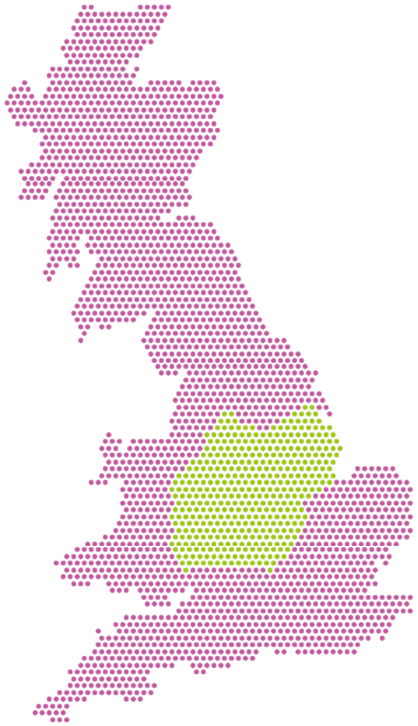
Midlands Connect

Freight Narrative Report

Final

Jacobs

11th April 2017



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Contents

Chapter 1: Logistics in the Midlands

1.1 The Importance of Logistics

Logistics is a unique industry. Every business and person makes use of logistics services every day. Some businesses are dependent on efficient logistics services to prosper. Logistics is a major employer in its own right. One aspect of logistics is particularly visible: freight transport, and dealing with the negative impacts of freight transport is an important area of policy.

Logistics is particularly important to the Midlands. As the engine of the economy, manufacturers, quarries, and food producers depend on efficient supply chains and high quality transport links to receive supplies and send products to customers around the world. Midlands Connect has identified two high growth sectors where good transport links are particularly important: advanced manufacturing, and logistics itself.

The Midlands lies at the heart of an excellent network of strategic road and rail links to all other regions of the UK and to the main ports and airports. This combination attracts businesses to invest in the Midlands and to locate distribution centres here. At the heart of the UK, the Midlands is also an important part of transport links to other regions, handling significant volumes of road and rail freight passing between origins and destinations outside of the region.

Figure 1 shows the one hour, two hour, three hour and four hour freight journey times from the Midlands to the rest of the UK (by road). An analysis of UK population within each time band revealed that 78% of the UK population is within a 3 hour drive of the Midlands and it can be presumed that approx. 90% of the UK's population is within a 4 hour drive (it should be noted that the DfT data does not include Scotland and Wales).

This analysis explains why the logistics industry is locating national and regional distribution centres within a 'Golden Triangle' within the Midlands to serve the UK. The central location, combined with the accessibility to all parts of the UK, make this location the logical place to locate centralised facilities in order to achieve the most efficient operation of freight logistics. Maintaining this accessibility therefore relies upon the free flow of freight on the routes radiating from the heart of the Midlands, Specifically, the M6, M1, M40, M5, A14, A50, A1 and the M42.

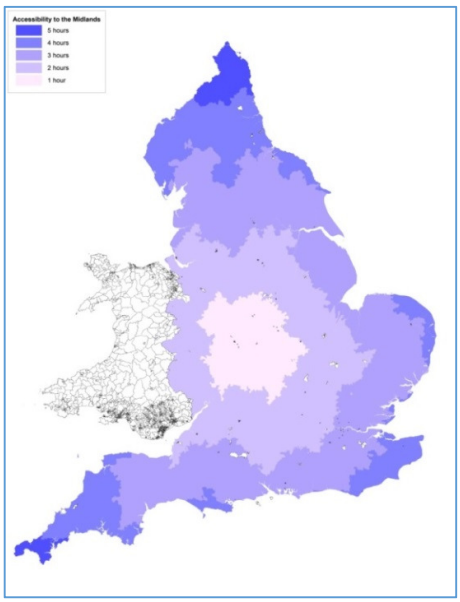


FIGURE 1: FREIGHT JOURNEY TIMES FROM THE MIDLANDS TO OTHER REGIONS, DFT DATA.

1.2 International Trade

The Midlands contributes a large proportion of the UK's exports. Between 2010 and 2013, exports from the Midlands increased by 37% compared to the UK average of 15% (Regional Trade Statistics 1996-2015). In 2013, the value of these exports was over £50bn. Figures 2 and 3 below illustrate the evolution of commodity movements by value and tonnages in the 20 years between 1996 and 2015, distinguishing between the East and West Midlands. The impact of the last recession is clear, as is the recovery in growth since the downturn, and the faster 'bounce back' in the West Midlands.

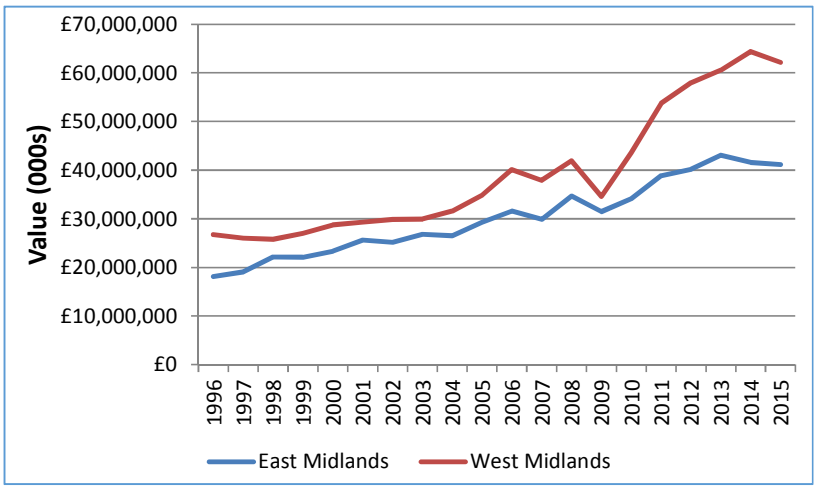


FIGURE 2: NOMINAL VALUE OF IMPORTS/EXPORTS, EAST AND WEST MIDLANDS, REGIONAL TRADE STATISTICS 1996-2015

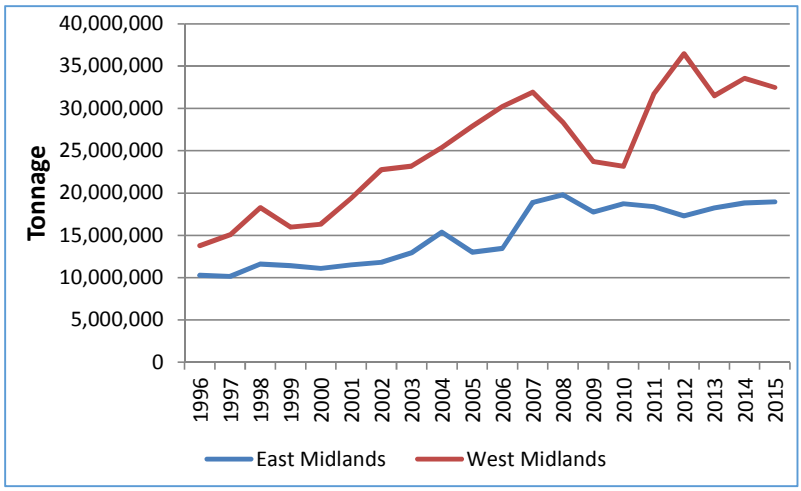


FIGURE 3: TONNAGE (ALL COMMODITIES), EAST AND WEST MIDLANDS, REGIONAL TRADE STATISTICS 1996-2015

1.3 Road and Rail Volumes

In the UK most road freight moves short distances. Only 31% of UK road freight moves over 100km. This can be seen in Table 1– nearly two thirds of all goods starting a journey in the Midlands do not leave the region. Much of this traffic is truly local – within the individual towns and cities for example. Midlands Connect is a strategic body, and therefore mainly concerned with the 60% + of movements between cities and to and from other regions.

Freight Segment	Volume (million tonnes)
Within Midlands	203 (41%)
From the Midlands	111 (22%)
To the Midlands	110 (22%)
Through the Midlands	70 (13%)
Total	494

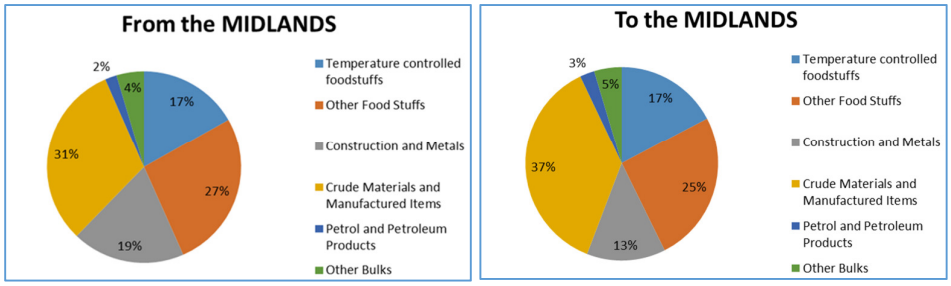
TABLE 1: FREIGHT TONNAGES TRAVELLING WITHIN, FROM, TO AND THROUGH THE MIDLANDS (MDS DATA)

In contrast, of 35Mt of freight lifted by rail in 2010, only 6.4Mt remained within the Midlands, 82% was to or from another region. Since 2010, internal Midlands rail freight has declined substantially, as Britain has moved away from coal-fired electricity generation.

In terms of modal split, in 2013/14 rail carried only 3% of goods transported wholly within the region, and 13% of goods transported to or from the region.

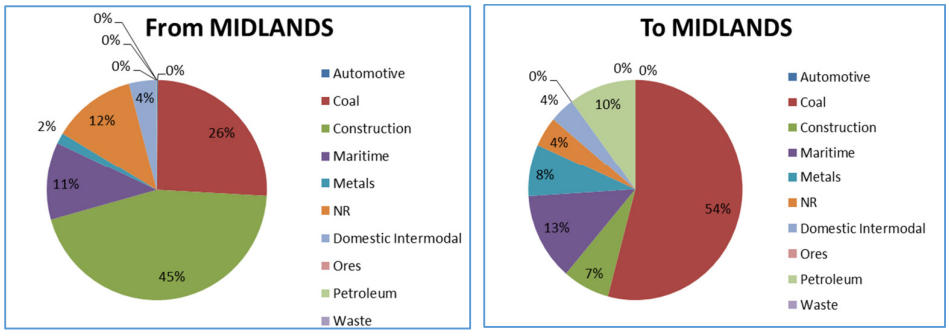
1.4 Commodities

There are significant differences between the commodities carried by road and rail to and from the Midlands shown in Figures 4 to 7:



FIGURES 4 AND 5: COMMODITIES TRANSPORTED BY ROAD TO AND FROM THE MIDLANDS, 2014 (MDS DATA)

Crude materials and manufactured items and other food stuffs categories dominate the tonnages of road freight carried.



FIGURES 6 AND 7: COMMODITIES TRANSPORTED BY RAIL TO AND FROM THE MIDLANDS, 2010 (MDS DATA)

For rail coal dominates the picture of commodities coming into the Midlands, whilst construction accounts for almost half of rail freight leaving the region. By 2016 most of the coal traffic has been lost. The construction sector is one of the region's strengths, with the sector accounting for 3.97% of the region's employment and 2.44% of GVA (£13.5million). Intermodal freight is growing strongly, and includes a wide variety of goods from food to high value manufactured goods in containers.

1.5 Markets served by road

73% of all road freight from the Midlands travels to four key regions: the North West, East of England, South East and Yorkshire and the Humber (Figure 8). These are, of course, the Midlands' nearest neighbours and the split reflects the importance of trade of relatively short distances, and the advantage of being located in the heart of the UK.

