Oxfordshire County Council – Freight and Logistics Strategy 2022 – 2050

July 2022

Document information

Title	LTCP Freight and Logistics Strategy
First published	Not published
Status	Pending approval / adoption
Enquiries	LTCP5@oxfordshire.gov.uk

Version control

Version	Date	Changes
V4	January 2022	Draft submitted to public consultation
V5	May 2022	Updated draft submitted to cabinet

Contents

Executive Summary

Freight is the general term for goods transported from one place to another by any means. Freight can therefore be moved in a variety of ways including by Heavy Goods Vehicles (HGV), Light Goods Vehicles (LGV), rail, cargo bikes and emerging modes such as drones. This strategy covers all modes of freight movement in Oxfordshire.

Traditionally we have focused on just the mode responsible for transporting goods. However, it is increasingly important that we consider broader factors. We have therefore incorporated considerations about logistics. Logistics refers to the overall process of managing how resources are acquired, stored, and transported to their final destination.

The movement of goods is essential to supporting many aspects of our lives at both the local and national level. However, there are a number of complex challenges surrounding the freight system, particularly at the local level.

This strategy addresses some of the challenges associated with the movement of goods in Oxfordshire and sets out the actions required to deliver appropriate, efficient, clean and safe movement. Addressing the movement of goods is essential if we are to meet broader air quality and net-zero objectives.

This strategy has been published in support of Oxfordshire County Council's Local Transport and Connectivity Plan (LTCP). The LTCP outlines our long term transport ambitions for the county and the policies required to achieve them. This is one of a number of more detailed supporting strategies that addresses complex topics.

Background
Following review of our Freight Strategy published in 2016 and analysis of the broader context, it was concluded that a new freight and logistics strategy for Oxfordshire is required. This is for several key reasons:

- The amount of goods being moved, and vehicle miles driven have been increasing.
- The way goods are moved, and customer expectations have been changing.
- Technological changes to how goods can be moved.
- Changing policy context, particularly the increased focus on environmental goals and net-zero emissions since 2016.

Key Principles
Based on our analysis, we have identified a set of key principles which our Freight and Logistics Strategy seeks to deliver. Our key principles are:

- Appropriate movement
- Efficient movement
- Net-zero movement
- Safe movement
- Partnership working

It should be noted that whilst the movement of goods is related to a range of issues such as congestion, road safety and air quality, it is also important to the national and local economy. Solutions will therefore be required that balance these considerations and create an efficient, sustainable transport network for all.

Actions

The document outlines our proposals for how we will address the issues associated with the movements of goods in the county and deliver our key principles. The document includes three distinct sections. These are:

- Long distance movement
- Local movement
- Last mile movement

This approach has been taken to reflect the complexity of the freight system and that different solutions will be required to address the issues at each level. The proposals in each section are all seeking to deliver our key principles. A summary of the actions is provided below. For further details please use the contents to navigate to the relevant section of the strategy.

Long distance movement	**Action 1** – Promote rail freight
	Action 2 – Work with stakeholders to increase rail network capacity
	Action 3 – Monitor the use of water freight
	Action 4 – Monitor truck platooning progress and opportunities
	Action 5 – Cross boundary working
	Action 6 – Work with stakeholders to encourage alternatives to road freight
Local movement	**Action 7** – Develop appropriate HGV route map
	Action 8 – Create a map of existing weight restrictions
	Action 9 – Promotion of HGV route map
	Action 10 – Conduct countywide study to establish an approach for area based weight restrictions
	Action 11 – Fund development and delivery of the area based weight restriction programme
	Action 12 – Lobby for enforcement of moving traffic offences under Traffic Management Act Part 6
	Action 13 – Explore implementation of road user charging schemes
	Action 14 – Explore technology to aid enforcement
	Action 15 – Review best practice
	Action 16 – Review current rest stops and lorry parking facilities
	Action 17 – Promote the creation of rest stops and lorry park facilities
	Action 18 – Support BEV charging infrastructure requirements
	Action 19 – Monitor alternative HGV fuel requirements and options
	Action 20 – Strategically locate refuelling infrastructure
	Action 21 – Monitor electrified road systems study
	Action 22 – Enhance network management
	Action 23 – Improve data gathering and usage
	Action 24 – Improve data sharing
	Action 25 – Support the provision of rail freight interchanges

	Action 26 – Explore opportunities for express rail freight
	Action 27 – Seek to influence the location and design of new development
	Action 28 – Ask developers of major sites to prepare Construction Logistics Plans
Last mile movement	**Action 29** – Promote cycle freight in Oxford
	Action 30 – Promote cycle freight across Oxfordshire
	Action 31 – Freight consolidation feasibility study
	Action 32 – Safeguard land for freight consolidation
	Action 33 – Promote considerations about reducing the need for freight movement
	Action 34 – Engagement around Clean Air and Zero Emission Zones
	Action 35 – Reduce conflicts between freight vehicles and people
	Action 36 – Promote road safety education resources and campaigns
	Action 37 – Support expansion of 20mph speed limits
	Action 38 – Establish a code of conduct with food delivery operators
	Action 39 – Support the development and trialling of UAV and CAV technology
	Action 40 – Consider future technology requirements
Monitoring	**Action 41** – Delivery of the LTCP monitoring policy
	Action 42 – Analyse HGV data by axles and weight
	Action 43 – Analysis of freight data
	Action 44 – Monitoring of freight schemes
Partnership working	**Action 45** – Engagement, cocreation and problem solving
	Action 46 – Explore establishment of freight steering group
	Action 47 – Work with stakeholders to reschedule journey times

How will the Freight and Logistics Strategy be funded and implemented?
Some of the actions identified in the strategy will require funding to deliver. However, councils no longer receive funding directly to spend on transport improvements. We will therefore work hard to identify alternative funding sources. Key potential funding sources are; funding bids, developer contributions, partnership working, charging schemes and enforcement revenues.

We are committed to delivering the range of actions identified in this strategy, however it is necessary to prioritise them. This will help to guide future work on delivery of the strategy and make best of use of the resources available. In order to do this, we have grouped the actions into those we anticipate to deliver by 2025 and those that will be delivered between 2025 and 2030.

Introduction

Freight is the general term for goods transported from one place to another by any means. Freight can therefore be moved in a variety of ways including by Heavy Goods Vehicles (HGV), Light Goods Vehicles (LGV), rail, cargo bikes and emerging modes such as drones. This strategy covers all modes of freight movement in Oxfordshire.

Traditionally we have focused on just the mode responsible for transporting goods. However, it is increasingly important that we consider broader factors. We have therefore incorporated considerations about logistics. Logistics refers to the overall process of managing how resources are acquired, stored, and transported to their final destination.

The movement of goods is essential to supporting many aspects of our lives at both the local and national level. The freight system plays a key role in supporting the national economy transporting raw materials and products to factories, finished goods to retailers and goods to ports. More locally the freight system plays a key role in delivering goods to our shops, products to our homes, and serving the manufacturing and construction industries.

The UK freight system moved 154 billion tonnes of goods in 2019[1] supporting almost £400 billion in manufacturing sales and transporting 140 million tonnes of goods to ports for export[2]. However, there a number of complex challenges surrounding the movement of goods, particularly at the local level.

This strategy has been published in support of Oxfordshire County Council's (OCC) Local Transport and Connectivity Plan (LTCP) and seeks to outline our approach to addressing these challenges.

The LTCP is the County Council's statutory Local Transport Plan, required under the Transport Act 2000. It outlines our long term transport ambitions for the county and the policies required to achieve them. This is one of a number of more detailed supporting strategies that addresses complex topics in more detail.

This strategy addresses some of the challenges associated with the movement of goods in Oxfordshire and sets out the actions required to deliver appropriate, efficient, clean and safe movement. The strategy also outlines how the freight system is essential if we are to meet broader air quality and net-zero objectives, as outlined in the main LTCP.

As part of developing this strategy we have engaged with relevant partners including our district councils and the Road Haulage Association. We have engaged with these partners as we recognise the need for action at various levels to address the existing issues with goods movement in the county. We plan to continue working with a range of partners as we move forward to deliver this strategy.

[1] Department for Transport: Domestic Road Freight Statistics, United Kingdom 2019
[2] The Value of Freight, Vivid Economics, 2019

LTP4 Freight Strategy

OCC's existing Freight Strategy was produced in 2016 and was an approved strategy as part of the Local Transport Plan 4 (LTP4). The strategy sought to address the specific challenges associated with freight in Oxfordshire.

The LTP4 Freight Strategy provides an overview of freight and outlines an approach based around 6 principles. These principles were:

- Understand
- Inform
- Encourage
- Deter
- Manage
- Plan

The strategy is complemented by the LTP4 Route Hierarchy which outlines 6 different road classes, the definition and characteristics of each. The hierarchy identifies which Oxfordshire routes are in each class and whether the class is suitable for restrictions on access or permanent weight restrictions.

Using the route hierarchy, the Oxfordshire lorry route map was produced. The map identified suitable through routes in the county and suitable roads for accessing Oxfordshire's towns. It also highlighted where existing restrictions are and environmentally sensitive areas that should be avoided if at all possible.

As part of the development process for this strategy, we have conducted a critical review of the LTP4 freight strategy to understand strengths, weaknesses and identify areas to carry over. This has helped to inform and refine the content of this strategy.

LTP4 Freight Strategy actions

As part of our critical review, we have also reviewed the actions identified in the LTP4 Freight Strategy and progress made on delivering them. These are shown below and help to demonstrate progress made.

Action	Progress
Reviewing cycling and HGVs in order to understand how cyclist casualties can be reduced.	Ongoing road safety work and casualty reporting conducted.
We will improve our understanding of freight transport, the needs of freight operators and their customers as well as the impacts on local communities.	Established regular contact with the Road Haulage Association.
We will take advantage of new technology and best practice to help manage freight movements, notably through our recent adoption of Freight Gateway.	Freight gateway adopted but has since ceased to operate.
We will support the provision of appropriately sited rail freight facilities.	Ongoing work to identify suitable locations.
The county council will consider environmental weight restrictions across the County,	Burford weight restriction trial completed – note that this was funded by 3rd parties as no funding

particularly areas which are subject to significant levels of HGV traffic, prioritising the towns of Burford, Chipping Norton and Henley-on-Thames.	was available.
In Oxford we will review signing on the ring road to ensure that lorries are directed to their destinations within the city by the most appropriate routes.	Not completed.
We will integrate neighbourhood weight watch with the LorryWatch online reporting facility.	LorryWatch available but OCC no longer have access.
We will engage with freight and logistics operators and other stakeholders, reflecting our resource levels and prioritising practical solutions to problems raised.	Ongoing engagement with operators and stakeholders however limited resources and funding has limited ability to implement solutions.
We will influence the location and design of new development, particularly employment sites and any related transport infrastructure so that these can function well, with efficient freight access to and from the strategic transport network.	Ongoing consideration that OCC seek to influence.
We will ask developers of major sites to prepare Construction Logistics Plans and Delivery and Servicing Plans.	Ongoing requirement for developers of major sites.
We will seek developer contributions to mitigate the impact of freight traffic on the environment and on the local and strategic road network.	Ongoing negotiation with developers for contributions to mitigate a range of impacts including freight traffic.

Why we need a new strategy

Following review of the LTP4 freight strategy and analysis of the broader freight context, it was concluded that a new freight and logistics strategy for Oxfordshire is required. This is for several key reasons:

- The amount of goods being moved, and vehicle miles driven have been increasing.
- The way goods are moved, and customer expectations have been changing.
- Technological changes to how goods can be moved.
- Changing policy context, particularly the increased focus on environmental goals and net-zero emissions since 2016.

The freight related factors are expanded upon during our data analysis in the freight context section. The broader changes to policy context are summarised in the main LTCP document and supporting baseline report.

Freight Context

This section provides an overview of current freight conditions. This helps us to understand the importance of freight, how it currently moves, its impacts and potential future changes. This understanding has informed how we propose to manage freight.

Where possible we have identified Oxfordshire specific statistics. However, owing to the extensive and sophisticated nature of the freight network this is not always possible and so we have also included nationally published statistics. Whilst these are not specific to Oxfordshire, they help us to understand current impacts and future changes that will affect the county.

As with many sectors, freight movements were disrupted by the COVID-19 pandemic in 2020. We have therefore focused on data from 2019 which was consistent with long term trends. Further analysis can be found in the LTCP baseline report which notes 2020 trends. We will continue to monitor future data to assess whether any trends from 2020 are part of a longer term shift.

Economic Value of Freight

The UK freight system moved 154 billion tonnes of goods in 2019[3] supporting almost £400 billion in manufacturing sales and transporting 140 million tonnes of goods to ports for export. In total, the cost of the UK freight system is equivalent to around 4% of Gross Domestic Product (GDP)[4].

The freight system therefore plays a critical role in supporting the national economy and is a significant financial sector. It is estimated that the UK spends up to £80 billion per year on road freight, rail freight and warehousing. Of this, road freight accounts for around £38 billion; rail freight for around £1 billion; and warehousing for £20-38 billion. The efficient movement of freight is therefore important for both the national and local economies.

Freight Movement

The amount of freight moved, and the vehicle miles driven have been increasing over the last 15 years. In 2019 there were 154 billion tonnes of goods moved, a 1% increase from 2018 and 19.1 billion vehicle kilometres travelled, a 2% increase from 2018. In total the amount of goods moved has increased by 23% since 2009[5].

[3] Department for Transport: Domestic Road Freight Statistics, United Kingdom 2019
[4] The Value of Freight, Vivid Economics, 2019
[5] Department for Transport: Domestic Road Freight Statistics, United Kingdom 2019

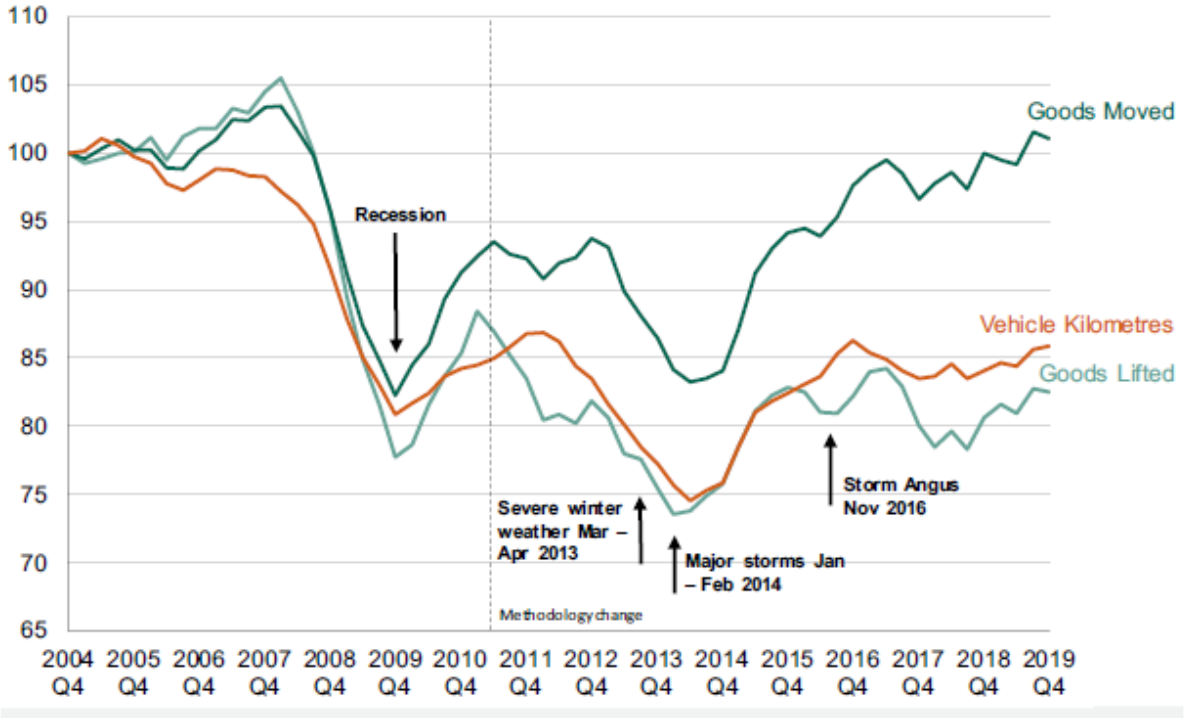


Figure 1 - Trend in goods moved, goods lifted and vehicle kilometres by GB-registered HGVs, rolling 4 quarter totals, 2004 Q4 to 2019 Q4[6]

The way in which goods are moved has also been changing over the last 20 years. There has been a significant growth in the number of LGVs, vans of no more than 3.5 tonnes, with the number HGVs falling. In total, the number of LGVs increased by 29% between 2004 and 2014, compared to a 5% decrease in the number of HGVs over the same period[7]. LGV traffic has increased by 67% over the last 20 years and currently makes up 15% of all traffic, with HGVs making up 5%.

