



High Speed UK

Connecting the Nation,
Connecting the Midlands Engine,
and Connecting Coventry

Who are we?

- Colin Elliff BSc CEng MICE
Civil Engineering Principal, HSUK



- Quentin Macdonald BSc(Eng)
CEng MIET FIRSE
Systems Engineering Principal, HSUK

Colin Elliff – in one page

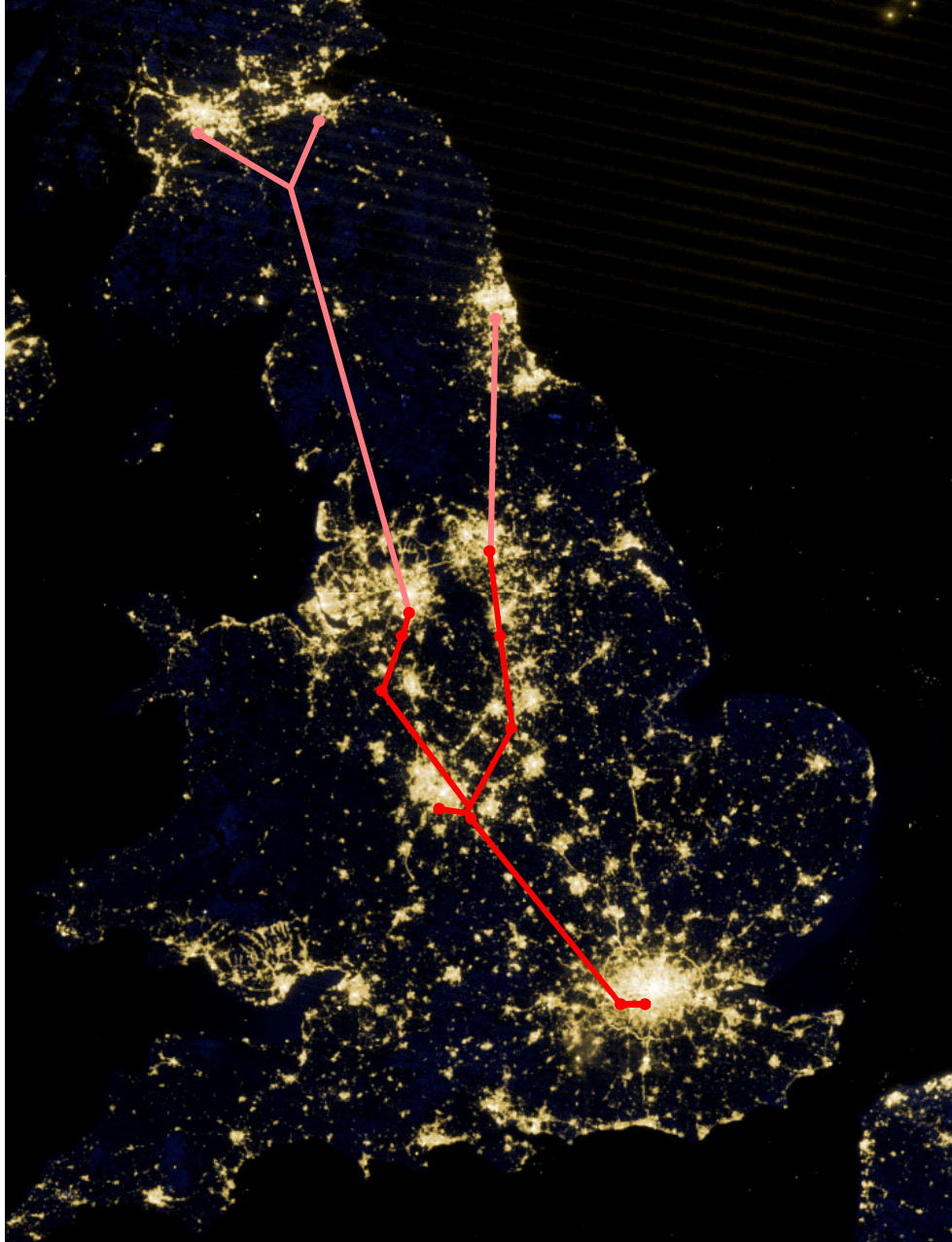
- 1958: Born in Darlington
- 1963-1976: Schooling in Hexham & Harrogate
- 1976-1979: BSc in Civil Engineering, Bristol Uni
- 1980: Joined British Rail, started at York
- 1989: Transferred to BR Southern at Croydon
- 1995: TUPE'd to major railway consultant
- 2001: *Rails around London* (ICE paper)
- 2004: Returned to Harrogate, same employer
- 2006: Started developing HSUK concept
- 2010: Gagging order from consultant employer
- 2013: Retired to work full-time on HSUK

What is HSUK?

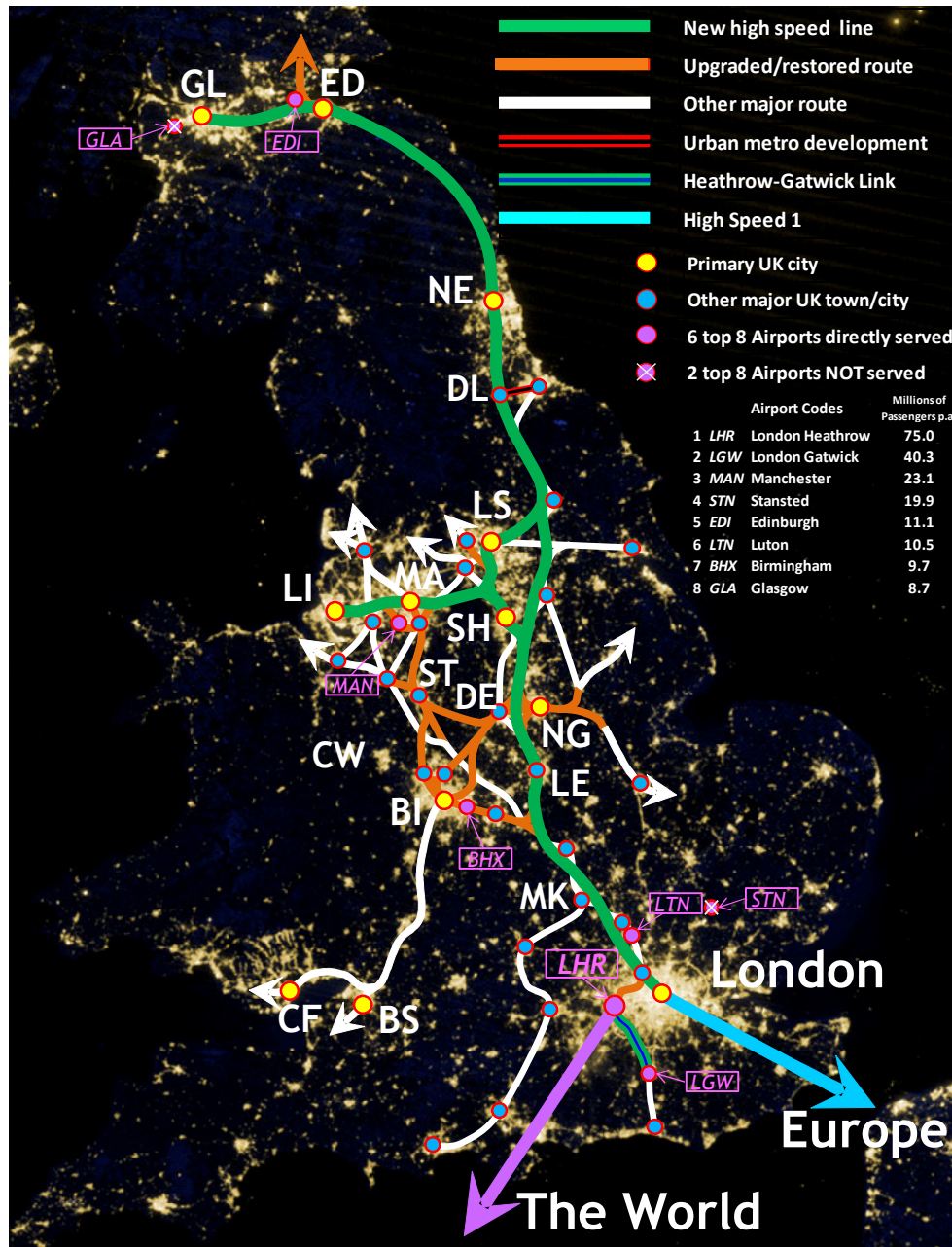
- A complete alternative **design** to HS2
- Designed because of the obvious deficiencies of the HS2 design as seen through the eyes of professional railway engineers
- Work began 11 years ago and the essence of the design was complete 4 years ago
- Since then primary focus on analysing the performance of HSUK as a railway system to create a fully integrated UK intercity network



The far from
blank canvas
of the UK waiting
for new railways
to traverse it



The HS2 response



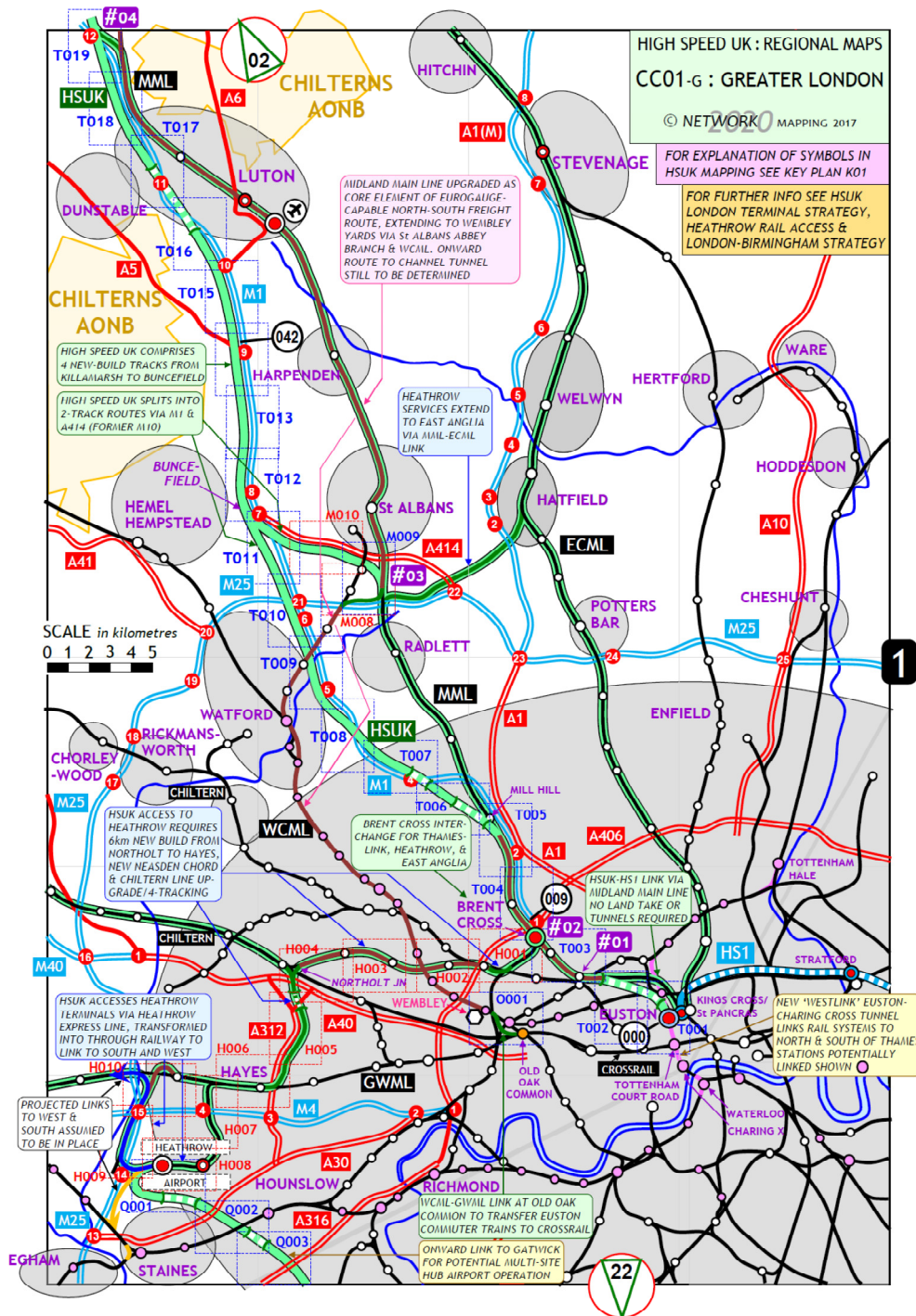
Scope of HSUK

The HSUK Design

- It is a design which consists of a mixture of new high speed line, upgraded existing lines and reopened lines.
- It is fully mapped at a scale of 1:200,000 which displays the scope of the design. 21 sheets cover from London to Glasgow.
- It is also fully designed at 1:25,000 which means that it is ready to be taken to the next stage of detailed development.
- On 400+ alignment drawings every straight, every transition and every circular curve has been designed – with supporting vertical alignments.

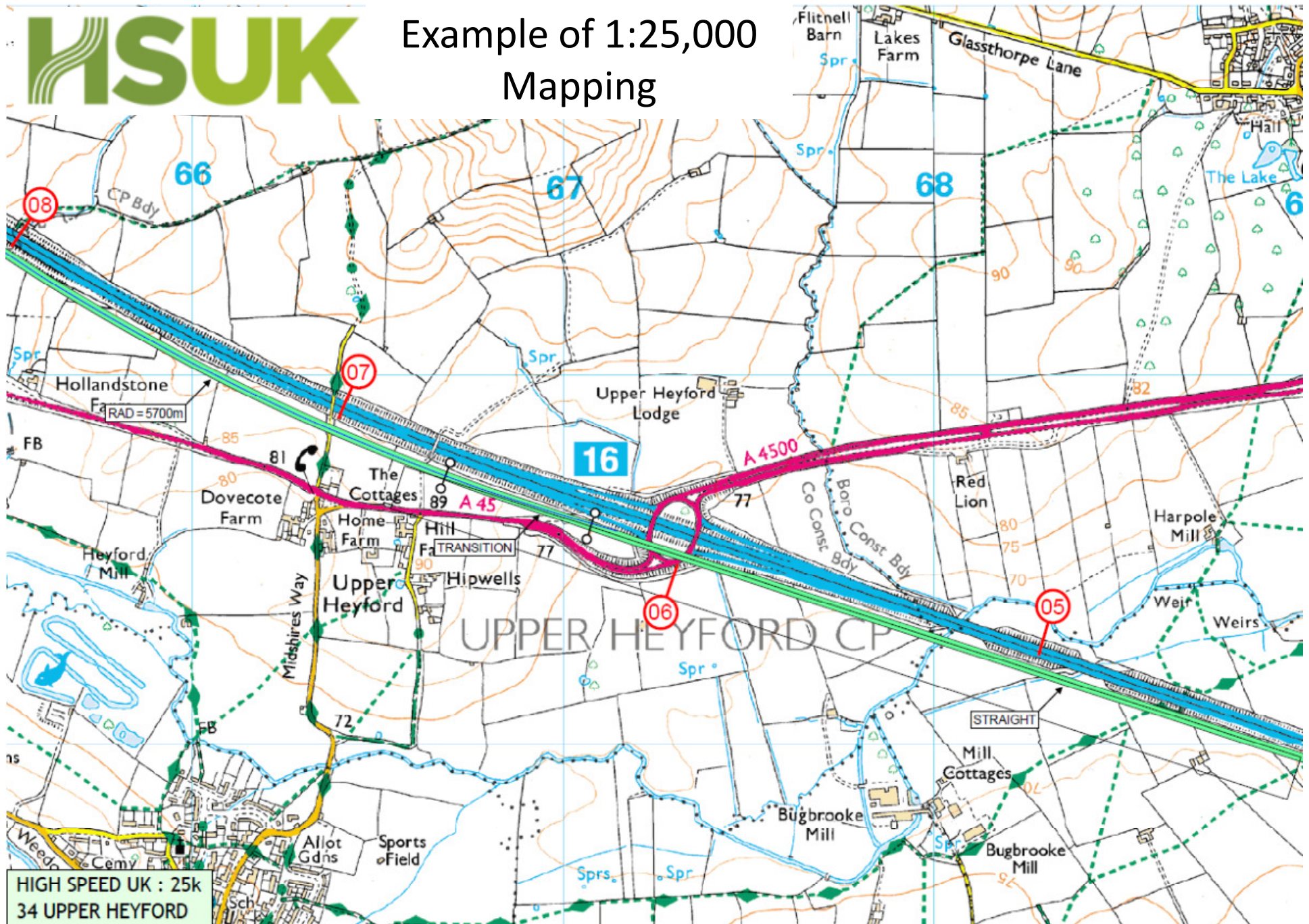
HSUK – High Speed UK –
Connecting the Nation

Example of
1:200,000
scale mapping





Example of 1:25,000 Mapping



HS2's Mission Statement

- In evidence to the House of Commons HS2 Select Committee on 30th November 2015, Prof. Andrew McNaughton (then Technical Director of HS2 Ltd.) uttered the following 'Hostage to Fortune':
- **"The aim of the HS2 project is to deliver hugely enhanced capacity and connectivity between our major conurbations."**
- Good stuff - could anyone disagree with that?
- The question is ***does HS2 deliver it?***
- **Answering that question is one theme today.**
- **Introducing *HS2 – High Speed to Failure:***

Connectivity – *What does it mean?*

- Connectivity – the state of being connected
– availability & ease of undertaking a journey
- 4 key measures employed by HSUK:
 1. Journey time reduction
 2. Number of direct journeys possible
 3. Number of journeys made faster
 4. Number of journeys ‘made worse’
- ‘Made worse’ =
 1. Frequency reduced
 2. Journey made slower
 3. Change introduced or new walking transfer

Capacity – *What does it mean?*

- Capacity – how many trains per hour??
- The real Capacity issue – the provision of sufficient ‘space’ in a railway system to run the trains necessary to achieve the required connectivity.
- Capacity influenced by:
 1. Number of available routes
 2. Number of available tracks
 3. Different types of rail traffic ie speed & stopping pattern
 4. Number of available platforms at stations
 5. Signalling system

What should HS2 achieve (1)?

