HSUK NATIONAL NETWORK DEVELOPMENT

These diagrams set out the vision of an enhanced national railway network, based around the High Speed UK core network of dedicated high speed lines.

NND1 : EXISTING UK RAIL NETWORK

This identifies the incomplete connectivity offered by the existing intercity rail network. Main lines radiate from London (East Coast, Midland, West Coast, Great Western) with CrossCountry and TransPennine providing interregional connections. These interregional routes comprise multiple city pairs, greatly increasing their viability, whereas the London-centric system comprises single city pairs. Connectivity is assessed against the benchmark requirement of direct services operating at minimum hourly frequency. Many of these services between regional centres comprise short and often ageing multiple units offering cramped passenger accommodation, not of 'intercity' quality.

NND2 : HS2 PROPOSALS SUPERIMPOSED ONTO EXISTING UK RAIL NETWORK

The HS2 proposals are illustrated in 'extended Y' format, extending either side of the Pennines beyond the currently projected terminating points of Leeds and Manchester to all primary regional cities. The resulting system is of limited connectivity, focussed upon London with few viable interregional links; it is also segregated from the existing intercity railway, with high speed stations disconnected from regional 'hubs', and intermediate second-tier centres left bypassed. Subsequent Northern Powerhouse Rail (NPR) and Midlands Rail Hub (initiatives) will do little to remedy HS2's connectivity deficiencies. This will compromise economic (and environmental) performance, with most benefits accruing in London where connectivity is concentrated. It will also create a 2-tier system, compromising the basic integrity of the national rail network, and preventing efficient development of rail links within both the Midlands and the North.

NND3 : HIGH SPEED UK CORE NETWORK & PROPOSED SERVICE FREQUENCIES

This diagram shows how HSUK will establish for the first time a national rail network capable of interlinking all of the principal conurbations of the Midlands, the North and Scotland with high quality, high speed, and high frequency intercity services. This is achieved through the primary HSUK interventions of an Anglo-Scottish trunk high speed route, a transpennine high speed route following the Woodhead corridor to Manchester and Liverpool, and selected upgrades of the existing network. The service frequencies illustrated are supported by a comprehensive 'demonstrator timetable' which itself is based upon the detailed route design that backs up the entire HSUK scheme.

NND4 : HIGH SPEED UK SERVICES EXTENDING ONTO EXISTING UK RAIL NETWORK

High Speed UK's blend of new build and upgraded routes, and its radically different 'spine and spur' configuration gives comprehensive connectivity between all primary regional centres of the Midlands, the North and Scotland, and extending to all principal UK cities. It is a far more efficient, symmetric and comprehensive system than the HS2 'Y', covering all primary main line corridors with 54 city pairs linked (as against 12 for HS2), yet requiring fewer route kilometres to be constructed and fewer trains to be operated.

NND5 : HIGH SPEED UK PROPOSED HEATHROW SERVICE PATTERN

This diagram illustrates how 5 train diagrams can link Heathrow Terminal 5 and the Central Terminal Area to all primary centres of the Midlands, North and Scotland, plus South Wales and the West Country. This will effectively eliminate any requirement for domestic flights to Heathrow. This is only achievable with HSUK's basic routeing efficiency, with several cities placed on a single line of route.

NND6 : KEY DIAGRAM ILLUSTRATING PRINCIPAL HSUK INTERVENTIONS

The development of an efficient and optimised national network under the UK high speed rail initiative demands a coordinated programme of major infrastructure works. This diagram sets out the key works required to realise the HSUK vision.

NND7 : KEY DIAGRAMS ILLUSTRATING EXISTING NETWORK ENHANCEMENTS

The improvement of intercity rail services under the UK high speed rail initiative demands parallel enhancements to existing local networks. HSUK has formulated complementary regional development strategies to highlight the key projects that must be undertaken to realise the vision of enhanced local, regional and national rail networks. Effectively these strategies comprise an optimised 'Integrated Rail Plan for the Whole GB Network' that is now demanded by Government policy.

NND8 : PARALLEL DEVELOPMENT OF 'EUROGAUGE UK' RAILFREIGHT NETWORK

High Speed UK's routeing, closely aligned with and frequently connected to existing rail corridors, presents the opportunity to create a parallel national network of lines on which freight becomes the prime user. This system, following 'decriticalised' routes generally clear of major tunnels and stations, has the potential for 'gauge enhancement' i.e. creating the larger clearances necessary to permit the operation of larger 'Eurogauge' Continental wagons and 'piggyback' operation of articulated HGV trailers on rail wagons. This harmonises with other HSUK proposals, for TransPennine lorry shuttle operations and for coast-to-coast freight links via the restored Woodhead corridor.