Some of these changes may be attributable to the fact that freight is increasingly carried in larger HGVs. The share of freight carried in smaller rigid HGVs (under 17 tonnes) decreased from 11% in 2000 to only 2% in 2017. The share of freight carried in larger rigid HGVs increased from 13% to 18% over the same period[8]. Whilst these changes may help to reduce the number of HGVs on the road, they present challenges at the local level, particularly in many of the rural villages in Oxfordshire.

Other factors that may be changing the way freight is moved are the rise of online shopping and changing customer expectations. In 2018 online sales comprised 18% of total sales across all retail in the UK, up from 16% in 2017[9]. The COVID-19 pandemic has likely contributed to an increased demand for online shopping and home deliveries.

[6] Department for Transport: Domestic Road Freight Statistics, United Kingdom 2019
[7] RAC Foundation: Van Travel Trends in Great Britain
[8] The Value of Freight, Vivid Economics, 2019
[9] Office of National Statistics (2018) Retail sales, Great Britain: October 2018

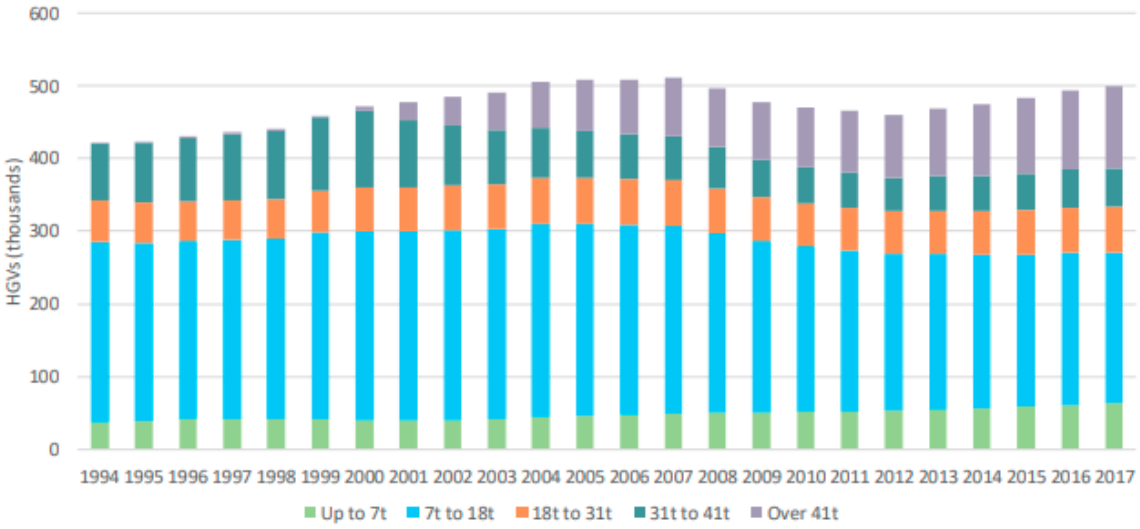


Figure 2 – Proportion of UK freight carried by HGV weight class[10]

Similarly, customer expectations have also changed, with there now being more demand for deliveries to be made in tight timescales. This presents a challenge for delivery services and can require running more vehicles to meet demand[11].

Climate Change

Transport is now responsible for the largest proportion of UK greenhouse gas emissions. In 2016 transport was responsible for 27% of total UK greenhouse gas emissions, with road transport responsible for 91% of transport emissions. Within this HGVs and vans produce 35% of road transport emissions[12].

In Oxfordshire transport is responsible for a larger proportion of greenhouse gas emissions than the national average, producing 36.5% of all emissions in the county[13]. Road transport is responsible for the majority of these emissions, 33.3%, making it the largest source of emissions in Oxfordshire.

With forecasts predicting an increase in freight miles, there is further need to address the impacts of freight on climate change. If unaddressed, this could lead to carbon dioxide emissions from freight transport increasing by around 20% by 2050[14].

Action is needed to address emissions from all modes of road transport in Oxfordshire in order to achieve our goal of a net-zero transport system by 2040.

[10] The Value of Freight, Vivid Economics, 2019
[11] McKinsey & Company (2014) Same-day delivery: The next evolutionary step in parcel logistics
[12] UK Government: The Road to Zero
[13] University of Oxford Transport Studies Unit: Pathways to a zero-carbon Oxfordshire
[14] The Value of Freight, Vivid Economics, 2019

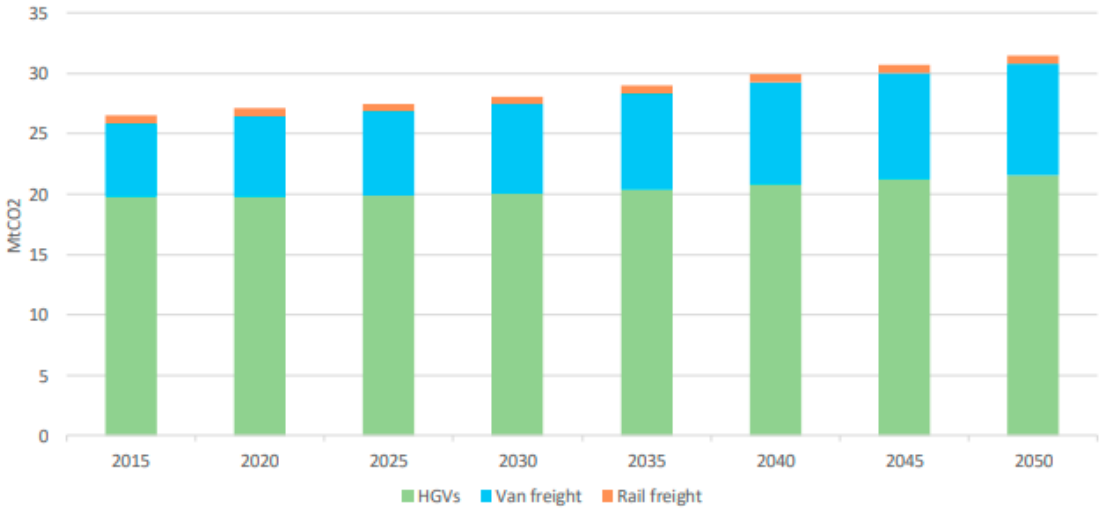


Figure 3 – Projected emissions from freight if unaddressed[15]

Local Air Pollution

Air pollution is a mix of particles and gases of both natural and human origin. The main components of urban air pollution are particulate matter (PM) and nitrogen dioxide (NO_2). Road transport is the largest source of NO_2 and fourth largest source of PM[16]. Currently, there is no clear evidence of a safe level of exposure.

In Oxfordshire, it was estimated that 3,578 years of healthy life were lost due to air pollution in 2017[17]. Research by King's College London also found that roadside air pollution in Oxford stunts lung growth in children by 14.1%[18]. Immediate action is therefore required to protect resident's health.

Congestion

The increase in vehicle miles travelled and a growing population have created issues with congestion across the UK. On average British drivers lose 115 hours per year to congestion, costing the UK economy an estimated £5.2 billion[19].

Freight is both impacted by and contributes to congestion. It is estimated that congestion delays HGV journeys by around 23% today, potentially rising to 35% by 2050[20]. Overall, it is estimated that the total cost of congestion to the UK freight system today is more than £6 billion.

Freight also contributes to congestion and this contribution could increase due to the projected rise in LGV and HGV miles. Options for reducing congestion are more limited for freight than for passenger vehicles. However, a range of options exist that we will seek to explore with freight operators. Technology is also creating new opportunities for more efficient freight movement.

[15] The Value of Freight, Vivid Economics, 2019
[16] https://www.gov.uk/government/publications/health-matters-air-pollution/health-matters-air-pollution
[17] Oxfordshire Health and Wellbeing Joint Strategic Needs Assessment 2020
[18] Kings College London: Personalising the Health Impacts of Air Pollution – Summary for Decision Makers, 2019
[19] INRIX 2019 Global Traffic Scorecard
[20] The Value of Freight, Vivid Economics, 2019

Future Projections

As highlighted, the amount of freight movement is forecast to increase. The Department for Transport (DfT) has forecast LGV traffic to increase by between 23% and 108% by 2050, depending on the scenario. Whereas HGV traffic growth is forecast to be lower than other vehicle types with growth ranging from 5% to 12% by 2050[21]. The graphs below demonstrate the current levels of LGV and HGV traffic and the forecasts for growth under different scenarios.

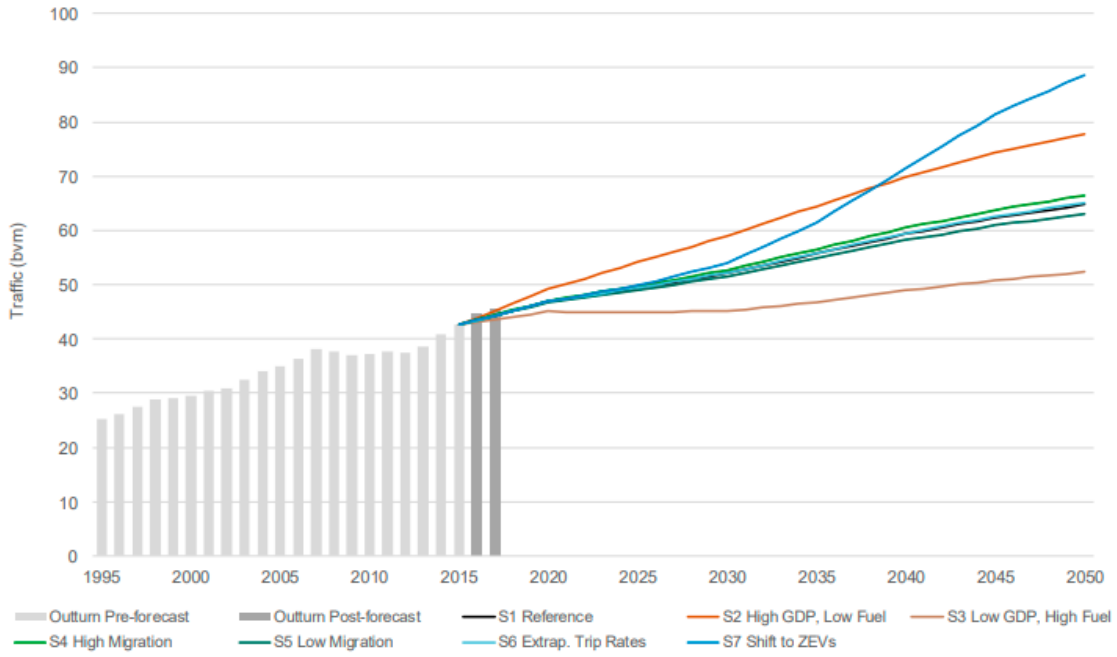


Figure 4 – LGV road traffic forecasts[22]

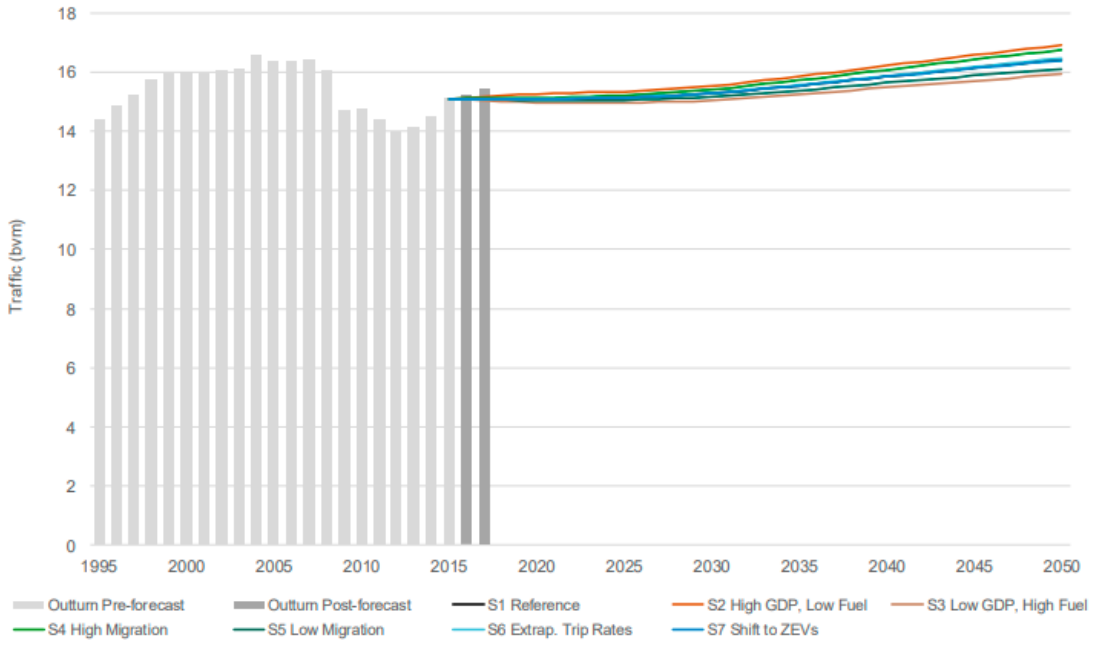


Figure 5 – HGV road traffic forecasts[23]

[21] Department for Transport: Road Traffic Forecasts 2018
[22] Department for Transport: Road Traffic Forecasts 2018
[23] Department for Transport: Road Traffic Forecasts 2018

Increased freight traffic will have knock on impacts for congestion and air quality in the county. The impacts of this projected growth and potential mitigating measures will be considered as part of this strategy.

Future fuel type

In November 2020 the UK government announced that from 2035, all new cars and vans must be Zero Emission Vehicles (ZEV). A delivery plan for how this will be achieved was published in July 2021. Zero emission LGVs are largely Battery Electric Vehicles (BEVs), utilising the same technology as electric cars.

However, there is some uncertainty regarding the future fuel type of HGVs. The uptake of zero emission HGVs has been much slower than other vehicle types owing to a range of challenges. It remains to be seen which fuel type, be it electric, hydrogen or another, will emerge as the dominant fuel.

Future projections for the uptake of these vehicles therefore vary and are unreliable. It is predicted that both battery electric and hydrogen powered HGVs will be adopted to replace Internal Combustion Engine (ICE) HGVs.

Battery electric HGVs are predicted to be adopted at scale between 2022 and 2030, exceeding ICE HGVs from approximately 2032. Hydrogen powered HGVs are predicted to be adopted at scale between 2024 and 2040, exceeding ICE HGVs from approximately 2036[24].

Owing to this uncertainty, in Summer 2021 the government consulted on when to end the sale of new non-zero emission HGVs. This was conducted following publication of the Department for Transport's decarbonisation plan. The possible dates included were 2035 and 2040.

Local Context and Issues

Many of the issues in this section have been high level. However, owing to the complex nature of the UK freight system, there are also very local challenges that affect residents across Oxfordshire. Some specific challenges for Oxfordshire in relation to freight are:

- Resilience and congestion issues on the A34 which is an important road for movement between the Midlands and southern ports.
- Inappropriate vehicles and levels of freight movement through towns.
- Road safety issues, particularly with people cycling.
- Contribution to local air quality issues.
- Last mile delivery, particularly in Oxford.
- Construction and logistics movements associated with the large number of housing development sites.
- The strong rural economy in Oxfordshire which is often away from the 'A' road network.
- Capacity of rail network through Oxfordshire for freight movement.

[24] Shell: Decarbonising Road Freight: Getting into Gear

Barriers

As part of the context it is also important to reflect on some of the key barriers. These provide context for why certain actions have been identified and the broader context that we are working in.