- **NB only applies within the HS2 Zone of Influence**
London, W. Midlands, E. Midlands, Merseyside, G. Manchester, S. Yorkshire,
W. Yorkshire, Humberside, Teesside, Tyneside, Central Belt of Scotland
- Be accessible to the greatest possible proportion of the UK population **X**
- Deliver hugely enhanced connectivity and capacity between our major conurbations **X**
- Give the greatest reductions in journey time for the least cost and environmental damage **X**
- Improve links to UK's principal airports not just LHR (75.0) but also LGW (40.3), MAN (23.1), EDI (11.1), LTN (10.5), BHX (9.7 Millions of Passengers p.a.) **X**

What should HS2 achieve (2)?

- Enable the development of ‘Powerhouse Economies’ in all UK regions **X**
- Through good network design, maximise the opportunity for more freight to be transported on the existing network thereby reducing road congestion and pollution **X**
- Offer a scheme with a Benefit to Cost ratio of at least 4.0 as in the Treasury Green Book **X**
- Conform with all aspects of public policy e.g. the 80% target for reduction of CO₂ required by the 2008 Climate Change Act **X**

Does HS2 Pass the Tests?

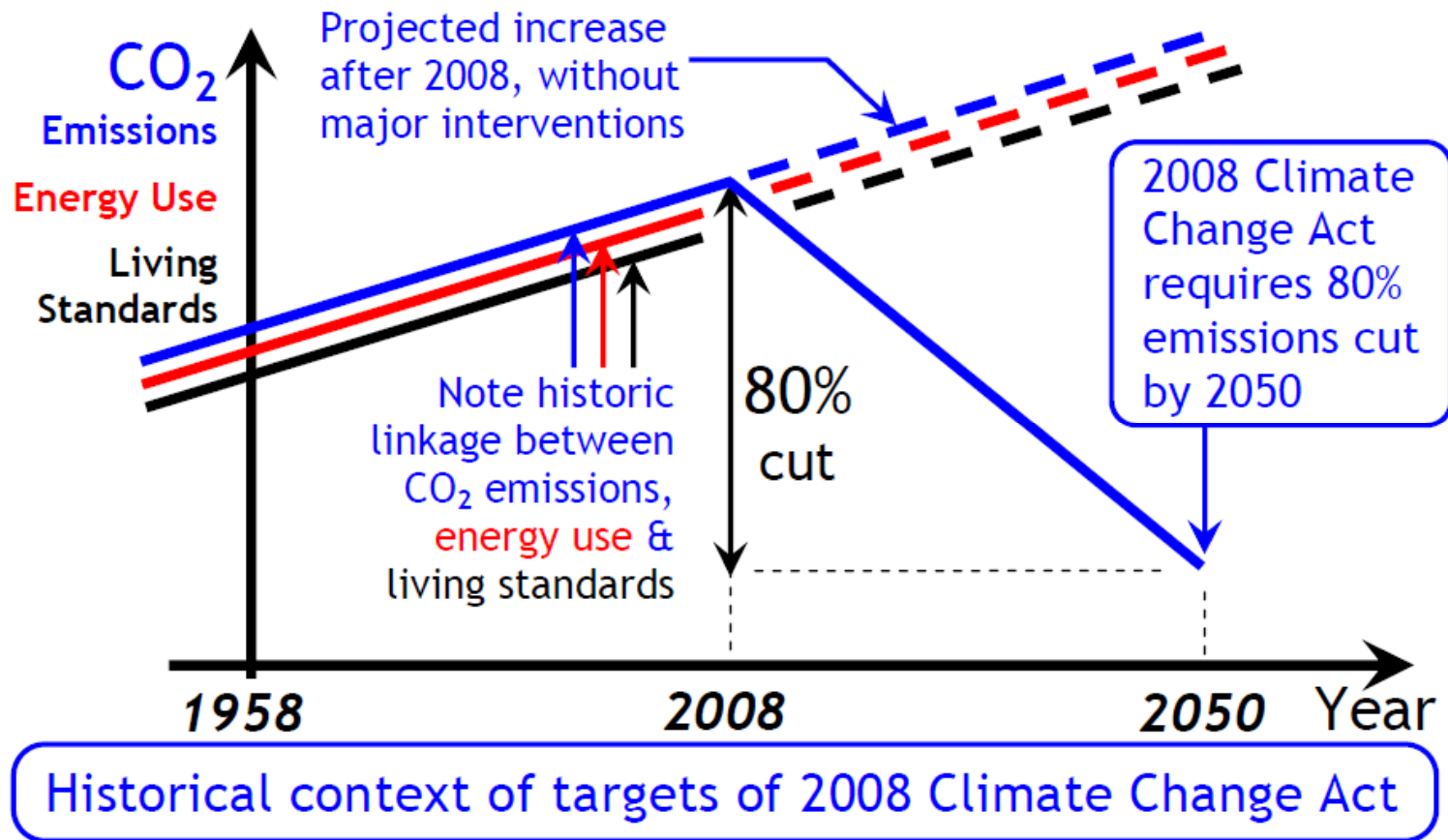
- We set 22 tests and judged HS2 against each one.
- HS2 fails every single one of the 22 tests.
- It is clear from the tests that HS2 is a very poor scheme which is not value for money.
- HSUK on the other hand passes all the tests.
- Key difference – HSUK designed as network, offering far greater capacity & connectivity.
- Copies of our report *HS2 – High Speed to Failure* available online www.highspeeduk.co.uk

22 Tests of *HS2 - High Speed to Failure*

1	Connectivity	12	Midlands Engine
2	Capacity	13	Northern Powerhouse
3	City Centre Station	14	Route to Scotland
4	6 Principles of Network Design	15	Cost & BCR
5	Timetable	16	CO ₂ Emission Reductions
6	London Hub Airport	17	Remit
7	Heathrow access	18	Speed
8	European access	19	Option Selection
9	Freight strategy	20	Impartial Assessment
10	Chilterns or M1 routeing	21	Network Design
11	Euston access	22	Democracy/Consultation

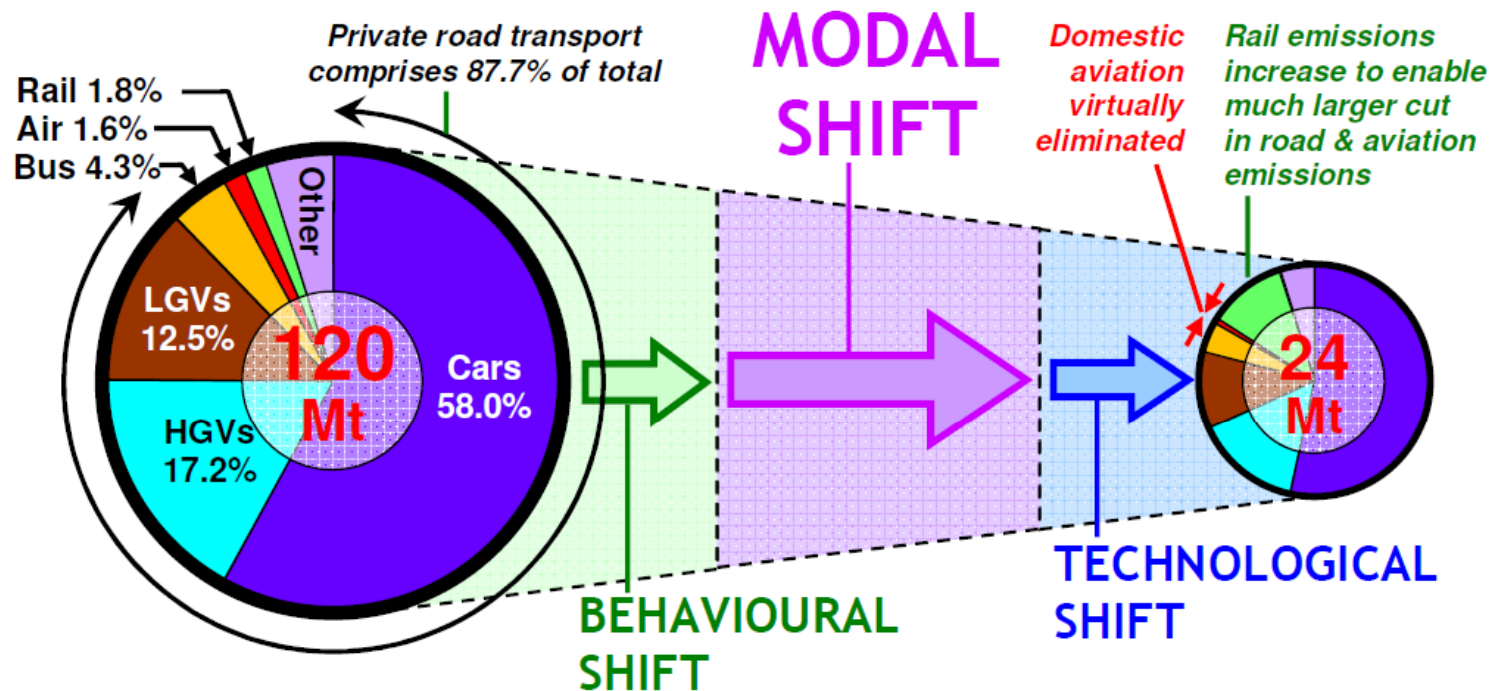
HS2 fails all 22 Tests

Environmental Implications (1)



- 80% target not achievable through 'business as usual'

Environmental Implications (2)

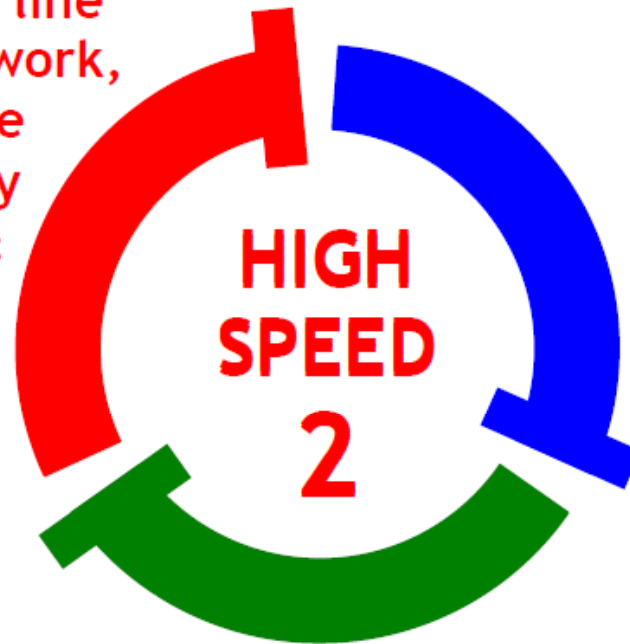


3 'Shifts' must occur to deliver 80% emission reductions by 2050

- 25% of CO₂ emissions from the transport system
- Step-change modal shift offers greatest opportunity

Environmental Implications (3)

HS2 designed as line rather than network, with no effective integration. Only small capacity & connectivity gains achieved

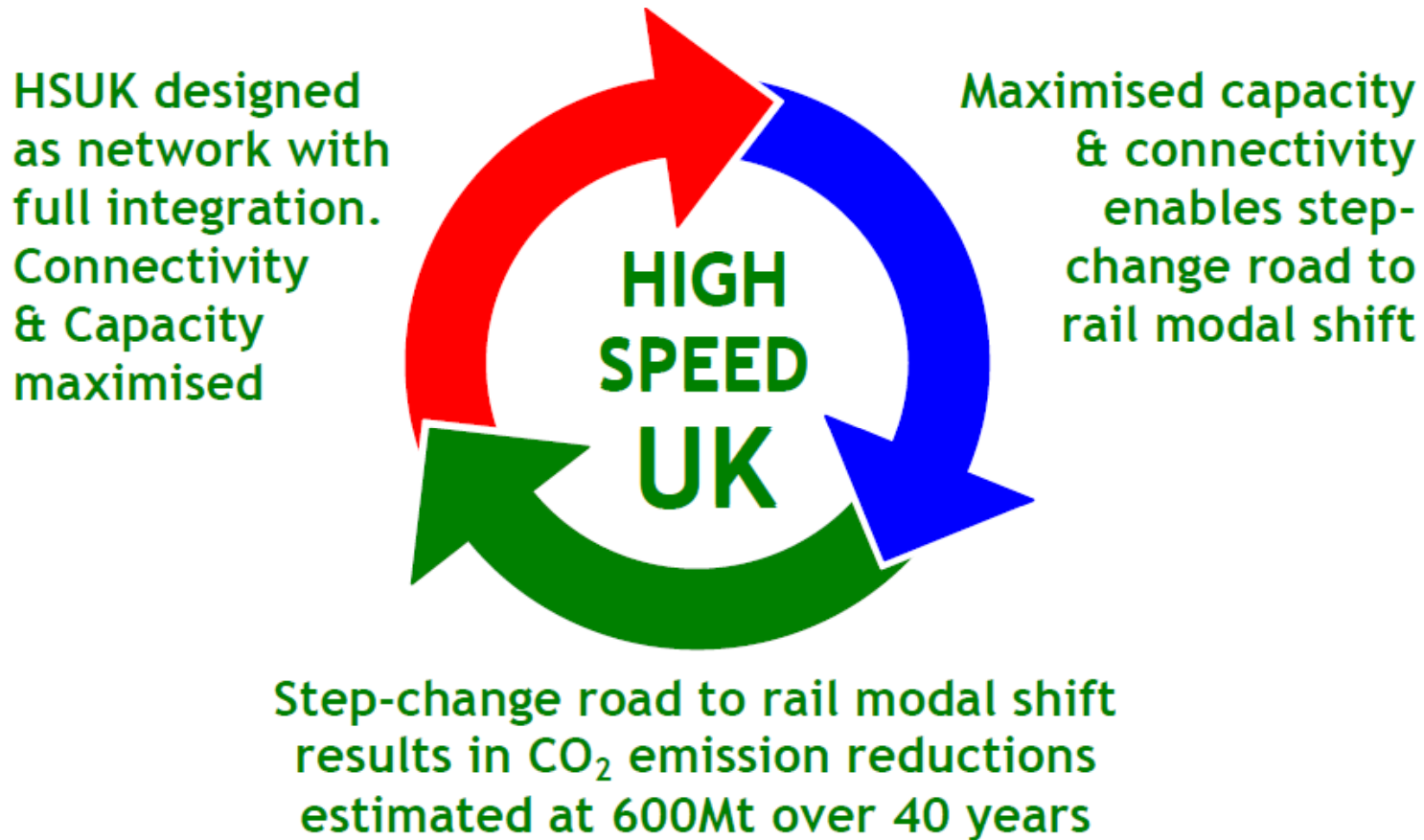


Connectivity & capacity gains insufficient for major road to rail modal shift

Without major road to rail modal shift
HS2 cannot achieve major
CO₂ emission reductions

- Connectivity & capacity failures prevent HS2 from delivering modal shift & consequent CO₂ reductions

Environmental Implications (4)



- HSUK's connectivity & capacity enhancements achieve step-change modal shift & consequent CO₂ reductions

HS2 - High Speed to Failure - Cost

HS2 and HS3

Infrastructure required to interlink London & 6 primary cities of the Midlands and the North:

699km new railway - mostly clear of existing transport corridors

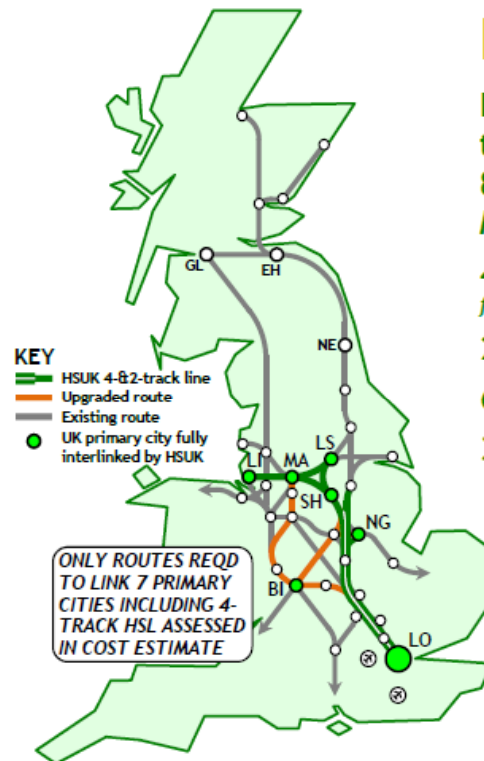
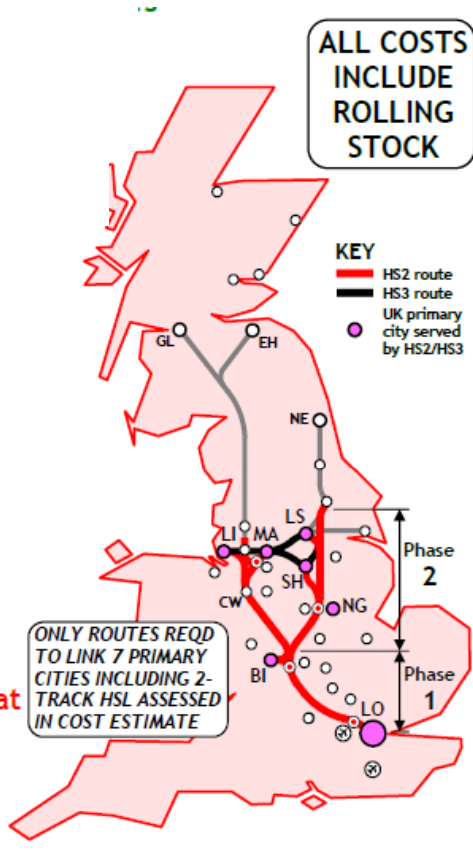
54km upgraded/restored

134km tunnel

8 new HS2 stations

Local integration projects at disconnected HS2 stations

Cost estimate **£73bn**



High Speed UK

Infrastructure required to fully interlink London & 6 primary cities of the Midlands and the North:

462km new railway - mostly following existing transport corridors

202km upgraded/restored

60km tunnel

3 new stations

Cost estimate **£52bn**

ALL COSTS INCLUDE ROLLING STOCK

In other words, HS2 is a complete waste of £21 Billion for the simple reason that it is not a sensible design

HS2 - High Speed to Almost Nowhere

- We decided that *High Speed to Failure* was not enough to convince people how bad HS2 is.
- A quantitative study was needed which would enable HS2's failure to be measured.
- 32 centres were chosen. 32 places to start your journey and, for each starting point, 31 places to finish it.
- That is a total of 496 journeys.
- The journey time for every one of the 496 has been calculated with HS2 and with HSUK and compared with today.
- The results are, we believe, alarming.

