

**APPENDICES TO THE PROOF OF EVIDENCE OF ALLAN DARE**

**TRANSPORT**



**THE CHILTERN RAILWAYS (BICESTER TO OXFORD IMPROVEMENTS) ORDER**

**TRANSPORT AND WORKS ACT 1992**

**TRANSPORT AND WORKS (APPLICATIONS AND OBJECTIONS PROCEDURE)  
(ENGLAND AND WALES) RULES 2006**

**Chiltern Railways**

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## Appendix 1

### Extract, Office of Rail Regulation “National Rail Trends Yearbook 2009-10”

1. The Office for Rail regulation publish an annual yearbook showing time-series trends for a wide range of national rail data. Information is set out on a quarterly basis. Extracts for the 2009-10 Yearbook are set out below.
2. It can be seen that, despite the recession, passenger kilometres increased in 2009-10 over the previous year. Passenger journeys decreased for 2009-10 overall, but increased in 2009-10 Quarter 4, thus indicating that rail business was beginning to recover from the recession.

### Key results: 2009-10 on 2008-09

#### 1.1 Passenger kilometres

- 51.1 billion passenger kilometres were travelled in 2009-10, an increase of 0.8% from 2008-09.
- Ordinary fares kilometres increased by 3.2% to 36.4 billion kilometres and season tickets kilometres decreased by 4.6% to 14.7 billion kilometres in 2009-10 compared to 2008-09.
- London and South East passenger kilometres decreased by 1.8% to 23.8 billion kilometres; long distance increased by 3.7% to 17.6 billion kilometres; and regional operators increased by 2.2% to 9.7 billion kilometres in 2009-10 compared to 2008-09.

#### 1.2 Passenger journeys

- 1,258 million journeys were made in 2009-10, a 1.3% decrease from 2008-09. Ordinary fare journeys increased by 3% to 685 million journeys and season ticket journeys decreased by 5.9% to 573 million journeys in 2009-10 compared to 2008-09.
- The long-distance sector had 112 million journeys, a 2.1% increase; London and South East decreased by 1.5% to 841 million journeys and regional operators decreased by 1.8% to 305 million journeys in 2009-10 compared to 2008-09.

#### 1.3 Passenger revenue

- Revenue was £6,179 million in 2009-10, a 2.9% increase from 2008-09.

#### 1.4 Timetabled train kilometres

- There were 500 million timetabled train kilometres in 2009-10, a 4.3% increase from 2008-09. Franchised operators had just over 495 million timetabled train kilometres in 2009-10, a 4.4% increase when compared to the previous year. Non-franchised operators had 4.87 million timetabled train kilometres in 2009-10, a 0.7% increase from the previous year.

## **Key results: 2009-10 Q4 on 2008-09 Q4**

### **1.1 Passenger kilometres**

- There were 13 billion passenger kilometres travelled in 2009-10 Q4, a 5.2% increase from 2008-09 Q4.

### **1.2 Passenger journeys**

- 332 million journeys were made in 2009-10 Q4, a 6.1% increase from 2008-09 Q4. Journeys using ordinary fares increased by 11.7% to 172 million and season ticket journeys increased by 0.6% to 159 million in 2009-10 Q4 compared to 2008-09 Q4.

### **1.3 Passenger revenue**

- Passenger revenue was £1,594 million in 2009-10 Q4, a 6.2% increase from 2008-09 Q4.

### **1.4 Timetabled train kilometres**

- Timetabled train kilometres for all operators increased by 2.4% to 124.26 million km for 2009-10 Q4. Both franchised and non-franchised operators showed a 2.4% increase for 2009-10 Q4 on 2008-09 Q4.

OFFICE OF RAIL REGULATION

## Appendix 2

### Road network stress maps from Highways Agency “South East Regional Network Report 2008”

1. The Highways Agency reported its analysis of conditions on its core network in the south east in its “South East Regional Network Report 2008”. This included “stress maps” showing actual and predicted stress levels on the core highway network in the region. These maps are shown below.

Figure 1: Observed Stress 2006 (figure 6.4. SE RNR 2008)



Figure 2: Observed Stress 2016 (figure 7.1. SE RNR 2008)