These barriers have highlighted that whilst the movement of goods is related to a range of issues such as congestion, road safety and air quality, there are a set of complex considerations required. Solutions will therefore be required that balance these considerations and create an efficient, sustainable transport network for all.

Complexity of the freight system

The freight system is extremely complex and much of it is beyond the county council's control. We can influence some areas of freight and logistics, but many issues will require regional, national or international developments to truly address.

Need for goods

The movement of goods is critical to the national economy, local economy and residents' everyday lives. Therefore, we need to facilitate the efficient movement of goods and carefully consider the impacts of any restrictions.

Amount of goods transported

There is a significant amount of goods that need to be moved each day. Figures for the amount of goods moved are not readily available. The best estimate we have is that approximately 400,000 tonnes (t) of goods per day are needed to resupply London[25]. The majority of this is moved by road freight.

When scaled according to population, this equates to approximately 31,000t of goods per day to resupply Oxfordshire. This would require between 1,700 and 4,000 HGV trips. Whilst we recognise this is not an accurate figure, it provides an indication of the scale of the challenge.

Modal shift

The different modes for transporting freight are part of wider system. Rail freight and emerging modes such as e-cargo bikes can help to complement road freight but cannot replace it entirely. Further detail about this is provided later in the strategy.

The volume of goods that need to be transported each day highlights why we need a combination of modes and cannot rely solely on one mode. Encouraging modal shift also takes a significant amount of time, especially to have a fundamental impact on the volumes of freight currently moved.

Market forces

Freight and logistics are ultimately part of the private sector. This means that companies already operate in the most cost effective way. Solutions, such as freight consolidation centres, are not viewed as cost effective and therefore will not be developed by market forces.

[25] Transport for London, 2014

This affects our ability to deliver some solutions and highlights the need to carefully consider supporting policy and potential impacts on local businesses and residents.

Impacts on businesses and consumers

As highlighted in the previous barrier, freight and logistics is a commercial sector. On average the industry operates on very small profit margins of around 2%[26]. Actions therefore need to consider potential impacts on local businesses which support the economy and residents' jobs.

Similarly, any increases to operators' costs have a knock on affect for consumers in Oxfordshire in the form of higher delivery costs.

[26] Statista 2021

Key principles

We have analysed the trends and issues identified in the previous section in order to develop our strategy. Based on our analysis, we have identified a set of key principles which underpin our strategy. These build on the LTCP vision and key themes but provide some more specific outcomes related to freight and logistics that we are seeking to deliver.

The following chapters include the proposed actions required to deliver our key principles. Our key principles are:

- Appropriate movement
- Efficient movement
- Net-zero movement
- Safe movement
- Partnership working

Structure of the document

The following sections of the document outline our proposals for how we will address the issues associated with the movements of goods in the county and deliver our key principles. The document includes three distinct sections. These are:

- Long distance movement
- Local movement
- Last mile movement

This approach has been taken to reflect the complexity of the freight system and that different solutions will be required to address the issues at each level. The proposals in each section are all seeking to deliver our key principles.

The proposals identified are evidence based and have been developed with input from a range of stakeholders, including the freight industry. We will continue to work in partnership with stakeholders to deliver these proposals and improve the movement of goods in Oxfordshire.

Long distance movement

The first type of movement this strategy focuses on is long distance or strategic goods movement. This is defined as those movements that pass through but do not stop if Oxfordshire. For example, movements between the Solent ports and the Midlands which pass through Oxfordshire using the A34.

Currently the majority of this movement is on roads by HGVs. This increases the number of vehicles in the county contributing to congestion, emissions and air quality issues. There may also be times when these vehicles do not use the strategic road network and move through our towns on inappropriate roads.

These long distance movements are not accessing destinations in Oxfordshire. Our goal is therefore to move them through the county in the most appropriate, efficient and safe manor. The main way in which this can be done is by encouraging the use of alternative modes.

Our priority for long distance goods movement is therefore to support the mode shift from road to rail. This is safer, helps to reduce emissions and reduces impacts on our roads.

Alternative modes
Whilst we believe there are opportunities for rail freight to help improve the long distance goods movement, it is part of a wider system and cannot replace road freight entirely. The pros and cons of the main modes are outlined below to help demonstrate why we cannot replace road freight entirely.

As outlined in the key barriers, significant levels of modal shift will take a number of years. Therefore, we recognise that this will be a gradual progress and we will need to continue to address road freight in the short to medium term.

It should also be noted that the county council only have a limited ability to influence the freight industry. A large amount of partnership working will therefore be required.

Mode	Pros	Cons
Rail	• Reduced emissions • Environmental benefits • Reduced road congestion • Improved safety • Better journey time reliability	• Lack of capacity on network • Less flexible than road • Not suitable for first/last mile • Not economically viable for short distances
Water	• Good for heavy cargo • Lower cost than road and rail • Reduced road congestion • Reduced emissions • Journey time reliability	• Slow speed • Less flexible than road • Not suited to first/last mile • Lack of facilities and knowledge
Road	• Cost effective • Can be used for all distances • Full door to door movement • Easier to track cargo	• Limitations on cargo size and weight • Slower than rail over long distances • Negative environmental and air quality impacts

	• Freight can be moved quickly	• Contribute to congestion and road safety issues

Rail freight

As noted previously, rail is the main mode which could contribute to improving the long distance movement of goods. The table in the previous section also highlighted that it is most appropriate for longer distance journeys rather than first or last mile movements.

Rail currently accounts for approximately 9% of UK Freight movements[27]. There has been a 25% decline in the amount of freight moved by rail since a peak in 2014/15. However, as shown on the graph below, this can largely be attributed to the Department for Business, Energy and Industrial Strategy's policy to phase out coal-based energy in 2015.

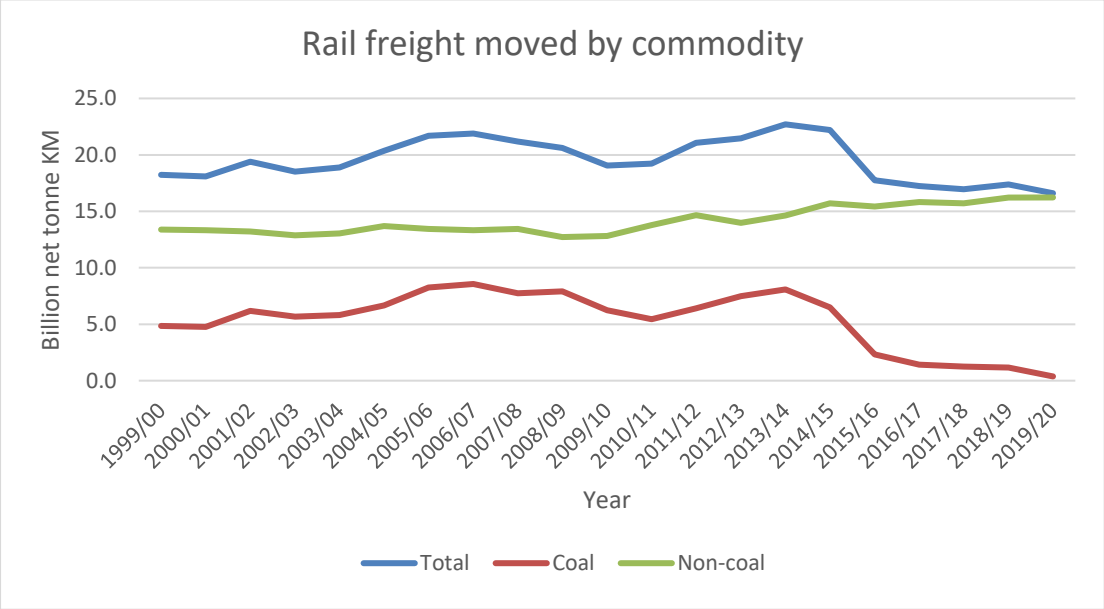


Figure 6 - Rail freight moved by commodity[28]

The amount of non-coal commodities moved by rail freight has been steadily increasing since 2013/14. There has been an 11% increase in non-coal commodities carried by rail freight in this time period[29]. This demonstrates the potential for increased rail freight movement for all commodities.

The Oxfordshire Rail Corridor Study (ORCS) forecast rail freight growth across Oxfordshire and identified the need for a 50% increase in capacity by 2033[30]. This highlights that rail freight is forecast to increase in the county and work will be required to support this.

[27] UK Rail Factsheet 2019
[28] Department for Transport: National Railways freight moved by commodity, annual from 1996/97
[29] Department for Transport: National Railways freight moved by commodity, annual from 1996/97
[30] Network Rail: Oxfordshire Rail Corridor Study

In 2018/19, 7 million road haulage journeys were avoided as a result of rail freight movements[31]. This is equivalent to 1.6 billion road vehicle kilometres. Rail freight therefore helps to reduce road congestion and create a more efficient transport network for all users.

Rail freight currently produces 76% less carbon dioxide per tonne of cargo relative to road haulage[32]. It can contribute to broader environmental benefits and with the electrification of the rail network will contribute to achieving net-zero transport emissions by 2040.

For these reasons our priority for long distance goods movement is to support the mode shift from road to rail. This will capitalise on the rail network in Oxfordshire. It will also help to reduce the number of HGVs, free up road space, tackle congestion and emissions and create a more efficient road network for all users.

Action 1 – Promote rail freight
Our priority for long distance goods movement is to encourage the mode shift of freight from road to rail. We will work with stakeholders to encourage this shift and understand what measures are required to further encourage the use of rail freight.

Whilst our priority is to support the mode shift of freight to rail, it is important that this does not affect our passenger rail network. The lack of spare capacity on Oxfordshire's rail network is currently a key constraint that will need to be addressed to enable more rail freight.

Upgrades to the rail network are beyond OCC's control. We will therefore need to lobby and work with the DfT and Network Rail to upgrade Oxfordshire's rail network and free up capacity for freight. In particular, we will take account of the recommendations in the Oxfordshire Rail Corridor Study.

Action 2 – Work with stakeholders to increase rail network capacity
We will work with Network Rail and the Department for Transport to seek improvements which optimise capacity on the existing rail network for freight and passenger services.

Water Freight

In total, approximately 95% of UK imports and exports are transported by water[33]. The majority is international traffic, however 13% of domestic freight is currently moved by water[34]. Of relevance to Oxfordshire is the 7% of water freight (1% of total freight movement) that is moved on inland waterways[35].

Inland waterway traffic is carried by barge or sea going vessels on the inland waterways network (rivers and canals). The River Thames, which passes through

[31] Department for transport: Number of freight train movements, impacts on road haulage and Freight Performance Measure: annual from 2005/06
[32] Network Rail (2017) Freight Network Study
[33] Freight transport association: Growing the UK inland water freight sector: lessons from the Thames
[34] Department for transport: Domestic freight transport, by mode: 1953 to 2019
[35] Department for transport: Waterborne transport within the United Kingdom: goods lifted and goods moved by traffic type from 2001

Oxfordshire, is the most used inland waterway for freight movement in the UK. The majority of this movement is to or from terminals within London[36].

Waterways are not congested providing benefits for the efficiency of freight movement. Barges are also capable of carrying up to 1000 tonnes compared to approximately 20 tonnes for HGVs[37]. They can therefore help to move goods more efficiently and reduce the number of HGVs.

There are currently a number of challenges around the use of inland waterways for freight movement in Oxfordshire. These include a lack of knowledge, a lack of suitable facilities and potential environmental challenges.

However, we do not view water freight in isolation and instead recognise that it could play a role in the future freight system. We will therefore continue to monitor potential opportunities in this area.

Action 3 – Monitor the use of water freight
We will continue to monitor potential opportunities for increasing the use of water freight in the county.

Road freight
Whilst our priority is to encourage rail freight for long distance movements, we recognise that road freight will still play a role, particularly in the short term. It will therefore be important that we seek to improve the safety and efficiency of these journeys.

A technological development that could help with this is the development of connected and autonomous vehicles (CAV). Connected vehicles can be defined as those equipped to exchange information between vehicle and the surrounding environment, either through local wireless networks or the internet[38]. Autonomous vehicles operate in a mode which is not being controlled by an individual[39].

The primary application of CAV technology to freight is via truck platooning. Platooning is the linking of two or more trucks in convoy, using connectivity technology and automated driving support systems[40].

The vehicles automatically maintain a set, close distance between each other when they are connected for certain parts of a journey, for instance on motorways. The truck at the head of the platoon acts as the leader, with the vehicles behind reacting and adapting to changes in its movement. In the first instance lead vehicle will be driven by a human but in time this could become fully autonomous.

[36] Transport for London: Freight and Servicing Action Plan
[37] Freight transport association: Growing the UK inland water freight sector: lessons from the Thames
[38] Lengton et al., 2015
[39] Automated and Electric Vehicles Act 2018
[40] https://www.acea.auto/uploads/publications/Platooning_roadmap.pdf

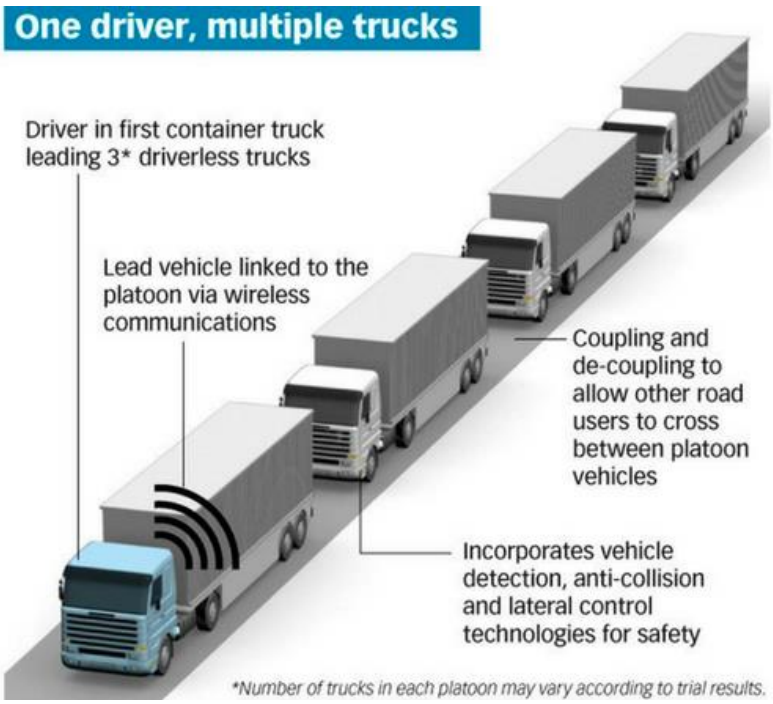


Figure 7 – Truck platooning[41]

The benefits of platooning are:

- Reduces air drag, lowering fuel consumption and CO_2 emissions by up to 16% for the trailing vehicles and 8% for the lead vehicle.
- Improves safety – 85% of road traffic collisions are due to human error.
- Improves efficiency by using roads more effectively.

In 2017 the DfT conducted a feasibility study into platooning. The study deemed that a trial on a UK motorway would be feasible. We will therefore continue to monitor progress in this area and opportunities to be involved in a trial. Any such trial would contribute to delivery of our efficient movement and safe movement key principles.

Action 4 – Monitor truck platooning progress and opportunities
We will continue to monitor progress made on HGV platooning and any opportunities to be involved in a trial.

Partnership working

We recognise that transport does not stop at county boundaries and long distance movements are particularly complex. Long distance movements by their nature pass through multiple local authorities. As a result, there may be opportunities to increase engagement with neighbouring local authorities, sub-national and national bodies to create cross-boundary solutions.

Cross-boundary working refers to the relationships developed between neighbouring local highway and unitary authorities to achieve joint-ambitions and collaborate. Sub-

[41] Singapore Ministry of Transport

national transport bodies will play a particularly important role here due to their regional oversight.

OCC are a part of England's Economic Heartland (EEH) sub-national transport body. EEH published a freight study in 2019 and we will continue to work closely with them on freight issues, particularly those around long distance movement.

There may also be opportunities to work with national bodies such as Network Rail and National Highways on cross-boundary solutions. For example, Network Rail and National Highways published the Solent to Midlands multimodal freight strategy phase 1 in June 2021. As noted, this road and rail corridor passes through Oxfordshire and so we will seek to engage and work with national bodies as part of this work.

Action 5 – Cross-boundary working
We will explore opportunities to engage with neighbouring local authorities and national bodies to develop cross-boundary solutions to long distance freight issues.