HS2 - High Speed to Almost Nowhere

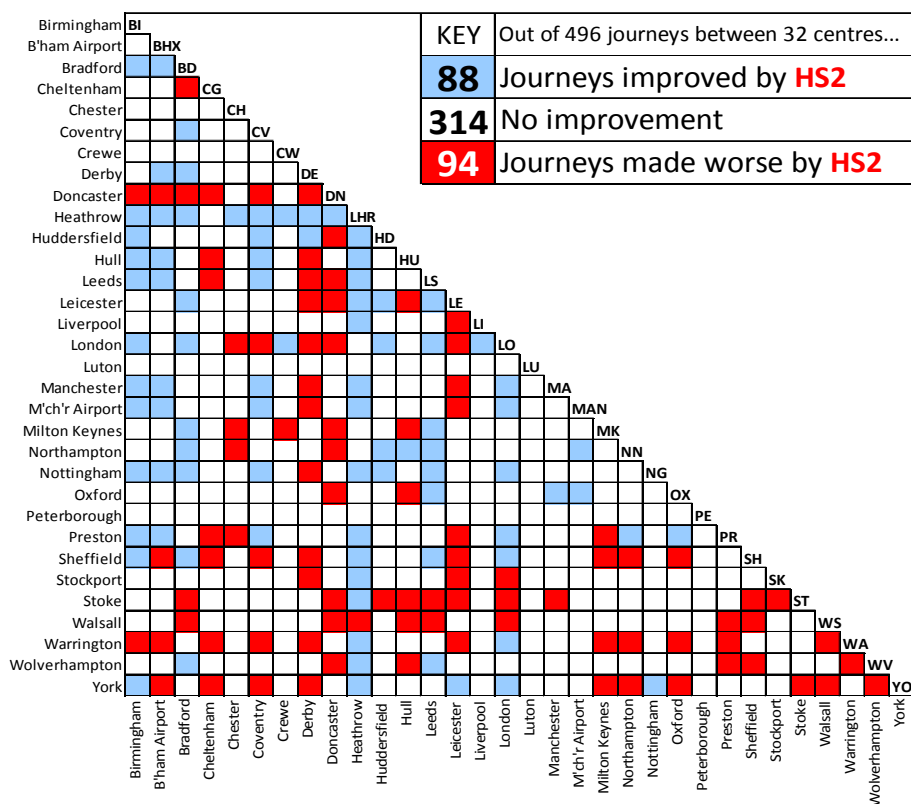
32 Centres Considered in Journey Time Assessment:

- 7 Primary Cities – Birmingham, Leeds, Liverpool, London, Manchester, Nottingham, Sheffield
- 16 Second-tier Cities – Bradford, Coventry, Crewe, Derby, Doncaster, Huddersfield, Hull, Leicester, Luton, Milton Keynes, Northampton, Stockport, Stoke, Walsall, Warrington, Wolverhampton
- 3 Airports – Heathrow, Birmingham & Manchester
- 6 Gateway Cities – Cheltenham, Chester, Oxford, Peterborough, Preston & York
- 32 Centres, 496 possible journeys

“HS2 & HSUK Journeys Compared”

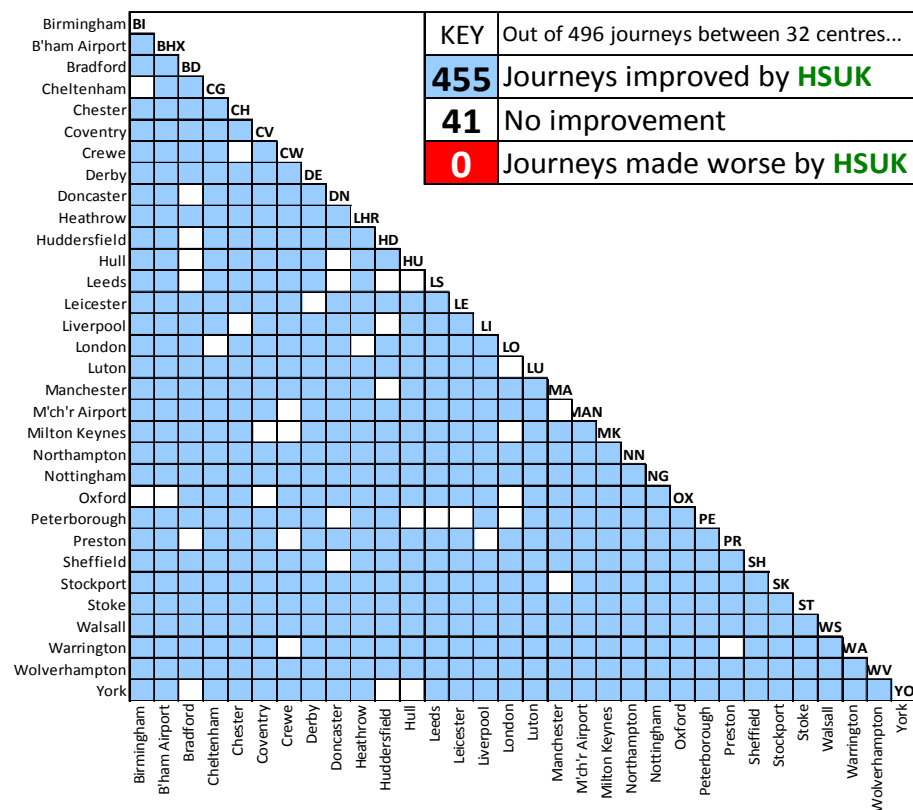
HIGH SPEED 2

NETWORK PERFORMANCE : JOURNEYS IMPROVED/MADE WORSE



HIGH SPEED UK

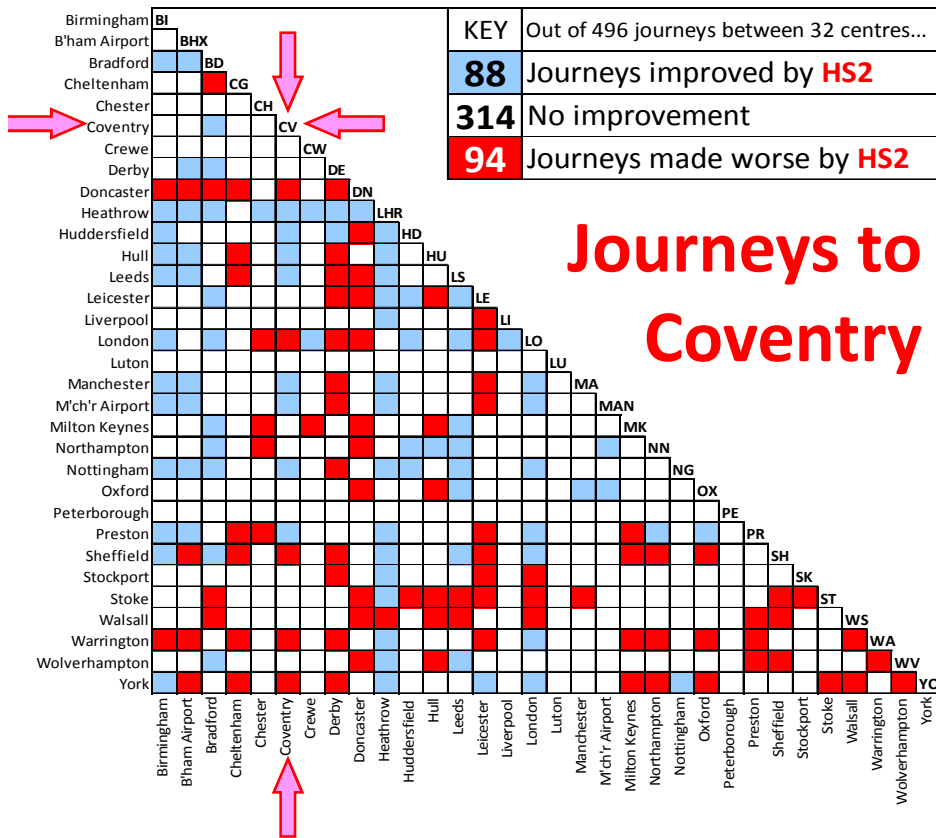
NETWORK PERFORMANCE : JOURNEYS IMPROVED/MADE WORSE



“HS2 & HSUK Journeys Compared”

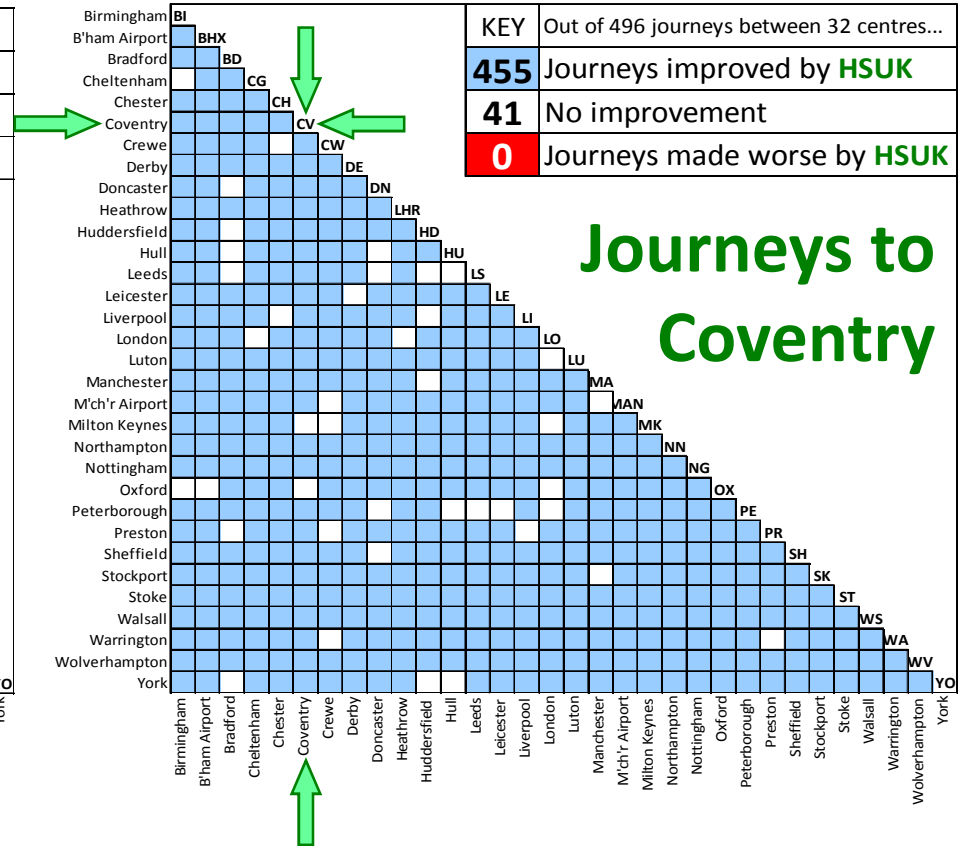
HIGH SPEED 2

NETWORK PERFORMANCE : JOURNEYS IMPROVED/MADE WORSE



HIGH SPEED UK

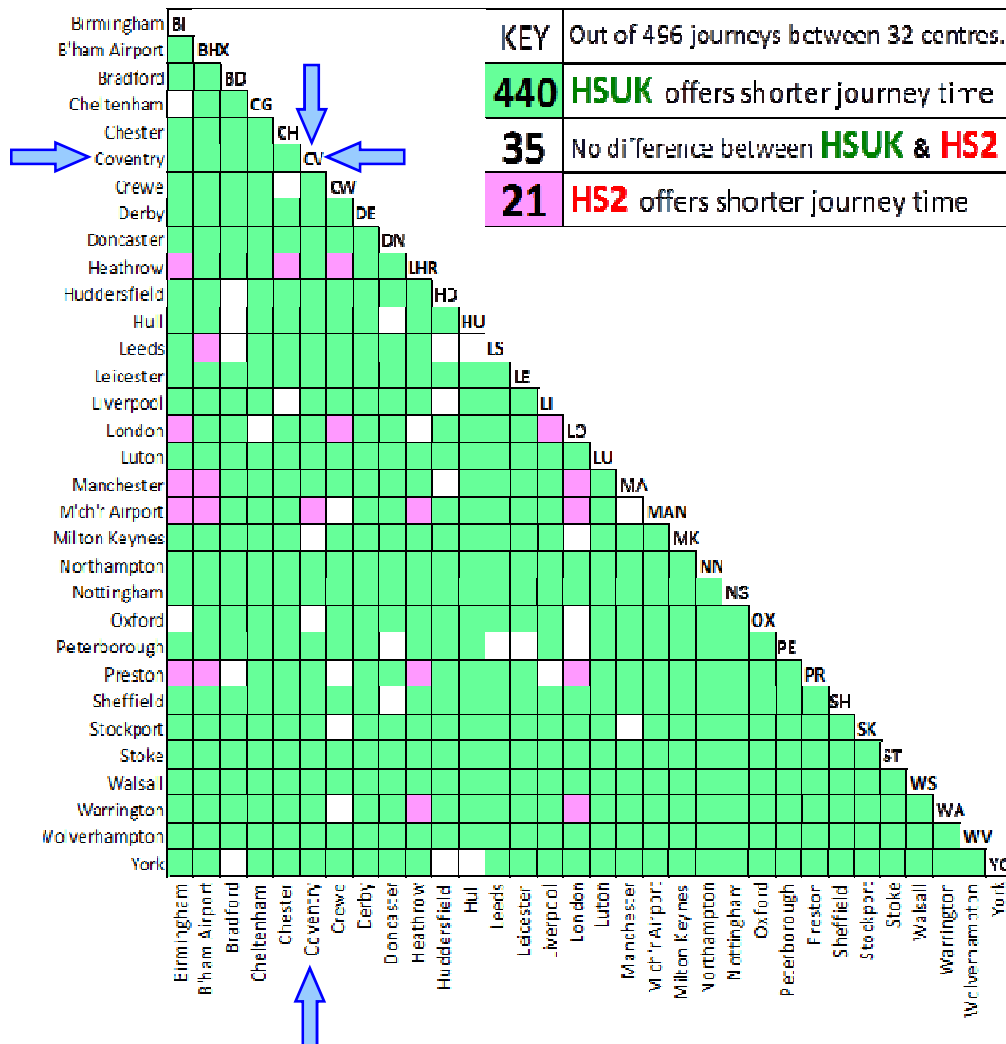
NETWORK PERFORMANCE : JOURNEYS IMPROVED/MADE WORSE



Journeys to Coventry

HIGH SPEED UK & HS2

COMPARATIVE PERFORMANCE IN ACHIEVING JOURNEY TIME REDUCTIONS ACROSS NATIONAL NETWORK



HSUK – High Speed UK
Connecting the Nation

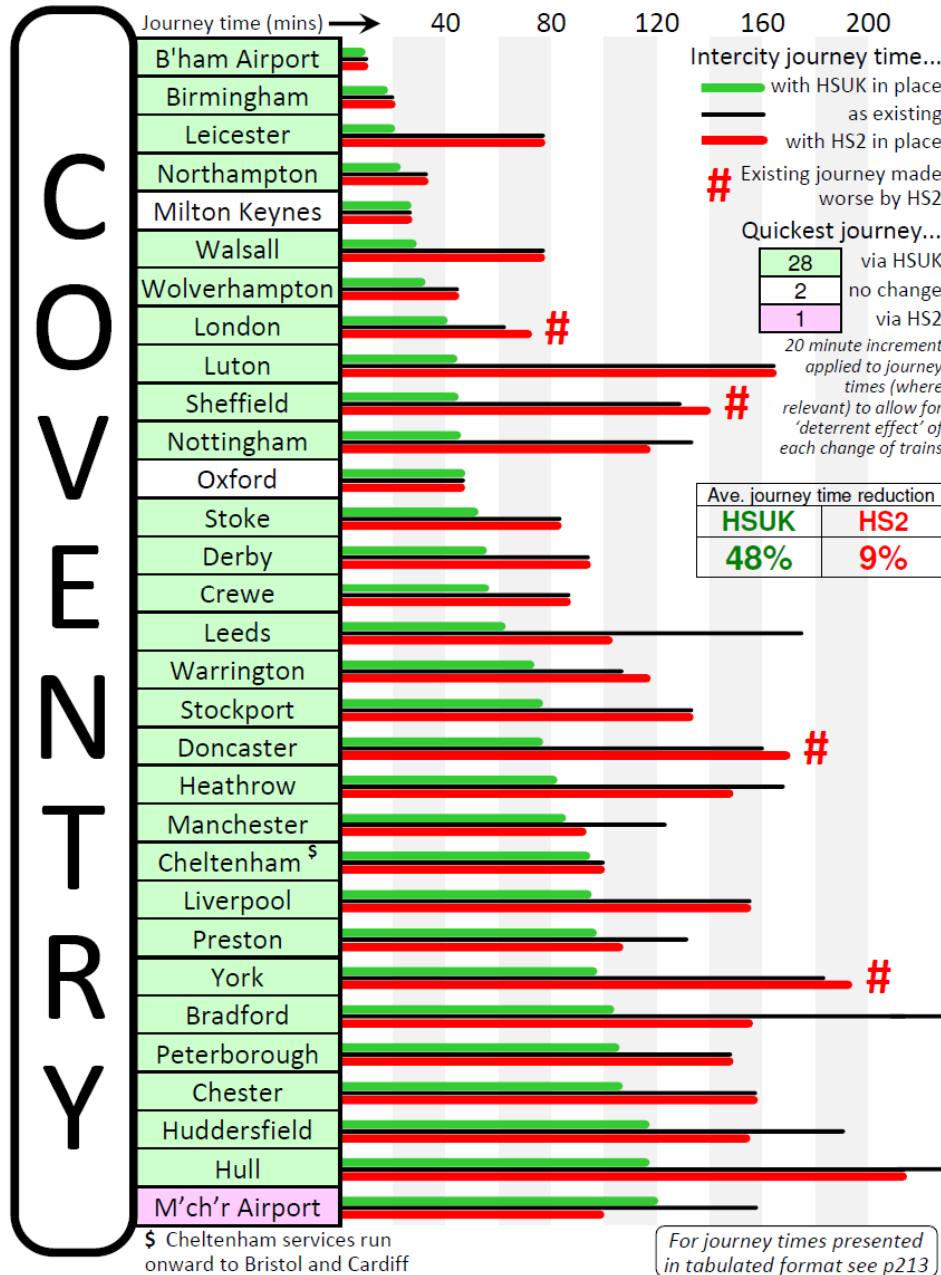
HS2 vs HSUK Fastest Journey Times

Note: Journey Time of 2-leg journey A to C, with change at B, calculated:

- Travel time A to B, *plus*
- Change time at B, *plus*
- Travel time B to C, *plus*
- 20min 'change penalty'

HIGH SPEED UK & HS2 LINKS TO

COVENTRY



HSUK – High Speed UK
Connecting the Nation

HS2 vs HSUK Journey Times Compared

Principal Findings of the Study (1)

1. HS2 will only benefit a select group of primary cities.
2. HS2 has insufficient capacity to serve other major cities (only 2 tracks in London - West Midlands spine).
3. HS2 fails as high speed railway – only 9% average journey time reduction.
4. HS2 provides no extra capacity for local services in regional cities.
5. HS2 is not future proofed.