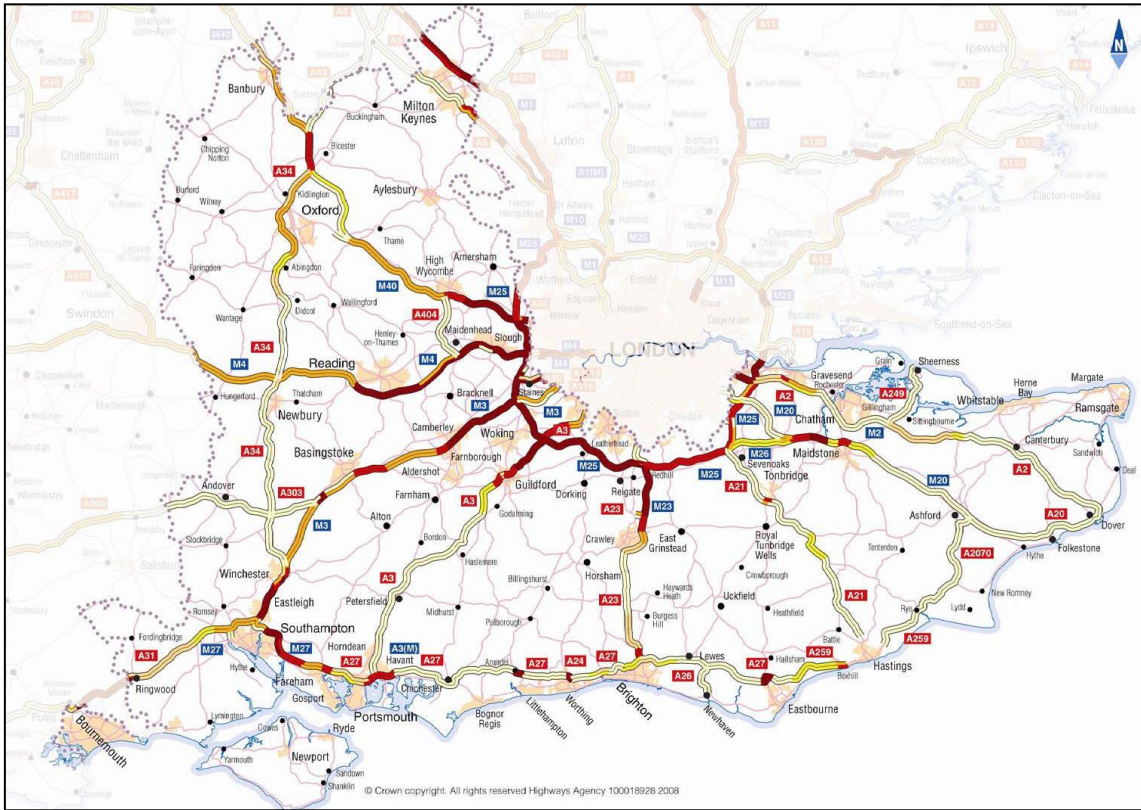
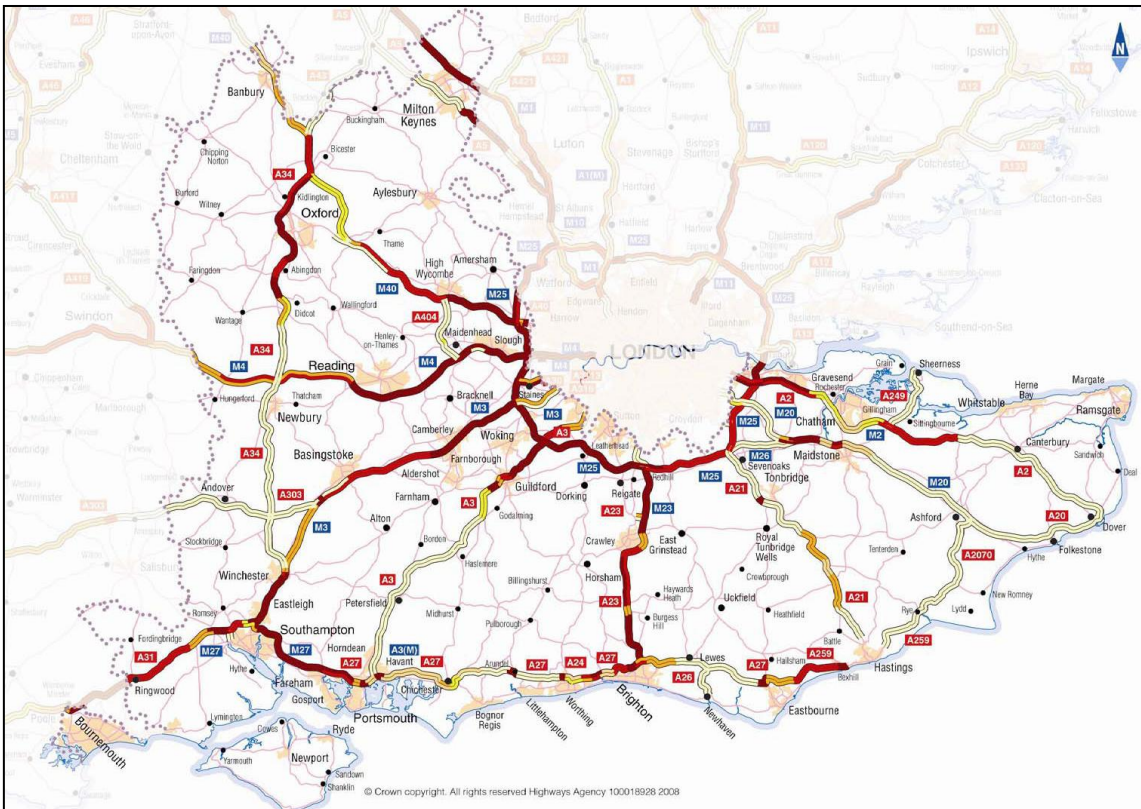


Figure 3: Observed Stress 2026 (figure 7.2, SE RNR 2008)



## Appendix 3

### Extract from Rail Safety & Standards Board report T618 “Traction Energy Metrics”, 2007

1. This report compared energy use and CO<sub>2</sub> emissions between different types of train, and between these and other modes of transport., The Class 170 trains quoted are identical, apart from couplings, with the Class 168 trains that Chiltern proposed to use on Marylebone-Oxford services.

