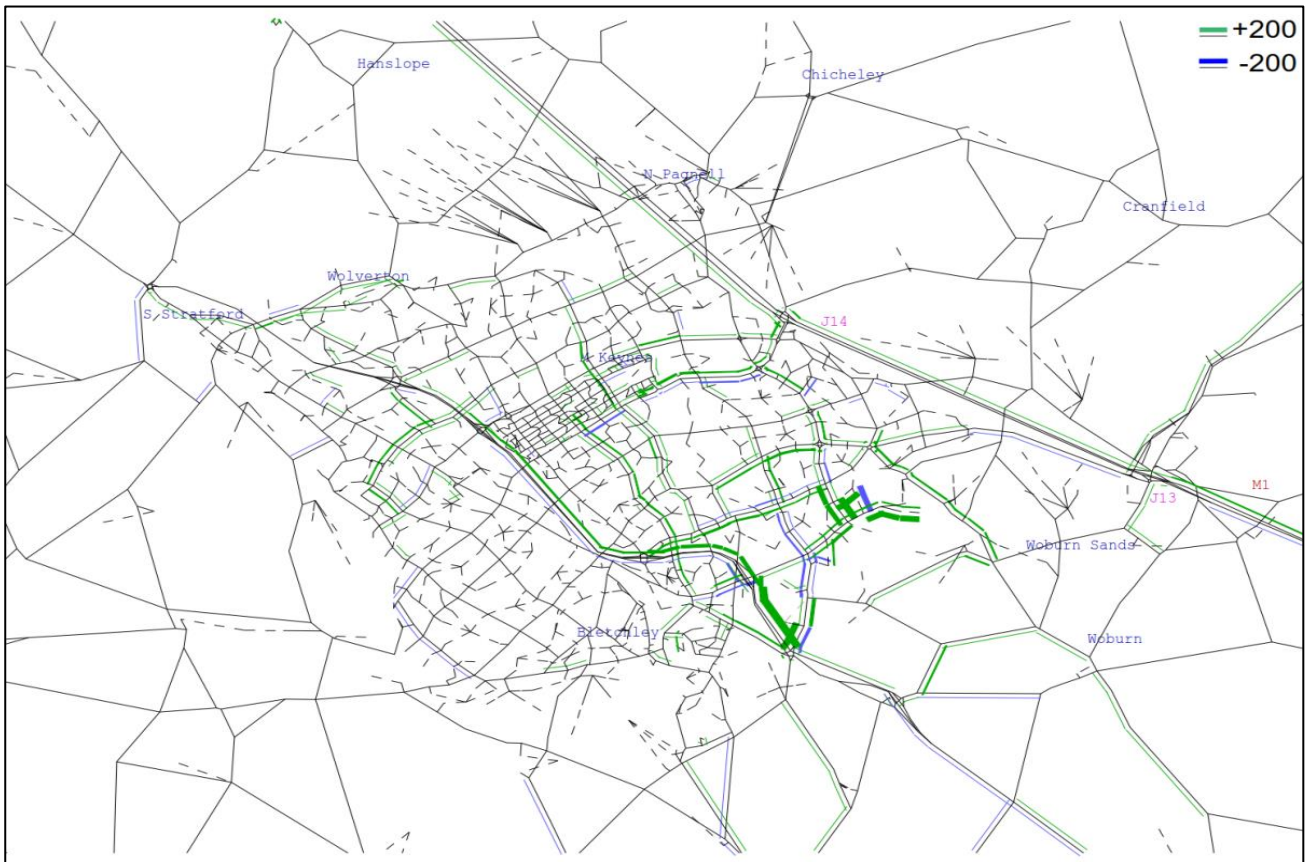
6.2   Public Transport

There is greater growth in public transport demand between the Reference case and Plan:MK Scenario 1 demand than highway demand as seen previously. The greatest growth occurs in the AM Peak period as seen in Table 19.

Table 19 Public Transport totals (excluding external to external trips)

	Reference Case demand	Plan: MK Scenario 1 demand	2031 Sc. 1 Post Demand Model
AM	6,253	6,409	2.5%
IP	5,111	5,199	1.7%
PM	6,195	6,316	2.0%

6.3   Plan:MK Scenario 1 Conclusions

Plan MK: Scenario 1 has little additional impact over and above the reference case in terms of both traffic flow and delays across the Milton Keynes Urban area. Plan:MK Scenario 1 does impact around south Caldecotte and Strategic Expansion Area South East sites with a number of junctions requiring further mitigation measures in addition to the mitigation required to address reference case issues. Both trip distance and travel time changes for car and public transport are negligible.

7.   Challenges and Opportunities

While Milton Keynes has made significant progress since the LTP3 was adopted, there remain challenges that need to be addressed if this rate of progress is to be maintained, and if the ambitious growth planned for Milton Keynes is to be delivered.

Existing conditions and future opportunities for transport in Milton Keynes were considered through a review of baseline evidence and future conditions for growth and transport and are set out below.

7.1   Current Transport Conditions

7.1.1   Milton Keynes Multi-Modal Model

The existing Milton Keynes Multi-Modal Model (MKMMM) was produced in 2009 to predict transport demand and movements across the entire Milton Keynes Borough in the future. It was updated in 2016 to provide an up-to-date baseline for option and growth testing, including the testing of the Plan:MK growth scenario.

The new baseline is 2016 and the future scenarios have been modelled for 2031. Transport impacts from the baseline and future scenarios have informed the Mobility Strategy.

7.1.2   Travel Patterns

Travel patterns in Milton Keynes are currently dominated by a high level of private car usage, despite having a substantial walking and cycling network in the Redways. The town's efficient grid road network, relatively stable journey times and the availability of cheap parking are the main reasons for this. The convenience and cost of driving into CMK ensures that for many residents and visitors, the car is the most obvious choice; and in some cases, especially multi- purpose, multi-destination journeys, the only mode of transport available.

Residents have above average car ownership at 81%, compared with 74% for the rest of England (2011 Census), with the 2011 Census also reporting an above average car use for the journey to work at 62%, against 54% for England, and 29% for journeys to school made by car. There are also pockets of low car ownership in Milton Keynes, predominantly in those areas where deprivation levels are highest. It is important that the residents of these area have access to other modes of transport so they can access employment and key services.

In 2011, broadly two thirds of journey to work trips in the town were car based while all other modes accounted for one third of trip. The domination of car based trips is even greater when longer distance trips are considered.

Table 20 Journey to work trips

Mode	Live and work in the urban area	Live in the Borough and work in the urban area	Live outside the and work in the Borough	Live in the urban area but work outside the Borough
Car	65%	80%	83%	85%
All other modes	35%	20%	17%	15%

Source: Census 2011

Table 20 shows that for journey to work trips, car is the dominant mode, not only for trips within the town, but particularly for longer distance trips. With additional growth in employment Milton Keynes will become an even more attractive destination and the number of car based trips can be expected to increase.

The grid based road network, the supply and cost of parking in Central Milton Keynes reinforces the decision to drive as a cheap and convenient mode of travel meaning that other modes, such as public transit or cycling, cannot compete. The greater the use of car as a mode the less viable public transit options become, which has an adverse impact on available routes and service frequency making it less attractive as an option.