Principal Findings of the Study (1)

1. HSUK will directly benefit all major UK cities.
2. HSUK has sufficient capacity to serve other major cities (4 track London - South Yorks spine).
3. HSUK succeeds as high speed railway – 46% average journey time reduction.
4. HSUK provides step-change capacity increase for local services in all principal regional cities.
5. HSUK is future proofed.

Principal Findings of the Study (2)

6. HS2 has only been designed as a line – not as a national network.
7. HS2 will seriously damage the existing national rail network.
8. HS2 will be the fastest railway in the world and possibly provide the slowest network.
9. HS2 will reinforce the North-South divide.
10. HS2 has never been technically optimised as a railway system.

Principal Findings of the Study (2)

6. HSUK has been designed as a network.
7. HSUK will greatly enhance the existing national rail network.
8. HSUK may not be the fastest railway in the world but should achieve the greatest overall acceleration of an existing network.
9. HSUK should reverse the North-South divide.
10. HSUK's achievement in designing an enhanced national railway system is unparalleled.

HS2 - High Speed to Almost Nowhere

- This document is a report on the findings of the study of 496 journeys.
- Currently on our web site in draft form.
- It will be finalised soon and published.
- HS2 fails abysmally as a national network, offering no worthwhile gains in capacity and connectivity.
- Does it do any better as a local system offering benefits for Coventry & for the Midlands?

High Speed Rail in Coventry – 5 Key Requirements

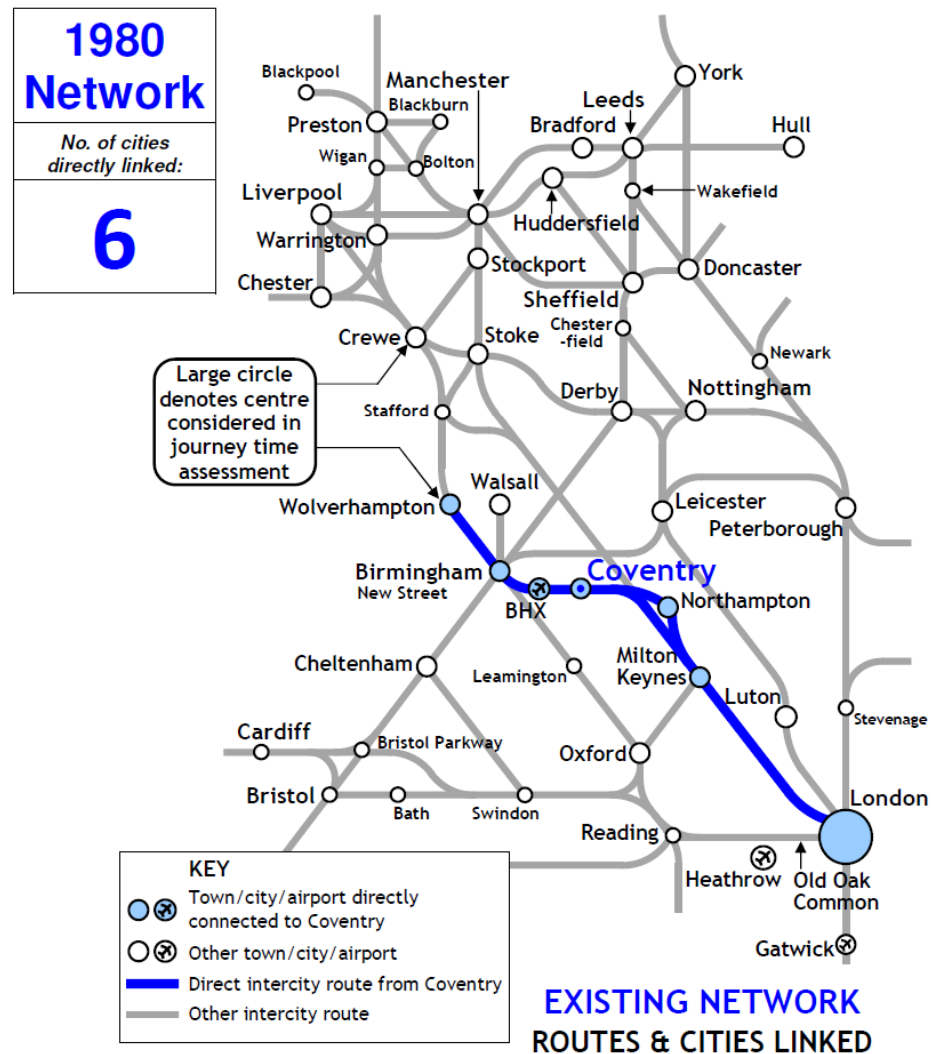
1. Direct links to other major UK cities
2. Direct links to the other cities of the Midlands Engine
3. Local capacity/connectivity gains
4. Full integration between local and national networks
5. Coordination with other city/region development plans

Coventry – It's a Major City

- Founded in 11th Century
- Lady Godiva's bare-backed horse ride ????
- City Charter in 1345
- Population 345,000 (2015)
- 15th largest in UK
- Part of West Midlands Metropolitan area
- Completely separate from Birmingham conurbation

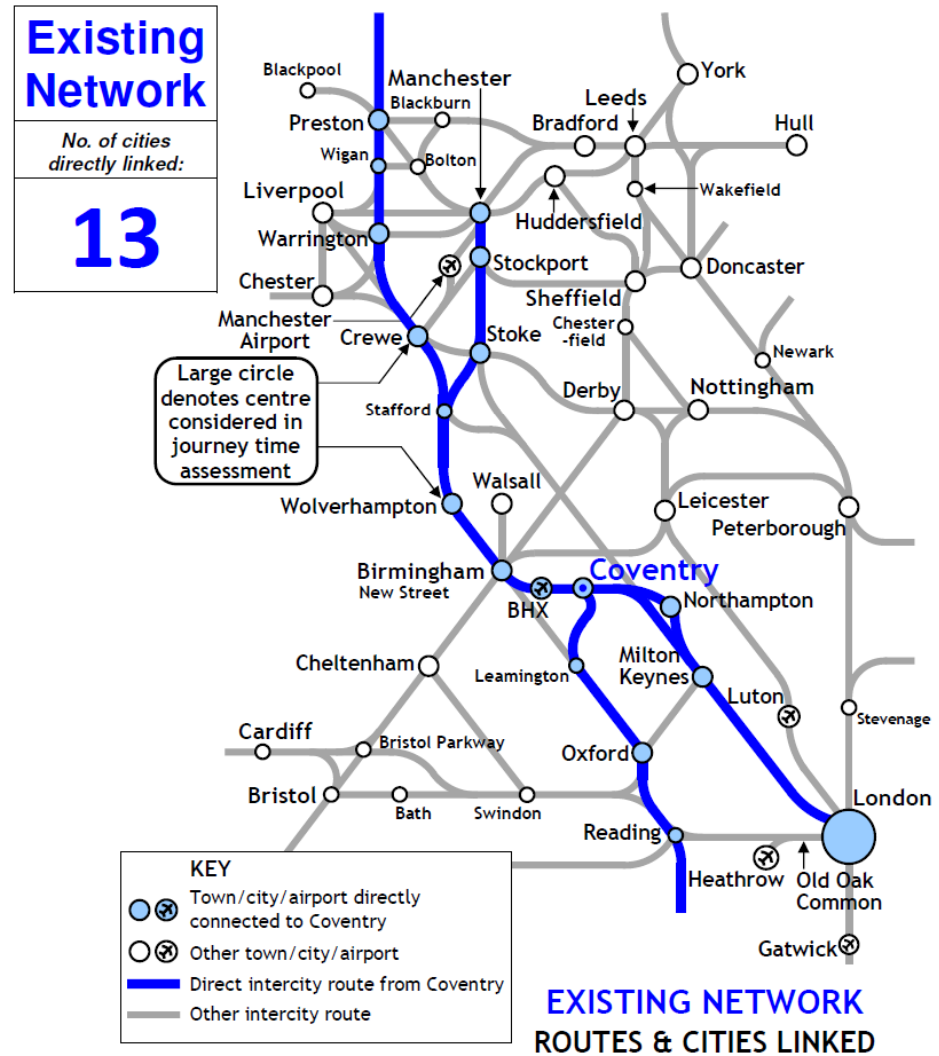
1980 Rail Links to Coventry

Direct links
to all major
UK cities
via intercity
network??



Existing Rail Links to Coventry

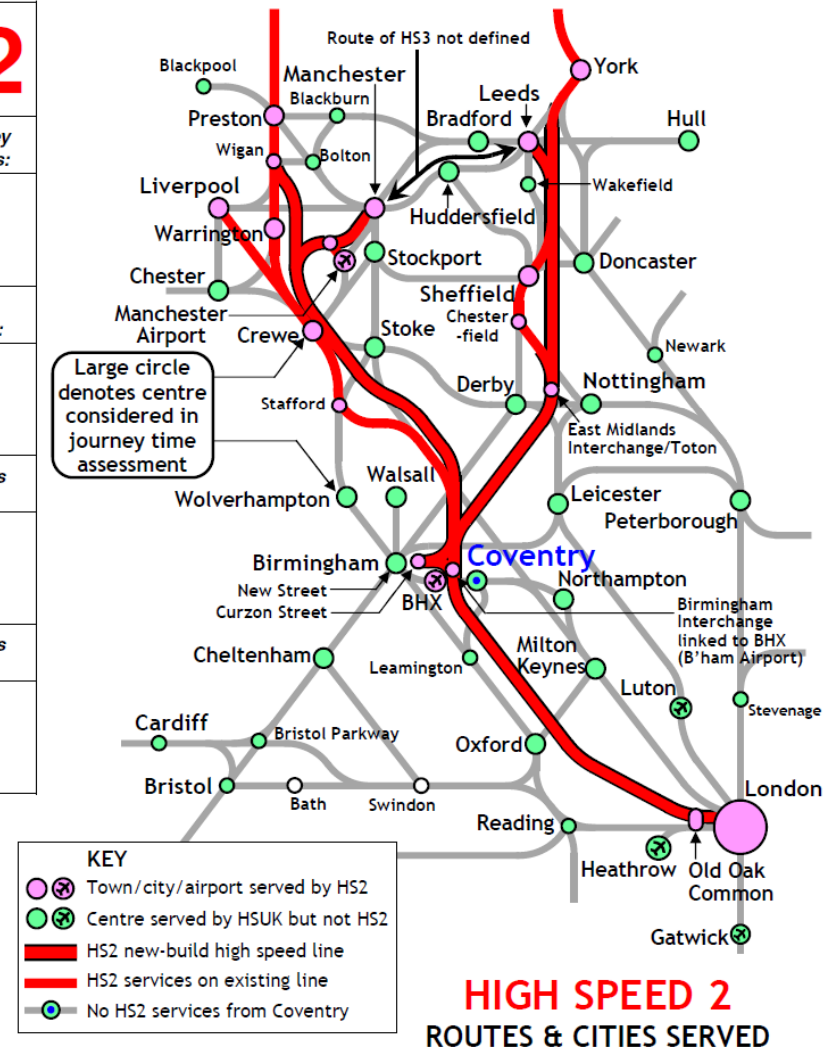
Direct links to all major UK cities via intercity network??



No HS2 Services to Coventry

Direct links
to all major
UK cities
via HS2??

HS2	
Average journey time reductions:	9%
No. of cities directly linked:	0
No. of journeys made faster:	9
No. of journeys made worse:	5



Reduced Intercity Services to Coventry



Intercity services to London reduced from 3tph to 1tph??

HS2 Captive Services	HS2 Classic-Compatible Services	Classic Network
3tph Euston-Manchester, calling at Old Oak Common and 1tph at Birmingham Interchange.	2tph Euston-Liverpool calling at Old Oak Common and Runcorn, one of which splits/joins a Euston-Birmingham service at Birmingham Interchange, also calling at Stafford. Second also calls at Crewe.	LM WCML services south of Birmingham - net 59 more per day, inc. 26 more Wolverhampton-Euston stopping services (via Birmingham, Coventry, Milton Keynes and other stations), between Milton Keynes/Rugby and Euston and within West Midlands (New Street to Coventry and New Street to Birmingham International).
3tph Euston-Birmingham, calling at Old Oak Common and 2tph at Birmingham Interchange.	2tph Euston-Edinburgh/Glasgow, calling at Old Oak Common and splitting/joining at Carstairs. 1tph calls additionally at Birmingham Interchange and Preston.	ICWC services/LM north of Birmingham - net 87 fewer per day, including merging ICWC Liverpool and Wolverhampton services by diverting Liverpool trains via West Midlands and adding station calls, 19 new Crewe-Euston trains and reduction from 50 to 11 ICWC Manchester-Euston services, excl. three peak services and eight extended

**HIGH SPEED TWO
(HS2) LIMITED**

HS2 Regional Economic Impacts

Table 23, pp91-92,
HS2 Regional
Economic Impacts
(2013)

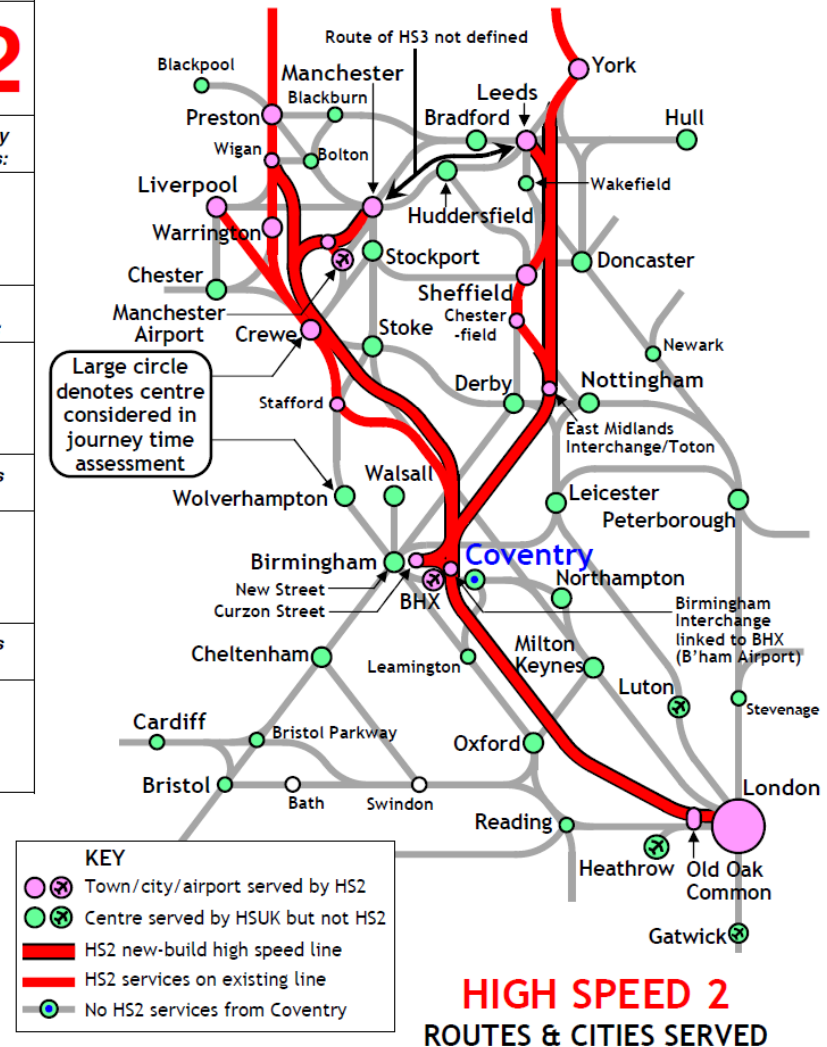
HS2 Remit

- Build high speed line from London to West Midlands.
- Consider development of HS2 further north.
- Select London terminal.
- Consider intermediate parkway station.
- Develop interchange with GWML/ Heathrow/Crossrail services.
- Connect to HS1 and the existing network.