## 6 COMPARISON BETWEEN MODES OF TRANSPORT

### 6.1 LIMITATIONS OF THIS COMPARISON

Results presented in previous sections of this report were based on hard data calculating the energy and fuel consumption for different groups of vehicles on the basis of kWh/seat-km or litres/100 seat-km. It is not appropriate to use these measures when comparing different domestic transport modes as they have very different load factors. In general, services that operate a fully reserved, point-to-point service have a higher average load factor than those that operate a “turn up and walk on” service with multiple stops. In this section, we have assumed the following load factors: urban bus 20%, intercity coach 60%, intercity rail 40%, all other trains 30% (including commuter services), domestic airlines 70%, cars 30%.

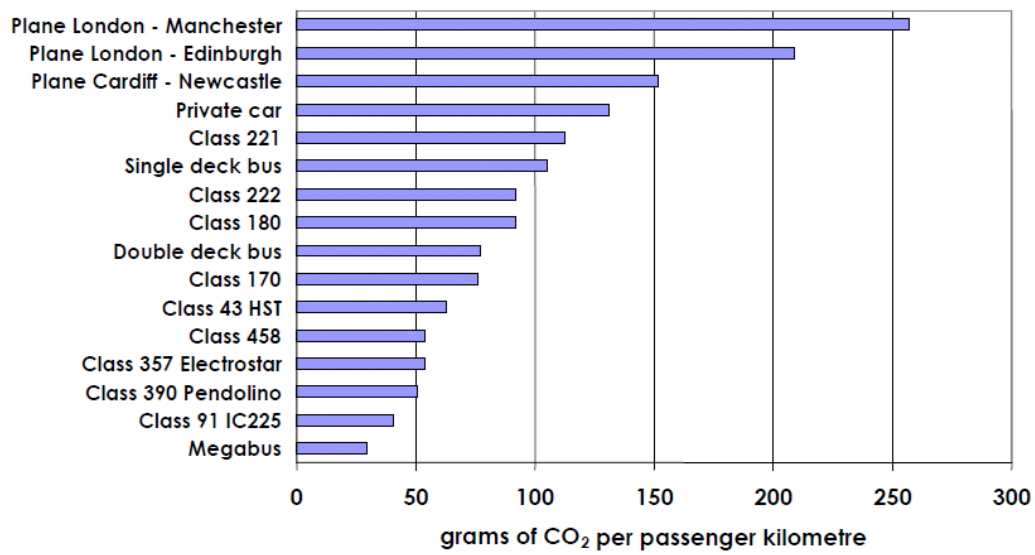
This section also compares domestic transport modes across a wide range of speed and styles of passenger accommodation. Urban buses may have an average speed of 10 km/h and stop every 500 metres; domestic airlines fly almost 10 times faster with 500 times the distance between stops. The data in the following section is not intended to be an authoritative league table of transport modes but provides broad comparative data of CO<sub>2</sub> emissions, which can be a surrogate for energy consumption.

We have considered only the relative CO<sub>2</sub> emissions of the different domestic transport modes. This is valid with the present and assumed future GB energy mix and with existing technologies. However a completely new technology, such as a hydrogen-fuelled bus with a dedicated supply of hydrogen produced directly from nuclear power without going through the public electricity supply, could be considered to have zero CO<sub>2</sub> emissions, but may have very large energy demands. In such a case, it would be appropriate to also compare other factors such as total energy use, not just CO<sub>2</sub> emissions, as has been done here.

The Class 373 Eurostar train has been omitted from this section because the assumptions used for domestic trains cannot reasonably be applied to Eurostar pan-European services as they are operationally and commercially very different.

### 6.2 COMPARISONS OF CO<sub>2</sub> EMISSIONS OF DIFFERENT MODES

The following diagram shows indicative CO<sub>2</sub> emissions per passenger on the load-factor assumptions above. Road, air and diesel-powered rail vehicle emissions have been increased to take account of refinery losses and electric powered vehicles take into account losses from power generation through to the train. The bar length represents the emissions based on current electricity generation mix.



Notes: Data assumes the following load factors: urban bus 20%, intercity coach 60%, intercity rail 40%, all other trains 30%, domestic airlines 70%, and cars 30%. Road, air and diesel-powered rail vehicles emissions have been increased to take account of refinery losses and electric powered vehicles take into account losses in the grid. The aviation figures include a factor for radiative forcing.