UK RAIL NETWORK:

EFFECTIVENESS OF INTERCITY LINKS & CONNECTIONS TO HEATHROW AIRPORT

DIAGRAM NND 1

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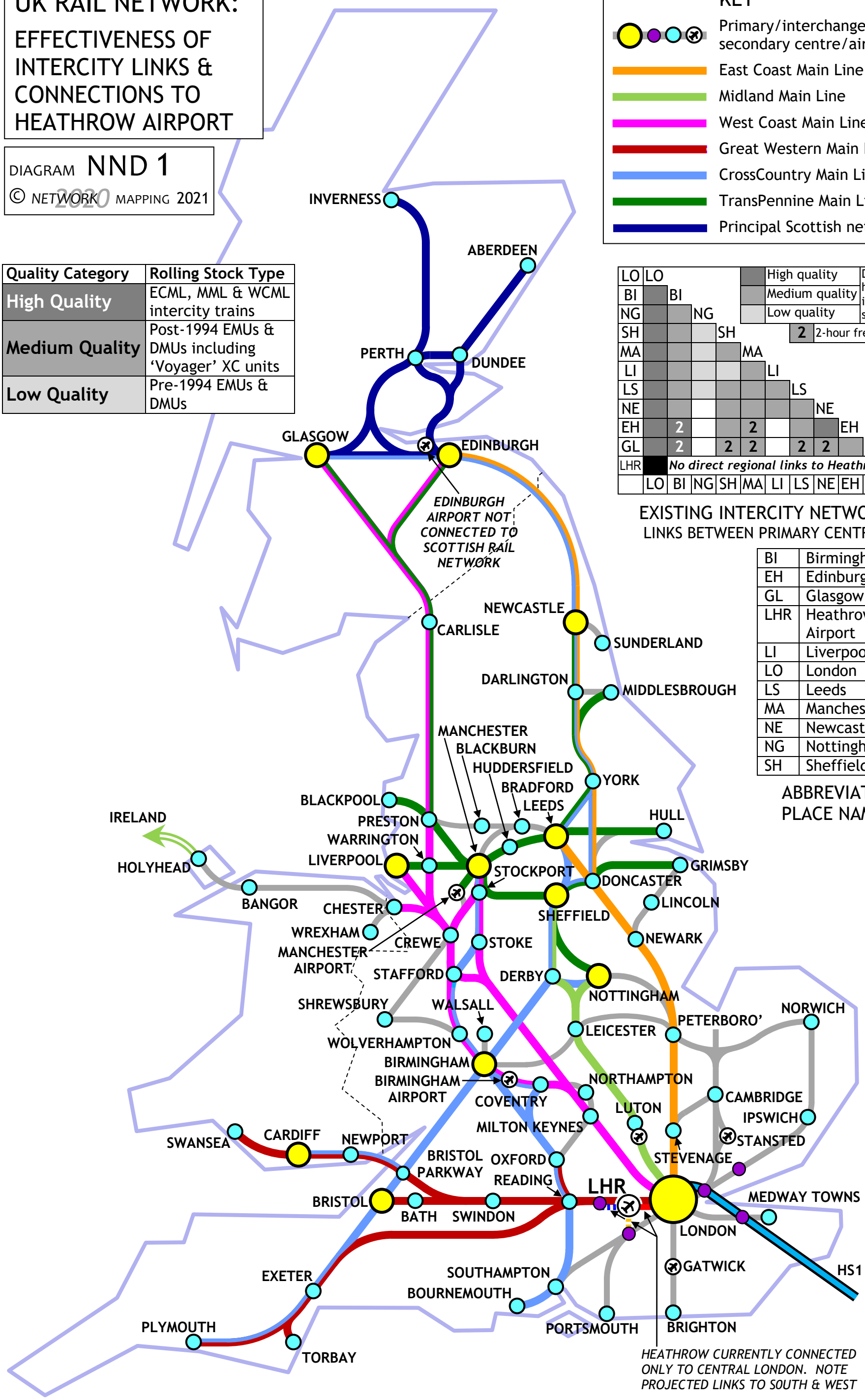
Quality Category	Rolling Stock Type
High Quality	ECML, MML & WCML intercity trains
Medium Quality	Post-1994 EMUs & DMUs including 'Voyager' XC units
Low Quality	Pre-1994 EMUs & DMUs



KEY

- Primary/interchange hub/ secondary centre/airport
- East Coast Main Line
- Midland Main Line
- West Coast Main Line
- Great Western Main Line
- CrossCountry Main Line
- TransPennine Main Line
- Principal Scottish network

LO	LO										
BI		BI									
NG			NG								
SH				SH							
MA					MA						
LI						LI					
LS							LS				
NE								NE			
EH		2			2				EH		
GL		2		2	2		2	2		GL	
LHR		*No direct regional links to Heathrow*									LHR
	LO	BI	NG	SH	MA	LI	LS	NE	EH	GL	LHR

High quality / Medium quality / Low quality — Direct hourly intercity service

2 — 2-hour frequency

EXISTING INTERCITY NETWORK

LINKS BETWEEN PRIMARY CENTRES

BI	Birmingham
EH	Edinburgh
GL	Glasgow
LHR	Heathrow Airport
LI	Liverpool
LO	London
LS	Leeds
MA	Manchester
NE	Newcastle
NG	Nottingham
SH	Sheffield