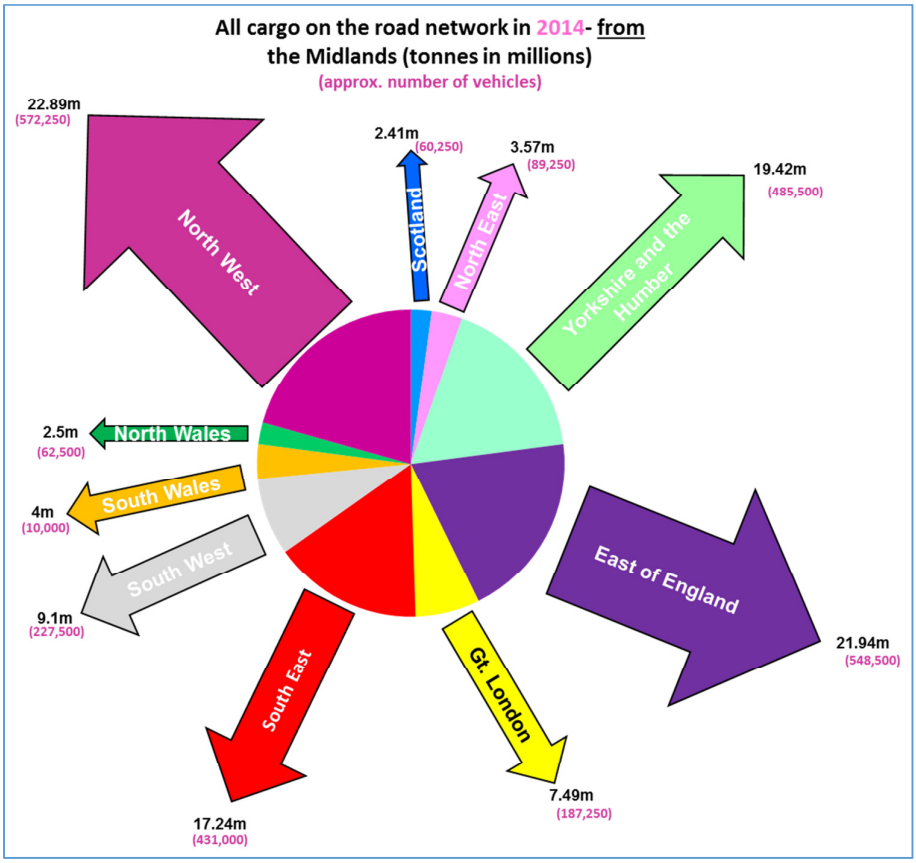


FIGURE 8: ALL CARGO ON THE ROAD NETWORK IN 2014- *FROM* THE MIDLANDS (MILLIONS OF TONNES AND APPROXIMATE VEHICLE NUMBERS)

1.6 Markets served by rail

The major rail freight flows to or from the Midlands are:

- Coal, mostly within the Midlands or from Yorkshire/Humber (now almost gone)
- Construction materials, mostly from the East Midlands
- Metals from Wales to the West Midlands
- Intermodal from the south east ports to the West Midlands
- Intermodal from the East Midlands (near Rugby) to Scotland
- Oil from the Humber

The following analysis looks at the pattern for each commodity, illustrating the key markets served for each, taken from the Rail Freight Demand Forecasts to 2030 v2, RFG Website:

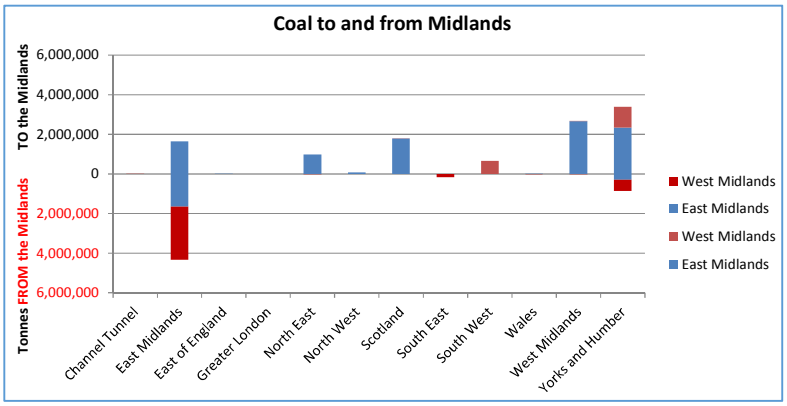


FIGURE 9: COAL LIFTED (TONNES) 2010

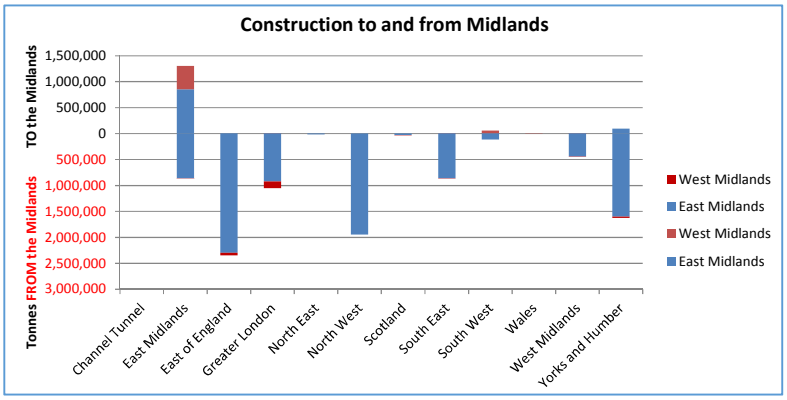


FIGURE 10: CONSTRUCTION MATERIALS LIFTED (TONNES) 2010

The large volumes of construction materials mainly arise in the East Midlands and play a vital role supplying materials for housing and infrastructure projects, particularly within the region and in the East of England, North West, London and the South East, and Yorkshire and Humber.

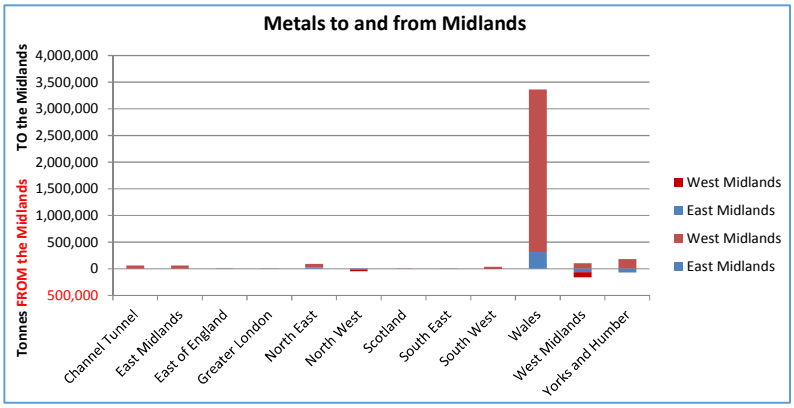


FIGURE 11: METALS LIFTED (TONNES) 2010

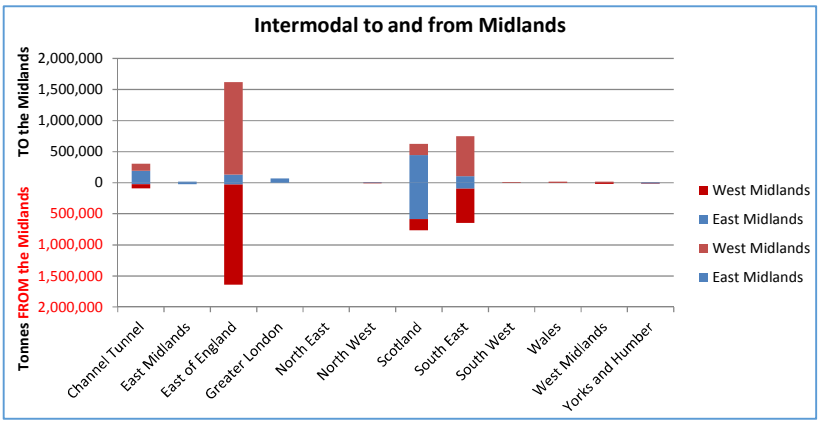


FIGURE 12: INTERMODAL LIFTED (TONNES) 2010

Intermodal rail freight is growing the most strongly. In 2010 the three major intermodal flows to or from the region were:

- West Midlands to and from Felixstowe
- East Midlands to and from Scotland (DIRFT traffic)
- West Midlands to and from Southampton

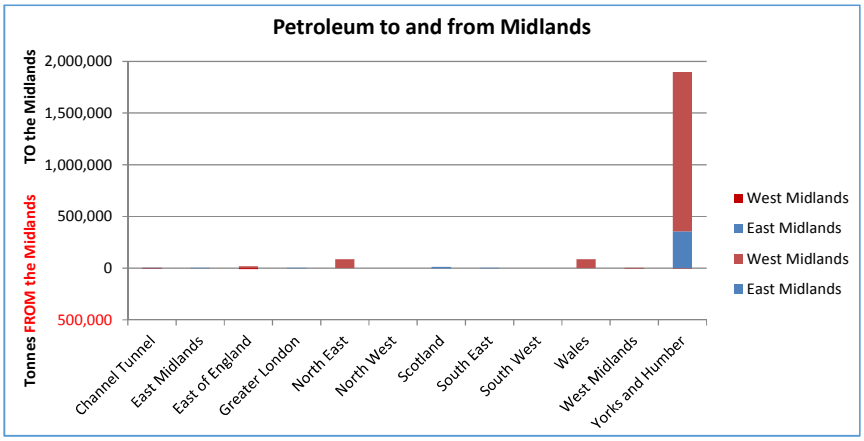


FIGURE 13: PETROLEUM LIFTED (TONNES) 2010

Finally, petroleum traffic is also important, dominated by several trains per day moving from the Humber to Kingsbury (north east of Birmingham), which is the UK's largest inland petroleum terminal.

A larger volume of rail freight also passes through the Midlands – in other words, it uses Midlands's rail corridors but both the origin and destination are outside the Midlands. This includes a substantial intermodal traffic between the south east ports and the north of England and Scotland. The Midlands rail network therefore plays a vital role in the economy of most other regions in the country.

1.7 Trends

1.7.1 Road

Since the economic recession, there has been ongoing recovery in volumes of road freight moved, in both tonnes and tonne kilometres. Table 2 shows that between 2014 and 2030 there is a forecast 13% increase in volume in Tonnes lifted by road to, from, within, or through the region.

Freight Segment 2014	Volume (million tonnes)	Freight Segment 2030	Volume (million tonnes)	Change (million tonnes)
Within Midlands	203 (42%)	**Within Midlands**	223 (40%)	+20 (+10%)
From the Midlands	111 (23%)	**From the Midlands**	123 (22%)	+12 (+11%)
To the Midlands	110 (22%)	**To the Midlands**	126 (23%)	+16 (+15%)
Through the Midlands	70 (13%)	**Through the Midlands**	84 (15%)	+14 (+20%)
Total	**494**	**Total**	**556**	**+62 (+13%)**

TABLE 2: ALL CARGO ON THE ROAD NETWORK IN 2014 AND 2030- WITHIN, TO, FROM AND THROUGH THE MIDLANDS

This shows that whilst there is forecast to be little change in each freight segment as a proportion of total freight, the importance of through flows are projected to increase slightly.

These forecasts are in tonnes. As vehicle utilisation is slowly improving, the increase in goods vehicle movements will be somewhat lower.

1.7.2 Rail

Two sectors in particular have begun to grow and have the potential to grow strongly in the future: intermodal and construction. All industry forecasts agree that significant growth is expected for intermodal traffic between the Midlands and the main deep sea ports (Felixstowe, London Gateway and Southampton). This international traffic is particularly important for Midlands businesses. The success of DIRFT shows that domestic intermodal services also can be cost effective and popular with freight customers (particular to and from Scotland), but there are differing views on the potential rate of growth that can be expected.

Growing intermodal traffic will partly be driven by increasing the number of Strategic Rail Freight Interchanges in the Midlands and other regions.

Figure 14 illustrates the rail freight terminals in the Midlands and estimated volumes. There are sufficient planned and existing rail freight interchanges in the Midlands to accommodate the intermodal traffic forecasts. Growth will be constrained by the competitiveness of road freight for domestic traffic and lack of suitable Strategic Rail Freight interchanges in other regions.

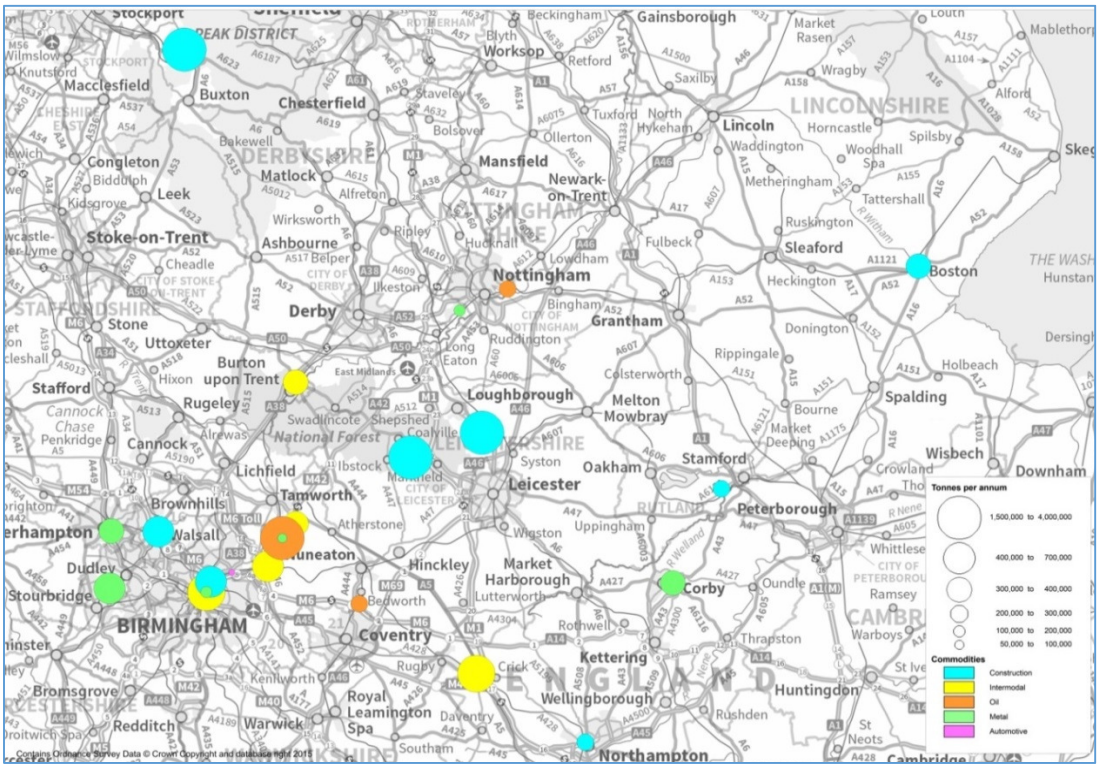


FIGURE 14: RAIL FREIGHT TERMINALS IN THE MIDLANDS AND ESTIMATED VOLUMES BY COMMODITY

Chapter 2: Opportunities and Threats

2.1 The Changing Logistics Market

The Midlands needs to accommodate and take advantage of changes in the way that logistics services are provided and in the techniques and technologies available. Any strategy must be flexible enough to accommodate these changes, some of which are superficially contradictory.