## Appendix 4

### Secretary of State's timetable requirements

1. The Deed of Amendment to the Chiltern Railways Franchise Agreement, dated 6<sup>th</sup> January 2010, sets out the Secretary of State's requirements for the minimum passenger service to be operated, as follows:

#### ANNEX 2: Oxford Timetable Outputs

Replaces Flow B in Output Plan from the Passenger Change Date or Subsidiary Change Date on which the Franchise Operator begins to deliver the Oxford Timetable Outputs

#### 4.5 Flow B: London Marylebone to Bicester-Monday to Fridays

**Table1: Monday to Friday services to London Marylebone from stations specified in Column A**

Station of Departure /Core Calling Pattern	Early Service to London Marylebone from station in column A, shall arrive no later than	Late Service to London Marylebone from station in column A, shall depart no earlier than	Maximum intervals between services, including Early and Late Services (minutes)	Maximum Journey Time of all services (minutes)	Morning Peak number of services arriving London Marylebone, between 0700-0959	Number of trains per hour arriving or departing from London Marylebone between 0700-2100 (excluding peak hours)
A	B	C	D	G	H	I
Oxford	0745	2210	60	80	6	2
Water Eaton Parkway	0745	2210	60	N/A	6	2
Bicester (c)	0730	2225(a)	60	N/A	11	4
Haddenham & Thame Parkway	0730	2240(a)	60	N/A	10	2 ½ (d)
Princes Risborough	0700	2310(b)	60	N/A	11	3

**Table 2: Monday to Friday services from London Marylebone to stations specified in Column A**

Station of Arrival /Core Calling Pattern	Early Service from London Marylebone to station in column A, shall arrive no later than	Late Service from London Marylebone to station in column A, shall depart no earlier than	Maximum intervals between services, including Early and Late Services (minutes)	Maximum Journey Time of all services (minutes)	Evening Peak number of services departing London Marylebone, between 1600-1859	Trains per hour arriving or departing from London Marylebone between 0700- 2100 (excluding peak hours)
A	B	C	D	G	H	I
Princes Risborough	0740	2330	60	N/A	14	3
Haddenham & Thame Parkway	0750	2230	60	N/A	10	2 ½ (d)
Bicester (c)	0800	2230	60	N/A	11	4
Water Eaton Parkway	0725	2215	60	N/A	6	2
Oxford	0730	2215	60	80	6	2

Footnotes to Columns C and I in Table 1 and Table 2:

- (a) *The Late Service is the same service that has to depart Snow Hill for London Marylebone no earlier than 2115 (Flow A, Table 1).*
- (b) *The Late Service is the same service that has to depart Aylesbury for London Marylebone no earlier than 2300 (Flow B, Paragraph 4.5.3(c)).*
- (c) *Bicester North or Bicester Town*
- (d) *5 trains every 2 hours*

**4.5.7 Islip (Flow B, Table 1 and Table2) shall be served by:**

- (a) *Seven services in each direction shall call at regular intervals.*
- (b) *A service from Islip shall be provided that arrives at Oxford no later than 0830.*
- (c) *A service from Oxford to Islip shall be provided that departs between 1700 and 1800.*

#### 4.6 Flow B: London Marylebone to Bicester – Saturdays

**Table 3: Saturday services to London Marylebone from stations specified in Column A**

Station of Departure /Core Calling Pattern	Early Service to London Marylebone from station in column A, shall arrive at London Marylebone no later than	Late Service to London Marylebone from station in column A, shall depart no earlier than	Maximum intervals between services, including Early and Late Services (minutes)	Maximum Journey Time of all services (minutes)	Number of trains per hour arriving or departing from London Marylebone between 0700-2100
A	B	C	D	G	I
Oxford	0830	2205	60	80	2
Water Eaton Parkway	0830	2210	60	N/A	2
Bicester (g)	0815	2220	60	N/A	4(a)
Haddenham & Thame Parkway	0815	2230	60	N/A	2(b)
Princes Risborough	0815	2240	60	N/A	2(c)

**Table 4: Saturday services from London Marylebone to stations specified in Column A**

Station of Arrival /Core Calling Pattern	Early Service from London Marylebone to station in column A, shall arrive no later than	Late Service from London Marylebone to station in column A, shall depart no earlier than	Maximum intervals between services, including Early and Late Services (minutes)	Maximum Journey Time of all services (minutes)	Number of trains per hour at London Marylebone between 0700- 2100
A	B	C	D	G	I
Princes Risborough	0830	2230	60	N/A	2(d)
Haddenham & Thame Parkway	0840	2230	60	N/A	2(e)
Bicester (g)	0850	2230	60	N/A	4(f)
Water Eaton Parkway	0725	2215	60	N/A	2
Oxford	0730	2215	60	80	2