As highlighted in action 2, many of the issues associated with long distance movement require action from central government. A key issue in this category is the mode by which freight is moved. We will therefore work with and lobby stakeholders at the regional and national level to encourage the shift of freight from road to rail.

Action 6 – Work with stakeholders to encourage alternatives to road freight
We will work with and lobby a range of stakeholders at the regional and national level to encourage the shift of long distance freight from road to rail.

Local movement

The second type of movement this strategy focuses on is local goods movement. This is defined as those movements to and from destinations in Oxfordshire. For example, deliveries to local businesses, warehouses and construction sites. It doesn't consider the final stage of a goods journey and delivery to individual homes.

As with long distance movement, the majority of this movement is currently on roads by HGVs. Whilst there are opportunities to encourage the use of other modes, these are more limited, and it is important to recognise that HGVs will remain the primary mode for local movement.

Within Oxfordshire there are issues with HGVs passing through our towns and villages on inappropriate roads. This has negative impacts on residents health and wellbeing and on freight operators.

Our priority for this type of movement is therefore to encourage use of the most appropriate routes, improve safety and encourage the uptake of zero emission vehicles.

Road Freight

There are issues in Oxfordshire with HGVs using inappropriate routes. This has negative impacts on resident's health and wellbeing due to noise, air pollution and vibration. It also causes disruption to resident's everyday lives.

Inappropriate movement impacts on our historic environment. The roads in historic county towns were not designed to accommodate HGVs and so there is limited space for the vehicles to manoeuvre. This poses a road safety risk to people walking and cycling.

It also has negative impacts on freight operators. Any small increase in delay could drive a large increase in freight costs. Maintaining efficiency is important to both keep costs down and meet customer expectations. Ensuring vehicles are using the most appropriate roads is therefore of benefit to freight operators.

Ongoing changes to technology and the freight industry may make these issues worse. The shift to larger HGVs will increase the likelihood of inappropriate vehicles passing through Oxfordshire's towns. The increased use of smart phones as navigation devices has likely also contributed to vehicles using inappropriate routes.

Long distance HGV movements will also contribute to these issues; however, they are less likely to be a primary contributor as they do not require access to our county towns and are considerably more likely to be on the strategic road network. But the actions outlined in this section will also help to improve the routing, efficiency and emissions of long distance HGV movements.

HGV route map

There will always be a significant number of local HGV trips required to service Oxfordshire. These trips are essential to support the local economy and residents everyday lives.

Therefore, when trips are required it is important these are on the most appropriate routes. In order to address this issue, we believe it is important to have a clear map to show appropriate HGV routes in Oxfordshire. This has been developed following a review of the LTP4 lorry route map and will help to inform stakeholders of appropriate routes.

Action 7 – Develop appropriate HGV route map

Following review of the LTP4 lorry route map, we have developed an appropriate HGV route map. This map is shown below and identifies suitable HGV routes across the county. We have also created a digital version of this map which can be shared with stakeholders and will be used by a range of council teams.

Action 8 – Create a map of existing weight restrictions

To complement the HGV route map, we will create a digitised and up to date map of all existing weight restrictions in the county. This is part of a broader project to review, map and make available a range of transport information. Once completed the weight restrictions will be added to the map.

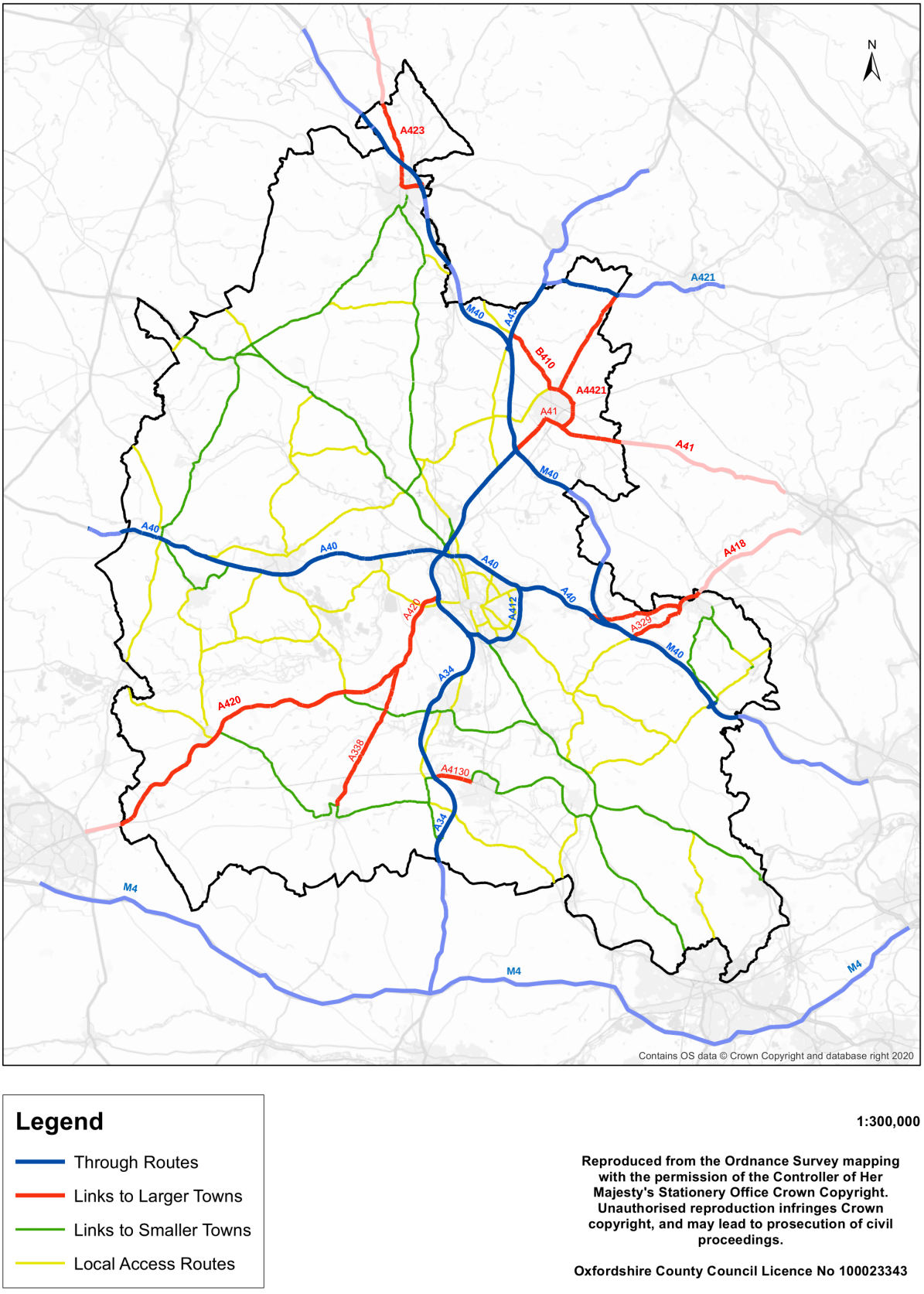


Figure 8 - HGV route map

We published a lorry route map in the 2016 LTP4 freight strategy to show appropriate routes. However, we have learnt that few drivers and freight operators use individual local authority maps so the impact on route choice is limited. Therefore, as part of this strategy we have thought about what actions can support our aspirations.

Action 9 - Promotion of HGV route map

We will promote use of the Oxfordshire HGV route map by:

- Seeking to work with HGV GPS system developers, sat nav providers and digital navigation providers such as Google Maps to incorporate our appropriate route information.
- Exploring opportunities to use online portals similar to 'freight gateway'.
- Engaging with operators, businesses and trade associations.
- Engaging with other local authorities and regional partners.

Encouraging use of HGV routes

We recognise that promotion alone will not be sufficient, and some action may be required to encourage use of appropriate HGV routes. There are a range of ways in which this can be achieved including signage and engagement with local operators.

In exceptional circumstances it may be necessary to restrict HGV traffic. This is primarily done by establishing environmental weight or width restrictions to discourage HGVs from entering an area.

Traditionally, this has been through a point based restrictions on individual roads or structures such as bridges. These restrictions have been considered and developed on a case by case basis subject to funding. However, we have found that in many cases this approach does not address the issues with inappropriate movement. This point based approach often pushes HGVs onto surrounding roads creating a new issue with inappropriate movement elsewhere.

Furthermore, this approach to weight restrictions requires significant resource and funding, is challenging to enforce and can have negative impacts on the efficient movement of goods and local businesses.

Most recently we have seen the issues associated with this approach to weight restrictions during the Burford Experimental Traffic Restriction Order (ETRO). Our findings from the Burford ETRO are summarised below.

Case Study - Burford ETRO

The Burford ETRO was established in August 2020 to prevent goods vehicles that exceed 7.5t passing through Burford. The restrictions prevented goods vehicles from using the A361 (The Hill & High Street), Barns Lane and Tanners Lane.

Permit applications for exemptions were available for locally based HGV owners/operators. This was managed by Burford Town Council.

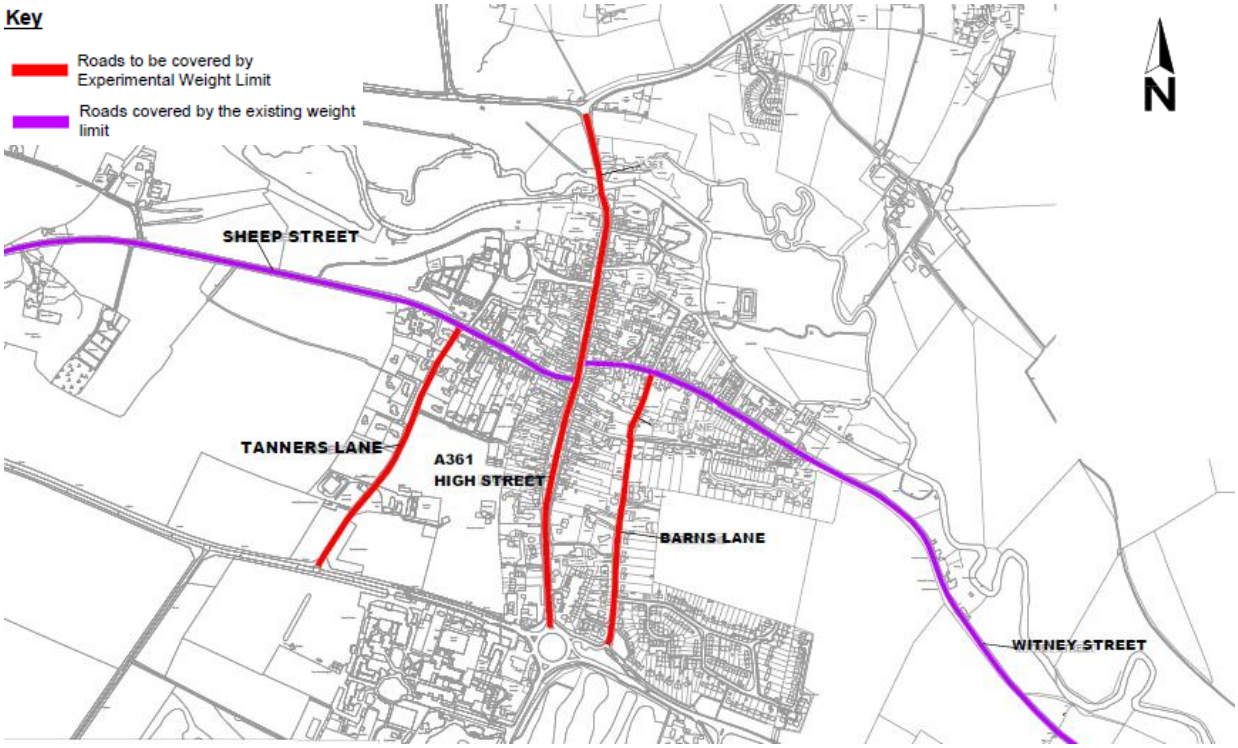


Figure 8 – Map of Burford ETRO area

A number of roads in the vicinity of Burford were monitored before and twice during the ETRO. The data had some limitations, but was useful in setting out key trends:

- There was no change in overall levels of HGVs in Burford between April 2019 and February 2021. But the data shows over 50% reductions in the heaviest vehicles with 3 axles and above.
- High increase in 3 axle and heavier HGVs at the A44 Oxford Road, Bladon roundabout.
- Increase of total HGVs on A4095 Bridge Street and B4022 West End, Witney. Both of these roads already have severe congestion.
- Increase in HGV traffic on Dry Lane and Leafield, both unclassified roads.

There were also objections from Gloucestershire County Council due to significant increases in HGVs at six survey sites, the Road Haulage Association and Freight Transport Association.

The experimental weight restriction was a unique study, and much was learnt about HGV movements in the area. The scheme saw benefits for Burford and some neighbouring communities, but the negative impacts were dispersed over a wider area and passed to Burford's neighbours.

Following this analysis it was considered that an area wide approach to environmental weight restrictions may help to share benefits across neighbouring communities and be clearer to hauliers than a series of point restrictions.

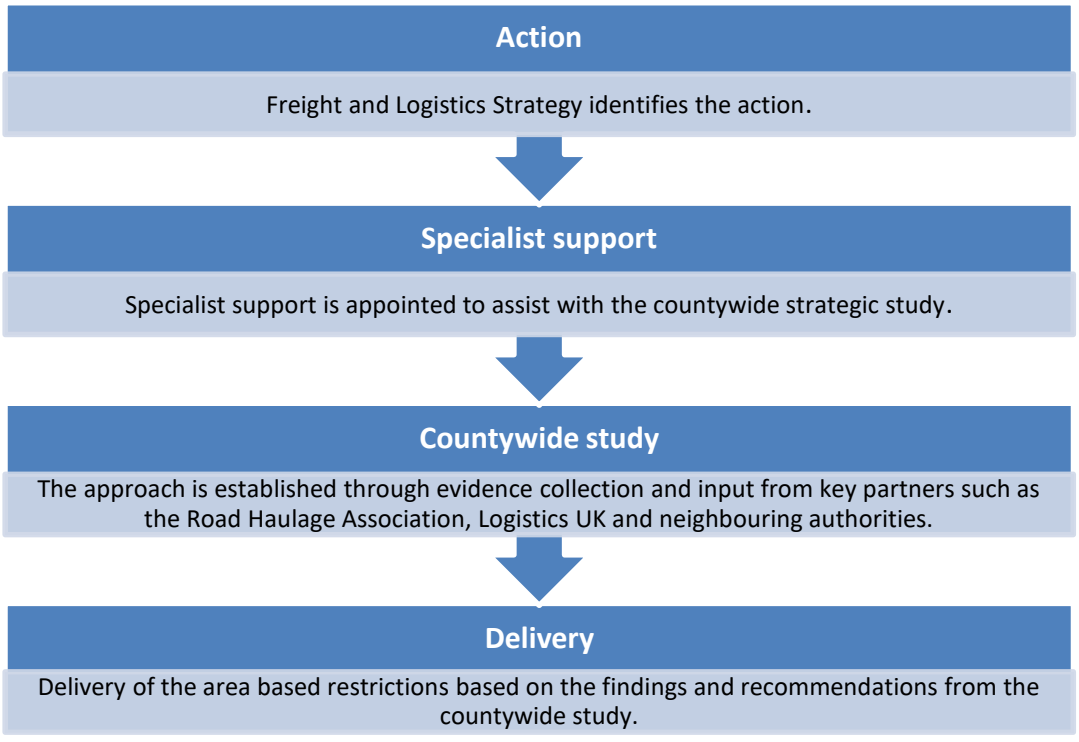
Therefore, the Cabinet Member for Travel Development and Strategy resolved to approve the consideration of developing area wide restrictions across Oxfordshire and revoke the Burford ETRO. This decision was endorsed by the county council's cabinet in February 2022.

Following the decision regarding the Burford ETRO we are therefore proposing to explore an area based approach to weight restrictions. This approach will consider how we can keep HGVs on appropriate routes in larger geographic areas to reduce freight traffic in our towns and villages and stop issues being moved from one road to another.

It is important that this approach considers the whole county and so we will pause any area specific studies to focus on a strategic countywide study. This study will set out our area based approach and will be informed by a wide range of evidence and stakeholder engagement.