Key changes and their potential impact are set out in the table below.

Logistics Change	Potential Implication
Port Centric Logistics	Reduced demand for centralised inland warehouses; increased need for high quality transport links to ports.
Centralisation	Continued pressure for large distribution facilities to serve increasingly centralised retail chains.
E Commerce	Increased demand for same day deliveries will require distribution centres to be located close to population centres. Possible development of satellite distribution centres.
Consolidation	This refers to a variety of logistics solutions. Offers opportunities to reduce traffic and improve customer service. May require new types of urban distribution facility.
Collaboration	Shared use of vehicles and other resources increases logistics efficiency
Technological Change	A range of potential developments including better real time planning and route finding, low or zero emission vehicles, autonomous delivery vehicles, platooning.
Globalisation	Not just an increase of imports and exports, but also a wider range of logistics service providers and pan European and international supply chains.
Information Technology	The sharing economy, internet of things, big data, etc. may have unpredictable impacts on supply chains, improving flexibility and responsiveness to customers.

TABLE 3: KEY CHANGES AND POTENTIAL IMPACTS TO THE LOGISTICS MARKET.

2.2 Meeting the Needs of the Midlands

As described in the previous chapter, logistics plays an important double role in the Midlands: as an enabler of trade and growth; and as a generator of investment and employment in its own right.

Logistics businesses locate in the Midlands because of proximity to customers and population centres, and because of excellent access to suppliers and wider markets. Business in the Midlands benefits from this by having a wide range of competing logistics providers and a choice of modes nearby.

This suggests that there is a benefit to the Midlands economy in ensuring that the region remains the national hub for logistics, and that the range and quality of services available is expanded.

2.3 What Freight Means to the Midlands Economy

'Medium' and 'High' freight relevant sectors were identified in the Cambridge Econometrics data for the Midlands. Key freight economic sectors contribute:

- **44.9%** of regional **GVA** and;
- **44.7%** of **employment**.

The Midlands is an important part of the UK economy and its "engine for growth". A strong and thriving Midlands economy benefits the UK as a whole.

2.4 Opportunities

2.4.1 The Midlands continues to be the Preferred Location for Logistics Businesses

The road freight "Golden Triangle", broadly between the M6 / M1 and M42/A42, is the preferred location for major national distribution centres, with continued growth being evidenced by plans for significant expansion at Magna Park and DIRFT among others. Some businesses are looking elsewhere, particularly northwards, attracted by better availability of land (and lower prices) and staff, but no location offers the same combination of good access to international markets and excellent access to UK population centres.

Significant expansion of distribution services has taken place in both the East and West Midlands, including Hams Hall for example. However, a map of distribution centre locations suggests that areas west of Birmingham are less well provided for, even though there is brown field land available and a ready supply of employees and freight generators. This provides an opportunity to encourage businesses to locate in these areas, close to the natural centre of gravity for logistics businesses. This may require investment to open up sites and improve links to markets and ports. However there is a need to reduced traffic congestion and improved journey times on trunk roads.

2.4.2 Improvement in Journey Times and Reliability

While worsening reliability and its impact on average journey times is a threat, improvement of average journey times could open up a wider area of the Midlands to investment for logistics businesses and improve access for businesses in the region. In particular, even small improvements on routes to ports could expand the area of the Midlands that can be accessed within a lorry shift, potentially attracting more investment to the West Midlands.

2.4.3 Improved Logistics Efficiency

Hauliers, shippers, and logistics companies have continually improved efficiency and customer service. Examples include more efficient engines with reduced emissions, double deck lorries, and improved back loading. Technological and structural progress offers further opportunities to improve vehicle utilisation and reduce emissions. Examples include hybrid or hydrogen engines for HGVs, and increased collaboration in supply chains.

These developments may reduce the forecast growth in vehicle miles and growth in emissions.

2.4.4 Investment in Northern Ports

The recent opening of Liverpool 2 and development of new facilities and services in the Humber ports, offer an opportunity to redirect imports and exports away from ports around the south east. This can potentially reduce lead times, costs, and emissions, for businesses in the Midlands. Currently it is not clear how much of a market share of container and RoRo markets these new facilities can achieve, but if they are very successful improvements may be required to corridors between these ports and the Midlands.

2.4.5 A Focus on Collaboration

Collaboration in various forms provides an opportunity to improve logistics services and reduce their impacts. In particular, collaboration between businesses provides opportunities to use road vehicles more efficiently, whether filling empty space or securing more back loads. The logistics industry is making progress in this area, but there is potential at a regional level to improve penetration of various types of collaboration. This will directly result in few goods vehicle movements.

Another type of collaboration is between business and government. It is recognised that such collaboration can produce benefits including improved service levels, improved safety, and reduced emissions. Examples include freight recognition schemes, implementation of Delivery and Service Plans, and active freight forums.

2.4.6 Technological Opportunities

Low emission goods vehicles, platooning, and real time scheduling and rerouting are initiatives which are at an early stage, and can provide a wide range of benefits for business and the environment. The Midlands has an opportunity to use its leading role in advanced manufacturing to catalyse technological change for logistics businesses in the region.

2.4.7 Rail Freight Growth through Ports

Intermodal rail freight is forecast to grow, driven by growth in trade through the main deep sea ports. This opens opportunities to operate more frequent services to terminals in the Midlands, providing customers with an improved service and eliminating the worry of missing a service and having to wait 24 hours for the next service. In such cases shippers often choose to send the container to the port by road, adding to traffic.

2.4.8 Construction Rail Freight Growth

The movement of construction materials by rail is forecast to grow strongly, providing opportunities for quarries and cement plants in the Midlands to increase their market by serving other regions efficiently by rail and by using rail to serve major projects such as HS2.

2.4.9 New Rail Freight Interchanges

New rail freight interchanges will be needed to handle growing volumes of intermodal freight to and from ports. Growth to and from ports is driven by growth in trade and improvements in rail competitiveness.

The logistics sector continues to show interest in developing logistics parks in the region – and there is a clear benefit to both occupiers and the region if as many as possible of such developments are rail served.

Businesses located at or near rail interchanges will also benefit from a rail choice of mode for domestic distribution, particularly to or from Scotland, and this could lead to modal shift, reducing road traffic on trunk routes.

2.4.10 New Rail Freight Connections

For any industry moving significant volumes of goods over long distances, providing a rail connection to the manufacturing plant or distribution centre provides an opportunity to cut rail freight costs and improve the competitiveness of rail compared to road haulage. This is particularly true for the automotive and construction industries in the Midlands. There are several opportunities in the region to provide new connections to automotive plants and quarries, as well as other industries.

2.4.11 Rail Freight Capability Improvements

Rail freight capability includes the size, weight, and length of wagons and trains, as well as the power and energy consumption of locomotives. Network Rail is undertaking a programme of gauge enhancement and electrification. The Network Rail Freight Network Strategy brings these projects together with further proposals to develop a high capability network serving the core freight routes, nearly all of which pass through the Midlands. If developed, these proposals will allow heavier longer trains to operate, which

reduce costs per unit AND provide capacity for growth. There are also proposals to enhance more routes to W10 or W12 gauge. W10 gauge is particularly important to and from rail freight interchanges.

Improvements to and from the major ports, including high capability diversionary routes, are particularly important for the Midlands.

2.4.12 HS2

The construction of HS2 provides an opportunity to move construction materials to and from construction sites by rail. Once complete, HS2 should release capacity on other lines, particularly the WCML. This capacity is needed to sustain rail freight growth. But HS2 also presents some challenges, particularly on routes where passenger services from HS2 use the traditional network.

2.4.13 International RoRo Growth

The movement of goods to and from Europe is dominated by RoRo services, particularly across the Channel but also from Humber ports and the Solent. All of these routes are served by motorways or trunk roads, but rail freight plays no role because road trailers generally cannot be carried by rail in the UK. While various “piggyback” proposals have been considered, the best opportunity is to move more goods to and from the continent through the Channel Tunnel on freight trains. The challenges are significant, but this is a major opportunity for modal shift and to provide a real choice for shippers.

2.5 Threats

2.5.1 Shared Use of Trunk Routes

The motorways and railways which are used by freight in the Midlands are, of course, also used by cars and passenger trains. Many key sections are shared between long distance freight and passenger traffic and short distance traffic, for example the M6 though Birmingham. The differing needs of long and short distance traffic create problems of congestion and limit capacity.

2.5.2 Lack of Distribution Sites

The Golden Triangle, while having excellent transport links, does not have a pool of large brown field sites immediately suitable for distribution. This means that distribution parks must either use green field, or move to other locations in the Midlands or other regions.

2.5.3 Increased Road Congestion and Disruption

Road congestion has a significant impact on the logistics industry. At a minimum it impacts operating costs (and therefore also emissions). However, it also impacts on supply chain strategy, and, ultimately, the competitiveness of businesses that rely on long supply chains to bring in materials and serve customers.

What will be the impact of worsening congestion on trunk routes serving the Midlands? Industry research and consultation suggests the following:

- Costs will increase, affecting not only businesses in the Midlands but businesses whose materials pass through the Midlands, particularly the North of England and Scotland.
- Emissions will increase as vehicles spend more time idling.
- New businesses will be deterred from locating in the Midlands – perhaps moving closer to ports or even overseas.
- In particular, the West Midlands may suffer if distribution companies increase their focus on the East Midlands “Golden Triangle” driven by access to ports within three hours.
- Supply chain strategies may adapt, including potentially decentralisation or locating to other regions. As well as the employment impact, such solutions risk increasing freight mileages, and adding to congestion and emissions.

2.5.4 Lack of Rail Capacity

Rail freight services compete for paths with other rail freight services and also with growing demand for passenger services. Historically most coal trains ran on routes with little demand for passenger services or for other freight services. A lot of other freight trains operated at night. But the growing sectors of rail freight (intermodal / long distance construction) need to use the same main lines as many passenger trains, and to meet customer demands for more daytime services.

For the Midlands it is essential that constraints on routes to ports and to London and Scotland are provided with additional freight capacity, otherwise freight growth will be constrained.

2.5.5 Poor Resilience

While the Midlands is connected to major markets by excellent road and rail corridors, many of these suffer from lack of strategic or even local alternative routes, and some corridors are affected by regular major failures that have a serious impact on logistics business.

2.5.6 Competing Priorities

The importance of logistics to businesses in the Midlands is recognised. But the bodies making strategic infrastructure investment decisions sometimes do not understand freight impacts, and having strongly competing pressures to improve passenger services (As we say in the industry: “Freight doesn’t vote.”).

Chapter 3: Implications for Transport

3.1 Networks

The clear message from this analysis is that excellent transport links to key markets are fundamental to the success of the Midlands – and that good transport links within the Midlands benefit both the Midlands and every other region in the UK as so much long distance freight passes through the region.