**Footnotes to Column I in Tables 3 and 4:**

- (a) The number of services required to arrive at London Marylebone from Bicester North is one per hour between 0700-0900, two per hour between 0900-1100, and one per hour between 2000-2100.
- (b) The number of services required to arrive at London Marylebone from Haddenham & Thame Parkway is one per hour between 0700-0900 and 2000-2100.
- (c) The number of services required to arrive at London Marylebone from Princes Risborough is three per hour between 0900-1100 and one per hour between 2000-2100.
- (d) The number of services required to depart London Marylebone for Princes Risborough is one per hour between 0700-0800.
- (e) The number of services required to depart London Marylebone for Haddenham & Thame Parkway is one per hour between 0700-0800 and 2000-2100.
- (f) The number of services required to depart London Marylebone for Bicester North is one per hour between 0700-0800, two per hour between 0800-1000 and 1900-2000, and one per hour between 2000-2100.
- (g) Bicester North or Bicester Town

#### 4.6.6 Bicester Town and Water Eaton Parkway Services (Flow B, Table 4):

- (a) Two services from Bicester Town and Water Eaton Parkway shall arrive at Oxford between 0800 and 0900. These services may be formed of services specified in Table 4.

#### 4.6.7 Islip (Flow B, Table 3 and Table 4) shall be served by:

- (a) Seven services in each direction shall call at regular intervals.

4.7 Flow B: London Marylebone to Bicester – Sundays

**Table 5: Sunday services to London Marylebone from stations specified in Column A**

Station of Departure /Core Calling Pattern	Early Service to London Marylebone from station in column A, shall arrive at London Marylebone no later than	Late Service to London Marylebone from station in column A, shall depart no earlier than	Maximum intervals between services, including Early and Late Services (minutes)	Maximum Journey Time of all services (minutes)	Number of trains per hour arriving at London Marylebone between 1200 and 2100
A	B	C	D	G	I
Oxford	1100	2205	60	90	2(d)
Water Eaton Parkway	1100	2210	60	N/A	2(d)
Bicester (c)	1045	2220	60	N/A	3
Haddenham & Thame Parkway	1045	2230	60	N/A	2
Princes Risborough	1045	2240	60	N/A	3

**Table 6: Sunday services from London Marylebone to stations specified in Column A**

Station of Arrival /Core Calling Pattern	Early Service from London Marylebone to station in column A, shall arrive no later than	Late Service from London Marylebone to station in column A, shall depart no earlier than	Maximum intervals between services, including Early and Late Services (minutes)	Maximum Journey Time of all services (minutes)	Number of trains per hour departing from London Marylebone between 1200 and 2100
A	B	C	D	G	I
Princes Risborough	0840	2330	60(a)	N/A	3
Haddenham & Thame Parkway	0850	2330	60(a)	N/A	2
Bicester (c)	0900	2330	60(a)	N/A	3(b)
Water Eaton Parkway	0910	2315	60(e)	N/A	2(f)
Oxford	0915	2215	60(e)	90	2(f)

**Footnotes to Columns D and I in Tables 5 and 6:**

- (a) An interval of 80 minutes is permitted before 0900.
- (b) In one of the specified hours there may be two trains departing London Marylebone.
- (c) Bicester North or Bicester Town
- (d) The number of services required to arrive at London Marylebone from Oxford is one per hour between 1800-2100.
- (e) An interval of 80 minutes is permitted before 1015.
- (f) The number of services required to depart London Marylebone for Oxford is one per hour between 1200 and 1300 and between 1900 and 2100.