No HS2 Services to Coventry

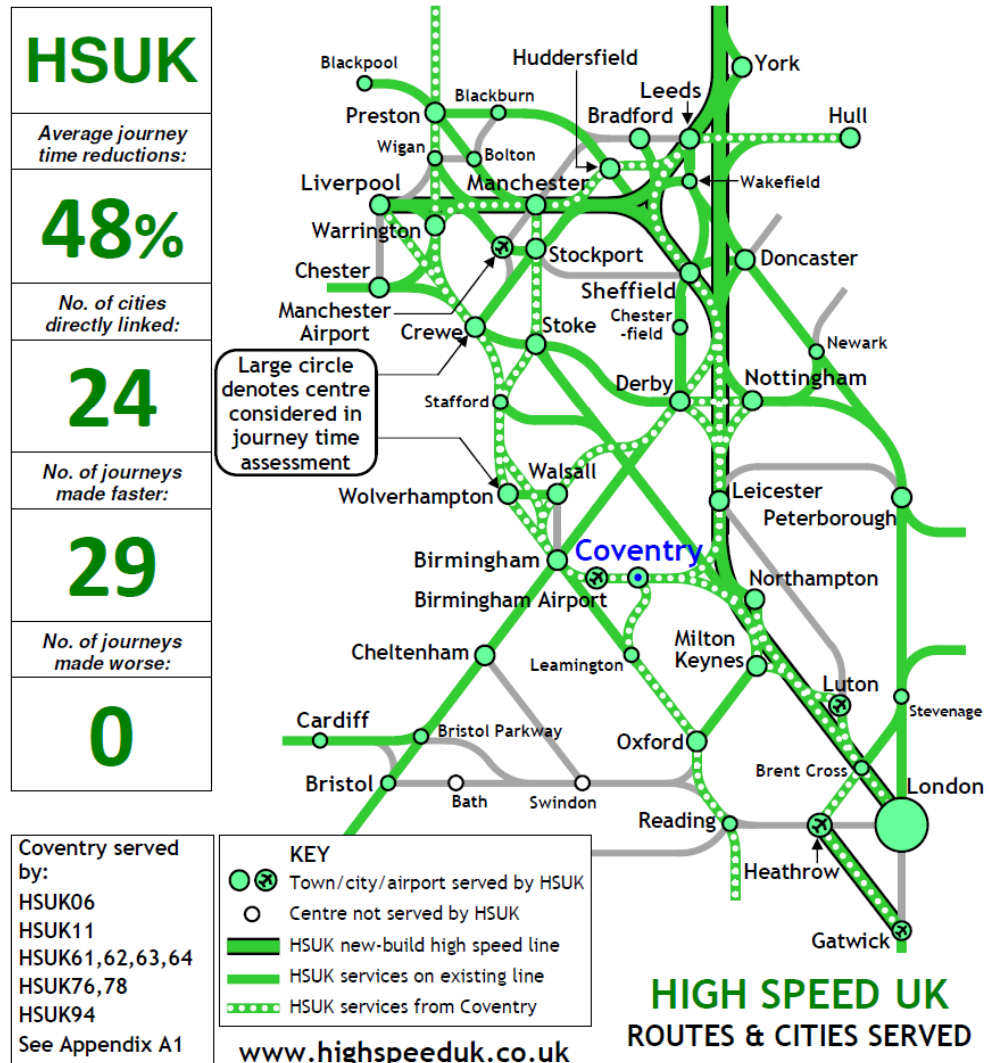
Direct links
to all major
UK cities
via HS2??

HS2	
Average journey time reductions:	9%
No. of cities directly linked:	0
No. of journeys made faster:	9
No. of journeys made worse:	5



High Speed Rail in Coventry

Direct links
to all major
UK cities
via HSUK??



HSR Connectivity in Midlands

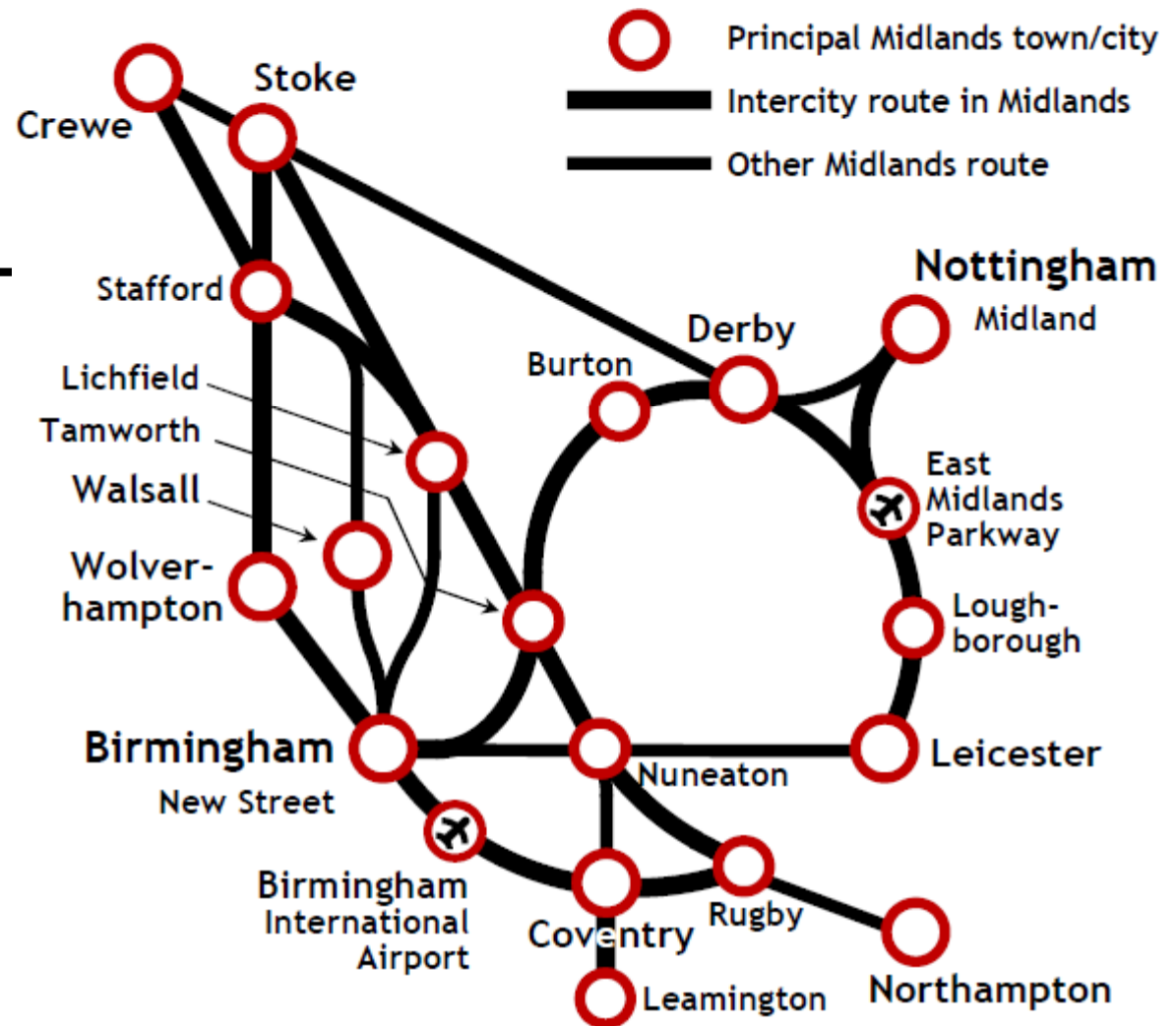
Midlands City/Airport	HIGH SPEED UK				HS2			
	Average journey time reduction	Cities directly linked by HSUK services	Journeys made faster (out of 31)	Journeys made worse (out of 31)	Average journey time reduction	Cities directly linked by HS2 services	Journeys made faster (out of 30)	Journeys made worse (out of 30)
Birmingham	36%	29	28	0	23%	8	12	2
B'ham Airport	43%	24	29	0	20%	6	9	4
Coventry	48%	24	29	0	9%	0	9	5
Crewe	32%	20	25	0	6%	4	2	1
Derby	47%	27	29	0	2%	0	4	12
Leicester	62%	27	29	0	6%	0	5	12
Northampton	60%	18	31	0	5%	0	6	5
Nottingham	56%	27	31	0	10%	0	9	1
Stoke	46%	26	31	0	1%	0	1	11
Walsall	59%	18	31	0	0%	0	0	10
Wolverhampton	47%	27	31	0	2%	0	3	6
Average	49%	24	30	0	8%	1.6	5.5	6.3

Making the Midlands Engine Happen – 4 Key Railway Requirements

1. Development of high quality fast & direct links between all key Midlands centres.
2. Maintenance of high quality links to London.
3. Equal priority for East & West Midlands.
4. Elimination of false MML/WCML divide.

Rail Connectivity within Midlands

Existing
Network –
can it start
the Midlands
Engine??



Rail Connectivity within Midlands

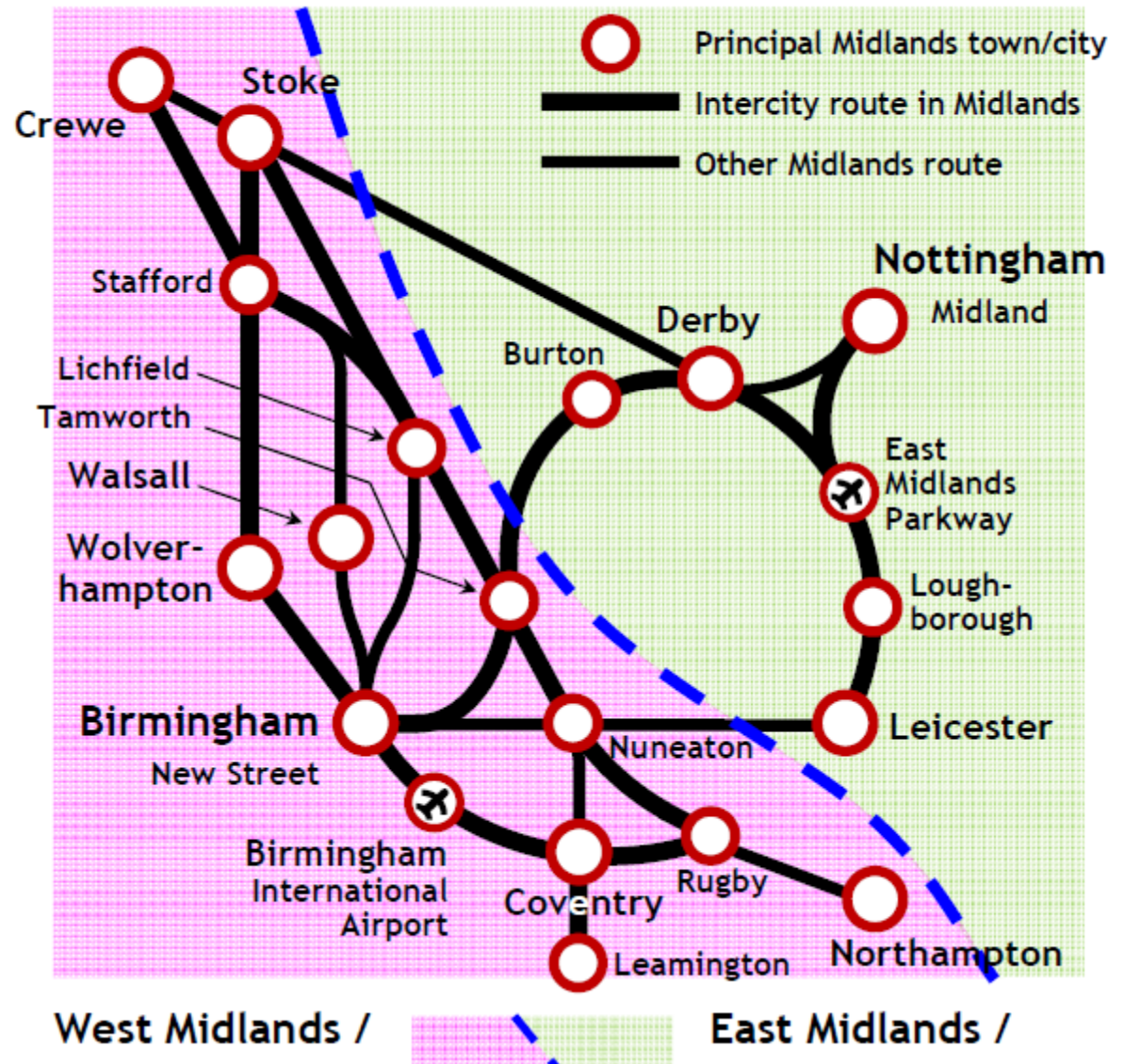
Existing Network – offers 28 direct links out of 55

[illegible]

55 possible
direct links
between
11 centres

Rail Connectivity within Midlands

Existing
Network –
MML/WCML
East Mids/
West Mids
divide
maintained



Rail Connectivity within Midlands

HS2

– no
worthwhile
connectivity
gains



Rail Connectivity within Midlands

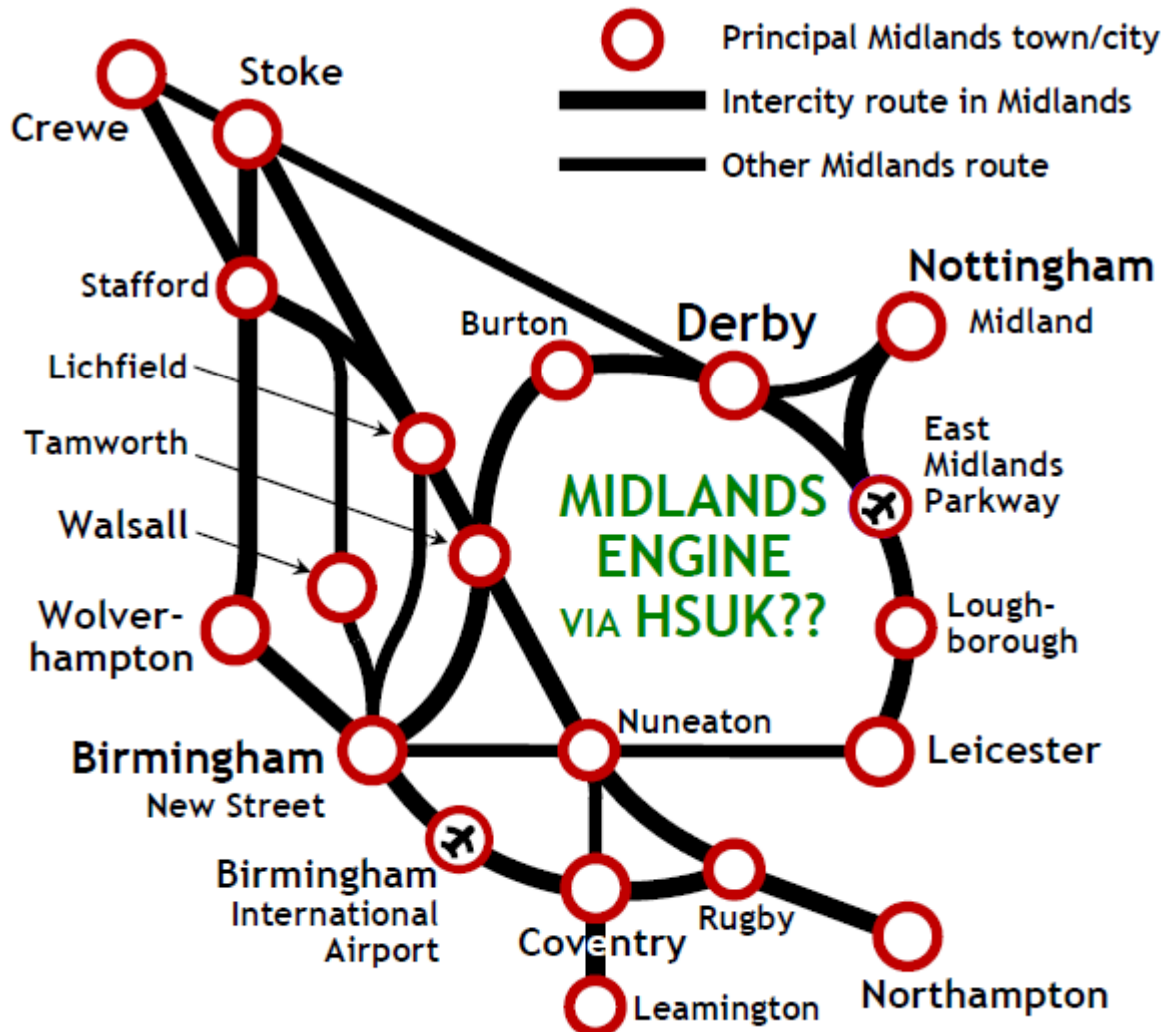
HS2 – offers 1 direct link out of 55 possible

[illegible]