<u>Action 10 – Conduct countywide study to establish an approach for area based weight restrictions</u>

We will conduct a strategic countywide study to establish an approach for area based weight restrictions. This work will be progressed in the following processes:



In order to develop the study and deliver the area based weight restrictions funding will be required. The county council will therefore commit to funding the development and delivery of the area-based weight restriction programme. Individual town and parish councils will not be asked to commit funding for the development or delivery of these restrictions, recognising the need for a coordinated and fair approach.

Action 11 – Fund development and delivery of the area based weight restriction programme

We will commit to funding the development and delivery of the area based weight restriction programme. Individual town and parish councils will not be asked to commit funding for the development or delivery of the restrictions.

Enforcement

Where existing action has been taken to address inappropriate HGV movement, the county council conduct enforcement. Primarily, this has been through the enforcement of existing weight restrictions.

Whilst resources have reduced in recent years, we have become more efficient allowing for an increase in activity since 2007 when enforcement began. However, we recognise that owing to the time involved for enforcement and the sheer quantity of HGV traffic on the road, breaches of weight restrictions are difficult to reduce.

We are therefore keen to explore new opportunities to improve enforcement and increase the use of our identified HGV routes. A key factor in enabling this would be if the Department for Transport (DfT) granted local authorities enforcement powers under Part 6 of the Traffic Management Act 2004.

Traffic Management Act 2004 - Part 6

Under Part 6 of the Traffic Management Act (TMA) local authorities can apply for powers to take on further enforcement themselves, rather than relying on the police. Whilst councils can enforce parking and bus lane contraventions, the provisions relating to moving traffic offences have not been activated.

If secondary legislation is passed, local authorities would be granted powers to enforce and issue penalty charges for offences such as disregarding one-way systems, failing to give priority to ongoing traffic, or disregarding box junctions.

Part 6 of the TMA enabled the introduction of the London Lorry Control Scheme (LLCS). The LLCS controls the movement of heavy goods vehicles over 18t at night and at weekends on specific roads in London. This helps to manage the environmental impact of HGV vehicles and minimise noise pollution. Enforcement is carried out in residential areas during unsociable hours through restricted use of these roads.

Action 12 – Lobby for enforcement of moving traffic offences under Traffic Management Act Part 6

We will continue to lobby for the government to pass secondary legislation allowing local authorities to enforce moving traffic offences under the Traffic Management Act Part 6.

Alongside Traffic Management Act Part 6 there are other options to improve enforcement of weight restrictions that we will explore. One of these is the implementation of road user charging schemes.

Road user charging involves charging drivers for the use of the roads they drive on. Traditionally this has involved charging vehicles based on the emissions they produce. Examples of this include the London Ultra-low Emission Zone (ULEZ) and Oxford city Zero Emission Zone (ZEZ).

Using the same principles and technology, it is possible to charge vehicles based on their weight category for use of a road. Where restrictions are in place, but issues persist, this type of charging could be implemented to act as a deterrent and help us to encourage use of the identified appropriate routes.

Action 13 – Explore implementation of road user charging schemes
Where appropriate, we will explore the implementation of road user charging schemes to reduce the impact of HGVs, including supporting weight restrictions and appropriate routeing.

There are also changes to technology that may help us to improve our enforcement. Technology continues to develop rapidly and there have been a number of innovations in the transport industry in recent years. It is therefore important that we consider these changes and how to harness them.

For example, there has been the development of cameras and sensors that can be used to identify different vehicles. These could be deployed at multiple locations, tracking HGVs in and out of weight restriction entrances and exits. This would allow for cross matching and identification of those that stopped in the area.

Action 14 – Explore technology to aid enforcement
We will monitor and explore technology that could help us to improve the enforcement of weight restrictions.

Finally, we will seek to improve our enforcement by reviewing best practice nationally and internationally on freight transport management. This includes engaging with other local authorities to understand work they are doing and the effectiveness of it and our sub-national transport body England's Economic Heartland (EEH).

Action 15 – Review best practice
We will seek to improve our enforcement by reviewing best practice nationally and internationally on freight transport management.

Parking facilities
Appropriate parking facilities are an important consideration to ensure safe and efficient local HGV movement. Appropriate parking facilities allow journeys to be made without major detours and prevent HGVs from disrupting other road users. As highlighted previously, even small detours can have a large effect on operators' costs and journey times.

Strategically located rest stops can also help to encourage the use of appropriate routes. Facilities could be located on our identified appropriate HGV routes, contributing to delivery of our priority to keep local HGV movement on the most appropriate routes.

Currently parking facilities in the South East are at 84% utilisation[42]. This is only 1% below the 'critical' utilisation level. The Welcome Break Oxford services were identified as being at 114% utilisation highlighting the pressures on lorry parking in the county.

In order to inform future work on this topic, we will review current rest stops and lorry parking facilities. This will identify what facilities are currently available and where there are gaps in the current network.

Action 16 – Review current rest stops and lorry parking facilities
We will review current rest stops and lorry parking facilities in order to improve our understanding and inform future work.

Following this review, we will promote the development of lorry parking facilities. The county council do not currently have any funding for the delivery of new facilities. As a result, external funding will be required and we will work with a range of stakeholders such as developers, neighbouring local authorities and the freight industry to understand the potential for any such facilities.

The A34 and M40 are part of the strategic road network and so are managed by National Highways. Therefore, working with National Highways will be essential to delivering any facilities on these corridors.

As part of this we will work to ensure that any facilities are located in accordance with our HGV route map. Similarly, it will be important to consider potential future fuel requirements at these facilities such as electric vehicle charging or hydrogen refuelling stations.

Action 17 – Promote the creation of rest stops and lorry park facilities
We will work with a range of stakeholders to promote the creation of rest stops and lorry park facilities. We will seek to ensure that any facilities are located in accordance with our HGV route map and that they consider the need for future refuelling requirements.

Vehicle refuelling requirements
One of our other priorities for local movement is to encourage the uptake of zero emission vehicles (ZEVs). ZEVs significantly reduce emissions of carbon, nitrogen oxides and other pollutants, both at the tailpipe and upstream in the energy system.

There are two kinds of freight vehicles, LGVs and HGVs. Both of these vehicle types will need to be zero emission if we are to deliver a net-zero transport system by 2040. However, there is a significant variation in how developed alternative fuels for these vehicles are.

For LGVs there is more certainty about the technology available. Zero emission LGVs are largely Battery Electric Vehicles (BEVs), utilising the same technology as

[42] National Survey of Lorry Parking, 2017

electric cars. As a result, the UK government has required that from 2035, all new cars and vans must be ZEVs.

In the short to medium term, electric vehicle charging infrastructure is the most pressing requirement to support these vehicles. To enable this, OCC along with our partners in the District and City Councils, has adopted the Oxfordshire Electric Vehicle Infrastructure Strategy (OEVIS), which sets out 17 policies and associated key actions for the short term (2020-2025).

The OEVIS will guide our short term work which will support all BEVs, including the freight industry. We are also planning to develop a longer-term strategy to meet the infrastructure requirements of ZEVs of all propulsion types and classes.

Our District and City councils may also produce their own strategies and delivery plans to support ZEVs. For example, Oxford City Council are currently working an Electric Vehicle Strategy. Supporting the delivery of these strategies will also be critical to supporting the uptake of ZEVs.

Action 18 – Support BEV charging infrastructure requirements
We will work to ensure that the OEVIS supports the freight industry's electric vehicle charging requirements. We will also continue to engage with freight operators as we develop a long-term strategy to understand their electric vehicle charging requirements.

HGVs are also evolving and work is progressing to develop ZEVs. However, HGV technology is further behind and there is less certainty about when alternative fuels will be adopted at scale. The primary alternatives that are being developed are BEVs, Hydrogen Fuel-Cell Vehicles (FCEV) and electrified road systems (catenary).

Battery electric HGVs are predicted to be adopted at scale between 2022 and 2030, exceeding ICE HGVs from approximately 2032. Hydrogen powered HGVs are predicted to be adopted at scale between 2024 and 2040, exceeding ICE HGVs from approximately 2036[43].

As part of the Transport Decarbonisation Plan, the government is consulting on when to end the sale of all new non-zero emission HGVs. The dates proposed are 2035 for HGVs of 3.5t to 26t and 2040 for HGVs above 26t. We will continue to monitor the outcomes from this consultation.

Whilst electric vehicle technology is generally further ahead, there are issues associated with electric HGVs that could make hydrogen an attractive alternative. These issues include the fact that batteries for electric vehicles are heavy and take up space therefore reducing the HGVs load and making each vehicle less efficient.

Hydrogen technology is further behind and there are also issues associated with it. Hydrogen is considerably less carbon efficient than electrification and so the benefits are lower. As a result, more off-setting in other areas would be required.

[43] Shell: Decarbonising Road Freight: Getting into Gear

We will need to monitor technological developments in the sector. This will include monitoring the outcomes of the zero emission HGV technology trials the government have committed to as part of the Transport Decarbonisation Plan. We will also incorporate findings from the Oxfordshire hydrogen strategy.

Action 19 – Monitor alternative HGV fuel requirements and options
We will continue to monitor developments in zero emission HGV fuels. As more is known we will update our strategy and consider the necessary requirements. This will include consideration of the zero emission HGV technology trials and findings from the Oxfordshire hydrogen strategy.

When more is known about what fuel will be used to power zero emission HGVs, there will be an opportunity for the county council to be involved in the provision of refuelling infrastructure. This could be by providing refuelling infrastructure on the council owned highway or by identifying land for refuelling stations.

There is an opportunity to develop this infrastructure in accordance with our HGV route map. Strategically locating refuelling infrastructure on this network will help to encourage use of appropriate HGV routes and deliver the associated benefits outlined previously.

Action 20 – Strategically locate refuelling infrastructure
We will seek to strategically locate zero emission HGV refuelling facilities in accordance with our HGV route map. This will support zero emission freight movement whilst encouraging use of appropriate routes.

Electrified road systems are another alternative that could be used to power zero emission HGVs. Electrified road systems use overhead cables to deliver energy to the vehicle. This reduces the need for energy storage via large, heavy batteries.

This system would rely on the overhead cables being delivered on key freight corridors. It is estimated that this could deliver as much as 80% reduction in the carbon emissions from a long-haul articulated vehicle[44]. Demonstrator projects have been delivered in the USA, Germany, Sweden, and the Netherlands.

[44] https://www.mobility.siemens.com/global/en/portfolio/road/ehighway.html

Figure 9 – Electrified road system trial[45]

In order to implement this a significant amount of new infrastructure would be required. The cost of this infrastructure is estimated to be £1 million per km. There are approximately 7,000 miles of suitable trunk roads in the UK setting the infrastructure costs of this approach at £7 billion[46].

Whilst there is a significant cost involved, electrified road systems are currently being explored further by Innovate UK-funded projects. We are involved in a project looking into this and will monitor the outcomes of the study.

Electrified road systems will also be included in the zero emission HGV technology trials committed to in the government's Transport Decarbonisation Plan. We will monitor the outcomes of these trials.

Action 21 – Monitor electrified road systems study
We will continue to monitor and engage with research projects reviewing the feasibility of electrified road systems in the UK and across Europe.

Network management
We can also support the efficiency of local freight movement by road. OCC as the Highway and Streetworks authority are responsible for a range of management functions. This includes working to manage congestion through network management.

The core purpose of network management is to tackle congestion and ensure the safe, free-flowing movement of traffic, people and freight across the Oxfordshire road network. It also has the potential to influence travel choices and prioritise public transport, walking and cycling.

[45] Siemens
[46] Government office for science: Decarbonising road freight

The Traffic Management Act (2004) places a duty on the Council to reduce and manage congestion and to collaborate effectively with other traffic authorities to achieve this. OCC is also responsible for ensuring a co-ordinated approach to maintaining public safety through approval of all works on the public highway.

Our key network management objectives are to:

- Promote economic activity in and through the county.
- Enable access to employment, leisure and educational facilities for all.
- Reduce traffic congestion, air and noise pollution.
- Reduce accidents and promote public safety.

Effective network management will be an essential part of delivering efficient goods movement in Oxfordshire. Enhanced network management can reduce the impact of roadworks, accidents and incidents on the network, therefore improving productivity and road safety for all road users.

Action 22 – Enhance network management
We will work to improve our network management to allow efficient goods movement by managing congestion and reducing the impact of roadworks, accidents and incidents on the network. More detail about how we will do this can be found in the LTCP network management policy.

In support of our network management functions, data has become available from a range of different sources and at larger quantities. New data sources include edge devices (devices that provide data between a local network and a wide network, such as routers), big data and the Internet of Things (IoT).

We are seeking to improve our approach to data because it can be leveraged to ensure we're meeting residents' needs, measure progress, understand future needs and improve our awareness of changes.

Better real time data will enhance our network management by allowing near real time adaption to changes on transport networks, helping to minimise disruptions to journeys and improve air quality. This will support the efficient movement of goods.

Action 23 – Improve data gathering and usage
We will work to enhance our network management by implementing a consistent approach to gathering and using data. More detail about this can be found in the LTCP data policy.

There has also been a shift towards providing open data. The provision of open data allows transport data to be more widely available. It can then be used for innovations in the private sector and combined with data from other sectors to improve our understanding of transport user's needs.

Open data is data that is available to everyone to access, share and use[47]. Open data should be easy to use and in a standardised format. Open data is a government

[47] https://theodi.org/

priority and is seen as a key enabler for the government's digital transport strategy. Transport Systems Catapult estimate that not sharing, and not making transport data open, could result in £15bn in lost direct and indirect benefits to the UK between 2017 and 2025[48].

Sharing our data will help navigation software providers to update their software and will enable freight transport operators to improve the efficiency of their operations.

Action 24 – Improve data sharing
We will implement a consistent approach to data sharing in order to help freight transport operators improve the efficiency of their operations. More detail about this can be found in the LTCP data policy.

Rail freight
There are less opportunities for rail freight to replace HGVs for local movements as rail is not suitable for the first or last mile and there are only a limited number of destinations in the county that can be accessed via the existing network.

However, there are still opportunities to move freight by rail for some part of its journey. This will help to reduce the length of HGV journeys and have benefits for emissions, safety and congestion.

In order to facilitate this rail cannot be viewed in isolation. Rail freight is part of a wider system. Some road movement will still be required to move goods on the first and last miles of their journey.

We know that in order to encourage rail freight for local journeys, more rail freight interchanges (RFI) are required. RFIs are rail served distribution and warehouse parks linked into both rail and the strategic highway network. These facilities are key to enabling the first/last mile road movement and encouraging use of the rail network.

In order to encourage the mode shift of freight to rail we will support the provision of appropriately sited RFIs, subject to funding being available and having regard to the impacts on local communities and on the road and passenger rail networks.

For example, RFIs may not be suitable in locations where capacity on the existing road and/or rail networks is not available, capacity of the road or rail cannot be enhanced, or in locations with particular environmental sensitivities and/or other planning constraints.

Action 25 – Support the provision of rail freight interchanges
We will support the provision of appropriately sited rail freight interchanges, subject to funding being available and having regard to the impacts on local communities and/or any other relevant planning considerations, and on the capacity and suitability of impacted road and rail networks.

[48] The case for government involvement to incentivise data sharing in the UK Intelligent Mobility sector —Transport Systems Catapult 2017

There are also emerging developments that we will explore to encourage the increased of rail for local goods movement. The main development in this area is 'express freight'. Express freight is an emerging freight sector and Network Rail are currently working to understand opportunities with operators.

Express freight views parcels as passengers. Following the decline in rail passenger number following the COVID-19 pandemic, there is more free space on some existing passenger train services. Express freight seeks to utilise this space to carry logistics and parcels.

This concept could work on multiple levels from utilising one carriage on a passenger train to carry parcels, through to using whole empty passenger trains. This approach would help to move parcels and logistics into the heart of urban areas before they are moved to their final destination by smaller vehicles. This will help to reduce the number of HGVs entering urban areas.

There is the potential for this concept to be applied in Oxfordshire due to the county's pivotal point in the UK rail network, with rail lines heading north, south, east and west. We will therefore work with partners to explore opportunities for express rail freight.

Action 26 – Explore opportunities for express rail freight
We will work with partners such as Network Rail and rail operators to explore opportunities for express rail freight in Oxfordshire.