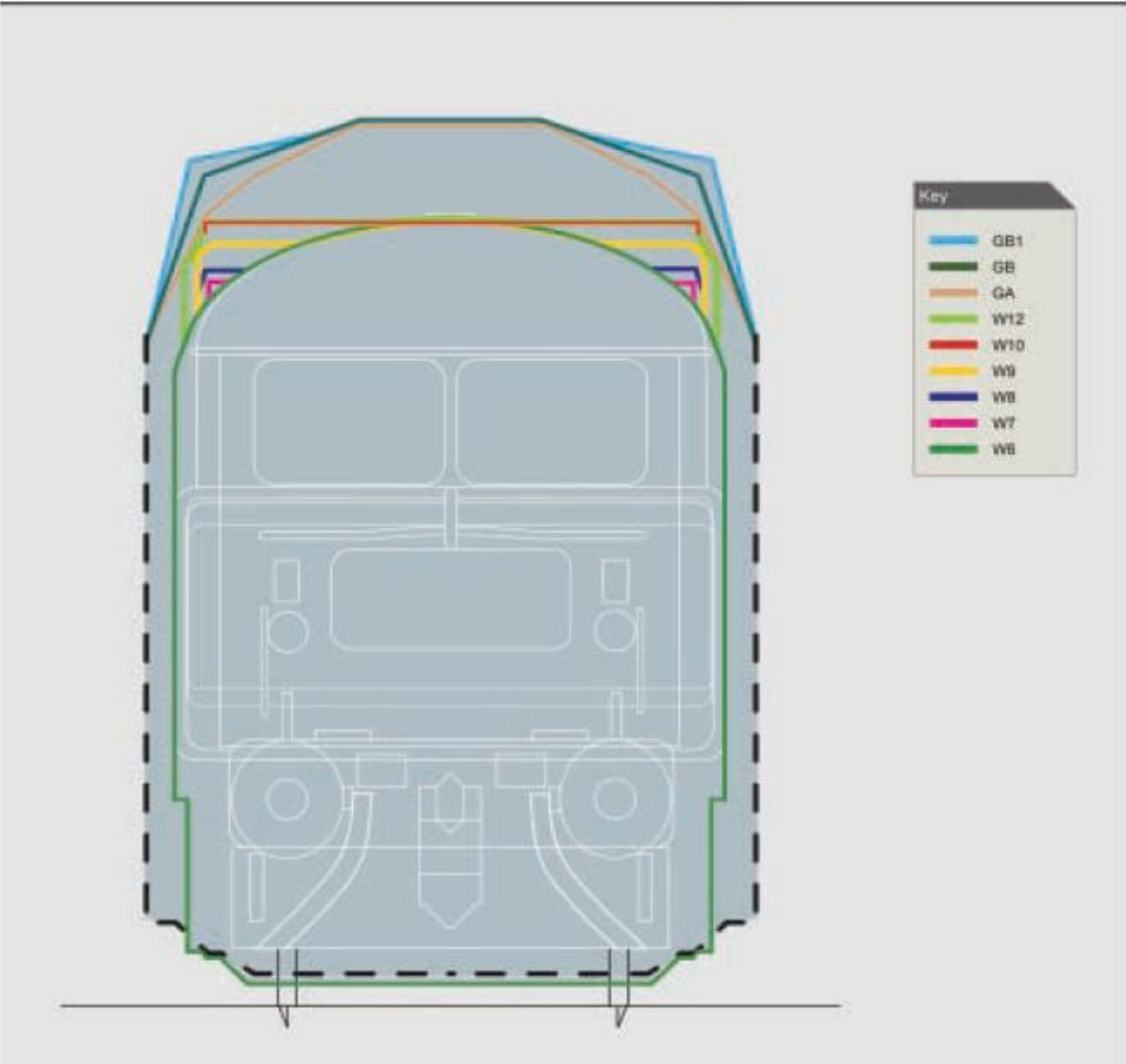
## Appendix 5

### Freight loading gauge

- 1 When the use of multi-modal shipping containers commenced in the 1960s, dimensions were standardised at 8'0" high, 8'0" wide, and multiples of 10'0" long.
- 2 Subsequently, whilst the width and length of containers has remained standard, the height has increased, first to 8'6" and now to 9'6", and the latter containers now account for a significant proportion of world trade. This reflects the changing transport task, from low-volume/high weight industrial materials to high volume/low weight consumer goods. 9'6" represents the practical height limit for most transport systems worldwide, and is now the de-facto international standard.
- 3 For historical reasons the British railway loading gauge (i.e. the vertical and lateral space within bridges and tunnels for rail vehicles) is more restricted than in most other countries. Most routes were originally restricted to W6 gauge (see **Figure 1** below), but many have been converted to "W8" gauge, which allows carriage of 8'6" high containers on conventional wagons. 9'6"-high containers can only be transported over W8 routes using wagons with very small wheels (which gives rise to extra maintenance costs) or with a dropped-floor "well" between the bogies (which restricts the load space per wagon, thus requiring more wagons to move a given amount of cargo). In either case the ability of rail to compete with less-sustainable road transport is reduced.
- 4 The rail industry and the DfT have thus embarked on a programme to enlarge those rail routes leading to and from the key ports to "W10" gauge, which will enable carriage of 9'6" containers on conventional wagons. Where appropriate, provision is also being made for "W12" gauge. As with "W10" gauge this allows 9'6"-high containers, and also the slightly wider (2.6m) European-standard "swap-bodies". (These are dual-mode containers designed for carriage by road and rail, but not by deep-sea shipping.)
- 5 "W12+" gauge is a variant of "W12", that also allows space for future electrification using overhead wires at 25kV ac.
- 6 As can be seen from in **Figure 1**, the main requirement for increased clearances is at cantrail level (i.e. eaves height). This is because shipping containers are rectangular in profile, whereas structures such as tunnels have a curved profile that is closely matched by conventional railway vehicles with arched roofs. In a tunnel gauge enhancement is normally achieved by lowering the track, with the result that the void between the top of the vehicles and the tunnel roof actually increases, despite the carriage of higher containers

Figure 1: Loading gauge profiles

### Rail freight loading gauges



Source: DfT "The Strategic Rail Freight Network", 2009

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## Appendix 6

### DfT report “The Strategic Rail Freight Network: the Longer-Term Vision” (The SRFN Report), 2009

- 1 In September 2009 the DfT published the SRFN Report. It SRFN Report:
  - Acknowledges that rail freight generally has a less negative impact on society than does road transport, so has a crucial role to play in delivering significant reductions in pollution and congestion;
  - Builds on existing programmes to increase loading gauge and capacity on key freight routes serving major ports; and
  - Sets out how the DfT envisages that the intensively-used, mixed-traffic rail network can be enhanced to accommodate rail freight growth through to 2030.
- 2 The SRFN Report sets out key principles for the development of the network. Those relevant to the Order Scheme are that:
  - Consideration should be given to the reopening of the East-West Rail line (Oxford-Bletchley-Bedford) for freight; and
  - W12 loading gauge capacity should be implemented on strategic container routes.
- 3 Reference is made in the SRFN Report to heavier axleloads on selected routes; it is understood that this is for major flows of bulk traffics such as iron ore, and is not proposed for the East-West line.
- 4 Relevant extracts form the SRFN Report are set out below.