For both road and rail, corridors serving the major ports are the first priority, particularly as trade increases, and particularly post Brexit when trade patterns may change to a more global pattern. Of similar importance are the corridors linking the Midlands to the South East, North West, Humber, South West and Wales. All of these corridors start, or pass through, the Midlands, and it is this role as a hub that is central to the success of the Midlands in UK logistics terms. However, the success of the Midlands Economy is also the cause of congestion on roads and lack of capacity on railways. The strategic road network is illustrated in Figure 15, with the rail network and freight terminals shown in figure 16:

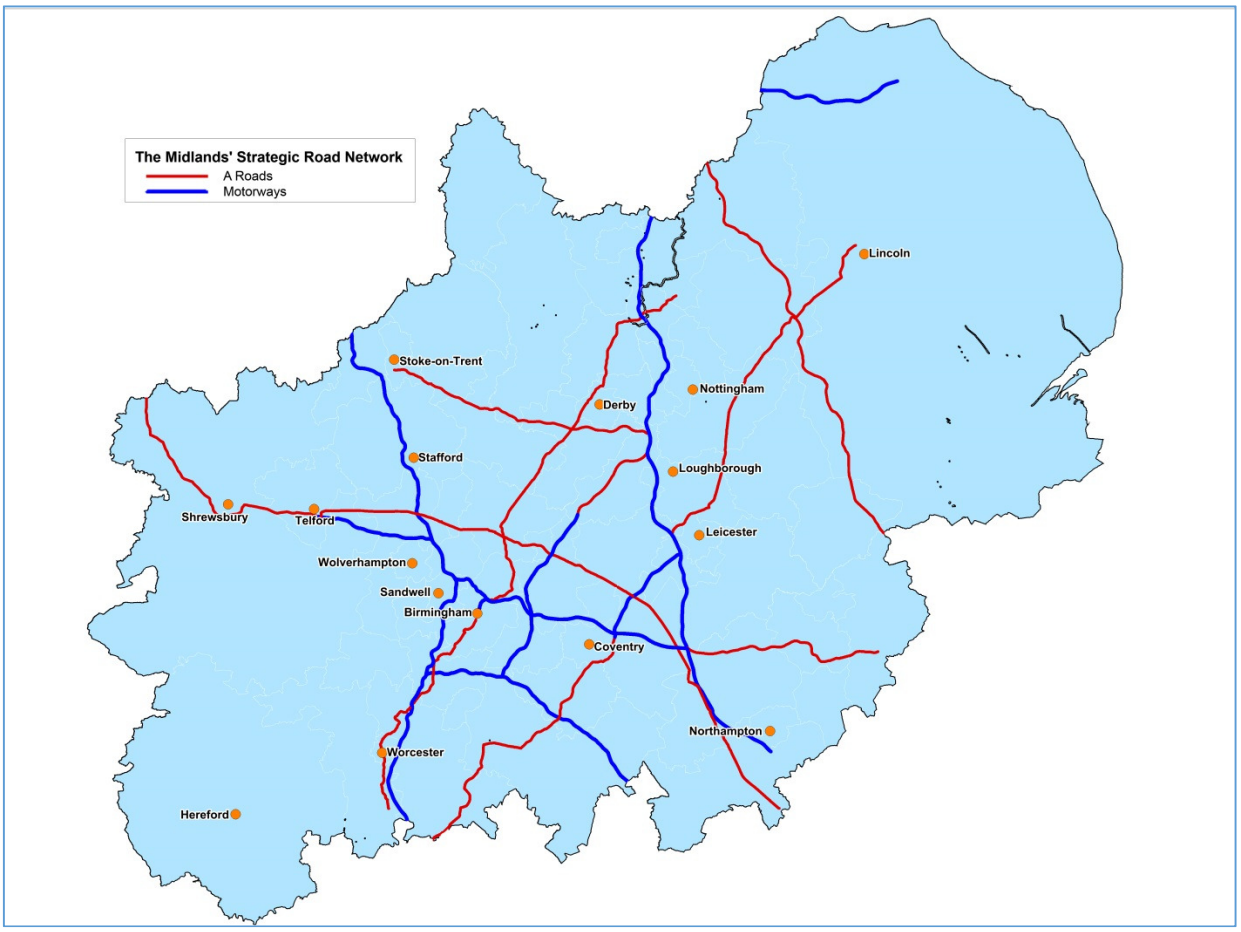


FIGURE 15: THE MIDLANDS' STRATEGIC ROAD NETWORK

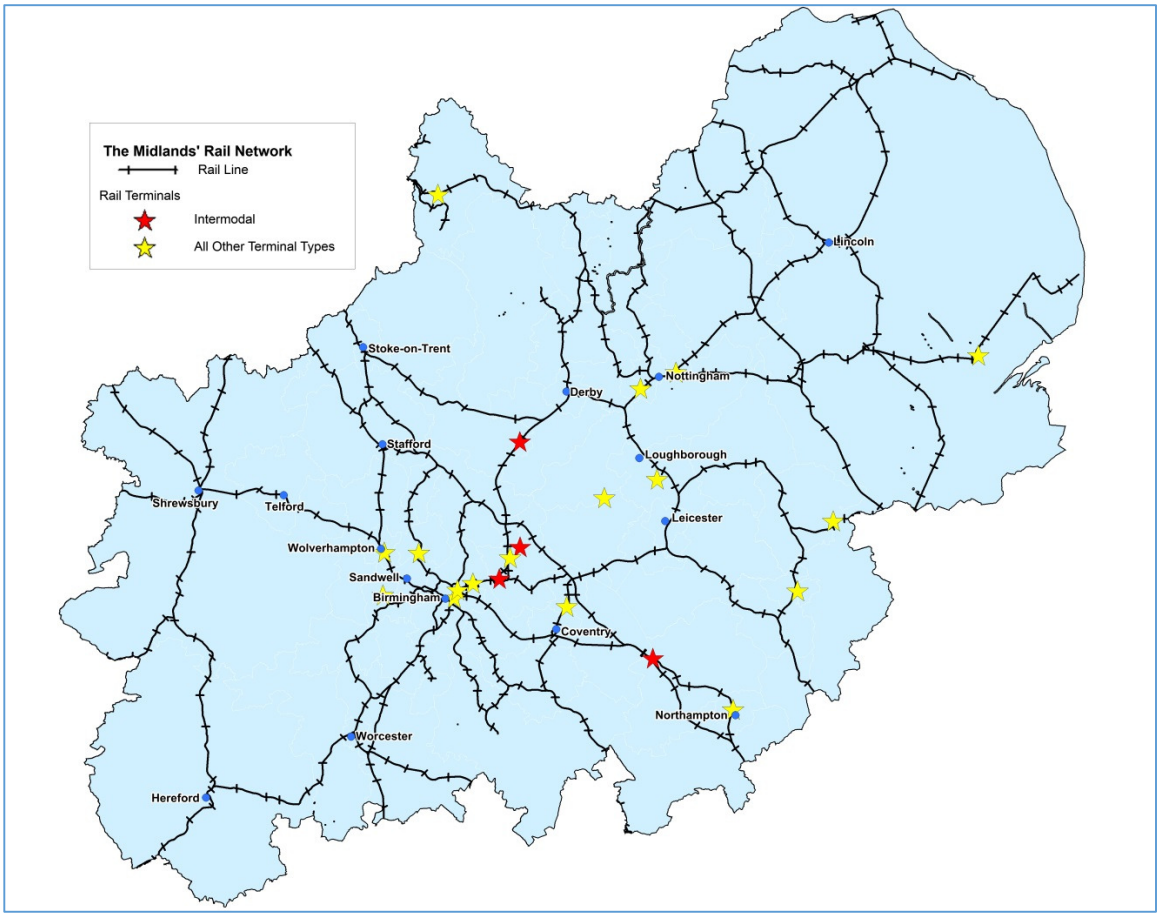


FIGURE 16: THE MIDLANDS' RAIL NETWORK

3.1.1 Road Network

Figure 17 below illustrates the number of HGVs on each section of the road network. There is a clear focus on the trunk network, particularly the motorways (M1, M6, M5, M40, M42), plus the A1, the A14 and the A50. These roads are used by a mix of traffic to and from the Midlands and through the Midlands between other regions. Notably, the Birmingham Box in particular is also used for significant volumes of short distance HGV journeys, for example from distribution centres into the city and short hop intra-city trips.

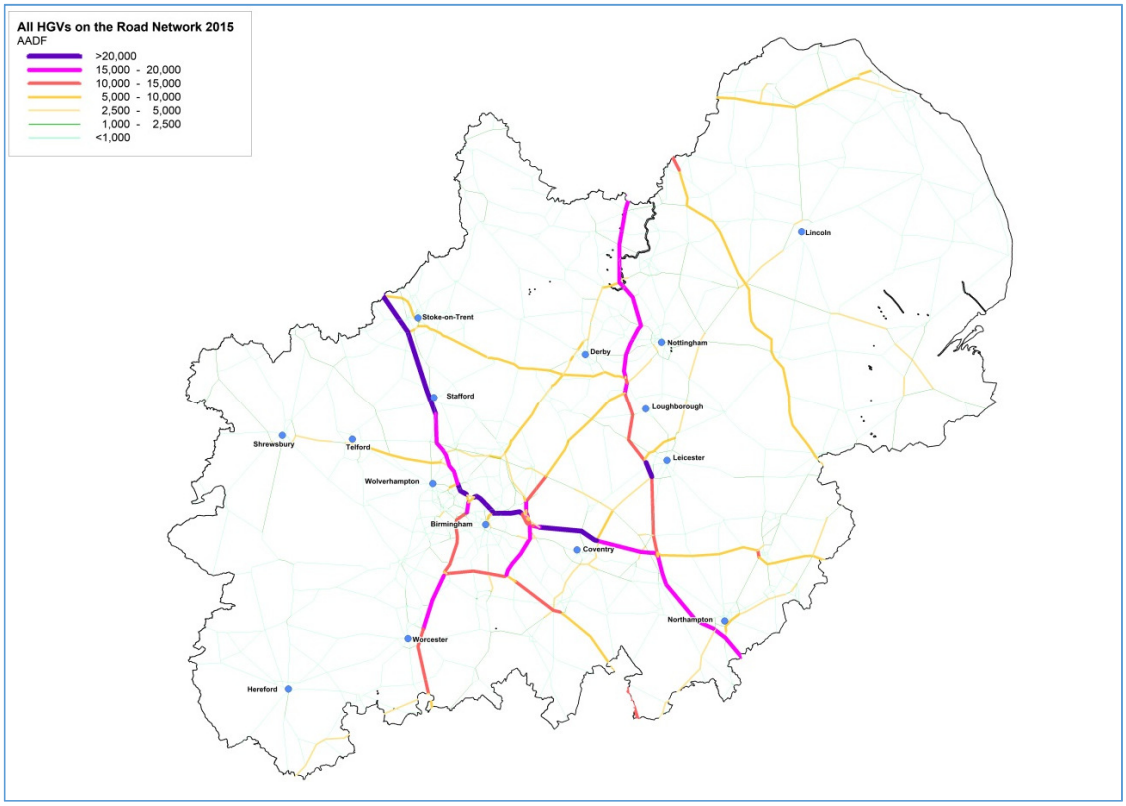


FIGURE 17: VOLUME OF HGVS ON THE ROAD NETWORK 2015 (AADF DATA, DFT)

Beyond the Midlands the trunk routes serving Felixstowe and Southampton are of major strategic importance, in addition to routes to major markets in the UK (London, NW, Scotland, and Yorkshire & Humberside). Figure 18 illustrates the current journey time reliability on the SRN, highlighting in red the key AM peak stress locations:

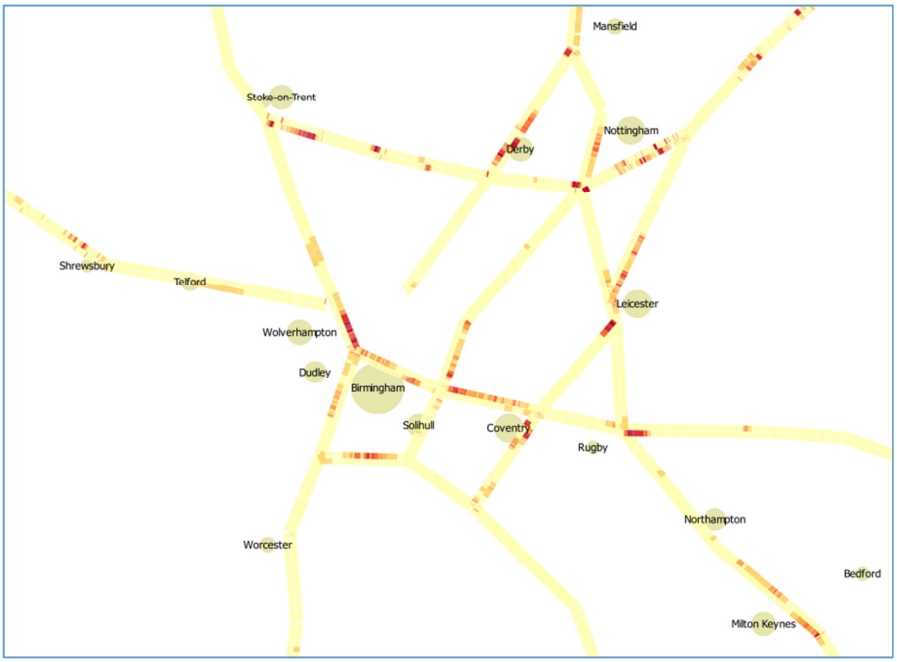


FIGURE 18: AM PEAK NETWORK CONGESTION (PROVIDED BY ATKINS. SOURCE: TOMTOM DATA)

For the AM peak, the key HGV routes and junctions highlighted as the most congested are the M6, M1, the northern end of the M5, the A50/A500, and the M42.