55 possible
direct links
between
11 centres

Rail Connectivity within Midlands

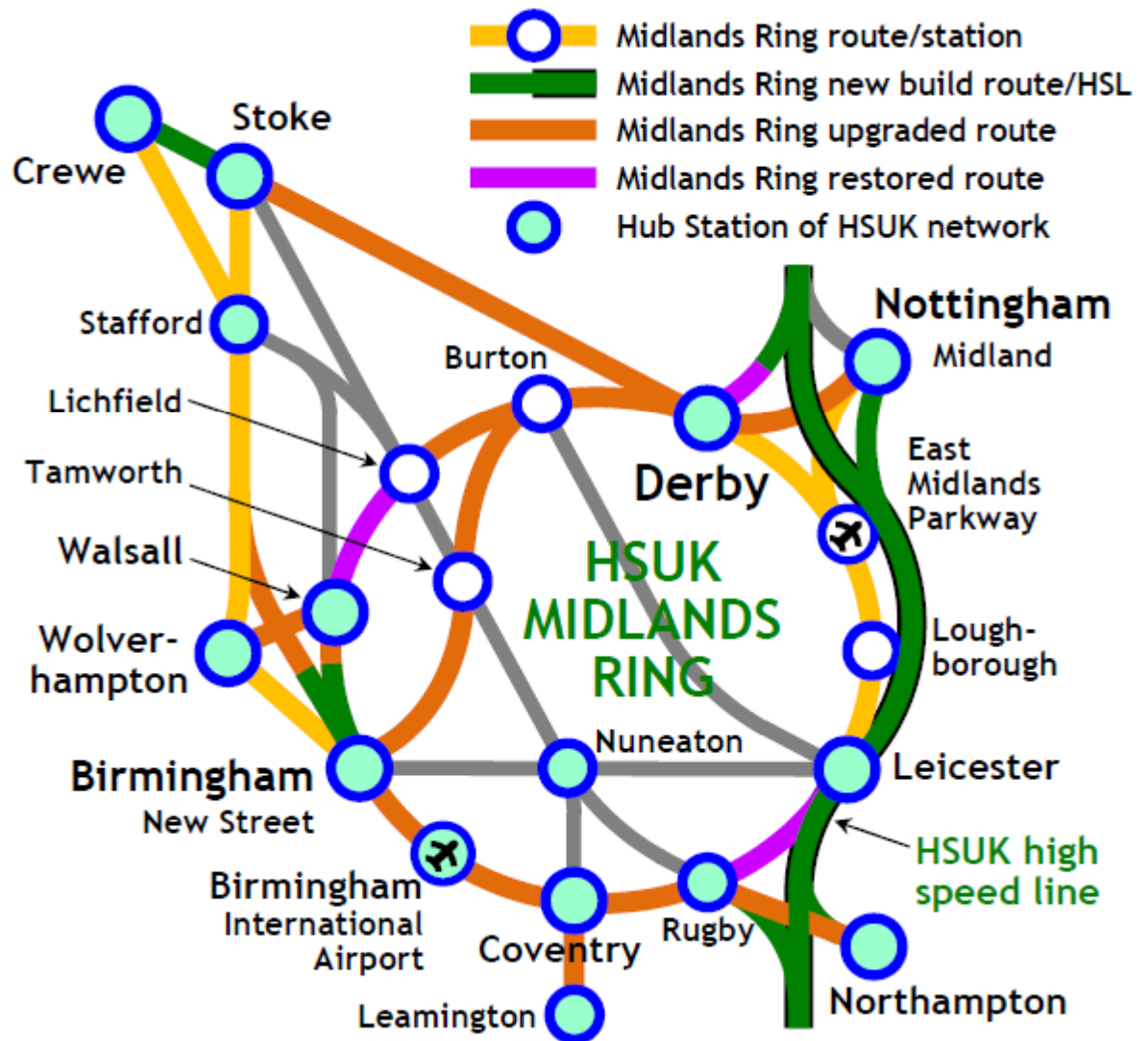
Existing
Network –
Inadequate
connectivity
for the
Midlands
Engine



Rail Connectivity within Midlands

HSUK

– creates a
'Midlands
Ring'
linking all
major cities



Rail Connectivity within Midlands

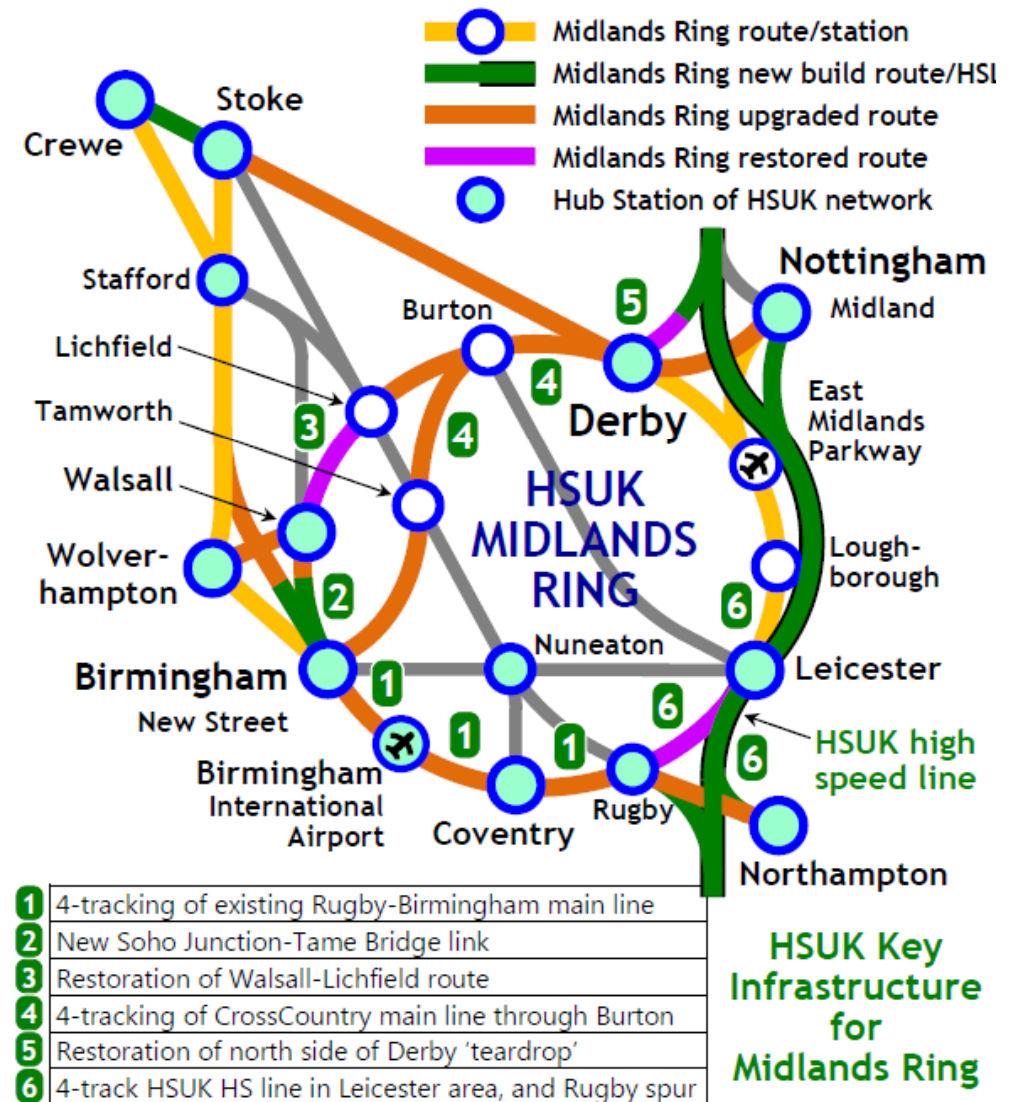
HSUK – offers 53 direct links out of 55 possible

[illegible]

55 possible
direct links
between
11 centres

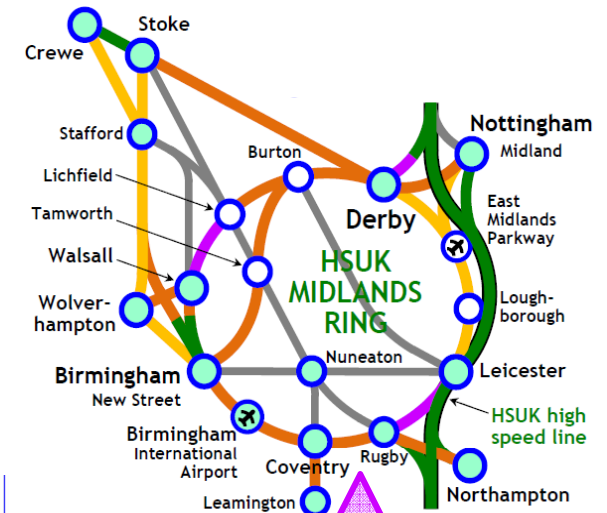
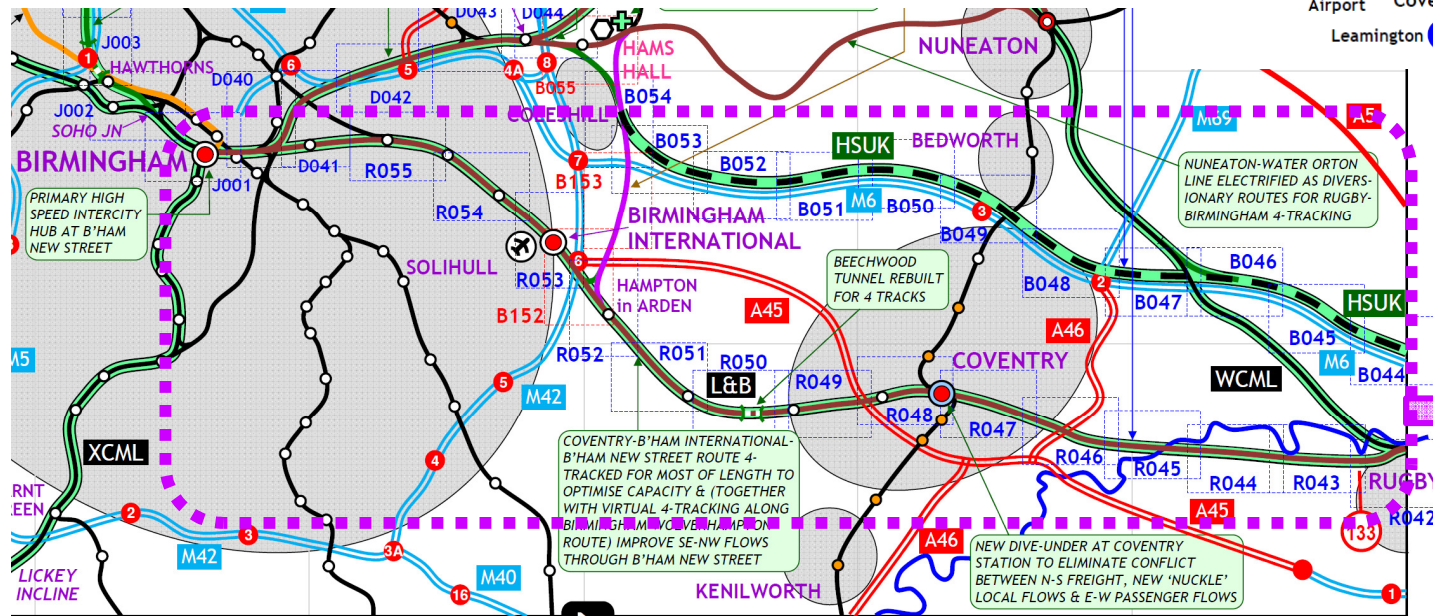
Rail Connectivity within Midlands

6 key elements
of HSUK
'Midlands Ring'

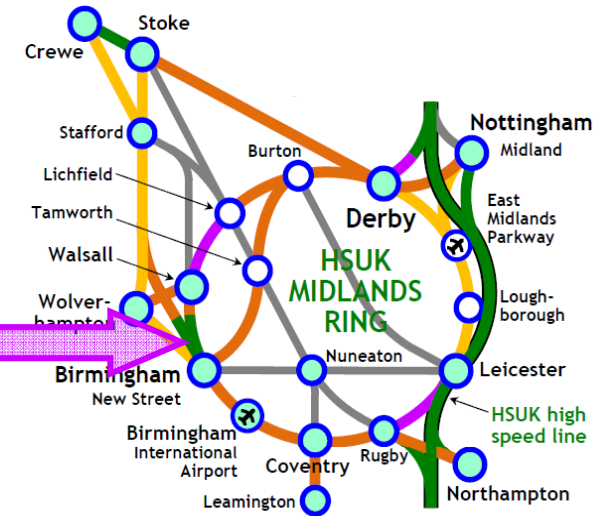
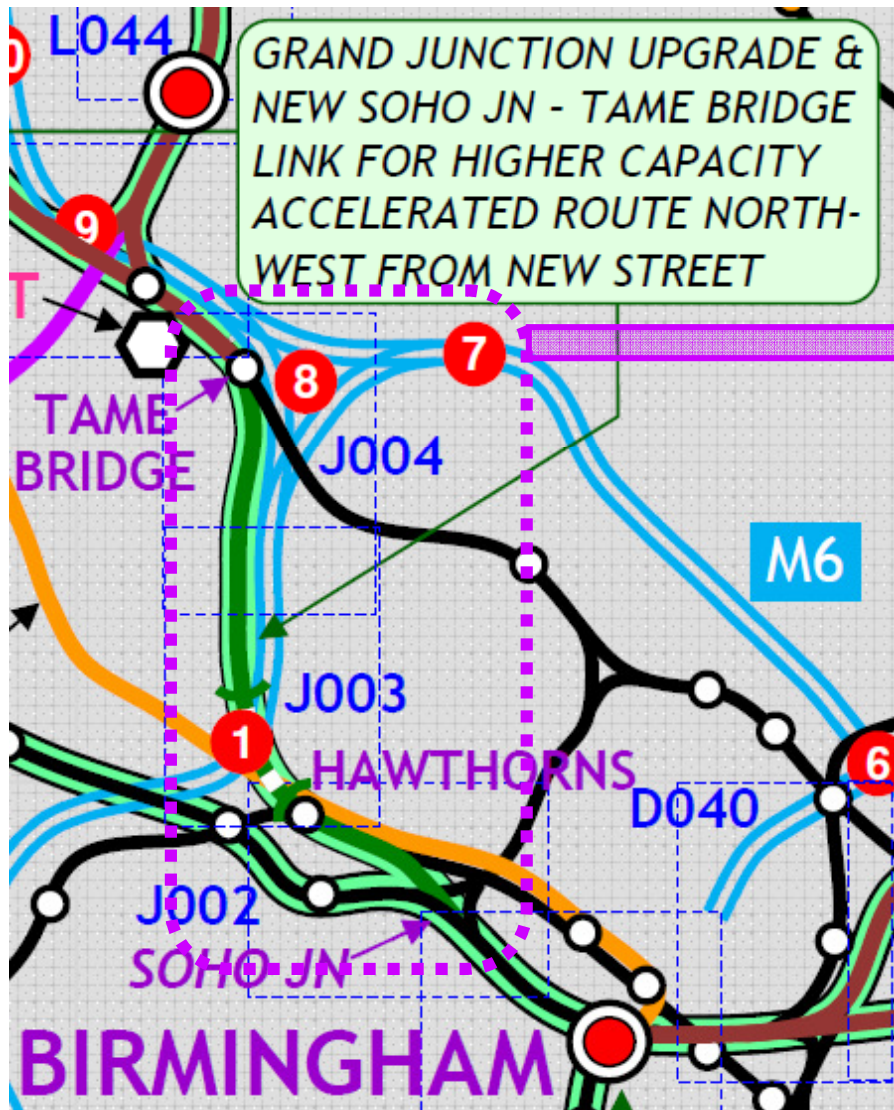


Rail Connectivity within Midlands

‘Midlands Ring’ Element (1) 4-tracking from Rugby to Birmingham



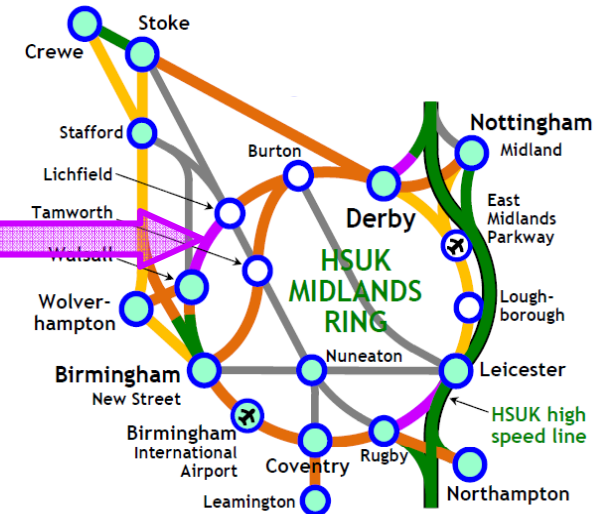
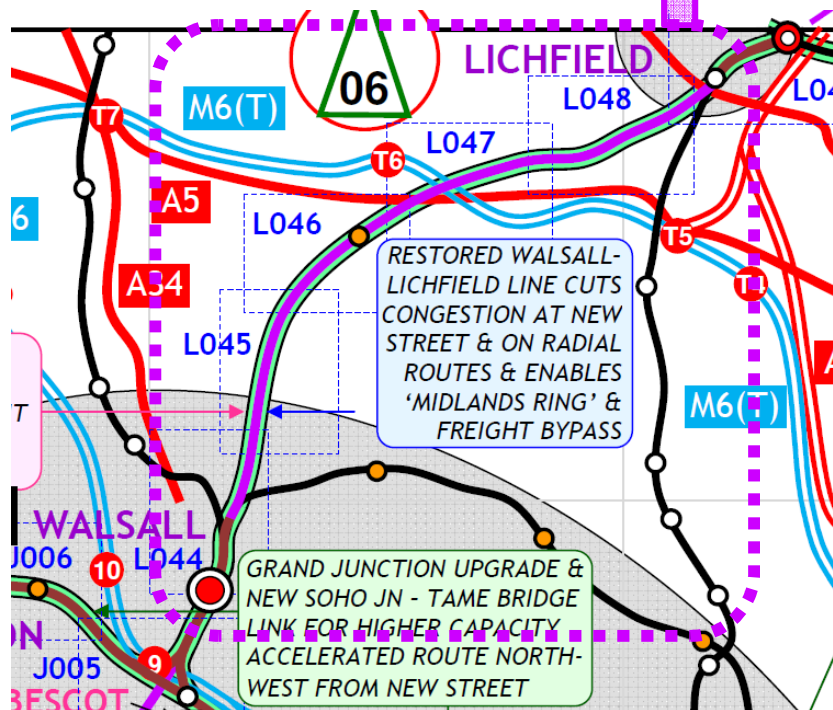
Rail Connectivity within Midlands



