The Provision of Research Support for the International Gateway Study

Final Report

DfT

22 July 2016

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1. Introduction

Atkins was commissioned by DfT in February 2016 to undertake research into connectivity to England's international gateways. The purpose of the study, and key specific requirements of the study brief are set out in section 1.2 below.

This report summarises the key relevant points from our work and, drawing upon findings from research at a number of case study locations, sets out recommendations for ensuring that the crucial issue of gateway connectivity is given due consideration in future decision-making with respect to investment priorities on the transport system.

1.1. Why this study is important

The term "gateway" is used to cover ports and airports.

Ports are critical to the national economy, with 95% of UK cargo movements by tonnage being waterborne and with ports collectively employing 117, 000 people. There are issues however of congestion and bottlenecks on the transport system providing access to ports, and the process related to funding for major access network enhancements is not always clear. Local authorities (delivering against their own priorities) may not always prioritise port movements over other, less strategically important routes. The "Access to Ports" report by the House of Commons Transport Committee (2013) emphasised the importance of removing constraints on port development caused by connectivity issues. With significant port growth forecast, as well as growth in general traffic on the access network, issues of delay, congestion and unreliability are expected to be accentuated in the absence of specific interventions.

The surface access issues impacting on freight movements to airports by road are often similar to those impacting upon passenger movements – congestion and reliability – with rail frequently not a viable option.

Those accessing international gateways inevitably compete for space on the transport network with a range of other transport network users. Enhancing gateway access inevitably raises therefore complex questions involving multiple stakeholders of how enhancements are delivered, how funding is apportioned, and how wider costs (for instance, in terms of noise and air quality) and benefits (for instance, reliability improvements to general traffic, not just those accessing the gateway) are measured and factored into decision-making.

1.2. Project Objectives

The purpose of the study is to provide further research (with reference to a number of specific case studies) on the nature of the issues and opportunities around access to gateways from the Strategic Road Network (SRN) and to determine what 'the last mile' means in practice.

Specifically, the purpose of the study, as set out in the project specification, is to identify and recommend:

- what the terminology of the 'last mile' should encompass;
- the geographic connectivity to the SRN for specific case studies;
- how these connections are owned and maintained, setting out issues and the benefits of any change;
- the costs of change and implications for maintenance; and
- congestion minimisation options around the ports/airports.

The brief requires the study to produce as an output a set of general criteria which can be applied by Government when considering road connectivity access policy matters, recognising different user needs and drawing upon specific examples. The work must allow for decision-making on a consistent basis, which contributes to a more consistent standard of access provision across the network.

Ultimately the study outputs need to be of a quality and robustness to form the basis for port and airport road access related input to Roads Investment Strategy (RIS) II, which is due to be launched in 2019, and to provide long-term policy direction and points of reference for subsequent RIS periods.

While the study brief makes reference to the phrase "last mile", it also stresses that this should be interpreted pragmatically[1]. Our work is not restricted to issues associated with the access network immediately adjacent to the gateway; we have taken a wider geographical view of surface access connectivity issues. **However, where the phrase 'last mile' is used in the report it refers to the final/first leg of access to/from the gateway (whether greater or less than a mile in reality)**.

Our work has focused on access to gateways by road. While other modes are acknowledged as critical components of surface access strategies designed to enhance connectivity and to offer greater resilience, we have followed the specific requirement set out within the study brief to gear the work towards the needs of RIS II.

1.3. Report Structure

Following this introductory section, the report is structured as follows:

- Chapter 2 describes the key conclusions from the case study work undertaken, and draws together key conclusions from the desk-based analysis and from consultation with stakeholders;
- Chapter 3 describes the nature of the challenge for connectivity to international gateways, and sets out a proposed 'typology' for gateway connectivity issues, designed to provide a starting point to support decision makers in considerations on future investment to support enhanced connectivity objectives; and
- Chapter 4 draws together key recommendations for ensuring that the crucial issue of gateway connectivity is given due consideration in future decision-making with respect to investment priorities on the transport system, with reference to specific examples from the 'toolkit' of potential interventions.

A series of Appendices provides supporting and additional information.

[1] We note also that, for some stakeholders, there was a view that the phrase is more readily associated with logistics and last mile delivery in supply chain management.

2. Analysis of Case Study Locations

2.1. Introduction

This study has drawn largely upon pre-existing data sources, supplemented by desk-top analysis and the findings of stakeholder consultation at a number of case study locations (selected at the study outset by DfT) We have drawn upon concurrent work relevant to gateways being undertaken, for instance on behalf of Highway England on the Strategic Economic Growth Plan, or with respect to specific gateway enhancement measures, such as highway proposals under development on the main access route to Port of Liverpool.

This section lists the locations chosen, and sets out the key findings from desk-based analysis and consultation. This analysis forms the evidence base against which broad study recommendations have been developed.

2.2. Case Study Locations

The brief set out proposals for the locations to be adopted as case studies. The following locations were chosen, providing a spread both by geography and by freight commodity and trip purpose:

- Ports

  Felixstowe (Hutchison Port Holdings) – containers – Anglia

  Liverpool (Peel Ports) – dry and liquid bulks – North West

  Dover (Trust Port) ro-ro (HGVs and passengers) – South East

  'Immingham & Grimsby' and Hull (ABP) – mixed use – North East

  Port of Tilbury (Forth Ports) – mixed use – South East

- Airports

  Stansted – South

  East Midlands – Midlands

  Manchester – North

2.3. Gateway Characteristics

The case studies cover ports which all feature within England's top 10 busiest, but represent a mix of different commodity types, from the predominance of containers at Felixstowe, through to bulk goods at Liverpool. Dover performs an important role both for passengers and freight.

Manchester and Stansted are England's third and fourth busiest airports respectively, with East Midlands also in England's top 10 in terms of passenger throughput. The split between business and leisure trips varies, with Manchester used more for business trips than the other two locations. All three airports sit within the top 5 UK airports in terms of freight by volume, and East Midlands and Stansted sit second and third to Heathrow in importance.

Data was collated by case study location, as follows:

- Up-to-date mapping including any recent access improvements which have been implemented;
- Details of current access movements by type/category, distinguishing between different freight types (container, bulk cargo, passenger/RoRo, and mixed use);
- Journey time and variability analysis;
- analysis of 'last mile' specific problems and issues and impacts on connectivity;
- Data on road ownership and maintenance arrangements; and
- Details of proposed enhancements, including timescale, business case, costs, etc.

Full case study reviews are given in Appendix A with a summary of key points given below.

Gateways: size and nature of the operation

Patterns of connectivity vary according to the size and nature of the Gateway (although, as we suggest in section 3, good connectivity is important irrespective of commodity type or trip purpose). Initial analysis, as summarised below, therefore focused on the size and nature of the Gateway.

Tables 2-1 gives total freight throughput, and commodity breakdown for each of the case study ports. Table 2-2 gives total passenger and freight throughput for the three case study airports, including a breakdown by trip purpose.

Table 2-1 Case study Ports. Total throughput and commodity breakdown

	Liverpool	Dover	Felixstowe	Harwich	Hull	Immingham and Grimsby	Tilbury*
Cargo type:	**Cargo in thousands of tonnes per annum (2014)****						
All liquid bulk traffic	10,572	-	56	461	1,689	20,851	
All dry bulk traffic	7,564	15	-	62	3,603	21,320	
All bulk traffic	18,136	15	56	56	5,292	42,171	
All other general cargo traffic	957	303	4	171	1,519	951	
All container traffic	4,852	-	9,112	7	1,426	1,459	
All ro-ro self-propelled traffic	2,272	26,764	136	3,187	726	2,643	
All ro-ro non self-propelled traffic	4,779	523	2,828		3,187	12,146	
All traffic	30,996	27,605	28,127	3,888	10,925	59,370	16,000

**No disaggregated port usage data available for Tilbury*
Source: Port Freight Statistics: 2014 final figures. Department for Transport (2015)

Table 2-2 Case study Airports. Total passenger throughput and trip purpose breakdown – volume/type of freight

	East Midlands Airport	Stansted Airport	Manchester Airport
Passenger Arrivals / Departures (million pax per annum 2014)	4.5m	19.9m	21.7m
Business/leisure split (% business/% leisure)	7/93	18/82	15/85
Freight (Tonnes per annum)	277,412	205,000	93,465

Source: https://www.caa.co.uk/Data-and-analysis/UK-aviation-market/Airports/Datasets/UK-Airport-data/Airport-data-1990-onwards/

Journey time variability to Gateways

We have examined Highways England published data on network performance on the SRN, and also undertaken analysis of specific journey time characteristics at each of the case study locations. Consistent and reliable journey times are a critical component of good gateway connectivity. Highways England Route Based Strategies acknowledged that for journeys on their SRN generally, delay and congestion *per se* may be perceived by network users as less of an issue if a consistent amount of additional time can be factored into journey planning [2] . Where journey times are highly variable, journey planning becomes more challenging. This is particular acute for gateways where flight/sailing times need to be met, and where unscheduled delays and congestion can significantly increase the costs of operation.

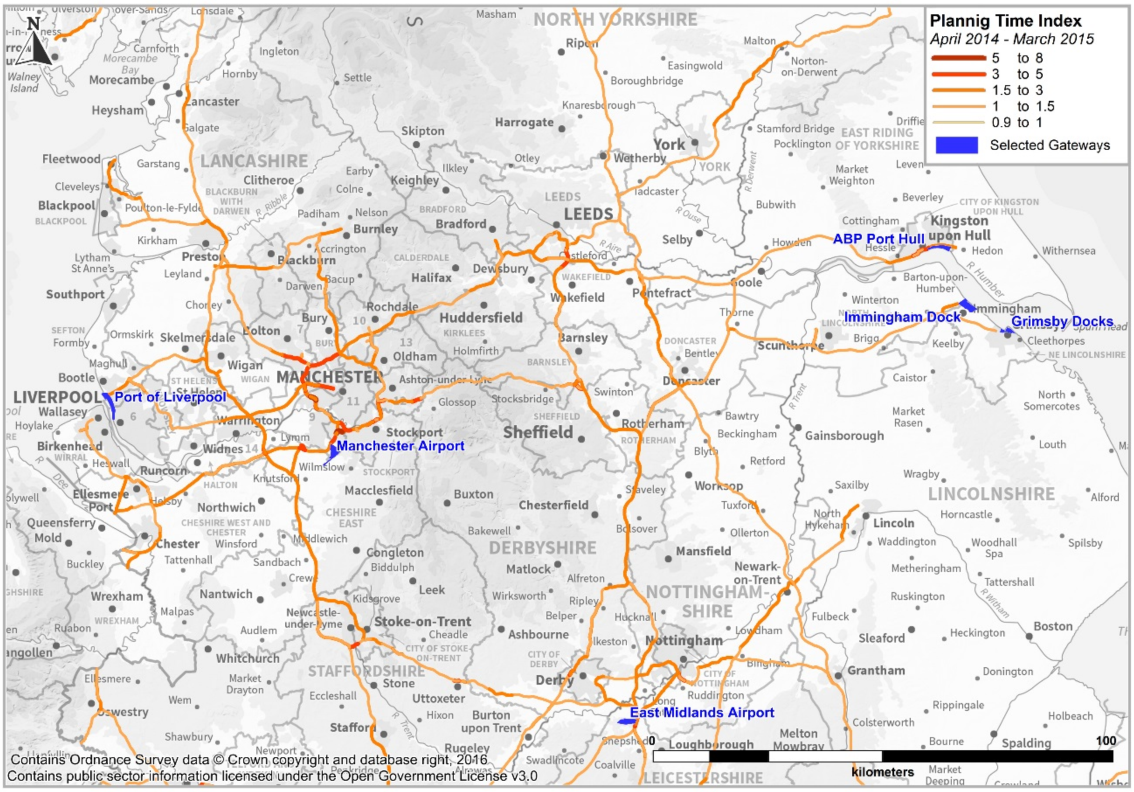
Figures 2.1-2.2 show Highways England published representations of journey time performance on the SRN in the form of Planning Time Index (PTI), representing the relationship between free flow time and the slowest journeys. This is considered as a measure of reliability, where a value of 2.50 means that for a 30 minute trip in light traffic, 75 minutes should be planned. This shows that:

- In northern England the sections of SRN with the highest PTI are around Manchester and would affect journeys to and from Manchester Airport;
- The sections of SRN adjacent to East Midlands Airport, Port of Liverpool and Hull also have relatively high PTI indices (>1.5);
- In southern England the eastern (before Dartford free flow toll) and western sections of the M25 typically have the highest PTI indices and whilst eastern section around the Dartford Crossing would affect Tilbury, traffic from north western and western England would pass through western side of the M25 en route to Dover; and
- The sections of SRN adjacent to Dover Port also has relatively high PTI indices (>1.5).

The PTI indicates that the journey time for the 'last mile' to and from the followings ports is more than twice the free flow time:

- Dover Port (both directions);
- Immingham (heading northbound);
- Liverpool (heading eastbound); and
- Tilbury (both directions)

Figure 2-1 Northern England Planning Time Index (April 2014 – March 2015)



[2] See, for instance section 2.1.8 of the following document, where the concept of 'reliably congested' is referred to. https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/364210/London_Orbital_and_M23_to_Gatwick.pdf

Figure 2-2 Southern England Planning Time Index (April 2014 – March 2015)

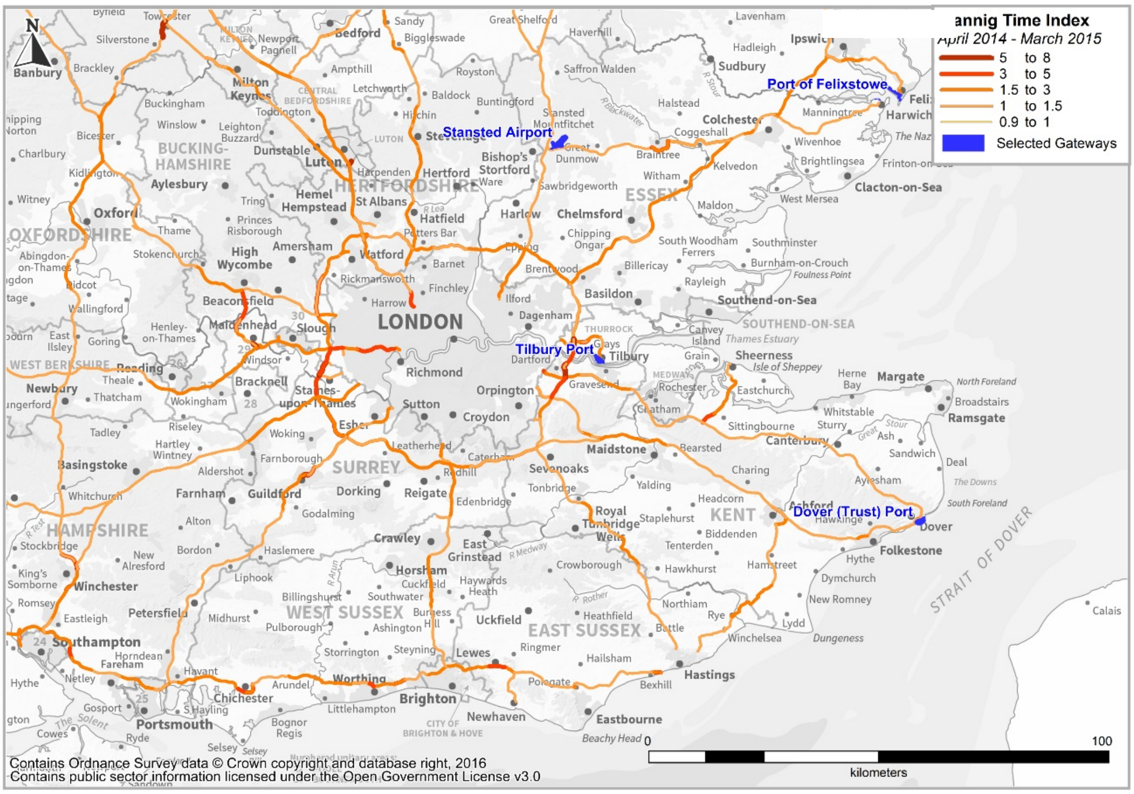


Table 2-3 shows journey time variability for the surface access networks at each of the gateways. This examines the performance on the 'last mile' and is based upon a comparison of free flow conditions to conditions during peak times of general traffic demand, drawn from analysis of Google maps data. The following observations can be made:

- The worst congestion, as measured by increased journey time compare to free flow conditions, is typically experienced on the last mile to the airports, with peak time journeys to the east and north of Manchester Airport being between 100% and 300% longer than free flow journeys depending upon route and time of day; and
- The Port of Liverpool and Hull are the two ports that experience the greatest changes to journey times as a result of congestion.

It is evident from this data that those gateways closest to busiest parts of the SRN (Manchester Airport and Tilbury) experience the largest changes in journey times as these parts of the network have relatively high speeds in free flow conditions but are highly congested in the peak. Those ports in urban locations (Liverpool and Hull) experience the congestion in the peaks but free flow journey speeds are not significantly higher than peak time speeds.

Table 2-3 'Last Mile' journey time variability at the case study gateways

Port	Route	Free Flow (minutes)	AM extra time	PM extra time
Dover	To M20	10	20%	20%
	To M2	24	4%	25%
Felixstowe	To M11	65	31%	31%
Harwich	To A12	20	20%	20%
Immingham	To M180	14	14%	29%
Hull	To M180	28	61%	61%
	To M62	24	67%	42%
Grimsby	To M180	18	22%	22%
Liverpool	To M62	18	56%	67%
	To M53	18	56%	56%
Tilbury	To M25 NB	12	150%	83%
Airport	**Route**	**Free Flow (minutes)**	**AM extra time**	**PM extra time**
East Midland	To M1/A52	8	50%	225%
	To M1 NB	4	0%	200%
Manchester	To M50 EB	6	200%	333%
	To M50 WB	6	133%	100%
Stansted	To M11 NB	5	180%	60%
	To M25	14	43%	43%

Some of the most variable journey times are at gateways adjacent to the busiest parts of the SRN. This is considered further in Section 3.

All case study gateways feature some degree of journey time variability, with some of the worst performing locations being close to parts of the SRN with high levels of competing demand. At some locations variability on other parts of the network away from the 'last mile' impacts on the quality of overall connectivity as much as the performance of the immediate access network.

Connectivity problems and Issues

Appendix B provides an overview of documented problems and issues at gateways, and a summary of proposed interventions (some of which are currently being progressed). This highlights that while congestion, delay and unreliability (either directly at the gateways themselves or at more remote parts of the surface access networks) feature at all locations, other factors (such as safety and severance) are also significant. Current responses to connectivity issues are also highlighted, noting that interventions are often designed to address issues beyond connectivity (such as severance, safety and environmental impact). Aspirations for growth are noted at a number of locations, both in terms of the gateway operation, and in associated adjacent land uses (including Port Focused Logistics, with gateways serving functions as logistics centres alongside their more traditional roles) - pointing towards the importance of addressing the connectivity needs of the port and its wider surroundings.

All gateways have aspirations for growth. Network enhancement schemes exist at most locations, which should bring about connectivity enhancements. There is no evidence of any consistent approach however designed to safeguard consistent standards of accessibility.

Surface access network ownership

A specific aspect of our brief has been to examine the nature of network ownership on links which provide gateway connectivity. This has been undertaken with reference to Highways England land ownership records and a review of the National Street Gazetteer as referenced on *www.roadworks.org*.

As set out within Appendix B a mixed and relatively complex picture emerges. Even on sections of the road network designated as SRN, individual junction and localised route sections may not be Highways England owned or may have joint ownership. The implication is that Highways England does not own or necessarily control all of the access and egress points to its network and where these access points are signalised (rather than priority junctions and roundabouts), there will inevitably be some compromise to traffic on the SRN.

2.4. Stakeholder Consultation

Discussions were held with a range of interested parties at the case study gateways, from gateway operators through to Local Economic Partnerships (LEPs) and trade bodies. A full list of consultees, distillation of general themes emerging and a number of location-specific issues are highlighted in Appendix B.

Summary of Connectivity issues by location

Consultation with port and airport operators has pointed to a range of connectivity problems, with different emphasis at different locations. Regular congestion and unreliability is a feature at some locations; at others the main concern is the level of resilience in the network at times of incident or disruption. The extent to which impacts on surrounding and adjacent areas constrain gateway operations/growth potential is also variable. It is worth noting that each issue is present at each location, though to varying degrees.

Case study analysis and stakeholder consultation has confirmed that:

- **The nature of the connectivity issue varies from location to location, suggesting the need for location-specific interventions, rather than a single generic approach;**
- **The quality of connectivity at some locations is impacted as much by the performance of the network beyond the immediate gateway access network; suggesting that interventions in the 'last mile' may be less critical to overall connectivity enhancement at some locations than others;**
- **Resilience can be as much a connectivity issue as congestion; and**
- **Road ownership arrangements on the 'last mile' are complex and variable. This was highlighted as less an issue by stakeholders seeking connectivity enhancement, than frustrations around engagement in what is seen as a complex planning system.**

Table 2-4 Summary of Connectivity Issues by Location

Gateway	Immediate and adjacent congestion and journey time variability	Congestion and variability elsewhere on the network	Local impacts and constraints	Resilience/sensitivity to incident/ disruption	Availability of alternative routes
Hull	***	***	***	**	Some alternative (though sensitive) routes available
Liverpool	***	***	***	**	Some alternative (though sensitive) routes available
Tilbury	***	***	**	***	No suitable alternatives
Manchester Airport	***	***	**	*	Alternative routes available, though sensitive to M56
East Midlands Airport	***	***	*	*	Alternative routes available, though sensitive to M1
Stansted Airport	***	***	*	**	Alternative routes available, though sensitive to M11
Dover	**	***	***	***	High sensitivity to disruption/incident
Felixstowe	*	***	*	***	No suitable alternatives

3. Connectivity: Common Themes

3.1. Introduction

The study brief highlights that there is a perception that the consideration of the 'last mile' of journeys is not consistent across the network, and that the standard of provision varies based on long-established practice. Hence this study is driven by a need for a consistent approach which reflects commons themes and issues and draws upon a consistent set of potential solutions. Potential solutions are the subject of Chapter 4, with common themes and issues highlighted below. Building upon the case study work, we have undertaken a distillation of key characteristics and issues across our locations, with a view to establishing any generic problems, issues and themes by gateway type.