In broad terms, peak congestion is the result of car commuting to key centres and does not affect the *majority* of freight. However, the analysis highlighted that freight *does* continue to travel during these times and cannot avoid the peaks. For longer distance freight, it is impossible to avoid peak hour congestion at some point during the journey.

Figure 19 highlights congestion/reliability which affects freight in the inter-peak, with high volumes travelling during this period when aiming to avoid peak congestion.

The parts of the SRN most congested during this period are:

- Northern end of the M5/junction with M6
- A14 approaching the M1 (pre-M1 Junction 19 improvement)
- M6 north of Birmingham and around Stafford

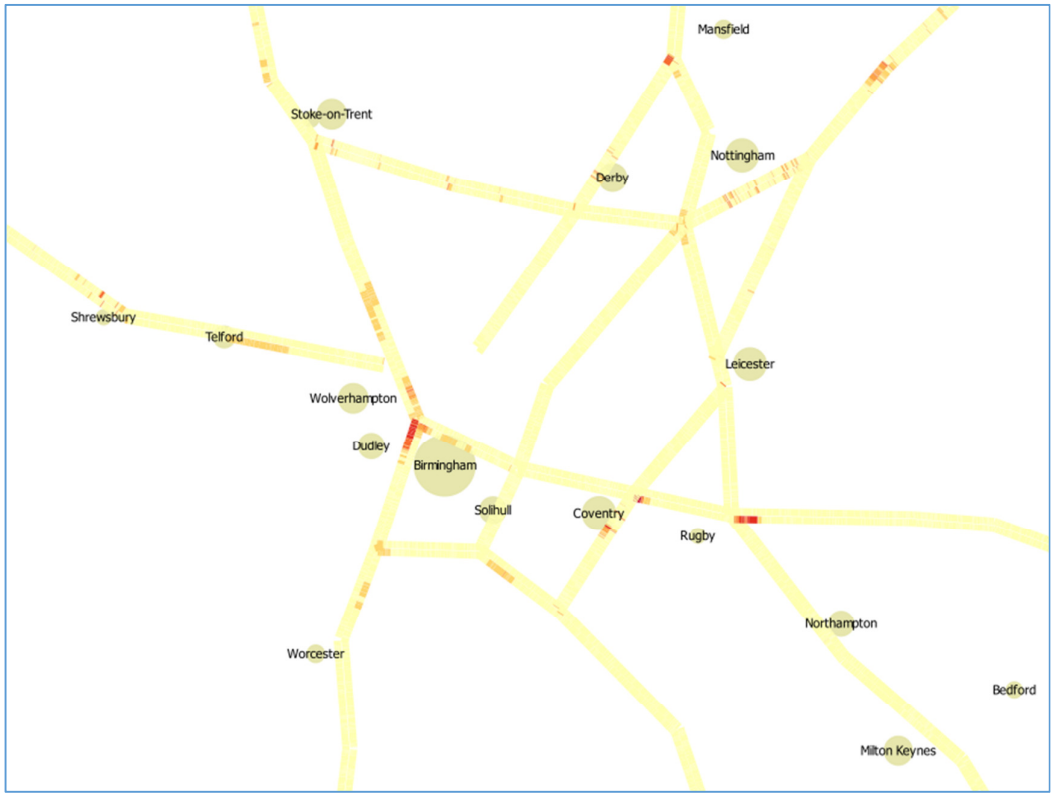


FIGURE 19: INTERPEAK NETWORK CONGESTION (PROVIDED BY ATKINS. SOURCE: TOMTOM DATA)

The Midlands Connect traffic model was developed to assess transport issues over the whole of the Midlands for the strategy studies and highlighted similar congestion locations, albeit less precisely in relation to junctions. Overall, the key congestion issues are forecast to be on the M6, M1 and M40, as well as the M5 and M42. In the future year congestion is set to worsen around central hubs as well as the M6, M5, M42 and A50. Although there are some other roads with a poor volume /capacity ratio, they tend to be less important for freight.

3.1.2 Rail Network

The following maps show the main routes used by intermodal and construction freight trains in 2011. These are the commodities which are forecast to grow, and will dominate freight movements to, from, and through the Midlands.

The Network Rail Freight Market Study used the Great Britain Freight Model to convert freight volumes in Tonnes to trains per day, and to assign trains to rail routes. Network Rail has provided access to this data which can only be published in an aggregated form. The Network Rail data provided indicates the number of trains on each route section by commodity.

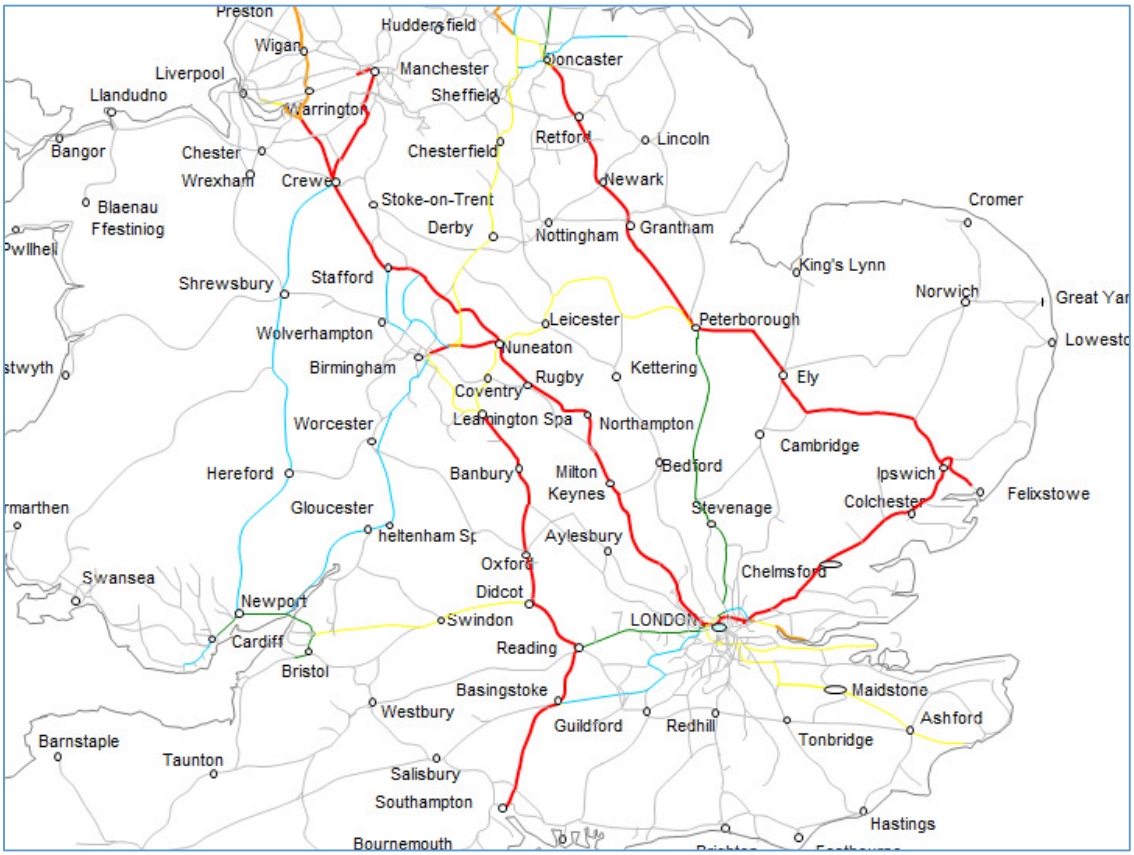


FIGURE 20: INTERMODAL TRAINS BOTH DIRECTIONS PER DAY 2011 (FMS 2013)

Focussing on intermodal trains only, the network is focussed on the West Coast Main Line (WCML) and East Coast Main Line (ECML) and the routes to Southampton and Felixstowe (via north London and via Ely). Following upgrades to the direct route to Felixstowe via Ely, there are now more trains taking this route to the Midlands rather than travelling via London.

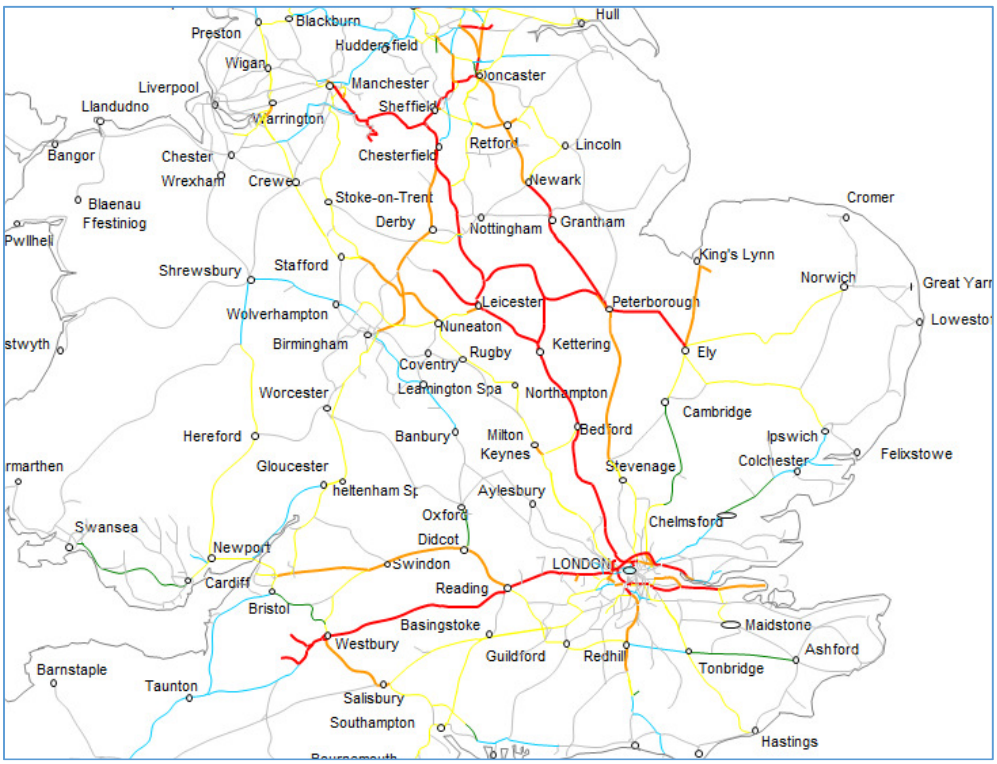


FIGURE 21: CONSTRUCTION TRAINS BOTH DIRECTIONS PER DAY

For construction traffic the pattern is significantly different, with trains to and from the Midlands being concentrated on the line to Ely, and the Midland Main Line towards London.

Chapter 4: Options for Improvement

4.1 Why Is Improvement Required?

First of all, many freight issues can be addressed without investment in infrastructure, and this represents a significant opportunity for the Midlands. Examples include:

- Use of larger vehicles or longer trains.
- Collaboration between shippers and operators to ensure every vehicle starts its journey full and thus reduce empty running.
- Information technology to help road freight operators avoid congested locations / periods and deal with incidents.
- Freight operators can retime some deliveries to avoid known regular peaks.

However, freight operates throughout the day to meet customers' requirements and has to operate to and from the businesses located within the urban areas, particularly Birmingham and the Black Country, Coventry, Leicester, Derby, Nottingham and North Staffordshire. Ultimately, the issues of congestion and capacity must be addressed to improve freight efficiency and these require investment.

4.1.1 Road Congestion

The obvious impact of congestion is to increase costs – longer driver's hours, more vehicles needed and increased fuel consumption. But the biggest impacts are also the most difficult to see. Congestion reduces the distance that a lorry can drive in a day, and locational decisions and investment, whether in manufacturing, retail, or logistics itself, are influenced by journey times and accessibility to markets. Reduced congestion will make the Midlands an even more competitive region to invest in. An ideal objective would be for the whole region to be able to access all major ports and all major UK population centres within a three hour HGV drive.

Investment in addressing congestion in the Midlands and on key routes serving the Midlands benefits the whole of the UK, particularly because of the volume of through traffic passing through the Midlands.

4.1.2 Rail Capacity

Rail capacity issues are different; rather than running more slowly, if there are no paths available trains cannot run. Worse, the risk of no paths being made available deters investment in rail freight.