# Britain's Transport Infrastructure

## Strategic Rail Freight Network: The Longer Term Vision



September 2009

# Introduction

7. Efficient and sustainable freight transport is increasingly important both to the UK's economy and to the achievement of our environmental goals. Rail transport generally has a less negative impact on society than road transport and so has a crucial role to play in delivering significant reductions in pollution and congestion. For this reason, the 2007 Rail White Paper announced the Government's intention to develop a Strategic Rail Freight Network (SRFN) to facilitate the continued growth of rail freight services.
8. The 2007 High Level Output Specification (HLOS) committed £200 million to take forward the development of the SRFN in Control Period 4 (CP4: 2009-10 to 2013-14), and provided funding for major infrastructure works at Reading and on the East Coast corridor, both of which will significantly enhance freight operations. This investment builds on the programme to increase the loading gauge and capacity of key freight routes serving major ports, announced under the Productivity Transport Innovation Fund scheme.
9. This paper looks to the future, beyond CP4, and sets out ways in which we envisage that further development of the SRFN and enhancement of freight operations will enable UK's intensively utilised mixed-traffic network to accommodate rail freight growth forecast to 2030.

# Context

10. We need to make the fullest use of the UK's predominantly mixed-traffic rail network. Conflicts occur between passenger and freight requirements (and between different types of passenger services) at numerous points on the railway, eroding network capacity and reliability. At present the network is almost nowhere optimised for freight, which reduces the efficiency of the UK's rail distribution logistics.
11. The SFN is intended to provide a framework for targeting investment and network management better to meet freight requirements and to resolve such conflicts. This should both improve the logistical efficiency of the railway and secure network capacity and reliability gains to the benefit of all users. The SFN is therefore a key element in making the best use of existing and future rail resources.
12. Network Rail (NR) is working with the industry and the Department to agree robust freight forecasts for 2030. The maps at *Annex A* provide: a picture of the proposed SFN; key freight/passenger network interaction; coal traffic flows for the electricity supply industry in 2006 and 2030; and the main flows of intermodal traffic anticipated in 2030. Analysis to date indicates growth of up to 75 per cent, concentrated on the deep sea intermodal sector but offset somewhat by a 20 per cent decline in coal traffic. Further information on the maps used in *Annex A*, the 2030 forecasts and NR's work on the SFN is available on the NR website ([www.networkrail.co.uk](http://www.networkrail.co.uk)).

# Definition of the Strategic Rail Freight Network

13. The 2007 Rail White Paper defined the SFN as: “a core network of trunk freight routes, capable of accommodating more and longer freight trains, with a selective ability to handle wagons with higher axle loads and greater loading gauge, integrated with and complementing the UK’s existing mixed traffic network.”
14. An ideal freight network would accommodate optimum sized freight trains travelling at appropriate line speed, without checks, over optimum routing to commercially preferred timings. In practical terms this suggests that the SFN should:
  - optimise the pattern of freight trunk routing to minimise passenger/ freight conflicts. This may lead to fewer, higher capacity trunk routes/ diversionary routes but also to the definition of ‘new’ trunk routes. This would provide potential gains in reliability, environmental performance and operating cost savings;
  - develop appropriate diversionary routes and implement a standard network-wide possessions regime, with general use of single line working (SLW), to provide 24-hour/365-day network availability;
  - upgrade an optimised pattern of freight trunk routes to eliminate traffic conflict and pinch points. This may require construction or reinstatement of chords, avoiding lines, investment in grade separated junctions etc; and
  - upgrade trunk freight routes to meet the requirements of traffic, which may include any (or all) of the following: measures to increase the number of freight train paths; provision for increased train length; increased loading gauge (including the longer term objective of securing a European gauge route from High Speed1 (HS1) to the North); increased axle-load; and infill electrification.
15. The SFN will continue to evolve over time to reflect emerging national and international logistics and freight network requirements. We should therefore consider safeguarding strategic disused freight alignments, etc.

# Strategic Rail Freight Network: longer-term development

19. The SFN schemes for Control Period 5 (CP5: 2014-15 to 2018-19) and beyond will be developed as an integral part of the network planning process which will underpin the next HLOS and the emerging strategies for dealing with future passenger demand on the main line routes.
20. The nine principles set out below define the key requirements for the longer-term development of the SFN.