ABBREVIATED PLACE NAMES

HIGH SPEED 2 / NPR

COMPLETED SYSTEM – 'Y' EXTENDING BOTH SIDES OF PENNINES & TRANSPENNINE LINK

DIAGRAM NND 2

© NETWORK 2020 MAPPING 2021

FULL NETWORK COMPARISONS	HSUK	HS2+ NPR
Route length of new HSL (km)	911	956+ 196
Length of restored or upgraded route	307	38+ 66
Primary city pairs connected	54	12+8
Main line corridors enhanced	6	3+1
Integration with secondary centres	Y	N
Direct access to Heathrow?	Y	N

NPR = NORTHERN POWERHOUSE RAIL

MRH = MIDLANDS RAIL HUB

KEY

- Principal intercity route
- HS2/NPR high speed line
- Projected extension of HS2 'Y' to link all primary cities
- Midlands Rail Hub route
- Primary/interchange hub/ secondary centre
- Regional centres not directly connected to high speed 'network'
- Airport connected to high speed network via local interchange

LO	LO										
BI		BI									
NG			NG								
SH				SH							
MA					MA						
LI						LI					
LS							LS				
NE								NE			
EH		2							EH		
GL		2								GL	
LHR											LHR
	LO	BI	NG	SH	MA	LI	LS	NE	EH	GL	LHR

Direct HS2/ NPR/ MRH link — at hourly or better frequency

Intercity link made worse

2 — 2-hour frequency

Segregated terminus or parkway stn

No direct regional links to Heathrow

HIGH SPEED 2 LINKS BETWEEN PRIMARY CENTRES

NPR: MANCHESTER-LEEDS TRANS-PENNINE LINK

HIGH SPEED 2: DEDICATED HIGH SPEED LINE IN 'Y' CONFIGURATION PROJECTED NORTHWARDS TO LINK ALL PRIMARY REGIONAL CENTRES OF MIDLANDS, NORTH & SCOTLAND TO LONDON AND BIRMINGHAM

NPR: VIABLE SCHEME FOR MANCHESTER-SHEFFIELD LINK YET TO EMERGE

MRH: UPGRADES OF ROUTES BETWEEN MIDLANDS CITIES

EDINBURGH-GLASGOW HIGH SPEED LINK VIA CARSTAIRS AS PER SCOTTISH GOVERNMENT PROPOSAL (32min E to G)

INVERNESS, ABERDEEN, PERTH, DUNDEE, GLASGOW, EDINBURGH, CARLISLE, NEWCASTLE, SUNDERLAND, DARLINGTON, MIDDLESBROUGH, YORK, BLACKPOOL, PRESTON, BRADFORD, LEEDS, HULL, WARRINGTON, LIVERPOOL, H'F'D, M'CHESTER, S'PORT, GRIMSBY, DONCASTER, HOLYHEAD, BANGOR, CHESTER, SHEFFIELD, LINCOLN, WREXHAM, CREWE, STOKE, NEWARK, TOTON, STAFFORD, DERBY, NOTTINGHAM, SHREWSBURY, WALSALL, WOLVERHAMPTON, LEICESTER, PETERBORO', NORWICH, BIRMINGHAM, COVENTRY, NORTHAMPTON, CAMBRIDGE, LUTON, MK, IPSWICH, STANSTED, SWANSEA, CARDIFF, NEWPORT, OXFORD, READING, BRISTOL, SWINDON, LHR, LONDON, MEDWAY TOWNS, GATWICK, HS1, EXETER, SOUTHAMPTON, BOURNEMOUTH, PLYMOUTH, TORBAY, PORTSMOUTH, BRIGHTON

HS2 CONNECTION TO HEATHROW VIA CHANGE AT OLD OAK COMMON. PLANNED HS2 SPUR TO T5 NOW CANCELLED

HS2-HS1 LINK VIA NORTH LONDON LINE NOW CANCELLED

Note

Toton/East Midlands Interchange (9km from central Nottingham) not counted in connectivity assessment.

City pairs connected with 2-hourly services fail to meet core requirement for hourly frequencies between all city pairs.

HIGH SPEED UK:

CORE NETWORK SERVING 16 KEY CENTRES WITH PROPOSED FREQUENCIES

DIAGRAM NND 3

© NETWORK MAPPING 2021

KEY

- High speed line
- HSUK services on existing network linking 16 centres
- Key hubs of HSUK 16-centre network

BI	Birmingham
DE	Derby
DL	Darlington
EH	Edinburgh
GL	Glasgow
LE	Leicester
LHR	Heathrow Airport
LI	Liverpool
LO	London
LS	Leeds
MA	Manchester
MK	Milton Keynes
NE	Newcastle
NG	Nottingham
SH	Sheffield
ST	Stoke

ABBREVIATED PLACE NAMES

	LO	MK	BI	LE	NG	DE	ST	SH	MA	LI	LS	DL	NE	EH	GL	LHR
LO	LO															
MK	3	MK														
BI	4	2	BI													
LE	8	3	2	LE												
NG	2	1	2	4	NG											
DE	2	1	5	4	4	DE										
ST	4	1	3	1	1	2	ST									
SH	7	2	4	8	3	5	1	SH								
MA	4	1	4	1	1	2	4	5	MA							
LI	3	1	2	1	2	1	2	3	6	LI						
LS	4	1	3	3	2	2	1	7	4	3	LS					
DL	4	1	2	2	2	2	1	2	3	1	6	DL				
NE	3	1	2	2	2	2	1	2	3	1	6	10	NE			
EH	3	2	2	2	1	1	1	2	2	1	4	8	8	EH		
GL	3	1	1	2	1	1	2	2	2	1	4	6	6	7	GL	
LHR		1	1	1	1	1	1	1	2	1	1	1	1	1	1	LHR