Our analysis has been guided in particular by the study brief requirements to:

- establish a set of general criteria which can be applied by Government when considering road connectivity access policy matters; and
- define criteria for a variety of gateway usage.

3.2. Categorisation by Gateway type

The study brief calls for guidelines for addressing international gateway connectivity issues which can be applied in a way which is consistent but also reflects gateway-specific challenges. We have examined the extent to which common themes exist across gateways in terms of how the connectivity challenges relate to gateway characteristics, and the extent to which gateways can be grouped and allocated to a particular type.

As highlighted within our case study analysis and summarised within this section, issues relating to the quality of connectivity were present at all locations, but to varying degrees and with varying contributory factors.

Initial focus was placed upon grouping by the nature of the movement passing through the gateway: commodity type for ports and freight at airports, and passenger trip purpose at airports. Section 2 shows significant differences between ports in terms of commodity handled, and some variation in trip purpose at airports.

Work by ITS at Leeds University[3] shows the value in freight time savings and reliability improvements for different commodity types. However, while commodity/trip purpose will inevitably play a role in influencing the particular composition of a surface access strategy geared towards the needs of a specific gateway[4], our case study analysis indicates that the quality of connectivity issues apply across all gateways, and that the nature of the connectivity issue (and the likely intervention required to address it), is influenced more by the hinterland of the gateway and the characteristics of the surface access network, irrespective of commodity or trip purpose. This is because:

- Time sensitivity will be a function of end-to-end journey considerations as part of the just-in-time supply chain, of which international gateway 'last mile' connectivity may play only one small part. (Such factors are best addressed as part of the development of wider aviation and freight strategies rather than focussed on the gateways); and
- Congestion and unreliability impacts also upon those travelling to work and doing business at the international gateway and at associated adjacent economic activities (as highlighted within our case study work in terms of the aspirations for Airport City and Port Centric Logistics type developments). The needs of these wider demands, and their impacts upon the efficiency of operation of the gateway, need to be considered alongside the specific requirements of the gateway commodities/ trip purposes.

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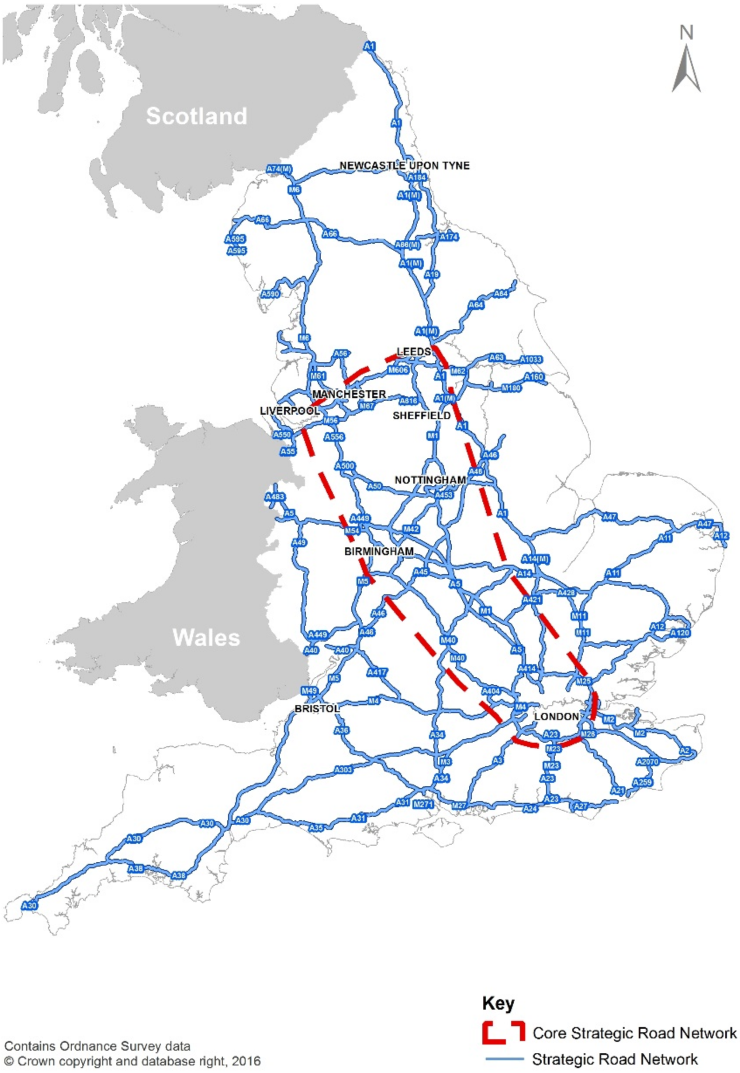
[3] Fowkes T. and Whiteing T. (2006). "The value of freight travel time savings and reliability improvements - recent evidence from Great Britain". ITS, University of Leeds, Association of European Transport and Contributors

[4] Case study analysis has highlighted the specific time-sensitive needs associated, for instance, with business passenger flights, perishable goods, and next day delivery. Interventions designed to reflect time sensitive operations will be an important consideration as part of an overall strategy for improved connectivity.

Categorisation has therefore been undertaken on the basis of the geography of the gateway and its relationship with the core[5] SRN, with two key criteria identified, as follows.

Criteria	Why does this matter for connectivity?
CRITERIA 1 - Location - with respect to the 'core SRN' network	Presumption that core SRN connectivity needs are more likely to be safeguarded through wider HE strategy and programmes – though specific 'last mile' issues may persist.
CRITERIA 2 - Demand - extent of mixed/competing uses on access network	Risk of compromise/dilution of connectivity needs as diverse network demands are met, or failure of planning processes to place sufficient emphasis on connectivity.



There is a need for enhancing connectivity at all international gateways irrespective of commodity type/trip purpose. Identifying appropriate interventions requires consideration of the hinterland of the gateway, and how it interacts with its surface access network.

[5] The 'core' SRN is a concept used for the purposes of this study and has no fixed geographical definition. It is a loose definition for the busiest and most central parts of the English strategic routes providing connectivity between key urban centres

We have identified three distinct gateway 'type', based upon the location of the gateway and demand characteristics of its surface access network:

Type	Proximity of SRN
TYPE 1	Served directly by core SRN
TYPE 2	Remote from core SRN, high level of competing demands (generally at gateways with more urban hinterlands)
TYPE 3	Remote from SRN, lower level of competing demands (generally at gateways with largely rural hinterlands)

3.3. The nature of the connectivity problem by gateway type

Table 3-1 sets out, with reference to case study locations, typical connectivity issues by gateway type.

Table 3-1 Connectivity Issues by Gateway Type

Geography	Constraints on connectivity	Location	Nature of the connectivity problem
TYPE 1 – Within core SRN area	Congestion arising from proximity to core central parts of the national SRN, and competing with other national and local movements	Manchester, East Midlands and Stansted Airports, Port of Tilbury	Very high level of competing uses on access routes. Typically vulnerable to issues on the wider network (10-50 miles), which can impact at peaks and other times.
TYPE 2 – Beyond core SRN area, high competing demands	Congestion due to urban location and competing with more local movements	Liverpool, Hull, Dover	High level of competing uses for access routes. Typically vulnerable to City wide journey to work peaks (0-10 miles)
TYPE 3 – Beyond core SRN area, lower competing demands	Congestion impacts at points on the road network more distant from gateway	Felixstowe/Harwich, Immingham, Dover	Vulnerable at times of specific incidents either on the wider network or impacting port movements more locally

Congestion, and the unreliability to journey times which arises from it, happens at different times at different points of the access journeys to gateways. This is a function of the location and geography of the gateway, including factors such as the nature of adjacent land uses, which in turn determines the level and nature of competing uses for the adjacent road network, and where the gateway is located relative to some of the key congestion pinchpoints on the national SRN.

Gateways such as Manchester and East Midlands Airport and the Port of Tilbury are all located adjacent (within 10-15 miles) to core central parts of the SRN featuring national trunk flows, and displaying the highest average variation from free flow time (and unreliability).

Other gateways are more peripherally located with respect to the central core network (this being the case especially for Ports, which by their nature are located 'at the end of' road links). Of these locations, the quality of immediate connectivity varies with the nature of adjacent land uses. Hull and Liverpool share their access with a multitude of uses associated with their city centre locations. At locations such as Felixstowe/Harwich, Immingham/Grimsby and Dover, while port movements do compete with local traffic, their vulnerability to congestion is more a function of the performance of most distant parts of the access network (under normal circumstances).

Consideration of potential interventions requires further refinement to the categorisation above, taking account also of surface access network supply and performance factors. Accordingly a third criterion has been defined, as below.

Criteria	What are the implications for connectivity?
CRITERIA 3 - Network Management	Ability to impact upon level/quality of connectivity through network capacity, level of service and operational performance

Taking account of the nature of network management leads to a refined categorisation as follows:

- **TYPE 1** - Served directly by core SRN;

  Type 1a – HE ownership to gateway entrance

  Type 1b - Mixed surface access network ownership

- **TYPE 2** - Remote from core SRN, high level of competing demands (generally at gateways with more urban hinterlands)

  (All case study type 2 locations have mixed/joint network ownership);

- **TYPE 3** - Remote from SRN, lower level of competing demands (generally at gateways with largely rural hinterlands).

  Type 3a – HE ownership to gateway entrance

  Type 3b - Mixed surface access network ownership

Table 3-2 summarises key characteristics by type, mapping case study locations against type.

Table 3-2 Key characteristics by Gateway Type

Criteria	Characteristic				
Criteria 1: Location	Within 'Core SRN'		Beyond 'Core SRN'		
Criteria 2: Mixed uses	High	High	Low/high	High	Low
Criteria 3: Ownership	HE	Mixed/Joint Ownership	Mixed/joint ownership	Mixed/joint ownership	HE
Type	1a	1b	3b	2	3a
Case study Examples	Stansted, Tilbury Manchester, EMA Immingham, Grimsby Harwich Dover Hull, Liverpool Felixstowe				

We have examined further the nature of the connectivity problem by examining the level of congestion and journey time variability at our case study locations to establish if different gateway types display distinctly different network performance characteristics. This has been undertaken with reference to our own case study journey time variability and analysis and also to Highways England congestion mapping, drawing on the evidence set out in section 2.

We have defined three bands of connectivity quality (in terms of variability of traffic journey times) as follows:

- Quality of Connectivity (QC) A. Always good, sufficient alternative routes to offer strong connectivity even at time of incidents;
- QC B. Generally good, but vulnerable at time of incidents; and
- QC C. Generally poor, even under normal (undisrupted) conditions due to ambient congestion and unreliability levels

Type 1 Gateways connectivity issue

Analysis suggests that the level of connectivity will generally fall either under QC categories B or C above.

The case study locations falling generally within TYPE 1 are the airports rather than the ports, reflecting the tendency for ports to be ‘peripheral’ and at the end of a route by nature, whereas airports, by nature of their more central locations may have wider route options. (Port of Tilbury is somewhat different to the other ports as a result of its estuarial location, and has a network of core SRN routes in relative proximity).

Analysis suggests good access to the core network is a double-edged sword, as these core networks (by their nature) tend to be amongst the busiest and feature the highest number of competing uses. At the case study locations, Type 1 gateways suffer from the highest journey time variability, and are also in proximity to some of the key congestion points highlighted in HE congestion mapping on the SRN.

For Type 1 gateways, in spite of the locational advantages with respect to the core SRN**, there remains significant scope for connectivity enhancement.**

Type 2 Gateways connectivity issues

Analysis suggests that the level of connectivity will generally fall either under QC Category C.

The case study locations falling within type 2 are ports which, while the SRN provides generally direct access, the SRN sections involved are on the peripheries of the SRN network, and are in urban locations with high levels of competing demands for the available highway capacity. Significant journey time variability is evident at these locations, both from our own localised case study analysis and from HE analysis.

For Type 2 gateways there remains significant scope for connectivity enhancement, but with a clear need to balance provision with a range of more localised needs. **Interventions may be considered on the primary access route, or on alternative routes to improve resilience and flexibility, and reflecting needs in areas where Port activities are dispersed and levels of connectivity are variable (e.g. Liverpool).**

Type 3 Gateways connectivity issues

Analysis suggests that the level of connectivity will generally fall under QC categories B or C.

The case study locations falling generally within Type 3 are ports which may or may not be served directly by the SRN (for our case studies, all locations have direct access to the SRN or access in close proximity – generally within a 1 or 2 miles). As with Type 2 Gateways, the SRN sections involved are on the peripheries of the SRN network, but meet less competition in terms of other non-gateway uses by nature of the less urban characteristics of surrounding areas. Type 3 gateways feature the least journey time variability and perform best against SRN network wide analysis.

However, the nature of the connectivity issue in these cases is vulnerability at times of incident, a reflection of dependence upon a single or limited choice of access routes. Such disruption/incident creates particular challenges in terms of the combined operation of the port and its access network. At such times impacts are both intensified by and imposed open other (non-port) road users.

For Type 3 gateways there remains significant scope for connectivity enhancement, but with **an emphasis upon management during times of disruption.**

This analysis shows that each gateway type features connectivity issues, but the nature of these issues differ, and the nature of the intervention is therefore likely to also differ.

3.4. Implications for Intervention

The evidence suggests that improving gateway connectivity requires intervention both on the 'last mile' network and at locations more remote from the immediate gateway access network. We consider in our broad guidelines in Chapter 4 both local and more remote interventions, but focus on the 'last mile; because:

- This is consistent with the requirements of our brief; and
- More remote interventions are likely to need to be addressed as part of the wider network enhancement requirement, with connectivity needs competing with other demands and objectives. (These schemes may be no less important in meeting the connectivity needs of some gateways, but the process by which they are identified and advanced requires a focus beyond the 'last mile').

Fig 3-1 plots case study type against our key connectivity criteria, and identifies an area of focus for intervention on the 'last mile'. As established earlier in the report, good connectivity is important at all gateways; those lying beyond the 'area of focus' below however are most likely to have connectivity needs addressed through wider HE route or area based strategy initiatives. The area highlighted as the focus of attention for 'last mile' interventions comprises gateway types 1b and 2, typically with higher mixed surface access competing uses and mixed network ownership.

Figure 3-1 Area of focus for 'last mile' connectivity enhancements

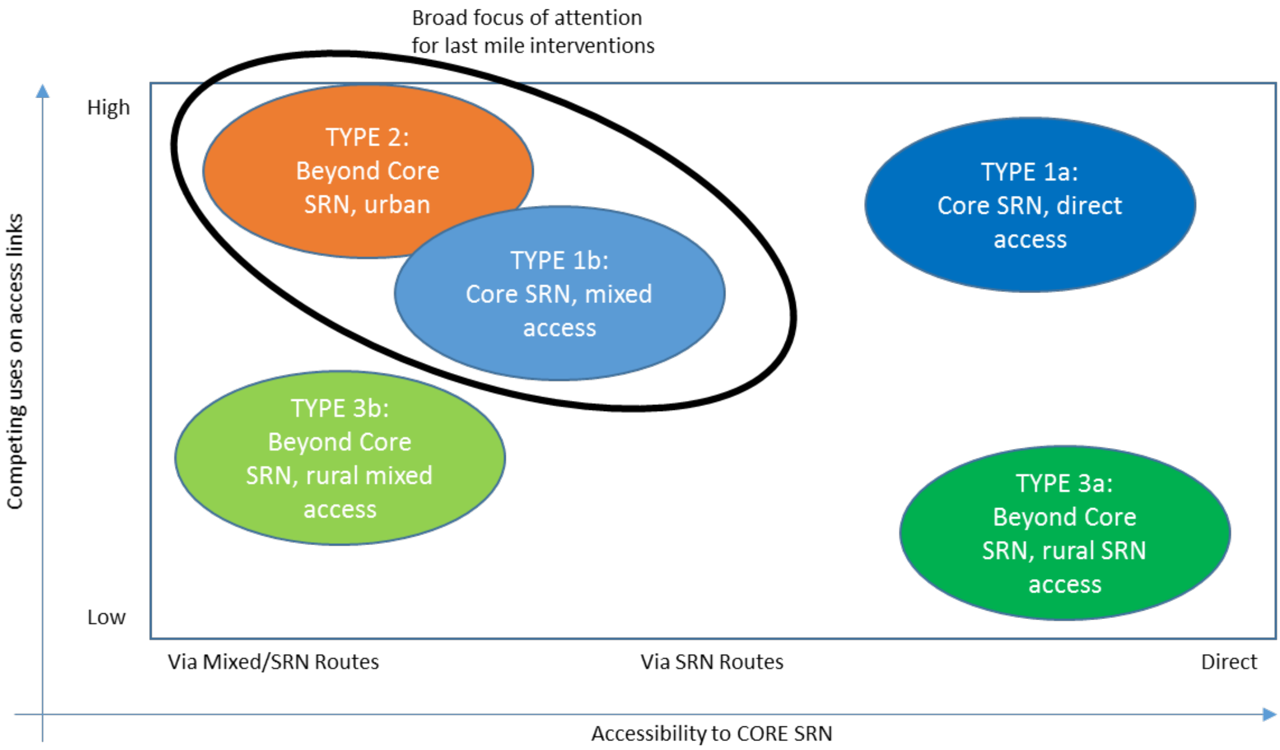


Table 3-3 sets out the 'toolkit' of potential interventions to enhance connectivity, identifying which intervention types may be most appropriate for each gateway type. (This is only intended as a starting point for option identification; the most appropriate intervention will be driven by the specific nature of the gateway issue). Table 3-3 also highlights the extent to which governance/ownership issues are likely to feature in scheme delivery, with Table 3-4 elaborating on the key considerations to take into account in assessing the scope and case for change in network responsibility.

Table 3-3 Likely applicability of intervention by gateway type, highlighting delivery issues

Toolkit	Type 1 Gateway	Type 2 Gateway	Type 3 Gateway	Is governance/ownership an issue in delivery?
Major new infrastructure (new/widened road links)		*	*	Less so, as major schemes are likely to be assessed on a strategic as well as local basis - emphasis in delivery is on ability of business cases required to take full account of benefits of gateway connectivity.
Minor new infrastructure (junction enhancements)	*	*	*	Potentially – ownership of pinchpoint could impact upon the extent to which gateway connectivity issues are taken into account in delivery
Operational Traffic Management measures (Smart Motorway, Telematics, CTM)	*	*	*	Yes – scope to impact quality of consistency of delivery
Operational: Physical Traffic Management measures (parking, priority lanes),		*	*	Likely to require delivery through liaison with local planning/delivery bodies
Maintenance		*	*	Yes – scope to impact quality of consistency of delivery
Safety schemes		*		Likely to require delivery through liaison with local planning/delivery bodies
Environmental schemes		*		Likely to require delivery through liaison with local planning/delivery bodies

Table 3-4 Transfer of Responsibility - key considerations (see also Appendix D for further detail)

Consideration	Evidence to review	Costs/benefits
National function		Prioritised funding will help to improve connectivity and traffic flow on these vital sections of road.
Condition and maintenance costs	**Condition data** should be reviewed to understand the state of both the carriageway and any structures that will be transferred. **Planned works programme review** should be carried out to understand if money has already been allocated to any road which may undergo transfer.	Phasing of maintenance works and prioritised maintenance will help to improve the continuity of the network to the vital ports and airport locations. Depending on the initial condition of the highway being transferred it is not foreseen that there will be an increase in maintenance costs.
Risks and liabilities	**Condition data** should be reviewed to understand the state of both the carriageway and any structures that will be transferred. **Accident data** should also be reviewed to understand if there are any accident spots that should be considered especially those which have been designed with a departure.	Depending on the condition of the assets there may be a cost to ensure the network is at an appropriate standard to be transferred to the SRN.
Economic benefits	Review of LHA priorities for investment and if there are any conflicts of interest.	By prioritising these sections of road network it will ensure that traffic flow will remain free and therefore congestion
Planning benefits		Encouraging a more streamlined approach for connectivity enhancements through rationalisation of ownership

4. Guidelines for 'Last Mile' Connectivity Enhancement

The study brief highlights that there is a perception that the consideration of the 'last mile' of journeys is not consistent across the network, and that the standard of provision varies based on long-established practice. Hence this study is driven by a need for a consistent approach which reflects commons themes and issues and draws upon a consistent set of potential solutions.