In most cases, there is adequate parking available; however parking demand can exceed capacity at key trip generator locations, such as weekdays around the employment area in the western half of Central Milton Keynes. Similarly, parking demand exceeds capacity on weekends around the retail core of Central Milton Keynes, particularly in the build up to Christmas. In both cases the issue is not a lack of supply as there is parking available nearby, which wayfinding signage or real time parking information could overcome, but the perception of drivers that they will be able to park at their immediate destination.

The major benefit to drivers is the cost of car parking. The average cost of car parking in Central Milton Keynes is £2.80, based on a 225 day working year. By comparison, the average cost of travelling within Milton Keynes by bus is £2.83, however from neighbouring towns; the cost is considerably higher at £5.53.

Such behaviour is firmly cemented into the mind-set of the town's residents and employers and the challenge lies in providing viable alternatives. Through LTP3 programme elements, efforts have targeted these patterns, from improving bus services, to travel planning for workplaces, and schools offering incentives to encourage sustainable travel among the population. Future development proposals will seek to improve the relationship between transport infrastructure and the layout of built form to increase its accessibility for transport users in a more connected way.

The Mobility Strategy 2018 – 2036 continues these programmes for influencing behaviour which challenge embedded perceptions and tackle the habitual default use of the car. This is especially critical given the town's growth ambition, and it is important that they are implemented alongside infrastructure improvements and other interventions which will provide residents with real transport choices which enable and encourage more sustainable travel behaviour.

7.1.3   Grid Road Network

Milton Keynes' urban area is centred on a grid network of roads and mainly roundabout junctions, which in general does not suffer from significant congestion. However, there are heavy flows of traffic leading to and from the major gateways, such as the M1 junctions 14 and 13 and to and from CMK on the B4034 and A422.

Figure 35 is an output from the Milton Keynes Multi Modal Model (MKMMM). It shows the model's representation of current congestion hot spots on links and junctions in the AM Peak period (07.00 – 09.00). Junctions and links which are highlighted in orange show where the volume of traffic flow rises above 85% of the road or junction capacity, those in red show a greater level of congestion at over 100% of link or junction capacity. By introducing forecast employment, housing and general traffic growth the model can be used test alternative interventions, such as increasing capacity at junctions, road layout improvements and new road links to help make decisions on future development and management of transportation systems.

Figure 35 MKMMM mapping of congestion hotspots 2016
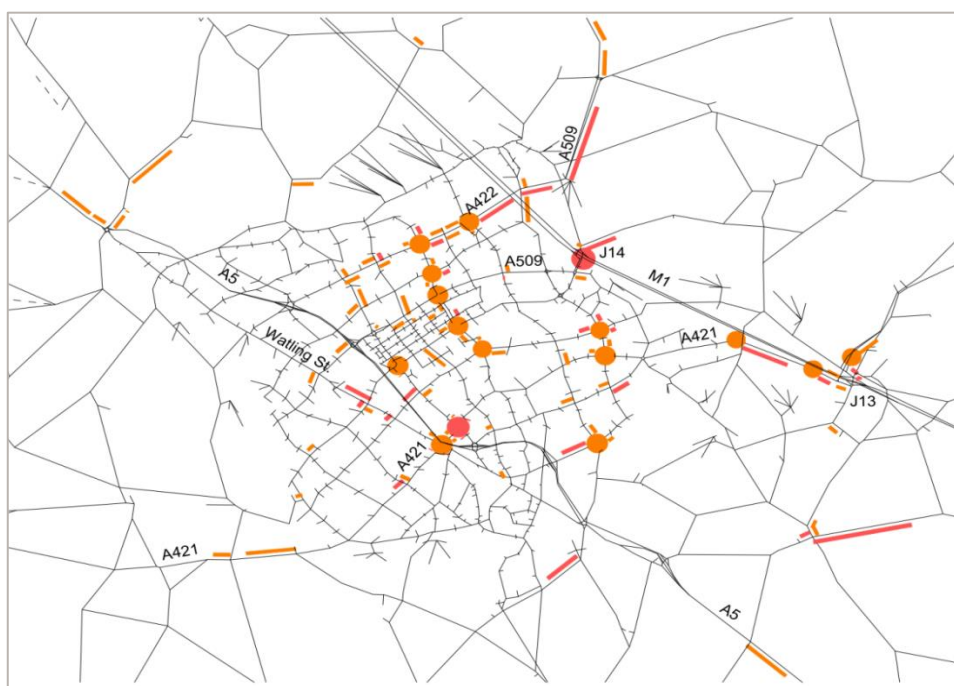
The 2016 Base Model showed that congestion issues were generally worse in the AM peak than the PM peak. This largely reflects the level of in-commuting to CMK and circulation of traffic within CMK (including links to / from the station/shopping centre and other key destinations).

Some of the capacity issues will be dealt with by planned and committed improvements to for example Brinklow and Monkston roundabouts and the A421 between M1 J13 and Eagle Farm. Other committed schemes such as junction improvements at Watling Street / Dansteed Way (Crownhill Junction) and Watling Street / Portway (Loughton Junction) will help to mitigate against future traffic arising from new development to the west of Milton Keynes.

7.1.4   Journey Times

What differentiates Milton Keynes from other large towns and cities within the UK is the use of a unique grid road system with speed limits of 60 / 70 mph. Generally the traffic entering Milton Keynes can do so at a higher speed limit to other urban centres, most likely due to the grid road configuration.

The speed limit on Milton Keynes' non-grid network is predominately 30 / 40mph and there are approximately 14 intersections (all roundabouts, four of which are signalised) with the surrounding grid road network. This in turn provides virtually straight, high speed and continual connectivity to the A5 and the M1.

Whilst the grid road network provides comparatively better network performance than other UK cities, Milton Keynes growth has had an impact on the performance of the network, as shown in Table 21. Average journey times, traffic flows and the volume of traffic entering Milton Keynes have increased over time.

Table 21 Network performance, 2009 - 2015

Performance Measure	2009	2015	% change
Average Journey Time (minutes per mile on A roads – weekday morning peak)	1min 40sec	1min 57sec	12
Annual average traffic flow	825,688	874,540	6

Source: Milton Keynes Council

As well as increased journey times, average vehicle speeds along major roads during the weekday peak have decreased. In 2009 the average vehicle speed across all major roads was 35.4 mph. In 2015, this average had decreased to 31.5 mph.

It is evident that the road network is performing well compared to other cities In the UK, however increases in traffic flows have already and will continue to have an impact on journey times and vehicle speeds and will threaten Milton Keynes' unique journey time reliability in the future.

7.1.5   Redway Network

Milton Keynes is home to 320 kilometres of multi-use paths known as Redways; it is also home to over 70 kilometres of leisure routes. Sustrans routes, bridleways, towpaths and other similar facilities also form part of a very large network for cycling. This unique design gives individuals in and around Milton Keynes safer opportunities for cycling away from the grid road.

 However, the Redways are not well used and cycling is does not currently have a large mode share. According to the Active People Survey (2014/15) only 15% of adults in Milton Keynes cycle at least once per month for any purpose. Furthermore, cycling accounts for only 4% of journeys to work within Milton Keynes which is similar to that in neighbouring Bedford (4%) and less than neighbouring Aylesbury Vale (5%).