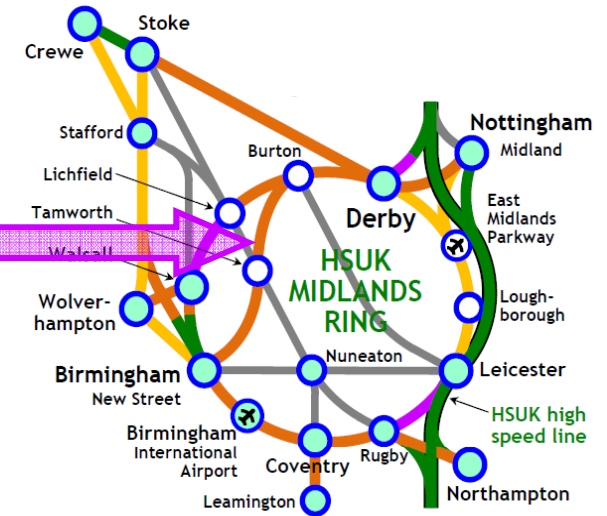
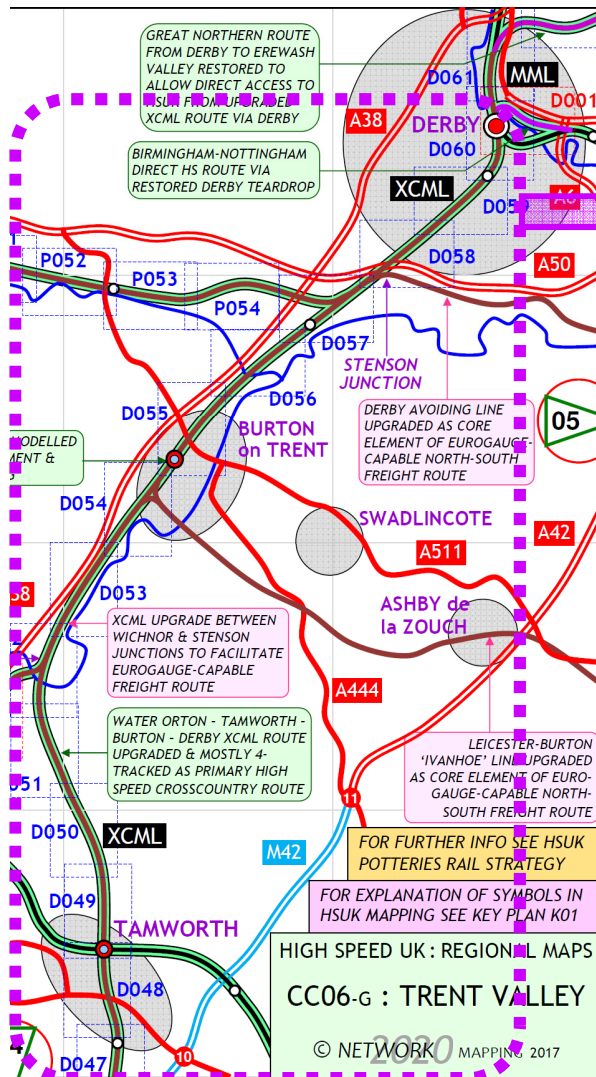
‘Midlands Ring’
Element (2)
New Link from
Soho Junction
to Tame Bridge

Rail Connectivity within Midlands

‘Midlands Ring’ Element (3) Restoration from Walsall to Lichfield



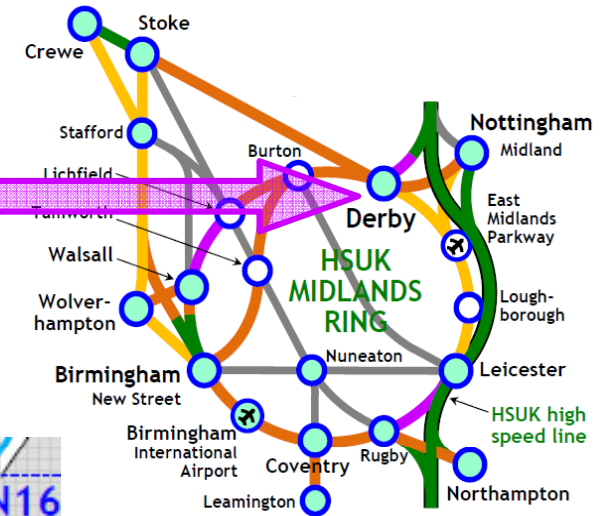
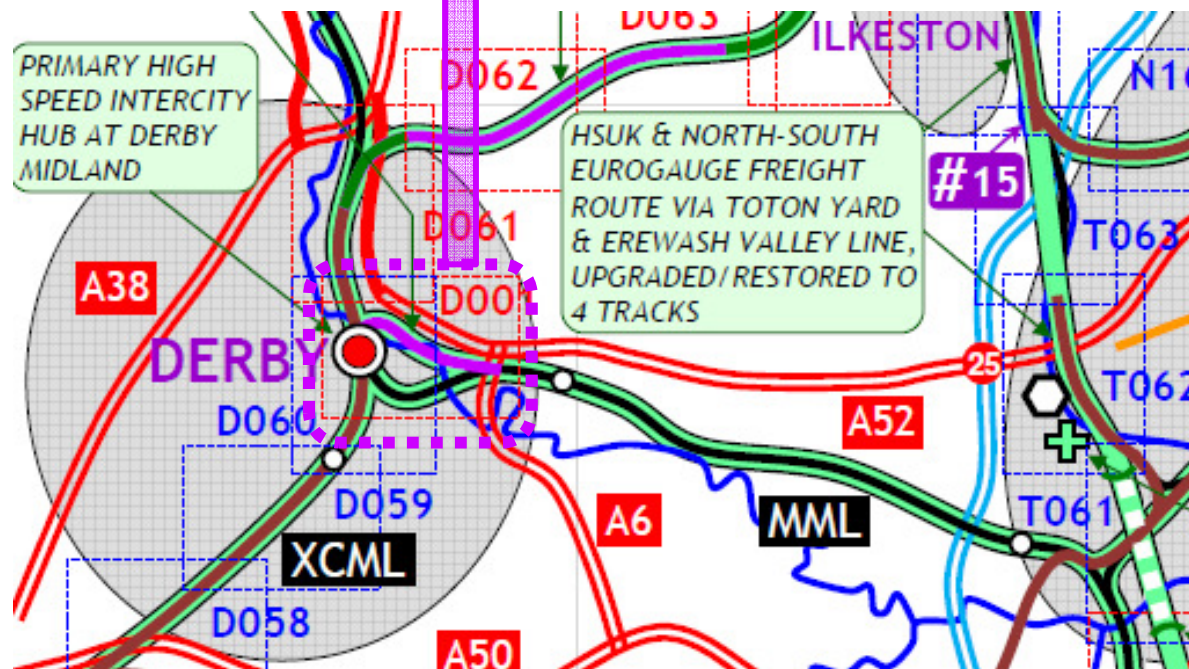
Rail Connectivity within Midlands



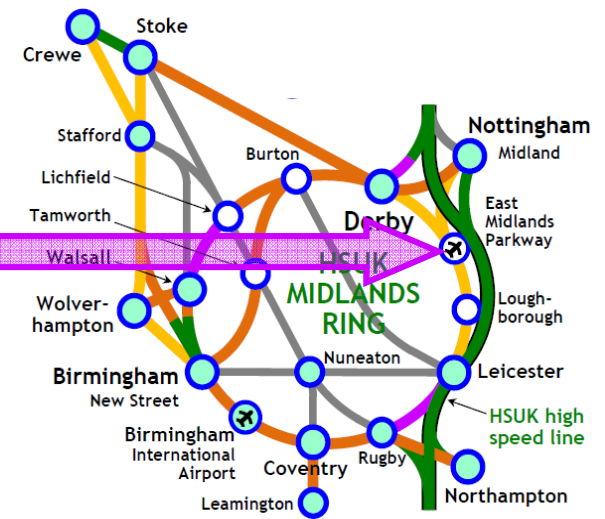
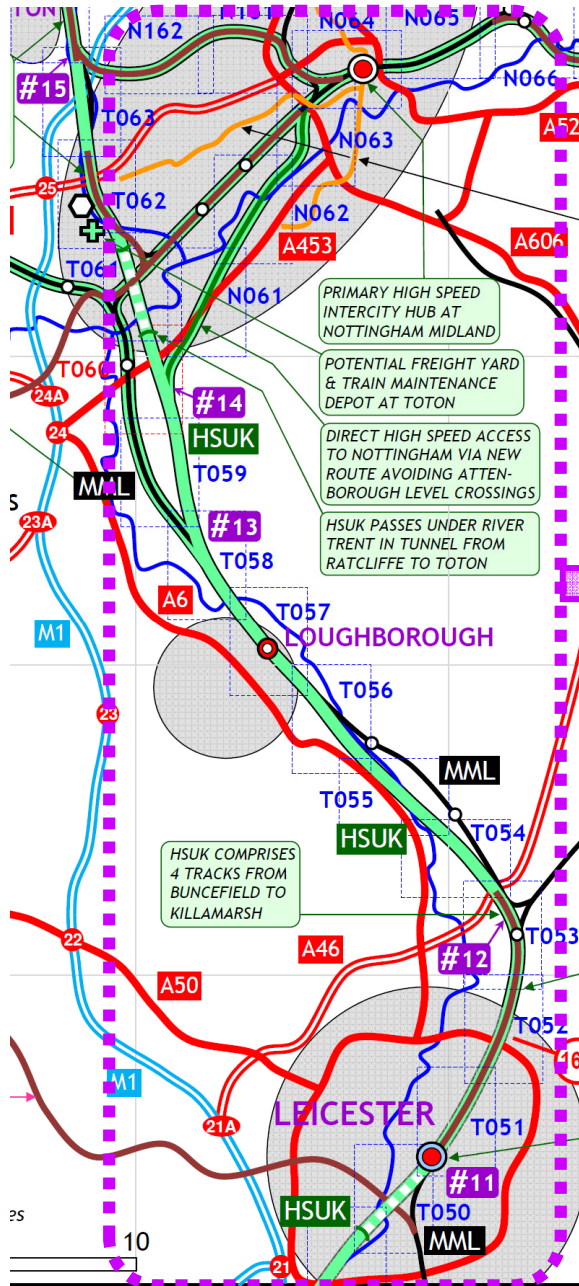
‘Midlands Ring’ Element (4)
4-tracking from
Birmingham to Derby

Rail Connectivity within Midlands

‘Midlands Ring’ Element (5) Restoration of ‘Derby Teardrop’

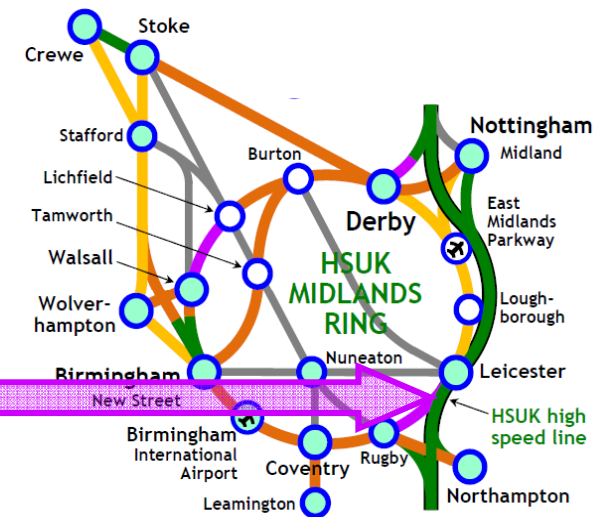
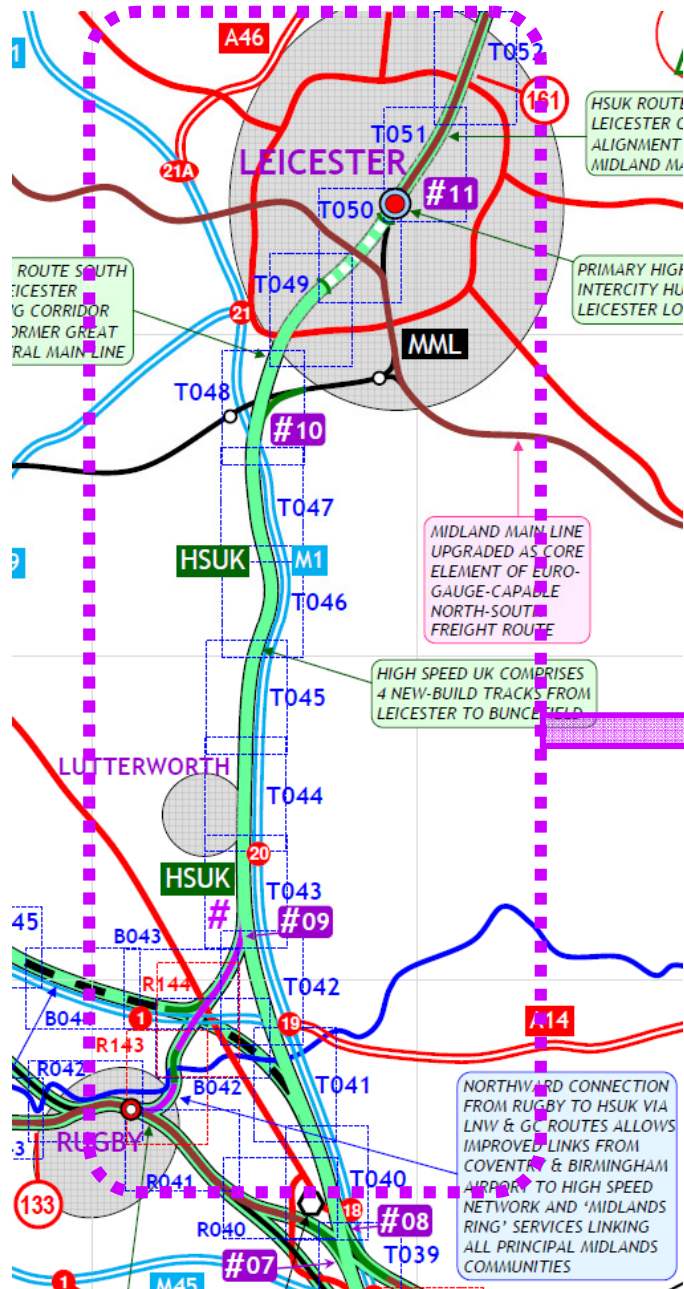