Influencing new development
Another key way in which we will encourage local movement to be moved appropriately is by seeking to influence new development. Current forecasts are for over 85,000 new jobs and 100,000 new homes in the county between 2011 and 2031. It will be important to ensure that these developments are located and designed to facilitate appropriate freight access.

The district councils are responsible for planning functions in Oxfordshire. However, there are opportunities for us to seek to influence development. For example, we will ensure that we consider freight management measures when responding to consultations on planning policy and relevant planning applications.

This also includes seeking to ensure new developments incorporate the needs of emerging technologies like drones and autonomous vehicles that may be used for last mile delivery in the future. We plan to do this through our Innovation Framework.

The framework, which is a supporting document of this LTCP, sets out a series of principles which should be applied to the integration of innovation into new development and infrastructure, so that innovation is used to further policies and strategies such as those within this document.

Action 27 – Seek to influence the location and design of new development
We will seek to influence the location and design of new development, particularly employment sites and any related transport infrastructure, so that these can function well, with appropriate freight access to and from the strategic transport network

without adverse impacts on local communities, other road users and the environment. This includes ensuring new developments incorporate the needs of emerging technologies.

We will also ask developers of major sites to prepare Construction Logistics Plans (CLPs). CLPs provide the framework for understanding and managing construction vehicle activity into and out of a proposed development[49].

CLPs provide us with an overview of the expected logistics activity during the construction programme. This will help to reduce the impact construction traffic has on local communities in relation to congestion, pollution and noise[50].

Case study – Croydon Growth Zone

The London Borough of Croydon put in place Construction Logistics Planning guidance for the Croydon Growth Zone project. Any failure to follow the guidance meant the project being rejected[51].

Some key aspects of the guidance included:

- Site traffic was not allowed between 7:30 – 9:30am and 4:00 – 6:30pm except concrete deliveries.
- Developers had to commit to using specific signed routes for designated Growth Zone traffic.
- Developers had to commit to using the Growth Zone Navigation App which directs vehicles via approved access routes.

A full CLP assessment should include detail such as the amount of construction traffic generated, the routes the construction vehicles will use and any traffic management that will be in place. They therefore help us to encourage use of appropriate routes, whilst also contributing to several of our other objectives.

There are a number of innovations in this area, for example the Croydon Growth Zone navigation app, that we will continue to monitor and explore as appropriate.

Action 28 – Ask developers of major sites to prepare Construction Logistics Plans

We will ask developers of major sites to prepare Construction Logistics Plans to minimise the impact of the large scale residential and business development planned for Oxfordshire.

[49] https://www.arup.com/projects/construction-logistic-plan
[50] https://ccsbestpractice.org.uk/entries/construction-logistics-plan/
[51] https://www.clocs.org.uk/casestudies/clocs_case_study_lb_croydon_aug_2020.pdf

Last mile movement

The last type of movement this strategy focuses on is last mile movement. This is defined as the final stage of a goods journey to individual homes. For example, moving a package from a delivery warehouse to a customers home.

Increasingly there are issues with inappropriate last mile freight delivery. As highlighted previously, the rise of internet shopping has led to the growth of LGVs. This is causing increasingly inappropriate levels of LGV traffic on local roads. We have also seen issues with inappropriate parking of both LGVs and motorcycle food delivery services.

As last mile movement is within our towns and villages it also has more of an impact on air quality and road safety due to emissions being produced in residential areas and increased interaction with people walking and cycling.

Our priority for this type of movement is to reduce the number of freight vehicles in our towns to improve and encourage the uptake of zero emission vehicles. We are primarily focusing on freight consolidation and mode shift to cycle freight to achieve this.

Cycle freight

One of our priority focus areas for last mile movement is encouraging more use of cycle freight. This is best suited to replacing LGVs for the last mile delivery of goods in urban areas.

Cycle freight refers to the transportation and delivery of goods using bicycles or electric bicycles. It can help to reduce emissions by up to 90% compared to diesel vans and by a third compared to electric vans. It also brings benefits to operators with delivery being up to 60% faster in city centres[52].

As noted in the key barriers, cycle freight is one part of the broader freight system. We believe it has the potential to move a greater proportion of goods, but it will not have the capacity to completely replace road freight in urban areas.

It will also take a number of years before operations across the county could be scaled up. We will therefore need to support zero emission LGVs for the majority of last mile delivery in the short to medium term.

There are existing cycle freight services operating successfully in Oxford. We believe there is potential to expand the use of cycle freight within Oxford, particularly with introduction of the Zero Emission Zone, and in other towns.

[52] Possible: The promise of low-carbon freight

Case Study – Pedal and Post

Pedal and Post is a sustainable courier and storage firm operating in Oxford. Pedal and Post uses cargo bikes to deliver medical supplies and samples, e-commerce parcels and other items.

Pedal and Post have various partnerships including with Baxter Healthcare and OUH Trust. As part of this partnership, more than 25,000 products were delivered between August 2020 and February 2021. This service has halved the time it takes for products to travel from Baxter's compounding facility in Cowley to the hospital site[53]. The success of pedal and post demonstrates the benefits of cycle freight in Oxford.

As of August 2021, OCC are working to purchase e-cargo bikes for Pedal and Post using funding from the Energy Savings Trust. Pedal and Post are planning to use some of these bikes to take over veg box deliveries in Oxford, replacing LGVs which currently make the deliveries. We are also involved with capturing and evaluating data from Pedal and Post.

Figure 10 - Cycle freight operated by Pedal and Post in Oxford[54]

Outside of Pedal and Post there is also work progressing to encourage cycle freight in Oxford. As part of the Energy Savings Trust funding we are purchasing a set of lease bikes for Oxford businesses to try at a low cost before they buy.

Oxford City Council are also providing some electric cargo bikes in Cornmarket. We will be involved with reviewing the results from both of these projects to get a rounded picture of usage and further inform our understanding of cycle freight.

Action 29 – Promote cycle freight in Oxford

We will continue to promote and support the expansion of cycle freight in Oxford. This includes working with Pedal and Post and others to evaluate data and leasing e-cargo bikes to Oxford businesses.

[53] http://www.pedalandpost.co.uk/pedal-post-pedal-power-drives-improved-medical-service-and-greener-deliveries/
[54] http://www.pedalandpost.co.uk/

Cycle freight could also be effective in a range of Oxfordshire towns. We are seeking to promote the use of cycle freight across the county because it will help to reduce the number of motorised vehicles. This will improve the health and wellbeing of residents by reducing emissions from HGVs and LGVs. It will also help to reduce congestion and noise pollution.

Cycle freight will deliver benefits to freight operators and local businesses through improved journey time reliability, reduced costs and more flexible pick up/drop off destinations.

Action 30 – Promote cycle freight across Oxfordshire
We will promote cycle freight across Oxfordshire by engaging with a range of stakeholders including our District and City council's, local businesses, freight operators and developers. We will also continue to monitor any funding opportunities.

Consolidation Centres
Our other priority focus for last mile movement is exploring the potential for freight consolidation centres. Freight consolidation is an important part of logistics.

Freight consolidation centres are operations that receive multiple small deliveries and convert them into fewer deliveries to the destination. Crucially, this is often done in zero emission vehicles or by cargo bike. They can therefore help to reduce local air pollutants from freight.

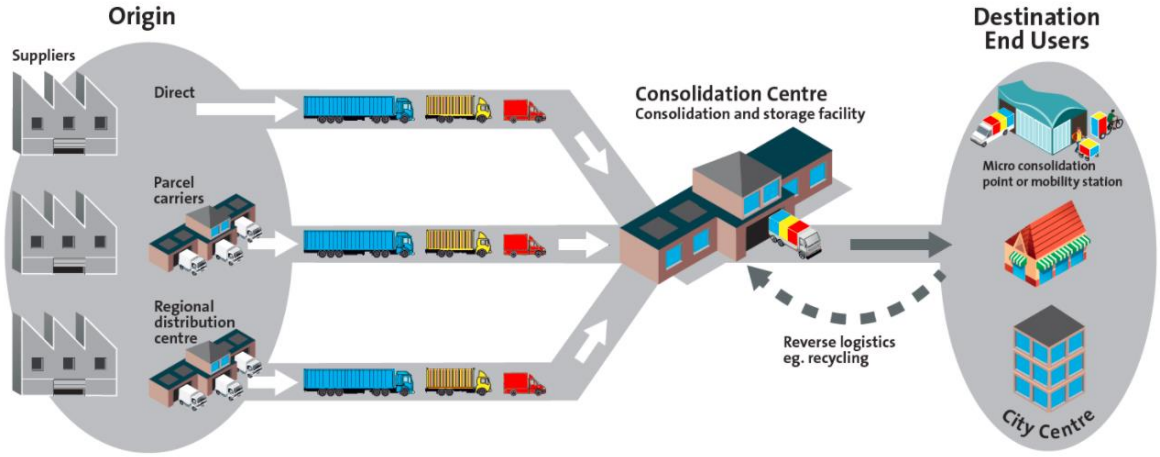


Figure 11 – Summary diagram of freight consolidation[55]

Freight consolidation centres can also provide a range of benefits such as allowing for more efficient vehicle usage and can reduce both the number of vehicles and distance travelled. This will contribute to delivery of our key principles of efficient movement and appropriate movement.

Freight consolidation centres can vary in scale and there are several different operating models. Many consolidation centres are used by a single company to improve the efficiency of their operation. However, other models exist where centres

[55] Travel West: Bristol Freight Consolidation Centre Case Study

are designed to be used by multiple operators. The most common examples are urban consolidation centres, micro consolidation centres and construction consolidation centres.

It is recognised that there are few examples of self-sustaining urban consolidation centres. However, many of those in operation have shown evidence of benefits. Examples from Monaco and Bristol are summarised below.

Case study – Freight consolidation centres

Monaco

HGVs are restricted from entering Monaco, with vehicles of more than 8.5 tonnes required to use the Monaco Consolidation Centre (MoCC). The MoCC was established in 1989 and is owned by the Principality of Monaco.

The Monaco scheme has resulted in a more efficient urban delivery system for the Principality of Monaco. Despite using diesel delivery vehicles, it was found to have reduced local air pollution by 30%, vehicle noise by 30% and traffic congestion by 38%[56].

Bristol

The Bristol Freight Consolidation Centre was initially set up as a pilot scheme in 2004 with European funding to help alleviate issues associated with freight in Broadmead, Bristol. Following the successful pilot, the operation grew, and the service extended to retailers in other parts of the central Bristol area[57].

At its peak, a 70% to 80% reduction in the number of onward trips was seen by the freight consolidation scheme. This meant that for every 10 vehicles that made a delivery to the consolidation centre, just 2 or 3 onward journeys to the central Bristol area were made. This led to a reduction of 11,034 kg of CO_2, 358 kg of NO_x and 11 kg of PM.

These examples show that locating freight consolidation centres on the outskirts of urban areas can help to reduce HGV and LGV movements and tackle the local air pollution. Utilising zero emission vehicles for last mile delivery will further enhance these benefits.

Freight consolidation centres are generally not supported by the freight industry. This is due to increased costs and issues with contamination or loss of products. Therefore, market forces are unlikely to lead the creation of consolidation centres.

We will need to consider this in terms of how they could be delivered, the need for supporting policy to encourage use and the potential impacts on cost for local businesses and consumers.

We also need to recognise freight consolidation as a long term solution owing to the time required for the development of facilities and significant modal shift.

[56] SEStran (South East Scotland Transport Partnership): Freight Consolidation Centre Study
[57] Travel West: Bristol Freight Consolidation Centre Case Study

Action 31 – Freight consolidation feasibility study
We will work with partners to review and explore the potential for freight consolidation centres, with a priority focus on enabling zero emission last mile delivery.

Action 32 – Safeguard land for freight consolidation
The development of any freight consolidation centres will require suitable land. As part of our work we will identify potential land for these facilities and seek to have it safeguarded in local plans.

Reducing the need to travel

Another important consideration for reducing the number of delivery vehicles in our local areas is whether the journey is needed at all. Reducing the need to travel is included in the main LTCP document and recognises that it can play an important role in tackling vehicle use and the associated negative impacts such as congestion and emissions.

Reducing the need to travel will be delivered in two primary ways. The first is through improved digital connectivity. Digital connectivity can reduce the need to travel by providing residents with the ability to work, shop and access services from home. This is primarily related to private vehicle usage rather than the movement of goods.

The second way we can reduce the need to travel is through planning such as the location of services within walking distance of residents. This is relevant to the movement of goods and may help to improve last mile delivery by tackling inappropriate levels of LGV traffic on local roads.

In the LTCP we have included policies which address reducing the need to travel. This is primarily through promotion of the 20-minute neighbourhood concept and our guidance for new developments.

We will work with our District and City Councils to ensure that regeneration schemes and new developments support application of these policies and incorporate considerations about reducing the need for freight movement. For example, the development of freight lockers or hubs near to developments to minimise the need for delivery vehicles to travel on local roads.

Action 33 – Promote considerations about reducing the need for freight movement
We will work with our District and City Councils to support application of the 20-minute neighbourhood and guidance for new developments LTCP policies and incorporate considerations about reducing the need for freight movement.

Clean Air and Zero Emission Zones

Whilst our priority is encouraging cycle freight, freight consolidation and a shift to zero emission vehicles for last mile movement, it is important to recognise that internal combustion engine HGVs and LGVs will continue to be the main way last mile movement is conducted in the short term.

These vehicles contribute to local air pollution. Air pollution is a mix of particles and gases of both natural and human origin. The main components of urban air pollution are particulate matter (PM) and nitrogen oxides (NO_x). Road transport is the largest source of NO_x and fourth largest source of PM[58]. Currently, there is no clear evidence of a safe level of exposure.

Air pollution is the largest environmental health risk in the UK. It causes more harm than passive smoking. Conditions exacerbated by air pollution include asthma, chronic bronchitis, chronic heart disease, and strokes. In Oxfordshire, it was estimated that 3,578 years of healthy life were lost due to air pollution in 2017[59].

Oxfordshire's air pollution comes from a variety of sources, and the mix of sources varies by location. Across Oxford road transport accounts for approximately 40% of NO_x emissions and 10% of particulate matter emissions. At roadside locations in the county with heavy traffic, road transport accounts for as much as 75% of NO_x and 20% of particulate matter emissions.

Nationally, HGVs and LGVs produce 35% of road transport emissions[60]. Action is required to address this contribution to air pollutants and as part of the LTCP we have committed to investigating the use of Clean Air Zones (CAZs) and Zero Emission Zones (ZEZs).

A CAZ is an area where vehicles with higher tailpipe pollutant emissions are restricted or charged for access. A ZEZ is an area where all vehicles except those with zero tailpipe emissions are restricted or charged for access.

In addition to the core restrictions or charges, CAZs and ZEZs may also include:

- Supporting traffic management, sustainable transport or behavioural change schemes.
- Electric vehicle charging infrastructure.
- Funding to help individuals and businesses to upgrade their vehicles.

CAZs and ZEZs generally apply to urban areas such as central Oxford and so are most relevant to last mile movement and will help to encourage the use of cleaner vehicles or alternative modes.

However, there are various considerations about how CAZs and ZEZs could apply to freight. For example, recognising that there are very few zero emission HGVs, the standards for these vehicles could be set at Euro IV.

Similarly, there is a need to consider the penalty charges for non-compliance. Owing to the fact that many HGVs are operated by freight companies' non-compliance charges may need to be higher to encourage use of cleaner vehicles.

[58] https://www.gov.uk/government/publications/health-matters-air-pollution/health-matters-air-pollution
[59] Oxfordshire Health and Wellbeing Joint Strategic Needs Assessment 2020
[60] UK Government: The Road to Zero

However, it is also important to consider the economic importance of freight and the needs of local businesses when planning any scheme. Local businesses, especially smaller ones, may have little influence on the vehicles used to deliver supplies.

We will therefore seek to engage with the freight industry and local businesses to inform the development of any CAZs or ZEZs in Oxfordshire and publicise proposals so that businesses have sufficient time to retrofit their fleet.

Action 34 – Engagement around CAZs and ZEZs
We will engage with the freight industry and local businesses when planning any CAZ or ZEZ scheme to inform its development. We will also ensure there is comprehensive communications and publicity about any CAZ or ZEZ proposals.