Cycling routes are "perceived to be indirect and unsafe", with the following barriers:

- Low levels of lighting;
- Maintenance issues; and
- Poor wayfinding.

For short journeys made by car, drivers are more likely to agree that they could switch to cycling than non-cyclists (57% compared to 35%).[5]

78% of working age residents in Milton Keynes work within the borough and around 40% of journeys to work in and around Milton Keynes are less than 5km in length (a distance that can be cycled by most people in less than half an hour). Cycle ownership in Milton Keynes is around 1.79 cycles per household, according to recent household survey data and 47% of households in Milton Keynes own two or more bicycles. Despite all of this, the proportion of cycling trips for journeys to work in Milton Keynes is just 2.8% (2011 Census).

What this shows is that there is a need to address barriers facing cyclists as well as encourage mode shift from the car to sustainable transport, such as walking and cycling.

7.1.6   Active Travel

To promote active travel in Milton Keynes, we know that we need to ensure we have a supportive built environment where people can walk and cycle safely, where key services and destinations are located with pedestrians and cyclists in mind. We must also promote and market interventions to help people overcome their personal barriers to cycling.

The evidence for increasing physical activity is clear; promoting active lifestyles has the potential to improve the physical and mental health of the nation. As well as its benefits for health, increasing cycling will reduce transport costs, save money and help the environment. Promoting active travel will reduce traffic congestion and pollution. Physical inactivity creates substantial costs to the NHS and wider economy; the costs of lost productivity have been estimated at £5.5 billion per year for sickness absence and £1 billion per year from the premature death of people of working age.

Figure 36 Cycle Hire in Milton Keynes

An increase in cycling can support a wide range of local objectives such as; improving public health and tackling health inequalities, reducing carbon emissions, improving air quality and reducing congestion.

Despite benefiting from a comprehensive walking and cycling infrastructure with the Redways network, Milton Keynes experiences a low commuting mode share for cycling and walking.

With the Redways segregated from the main road grid pattern, users sometimes identify wayfinding and signage to be a challenge. Perception of safety is another concern

hindering the use of the routes among both pedestrians and cyclists, with users stating that the routes are sometimes poorly lit or overgrown.

The last link between the Redways and a destination can be a potential barrier, with cycle access or a lack of trip end cycling infrastructure exacerbating problems with the network itself. For example, a lack of secure cycle parking around the city at key destinations is a significant barrier to usage, in marked contrast to the wide scale availability of car parking. Similarly, there is a relative lack of facilities such as showers and storage at places of employment, which prevents the journey to work by active modes being an attractive and easy option.

7.1.7   Public Transport

Figure 37   Electric buses

The challenge for public transit is to be able to compete with the ease and convenience offered by a private vehicle.

Accessibility is one of the key issues preventing the use of public transport. Large rural areas, low density neighbourhoods in the city and complexity of urban estate networks make it difficult to provide a fast, frequent and efficient transport service, therefore reinforcing car ownership and car trips.

Furthermore, there are currently over 50 different bus routes serving Milton Keynes, including urban, rural, school, college, shopping and leisure routes. Despite these routes, there are still limited options for children to travel to school other than parents driving them.

Bus use is low for the journey to work, at just 5.5% of all commuting trips[47], however, 'enforced ridership' is an issue, as 40% of bus users are travelling to and from work, and 50% of bus users indicate that they have no other transport option[48]. This suggests a lack of options and bus use by default, not through choice. For the 19% of households in the Borough, the availability of low cost transport options to access education, training and employment opportunities is critical to ensure these residents are able to participate in economic growth.

It is evident that there are a number of barriers preventing public transport being the most obvious and most convenient mode of travel. However, interventions which focus on public transport alone will not necessarily encourage commuters to switch from the car unless measures are taken to make public transport more attractive than car driving.

7.1.8   Logistics

Within the UK, freight is primarily moved via roads. In 2016 nearly three quarters (76%) of all goods were moved via roads, with the remainder by water (15%) and rail (9%)[49]. Evidence

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[47] ONS, 2011 Census https://www.ons.gov.uk/census/2011census/2011censusdata
[48] Transport Focus, Bus Passenger Survey – Autumn 2016, 2017 https://www.transportfocus.org.uk/research-publications/research/bus-passenger-survey/
[49] Domestic Road Freight Statistics 2016 https://www.gov.uk/government/statistics/road-freight-statistics-2016

shows that when approaching Milton Keynes the A421 experiences a significant amount of freight traffic as does as the A5 which passes close to CMK[50]. The MKMMM shows that from 20019-2015 the greatest increase in flows were for LGVs (14%) and HGVs (19%), compared to cars (3%) over the same period. DfT's traffic forecasts[51] suggest LGV traffic will grow by at least 42% between 2010 and 2040.

Milton Keynes is home to distribution centres for a number of major national freight companies. Because of this and its location close to the strategic national road network Milton Keynes experiences a high proportion of both 'passing through' traffic and traffic with either an origin or destination within Milton Keynes, such as at one of the many distribution centres, commercial centres or retail areas.

Milton Keynes is also home to a number of rail freight distribution centres, many of which receive freight from ports in the north, south, east and west of the country. Much of the freight within Milton Keynes arrives via the West Coast Main Line (WCML) which carries intermodal traffic to intermediate terminals along the line.

According to the Rail Freight Study (Network Rail, 2017) the expectation is of an overall growth rate in rail freight of 2.9% per year (in total tonne kilometres) from 2011 to 2043. HS2, when it opens, will release capacity on the WCML and allow for an increase in freight capacity.

7.1.9   Road Safety

Since 2006 there has been a decline in the total number of casualties killed or seriously injured with a spike in 2013 causing the total number to increase again. In 2014, 49% of casualties reported were car occupants, which is 4% higher than the national split of that year.

In 2014 the total number of casualties fell again, with motorcycle numbers reaching the lowest recorded rate in 10 years and car occupants making up nearly half of the total. Pedestrians make up 24%, cyclists 11%, motorcyclists 13% and car occupants 46%.

Nationally in 2015, car occupants accounted for 36% of reported fatalities or serious injuries. Cyclists accounted for 14%, pedestrians 22.4% and motorcyclists 14%. Although it is difficult to make a direct comparison with national statistics, it is clear that Milton Keynes has a significantly higher mode share of car occupant fatalities / serious injuries. This can potentially be attributed to high car use and high speeds on the network which results in a higher severity of injuries when a collision does take place.

MKC will continue to improve the safety of the highway environment through engineering and Road Safety Audit, but the challenge is to take action to affect driver behaviour and encourage use of the highway network in a responsible manner.

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[50] DfT – Milton Keynes Traffic 2016 Count Data https://www.dft.gov.uk/traffic-counts/area.php?region=South+East&la=Milton+Keynes
[51] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/411471/road-traffic-forecasts-2015.pdf

7.2   Opportunities

Growth is an expectation for Milton Keynes. The town's population has the potential to grow from 268,000 to over 400,000 people to 2050 with current growth ambition.

With population and employment set to increase, the number of cars on the roads will put a strain on the transport network, further impacting on journey time reliability. The quantum and location of household growth anticipated by 2031 is shown in *Figure 38*. Most of the growth is focused around the periphery of CMK and up to 500 new homes in the north.