Direct city pair link or Heathrow link at hourly or better frequency

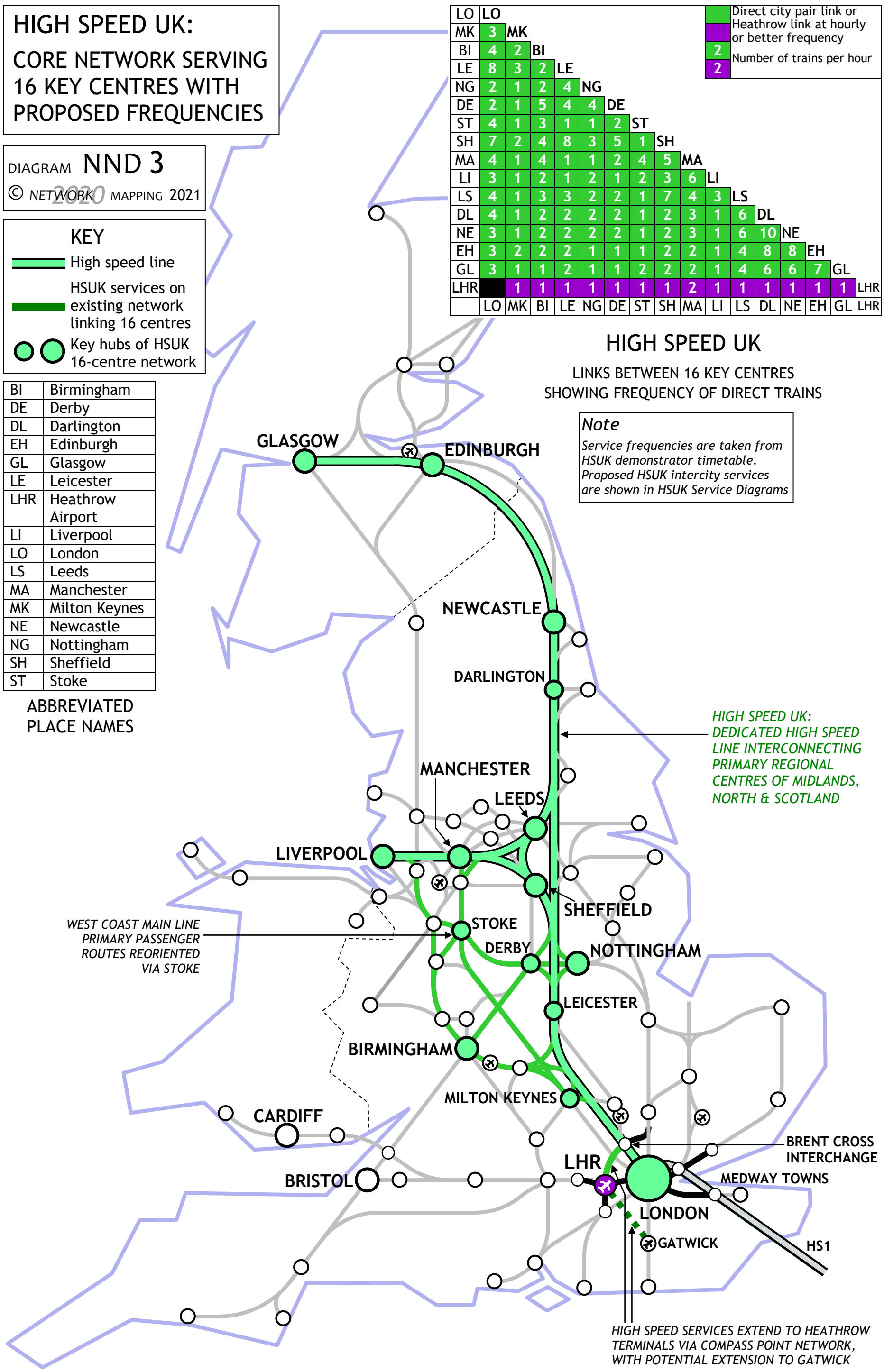
2 Number of trains per hour

HIGH SPEED UK

LINKS BETWEEN 16 KEY CENTRES SHOWING FREQUENCY OF DIRECT TRAINS

Note

Service frequencies are taken from HSUK demonstrator timetable. Proposed HSUK intercity services are shown in HSUK Service Diagrams



HIGH SPEED UK:

PRIMARY HIGH SPEED INTERCITY ROUTES EXTENDING ONTO CLASSIC NETWORK

DIAGRAM NND 4

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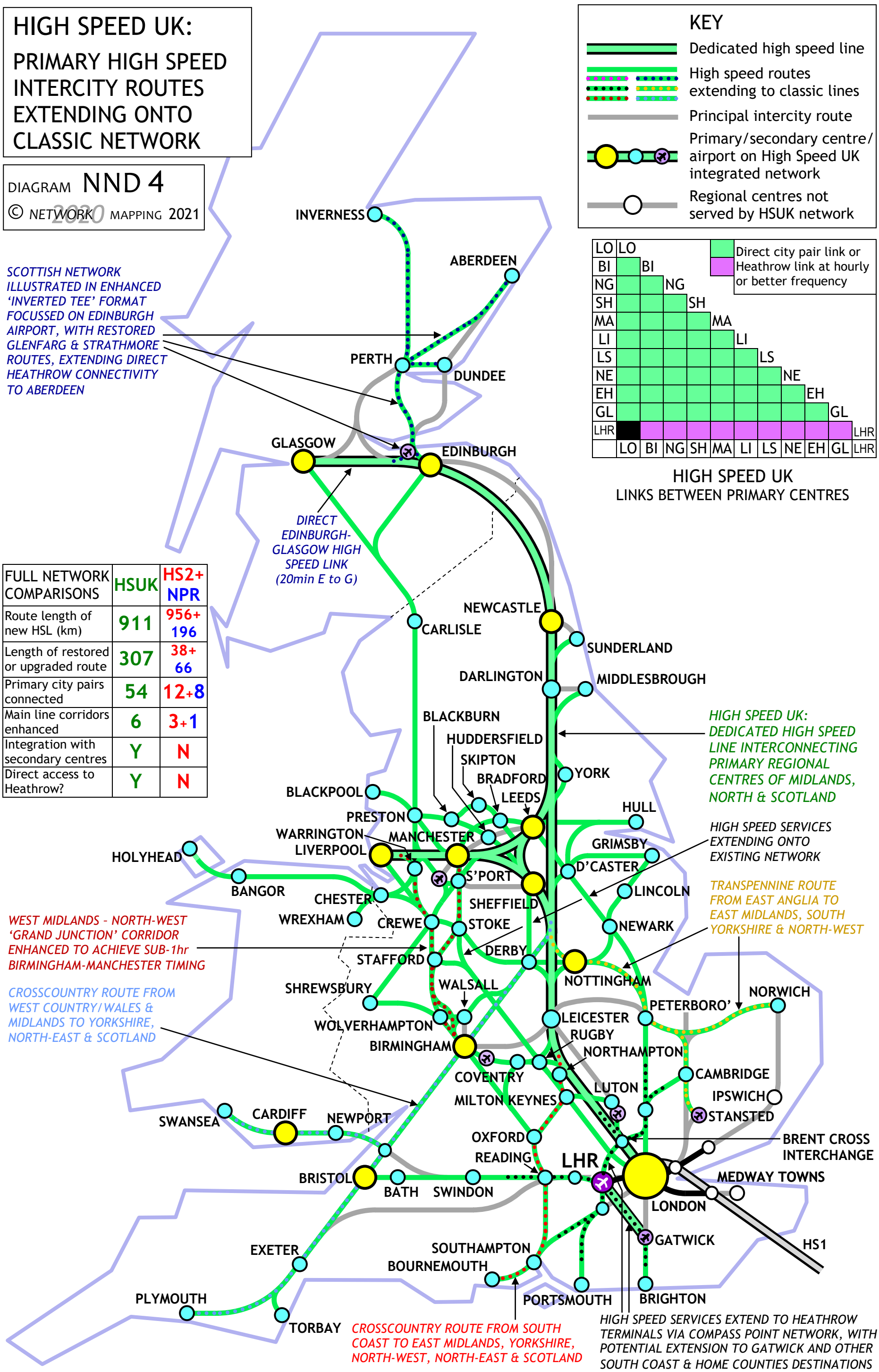

FULL NETWORK COMPARISONS	HSUK	HS2+ NPR
Route length of new HSL (km)	911	956+ 196
Length of restored or upgraded route	307	38+ 66
Primary city pairs connected	54	12+8
Main line corridors enhanced	6	3+1
Integration with secondary centres	Y	N
Direct access to Heathrow?	Y	N

HIGH SPEED UK:

PROPOSED SERVICE PATTERN FOR DIRECT CONNECTIONS TO HEATHROW AIRPORT

DIAGRAM NND 5

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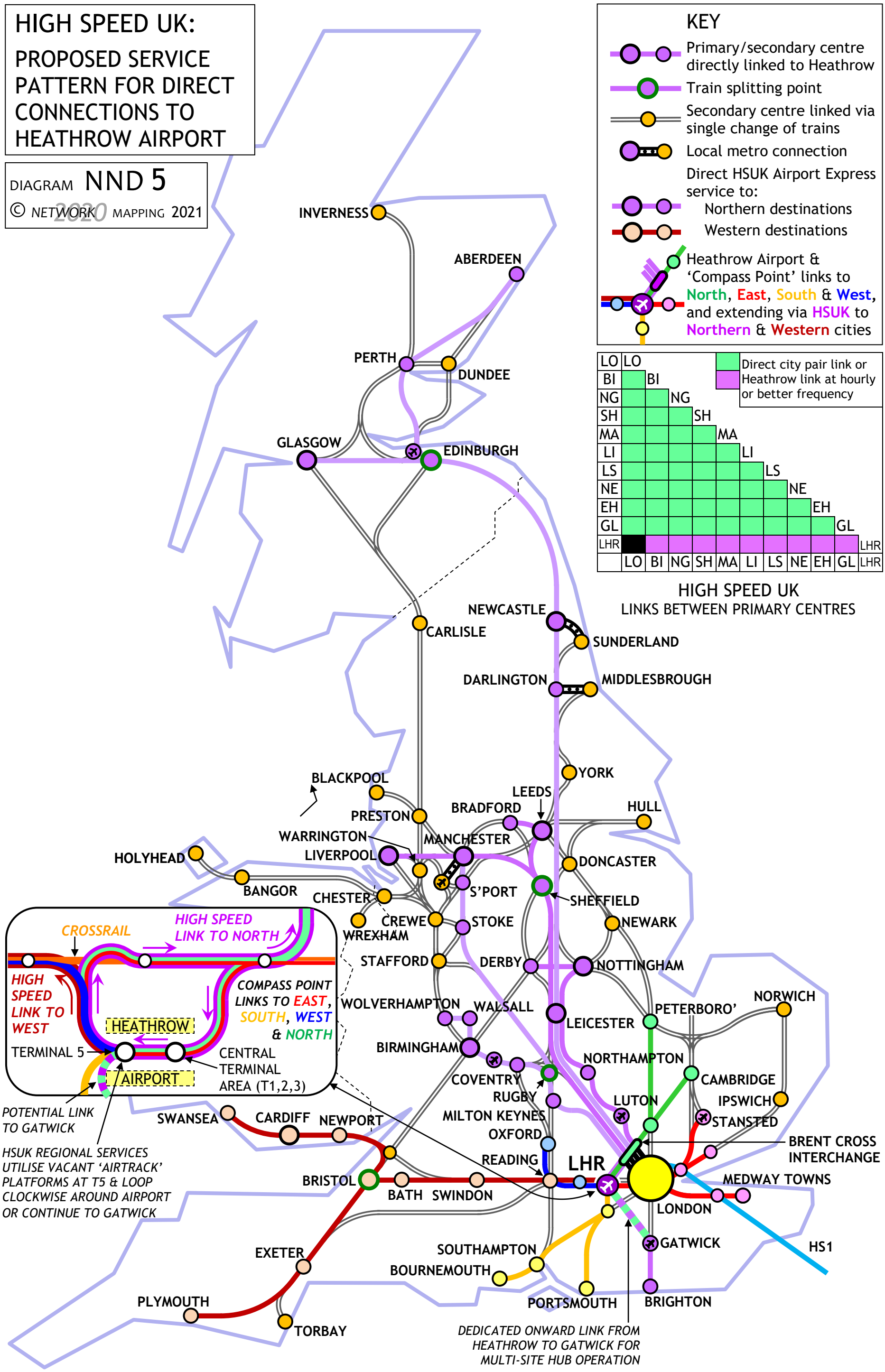

HIGH SPEED UK:

INTERVENTIONS TO EXISTING NETWORK TO HARMONISE WITH HIGH SPEED UK

DIAGRAM NND 6

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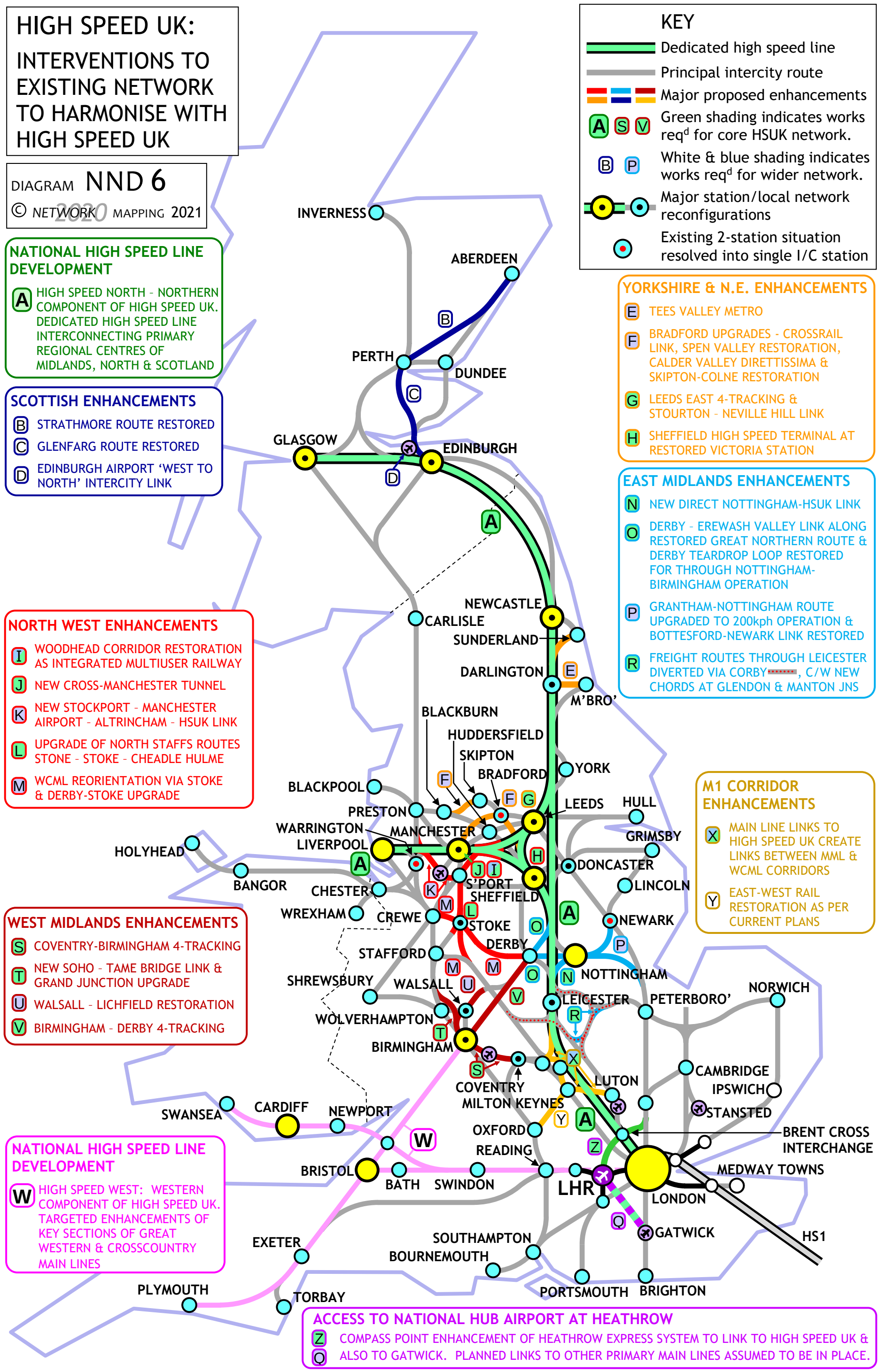