4.1. Conclusions drawn from evidence base

A review of the evidence base of connectivity at case study locations, as set out in Chapter 2, leads to a number of conclusions:

The Nature of the Connectivity Issue

- The quality of connectivity (measured in terms of journey time variability on the links providing access from the gateway to the Strategic Road network) varies from location to location, with highest levels of variability evident at gateways served by surface access links which feature high levels of mixed trip purposes;
- Highways England network wide route performance data highlights that network performance issues exist on routes which serve an important function providing gateway connectivity;
- Issues with the quality of the 'last mile' of connectivity are not uniformly evident at each study location. At some locations, congestion at points on the access network more remote from the gateway are as significant in terms of the overall quality of connectivity as the performance of the network immediately adjacent to the gateway;
- Particular issues of congestion and reliability are experienced, as may be expected, at gateways located in the larger urban conurbations, where road space is shared across many competing uses;
- For some gateways the resilience of the surface access network (for instance the availability of alternative routes at times of incident) is as important as the quality of the 'last mile' network;
- Good quality connectivity was cited by stakeholders as of high importance at all gateway locations, irrespective of the profile of gateway users (freight commodity, or trip purpose). Connectivity issues were cited as a constraint on growth at a number of locations, impacting not just in terms of the gateway users, but also on gateway staff, and on the efficient operation of gateway related activities;
- While network operational performance was highlighted as an issue by most stakeholders, this was not generally related by stakeholders to the question of who is responsible for managing the network;
- On the other hand a number of stakeholders highlighted issues around the planning process, and complexities and constraints around responsibilities and funding for scheme delivery; and
- The types of connectivity problems are diverse, and usually relate to gateway specific characteristics. Whilst common themes can be identified (see chapter 3), there is no evidence of single overriding issue calling for a single specific response.

Themes across gateway types

The study brief sets out the following two study requirements:

- To establish a set of general criteria which can be applied by Government when considering road connectivity access policy matters; and
- To define criteria for a variety of gateway usages

We have used the evidence from the work described in chapter 2 to establish generalised themes and criteria in chapter 3, as a point of reference for taking account of gateway connectivity in future road policy decision-making. Key points outlined in chapter 3:

- We have found no evidence to suggest that different criteria apply based upon the **scale of operation** at gateways (freight or passenger throughput). It is possible that scheme prioritisation will take into account a view of the relative **need for intervention** based upon economic contribution of the gateway, but it is beyond our current scope to rank gateways on the basis of the strength of case for intervention (although noting the significant importance placed upon gateway connectivity by Transport for the North, with respect to their 'Northern Powerhouse' ambitions);
- We have found no evidence to suggest that different criteria apply based upon the **type of commodity or trip purposes** passing through the gateway. This is because the need for good connectivity is evident at each gateway, irrespective of commodity or trip purpose, driven by the need for efficient movement of general gateway travel demands (including staff) and the connectivity needs of port-related activities;
- We have identified three criteria which help to guide decision-making on the need for and nature of possible connectivity enhancing interventions. These relate to the location of the gateway with respect to the surface access network, and operational and governance characteristics of the access network:

  CRITERIA 1: Location with respect to the 'core SRN' network

  CRITERIA 2: Demand - extent of mixed/competing uses on access network

  CRITERIA 3: Network Governance and Management
- Based upon the criteria above, we have identified a number of gateway types. The purpose of defining this typology is to group into a number of themes, as an early guide for the decision maker in identifying likely connectivity issues, and as a possible first step in identifying appropriate interventions:
  - **TYPE 1** - Served directly by core SRN;

    Type 1a – HE ownership to gateway entrance

    Type 1b - Mixed surface access network ownership
  - **TYPE 2** - Remote from core SRN, high level of competing demands (generally at gateways with more urban hinterlands)

    (All case study type 2 locations have mixed/joint network ownership);
  - **TYPE 3** - Remote from SRN, lower level of competing demands (generally at gateways with largely rural hinterlands).

    Type 3a – HE ownership to gateway entrance

    Type 3b - Mixed surface access network ownership
- We have defined three levels of quality of connectivity (QC); QC A -generally good, QC B - generally good but vulnerable at times of incident/disruption, and QC C - generally poor. All of the gateway types examined fell within QC B or C, pointing towards a general need for connectivity specific intervention across all international gateways.

4.2. Guidelines for future decision-making

With respect to developing guidelines for future decision-making, we make the following observations:

- In line with the diversity of connectivity issues, there are a range of possible responses;
- Many gateway surface access issues will be part of a complex wider pattern of transport demands and challenges. The location of the gateway is important to determining how connectivity issues are identified and addressed;
- Those on core parts of the SRN (type 1), or on a HE defined Strategic Route are likely to form a component of HE route or strategic studies;

- Those in large urban areas (type 2) are likely to be considered as part of the wider planning process for the City, with investment prioritisation determined by bodies such as the LEPs, or bodies arising through the current devolution agenda. (We have noted the emergence of Key Route Networks and Memorandums of Understanding between HE and local authorities, and stress the importance of safeguarding gateway connectivity needs as part of this process);
- Those more remote from the key urban centres and core SRN (type 3) may require special attention to ensure that their connectivity needs are addressed as part of route specific initiatives;
- While trade-offs with competing needs will be required for each of the ‘types’, connectivity needs are most at risk of comprise or dilution in the first two cases, while for type 3 there may be more of an issue of the absence of the appropriate mechanisms to identify and address connectivity needs;

As route strategies are updated information and evidence will be brought together from a range of stakeholders to help understand network performance and investment priorities. We recommend that the criteria set out within this report are applied to ensure that connectivity needs are fully factored in as research and evidence gathering on strategic and route studies informs decisions on the next Roads Investment Strategy and Business Plan.

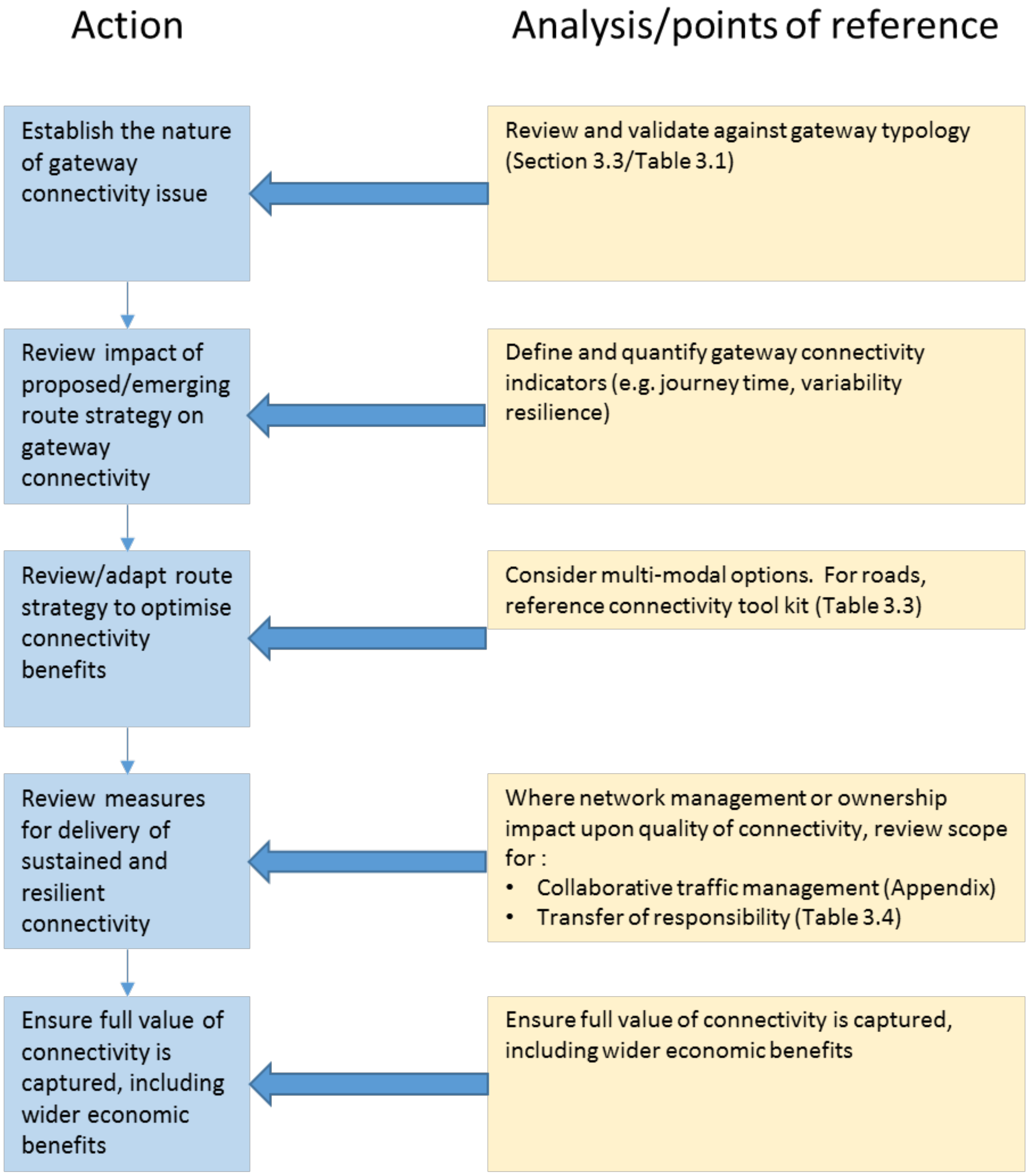
- While network ownership issues were not raised prominently by stakeholders, and the SRN provides generally direct connectivity to gateways (at our case study locations) our research has shown that there is a mixed and relatively complex picture in terms of network ownership at a more local level. This may lead to the connectivity needs of gateway not always being served most effectively, both in terms of shorter term operational needs, and longer term investment.

It is recommended that routes which are key to gateway connectivity are reviewed in terms of ownership, with a view – wherever possible - to facilitating a consistent and sustained level of connectivity through ownership under Highways England.

Applying connectivity criteria as part of the on-going RIS process

We propose that the following broad approach is adopted for future RIS related work:

Figure 4-1 Process for safeguarding/promoting Gateway Connectivity needs for RIS II

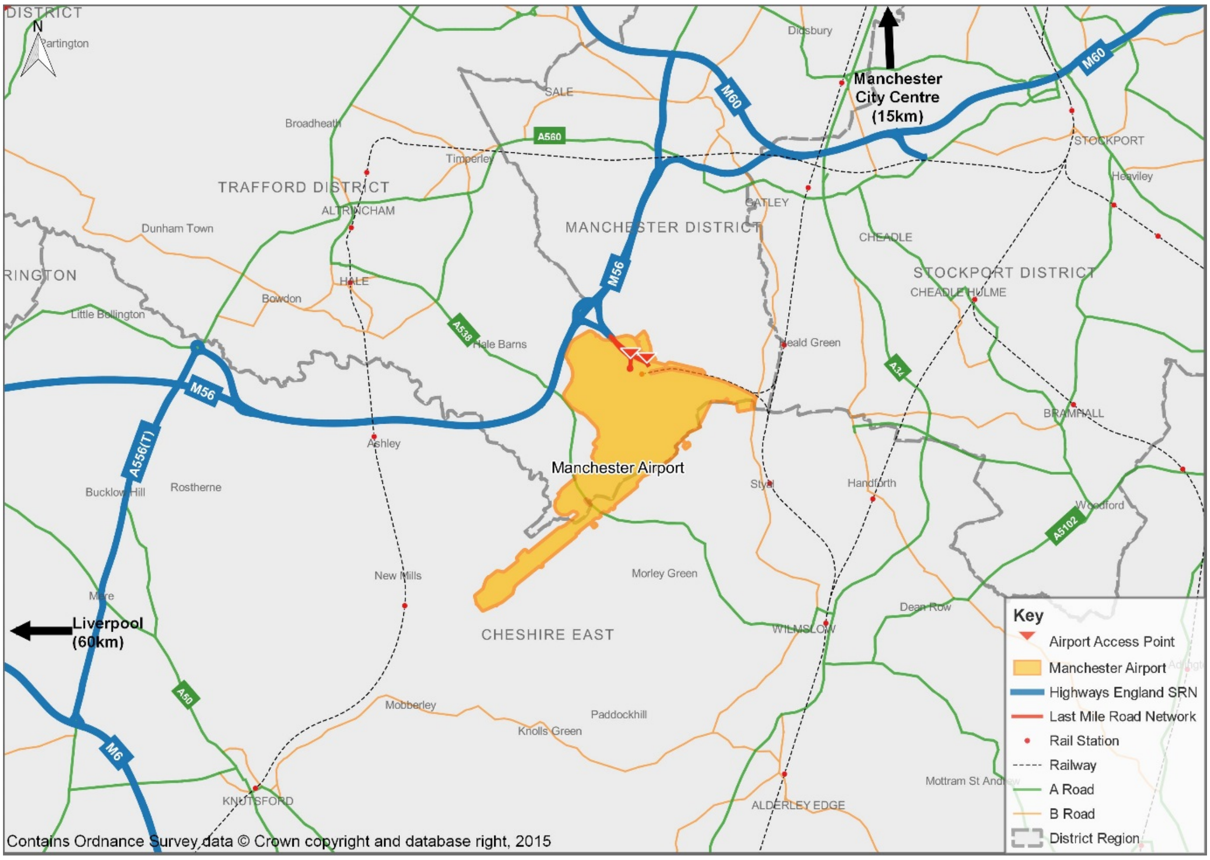


Appendix A. Case Study Reviews

A.1. Manchester Airport

A.1.1. Location

Manchester Airport is located adjacent to the M56 in Greater Manchester. It is served directly by the Core SRN.



A.1.2. Overview

Owned by Manchester Airports Group – Manchester Airport is the third busiest in the UK, with three passenger terminals, a freight terminal and two runways.

The Manchester Enterprise Zone is an area around the airport that benefits from reduced business rates. The Manchester LEP is overseeing a £400m investment in the “Airport City” project, which will create a large area of office space, logistics parks and manufacturing facilities in the area to the north of the airport.

A.1.3. Access

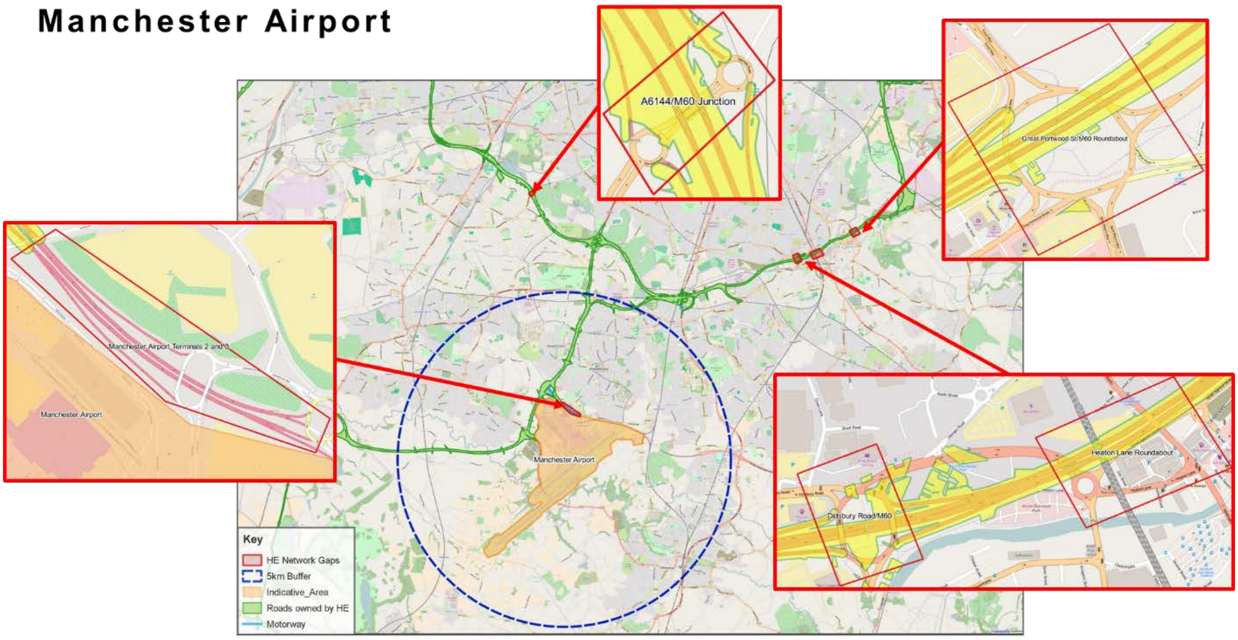
The airport can be directly accessed via a short motorway grade spur from the M56. The M56 continues west from the airport towards Manchester City and East towards Liverpool and the M6. There is also a dual carriageway heading southwest from the airport entrance, however this road narrows to single carriageway less than 600 metres from the airport entrance.

The airport is connected by national rail services (with 20 minute travel times to central Manchester) as well as by the Manchester Metrolink, which provides a connection to Manchester’s suburban tram network.

Coach services are provided by National express, which operates an extensive network from the airport. There are local buses from the airport serving Manchester and its suburbs.

A.1.4. Network ownership

The airport has SRN access practically to the terminal. However, the last section of the M56 from Thorley Lane to the Terminal 1 roundabout is not on land owned by Highways England. There are no other gaps in Highways England's network within 5km but a number of junctions on the M60 are not owned by Highways England.

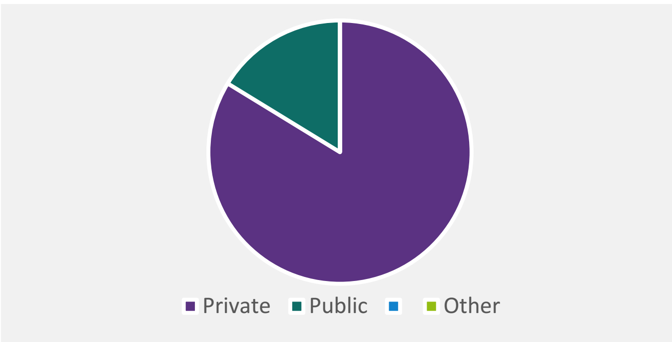


A.1.5. Demand analysis

Yearly airport usage based on CAA 2014 figures

Type	Total
Passenger Arrivals / Departures	20.9m pax p.a.
Freight	93,465 tonnes p.a.
Equivalent Vehicles	6,714

Overall Mode Share accessing Manchester Airport



Mode share by region

Region	Private %	Public %	Other %	Total Pax 000s
East Midlands	84.3	15.7	0	797
East of England	63.7	36.3	0	31
North East	64.3	35.7	0	461
North West	86.9	12.7	0.4	12,773
Scotland	64.5	35.5	0	364
South East	59.2	40.8	0	70
South West	85.0	15	0	69
Wales	92.4	7.6	0	849
West Midlands	91.6	8.4	0	1,250
Yorkshire And Humber	73.4	26.6	0	4,274
Total	83.5	16.2	0.2	20,938

Journey purpose (percentage)

Airport	International business		International leisure		Domestic business		Domestic leisure	
	UK	Foreign	UK	Foreign	UK	Foreign	UK	Foreign
Manchester	7.9%	4.9%	63.5%	12.3%	4.5%	0.6%	5.5%	0.9%

A.1.6. Future development

Airport City:

- The Manchester LEP is backing the Manchester Airport City expansion, which represents a £800 million investment in the airport. The City will include new on-site logistics, manufacturing, office and leisure facilities and will be the first airport city in the UK. The site is one of the largest property developments in the UK.
- The area has been designated as an enterprise zone by the government, and therefore benefits from reduced business rates.

Growth:

- According to the Airport's Master Plan 2030, it expects passenger numbers to increase by 4 – 6% per annum to 50m by 2030. The airport expects to see large increases in employment and has reserved an additional 40 hectares of land to cope with growth.

A.1.7. Future schemes

A6 to Manchester Airport Relief Road

Work has begun on a new dual carriageway link from the A6 at Hazel Grover to the M56 at Manchester Airport (using the A555 dual carriageway). This will provide a new east – west route, linking the airport to towns south of Greater Manchester.

A.1.8. Economic impact

The Airport City project is expected to contribute 10,000 jobs to the local economy and a £350m of additional GVA per annum.

A.1.9. Access/connectivity issues

The Table below shows journey time variability for the surface access networks and examines the performance on the 'last mile' and is based upon a comparison of free flow conditions to conditions during peak times of general traffic demand. This is measure using the Planning Time

Index, representing the relationship between free flow time and the slowest journeys and is considered as a measure of reliability, where a value of 2.50 means that for a 30 minute trip in light traffic, 75 minutes should be planned 'Last Mile' journey time variability at the case study gateways.

For Manchester, some movements have a PTI greater than 2 and indicate a high degree of journey time variability.

Name	Direction	Length (m)	Average PTI	Weekday time (m)	AM Time (m)	PM Time (m)	Free flow Time (m)
Manchester Airport	East	4,929	2.2	3.71	4.17	4.28	2.63
	North	4,225	2.7	3.30	2.99	4.95	2.25
	South	4,199	1.6	2.72	2.64	3.14	2.24
	West	4,859	1.4	2.86	2.77	3.23	2.59

Google Maps shows peak time traffic congestion issues on the M56 motorway servicing the airport as well as on Ringway road, which provides access from the south.

Airport to M50 EB	M50 WB to Airport	Airport to M50 WB	M50 EB to Airport
9 - 18 mins AM peak	5 - 8 mins AM Peak	7 - 14 mins AM peak	5 - 7 mins AM Peak
16 - 26 mins PM Peak	6 - 10 mins PM peak	7 - 12 mins PM Peak	6 - 10 mins PM peak
6 mins free flow	5 mins free flow	6 mins free flow	5 mins free flow

Journey times based on typical journey time data from Google Maps, using Thursday 8:30 for AM Peak, 17:30 for PM peak and 01:00 for free flow hours. The below maps show the routes used for calculations.

The airport's strategic plan forecasts increased car journeys to the airport in the years to 2030.