Figure 38 Forecast household growth in Milton Keynes 2016 – 2031
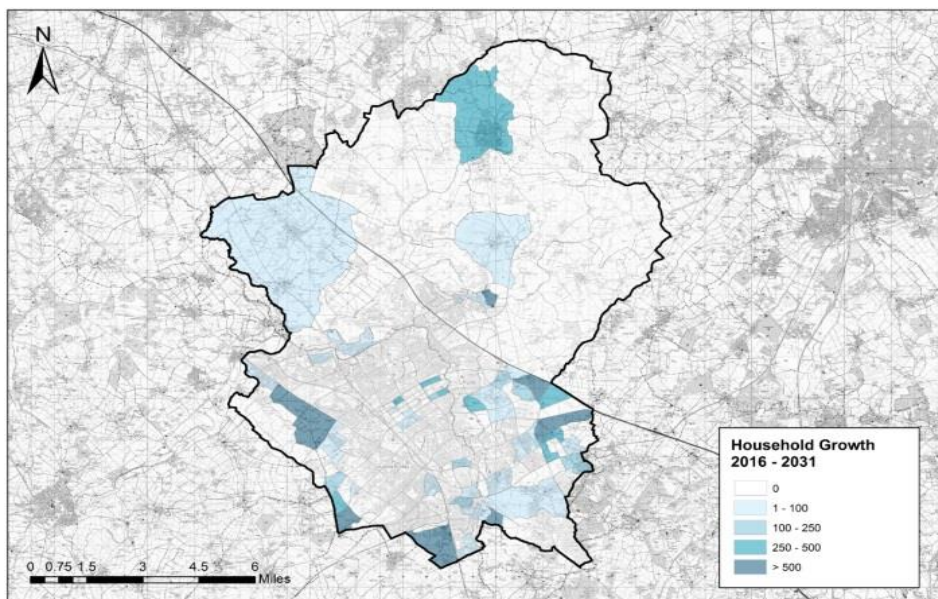
The quantum of employment, the growth anticipated by 2031 is shown in *Figure 39*. This is concentrated in Central Milton Keynes as well as to the east and west of the city centre. Additional population and employment growth is expected to come from Plan:MK, which is currently being drafted and tested in the Milton Keynes Multi-Modal Model (MKMMM).

Figure 39 Forecast employment growth in Milton Keynes 2016 – 2031
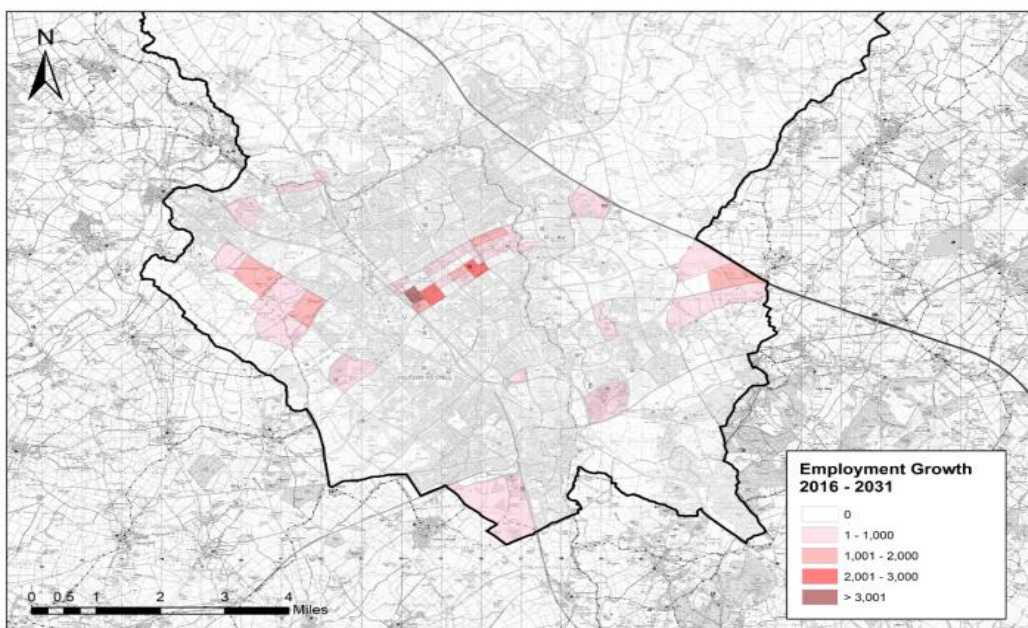
7.2.1   Future Mobility

Without interventions, some junctions around Central Milton Keynes have been forecast to be over capacity by 2031. However, improvements on the train and highway network may attract more car journeys. For example, East West Rail and the Oxford to Cambridge Expressway will attract more car journeys into Central Milton Keynes, placing further pressure on the levels of congestion. Furthermore, without investment in transport system there is a risk that the significant potential for growth in Milton Keynes will be stifled by congestion. Forecasts for Milton Keynes to 2050 show a steadily increasing congestion risk to the local economy. The challenge arises from seeking to maintain current journey times through encouraging alternative modes, as well as supporting growth in residential and employment areas.

Table 22 Modeshift challenge

Journey	Car / Other Modes (%)		
	2011 (Actual)	2030 (Target)	2050 (Target)
Milton Keynes	65 / 35	60 / 40	50 / 50
Intra-borough	80 / 20	70 / 30	55 / 45
Inter-borough	85 /15	80 / 20	60 / 40

Source: Strategy for First Last Mile Travel

The opportunities are, therefore to deliver a transport system and city environment which enables and incentivises mode shift to other modes so that Milton Keynes' growth is not stifled by increasing congestion.

Whilst future mobility provides opportunity, the sheer pace of change and possible technology and infrastructure solutions in the transport sector makes it hard to plan for the whole period to 2036. Therefore the Mobility Strategy seeks to provide a framework able to acknowledging uncertainty by planning for what can be determined, and managing change by shaping some aspects, and being well placed to react and respond to others by always being aware of emerging aspects.

Milton Keynes is exceedingly well placed to take advantage of the extensive opportunities for transport innovation. There is an already established partnership with the Open University (MK: Smart) and Transport Systems Catapult and industry partners, which means we are at the cutting edge of emerging technologies and trends. Furthermore, Milton Keynes has the opportunity to lead in innovation and act as a test bed for new solutions as the central hub in the Oxford – Milton Keynes – Cambridge high technology growth corridor.

The current trialling of driverless pods has potential to lead to widespread use or further testing to determine what efficiencies are possible for the transport network. There is also the opportunity for the integration of new technology into transport, such as the autonomous and connected vehicles trials. Linking these autonomous technologies may lead to changes to what people expect from transport and advocates of solutions such as Mobility as a Service (MaaS) and advanced mass transit options suggest that there could be a significant shift from car ownership to more of a service oriented approach, which could have a significant impact on demand for road space and parking in the longer term. The challenge lies in drawing all of these opportunities together in order to create a seamless transportation network which benefits all individuals.

8. SWOT Analysis

This chapter discusses the current and potential issues and opportunities for transport in Milton Keynes, both now and in the future to inform where transport investment should be targeted and therefore inform the transport strategy.

It considers the information from the previous chapters, including the wider context of Milton Keynes today, baseline evidence of the current transport network and travel habits within the borough, as well as the potential future conditions of the transport network based on expected growth and future committed transport investment.