HIGH SPEED UK: COVERAGE OF HSUK REGIONAL RAIL STRATEGIES

DIAGRAM NND 7

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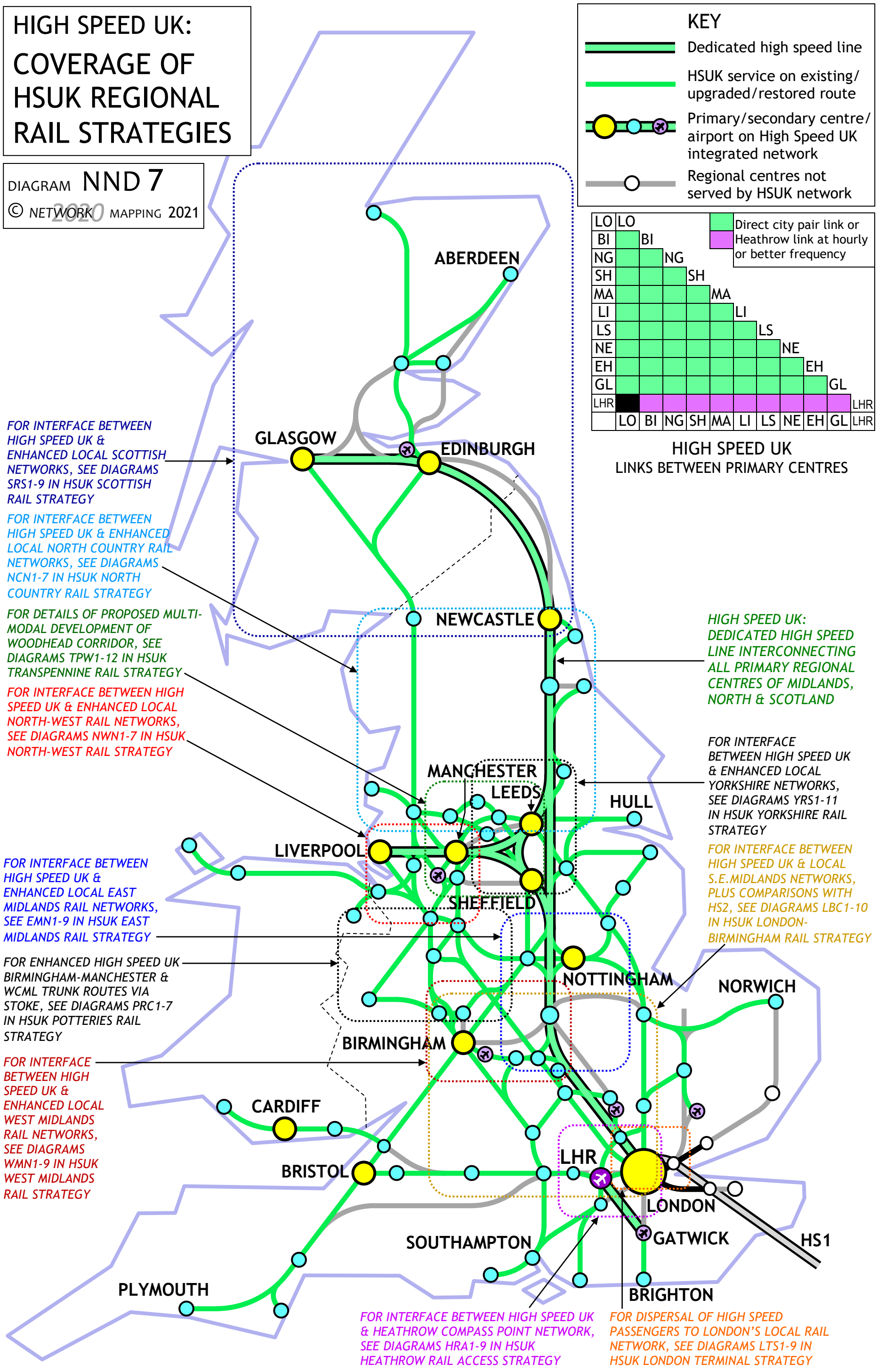
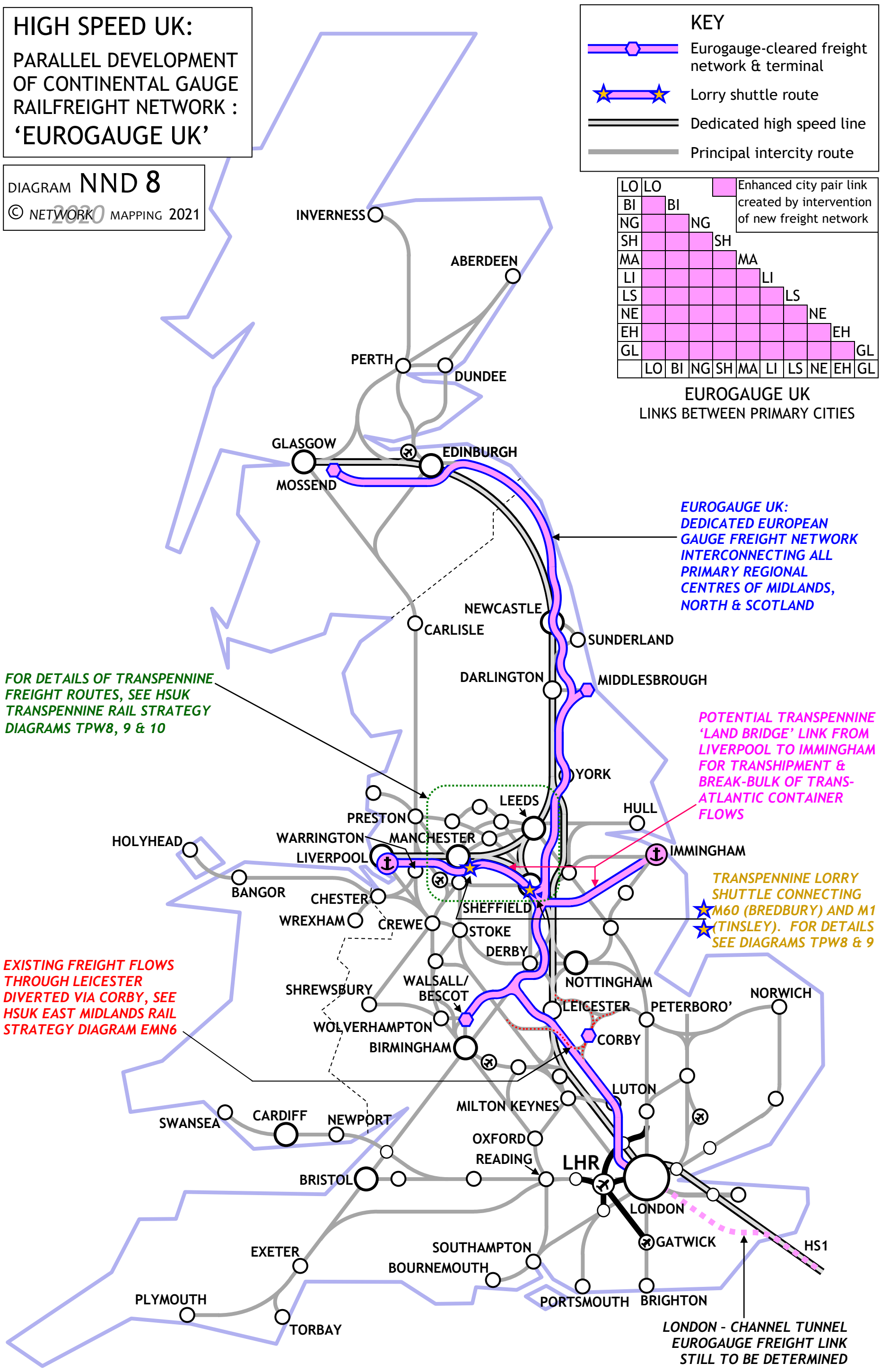


HIGH SPEED UK:

PARALLEL DEVELOPMENT OF CONTINENTAL GAUGE RAILFREIGHT NETWORK : 'EUROGAUGE UK'

DIAGRAM NND 8

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