Road safety
As part of the LTCP, we are adopting a vision zero approach to road safety. The aim of vision zero is to have zero road fatalities or life-changing injuries on Oxfordshire's transport system by 2050. This applies to all road users and includes freight and logistics vehicles. We will work with freight operators to improve road safety and contribute to our vision zero target.

Improving road safety applies to all types of movement and so the actions in this section will apply to all freight vehicle movement. We have included the actions in this section because last mile movement is within our towns and villages where there is more risk due to the greater interaction between people and freight vehicles.

Our overarching approach outlined in the LTCP will prioritise people walking and cycling over other modes. This approach will naturally help to reduce conflicts between freight vehicles and those walking and cycling, improving road safety.

However, there may also be specific road safety issues associated with freight vehicles that need to be addressed within local communities or on our appropriate HGV routes.

In 2019, there were 69 goods vehicle occupants who were casualties in road traffic collisions in Oxfordshire[61].This was an increase from 2018, however the total number of goods vehicle casualties has decreased since a peak in 2006.

[61] Oxfordshire County Council Road Traffic Accident Casualty Data Summary 2019

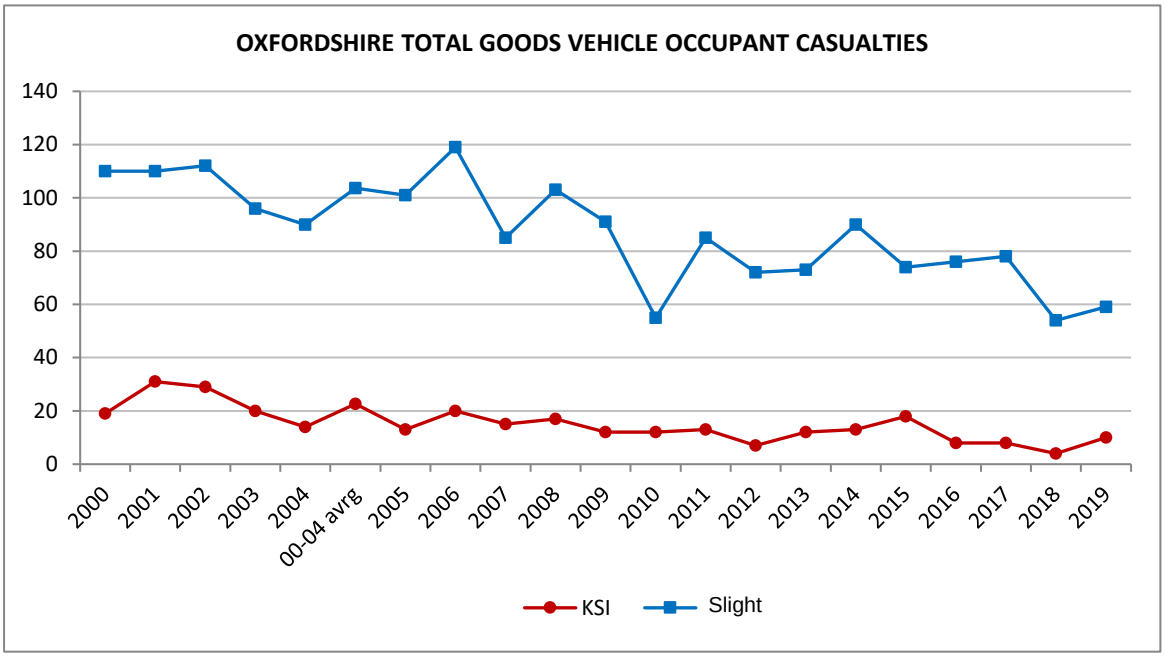


Figure 12 – Oxfordshire total goods vehicle occupant casualties[62]

Reducing conflict with people

As highlighted previously, our overarching approach in the LTCP will help to enable safe freight movement. Our transport user hierarchy sets out that we will prioritise walking and cycling first when developing future transport schemes and policies.

Application of the hierarchy will help to create attractive environments for people to walk, cycle and spend time in. It will be supported by application of the Healthy Streets Approach in Oxfordshire.

The Healthy Streets Approach is about a gradual shift to a system more focused on people. The Healthy Streets Approach provides a framework for making human health the central aspect of planning[63].

[62] Oxfordshire County Council Road Traffic Accident Casualty Data Summary 2019
[63] https://healthystreets.com/

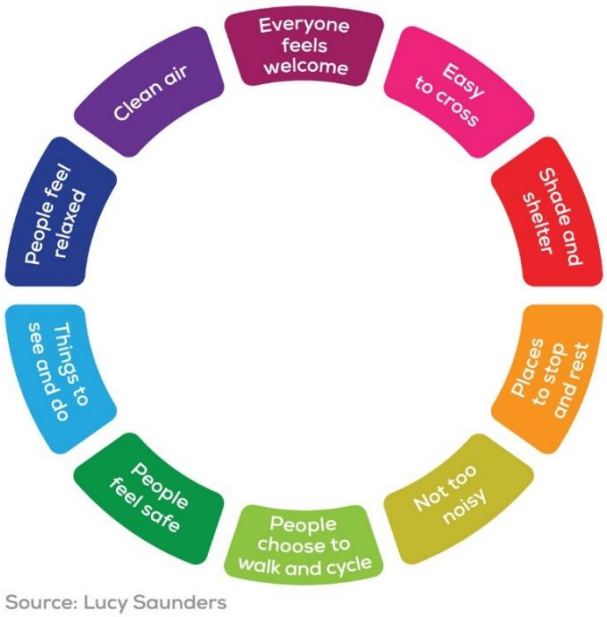


Figure 13 - Healthy streets indicators

In order to achieve this, the Healthy Streets Approach has identified 10 indicators for assessing how streets feel for human beings. There are assessment tools available that enable us to assess streets and scheme proposals against the indicators so that we can understand how appealing they are to walk, cycle and spend time in.

By embedding the Healthy Streets Approach into relevant guidance and decision making processes we can identify improvements to existing streets and seek improvements against all indicators for future proposals.

These approaches, in combination with the other LTCP policies, will reduce danger and create environments that enable goods to be moved as safely as possible. These measures will primarily be applied in residential areas and will therefore be particularly key to improving the safety of last mile movement.

Action 35 – Reduce conflicts between freight vehicles and people
We will reduce conflicts between freight vehicles and people walking and cycling through application of the transport user hierarchy and Healthy Streets Approach.

Education
Education can play an important role in helping to reduce road danger and enabling safe freight movement throughout Oxfordshire. OCC focus on educating vulnerable road users such as people cycling, children and motorcyclists to raise knowledge and reduce danger for all road users.

Oxfordshire Fire and Rescue Service (OFRS) are primarily responsible for road safety education in the county. The Fire and Rescue Services road safety policy supports the delivery of the 365alive vision that aims to save 6,000 more lives and educate 85,000 children and young adults to lead safer and healthier lives.

Over the years there has been significant investment and development of specific road safety programmes. A number of these programmes are placed into a road safety catalogue for use by area-based staff within their locality areas as and when they are needed or when specific requests are made for a specific programme.

The 365alive webpage contains road safety information for motorcyclists, pedestrians, cyclists, mobility scooter users and drivers and passengers. Key education programmes include Biker Down (motorcycle first aid) and children's cycle training (Bikeability). External education programmes are also promoted such as advanced motorcycle training courses. The OFRS also run various road safety campaigns to promote safety and key messages.

Action 36 – Promote road safety education resources and campaigns
We will continue to work with OFRS to promote road safety education resources and campaigns. This will help to raise knowledge, reduce danger for all road users and enable safe freight movement through Oxfordshire.

Speed management
Speed management in local communities will also help to deliver safe movement. A 20mph speed limit was introduced in Oxford in all residential areas, the city centre, and suburban shopping centres and although work is still needed to achieve better compliance, the effect on safety has been positive.

We are currently undertaking five 20mph trial sites within Oxfordshire to establish the best methodology for the implementation of a proposed countywide programme. All of the sites are amending existing 30mph limits to 20mph limits via a phased approach of initial sign only changes that are supported by further engineered designs to reduce vehicular speeds if required.

The LTCP outlines that we will promote 20mph as the default limit for roads through residential, villages and retail areas to ensure speeds are appropriate for the nature, environment and location. The expansion of 20mph speed limits will help to ensure freight vehicles are moving at safe speeds and will improve road safety in local communities across Oxfordshire.

Action 37 – Support expansion of 20mph speed limits
We will promote 20mph as the default limit for roads through residential, villages and retail areas to ensure speeds are appropriate for the nature, environment and location. This will contribute to improving road safety and ensuring freight vehicles are moving at safe speeds.

Food delivery riders
Food delivery riders present a specific road safety challenge associated with last mile movement. There has been a significant growth in the food delivery market over the last 6 years. This growth was further fuelled by the COVID-19 pandemic and

subsequent national lockdowns. Food delivery grew by £3.7 billion in 2020 to reach £11.4 billion, double its 2015 market value[64].

A factor in this growth has been the rise of online food delivery services such as Deliveroo, Uber Eats and Just Eat. These services work by customers placing an order through an app or website, then self-employed bicycle or motorcycle couriers transport orders from the restaurant to destination.

Whilst these services can help to support local businesses and provide residents with more choice, there are increasing numbers of safety and compliance issues associated with the delivery riders.

These issues include motorcycles using pedestrianised roads, cycling in no-cycle zones, use of pavements and inappropriate or illegal parking. These issues are particularly notable in Oxford City, but we are also seeing issues in other towns.

In order to address these issues and improve the safety of last mile food delivery in the county, we will seek to establish and agree a code of conduct with the food delivery operators.

Action 38 – Establish a code of conduct with food delivery operators
We will engage with food delivery operators and develop a voluntary code of conduct for agreement. This will set out the restrictions and safety requirements which riders will need to adhere to.

Technology
There are also a range of technological developments which may contribute towards our priorities for last mile movement. We recognise that technology alone will not solve many of the challenges identified. However, we believe it can play a role in addressing some issues and improving the efficiency of movement.

One notable technological development which can help to improve last mile movement is deliveries by Unmanned Aerial Vehicles (UAV) and Connected and Autonomous Vehicles (CAV).

UAVs, sometimes referred to as drones, are remote-controlled aircraft or small aerial devices which do not have an on-board pilot. CAVs are vehicles that operate in a mode which is not being controlled by an individual.

Currently, most UAVs are remote controlled by a human, but in the short to medium term, it is anticipated that automated UAVs will improve and facilitate wider autonomous usage. They also currently have a short range, due to battery constraints. Again, this is anticipated to improve over the short term, to allow longer distance flights.

UAVs are already being used in various practical applications, such as cargo delivery. In the near future, it's anticipated they could also be used for heavy lift

[64] Statista

facilitation. Similarly, there are already examples of small CAVs being used to conduct last mile deliveries.

Delivery UAVs will bring about benefits such as faster delivery of small items, due to the lack of congestion in the skies. This will benefit both residents and freight transport operators.

Cargo delivery by UAVs is also, potentially, between 20% and 35% more cost effective than traditional methods according to research from PWC, helping to reduce costs and meaning potentially cheaper delivery charges for people. UAVs could also reduce the need for freight vehicles, helping to lessen congestion and the associated negative impacts of LGVs.

Action 39 – Support the development and trialling of UAV and CAV technology
We will continue to promote and support the trialling of delivery UAV and CAV technology in order to improve the efficiency of goods movement. This will include working with stakeholders, monitoring progress and seeking to trial schemes in the county.

In order to facilitate these technological developments, there are future considerations that will be required now. For example, this may include landing areas for UAVs or docking points for CAVs. Considering the needs of future freight technology during construction and maintenance will help to avoid the need for potentially more costly retrofit at a later stage.

Our Innovation Framework, discussed previously, will guide both the integration of innovations within development and infrastructure, and provide a consistent approach to futureproofing for the mainstreaming of current innovations, such as CAV, UAV and 5G.

Action 40 – Consider future technology requirements
We will consider future freight technology requirements via the county's Innovation Framework. More detail about this can be found in the LTCP Innovation Framework policy or the Innovation Framework itself.

Monitoring

The final sections of this document related to monitoring and partnership working. The actions in these sections are overarching and apply to all types of movement, we have therefore included them in separate sections.

We want to improve our monitoring to improve the understanding of goods movement in the county. This data can be used to make improvements and inform the development of future solutions. Similarly, evaluating schemes helps to identify lessons learned to guide future work.

As outlined in the LTCP, there are currently a number of issues associated with monitoring and evaluation. These include inconsistent monitoring, monitoring when it is too late to alter a scheme, lack of methodological approach and challenges associated with data collection.

These issues are particularly pronounced when it comes to freight. Owing to the commercial and complex nature of the freight system it is challenging for us to collect data about patterns of movement.

Similarly, as highlighted earlier there are a lack of resources for enforcement in the county. Whilst we conduct some effective enforcement, we are aware that it is impossible to capture data about all weight restriction breaches in the county.

As part of the broader LTCP we are seeking to improve the transport monitoring and evaluation process. We plan to achieve this through four primary actions:

- Establishing a systematic monitoring and evaluation methodology.
- Conducting a data mapping and linking exercise within the county council.
- Develop long term data strategies for all key policies.
- Development of a monitoring tool.

The monitoring policy in the LTCP and the actions outlined above, will help to improve our monitoring of freight movement. To avoid repetition, we will not repeat the full LTCP policy here but support it as part of this strategy.

Action 41 – Delivery of the LTCP monitoring policy
We will work to deliver the LTCP monitoring policy and associated actions, ensuring that freight data and associated considerations are incorporated.

There are also freight specific data and monitoring considerations that need to be addressed. One consideration is the need to analyse HGV data according to axels and weight class.

During analysis of existing weight restriction schemes, we have noted the growth in 2-axle HGVs. As shown on the figure below, 2 axle-rigid HGVs are categorised into two groups. Smaller 2-axle lorries with a UK maximum gross weight over 3.5t and up to 7.5t, and bigger 2-axle lorries over 7.5t and up to 18t. Because 2-axle lorries can weigh anywhere between 3.5t and 18t, it makes monitoring and enforcement of a 7.5t weight restriction challenging.