During the task, a workshop was held with council officers from Milton Keynes to discuss these topics and gain their local knowledge and input to the strengths and weaknesses of the transport network and where they see the opportunities and threats are for the future.

Both the evidence presented in the previous chapters and the discussions in the Task 3 stakeholder workshop have informed the summary of the issues and opportunities in this chapter. These have been divided into a summary of the strengths, weaknesses, opportunities and threats (SWOT) for transport in Milton Keynes. The table below provides an explanation of what each of these categories mean.

STRENGTHS	WEAKNESSES
Elements of the transport network situation or particular conditions/factors that support or give an initial advantage to achieve the overall transport strategy	Elements of the transport network or travel habits that are likely to detract/hinder it from achieving the transport strategy objectives
OPPORTUNITIES	**THREATS**
Positive elements of the general transport network that could be further exploited or indirectly contribute towards a better delivery of the transport strategy objectives	Negative external factors or particular local situations of the general transport network that might hinder the transport objectives in the future

To enable a more targeted understanding of the issues and opportunities relevant to modes or elements of the transport network, a SWOT summary was provided for each of the key elements of the transport network, including highways, public and smart transport, walking and cycling and finally for the broader geographical context of Milton Keynes (which applies to all modes).

Therefore, a separate SWOT for each of these elements is shown below, however it is recognised that there may be cases where an overlap across the modes occurs. Where this is the case, the point is generally matched to what is considered the most relevant category.

8.1 Highways and Parking

STRENGTHS	WEAKNESSES
• Almost 70% of journeys to work are less than 10km (Census 2011), suggestion a high level of internalisation • A A428/A421 alliance has been established, which will help to build the case for east-west link improvements • Efficient grid road framework, allows a choice of routes through the city • Good transport links with the A5 and the M1 going through the borough	• Parking demand exceeds capacity on weekdays around the employment area in western half of CMK • Parking demand exceeds capacity on weekends around the retail core of CMK • High mode share for private vehicles for commuting trips in MK • Rate of single use occupancy for private car trips is very high • Significant congestion hotspots at key junctions • Average vehicle journey times during the AM peak on locally managed 'A' roads have increased by 3.16% over the last 7 years • East-west links are not as well developed as north-south • Air quality issue in Olney, most likely due to freight (estimated 1000 HGVs/day through town) • Political differences within borough
OPPORTUNITIES	**THREATS**
• Current trialling of driverless pods has potential to lead to widespread use or further testing to determine what efficiencies are possible for the highway network • Integration of new technology into transport, e.g. autonomous and connected vehicles, mobility as a service, advanced mass transit options • Manage parking capacity to support balance of modes accessing city centre • Urban Traffic Control System is being upgraded to an updated system that allows all systems from different manufacturers to communicate with each other, therefore supporting future transport innovations and automated bus priority at traffic signals • Dualling of the A421 from Milton Keynes to J13 on the M1 and beyond to Bedford will improve E-W links	• Relatively cheap car parking, which is widely available and the efficient grid road network make it difficult for other modes to compete • Increasing pollution with rising car and freight trips, leading to declining air quality and risk to public health • Predicted growth and inward commuting putting strain at strategic junctions and travel hubs • Growth leading to increased congestion and threatening journey time reliability • Community expectation that journey times will remain the same • Predicted increase of up to 57% in journeys by car by 2031, but city can only provide up to 25% additional capacity through junction improvements and other measures • Potential congestion impacts with HS2 construction traffic • Without interventions, all junctions around CMK would be over capacity by 2026

• Available network capacity	• Improvements on the highway network may attract more car journeys
	• Car ownership is continuing to rise (national average is falling)
	• People parking outside city centre to avoid parking fees
	• Health implications of people driving for most of their trips, i.e. inactive travel and rising emissions

8.2   Public and Smart Transport

STRENGTHS	WEAKNESSES
• Incentives for smarter travel choices to local businesses; several large companies already on board • Electric buses already running on some routes in MK, with remote charging capability • Already electric vehicle charging units in place, some of them rapid charging • Bus use has increased approximately 25% over period 2010-2015 • Fast and efficient strategic road and rail networks (particularly N-S to London and Birmingham), West Coast mainline provides good links • Supporting growth with smart technology and leading in new technology, e.g. trialling personalised rapid transit driverless pods	• Dispersed employment and residential sites hinder public transport effectiveness, does not cover rural areas well • Large rural areas, low density neighbourhoods in the city and complexity of urban estate networks make it difficult to provide a fast, frequent and efficient transport service, therefore encouraging car ownership and car trips • Low bus satisfaction level in comparison to other authorities who are measured • Large wait time for buses, average 15 minutes • Limited options for kids to travel to school other than parents driving them • Limited incentives to use public transport • Bus is uncomfortable to travel in, i.e. noisy and smelly • Limited internet coverage, currently preventing some residents and businesses from agile working and will limit the success of supporting technology for a more connected transport system
OPPORTUNITIES	THREATS
• Partnership with innovative businesses, such as Open University (MK: Smart) and Transport Systems Catapult • New innovations in transport technology to shape future strategic transport choices	• Limited mobility options to remote areas • Public transport improvements will not necessarily encourage commuters to switch from the car • High level of parking availability in the city

• Growing expectations among younger generations for technology based journey planning rather than vehicle ownership • Political ambition to lead the way in transport innovation, e.g. desire to enable Mobility as a Service to flourish within the city • Encourage a modal shift to reduce future congestion and vehicle emissions • Improving bus network coverage to provide public transport access to more of the population • £9m in funding awarded by Office for Low Emissions to achieve a step change in the use of sustainable vehicles • East-west rail will help improve congestion on road network and E-W links • HS2 will reduce overcrowding on West Coast line for N-S travellers and freight movement through MK • Encourage more flexible work hours and agile working to manage the road network demand • Better connections to town centre from Bletchley rail station through 'Fixing the Links' project will take advantage of East-West rail services via Bletchley and encourage regeneration of town centre • Use park and ride opportunities to increase PT and potentially cycle access to the city centre • Potential capacity in road network to support bus priority lanes	centre

8.3   Walking and Cycling

STRENGTHS	WEAKNESSES
• Comprehensive cycling infrastructure network with the Redway network • Public realm improvements delivered around Bletchley station • Many people cycle to the Milton Keynes rail station, one reason is possibly because of the large supply and obvious	• Low commuting mode share for cycling and walking • Lack of wayfinding information on the cycling network, so it's difficult to navigate • Redway routes are not direct, they are designed as meandering leisure routes and not seen as efficient and direct access for

location of cycle parking here • Relatively flat topography around the city centre, should encourage active trips	commuters • Lack of secure cycle parking around city centre • Two tiered cycle parking at rail station is difficult to use

OPPORTUNITIES	THREATS
• Continue programmes targeted towards behavioural change, particularly in new developments • 38% of journeys to work to Milton Keynes and 43% of journeys from Milton Keynes are less than five kilometres in length	• Limitations on funding availability for supporting transport infrastructure, e.g. Redway improvements • Safety risk of driverless pods sharing space with pedestrians and cyclists • Parents find it difficult to drop children to school and get to work by bicycle

8.4 Broader geographical context

STRENGTHS	WEAKNESSES
• Self-contained city, 74% of those who live in the borough work in the borough (as of 2014 • Strategic position, halfway between London and Birmingham, and between Oxford and Cambridge • MK attracts inward investment by national and international companies	

OPPORTUNITIES	THREATS
• Lead in innovation as the central point in the Oxford-MK-Cambridge high tech corridor and knowledge based arc of growth • Widespread uptake of electric vehicles	• Aging population will put strain on transport and support services • Stakeholders have suggested that there is poor broadband quality, which limits technology opportunities and agile working

9.   Intervention Options

Initial ideas for transport interventions have been gathered from a number of sources, including the study team, relevant Milton Keynes planning documents (such as Milton Keynes Futures 2050 and Plan:MK) and stakeholders who attended the various workshops.