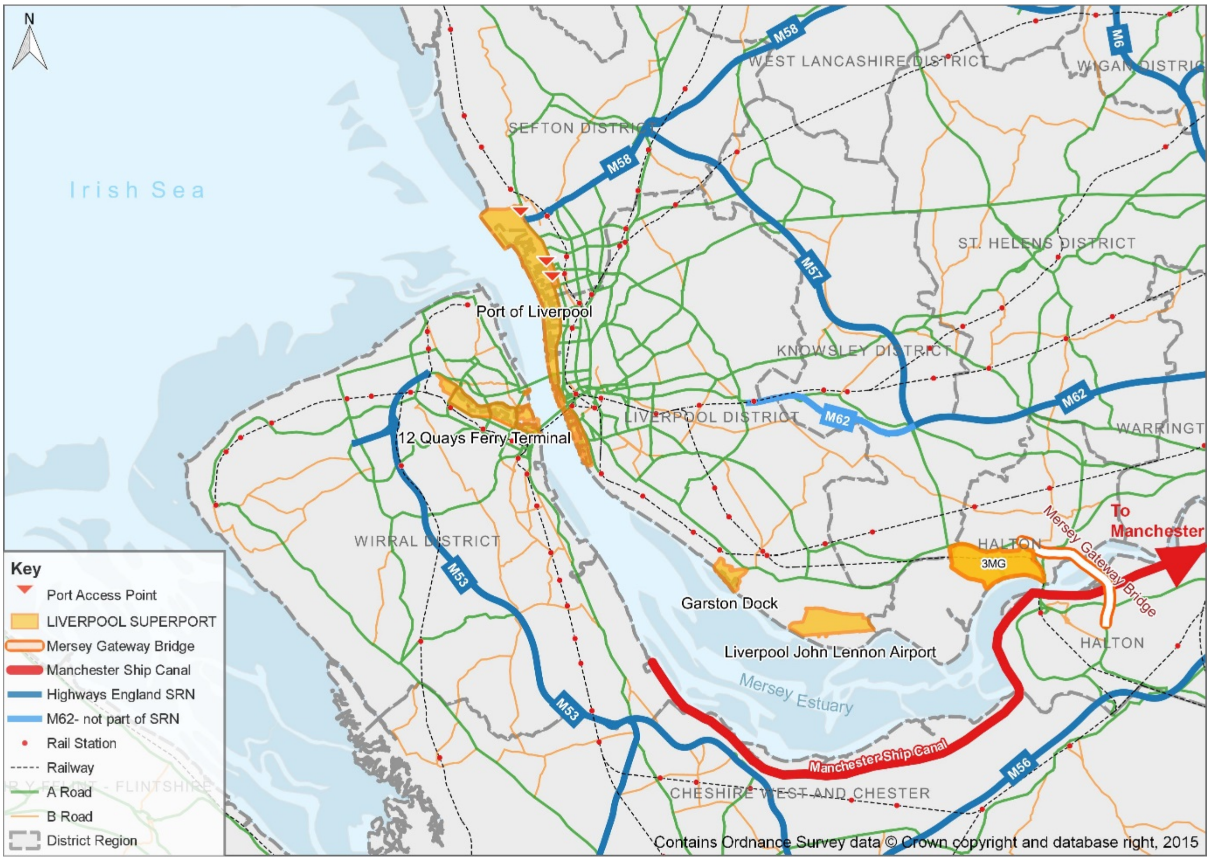
A.1.10. H&S/Accident/Environmental data

No AQMAs listed

A.2. Port of Liverpool

A.2.1. Location

Port of Liverpool is located at the western end of Liverpool. It is remote from the core SRN, with largely urban network access.



A.2.2. Overview

Owned Peel Ports - The Port of Liverpool handles automotive, container, cruise, energy, Forest, Liquid Bulk, Metal, and RoRo shipping. The port is undergoing a major expansion, with a new deep water facility for container shipping.

A.2.3. Access

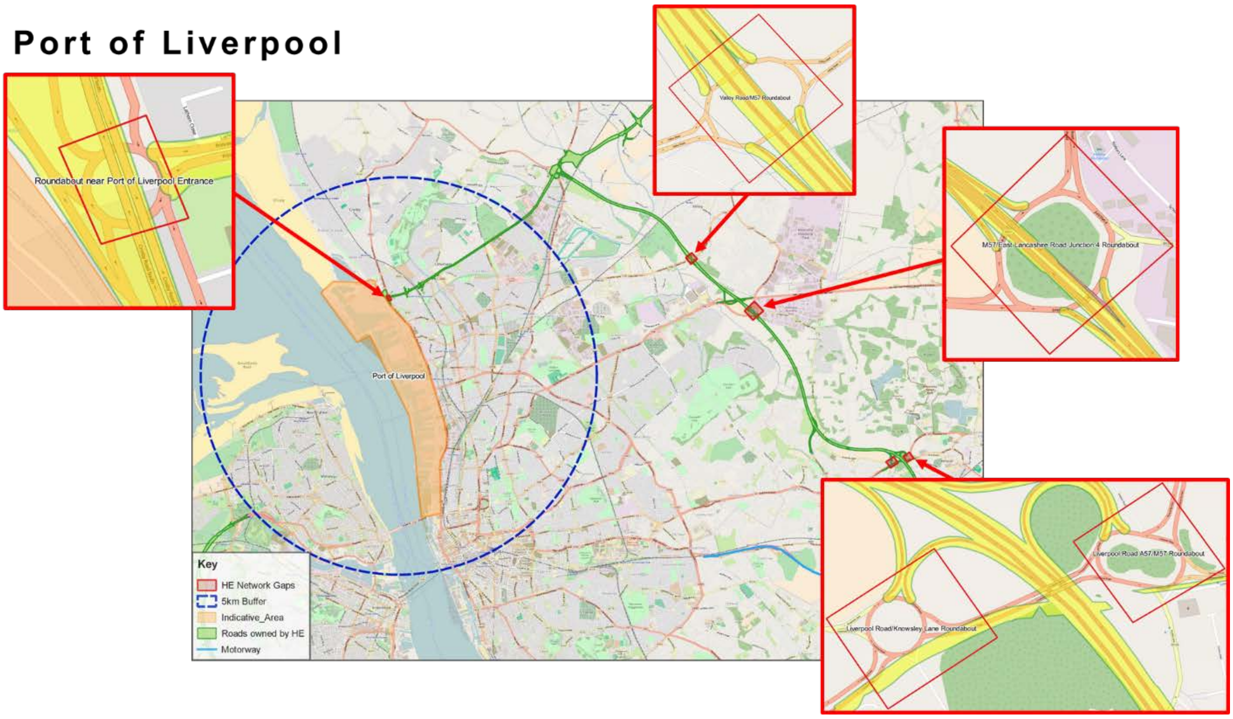
The Port is surrounded by the city of Liverpool, dual carriageway access is provided from the west by the A5036 and from the north and south by the A565. The A5036 dual carriageway connects directly to the motorway network at the M58 / M57 junction.

It is possible to connect to the motorway network using the A565, the road becomes single carriageway to the north and south of the port for short stretches. To the south of the port the M53 can be accessed via the A59 Kingsway Tunnel.

As part of the Liverpool2 expansion, there will be a new integrated rail terminal to handle increased demand for container transportation.

A.2.4. Network ownership

The port has SRN access practically to the terminal. However, the roundabout on the port end of Princess Way is not on land owned by Highways England. There are no other gaps in Highways England's network within 5km but a number of junctions on the M57 are not owned by Highways England. Furthermore M62 west of M57 in Liverpool is not part of highways England's network.



A.2.5. Operations and demand analysis

- **All traffic**: 30,996,000 tonnes pa (2014)
- **Foreign/Domestic**: 26,380,000/4,616,000
- **Passengers:** 124,000 pa (2014)

Table shows yearly port usage based on Department for Transport 2014 figures.

Cargo type	Thousands of tonnes p.a.	Equivalent vehicles	% of UK total
All liquid bulk traffic	10,572	759,508	6%
All dry bulk traffic	7,564	543,368	6%
All bulk traffic	18,136	1,302,876	6%
All other general cargo traffic	957	68,736	5%
All container traffic	4,852	348,570	8%
All ro-ro self-propelled traffic	2,272	163,189	7%
All ro-ro non self-propelled traffic	4,779	343,343	
All traffic	30,996	2,226,714	6%
Passengers	120,000 pax p.a.		1%

A.2.6. Future development

Liverpool2

Liverpool2 is a new deep water container terminal, which will be able to accommodate 95% of the world's global container vessel fleet. Peel Ports hopes it will empower Liverpool to become the UK's container gateway and transhipment hub for Ireland.

A.2.7. Future schemes

A5036 Port of Liverpool access:

- Highways England is currently consulting on the best way to improve access to Liverpool Port and ease congestion on the A5036. The project is at an early stage and may involve either junction improvements or a relief road.

Liverpool2:

- Liverpool2 will feature a new rail terminal, with 10 departing freight services per day.

A.2.8. Economic impact

The Superport scheme (of which Liverpool2 forms part) predicts a total GVA uplift of £18.2bn and an additional 30,000 jobs by 2030.

A.2.9. Access/connectivity issues

The Table below shows journey time variability for the surface access networks and examines the performance on the 'last mile' and is based upon a comparison of free flow conditions to conditions during peak times of general traffic demand. For Port of Liverpool, some movements have a PTI almost 2 and indicate a high degree of journey variability.

Name	Direction	Length (m)	Average PTI	Weekday time (m)	AM Time (m)	PM Time (m)	Free flow Time (m)
Port of Liverpool	East	4,812	1.9	5.28	5.21	5.69	5.09
	West	4,864	1.8	5.54	6.33	5.20	5.17

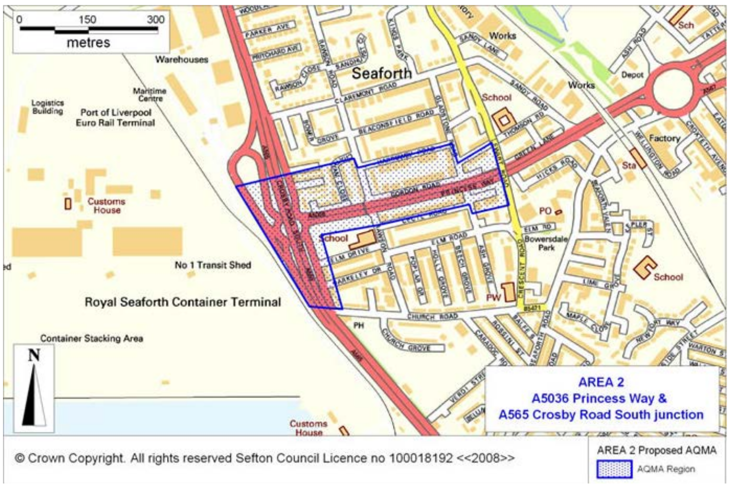
Google Maps shows peak time traffic congestion issues to and from the Port.

Port entrance to M62	M62 to Port entrance	Port entrance to M53	M53 to Port entrance
18 - 28 mins AM peak	20 - 35 mins AM Peak	18 - 28 mins AM Peak	18 - 26 mins AM Peak
20 - 30 mins PM Peak	20 - 30 mins PM peak	18 - 28 mins PM peak	18 - 26 mins PM peak
18 – 24 mins Free flow	20 mins Free flow	18 mins Free flow	16 mins Free flow

Journey times based on typical journey time data from Google Maps, using Thursday 8:30 for AM Peak, 17:30 for PM peak and 01:00 for free flow hours. The below maps show the routes used for calculations.

A.2.10. H&S/Accident/Environmental data

AQMA 2 (Sefton Metropolitan Borough Council). An area encompassing Princess Way A5036 from the Ewart Road flyover up to and including the Roundabout and flyover at the junction with Crosby Road South A565:



Declared due to high NO2 and PM10 readings.

A.3. Port of Dover

A.3.1. Location

Port of Dover is located at the eastern end of Dover. It is remote from the core SRN, with largely rural network access.

A.3.2. Overview

Owned by the Dover Harbour - The Port of Dover is a major role on role off port connecting the UK to mainland Europe. The Port also functions as a passenger ferry terminals for ferries to France.

The South East LEP has committed to investment to allow for port expansion at Dover, including new cargo handling facilities as well as announcing junction improvements on the A20 to cope with growth at the port.

A.3.3. Access

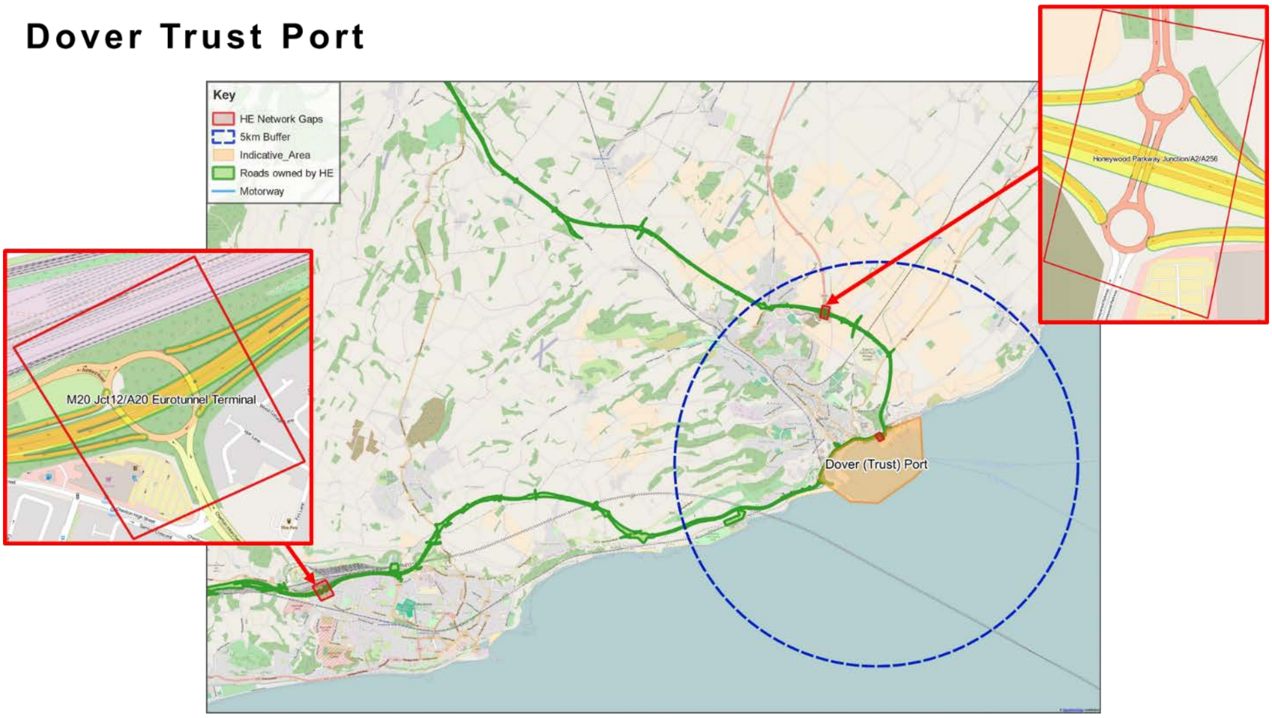
The Port is served by the A20 dual carriageway and the A2 trunk route. Both roads serve port entrances directly at roundabout junctions. The A20 continues toward the west where is becomes the M20 (at Folkestone), connecting to the main motorway network via the M25.

The section of the A2 connecting to the port has a 2+1 configuration, with two lanes northbound and one lane southbound. The road alternates between single and dual carriage way until it joins the motorway network at the M2.

A.3.4. Network ownership

The port has SRN access practically to the terminal. However, the roundabout on A2/A256 junction is not part of highways England's network. The M20 J12 roundabout is also not part of Highways England's network.

Dover Trust Port



A.3.5. Operations and demand analysis

- **All traffic**: 27,605,000 tonnes pa (2014)
- **Foreign/Domestic**: 27,605,000/nil

Table shows yearly port usage based on Department for Transport 2014 figures.

Cargo type	Thousands of tonnes p.a.	Equivalent vehicles	% of UK total
All liquid bulk traffic	-	0	-
All dry bulk traffic	15	1,072	-
All bulk traffic	15	1,072	-
All other general cargo traffic	303	21,771	1%
All container traffic	-	-	-
All ro-ro self-propelled traffic	26,764	1,922,686	27%
All ro-ro non self-propelled traffic	523	37,600	
All Freight traffic	27,605	1,983,129	6%
Passenger Traffic	13,286,000 pax p.a (Ferry) 95,000 pax p.a. (Cruise)		62% Ferry 5% Cruise

A.3.6. Future development

The Port of Dover is investing in the Western Docks development. This development will include new berthing for small boats, but also new logistics and cargo handling facilities – adding to the road capacity requirements of the port.

A.3.7. Future schemes

A20 Junction improvements

- In order to facilitate port redevelopment, junction improvements are being carried out on the A20. Two roundabouts will be replaced with smart traffic lights in order to improve the flow of traffic. The scheme is being delivered through a partnership between Dover District Council and the Port of Dover. The work is due to be completed by December 2016.

A.3.8. Access/connectivity issues

The port is heavily focused on ro-ro operations, which can lead to severe traffic problems in times of disruption to ferry crossings from the port. This leads Kent police to initiate Operation Stack on the M20, which has knock on negative impacts on the whole area.

Various lorry parking proposals have been made to replace operation stack, which would ease the congestion problems during port disruption. The current £250m proposal for lorry parking is some 23km from the port.

Alternative suggestions to the lorry park have included widening, through dualing the remaining single carriageway parts of the A2 (maintained by Highways England as far as the junction with the M2) to offer an alternative route, although there are no current plans to do this listed by Highway's England.

The Table below shows journey time variability for the surface access networks and examines the performance on the 'last mile' and is based upon a comparison of free flow conditions to conditions during peak times of general traffic demand. For Dover, some movements have a PTI almost 2 and indicates a high degree of journey time variability.

Name	Direction	Length (m)	Average PTI	Weekday time (m)	AM Time (m)	PM Time (m)	Free flow Time (m)
Dover Port	East	1,075	1.8	0.88	0.83	0.88	1.11
	West	1,029	1.8	0.81	0.84	0.78	1.03

Google Maps shows peak time traffic congestion issues to and from the Port.

Port entrance to M20	M20 to Port entrance	Port entrance to M2	M2 to Port entrance
10 - 12 mins AM peak	16 – 20 mins AM Peak	24 - 25 mins AM Peak	30 - 40 mins AM Peak
12 mins PM Peak	18 mins PM peak	30 mins PM peak	35 mins PM peak
10 mins free flow	16 mins free flow	24 mins free flow	30 mins free flow

Journey times based on typical journey time data from Google Maps, using Thursday 8:30 for AM Peak, 17:30 for PM peak and 01:00 for free flow hours. The below maps show the routes used for calculations.

A.3.9. H&S/Accident/Environmental data

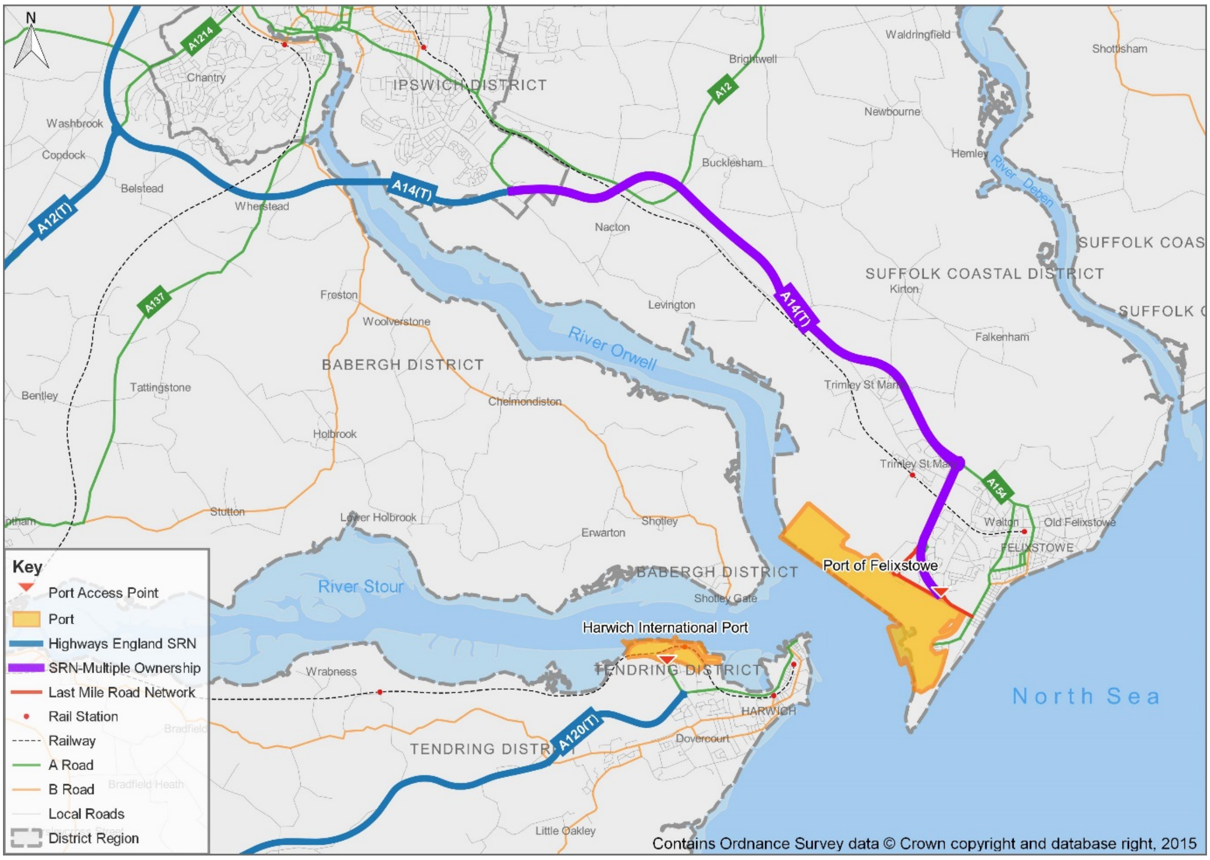
A20 AQMA Dover and Dover Docks AQMA:

Two AQMAs in the vicinity of Dover Port, one covering the port itself and surrounding residences and one covering the A20 approach road to the docks. Both are caused by high levels of NO_2, with the Dover Docks AQMA emissions explained as shipping emissions.