Rail freight plays an important role in the Midlands economy, connecting businesses to suppliers and customers in the UK and internationally. The rail network in the Midlands plays an essential role for rail freight for all other regions in the UK, particularly in the growth area of intermodal services.

Transporting goods by rail:

- Frees space on trunk roads to reduce congestion or defer the need for trunk road investment.
- Reduces greenhouse gas (GHG) emissions and emissions of other harmful pollutants.
- Reduces the number of accidents on roads and the impact of heavy goods vehicles on communities.
- Provides businesses in the Midlands with an alternative to road haulage, and the potential for cost savings.
- Generates employment both directly and at associated terminals and interchanges.

Rail freight forecasts, based on the Network Rail Freight Market Study, identifies three potential growth markets for rail freight services in the midlands:

- Services to and from deep sea ports.
- Domestic intermodal services.
- Movement of construction materials.

The demand for domestic intermodal services in particular will be dependent on the development of new Strategic Rail Freight Interchanges and capacity improvements on key routes – most of which are also needed to carry growing passenger traffic.

In addition the movement of finished vehicles, petroleum products, and steel products play a significant role in the economy and also have some potential for growth.

4.2 Road Gaps and Opportunities

Each link of the Strategic Road Network was analysed to create a combined measure of importance and congestion. By reducing congestion and journey times on the SRN in the Midlands, the region will be able to retain and attract further business, cementing the region's position as the most logical place for logistics operators and manufacturers to place their distribution centres and factories.

In addition to direct investment on the road network, attempts need to be made to improve efficiency within the freight industry itself; by reducing empty running and using technology to steer road freight traffic along the most efficient routes possible. Other innovative options such as freight specific lanes on the road network and automated vehicles are potential long-term solutions for the industry to utilise to maximise efficiency

Figure 1 illustrates the performance scores for each road link for the forecast year in the model, 2037, taking the average of the AM and PM peaks. At this point, no schemes have been applied:

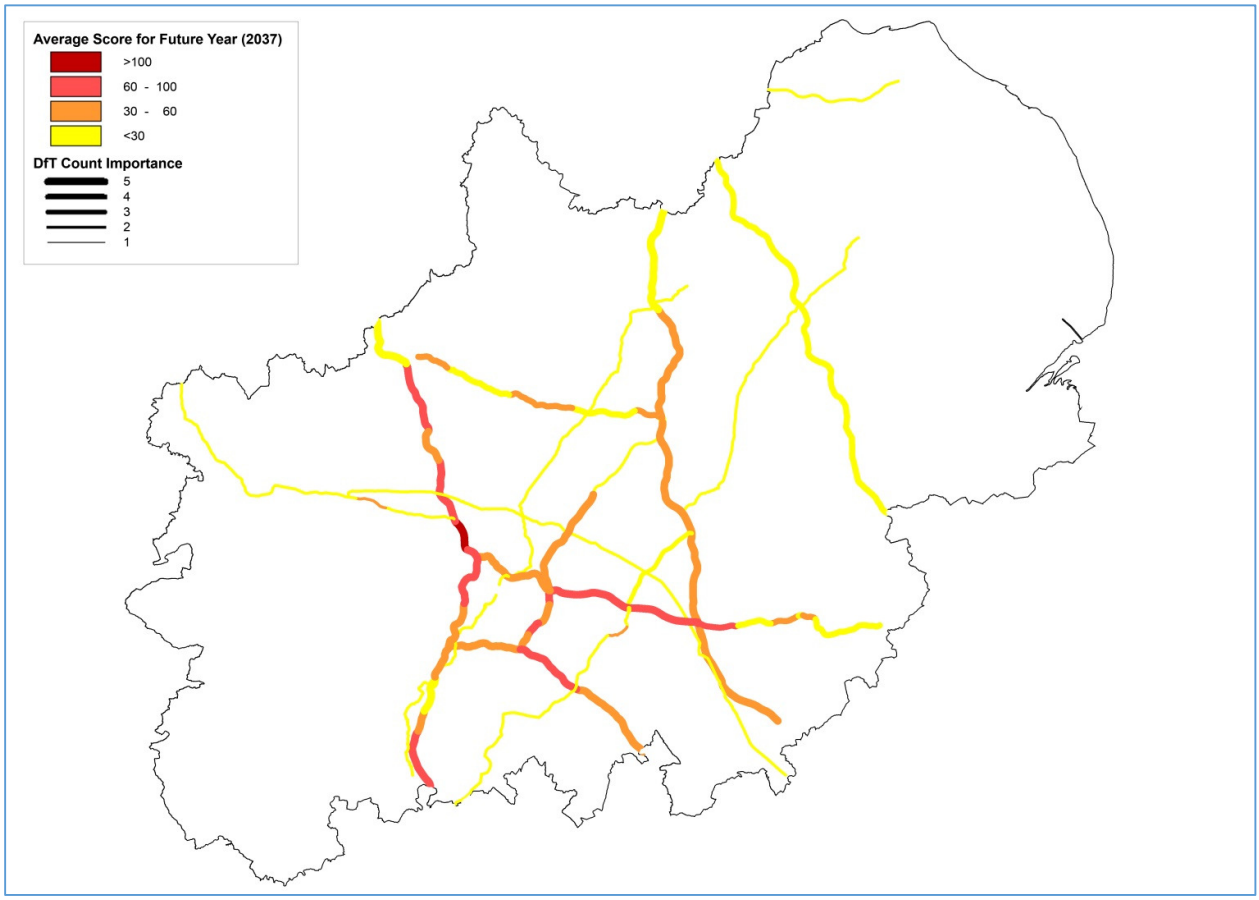


FIGURE 22: SRN PERFORMANCE SCORE FOR FUTURE YEAR (2037)

Highways England have an extensive programme of investment in the network as part of the agreed Roads Investment Strategy (2015-2020). The likely improvements as a result of these schemes in two stages have been assessed – first looking at Smart Motorway improvements, then junctions.

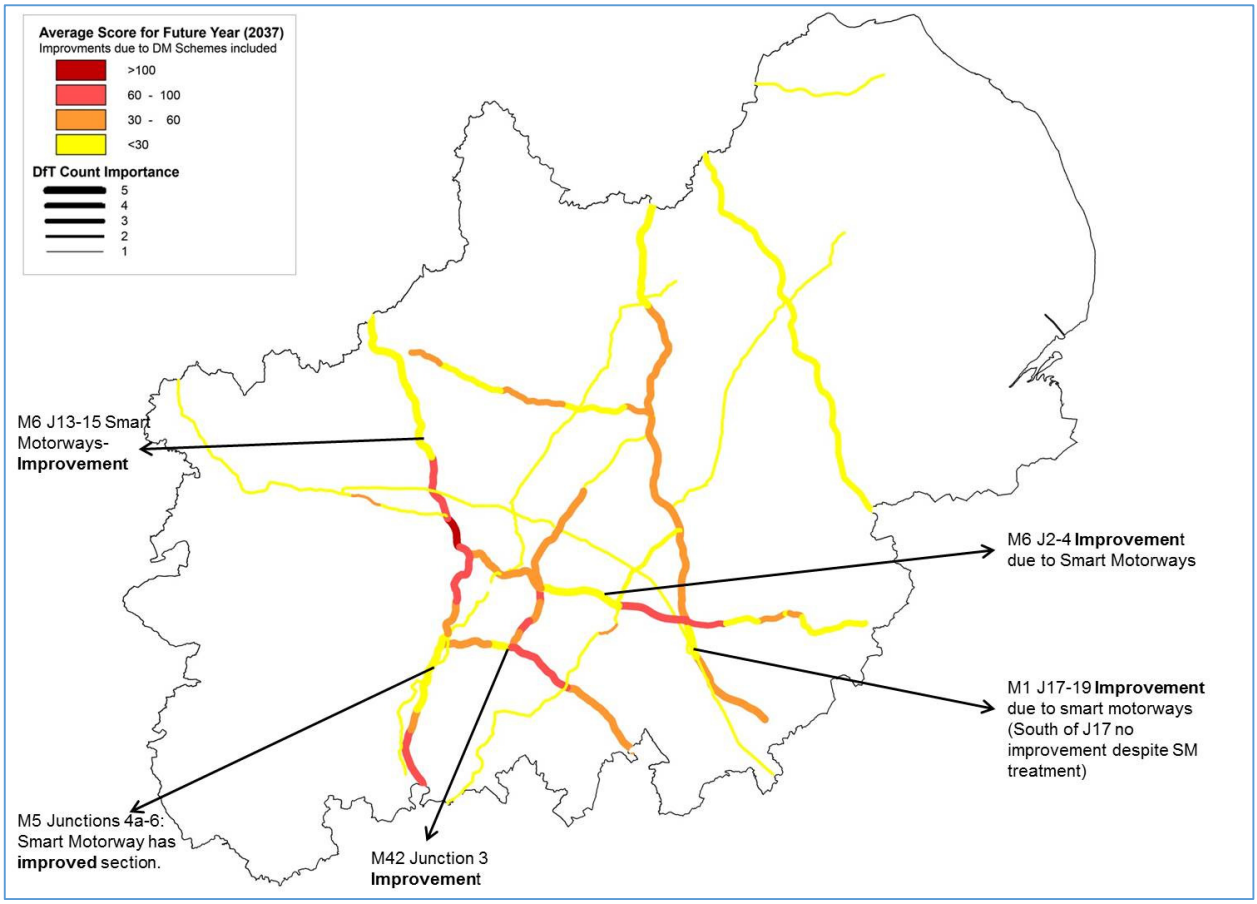


FIGURE 23: SRN SCORE WITH DO MINIMUM SCHEMES INCLUDED (2037)

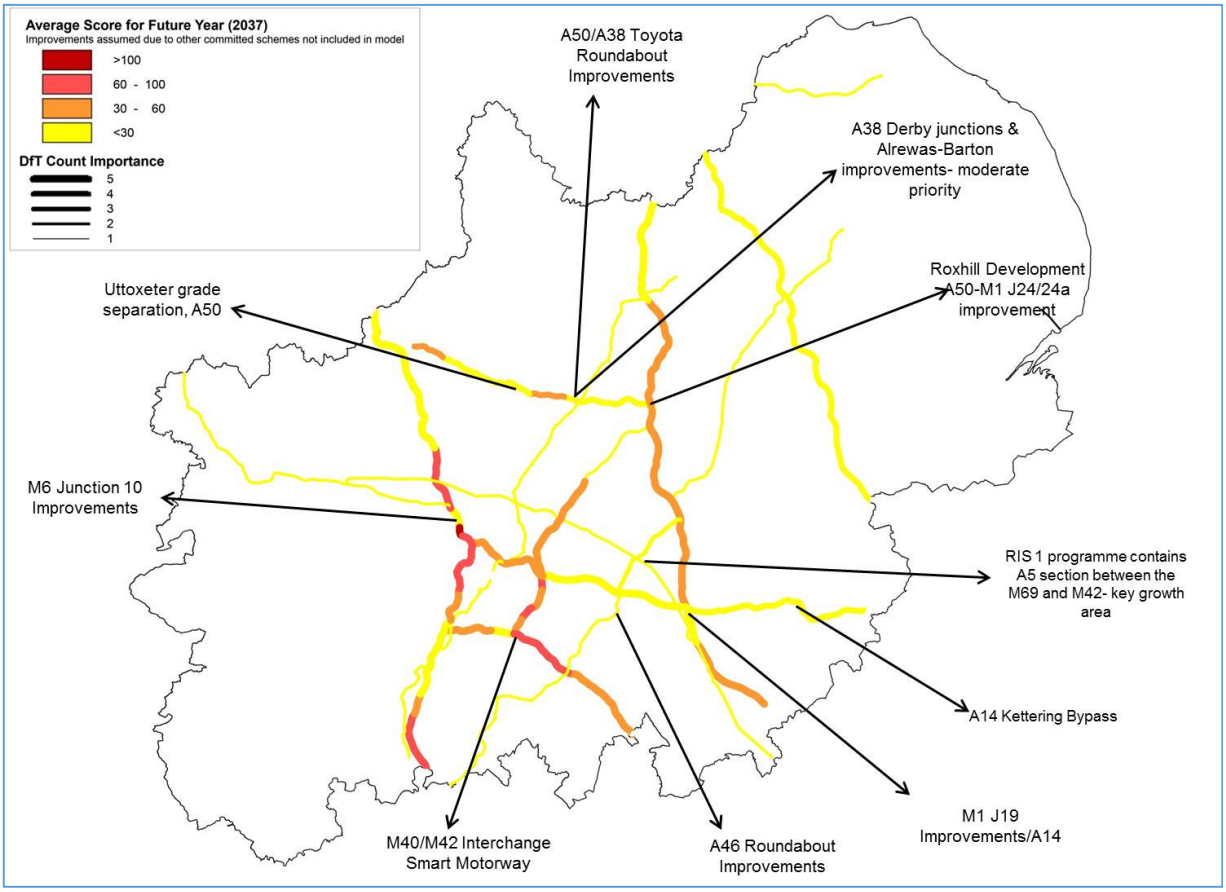


FIGURE 24: SRN SCORE WITH OTHER COMMITTED SCHEMES (2037)

Parts of the scheme at Uttoxeter on the A50 are under review, and the schemes east of Coventry on the A46 may need to be reconfigured, but it is assumed that appropriate and affordable schemes for these locations will be developed in due course. In addition, the M54 has been removed as a residual gap. The section is not in a high importance category for freight, and more likely to be prioritised from a business travel or local perspective.