Rail Connectivity within Midlands



‘Midlands Ring’ Element (6a)
New north-south Spine with
Spur to Nottingham

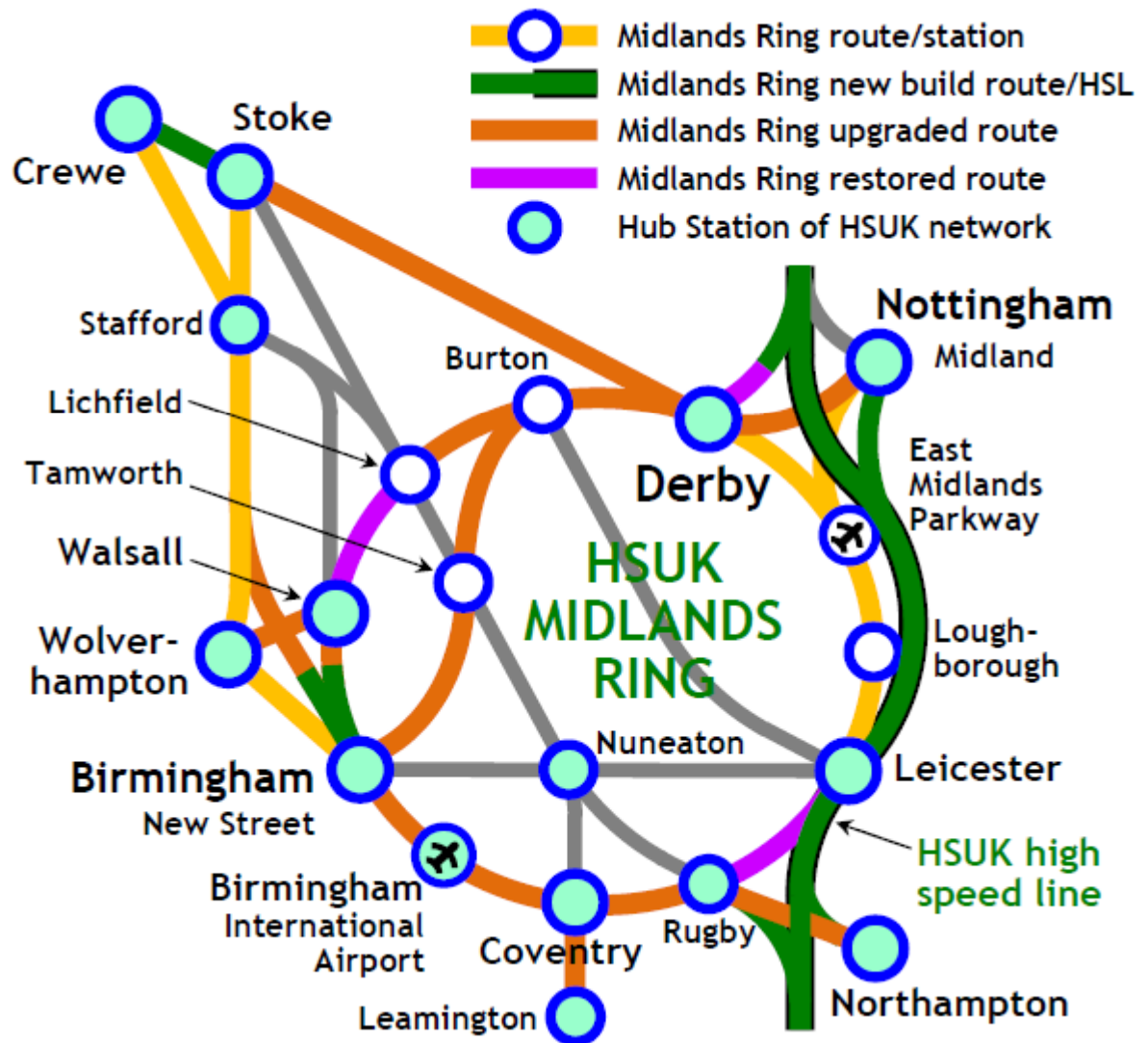
Rail Connectivity within Midlands



‘Midlands Ring’ Element (6b)
New north-south Spine with
Spur to Rugby

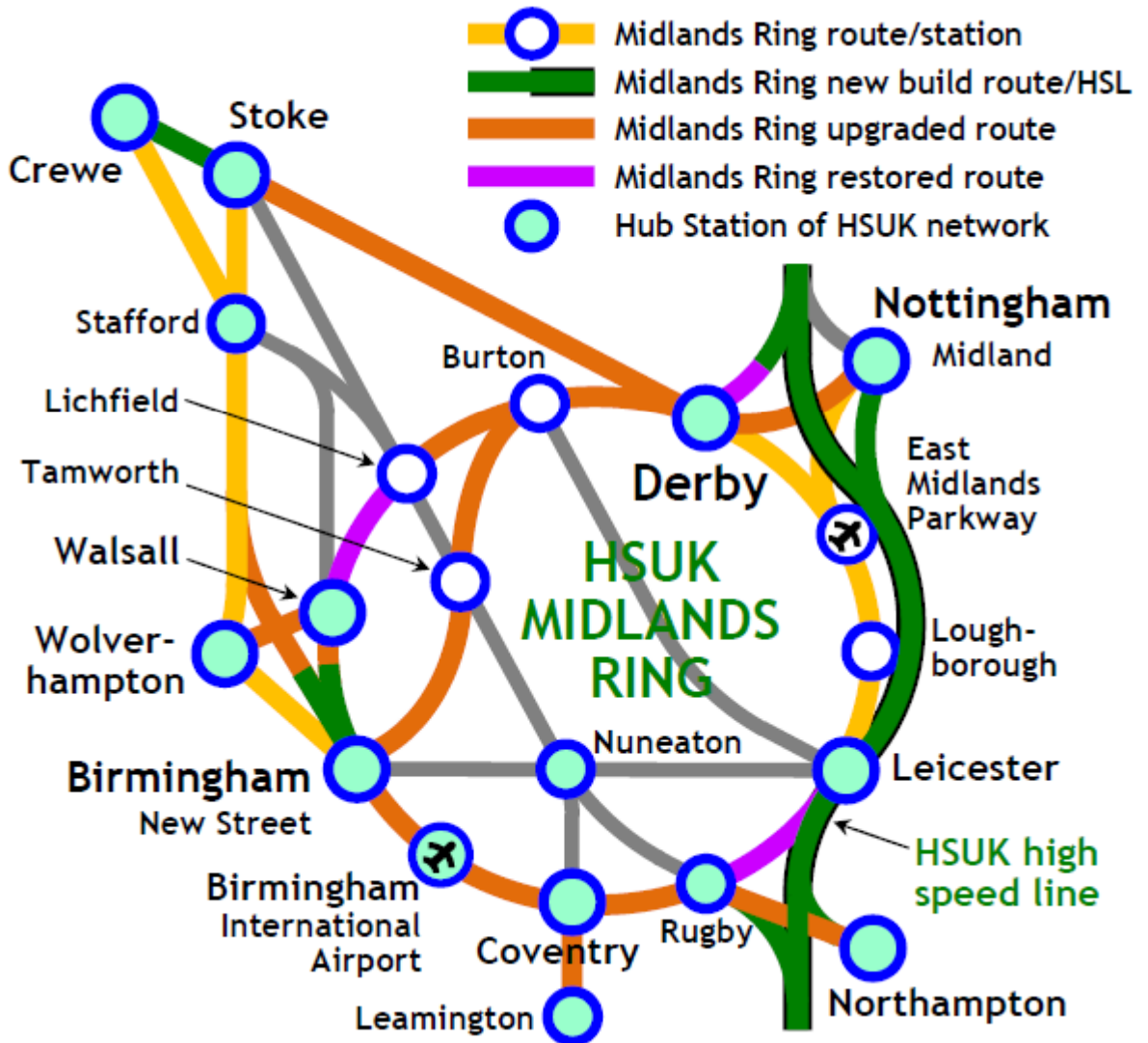
Rail Connectivity within Midlands

HSUK
Midlands
Ring –
all aims of
'Midlands
Engine'
satisfied



Rail Connectivity within Midlands

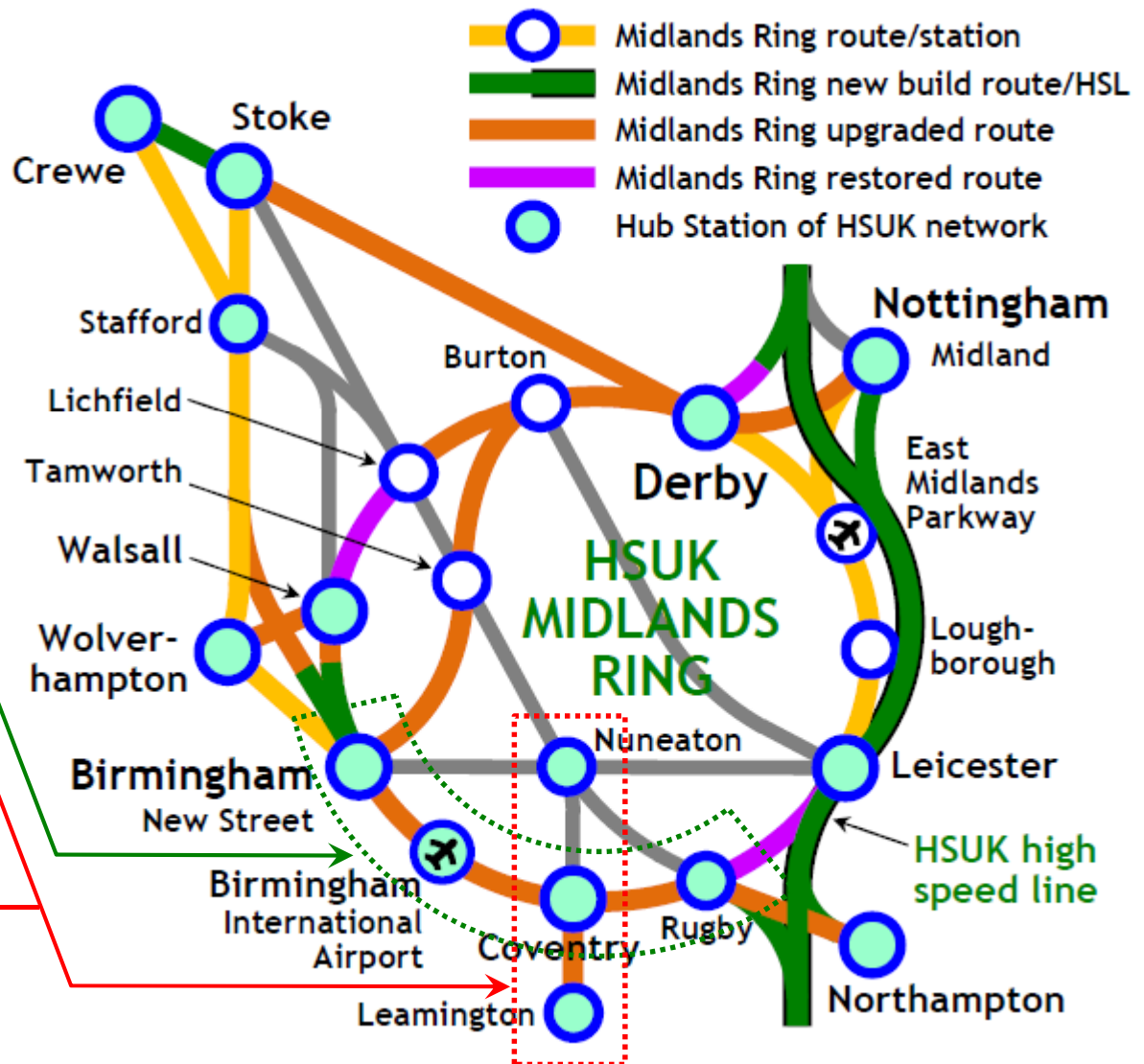
HSUK –
Local
benefits for
Coventry



Rail Connectivity within Midlands

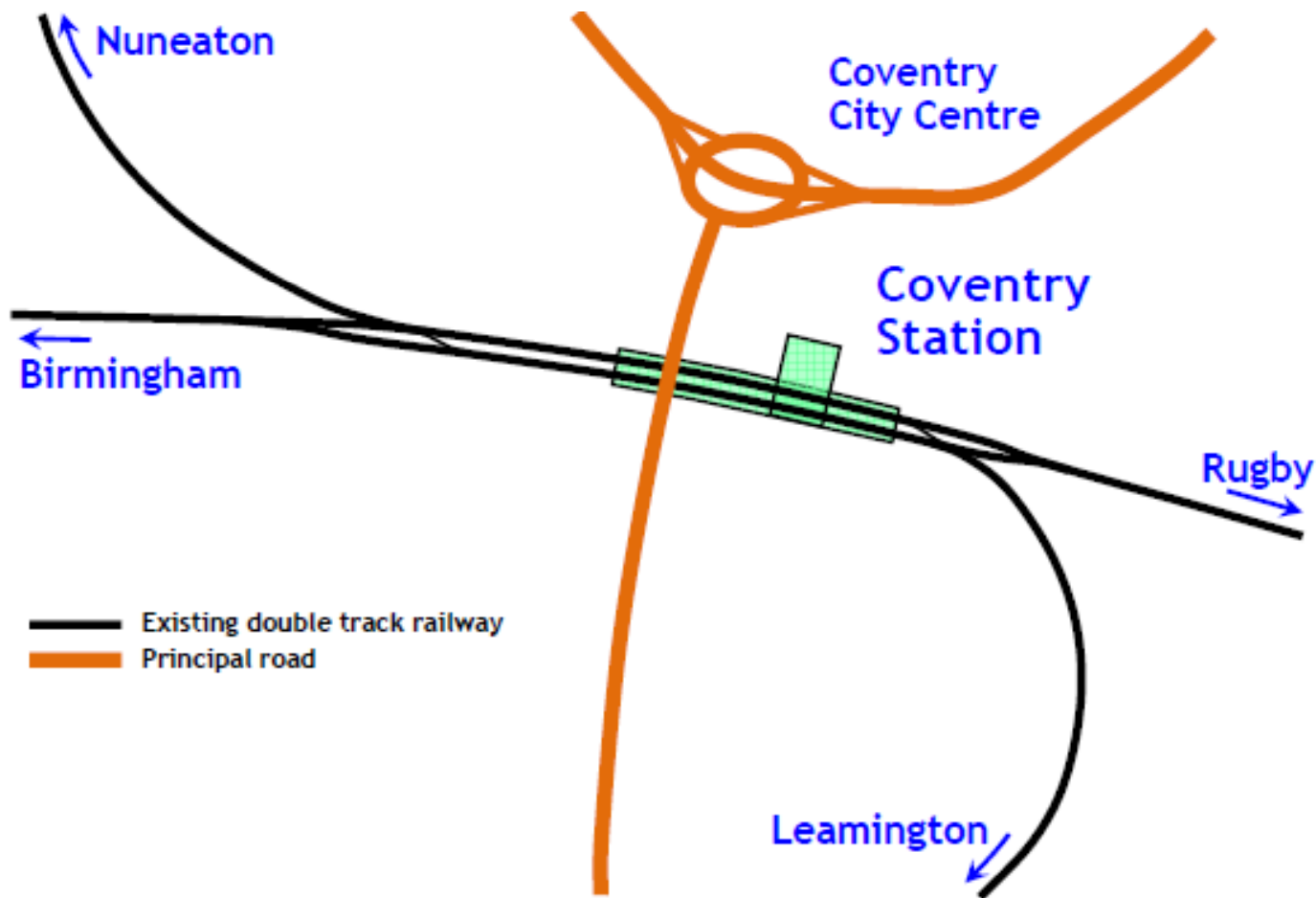
HSUK –
Local
benefits for
Coventry –

- **HSUK**
- **NUCKLE** scheme
- **Freight**



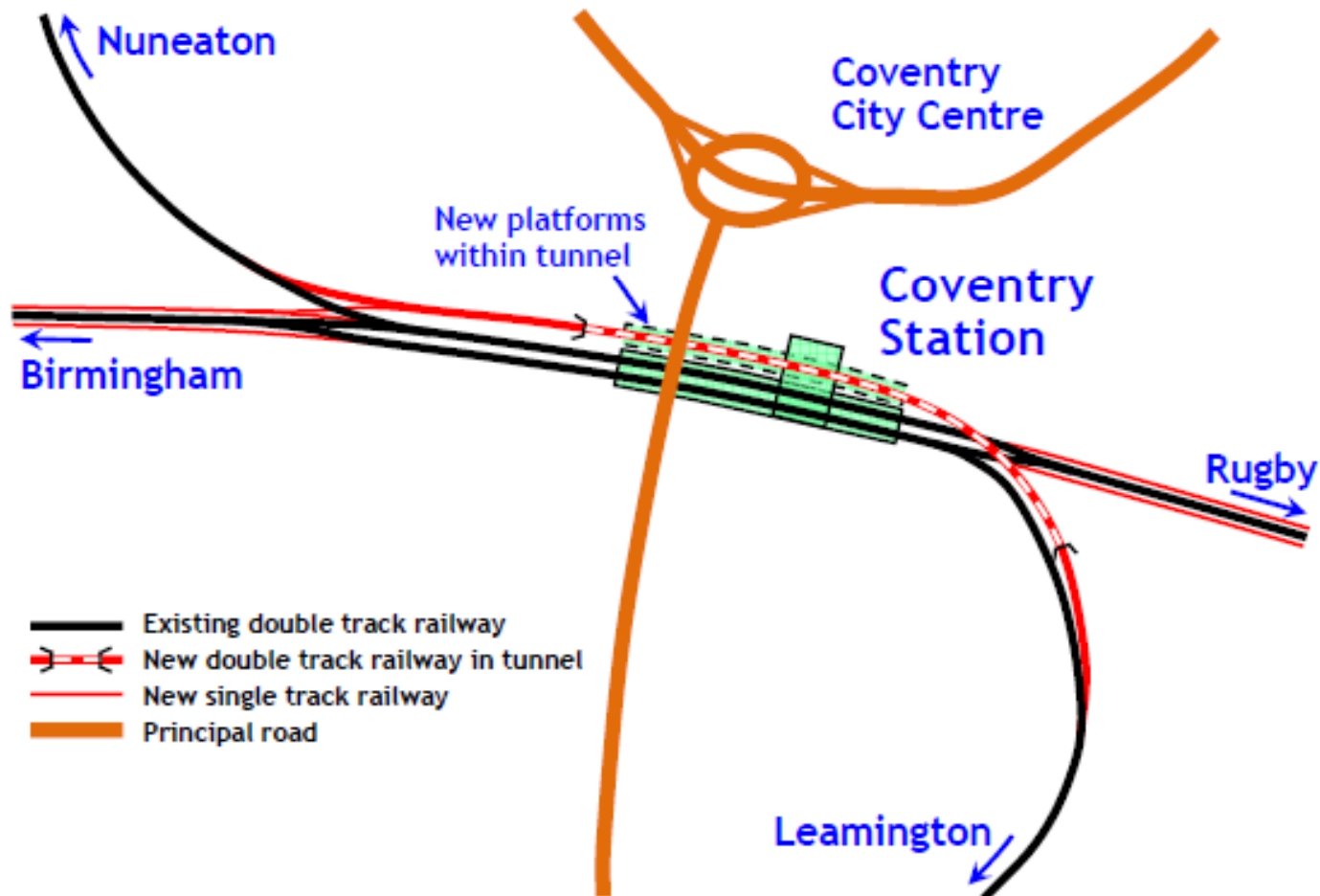
High Speed Rail in Coventry

Existing Station Layout



High Speed Rail in Coventry

HSUK Scheme for New Diveunder



HSUK's Challenge to HS2

If HS2 is to have any legitimacy, HS2 Ltd and the Government must demonstrate that their proposals comprise:

- The technical solution best able to deliver the UK high speed rail project's overall objective of “hugely enhanced capacity and connectivity” between the UK's major conurbations
- A genuine ‘low impact’ solution that respects the communities that lie in its path, and to either side, providing collateral benefits for the local transport system and the local economy

We are confident that HSUK hugely outperforms HS2 on both criteria. Over to you, Mr Grayling...

HSUK's Challenge to the UK Public

HS2's multiple deficiencies and dysfunctionalities carry huge costs for every UK citizen:

- >£100Bn of pounds of public money squandered.
- Half a billion tonnes of needless CO₂ emissions.
- Treasured landscapes destroyed forever.
- A lost chance to reverse the North-South Divide.
- A unique opportunity to create a balanced and fully connected national rail network lost forever.

All the checks and balances of our democratic system have failed to bring HS2 under control.

Every UK citizen must stand up and be counted.



High Speed UK

www.highspeeduk.co.uk