A.4. Port of Felixstowe & Port of Harwich

A.4.1. Location

Port of Felixstowe is located at the west of Felixstowe whilst the Port of Harwich is just outside of Harwich. It is remote from the core SRN, with largely rural network access.



A.4.2. Overview

Owned by Hutchison Port Holdings Limited - The Port of Felixstowe is the largest container port in the UK. It is a major centre for goods entering the "golden triangle" area of the midlands which hosts much of the country's major distribution centres.

Harwich Port, also owned by Hutchison, is located across the estuary from Felixstowe. The port caters largely to ro-ro ferry services.

A.4.3. Access

The A14 Dual carriageway provides direct access, the A14 meets the port entrance at an uncontrolled roundabout. The A14 continues west providing access to the A12 for southbound movements and the M11 further to the west.

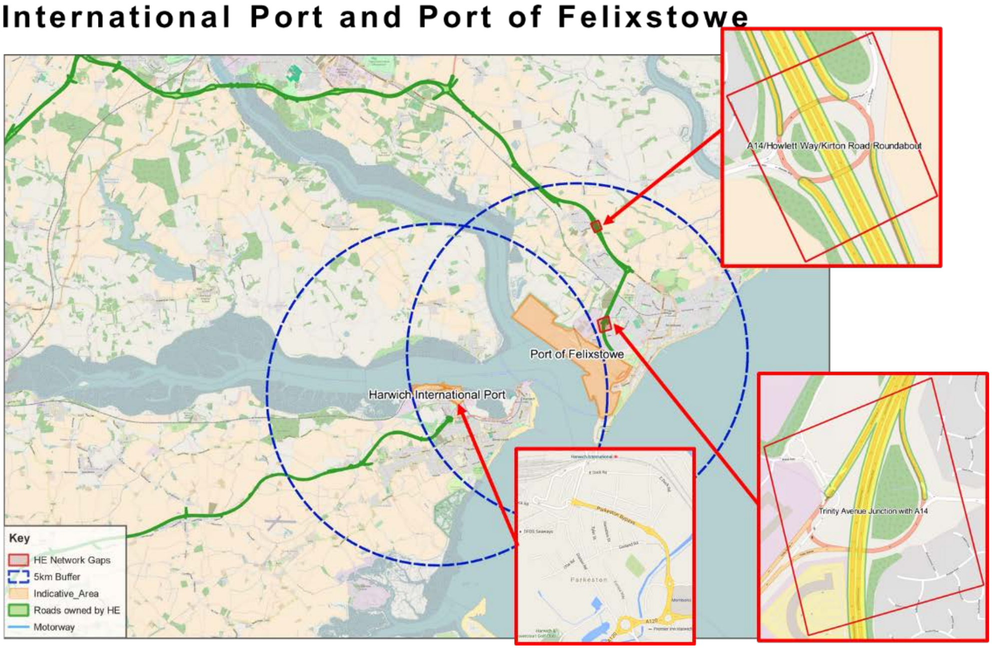
Felixtowe has extensive rail connections, with 62 daily arrivals and departures operated by three firms, DB Schenker Rail (UK) Ltd, Freightliner Ltd and GB RailFrieght. There are direct connections to 16 destinations within the UK.

Harwich is accessed via the A120, which continues as a single carriageway road for approximately 7 miles before becoming a dual carriageway.

A.4.4. Network ownership

The port of Felixstowe has SRN access to the terminal and there are two roundabouts at junctions on the A14 within 5km of Felixstowe that are not part of Highways England's network. The last 1km to the Port of Harwich as Local Authority network.

Harwich International Port and Port of Felixstowe



A.4.5. Operations and demand analysis

- **All traffic**: 28,127,000 tonnes pa (2014)
- **Foreign/Domestic**: 27,292,000/835,000

Table shows yearly port usage at **Felixstowe** based on Department for Transport 2014 figures.

b	Thousands of tonnes p.a.	Equivalent vehicles	% of UK total
All liquid bulk traffic	56	4,054	-
All dry bulk traffic	-	-	-
All bulk traffic	56	4,054	-
All other general cargo traffic	4	304	-
All container traffic	9,112	1,803,306	41%
All ro-ro self-propelled traffic	136	9,778	3%
All ro-ro non self-propelled traffic	2,828	203,166	
All traffic	28,127	2,020,608	6%

Table shows yearly port usage at **Harwich** based on Department for Transport 2014 figures.

Cargo type	Thousands of tonnes p.a.	Equivalent vehicles	% of UK total
All liquid bulk traffic	461	33,142	-
All dry bulk traffic	62	4,419	-
All bulk traffic	56	37,561	-
All other general cargo traffic	171	12,256	1%
All container traffic	7	536	-
All Ro-Ro	3,187	228,985	3%
All traffic	3,888	279,339	1%
Harwich Passengers	672,000 pax p.a. Ferry 120,000 pax p.a cruise		3% Ferry 7% Cruise

A.4.6. Future development

Port Expansion

Hutchinson Ports plans to expand the port, including dredging to allow access to more of the port for some of the World's largest container ships and the construction of a large logistics park to the North of the port.

Hutchinson has plans to build container facilities across the estuary from the main port at Harwich. This will generate additional container capacity and involve improvement works on ten kilometres of the A120 trunk road, which services the town and port.

A.4.7. Future schemes

RIS Scheme: A12 widening

- The A12 is a major trunk road from London to Suffolk. Highways England plans to widen the section between Chelmsford and the A120, which should improve port accessibility to and from the South East.

Harwich container port

- As part of the new port scheme 10 km of improvements to the A120 are proposed.

A.4.8. Access/connectivity issues

The Port is relatively remote from the Motorway, but with A14 providing dual carriageway (albeit no hard shoulder) access to port entrance, accessibility is generally good.

The issue is with resilience – only one route from port. Port very vulnerable to any issue with the Orwell Bridge. Proposals in the past for an Ipswich northern bypass would have added resilience, but not progressed. Orwell Bridge is approaching capacity – no alternative route other than through Central Ipswich.

Harwich has more of an issue with peaks, with nature of ferry arrivals. The Port operates a 'stack' system. This is implemented, for instance, at times of high winds. Stack is implemented relatively infrequently.

The Table below shows journey time variability for the surface access networks and examines the performance on the 'last mile' and is based upon a comparison of free flow conditions to conditions during peak times of general traffic demand. For Port of Felixstowe, movements have a PTI greater than 1.5.

Name	Direction	Length (m)	Average PTI	Weekday time (m)	AM Time (m)	PM Time (m)	Free flow Time (m)
Port of Felixstowe	North	2,681	1.5	1.78	1.75	1.81	1.56
	South	2,870	1.5	1.88	1.90	1.87	1.67

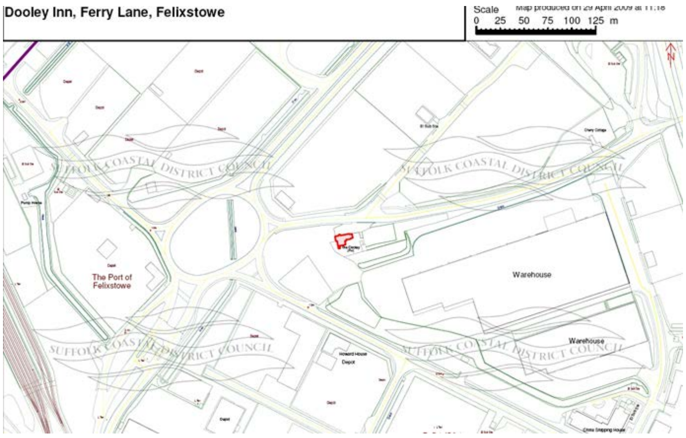
Google Maps shows peak time traffic congestion issues to and from the Port.

Felixstowe to M11	M11 to Felixstowe	Harwich to A12	A12 to Harwich
65 - 85 mins AM peak	65 - 85 mins AM peak	22 - 24 mins AM peak	22 mins AM peak
65 - 85 mins PM Peak	75 - 100 mins PM Peak	24 mins PM Peak	22 mins PM Peak
65 mins free flow	65 mins free flow	20 mins free flow	22 mins free flow

Journey times based on typical journey time data from Google Maps, using Thursday 8:30 for AM Peak, 17:30 for PM peak and 01:00 for free flow hours. The below maps show the routes used for calculations.

A.4.9. H&S/Accident/Environmental data

AQMA Dooley Inn, Ferry Lane, Felixstowe. Declared due to high NO_2 levels caused by industry and transport.

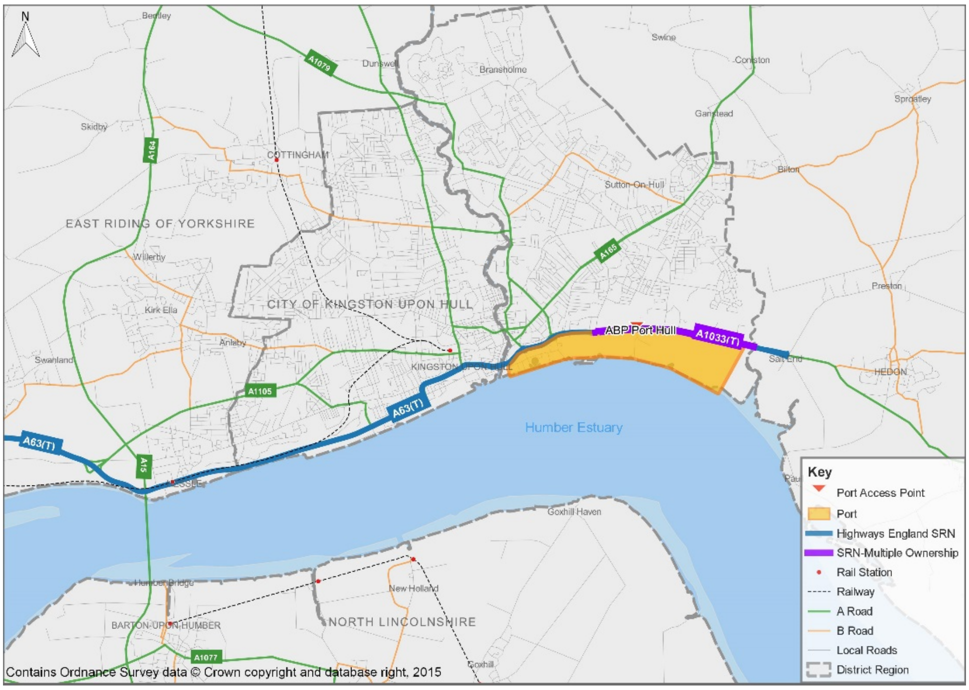


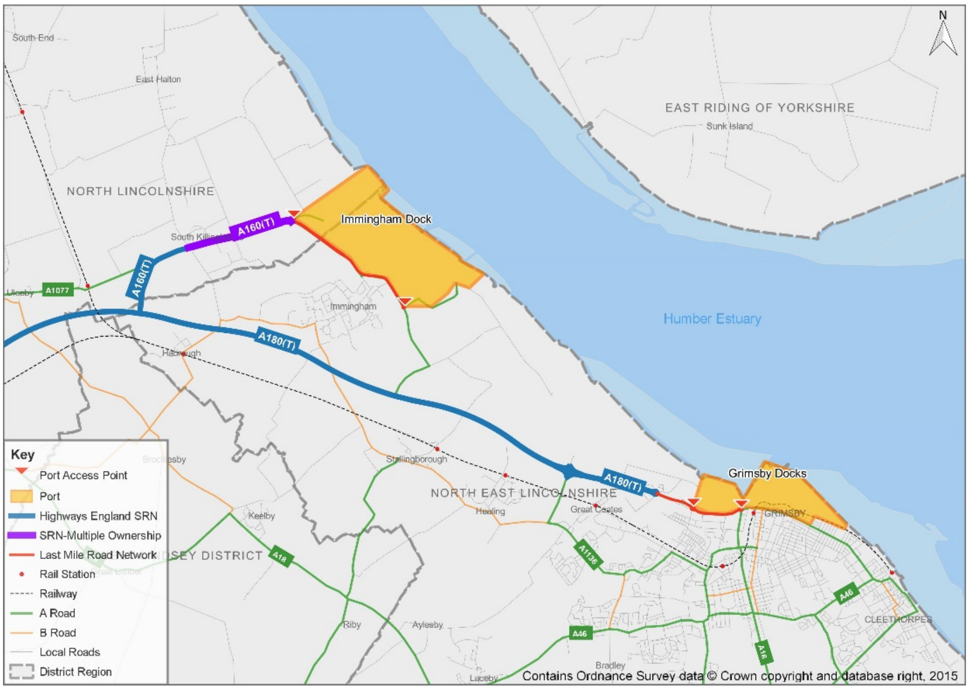
Refers to the general area around the Dooley Inn (above).

A.5. Hull, Immingham & Grimsby

A.5.1. Location

The Port of Hull is located at the east of Hull on the northern side of the Humber Estuary. The port of Immingham is on the southern side of estuary approximately 12km downstream and the port of Grimsby is a further 12km downstream. They are remote from the core SRN, with largely rural network access.





A.5.2. Overview

Associated British Ports owns three ports on the Humber Estuary; Hull, Immingham and Grimsby. The ports handle containers, roro, ferries, and specialises in handling forest products and a range of other bulk commodities.

A.5.3. Access

Hull port can be directly accessed by the A63 dual carriageway, the dual carriageway continues west from the Southcoates roundabout as the A1033, which can be used to access Eastern sections of the port. The A63 continues east as a dual carriageway until it meets the motorway network at the M62. The motorway network can also be accessed to the south using the Humber Bridge / A15 dual carriageway which connects to the M180.

The A180 is the main access route for both Immingham and Grimsby docks, with the A160 providing a duelled spur to Immingham as far as the last roundabout before the port entrance. The road continues as single lane until the port. The A180 provides dual carriageway access to a roundabout roughly 350 meters from the entrance to Grimsby docks. The A180 connects to the A15 and M180 as above.

Immingham port has freight rail connections, with 260 rail freight movements per week from the port.

A.5.4. Operations and demand analysis

- All traffic Immingham and Grimsby: 59,370,000 tonnes pa (2014)
- All traffic Hull: 10,925,000 tonnes pa (2014)
- Foreign/Domestic Immingham and Grimsby: 53,418,000/5,952,000
- Foreign/Domestic Hull: 10,782,000/142,000
- Passengers:
- Hull: 929,000 pa (2014)
- Grimsby and Immingham: 89,000 pa (2014)

Table shows yearly port usage based on Department for Transport 2014 figures.

Immingham and Grimsby

Cargo type	Thousands of tonnes p.a.	Equivalent vehicles	% of UK total
All liquid bulk traffic	20,851	1,497,944	11%
All dry bulk traffic	21,320	1,531,582	17%
All bulk traffic	42,171	3,029,526	14%
All other general cargo traffic	951	68,295	4%
All container traffic	1,459	104,826	2%
All ro-ro self-propelled traffic	2,643	189,898	15%
All ro-ro non self-propelled traffic	12,146	872,542	
All traffic	59,370	4,265,087	12%
Passengers	89,000 pax p.a .(2014)		0.4%

Hull

Cargo type	Thousands of tonnes p.a.	Equivalent vehicles	% of UK total
All liquid bulk traffic	1,689	121,308	1%
All dry bulk traffic	3,603	258,866	3%
All bulk traffic	5,292	380,174	2%
All other general cargo traffic	1,519	109,138	7%
All container traffic	1,426	102,477	2%
All ro-ro self-propelled traffic	726	52,165	3%
All ro-ro non self-propelled traffic	1,961	140,870	
All traffic	10,925	784,824	2%
Passengers	929,000 pax p.a. (2014)		4%

A.5.5. Future development

Green Port Hull:

- Green Port Hull is a plan supported by the local LEP to make Hull into a centre for offshore wind energy. The plan will see additional manufacturing opportunities around Hull and additional demand on the Port.
- The plan includes the creation of Enterprise Zones around Hull and a total programme investment of £500 million.

A.5.6. Future schemes

A63 Castle Street Improvement

- Highways England is currently planning to upgrade a 1.5km stretch of the A63 through Hull, which leads to the Port of Hull. The investment will include a new overpass junction.
- The scheme's purpose is expressly stated as improving vehicular access to the Port of Hull.
- The current planned start date is March 2017.

A.5.7. Economic impact

- The Green Port Hull scheme is expected to increase the GVA contribution of the port by £300m pa, and the up-skilling of 1,900 local employees.

A.5.8. Access/connectivity issues

The Table below shows journey time variability for the surface access networks and examines the performance on the 'last mile' and is based upon a comparison of free flow conditions to conditions during peak times of general traffic demand. For Immingham Port, some movements have a PTI greater than 2, indicating significant journey time variability. At Grimsby and Hull the journey time variability is lower, although at Hull the average speed of the last mile is slower as it is through an urban area.

Name	Direction	Length (m)	Average PTI	Weekday time (m)	AM Time (m)	PM Time (m)	Free flow Time (m)
Grimsby Port	East	1,970	1.5	1.30	1.32	1.34	1.09
	West	1,979	1.4	1.26	1.23	1.25	1.08
Hull Port	East	5,297	1.6	5.25	5.00	5.71	4.94
	West	5,283	1.5	5.25	5.72	5.02	4.92
Immingham Port	East	3,249	1.8	2.74	2.85	2.69	2.02
	North	1,173	2.3	1.03	1.15	0.97	0.81
	South	1,168	1.4	0.97	0.97	0.97	0.83
	West	3,254	1.8	2.76	2.73	2.86	2.02

Google Maps shows peak time traffic congestion issues to and from the Port.

Immingham to M180	M180 to Immingham	Hull to M180	M180 to Hull	Grimsby to M180	M180 to Grimsby
14 -16 mins AM peak	12 - 16 mins AM Peak	28 -45 mins AM peak	30 -50 mins AM peak	18 -22 mins AM Peak	18 - 24 mins AM Peak
14 – 18 mins PM Peak	14 mins PM peak	30 – 45 mins PM Peak	28 -40 mins PM Peak	18 -22 mins PM peak	18 - 20 mins PM peak
14 mins overnight	12 mins overnight	28 mins overnight	26 mins overnight	18 mins overnight	18 mins overnight

Journey times based on typical journey time data from Google Maps, using Thursday 8:30 for AM Peak, 17:30 for PM peak and 01:00 for free flow hours. The below maps show the routes used for calculations.

A.5.9. H&S/Accident/Environmental data

Hull AQMA No. 1(A):

- This AQMA covers the area around the Port of Hull and Hull city centre. The AQMA is a result of high levels of NO2 emissions (no map provided).
- Location: An area of the City Centre bordered to the west by Coltman Street, Hessle Road and Strickland Street, to the north by Anlaby Road, Carr Lane, Whitefriargate, Scale Lane and Silver Street, and the south and east by the Rivers Humber and Hull respectively.

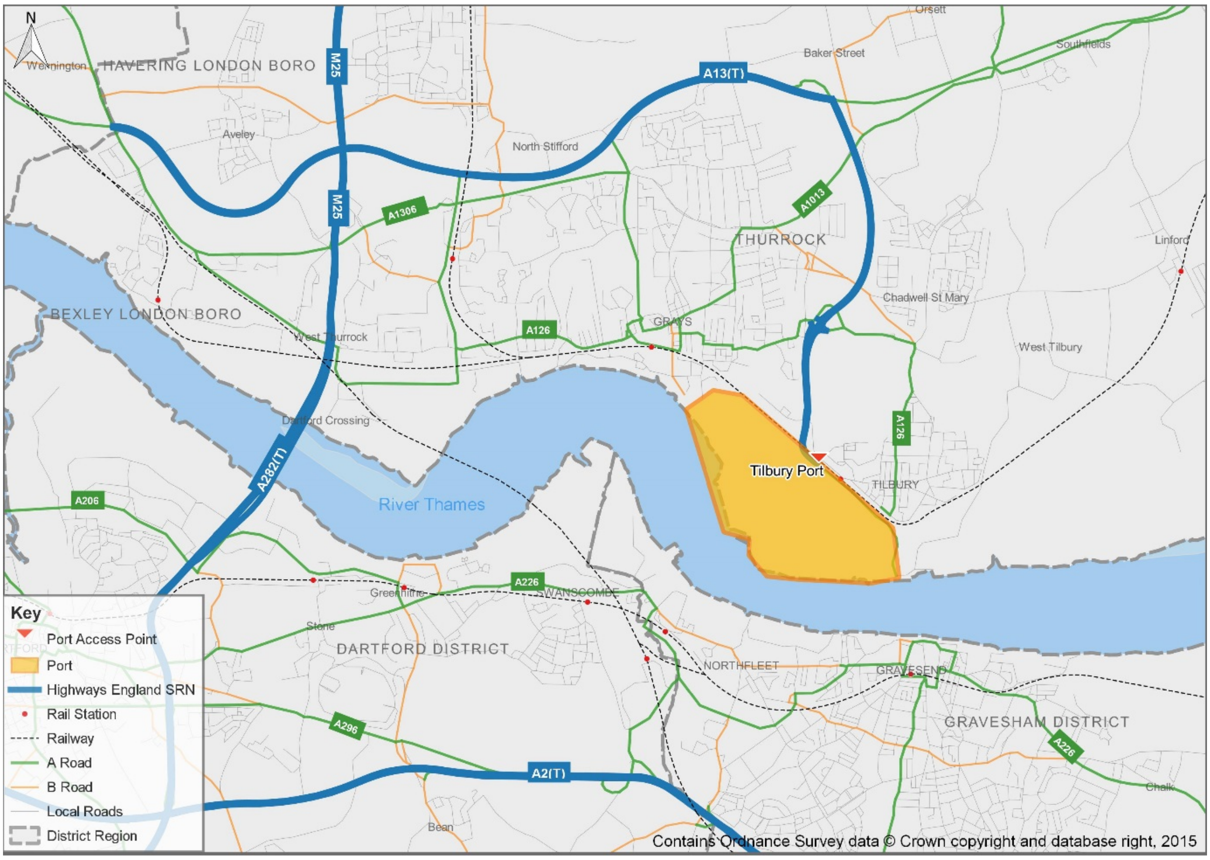
Immingham AQMA:

- The Immingham AQMA is located roughly 300 metres from the Port boundary on King's Road. The road does not provide a main route to the trunk road network so it is not clear how much affect port traffic would have on emissions in the area.