Rather than specific highway capacity upgrades to address growing traffic volumes, the initial interventions defined are focused on making better use of the existing infrastructure and providing alternative options to the private vehicle and addressing barriers to the use of more sustainable modes.

The intention is not to exclude interventions in the strategy that will support car use, but better manage the existing network and provide a range of transport options for everyday journeys, so that alternative modes are just as easy to use as the private vehicle. Already there are quite a number of existing highway capacity upgrades in the future committed schemes and future scenario modelling predicts that these will not be enough to cope with predicted increases in demand. Therefore it is important to both manage this demand by both providing alternatives to the private vehicle and also upgrading the highway capacity where necessary to ensure local journey times remain competitive with other similar towns.

The initial list is a brainstorm of future possibilities for the transport network, which could be considered appropriate to MK. These will be further refined and tested against the emerging strategy vision and objectives in Task 4 of the study.

The interventions have been grouped into broad categories as shown in the table below. In some cases there will be overlap between categories and it is expected that they will be further developed and assigned more specific modal categories in the next stage of the study.

Category	Intervention
Private vehicles, parking and technology	• Manage parking capacity, including limiting supply in new developments • Expand coverage of electric vehicle charging points • Partner with universities and Transport Catapult to continue trialling new transport technologies • Incentives for alternative fuel vehicles • Widespread implementation of Personalised Rapid Transit (driverless pods currently being tested in Milton Keynes)
Sustainable and smart transport	• Continue behavioural change programmes • Increase coverage of cycle hire scheme • Identify gaps in cycling network and provide necessary infrastructure • Identify other barriers to cycling among residents and businesses • Determine reasons for lack of bus satisfaction and address these • Improve bus network coverage • Improve bus network frequency

- Consider transport access for aging population, including comfortable walking routes and public transport access

- Increase cycle parking and the range of cycle parking available, such as disabled cycle parking and space for larger family bikes

- Improve school bus coverage and efficiency

- Continue school travel planning

- Links to implementation plan for Sustainable Modes of Travel Strategy

- Update toolkit of options for travel plans to include mobility as a service, agile working options and on demand car share

- Extend travel plan offer to existing residents, market research to find target groups

- Improve superfast broadband service to support agile working, online journey planning, demand responsive mobility, car share opportunities and mobility as a service

- Trial and monitor mobility as a service

- Work with companies like Uber or Transport Systems Catapult to trial demand responsive public transport, being trialled in Helsinki (use bus priority lanes)

- On demand shared mobility for rural areas currently not well served by public transport, perhaps linked to park and ride locations

- Additional bus priority on key routes where the grid network allows for a road user hierarchy to be in place

- Support door to door transport options, such as mobility as a service, to reduce parking demand and private vehicle trips

- Consider freight consolidation centres to reduce freight vehicle trips in urban centres

- Free shuttle bus service to retail core at weekends

- Extend park and ride facilities, serving the north, south and west

Appendix A   LTP3 Indicators and Performance

Name	Definition	LTP3 Baseline		Update		Change
		Year	Act.	Year	Act.	% Change from LTP3 Baseline
Population of Milton Keynes	Population estimate for Milton Keynes (LTP3, Office for National Statistics)	2011	242,800	2016	264,479	9%
All Road casualties	Number killed or seriously injured on all roads (DfT STATS19 Report)	2005/6-2009/10 average	103	2015	89	-14%
Pedestrian casualties	Number of pedestrians killed or seriously injured on all roads (DfT STATS19 Report)	2011	22	2015	21	-5%
Cyclist casualties	Number of cyclists killed or seriously injured on all roads (DfT STATS19 Report)	2011	11	2015	10	-9%
Bus passenger journeys	Total annual passenger journeys on local bus services within Milton Keynes (DfT BUS0109a Data)	2011	9.7M	2015/16	10.3M	6%
Bus passenger satisfaction	% very/fairly satisfied with bus services in Milton Keynes (Transport Focus Bus Passenger Satisfaction Survey)	2009/10	40%	2016/17	84%	110%
Rail passenger journeys from Milton Keynes Central Station	Annual rail passenger usage (entries and exits) for Milton Keynes rail stations (Office of Rail and Road Statistics)	2011/12	6.9M	2015/16	8.4M	22%
No. of cycling trips	Daily flows from a weekday average (taken from a sample of 11 sites across Milton	2011	115	2015	131	14%

Name	Definition	LTP3 Baseline		Update		Change
	Keynes and supplied by Milton Keynes Council)					
No. of cycling trips	Measured on major roads through 36 DfT counters in Milton Keynes	2011	447	2015	607	36%
PT mode share of commuting trips to employment in MK	PT journey to work (JTW) mode share for trips with a destination within Milton Keynes (Census, 2011)	2011	8%	N/A	N/A	
Cycling mode share of commuting trips to employment in Milton Keynes	Cycling JTW mode share for trips with a destination within Milton Keynes (Census, 2011)	2011	3%	N/A	N/A	
Walking mode share of commuting trips to employment in Milton Keynes	Walking JTW mode share for trips with a destination within Milton Keynes (Census, 2011)	2011	7%	N/A	N/A	
PT mode share of commuting trips by Milton Keynes residents	PT JTW mode share for trips originating within Milton Keynes (Census, 2011)	2011	11%	N/A	N/A	
Cycling mode share of commuting trips by Milton Keynes residents	Cycling JTW mode share for trips originating within Milton Keynes (Census, 2011)	2011	3%	N/A	N/A	
Walking mode share of commuting trips by Milton Keynes residents	Walking JTW mode share for trips originating within Milton Keynes (Census, 2011)	2011	8%	N/A	N/A	
Proportion of PT journeys faster than car journeys	Proportion of key destinations where journey time is faster by PT from Central Milton Keynes (destinations include Oxford,	N/A – New indicator		2017	36%	