The weight of a 2-axle vehicle can only be determined by checking the DVLA record therefore the number plate is needed, usually collected through Automatic Number Plate Recognition (ANPR). We will be investigating the use of cameras in future traffic monitoring to enable greater classification of 2-axle vehicles

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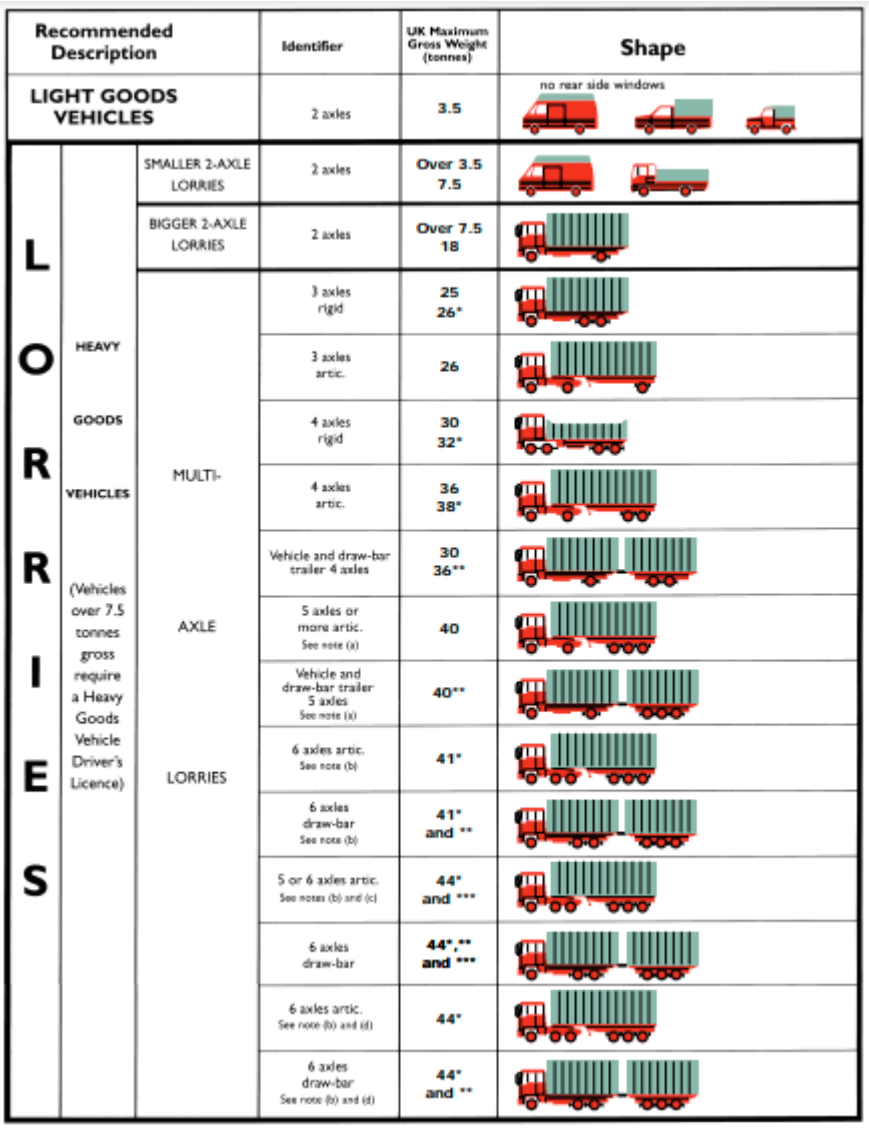

Recommended Description			Identifier	UK Maximum Gross Weight (tonnes)	Shape
LIGHT GOODS VEHICLES			2 axles	3.5	no rear side windows
LORRIES	HEAVY GOODS VEHICLES (Vehicles over 7.5 tonnes gross require a Heavy Goods Vehicle Driver's Licence)	SMALLER 2-AXLE LORRIES	2 axles	Over 3.5 7.5	
		BIGGER 2-AXLE LORRIES	2 axles	Over 7.5 18	
		MULTI-AXLE LORRIES	3 axles rigid	25 26*	
			3 axles artic.	26	
			4 axles rigid	30 32*	
			4 axles artic.	36 38*	
			Vehicle and draw-bar trailer 4 axles	30 36**	
			5 axles or more artic. See note (a)	40	
			Vehicle and draw-bar trailer 5 axles See note (a)	40**	
			6 axles artic. See note (b)	41*	
			6 axles draw-bar See note (b)	41* and **	
			5 or 6 axles artic. See notes (b) and (c)	44* and ***	
			6 axles draw-bar	44*,** and ***	
			6 axles artic. See note (b) and (d)	44*	
			6 axles draw-bar See note (b) and (d)	44* and **	

Figure 14 – Simplified guide to lorry types and weights[65]

The trends associated with 2-axle vehicles highlight the need to analyse HGV data across Oxfordshire by axles and weight. This will help us to better understand the pattern of larger vehicle use and the potential impacts of any area weight restriction scheme.

Action 42 – Analyse HGV data by axles and weight
We will seek to capture and analyse HGV data by axle and weight class across Oxfordshire. We will also use this understanding to inform future survey and monitoring requirements.

[65] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/211948/simplified-guide-to-lorry-types-and-weights.pdf

Freight data has historically been more difficult to obtain, however recently freight telematics data has become more common place. Telematics is the technology used to monitor a wide range of information relating to an individual vehicle or an entire fleet. This includes vehicle location data via GPS.

It is now possible for us to obtain telematics data that combines collated information from a wide range of operators. Analysis of this data enables us to identify and understand where the main freight vehicle movements are. This will help with many aspects of this strategy such as informing development of the area based weight restrictions.

Action 43 – Analysis of freight data
We will conduct analysis of freight data to understand movements and inform future work. This will include analysis of telematics data when available.

Finally, where we implement any freight related scheme, we will monitor it to understand impacts and evaluate its effectiveness. Improving our monitoring and evaluation will help us to learn from experiences and enable us to improve how we design future schemes.

The monitoring and review of the Burford weight restriction was an example of how we can regularly monitor and review the effectiveness of a scheme. We will conduct similar analysis of any future schemes.

This process will deliver more effective schemes, making better use of public money and optimising schemes so that they deliver better outcomes. It will also help to avoid problems and reduce any potential negative impacts.

Action 44 – Monitoring of freight schemes
We will conduct regular monitoring and review of any scheme that is implemented in relation to freight. This process will help us to learn from experiences and enable us to improve how we design future schemes.

Partnership working

As we have highlighted throughout this strategy, the freight system is complex and much of it is beyond the county council's control. It is therefore important that we work with partners to influence areas beyond the council's control.

Partnership working will also be essential to supporting many of the actions identified in this strategy. As outlined in the LTCP, OCC champion partnership working because we recognise the value and benefits of cultivating good working relationships with surrounding Local Authorities, regional/sub-national and statutory bodies.

Partnership working and the involvement of the whole supply chain will be essential to delivering this strategy, making more efficient use of Oxfordshire's roads and minimising the impact of freight on the county. We will work in partnership with operators, businesses, public sector organisations and our District and City councils to deliver this strategy and our long-term ambitions.

Many of the actions in this section underpin the aspirations outlined in the previous sections. We have specifically included them in this section to reflect the importance of partnership working if we are to deliver this strategy.

Engagement and cocreation
Where any issues arise with HGV movement, we will work with a range of stakeholders to explore solutions. Engagement and cocreation may help us to avoid the need for restrictions if alternative solutions can be found. Similarly, as part of the area based weight restriction study, we will engage with a range of stakeholders to explore potential solutions. This will ensure that the approach taken is tailored to the local area and has been shaped by a range of stakeholder feedback.

Action 45 – Engagement, cocreation and problem solving
Where issues are arising with inappropriate HGV movement we will look to engage with local communities, commercial operators, businesses and trade associations to understand the issue and explore solutions.

We currently host the Oxfordshire Strategic Transport Forum which consists of academics, trade associations and local transport user groups. The group is used to engage with and seek feedback on a range of transport projects we are working on.

The Road Haulage Association (RHA) are a part of this meeting to provide input from a freight operator perspective. However, we believe there is an opportunity to explore the establishment of a steering group that is more focused on freight.

The steering group would consist of the county council, District and City councils and external stakeholders such as the RHA to oversee implementation of this strategy and address general issues arising around freight. The steering group could also be established at a regional level to begin.

Action 46 – Explore establishment of freight steering group
We will explore the establishment of a freight steering group to oversee implementation of this strategy and address general freight issues. We propose the group consists of the county council, District and City councils and external stakeholders.

Another area where cocreation and joint working is possible is via network management. We previously outlined how network management can be used to improve the efficiency of local freight movement. There are opportunities to use our knowledge of network management to work with freight transport operators.

This joint working can be used to identify times of the day when there is more capacity on the road network. Freight operators could reschedule journeys to these times in order to improve the efficiency of their journeys.

Action 47 – Work with stakeholders to reschedule journey times
We will offer to work with freight transport operators to identify times of the day when there is more capacity on the road network.

Funding and implementation

The actions in this strategy have demonstrated that it will be delivered in a number of ways. This includes through the planning process, through engagement with stakeholders and in some circumstances restrictions.

This section provides an overview of how some of these actions will be funded. It also provides an overview of when we expect some of these actions to be delivered, recognising that we have a limited amount of resource and some actions will be prioritised for the shorter term.

Funding

Some of the actions identified in the strategy will require funding to deliver. However, councils no longer receive funding directly to spend on transport improvements. We will therefore work hard to identify alternative funding sources. Key potential funding sources are outlined below. Owing to the linkages with the LTCP some of these are the same as those in the main LTCP.

Funding bids

From time to time, there are opportunities to submit bids to specific grant funding opportunities. These funding opportunities come from a range of sources including central government and the DfT.

With tightening local authority budgets, these opportunities are particularly valuable, allowing us to carry out work no longer affordable from Council budgets. We will seek to bid for every suitable opportunity.

Developer contributions

We will also use developer contributions to deliver the LTCP and freight strategy. Developers either contribute towards improvements to mitigate their transport impacts or carry out works themselves under S278 Agreements with the Council.

Through this approach it is possible for developers to deliver infrastructure or contribute funding towards larger schemes. We will continue to work with developers to secure contributions which align with and help to deliver our aspirations.

Partnership working

Funding or delivery opportunities may also be available to our partners such as the Local Enterprise Partnership (LEP), District and City councils. We will continue to work with these partners to take account of the various funding sources available.

Charging schemes

We have proposed investigating charging schemes including road user charging and CAZs/ZEZs. These measures could provide a funding stream which can be used to deliver actions outlined in this strategy.

Enforcement revenues

Similarly, the enforcement of any freight vehicle restrictions could provide a funding stream from the payment of penalty fines. In the first instance this would be used to

cover the cost of enforcement, however it could also be used to deliver other actions in this strategy.

Implementation
We are committed to delivering the range of actions identified in this strategy. However, it is important to note that partnership working will be key to delivering many of these actions as the freight system is complex and we do not have control over all aspects of it.

It is also necessary to prioritise the actions. This will help to guide future work on delivery of the strategy and make best of use of the resources available. In order to do this, we have grouped the actions into those we anticipate delivering by 2025 and those that will be delivered between 2025 and 2030.

In the first instance our priority is conducting the countywide area based weight restriction study and delivering the resulting programme. As part of the LTCP review, we will review and update this section.

	Up to 2025	2025 - 2030
Long distance movement	**Action 1** – Promote rail freight	**Action 2** – Work with stakeholders to increase rail network capacity
	Action 5 – Cross boundary working	**Action 3** – Monitor the use of water freight
		Action 4 – Monitor truck platooning progress and opportunities
		Action 6 – Work with stakeholders to encourage alternatives to road freight
Local movement	**Action 7** – Develop appropriate HGV route map	**Action 13** – Explore implementation of road user charging schemes
	Action 8 – Create a map of existing weight restrictions	**Action 14** – Explore technology to aid enforcement
	Action 9 – Promotion of HGV route map	**Action 17** – Promote the creation of rest stops and lorry park facilities
	Action 10 – Conduct countywide study to establish approach for area based weight restrictions	**Action 18** – Support battery electric vehicle charging infrastructure requirements
	Action 11 – Fund development and delivery of area based weight restriction programme	**Action 19** – Monitor alternative HGV fuel requirements and options
	Action 12 – Lobby for enforcement of moving traffic offences under Traffic Management Act part 6	**Action 20** – Strategically locate refuelling infrastructure
	Action 15 – Review best practice	**Action 23** – Improve data gathering and usage

	Action 16 – Review current rest stops and lorry parking facilities	**Action 24** – Improve data sharing
	Action 21 – Monitor electrified road systems study	**Action 26** – Explore opportunities for express rail freight
	Action 22 – Enhance network management	
	Action 25 – Support the provision of rail freight interchanges	
	Action 27 – Seek to influence the location and design of new development	
	Action 28 – Ask developers of major sites to prepare Construction Logistics Plans	
Last mile movement	**Action 29** – Promote cycle freight in Oxford	**Action 31** – Freight consolidation feasibility study
	Action 30 – Promote cycle freight across Oxfordshire	**Action 32** – Safeguard land for freight consolidation
	Action 33 – Promote considerations about reducing the need for freight movement	**Action 34** – Engagement around Clean Air and Zero Emission Zones
	Action 35 – Reduce conflicts between freight vehicles and people	**Action 39** – Support the development and trialling of UAV and CAV technology
	Action 36 – Promote road safety education resources and campaigns	**Action 40** – Consider future technology requirements
	Action 37 – Support expansion of 20mph speed limits	
	Action 38 – Establish a code of conduct with food delivery operators	
Monitoring	**Action 41** – Delivery of the LTCP monitoring policy	**Action 42** – Analyse HGV data by axles and weight
	Action 43 – Analysis of freight data	**Action 44** – Monitoring of freight schemes
Partnership working	**Action 45** – Engagement, cocreation and problem solving	**Action 47** – Work with stakeholders to reschedule journey times
	Action 46 – Explore establishment of freight steering group	

Glossary

B

Battery Electric Vehicles (BEVs): A vehicle that uses an electric motor with energy stored in rechargeable battery packs.

C

Clean Air Zones (CAZs): An area where vehicles with higher tailpipe pollutant emissions are restricted or charged for access.

Connected and Autonomous Vehicle (CAV): Vehicles equipped to exchange information with surrounding environment and can operate in a mode which is not being controlled by an individual[66].

Construction Logistics Plans (CLPs): Provide the framework for understanding and managing construction vehicle activity into and out of a proposed development[67].

COVID-19: An infectious disease caused by a newly discovered coronavirus. Responsible for a global pandemic in 2020-21.

D

Department for Transport (DfT): The government department responsible for the English transport network.

E

England's Economic Heartland (EEH): Partnership authority group, which functions as a non-statutory sub-national transport body.

Experimental traffic regulation order (ETRO): A temporary traffic regulation order which highway authorities have the power to impose without consultation.

G

Global Positioning System (GPS): A device that is capable of receiving information from satellites and then calculate the device's geographical position.

Gross Domestic Product (GDP): Monetary measure of the market value of all the final goods and services produced in a specific time period.

H

[66] Automated and Electric Vehicles Act 2018
[67] https://www.arup.com/projects/construction-logistic-plan

Heavy Goods Vehicles (HGV): Commercial trucks that feature a gross combination mass of over 3500kg.

Hydrogen Fuel-Cell Vehicles (FCEV): Electric vehicles with a hydrogen fuel cell system instead of a battery pack.

I

Internal combustion engine (ICE): Device where the ignition and combustion of the fuel occurs within the engine itself. Presently used in petrol and diesel vehicles.

Internet of Things (IoT): System of interrelated, internet-connected objects that are able to collect and transfer data over a wireless network without human intervention[68].

L

Light Goods Vehicles (LGV): Commercial trucks that feature a gross combination mass of under 3500kg.

Local Enterprise Partnership (LEP): Voluntary partnerships between local authorities and businesses.

Local Transport and Connectivity Plan (LTCP): Oxfordshire County Council's new Local Transport Plan.

Local Transport Plan 4 (LTP4): Oxfordshire County Council's previous Local Transport Plan (2015-2031).

London Lorry Control Scheme (LLCS): Controls the movement of heavy goods vehicles over 18 tonnes at night and at weekends on specific roads in London.

N

New Roads and Streetworks Act (NRSWA): Provides a legislative framework for street works by contractors and works for road purposes.

Nitrogen Dioxide (NO_2): Nitrogen Dioxide is one of a group of gases called nitrogen oxides (NOx). NO_2 primarily gets in the air from the burning of fuel[69].

O

Office of Rail and Road (ORR): The independent safety and economic regulator for Britain's railways and monitor of Highways England[70].

Oxfordshire County Council (OCC): The county council for Oxfordshire.

[68] https://www.aeris.com/in/what-is-iot/
[69] https://www.epa.gov/no2-pollution
[70] https://www.gov.uk/government/organisations/office-of-rail-and-road

Oxfordshire Electric Vehicle Infrastructure Strategy (OEVIS): Oxfordshire's electric vehicle charging strategy which sets out 17 policies and associated key actions for the short term (2020-2025).

P

Particulate Matter (PM): Term for a mixture of solid particles and liquid droplets found in the air[71].

R

Road Haulage Association (RHA): Road haulage trade association.

S

S278 Agreements: A section of the Highways Act that allows developers to enter into a legal agreement with the council to make permanent alterations or improvements to a public highway, as part of a planning approval.

Strategic rail freight interchanges (SRFI): A large rail served distribution and warehouse park linked into both rail and the strategic highway network.

T

Traffic Management Act (TMA): Act of UK Parliament that details the street works regulations. All the parties interested in occupying streets / highways need to follow the specified guidelines.

Traffic regulation order (TRO): A legal tool which allows a local authority to restrict, regulate or prevent the use of any named road.

U

Ultra-Low Emission Zone (ULEZ): The charging low emission zone in central London.

Unmanned Aerial Vehicles' (UAV): Remote-controlled aircraft or small aerial devices which do not have an on-board pilot.

Z

Zero Emission Vehicles (ZEV): A vehicle which emits 0g of carbon dioxide from the tailpipe per kilometre travelled.

Zero Emission Zones (ZEZs): An area where all vehicles except those with zero tailpipe emissions are restricted or charged.

[71] https://www.epa.gov/pm-pollution/particulate-matter-pm-basics