A.6. Port of Tilbury

A.6.1. Location

The Port of Tilbury is located at the east of Tilbury on the northern side of the Thames. They are close to the core SRN.



A.6.2. Overview

Owned by Forth Ports - The Port of Tilbury is London's major port, handling the full range of cargoes with specialist expertise in the handling of paper and forest products, containers & Ro Ro, grain and bulk commodities and construction and building materials.

The South East area LEP identifies Tilbury Port as a key component of the area's current importance as a logistic hub for London. The LEP identifies logistics as a growth area with 1,200 jobs expected to be created as a result of expansion at the port.

A.6.3. Access

- A1089 provides direct access, on dualled road as far as the entrance to the port in the north of complex.
- A1089 connects to A13 and then M25 at J30.
- Freightliner operates five daily freight rail services from the port serving Birmingham, Bristol, Coatbridge, Felixstowe, Leeds, Liverpool and Manchester.

A.6.4. Operations:

All traffic: 16 million tonnes pa (2014)

Table shows yearly port usage for Tilbury Ports based on the Port's Handbook for 2016 publication:

Cargo type	Yearly amounts
Paper and Forest Products	3.5m tonnes p.a.
Recycled products	2m tonnes p.a.
Grain	1.4m tonnes p.a.
Containers	500,000 containers p.a.
Cruise passengers	100,000
All cargo traffic	16 Million Tonnes

A.6.5. Future development

LEP: The South East LEP Growth Deal and Strategic Economic Plan identifies the south of the region as a hub of freight transport and logistics, with both Tilbury and DP World located in the area. The LEP predicts growth at both ports and in the wider logistics industry, including 1,200 extra jobs at Tilbury.

Port Expansion:

- Forth Ports has purchased land adjacent to the port formally occupied by the Tilbury power station. The expansion on the site will represent a 25% increase in the port's size.
- London Distribution Park is currently nearing completion on a 70 acre site on the other side of the A1089 from the port. The site is accessed from the roundabout to the north of the main port entrance.

A.6.6. Future schemes:

- **RIS Scheme: M25 Junction 30** – Comprehensive expansion of the junction between the M25 and A13, including the introduction of free-flowing links for traffic from the southbound M25 to the eastbound A13.
- **DP World Port -** The port is opening in phases and will provide additional port capacity in the area.

A.6.7. Access/connectivity issues

The Port is accessed via the A1089, providing direct access to the site gate. Alternative routes are not viable due to circuitous route, on smaller class roads and therefore do not exist. The A1089 over the rail bridge is a bottle neck.

Last mile is regarded as being the Dartford Crossing. Delays to Southbound traffic can block the A13 access to the M25 which can block the A1089. The key issue is the M25 – it is a strength in terms of location but a problem as there is a lot of traffic with which the port traffic has to merge

Mainly road connectivity, although there is some open access rail (>2 trains / day).

The Table below shows journey time variability for the surface access networks and examines the performance on the 'last mile' and is based upon a comparison of free flow conditions to conditions during peak times of general traffic demand. For Tilbury, movements have a PTI greater than 1.6.

Name	Direction	Length (m)	Average PTI	Weekday time (m)	AM Time (m)	PM Time (m)	Free flow Time (m)
Tilbury Port	North	1,933	1.6	1.33	1.30	1.35	1.45
	South	1,873	1.6	1.33	1.36	1.31	1.36

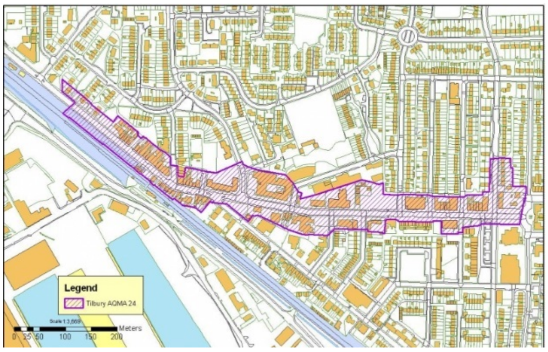
Google Maps shows peak time traffic congestion issues to and from the Port.

Port to M25	M25 to Pory
14 – 30 Mins AM Peak	10 – 14 Mins AM Peak
12 – 22 Mins PM Peak	10 – 14 Mins PM Peak
12 mins free flow	10 mins free flow

Journey times based on typical journey time data from Google Maps, using Thursday 8:30 for AM Peak, 17:30 for PM peak and 01:00 for free flow hours. The below maps show the routes used for calculations.

A.6.8. H&S/Accident/Environmental data

AQMA 24 Tilbury Dock Road, Calcutta Road part of St Chads Road, Tilbury. Declared in Nov 2014 due to high NO2 levels.

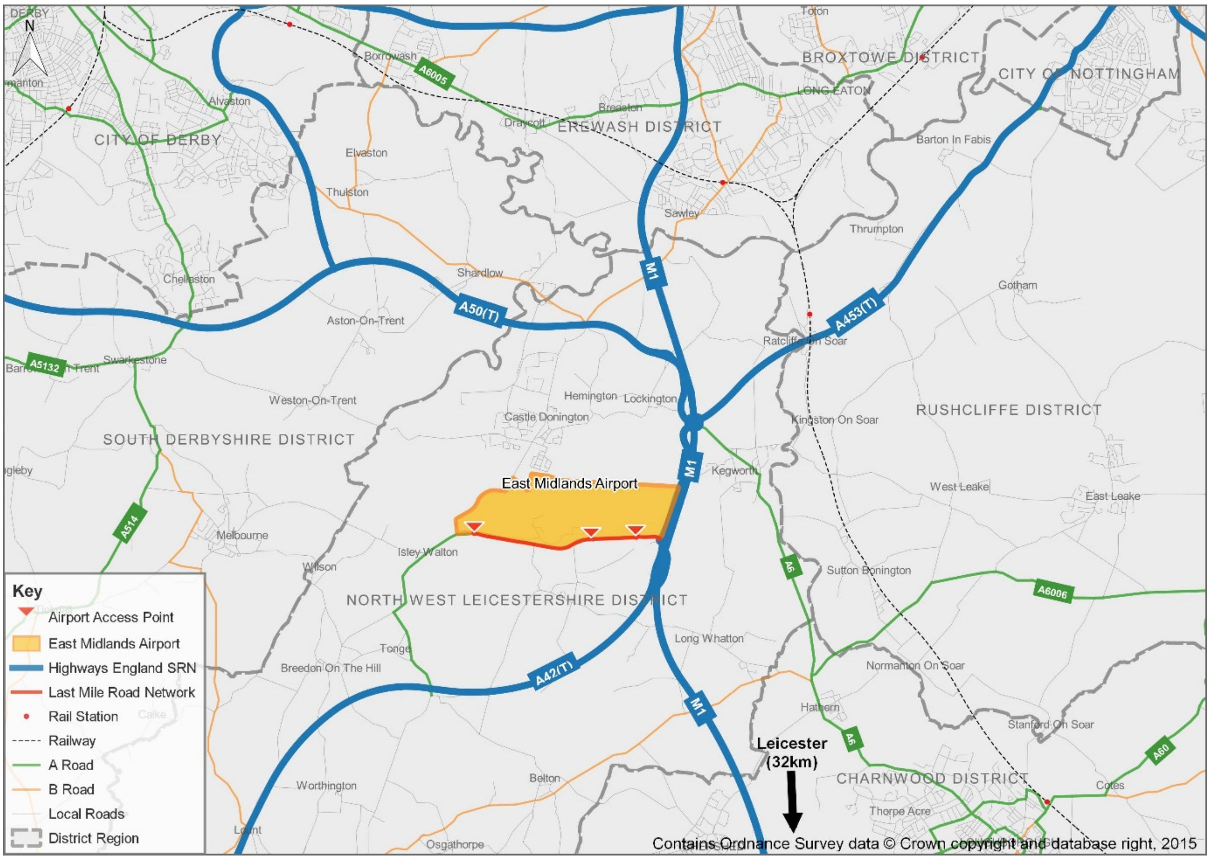


However this appears to be immediately after the turn off for the Port and therefore may not be caused by port traffic.

A.7. East Midlands Airport

A.7.1. Location

East Midlands Airport is located adjacent to the M1 in Leicestershire. It is served directly by the Core SRN.



A.7.2. Overview

Owned by Manchester Airport Group – East Midlands airport is only the 11th busiest airport by passenger volumes in the UK in 2014. However, it is the second busiest freight airport in the UK. The airport currently has one runway.

The D2N2 LEP is in favour of setting up the UK's first "free trade zone" around East Midlands Airport as part of devolution negotiations. The Zone would allow for tax breaks for companies engaging in foreign trade.

A.7.3. Access

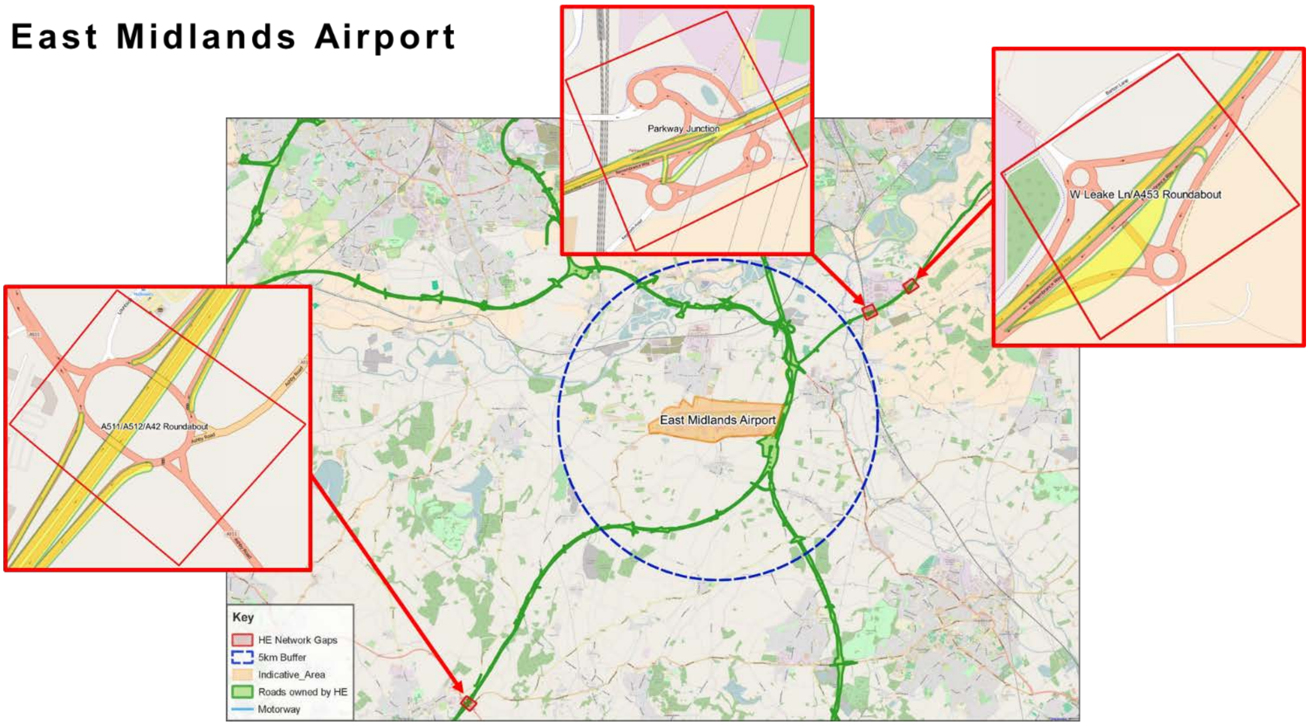
The airport is connected to the M1, which runs close to its eastern border, via the A453 Ashby single carriageway road. The A453 also provides access to the A42 and A50 dual carriageways serving the southwest and northwest respectively.

The airport is not directly connected to the rail network. The airport can be accessed from the mainline railway at East Midlands Parkway station via a (6 seater) shuttle bus. The shuttle bus runs hourly and takes 20 minutes to get to the airport.

There are local buses running to the airport from Nottingham, Leicester and Derby as well as National Express coaches.

A.7.4. Network ownership

The airport has SRN access practically to the terminal. . There are no other gaps in Highways England's network within 5km but a number of junctions on the A453 that are not owned by Highways England.

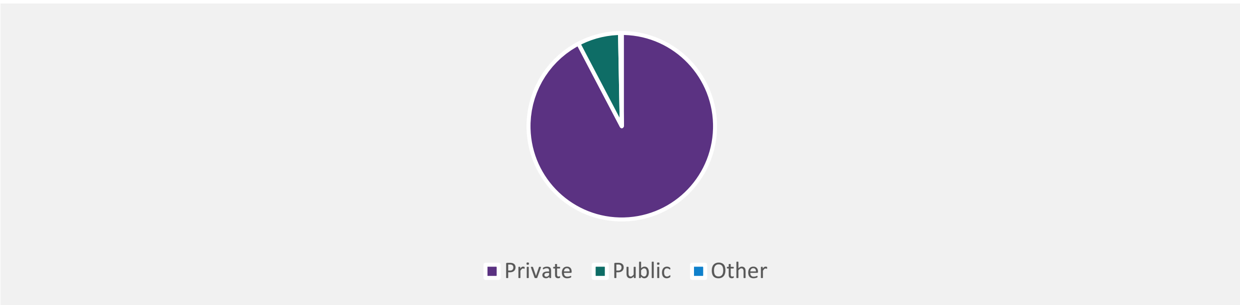


A.7.5. Demand analysis

Yearly airport usage based on CAA 2014 figures

Type	Total
Passenger Arrivals / Departures	4.4m pax p.a.
Freight	277,412 tonnes
Vehicle equivalent	19,929

Overall Mode Share accessing East Midlands Airport



Mode share by region

Region	Private %	Public %	Other %	Total Pax 000s
East Midlands	90.4	9.4	0.2	2,736
East of England	100	0	0	58
North East	89.1	10.9	0	14
North West	97.9	2.1	0	32
Scotland	100	0	0	7
South East	80.9	17.6	1.5	43
South West	97.6	2.4	0	31
Wales	98.4	1.6	0	13
West Midlands	97.1	2.5	0.4	769
Yorkshire And Humber	94.2	5.2	0.6	671
Total	92.3	7.4	0.3	4,374

Journey Purpose

Airport	International business		International leisure		Domestic business		Domestic leisure		Total Pax 000s
	UK	Foreign	UK	Foreign	UK	Foreign	UK	Foreign	
East Midlands	1.6%	1.0%	79.1%	9.3%	4.1%	0.1%	4.7%	0.2%	4,464

A.7.6. Future development

LEP: The D2N2 LEP supports the East Midlands Airport “Free Trade Zone” which would see tax incentives for importing and exporting businesses around East Midlands Airport.

Expansion: The Airport’s strategic plan envisages growing annual passengers from 4 to 10 million by 2030, which will include car park and terminal expansion. The airport also believes it can grow to handling 1.2 million tonnes of cargo per year.

A.7.7. Future schemes

M1 Smart Motorway – Highways England is currently in the process of upgrading stretches of the M1 to Smart Motorway standard. The scheme aims to reduce congestion through increased lane capacity, increase motorist information for better incident management, and to make journeys on the road more reliable.

Free Trade Zone

The proposed East Midlands Airport Free Trade zone has the potential to add additional freight requirements in the area.

A.7.8. Economic impact

“East Midlands Airport makes a significant contribution to the regional economy, particularly to the Three Cities of Nottingham, Leicester and Derby and to the district of North West Leicestershire. These economic benefits are in the form of passenger and cargo connectivity, economic activity (GVA –the value of goods and services produced in an economy) and in direct and indirect employment. East Midlands Airport is estimated to generate **£239 million** of GVA each year (2011).

A.7.9. Access/connectivity issues

The airport is not directly connected to the rail network, and therefore depends on road transport for access.

Google maps shows that there can be traffic issues at the junction between the A453 and the airport entrance at peak times. Additionally, there can be issues at the M1 junction for the airport at peak times.

The Table below shows journey time variability for the surface access networks and examines the performance on the 'last mile' and is based upon a comparison of free flow conditions to conditions during peak times of general traffic demand. For East Midlands Airport, movements have a PTI of 1.6.

Name	Direction	Length (m)	Average PTI	Weekday time (m)	AM Time (m)	PM Time (m)	Free flow Time (m)
East Midlands Airport	North	2,407	1.6	1.55	1.56	1.55	1.28
	South	2,837	1.6	1.83	1.83	1.83	1.51

Google Maps shows peak time traffic congestion issues on the M1 motorway servicing the airport.

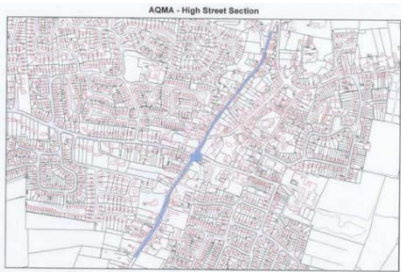
Airport entrance to M1 SB	M1 SB to Airport entrance	Airport entrance to M1 NB	M1 NB to Airport entrance	Airport entrance to M1/A52 junction	M1/A52 junction to Airport entrance
4 mins AM peak	5 -9 mins AM Peak	4 mins AM Peak	3 mins AM Peak	8 – 12 mins AM Peak	10 – 16 mins AM Peak
4 – 10 mins PM Peak	6 -9 mins PM peak	6 - 12 mins PM peak	4 mins PM peak	12 - 26 mins PM peak	10 - 14 mins PM peak
4 mins Free Flow	5 -6 mins Free Flow	4 mins Free Flow	3 mins Free Flow	8 - 10 mins Free Flow	10 mins Free Flow

Journey times based on typical journey time data from Google Maps, using Thursday 8:30 for AM Peak, 17:30 for PM peak and 01:00 for free flow hours. The below maps show the routes used for calculations.

The airport's strategic plan forecasts increased car journeys to the airport in the years to 2030.

A.7.10. H&S/Accident/Environmental data

Castle Donnington AQMA.

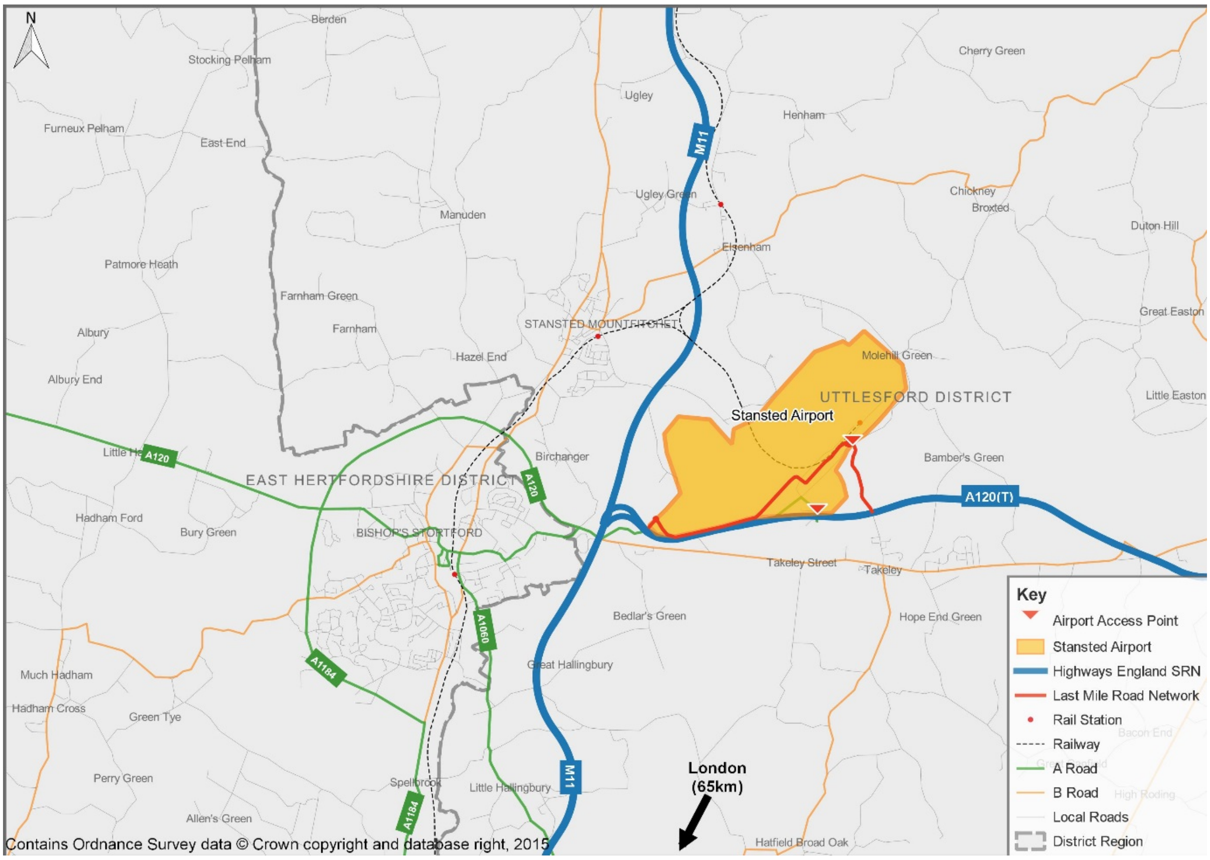


This AQMA is located on the high street of the town to the North of the Airport. It could be used as an alternative route to the airport from Derby.