Name	Definition	LTP3 Baseline		Update		Change
	Cambridge, Northampton, London, Coventry, Birmingham, Luton, Aylesbury, Peterborough, Leicester, Bedford; using quickest routes found on google maps for the AM Peak)					
Local bus punctuality	% of non-frequent buses on time (Table BUS 0902 DfT Statistics)	2010/11	82%	2015/16	90%	8%
Annual average car flows	Annual average car flows on major roads (DfT counters in Milton Keynes)	2011	609,038	2015	662,626	9%
Annual average bus and coach flows	Annual average bus and coach flows on major roads (DfT counters in Milton Keynes)	2011	3339	2015	3548	6%
Annual average LGV flows	Annual average light goods vehicle (LGV) flows on major roads (DfT counters in Milton Keynes)	2011	90,614	2015	114,781	27%
Annual average HGV flows	Annual average heavy goods vehicle (HGV) flows on major roads (DfT counters in Milton Keynes)	2011	73,333	2015	89,909	23%
Average daily traffic flow across CMK	Average daily flow on main roads across the city (Milton Keynes Council local data)	2011	16,188	2015	15,735	-3%
Average traffic flow into CMK	Weekday average of traffic coming into the city in AM Peak (7-10am) (Milton Keynes Council local data)	2011	21,932	2015	23,098	5%
Congestion	Average vehicle journey times during the weekday morning peak	2010/11	1.72 mins/mile	2015	1.95 mins/mile	13%

Name	Definition	LTP3 Baseline		Update		Change
	on locally managed 'A' roads by local authority (Milton Keynes data)					
Average cost of parking per day	Average daily cost of parking in Central Milton Keynes (based on a full-time employee annual parking permit and a 225 day working year)	N/A – new indicator		2017	£2.80	
Average cost of a local return bus trip	Average daily cost of travelling within Milton Keynes using a local bus service (based on a monthly ticket and 20 working days per month)	N/A – new indicator		2017	£2.38	
No. of cycles for hire	No. of Santander cycles for hire and docking stations	N/A – new indicator (introduced in 2016)		2017	500 bikes 60 docking stations	
Road condition data	Principal 'A' roads maintained by Milton Keynes where maintenance should be considered (DfT Statistics RDC0120)	2011/12	3%	2015/16	0%	-100%
Road condition data	Non-principal 'B' and 'C' classified roads where maintenance should be considered (DfT Statistics RDC0120)	2011/12	4%	2015/16	1%	-75%
Roadway condition	Condition of unclassified roads where maintenance should be considered (DfT Statistics RDC0130)	2011/12	10%	2015/16	7%	-30%
Mode share of journeys to school	% share of journeys to school by car (including vans & taxis but not car share)	2009/10	29%	2016/17	N/A	
Air quality at Olney AQMA (declared 2008)	Mean annual concentration of nitrogen dioxide (NO_2)	2011	26.9 µg/m^3	2017	36.9 µg/m^3	37%

Name	Definition	LTP3 Baseline		Update		Change
(NO$_2$)	at continuous monitoring site in an area in Olney encompassing all properties fronting Bridge Street and High Street South, and also including part of Market Place (Milton Keynes Council Air Quality Annual Status Report 2017)					
Air quality at Olney AQMA (declared 2008) (PM$_{10}$)	Mean annual concentration of particulate matter (PM$_{10}$) at continuous monitoring site in an area in Olney encompassing all properties fronting Bridge Street and High Street South, and also including part of Market Place (Milton Keynes Council Air Quality Annual Status Report 2017)	2011	21.3 µg/m^3	2017	17.4 µg/m^3	-18%
Air quality at CMK (NO$_2$)	Mean annual concentration of NO$_2$ at continuous monitoring site at the Milton Keynes Civic Office (Milton Keynes Council Air Quality Annual Status Report 2017)	2011	20.9 µg/m^3	2017	27.8 µg/m^3	33%
Air quality at CMK (PM$_{10}$)	Mean annual concentration of PM$_{10}$ at continuous monitoring site at the Milton Keynes Civic Office (Milton Keynes Council Air Quality Annual Status Report 2017)	2011	18.2 µg/m^3	2017	14.2 µg/m^3	-22%
Air quality at Wolverton Road (NO$_2$)	Mean annual concentration of NO$_2$ at continuous monitoring site on Wolverton Road	2011	34.8 µg/m^3	2017	42.6 µg/m^3	22%

Name	Definition	LTP3 Baseline		Update		Change
	between the M1 and Little Linford Lane (Milton Keynes Council Air Quality Annual Status Report 2017)					
Accessibility by PT	Average minimum travel time to reach the nearest key services by public transport for Milton Keynes (DfT Table ACS0107)	2011	13 mins	2013	11 mins	-15%
Accessibility by Cycle	Average minimum travel time to reach the nearest key services by bicycle for Milton Keynes (DfT Table ACS0107)	2011	8 mins	2013	8 mins	0%
Accessibility by Car	Average minimum travel time to reach the nearest key services by car for Milton Keynes (DfT Table ACS0107)	2011	5 mins	2013	5 mins	0%

Appendix B Workshop Notes

Workshop Notes

Introduction

This note presents an overview of the main points made in the breakout sessions and the discussion on vision and objectives at various workshops on the development of the Mobility Strategy.

SWOT

The following SWOT presents the combined comments of two breakout groups.

Strengths	Weaknesses
• Stable journey times on the roads • Many people cycle to the Milton Keynes rail station, one reason is possibly because of the supply of cycle parking here • Segregated Redway network • Supporting growth with smart technology and leading in new technology	• Plentiful supply of parking means car use is "easy" • Limited options for kids to travel to school other than parents driving them • No incentive to use public transport • Bus is uncomfortable for travel (i.e. noisy and smelly) • Lack of wayfinding information on the Wayfinding network, it's difficult to navigate • Redway routes are not direct, designed as meandering leisure routes instead and not seen as efficient and direct access for commuters • Lack of secure cycle parking around city centre • Two tiered cycle parking at rail station is difficult to use • Air quality issue in Olney, most likely due to freight (estimated 1000 HGVs/day through town) • Political differences and political will within borough • Public transport does not support rural areas well • Lack of clarity in the investment programme – what is it trying to achieve and how? • Public and domestic design – poor design for active modes encourages car use • Limited route options for PT – grid system means access to PT from with

	'blocks' is not ideal - Cultural perceptions and habits inhibit modal shift
Opportunities - Encourage more flexible work hours and agile working to manage the road network demand - Capitalise on park and ride opportunities - Infrastructure to support bus designated lanes - Use to dual carriageway to provide bus lanes - Provide transport hubs at key centres - Partnerships with private, innovative businesses - Network capacity - With growth comes the opportunities to change behaviours from the outset - Use technology to provide information to the traveller about door-to-door options - Use technology to deliver mobility options e.g. on demand driverless cars / pods	**Threats** - Risk of rising emissions and air quality issues with increased car use - People parking outside city centre to avoid parking fees - Health implications of people driving, i.e. inactive travel and rising emissions - Lack of clear strategy - Too much parking availability - Lack of funding - Lack of clarity in planning and delivery

Interventions

- Parking strategies:

  – Gradually increase parking fees along with an education campaign to public about how the additional funding will be reinvested into transport

  – In the long term, remove parking spaces and convert to public realm or housing (to boost housing density in CMK and address housing shortage)

  – Work travel plans and more effective monitoring

  – Flexible work patterns aimed at shifting demand

- Public Transport:

  – Introduce a rewards programme that incentivises PT use, e.g. the more PT trips you take the higher discount you get on parking fees or permits

  – Incorporate bus lane capacity in all new A-roads through developments, could be used immediately for buses or in future when the need arises