*(only those principles relevant to the Order Scheme are shown below)*

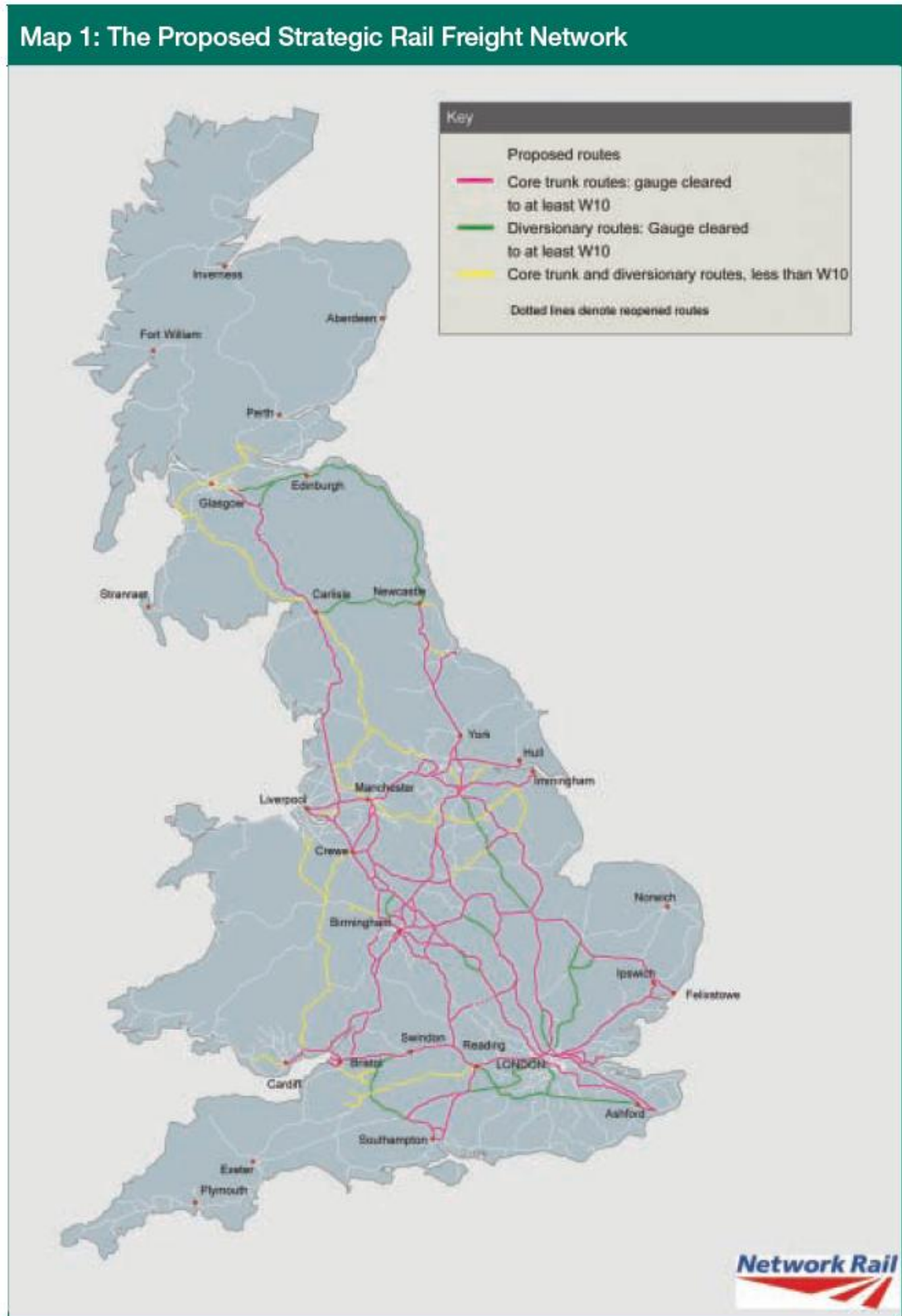
## 20.4 W12 loading gauge

- W12 should be implemented as the standard loading gauge for all strategic container routes including diversionary routes (except by specific route derogation) because it caters both for standard short sea sea containers. (See Annex E: Rail Freight Loading Gauges).
- Small scale 'infill' gauge clearance schemes should be progressed as opportunity and funding allows.

## 20.6 *New freight capacity*

- New SFN capacity, particularly on key intermodal routes, will be required to meet industry growth forecasts if this additional traffic is not to be forced onto the congested road network.
- Routes for consideration for early capacity enhancement are likely to include:
  - Ipswich to Nuneaton (CP4 and CP5);
  - the ‘Joint Line’ (to be upgraded in CP4 as the ECML Peterborough to Doncaster via Spalding freight line, with possible further capacity enhancement in CP5);
  - East-West Line (Oxford-Bedford with upgraded links to the West Coast Main Line (WCML) and MML);
  - MML 4-tracking;
  - Stourbridge to Walsall and subsequently Walsall to Lichfield restitution;
  - Southampton to WCML – possibly with upgrades to routes and/or examination of alternative routing options to provide capacity for growth;
  - Freight routes to Manchester Hub terminals including Trafford Park.
- SFN capacity should also be boosted by the safeguarding as ‘strategic freight capacity’ of part of any route capacity released on ‘classic’ lines in the event of the development of any new line(s) (see 20.9 below).

# Strategic Rail Freight Network maps



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