A.8. Stansted Airport

A.8.1. Location

Stansted Airport is located adjacent to the M11 in Hertfordshire. It is served directly by the Core SRN.



A.8.2. Overview

Owned by Manchester Airports Group – Stansted Airport is the fourth busiest in the UK, with one passenger terminal and one runway. Stansted has grown primarily as a low-cost airline destination. The Airport is Ryanair's largest hub.

Nearby Hertfordshire LEP is supporting expansion at the airport to allow for long-haul routes, giving business in the East of England more travel options without having to travel across London.

A.8.3. Access

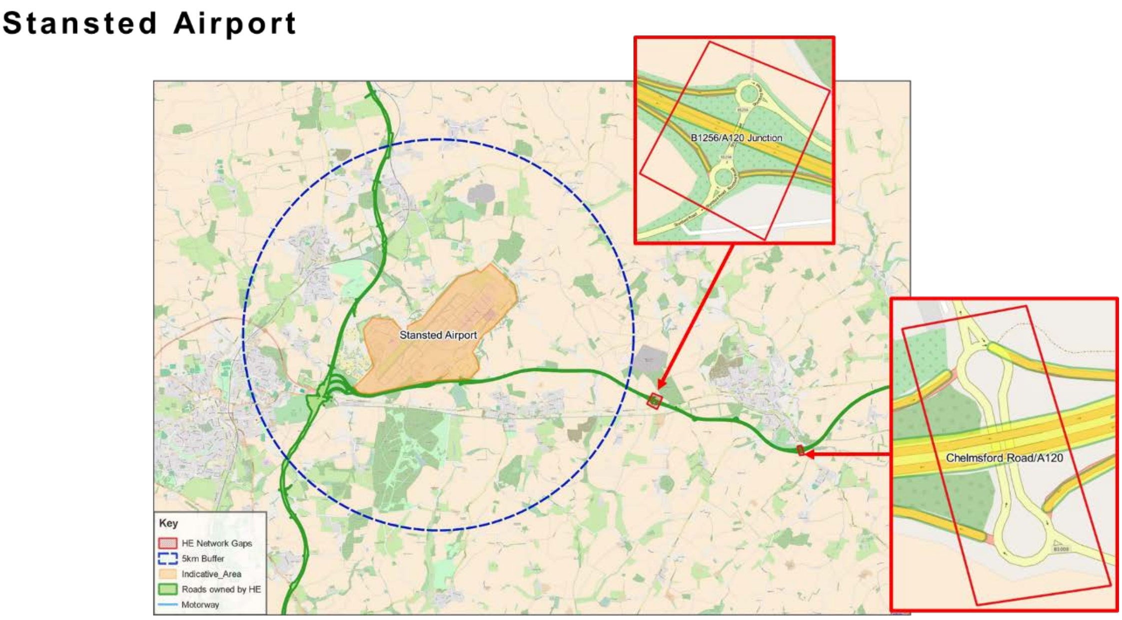
The airport is directly linked, via a grade separated junction, to the A120 dual carriageway and to the M11. The Airport A120 junction is roughly 1km from the A120 / M11 junction. The M11 provides motorway travel north as far as Cambridge and South to London and the M25. The A120 provides dual carriageway access to the rest of Essex.

The airport is connected to the national rail network via a spur from the London to Cambridge line. The Stansted express departs every 15 minutes at peak times from London Liverpool Street Station. The train also calls at Tottenham Hale with connections to the LU Victoria Line.

National Express, CityLink and Airport Bus Express operate coach services between London and the Airport. There are also national express services to Cambridge, Oxford, Nottingham, Thetford, Birmingham, Brighton, Heathrow and Gatwick.

A.8.4. Network ownership

The airport has SRN access practically to the terminal. There are no gaps in Highways England's network within 5km but a number of junctions on the A120 that are not owned by Highways England.

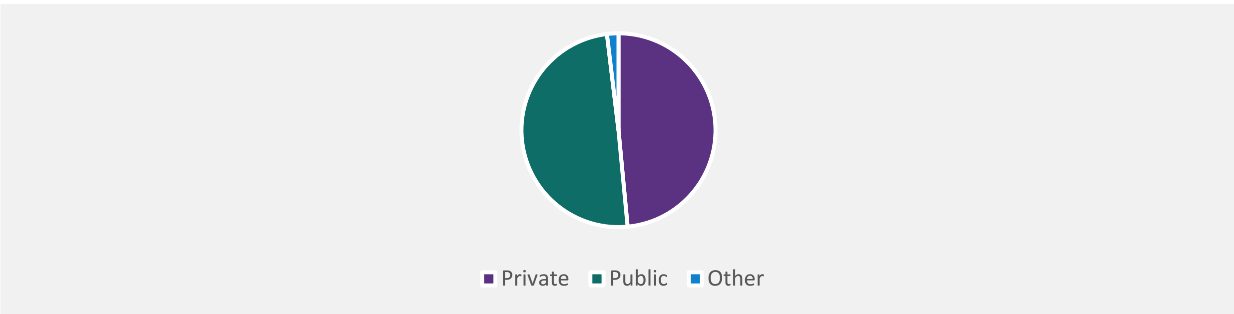


A.8.5. Demand analysis

Monthly airport usage based on CAA 2014 figures

Type	Total
Passenger Arrivals / Departures	19.1m pax p.a.
Freight	205,000 tonnes
Vehicle Equivalent	14,727

Overall Mode Share



Mode share by region

Region	Private %	Public %	Other %	Total Pax 000s
East Midlands	76.3	23.2	0.5	615
East of England	76.3	22.9	0.7	5,681
North East	62.3	36.9	0.9	44
North West	45.5	53.3	1.2	120
Scotland	20.3	77.1	2.5	39
South East	33.2	64.3	2.5	11,624
South West	55.6	42.7	1.7	354
Wales	30.9	67.1	2	93
West Midlands	53.3	45.6	1.1	310
Yorkshire And Humber	53.2	45.2	1.6	216
Total	48.5	49.6	1.8	19,096

Journey purpose (percentage)

Airport	International business		International leisure		Domestic business		Domestic leisure	
	UK	Foreign	UK	Foreign	UK	Foreign	UK	Foreign
Stansted	6.3%	6.5%	47.2%	34.3%	2.3%	0.1%	2.9%	0.4%

A.8.6. Future development

Airport Capacity:

- Manchester Airport Group has stated that Stansted would be a more cost effective alternative for airport expansion in the south east of England than Heathrow or Gatwick.
- Stansted airport submitted a plan to the Airports Commission envisaging a £10bn spend in order to turn the airport in to a four runway hub.

Growth:

- The South East LEP recognises Stansted as a key component of growth in the regions, and forecasts continued employment growth at enterprise zones near the airport.

A.8.7. Future schemes

M11 Junction 8 improvement – The Greater Cambridge Greater Peterborough enterprise partnership has earmarked £1 million to upgrade the M11 junction 8 at the airport. The upgrade works will increase capacity at the junction.

A.8.8. Economic impact

Stansted is the largest single-site employer in the East of England, with 10,000 staff employed on the site. Stansted generates around £770 million in GVA annually.

A.8.9. Access/connectivity issues

The Table below shows journey time variability for the surface access networks and examines the performance on the 'last mile' and is based upon a comparison of free flow conditions to conditions during peak times of general traffic demand. For Stansted, movements have a PTI less than 1.5, indicating that the last mile offers fairly consistent journey times.

Name	Direction	Length (m)	Average PTI	Weekday time (m)	AM Time (m)	PM Time (m)	Free flow Time (m)
Stansted Airport	East	1,307	1.2	0.76	0.80	0.73	0.70
	West	1,293	1.3	0.73	0.75	0.72	0.69

Google Maps shows peak time traffic congestion issues on the roads around the airport.

Airport entrance to M11 NB	M11 NB to airport entrance	Airport entrance to M11 SB	M11 SB to airport entrance
7 – 14 mins AM peak	4 mins AM Peak	4 -6 mins AM Peak	4 - 6 mins AM Peak
5 - 8 mins PM Peak	4 mins PM peak	4 -6 mins PM peak	4 - 6 mins PM peak
5 -6 mins free flow	4 mins free flow	4 mins free flow	4 mins free flow

Journey times based on typical journey time data from Google Maps, using Thursday 8:30 for AM Peak, 17:30 for PM peak and 01:00 for free flow hours. The below maps show the routes used for calculations.

Appendix B. List of Stakeholders, and summary of responses

Consultee	Method of Consultation
Ports/Airports	
Felixstowe	Face-to face
Tilbury	Face-to face
Dover	Phone
Hull	Phone
Manchester/Stansted/East Midlands	Face-to face
Liverpool	Face-to-face
LEPS	
New Anglia	Phone
Liverpool City Region	Face-to face
Greater Manchester	Face-to face
Humber	Phone
Others	
British Ports Association	Face-to-face
RAC Foundation	Face-to-face
Transport Focus	Phone
AoA	Phone
FTA	Phone

B.1. General Themes

Table 4-1 General Themes from Consultation

General
• In some locations the 'other' miles are more of an issue than 'last' mile (e.g. Felixstowe which encounters congestion on the A14 much further to the west and Tilbury which encounters problems on the M25); • Under normal conditions most ports (Liverpool and Hull being notable exceptions) said that the highway access was 'ok'. Problems arise at time of incident and disruption; • Problems are generally well understood and acknowledged, with schemes identified to address current or near-future problems (e.g. A5036 in Liverpool, A63 in Hull, M25 J30 near Tilbury, A20 in Dover);

General
• Drivers respond well to the sudden problems of relatively short duration using social media; • The ports were more concerned with the ability of the road network to cope with future expansion plans; • Consolidation in logistics is concentrating more activity at or adjacent to the port sites and changing where and how problems will materialise in the future; and • Connectivity Issues also exist at smaller gateways (not included as case studies within this study).
Connectivity Issues
• Reliability affects everything in the supply chain and affects the port's distribution facilities (goods stored on site for delivery) as well as direct delivery from the ship; • Delay critically affects foodstuffs, people and other niche products at each port (Tilbury receives much of the UK paper for newsprint with limited stockpiles); • Resilience is much more of a concern; • Felixstowe reliant on A14/Orwell Bridge; • Tilbury is heavily impacted by Dartford crossing; • Dover relies on B2011 for night closures of major routes; • Certain goods have specific time-critical delivery requirements, e.g. fresh food flown in to Stansted for the London market, mail into East Midlands; • Business air passengers need resilience and guaranteed journey times; and • Leisure air and cruise passengers also can't miss their journeys.
Network management/ownership
• Ownership was not generally identified as a key issue, though specific 'anomalies' were identified such as the M62 in Liverpool; • Emergence of Key Route Networks provides an opportunity (Manchester, Liverpool, New Anglia LEPs) for renewed focus on connectivity objectives; • Future changes in governance (devolution) creates further scope for changed 'ownership' and opportunity for influence, although some gateways claimed that 'influencing' in the context of diverse participants in the planning process was challenging; and • Nearly all gateways called for a national perspective around planning access.

B.2. Key issues by location

Key issues from consultation by location

Location	Key Issues
Port of Felixstowe	• At Felixstowe, 'last mile' is relatively good, issue is around resilience (e.g. Orwell Bridge, absence of alternative route around Ipswich), and 'other' miles elsewhere on A14; and • More constraints on Harwich, but smaller operation. Access issues (on A120) have been identified as a constraint on proposed development.
Port of Hull/Humber	• Hull –the last mile is the A63 – significant congestion and wider adverse environmental and severance impacts, which impact on Port growth and wider City aims; and • Immingham/Grimsby – more recent enhancements, but some safety issues with quality of final approach (under North Lincs ownership).
Port of Liverpool	• Expanding port particularly container market. Will have the potential to handle 95% of world ships. Currently can only accommodate 5%; • Other port facilities in River Mersey area also require good connectivity; • Northern Powerhouse freight and logistics strategy highlights the importance of supporting the port development; and • M62 not part of SRN from junction 6 of the M62, Liverpool bound.
Port of Dover	• Typically the concern is for the last 5-10 miles inbound and outbound; • Problems arriving at the port results in ferries carrying 'fresh air' and then playing catch up whilst the port has no internal stacking for outbound vehicles; and • Dover – Calais is a motorway on the sea.
Port of Tilbury	• Last mile is regarded as being the Dartford Crossing as delays to southbound traffic can block the A13 access to the M25 which can block the A1089; and • There is no other access and therefore no resilience.
East Midlands Airport	• Significant time sensitive parcel/mail operation; • 24 hour operation with a 4 hour freight catchment area; • Vulnerability to the performance of key road links – M1, A42 and A50; and • Scope for improved public transport connectivity, including for staff movements.

Location	Key Issues
Manchester Airport	• Polycentric catchment area with much demand outside peaks; • Sensitive to performance across network - including M56 and M60; • New infrastructure will provide new access options; and • Each new air link to a BRIC country estimated to generate £1bn in value to the UK economy.
Stansted Airport	• Reliant on M11/A120, with many competing demands on the transport system; • Relatively high public transport mode share, but that is road-based so impacted by congestion/resilience; and • Time sensitive fresh food imports for London/SE market.

Appendix C. Collaborative Traffic Management

C.1. Operational Interventions: Traffic Management

This section considers the scope for improved connectivity through better network management. Traffic management may take a number of different forms. Where it has been implemented on access to gateways, such as Operation Stack and the Traffic Assessment Project (TAP) at Dover, at least part of the objective has been to mitigate the impacts of gateway traffic, rather than with the main objective of improving gateway connectivity.

We focus within the following section on Collaborative Traffic Management, which recognises the need to balance competing demands, but offers the opportunity to bring about specific connectivity enhancements.

Collaborative Traffic Management

The Collaborative Traffic Management (CTM) programme is a 3 year programme, which aims to transform the customer experience of accessing the strategic road network in the South East and M25. The approach targets known hotspots on the network where congestion and delays can be reduced. It does this by optimising the operation of junctions through collaborative working with stakeholders and the deployment of new detection or technology where required. The main principles for CTM are:

- Working in partnership with Local Highway Authorities (LHAs) and other stakeholders
- Improving the performance of the overall network, both local and strategic
- Optimise the performance of key junctions which link the local and strategic networks

The CTM programme is made up of multiple projects which all work towards a more efficient network. The concept of an optimised junction has been developed as part of CTM and this is now being applied to strategic junctions across the network. There is also ongoing work to improve the assets and the sharing of data between stakeholders. A new Urban Traffic Management Control system (UTMC) has been procured which allows the sharing of information with local authorities leading to a better informed users and a freer flowing network.

C.2. The optimised junction concept

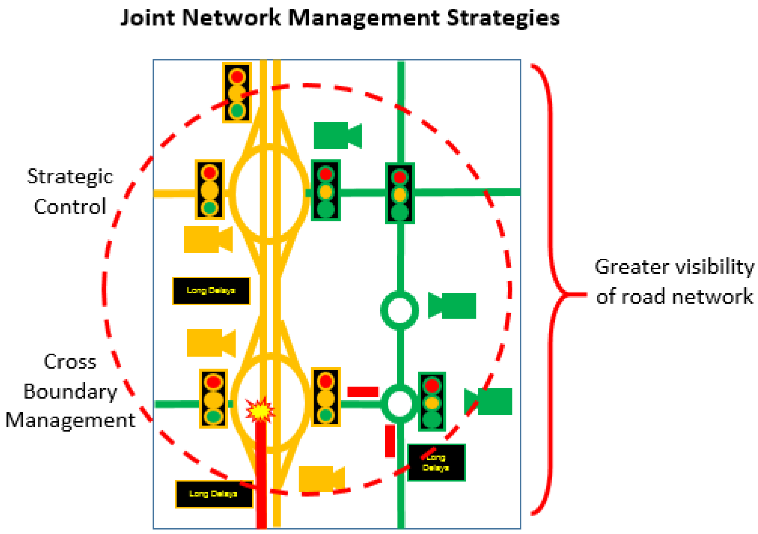
The concept of an optimised junction was defined as part of CTM:

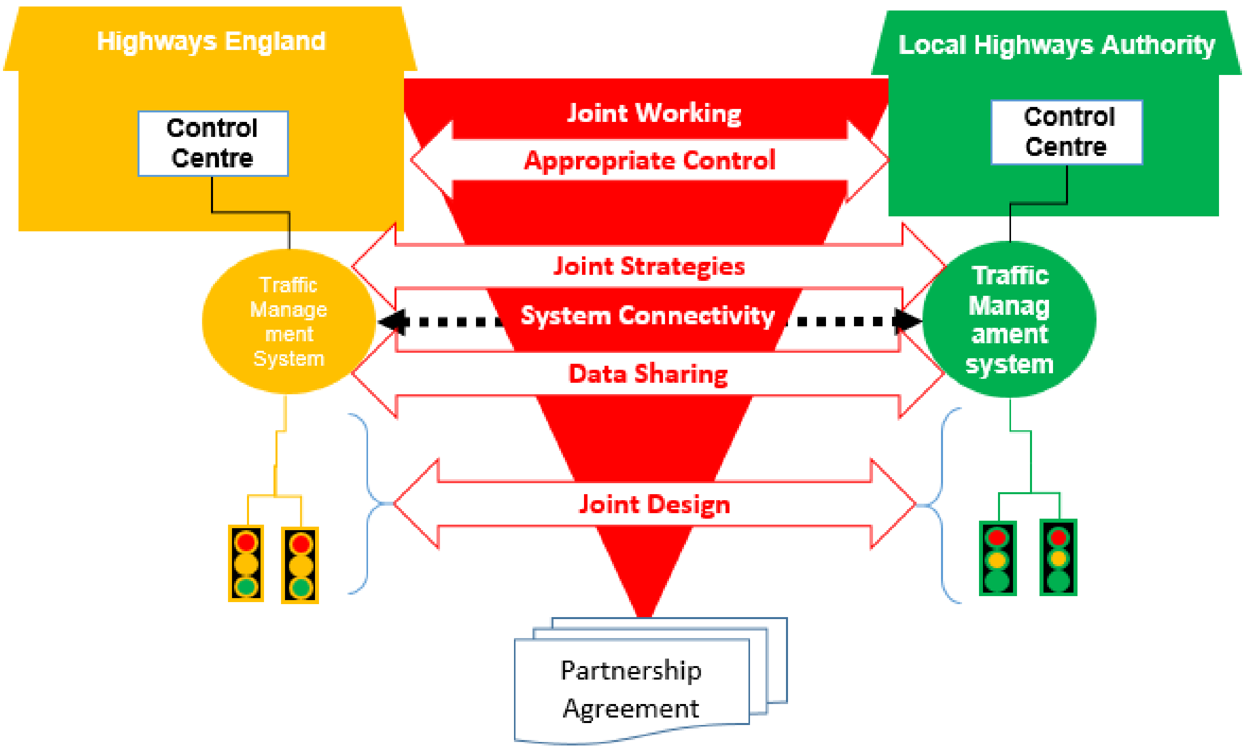
An Optimised Junction is one where all the stakeholders (including Local Highway Authorities, Highways England, suppliers, maintainers, etc.) agree that the control of traffic through the junction is as efficient as possible for the benefit of the end user. This means ensuring that the management of traffic onto and off the main carriageway is balanced against that of the local network.

An Optimised Junction will have appropriate data for incident management, strategic analysis and visibility of the network for all stakeholders.

The junction will be operated by the most appropriate party, have the tools to enable joint strategies to be deployed for effective incident management and provide travel information to road users and other parties.

By working collaboratively with all stakeholders an informed decision can be made as to how the junction should be run based on all the information that is available. Receiving live data from other stakeholders gives the operator of the junction a view of the whole network which is important when responding to incidents. Traffic signals can be set on both the local and strategic network to dissipate traffic.





C.3. Applying the concept to the last mile

There are three sites which are currently being optimised as part of CTM, however, more will be optimised as the programme continues. There will be other sites optimised as part of the CTM programme. Junctions of strategic importance have been identified through engagement with the local authorities, the road operators and maintainers. This has fed into a list of sites which would benefit from the optimised junction concept. The optimised junction sites help to build the collaborative working relationship between Highways England and the Local Authorities, this process should be able to be continued by the stakeholders after the programme.