  – Monitoring and following up travel plans

  – Subsidising PT trips

  – Improving paying mechanisms for PT, making it easier and simple to use

- – Shift work friendly services
- Demand management and behaviour change:
  - – Incentivise behaviours through gameification, such as introducing credits for travelling in the inter-peak rather than peak period
  - – Employment policies e.g. flexitime to allow for travel away from the peak hour
  - – Approaches aimed at different types of traveller e.g. students, employment, etc.
  - – Behaviour change in planning and delivery of transport e.g. it should be a standard approach to consider implementing a cycle lane when resurfacing a stretch of road / carriageway
- Technology:
  - – Smart cards
  - – Travel app to allow people to make an informed decision for a particular journey
  - – Pods and driverless cars
  - – Mobility as a Service
- Safety:
  - – Consider removal of underpasses, perceived as inherently unsafe, to encourage more walking and cycling
  - – Further improvements on the basis of the Better Bus Area Fund bid to provide facilities that would encourage greater bus use e.g. lit, comfortable, covered bus shelters with RTPI
- Funding:
  - – Consider a wider use of S106 funds, for schemes such as car share and new technology options
  - – Revenue funding to deliver, for example, monitored travel plans, promotion and marketing
- Other:
  - – Urban design is important in encouraging more walking and cycling especially for shorter trips
  - – MK to develop a policy position on the use of the fast grid based links, to allow for future proofing
  - – Improve points of connections and walking and cycling infrastructure (path ways, underpasses)
  - – Improving public realm and wayfinding
  - – Cycling hubs in urban and rural areas (providing safe and secure cycle lock ups)
  - – Shared transport pool

Vision and Objectives

- Vision:
  - – Confusion over the use of "mobility".

- Use of "quick and easy" suggests car use
- Does it need to make reference to the following word / phrases:
  - Safe
  - Travel needs
  - Investment
  - Embraces innovation
  - Facilitates high growth
- Need to assess the vision from the standpoint of a Milton Keynes resident and ask "what does it mean to me?"

- Objectives:
  - Use of "seamless" could cause confusion
  - Change "mobility" to "travel options"
  - What is meant by "mobility system"?
  - Transport does not cease at MK's boundary – it goes beyond and the objectives need to recognise this
  - What about including safety, air quality and social inclusion? Argument that these do not need to be made explicit
  - The ultimate objective is jobs and growth – should be reflected in the objectives?

Appendix C Glossary

Term	Description
Active travel	Travel using a type of non-motorised transport, principally walking or cycling.
AVRT	Advanced Very Rapid Transit (AVRT) network into which fits a range of personal travel options including autonomous pod fleets, electric car and bike share, and prioritised autonomous local bus services.
Autonomous Vehicle	A vehicle that is capable of sensing its environment and navigating without human input.
Bikeability	A cycle training scheme funded by Department for Transport that aims to give cyclists the skills and knowledge they need to cycle on today's roads.
Bus priority	A series of measures that can be used to improve the speed and reliability of bus services. Bus priority measures include bus lanes, changes to rights of way and alterations to traffic signals at junctions, usually by giving buses priority over other road vehicles.
Bus Rapid Transit	A high-quality bus-based transit system that delivers fast, comfortable, and cost-effective services at metro-level capacities.
Capacity	The number of passengers that can be carried by a transport network, route, or service
City Streets	City Streets are roads where buildings face out onto the street. They are distinct from Grid Roads (see Grid Roads).
Communication Information Technology	Technology used to handle telecommunications, broadcast media, intelligent building management systems, audio-visual processing and transmission systems, and network-based control and monitoring functions
Community transport	Specialised transport to people who may have difficulty in using mainstream public transport services or services where populations may not warrant a scheduled public transport service. These services are typically responsive to demand and must be booked in advance by the user.
Connected vehicle	Connected vehicles allow vehicles to communicate with each other and the world around them.

Demand Responsive Transport (DRT)	Public transport which is provided flexibly in terms of routing and timing which is typically based on a booking system.
Electric vehicles	Electric vehicles are powered using electricity stored on board the vehicle in batteries that typically need recharging.
First Last Mile Travel	Part of a strategy to review transport provision for the first last mile of each journey in order to support transformational growth in Milton Keynes.
Grid Roads	Grid Roads are urban clearways with lay-bys for bus-stops, with no direct building frontages and generally no at-grade pedestrian crossings. Some are dualled, and the remainder normally have land reserved for future dualling, or other transport purpose (e.g. mass passenger transit system). They have substantial landscaping for biodiversity, sound screening and emissions absorption, usually incorporating a Redway cycle and walking route.
Hopper service	A shuttle bus service usually operating over a short distance providing a transport link that may not be covered by an existing service.
Integrated transport	A comprehensive transport network that provides door-to-door travel where different modes meet different needs, including journeys where more than one mode is used. This careful integration of two or more modes may include a high frequency bus route that serves a railway station or the provision of secure cycle parking at a transport hub that allows you to continue your journey by bus.
Intelligent Transport System	An Intelligent Transport System is a group of traffic technologies linked by internet-based communication methods. An example of an ITS would be road sensors collecting traffic flow data and passing data to traffic lights which would allow for dynamically controlled phasing as traffic levels fluctuate throughout the day. An ITS will normally have a central control centre for strategic traffic management.
Interchange	The act of changing between different services or modes of transport during a journey, and/or the facility at which the change occurs, such as a rail-bus station.
Journey Planning	Planning a multimodal journey using interactive web technology. Results can be accessed on an information portal, mobile phone or via a call centre.

Local Transport Plan (LTP)	LTPs are statutory documents required by the Transport Act 2000 and retained by the Local Transport Act 2008. LTPs should contain a strategy and implementation plan for the delivery of transport across a local authority area.
Micro Metro	Maximising the connectivity offered by rail stations to encourage local journeys by rail, effectivity in the form of a local metro scheme.
Mobility as a System (MaaS)	Using a digital interface to source and manage the provision of a transport related service(s) which meets the mobility requirements of a customer.
Modes of transport	Different ways of travelling such as by car, train, bus, motorbike, cycling, and walking.
Mode share	The level of use of each mode of transport, calculated as the proportion of trips taken by each mode out of total trips made.
Park & Ride	Car parking facilities, usually in an edge of town location, with public transport links into the town centre or key destinations
Personalised Rapid Transport	A public transport mode featuring small automated vehicles, or pods, operating either on a network of specially built guideways or within the existing urban environment.
Personalised travel planning	A form of travel awareness and marketing, personalised travel planning is the provision of tailored public transport information to households based on their specific travel patterns and needs.
PlusBus (Rail / Bus)	PlusBus is a national scheme that allows passengers to buy reduced price bus passes when buying a train ticket. The scheme is recognised by over 200 bus operators across Britain.
Rapid (Mass) Transit System	High capacity public transport found in urban areas.
RTPI	Real Time Passenger Information systems use AVL technology to pin point bus location on the network and provide an estimated time of arrival at stops, interchanges and termini. This information can be provided on at-stop screens, on mobile phones or on information kiosks.
Redway network	The network of off-road cycleways and pedestrian footpaths in Milton Keynes.
Ultra-Low Emission Vehicles (ULEV)	A motor vehicle that emits extremely low levels of motor vehicle emissions compared to other vehicles.

Transit Corridors	A transit corridor is defined by one or more modes of transportation like highways, railroads or public transport which share a common course, and these are suited to higher density use by these different modes of transport.
Transport network	Refers to Roads, Public Transport, and Walking and Cycling networks.

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