After allowing for all the committed schemes, there is a clear concentration of problems around the Birmingham hub, particularly around the M5/M6 junction and on the M42 east of Birmingham, on the M1 corridor, and the remaining roundabouts on the A50.

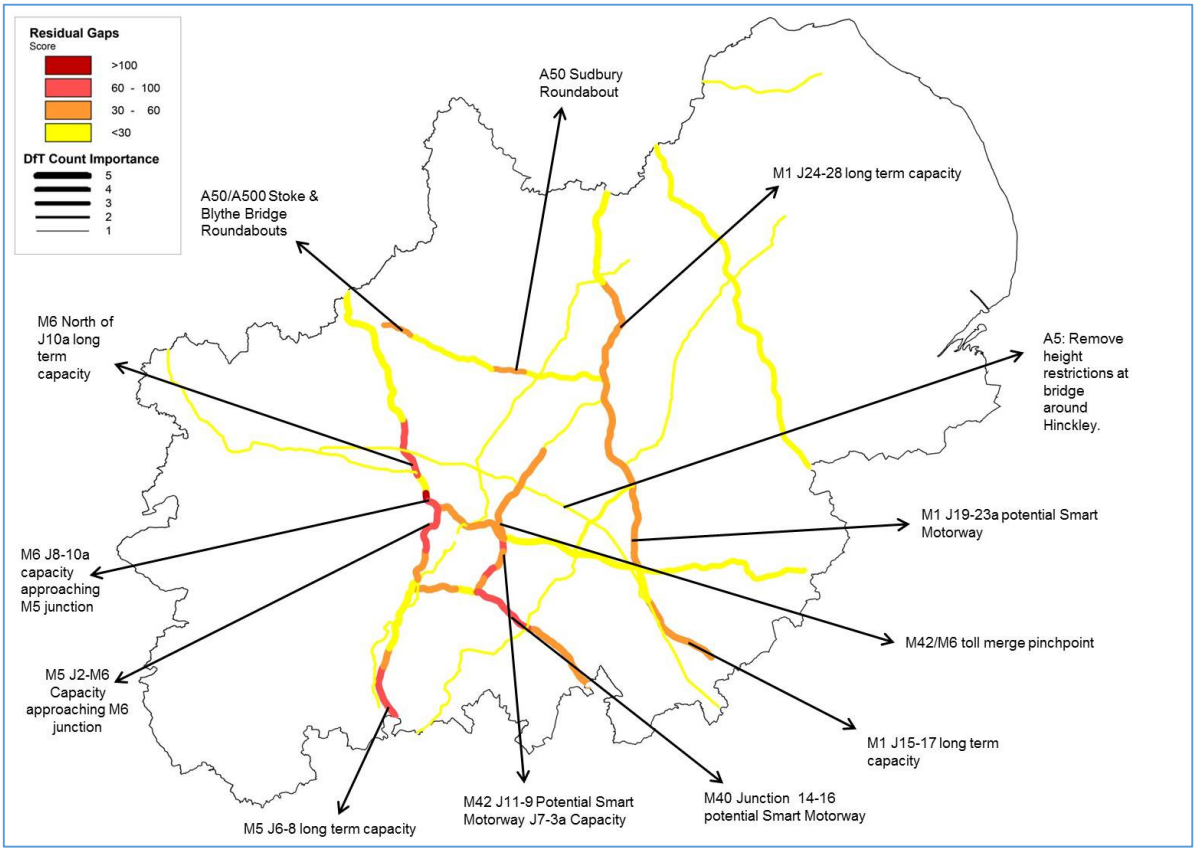


FIGURE 25: SRN LOCATION OF RESIDUAL GAPS

The gaps break down into three broad categories: severe current problems focused around the M5/M6 junction, pinch-points on other freight corridors, and long-term capacity growth on the principal long-distance corridors.

4.2.1 M5/M6 Junction

The M5/M6 junction and its approaches are largely on viaduct, making widening very expensive, possibly prohibitively so. The costs of widening will need to be evaluated, but other options must also be considered.

Smart Motorway has already been implemented on the M6, including hard-shoulder running, with localised widening of the viaducts to provide emergency laybys. A similar treatment may be possible on the northern end of the M5, though the problems are as much with providing enough capacity on the M6 to receive traffic from the M5.

RIS1 includes a commitment to develop a scheme for Birmingham Box Phase 4, which includes this section of the M5. This is now being taken forward as part of the Highways England / Midland Connect Midland Motorway Hub Study.

Given the severity of the problem, and in particular the absence of concrete proposals for the M6, two alternative ways of managing demand have been investigated: modal shift and local access restrictions. These emerged from preliminary discussions with the freight community, so it seemed sensible to test whether they might be effective.

For modal shift the transfer of car commuters to rail between western Walsall and central Birmingham was investigated. Unfortunately, modal shift alone has minimal impact on the strategic network. Any capacity generated by modal shift seems to get filled with local traffic.

To suppress junction-hopping, access restrictions to two of the three M6 junctions in the Walsall area, one either side of the M5/M6 junction was tested. This is not a specific proposal – just an illustration of the sort of approach that might be taken. This was more promising: restricting access at these junctions *would* seem to improve access to the M6 for HGVs. We have recommended that this be investigated further, with benefits to freight separately identified, as part of the Midlands Motorway Hub study.

4.2.2 Pinch-points

In contrast to the seeming intractability of the M5/M6 junction area, there are a number of pinch points on the strategic freight network where a step change in capacity is practical, and likely to be good value-for-money. In some situations, particularly close to cities, there may be demand-management or spatial planning approaches that would be effective, if the local authorities wished to pursue those, but they would require more detailed study.

Road	Gaps
M42 J2-3	Morning peak congestion eastbound, consider Smart Motorway
M42/M6 Toll Merge	Morning peak congestion southbound, consider alternatives to the nearside lane drop
M42 J11-9	Morning peak congestion southbound, two lane motorway, consider Smart Motorway
M40 J14-16	Evening peak congestion westbound, consider Smart Motorway
M1 J21	Peak congestion northbound, consider widening M69 approach
M1 J23-23a	Evening peak congestion northbound, consider Smart Motorway
M1 J28	Five arm signalled roundabout junction. Evening peak congestion on M1, consider junction simplification or widening the approach
A50/A500	Roundabouts at M6 J15, at A50/A500 junction, Blythe Bridge and Sudbury, consider grade separation
A5	Removal of rail bridge height restrictions at Hinckley

TABLE 4: RESIDUAL GAPS AND ISSUES - PINCHPOINTS

4.2.3 Capacity Growth

Beyond immediate pinch-points, there are a number of corridors where traffic growth is expected to exceed capacity over time. These are listed in approximate order of priority. The sections which have already been converted to Managed or Smart Motorway would require more substantial intervention.

Road	Gaps
M42 J3a-7	Already smart motorway. Junction improvement committed around junction 3a, and at junction 6, but the whole section is congested, particularly in the evening peak, and at risk of severe congestion with the development of further business parks at the UK Central site. Widening needs to be considered as part of the Midlands Motorway Hub study. Most freight can avoid this section of the motorway network in the evening peak period, by using the M40 and A46.
M5 J6-8	Conventional motorway, consider Smart Motorway (once the RIS1 schemes at junctions 5-7 have been implemented)
M1 J19-23	Conventional motorway, consider Smart Motorway (this scheme is already committed for development work in RIS1)
M40 J11-14	Conventional motorway, consider Smart Motorway
M1 J25-28	Managed Motorway (4-lane) with discontinuous hard shoulder, consider widening at structures and conversion to full Smart Motorway, longer term
M6 10a-13	Smart motorway, consider widening, longer term
M1 J13-17	Smart motorway, consider widening, longer term

TABLE 5: RESIDUAL GAPS AND ISSUES – LONG TERM CAPACITY

4.3 Rail Gaps and Opportunities

4.3.1 Objectives

Rail freight plays an important role in the Midlands economy, connecting businesses to suppliers and customers in the UK and internationally. The rail network in the Midlands plays an essential role for rail freight for all other regions in the UK, particularly in the growth area of intermodal services.

Midlands Connect has adopted a conditional output to provide rail freight capacity to meet forecast needs. Two forecasts were used to give a range for the capacity requirement. Network Rail produced an unconstrained long-term forecast in their 2013 Freight Market Study (FMS 2043). The Department for Transport published a *constrained* forecast in their 2016 Rail Freight Strategy (RFS), recognising that there are external factors and constraints that may lead to a lower growth trajectory – unless the constraints can be resolved. The constraint factors have been applied to the unconstrained forecast to generate a constrained forecast for 2043 (RFS 2043).

The most significant gaps are in **capacity**, as many parts of the network are operating near capacity for both passenger and freight traffic. However other issues need to be borne in mind, including provision of terminals, electrification, end to end journey time, and the **capability** of the network to accommodate larger loads (loading gauge), heavier loads, or longer trains.

With strong forecasts for growth of rail freight traffic- particularly intermodal and construction traffic- a significant growth in capacity may be required. Routes with more than a doubling of freight are highlighted in Table 9:

	Link Name	Corridor	2011	2043 (FMS)	Change	% Change
A	**Water Orton - Landor Street**	**Felixstowe to West Mids**	**34**	**74**	**40**	**118%**
B	Fenny Compton - Leamington Spa	Southampton to West Mids	21	35	14	67%
C	**Longbridge - Kings Norton**	**SW & Wales to West Mids**	**12**	**26**	**14**	**117%**
D	**Rugby – Nuneaton**	**West Coast Main Line**	**34**	**94**	**60**	**176%**
E	**Madeley - Basford Hall**	**West Coast Main Line**	**33**	**116**	**83**	**252%**
F	**Werrington Jn - Stoke Jn**	**East Coast Main Line**	**15**	**34**	**19**	**127%**
G	**Manton Jn to Syston East Jn**	**Felixstowe to West Mids**	**13**	**71**	**58**	**446%**
H	**Kettering**	**Midland Main Line**	**9**	**57**	**48**	**533%**
I	Branston Junction	Midlands to North	23	43	20	87%
J	Sleaford – Lincoln	East Coast Main Line	34	46	12	35%

TABLE 6: RAIL FREIGHT GROWTH AT KEY LOCATIONS (TRAINS PER DAY)

Most of these routes also accommodate significant volumes of passenger traffic, and in some cases these routes are important corridors for the Midlands with aspirations to significantly increase passenger train frequency. For this analysis, only passenger growth for services identified by Midlands Connect as having a strong economic rationale have been included, or where the growth is already committed. Table 7 shows combined freight and passenger aspirations for each of the key locations, and the impact on utilisation.

	Link Name	2013 /hour	RFS 2043 /hour	FMS 2043 /hour	Passngr current /hour	Passngr 2043 /hour	Headway (mins)	Current Utilisation	RFS 2043 Utilisation	FMS 2043 Utilisation	Junction Complexity
A	Water Orton - Landor Street	1.2	1.8	2.6	6	10	4	48%	79%	84%	High
B	Fenny Compton - Leamington	0.6	0.8	1.1	5	6	3	28%	34%	35%	Low
C	Longbridge - Kings Norton	0.2	0.3	0.4	10	12	3	51%	62%	62%	Low
D	Rugby – Nuneaton	1.4	2.1	3.8	9	8	3	52%	51%	59%	Low
E	Madeley - Basford Hall	1.2	2.2	4.3	2	2	3	16%	21%	31%	Low
F	Werrington Jn - Stoke Jn	0.3	0.5	0.7	6	6	4	42%	43%	45%	Low
G	Manton Jn to Syston East Jn	0.5	1.9	2.7	2	2	6	25%	39%	47%	Low
H	Kettering	0.3	0.9	1.8	5	6	4.5	40%	52%	58%	Low
I	Branston Jn	0.8	1.2	1.6	5	6	4	39%	48%	50%	Med
J	Sleaford – Lincoln	1.8	2.1	2.4	2	2	8	50%	55%	58%	Low
K	Wigston North Jn - Knighton Jn	0.6	2.0	3.1	6	8	4	44%	67%	74%	Med

TABLE 7: FREIGHT & PASSENGER GROWTH AT KEY LOCATIONS (TRAINS PER DAY AND % UTILISATION)

The analysis has identified two locations – Water Orton and Leicester – where the combination of forecast freight growth and aspirations for improved passenger services impose a strategic constraint on the achievement of Midlands Connect rail outputs (shown in Figure 23). At these locations, there is a need to assess the combined passenger and freight requirements, and assess whether proposals by Network Rail to address the issues are likely to be sufficient, affordable and timely.