The optimised junction concept can be applied across the whole network. It is possible to use the concept to optimise specific links, and to allow traffic to flow down a particular route. The diversion route around J20 on the M25 is being optimised to reduce the delays for vehicles using the route. Traffic signals along the diversion route will be set to allow the traffic to flow more freely through the diversion route and re-join the strategic network. This same principle can be applied to routes to and from a gateway once the vehicles have left the strategic road network or gateway. It is a benefit to all stakeholders to get large vehicles off the local network and to the ports or strategic road network as quickly as possible. If the traffic management system was able to receive data from the port, it would be able to change the traffic signals along the vehicle's route accordingly. A green wave could be created which allows the traffic to flow from the port to the strategic road network without stopping. Data on the vehicles which will be leaving the port would also be useful, for example if there is expected to be HGVs or long wheelbase vehicles the signal timings on the junctions can be set to stop the vehicles causing exit blocking at any roundabouts or junctions. This should enable the local road network to flow more smoothly as well as the route which is being prioritised to get vehicles onto the strategic road network.

One of the sites which may be optimised as part of CTM is in Dover. A new development is planned which is expected to increase the local traffic using the network. There are two roundabouts which are being signalised as part of this development, which would benefit from the signals being linked to the strategic network signals. This would enable the local network to flow more efficiently with the strategic network, and would allow traffic to be prioritised depending on the build-up on both networks. If port data was added into this approach it would allow for signals to be set pre-emptively before the traffic from the ports reaches these junctions, which will allow the traffic to be cleared from certain approaches. The data from the ports also enables the strategies to be set before the congestion builds up (which would be the normal trigger for the strategies), which keeps the network free flowing and utilises the capacity more efficiently.

The data received from stakeholders increases the networks ability to respond to the changes in traffic flow, creating a more efficient network. The linking of signals and data is made possible through the collaborative approach. This provides a more detailed picture of the network, which enables traffic signal operators to make more informed decisions as to how the network should be managed. This should lead to a reduction in journey times for all users.

Appendix D. Delivery: Transferring Network Responsibility

This section focuses upon the role of network ownership in delivery of connectivity enhancement. Specifically, it considers an option to transfer responsibility for a section of highway between the existing Strategic Road Network maintained by Highways England (SRN) and the gateway to the port or airport over to the SRN to provide continuous responsibility. The rationale, costs and benefits of responsibility transfer in the context of enhanced connectivity are set out below.

D.1. Context

Highway Authorities in England have their responsibilities and authority defined in the Highways Act 1980 as amended, and preceding legislation. These responsibilities and authorities are generally discharged through Highway Rights over the defined highway, and highway maintained at public expense often referred (somewhat erroneously) as the “adopted highway”.

It is important to note that the majority of highway and highway maintained at public expense is not *owned* (i.e. land title) by the highway authority. Indeed many adjacent property title deeds will show ownership up to the centre of the highway fronting that property. There is clearly no benefit to ownership of land over which a highway exists except in the event that the highway is extinguished in which case the land will revert to the owner (note this only usually happens under planning legislation related to new development or as a consequence of a highway improvement or similar).

Clearly a more recently (1920s onwards) constructed route (including most of the motorway network) will have required a Highway Authority to acquire the land in order to construct the road, in which case it is largely the case that the land ownership does remain with the Highway Authority. However the boundary of the highway maintainable at public expense and the land ownership may not be coincident, for example it is common practice to include in the land purchase sufficient for landscaping and constructing ponds as part of the highway drainage system which often are not included within the highway. Legislation relating to Compulsory Purchase Orders makes clear provision for such arrangements.

Responsibilities for highways in England

Highway Authority	Highway Network	Common service delivery arrangements
Highways England	Strategic Road Network (Motorways and Trunk Roads)	Directly managed contracts (typically 5 to 10 years) Privately financed and operated (typically 25 years) Tolled (typically estuary crossings)
Local Councils	Local road network (A and B roads, urban and rural minor roads)	Directly delivered (Direct Labour Organisations) Directly managed contracts (typically 5 to 10 years) Privately financed and operated (typically 25 years)
Commercial Private Roads	Airports, ports etc. internal road network	Directly delivered Directly managed contracts
Private Streets	Individual private streets usually residential	Managed by the adjacent property owners

D.2. High Level Process

Where there is a case for including or reincorporating local roads into the SRN it is expected that the Department for Transport would initiate the process as a result of high-level strategic decisions. In order to provide evidence that the reason for the transfer of ownership is due to high-level strategic decisions several questions should be answered:

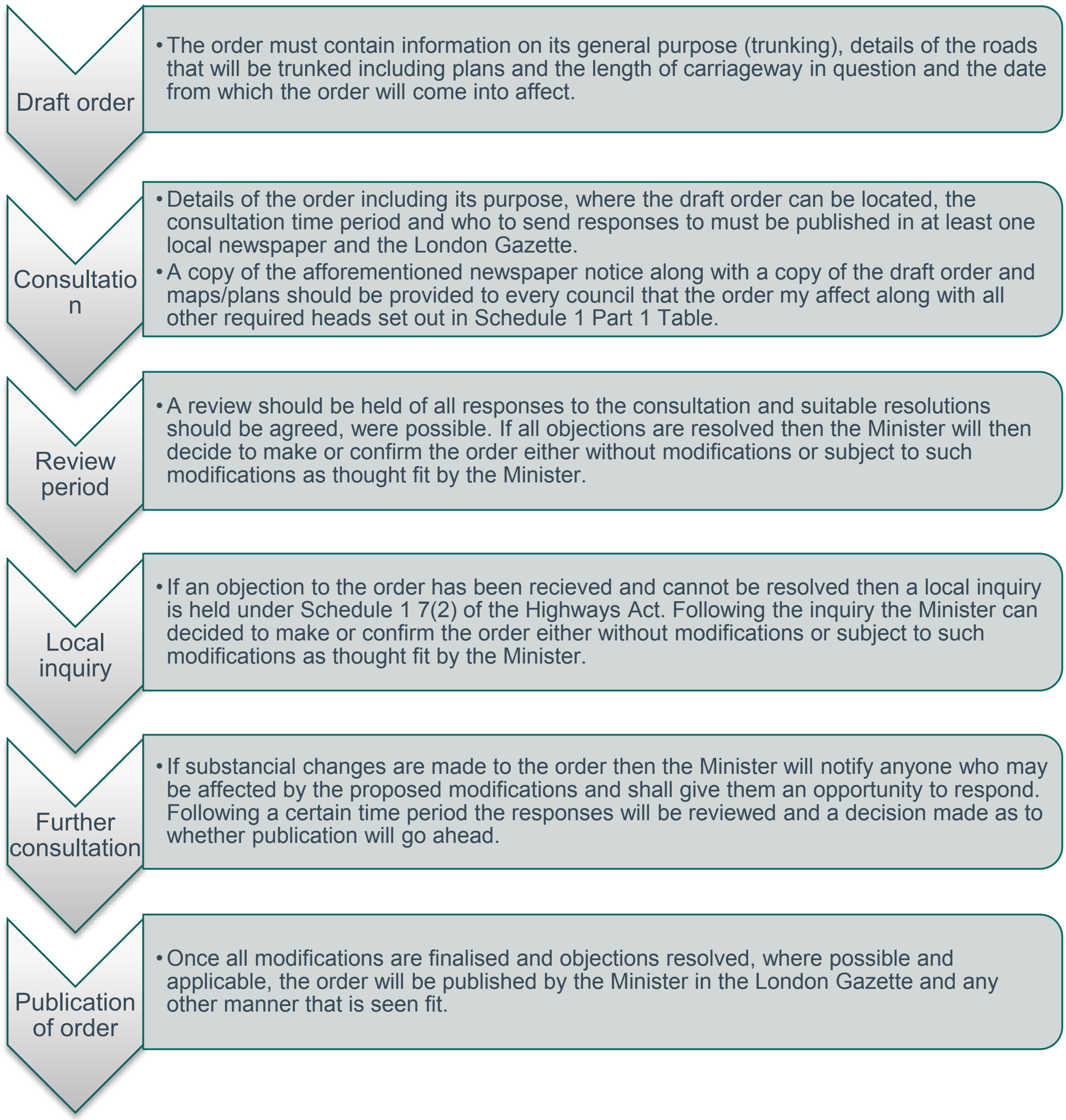
1. Is the road is performing a national level transport function?
2. Is the existing local road of adequate condition? Will there be large maintenance costs required to make the road safe and secure?
3. Will transferring the local road to the SRN be value for money? Will there be an escalation in day to day maintenance costs?

Each transfer of road would be required to be negotiated on an individual basis and an agreement arranged between Highways England and the existing owner or maintainer of the road in question. **It should however be noted that no highway which is within a City shall be, or become, a trunk road in accordance with the Highways Act 1980.**

If the decision is made to transfer a local road to the SRN then there is a formal process that is required. This process is governed by Section 10 of the Highways Act 1980 (as amended) and is outlined in Schedule 1 and 2 of the Highways Act 1980.

For the purpose of this report this process has been summarised into a 6 step process, see Fig D-1

Figure D-1 Process for developing a trunking order



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D.3. Costs

This section takes a strategic view of the areas where costs of changing the existing arrangements and responsibilities may arise. An assumption in considering these costs is that the transfer will be from a Local Highway Authority (LHA) to the SRN managed by Highways England, although other options are also referred to.

Costs of transfer of responsibility

As set out in Section 2 the transfer of responsibility for managing and maintaining a highway generally requires an Order to be made by the Secretary of State for Transport.

Consideration should be given to the need for related Orders in the same vicinity – for example changes to the highway network also requiring an Order relating to new development or other changes to the highway network which may provide an opportunity to make one Order covering all aspects.

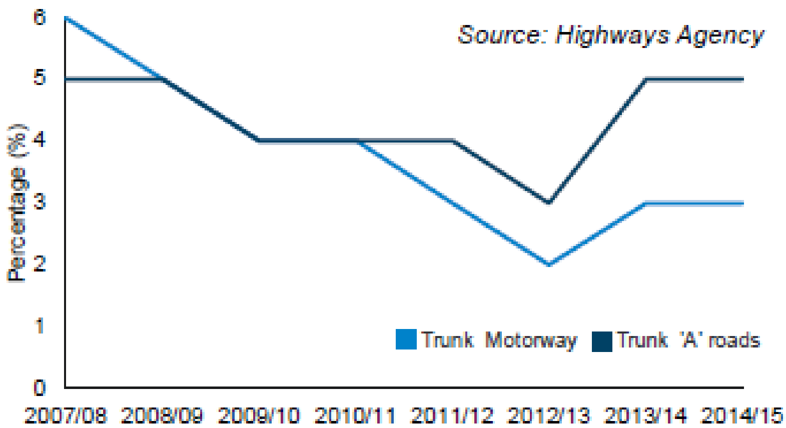
Costs of making an Order will typically require some staff time to accurately define the extent of the changes proposed, legal services to prepare and make the Order, governance and briefings, consultation with key stake-holders and primarily the current highway authority. It is estimated that these costs should usually be within a £50,000 budget although very dependent on the consultation extent and costs.

If an Order is objected to, the Secretary of State may consider it appropriate to call a Local Inquiry to consider the proposed Order. This is particularly likely if the current highway authority or any party with a direct interest (e.g. direct access, land ownership) objects to the Order. In these circumstances the cost will be significantly higher to meet the increased legal costs and probably a local public hearing, potentially several hundred thousand pounds. Early engagement with key stake-holders will usually inform this risk and enable mitigation and negotiation.

Costs of future maintenance

At a network level the standard of maintenance of Local Highway Authority "A" roads, and the few motorways under LHA management, are very similar to the standard of maintenance on the SRN. For example the average percentage of principal LHA roads where maintenance should have been considered in 2014/2015, as reported by DfT, was 4% which is comparable to the SRN. DfT reported in the 'Road Conditions in England 2015' report that the percentage of the trunk road network that should have been considered for maintenance varied between trunk road motorways and 'A' roads, as shown in **Figure D-2**.

Figure D-2 Proportion of the trunk network that should have been considered for maintenance by road type, 2017/08 to 2014/15



Of course there will be specific locations on both the LHA "A" road network and the SRN were the condition of the road varies. It may be that in some cases the road network in certain areas is in poor condition and waiting for some time to be treated as part of a planned forward programme of maintenance. If trunking the 'Last mile' is taken forward each section of road would need to be considered separately to understand the existing condition.

For the purpose of this report however Atkins has considered the average percentage of road to be maintained in the LHA which have access to the ports and airports under consideration, these are reported below.

Percentage of the LHA principal road network which should have been considered for maintenance in 2014/2015, specific to the LHA which have access to the ports and airports under consideration within this report

Port/Airport	Local Authority	Percentage of the LHA principal road network which should have been considered for maintenance in 2014/2015
Felixstowe (Hutchison Port Holdings)	Suffolk	2%
Liverpool (Peel Ports)	Liverpool and Wirral	9% and 2%
Dover (Trust Port)	Kent	3%

Port/Airport	Local Authority	Percentage of the LHA principal road network which should have been considered for maintenance in 2014/2015
'Immingham & Grimsby' and Hull (ABP)	North East Lincolnshire UA and East Riding of Yorkshire UA	2% and 1%
Port of Tilbury (Forth Ports)	Thurrock UA	3%
Stansted Airport	Essex	2%
East Midlands Airport	Leicestershire	1%
Manchester Airport	Manchester	Unknown (6% in 2013/2014)

From this data it is evident that in general the local authorities in question have a better than average road condition. A similar network level condition could lead to the conclusion that the *value* of the maintenance will be the same under either LHA or SRN management.

However, the cost of maintaining the SRN and a LHA network are often quoted as being very different, with the cost/lane mile to maintain the SRN being £51,000 (2014/15) and the average cost per km to maintain a LHA road being £5,000 (2016). Some caution should be exercised as these are often quoted at a network level and the LHA network will include over 50% unclassified roads (residential roads, rural lanes etc.) which by their nature require much lower maintenance and hence reduce the average cost of maintenance compared to the SRN.

A more reasonable assumption could be that provided the section of highway being transferred is from a continuous part of the LHA network to a continuous part of the SRN network then maintenance costs should be similar over time.

There is no evidence that transfer from LHA to SRN would reduce maintenance costs.

Costs of managing additional risks and liabilities

Clearly transferring a section of highway from LHA responsibility to the SRN will increase the risks and liabilities of the SRN but it would be a reasonable assumption that this will be proportionate to the length of highway transferred with the following considerations.

A consideration should be made of any additional liability arising from the transfer of highway structures – bridges, retaining walls etc. It would be prudent to undertake a condition assessment of these, or inspect the LHA records of the most recent condition assessment, to determine the risk of any disproportionate maintenance liability that may be transferred.

It would also be useful to consider the risk of transferring any disproportionate third party liabilities and prudent to review the recent road safety statistics for the section proposed to be transferred. If the section has been constructed or significantly improved by the LHA then departures from technical standards in the design may be higher than would usually be accepted on the SRN. Poor road safety statistics may therefore benefit from further site investigation of those specific locations. Risks and liabilities relating to maintaining existing technology and/or connecting into SRN systems and solutions should also be considered. Risks and liabilities relating to a disproportionate presence of public utilities (gas, electric, telecoms) should also be considered and also in the context of an additional risk to the SRN network occupancy targets.

4.2.2. Benefits

This section takes a strategic view to identify the headline benefits of changing the existing arrangements and responsibilities for Highway ownership and maintenance. An assumption in considering these costs is that the transfer will be from a Local Highway Authority (LHA) to the SRN managed by Highways England, although other options are also referred to.

Customer benefits from standards of maintenance

Whilst it is expected that a similar standard of maintenance will be achieved under either LHA or SRN management however the phasing of maintenance works and the continuity of maintenance interventions and treatments may be better achieved through a transfer of ownership.

Customers may also benefit from a more structured communication process within Highways England by being able to identify who to contact easier when there is an issue on the network. Despite this it is recognised that some members of the public may still direct their queries and concerns to the LHA in the first instance.

Key stake-holders – Freight Transport Association and similar – may certainly benefit from a conversation with a single highway authority and a more consistent customer response.

Customer benefits from standards of operation

Highways England, primarily due to the nature of their network and also now driven by a performance target, generally operate larger incident management arrangements than LHA. Customers would therefore benefit from greater certainty of journey times on often time-critical journeys to ports and airports following a transfer to create SRN continuity.

Highways England also operate a Traffic Officer services to support incident response and their customers which would also provide a clear and visible benefit of a transfer.

Benefits of prioritisation of economic investment

LHA establish their priorities for investment in their transport infrastructure in accordance with their Council corporate plans and Local Transport Plans. Increasingly there is an alignment with Local Enterprise Partnership's infrastructure investment priorities, including for example prioritisation for Local Growth Funding, and local major transport schemes. Inevitably these priorities will focus on growth to the local economy which often but not always aligns to national economic growth priorities including improving access to ports and airports. It should also be considered if there are competing priorities within the local funding arrangements for infrastructure investment, for example Further and Higher Education premises development and infrastructure including or other than transport infrastructure support Enterprise Zones.

The 'Road Investment Strategy' (RIS) set by the Secretary of State for Transport to which Highways England are licenced to comply with sets out clear priorities to join communities and link them effectively to each other. Through the RIS it is evident that the economic benefit of providing a well-established and free flowing network is recognised and in particular the benefits that comes with prioritising and delivering strategic improvements to access ports and airports.

Overall there is likely to be a benefit to the prioritisation of economic investment from transferring responsibility of the complete route to a port or airport into the SRN.

It may be useful to review the specific LHA and LEP infrastructure investment priorities for those with access to the ports and airports to assess if there is a gap with what would reasonably be expected as part of the SRN.

4.2.3. Summary of considerations

A summary is provided below of considerations for transferring a section of highway providing access to a port or airport from LHA to SRN. We have taken a specific example from our case study locations – the A453 at East Midlands Airport - to illustrate issues and options in ownership transfer in a 'real world' situation. (**Note that this does not imply a specific recommendation at this location; it is given for illustrative purposes**).

Summary of considerations

A453 at East Midlands Airport

Location

The private roads within the airport and its associated business park, including hotel and airport car park access, are connected to the A453 – a public highway maintained at public expense by Leicestershire County Council as Local Highway Authority. This section of the A453 runs between the junction of the A453 (Trunk Road – maintained by Highways England) and Junction 23A of the M1 Motorway at the Finger Farm interchange towards junction 14 of the A42(T), and prior to the opening of the A42 did form part of the SRN.

The LHA section of the A453 giving access to the airport is therefore generally constructed to Trunk Road standards and is maintained in a similar condition to the trunk road. It has had various minor improvements to junctions along its route over the last 20 years, largely driven through road safety improvements.

This section of the A453 is a 10m single carriageway, except for single lane and dual carriageway as part of some of the junction configurations.

There are 3 junctions along the A453 from the airport access roads, a roundabout at each end of the airport and its associated business park and a traffic signal controlled “T” junction which is signed as the main airport terminal access.

The private airport estate roads are interconnected so that traffic may distribute between the access points onto the A453.

Issues

The airport and the associated business part are expanding and undergoing economic growth which is increasing traffic flow along the LHA section of the A453 and starting to cause regular peak time congestion particularly at the junction with the M1 Motorway at junction 23A and the associated Junction 24. The single carriageway A453 between the first roundabout access to the airport private roads and the M1 junction 23A – some 400m – is therefore acting as a restriction to traffic capacity, although no doubt other improvements would be needed to fully address the congestion.

Next to the airport is a local road providing access to Castle Donington village. This access road runs parallel to the M1 motorway between the A453 and the A50 at Sawley, thus also provides an alternative local route between the A42 and the A50 when there is significant congestion or an incident on the M1 at either junctions 23A or 24. During these times traffic diverting onto this alternative local route impedes traffic flow to/from the airport, particularly given the single carriageway nature of the A453.

Also next to the airport is Castle Donington motorway circuit. This holds regular small scale events which from time to time add some congestion to the A453. There are also several major events held at the motor racing circuit including the Download Festival which attracts c100,000 visitors over a week-end for which a traffic management plan is implemented including the one-way operation of the A453 past the airport. For the major events significant delays occur for airport traffic.

Options

Transfer of the A453 - or part thereof – to the SRN to complete the “last mile” to the private airport access roads from the M1 junction 23A would support consideration of the improvement of the capacity. Constructing 400 m of dual carriageway from the first roundabout, across a wide level verge with no highway structures, for example would significantly increase the traffic capacity of the network.

Consideration	Evidence to review	Costs/benefits
National function		Prioritised funding will help to improve connectivity and traffic flow on these vital sections of road.
Condition and maintenance costs	**Condition data** should be reviewed to understand the state of both the carriageway and any structures that will be transferred. **Planned works programme review** should be carried out to understand if money has already been allocated to any road which may undergo transfer.	Phasing of maintenance works and prioritised maintenance will help to improve the continuity of the network to the vital ports and airport locations. Depending on the initial condition of the highway being transferred it is not foreseen that there will be an increase in maintenance costs.
Risks and liabilities	**Condition data** should be reviewed to understand the state of both the carriageway and any structures that will be transferred. **Accident data** should also be reviewed to understand if there are any accident spots that should be considered especially those which have been designed with a departure.	Depending on the condition of the assets there may be a cost to ensure the network is at an appropriate standard to be transferred to the SRN.
Economic benefits	Review of LHA priorities for investment and if there are any conflicts of interest.	By prioritising these sections of road network it will ensure that traffic flow will remain free and therefore congestion

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