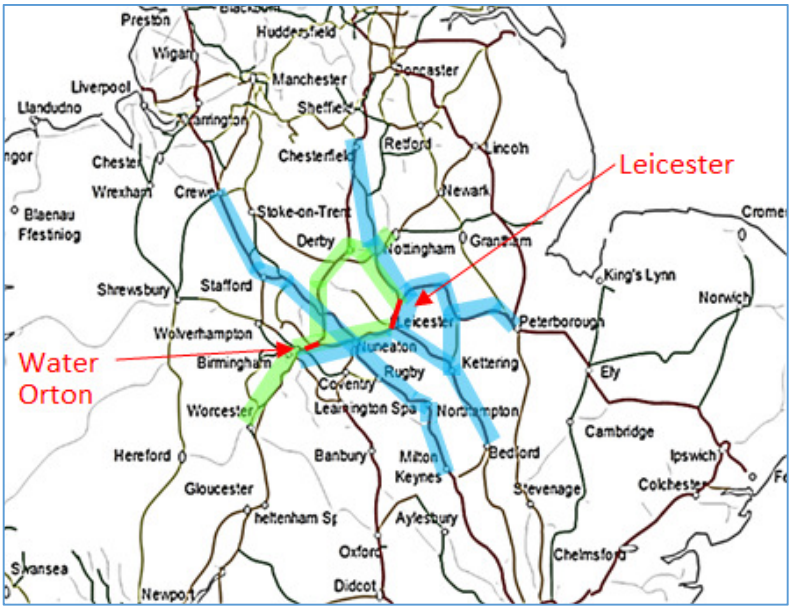


FIGURE 23: KEY RAIL FREIGHT CAPACITY INTERVENTIONS LOCATIONS

4.3.2 Water Orton

The highest priority constrained location is at Water Orton on the Birmingham to Derby and Leicester Line and at the junction with the freight only Sutton Park Line to the North of Birmingham. Particular constraints are; the 2-3 track railway to the west of the station; single track approach to the Sutton Park line, and; platform arrangement which leads to conflicts between Leicester and Derby trains. Also freight trains accessing the Sutton Park Line sometimes need to be held on the main line, causing delays.

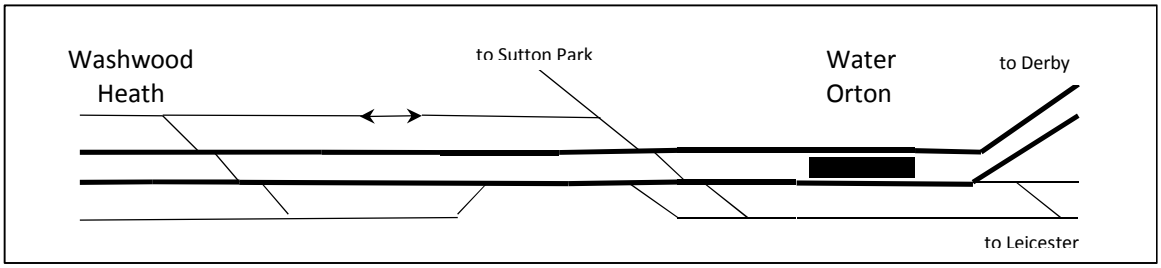


FIGURE 24: LAYOUT, WATER ORTON

Currently, a number of additional passenger services are proposed by Midlands Connect, as well as freight demand being expected to increase to existing and planned terminals in the West Midlands. Without additional infrastructure, these proposed new services would take the raw capacity utilisation to 79-84%, well beyond the threshold for reliable passenger and efficient freight operation at a complex junction.

Proposals are being developed for Water Orton as part of the Midlands Rail Hub Study, effectively 4-tracking the railway. In addition, the Sutton Park Freight line would be doubled. A new platform would be constructed on the south side of the layout. The layout has been designed to allow a flyover to be built at a later date, but the benefits do not currently look to be sufficient to justify grade separation, especially since HS2 will probably relieve some of the pressure from 2033.

Analysis suggests that further work will be required to be confident that there will be sufficient paths for freight. The indication is that a fairly comprehensive flat scheme should be sufficient, including more space for freight to stand and shorter headways. It will also be worth considering partial or full grade separation of the junction, though it currently seems unlikely that this will be required. It is recommended that the design for the new layout is more focused on accommodating freight movements.

4.3.3 Leicester

The formation between Syston, Leicester and Wigston is four tracks wide, but most of the route has only two or three tracks. Some freight is able to bypass the area, taking an alternative route between Syston North Junction and Kettering (though generally the direct route is preferred), but there is no practical alternative for freight on the Peterborough-Nuneaton or Coalville-Kettering routes. A range of freight and passenger services operate on this section. With additional service improvements, capacity utilisation of the existing network is expected to be around 67-74%. With constraints elsewhere in the area and on the wider network, intervention will be required to ensure this is reliable.

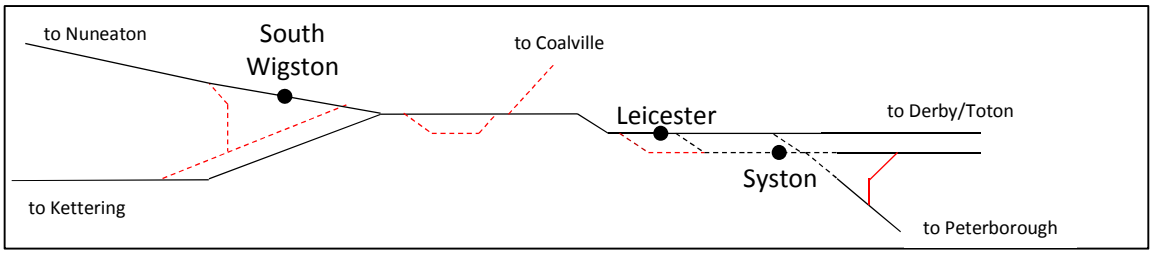


FIGURE 25: LAYOUT, WIGSTON-SYSTON (SIMPLIFIED)

The high potential increase in freight and passenger services indicated by the market studies has led to Network Rail proposing substantial interventions. This includes requadrupling from Syston to Wigston, with

relocation of Syston station, additional platforms at Leicester on the slow lines, and a dive-under at Wigston (£600m-£1000m), and also freight loops between Leicester and Nuneaton (£50-£100m).

The four-tracking of the section is likely to be of substantial benefit, helping to decouple the various conflicts. Knighton tunnel (disused) would need gauge clearance to W10 gauge with twin tracks. The rebuilding of Syston station, to permit that section of track to be requadrupled, could probably be achieved at relatively modest cost.

Additional platforms at Leicester should be seen in conjunction with the dive-under at Wigston. Without the dive-under, the platforms are of little benefit as passenger trains will continue to need to cross the layout on the flat. If the dive-under is built it makes sense for new platforms to be built as well, completely separating the CrossCountry services from the East Midlands Trains services. However this makes it harder for CrossCountry services to overtake east-west freight, hence the requirement for loops on the Nuneaton line.

The need for the proposed infrastructure will depend on the timetable to be operated and the daytime frequency of freight trains. A service of more than 2 freight trains per hour in each direction, along with an intensive passenger service as envisaged in the market studies, would mean that the current infrastructure would need substantial enhancement if good performance is to be delivered.

However, if the passenger service growth is more modest, taking into consideration HS2 services to Toton and Sheffield capping demand on the MML, and the absence of a likely business case for some of the other services, a simpler intervention, without grade-separation, is likely to prove adequate.

The other factor to consider is when the traffic growth is likely to occur. Freight growth tends to happen gradually over time, so substantial additional capacity is not required quite yet. There is probably capacity for additional fast passenger services from Birmingham without much alteration (though this will need to be tested), with intervention then required as freight builds up, perhaps in CP7 (2024-2029).

4.3.4 Summary of Midlands Connect Rail Freight Opportunities

Rail freight plays an important role in the Midlands economy, connecting businesses to suppliers and customers in the UK and internationally. The rail network in the Midlands plays an essential role for rail freight for all other regions in the UK, particularly in the growth area of intermodal services. There are three potential growth markets for rail freight services in the Midlands: (1) Services to and from deep sea ports, (2) Domestic intermodal services, and (3) Movement of construction materials. In addition the movement of finished vehicles, petroleum products, and steel products play a significant role in the economy and have some potential for growth.

Provision of new Rail Freight Interchanges and Strategic Rail Freight Interchanges will be the main driver for rail freight growth, and Midlands Connect will support such proposals where reasonable and work to address any gaps in provision across the region. Midlands Connect also supports the provision of Efficient Rail Freight Corridors, providing flexible capacity, capability and diversionary routes to enable the efficiency of rail freight to be as widely available as practical.

Midlands Connect has high aspirations for improved rail freight services to link businesses to their suppliers and customers. Midlands Connect also plans significant enhancements to rail passenger services to provide a step change in quality and capacity along key corridors. These aspirations provide significant challenges to rail infrastructure that may not be addressed by the existing rail planning process.

At two locations in particular: **Water Orton** and **Leicester**, the need for intervention to provide the capacity required is apparent, to meet the needs of businesses and the wider economy. This report recommends that schemes of an appropriate scale and timeliness be developed for both these locations, by Midlands Connect, working with Network Rail.

The indications are that at-grade solutions for both Water Orton and Leicester should be appropriate, with work on Water Orton required during CP6 (2019-2024) and Leicester required during CP7 (2024-2029).

Chapter 5: What's next?

5.1 Key Conclusions – Road

Many of the issues that have been identified as being the most important for freight have also been identified by Midlands Connect as priorities for business connectivity. These should now be taken forward into more detailed studies. From a freight point of view, the most important schemes are the ones that reduce congestion on the core motorway and expressway network, including in particular the area around the M5/M6 junction and the A50 (which links the distribution centres in the East Midlands to the North West and Scotland).

Specifically, it is recommended that junction restrictions around the M5/M6 junction are investigated further: initial examination indicates that this will be beneficial to freight, which is a major employer and potential growth industry in that area.

There is also a substantial congestion problem, primarily in the evening peak, on the M42 east of Birmingham. From a freight point of view, this section of motorway can often be avoided at congested times, using the A46 and M40. The existing commitment to remove the remaining at-grade junctions on the A46 east of Coventry is therefore welcomed, even though this is not currently a core freight route. A longer-term solution for the M42 is nevertheless required, either widening, managing the traffic even more intelligently, or reducing the volume of car commuting from the office parks adjacent to the motorway. This will require further study, and a coordinated multi-agency approach. This may also provide one of the best opportunities to look to apply emerging technology, perhaps managing the traffic more directly, or improving the targeting of information to allow longer-distance traffic to avoid predictably congested locations.

The largest issues on the busiest routes have been focused on, to have maximum impact. With better traffic models becoming available, it will be possible to look at the wider "Major" network, though still focusing on strategic traffic. The efficient movement of this traffic will enable the further development of freight-dependent businesses in more rural areas, notably in the agri-food sector. Where appropriate, this will allow us to recommend schemes for development, perhaps improving access to the motorway system, or bypassing known congested locations such as Hereford.

While further development work will look at both business and freight uses of the network in combination, the focus specifically on freight has been invaluable at revealing fresh perspectives on issues. Dialogue and engagement with the freight community will be maintained, to ensure that that focus and perspective is continued.

5.2 Key Conclusions – Rail

The two main priorities for rail freight in the Midlands are the provision of capacity at Water Orton and at Leicester. However, the principal driver of investment will be the development of new fast passenger services between Nottingham and Birmingham, and between Leicester and Birmingham. As Midlands Connect develops its proposals for these services, interventions need to allow for long term freight growth, and be designed accordingly.

In particular, it is expected that Midlands Connect will be developing proposals for Water Orton during the course of CP6 (2019-2024), and should ensure that flexible freight provision is built into the scheme. An intervention at Leicester is also likely to be required, but this is more likely to be developed in CP7 (2024-2029), and be incremental in nature.

While further development of schemes at Water Orton and Leicester will need to look at business and freight use in combination, it is clear that a specific freight focus has helped identify the ways in which freight and passenger issues intersect, and the extent of intervention that is appropriate. Midlands Connect will continue to engage with the rail freight sector, to ensure that their perspective is properly incorporated as schemes are developed.

Midlands Connect

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