

HIGH SPEED TWO:

Is it on the right track?

Peter Delow

STOP HS2

Who am I?

- Member of Stop HS2
- Chairman Cubbington Action Group against HS2
- Member of Cubbington Parish Council
- Member of the Institution of Engineering & Technology
- Blogging on HS2 and the Environment

Well is HS2 on the right track?

- Features of the HS2 design
- Journey time objective
- Capacity objective
- Resilience
- Train path requirement
- International services
- Environmental consequences

Features of the HS2 design

- In service: Phase 1 2026 Phase 2 2033
- Twin track
- Track lengths: Phase 1 225km Total network 531km
- Connections: HS1 (single track), WCML, ECML, Heathrow spur (pending)
- Speed: 400kph (design), 360kph (initial operation)
- Stations: Phase 1 four, Phase 2 five
- GC loading gauge
- Services: Captive hs, classic compatible, no freight



Problems of meeting the journey time objective

Consequencies of pushing the speed envelope

- Minimum curve radius (7200m)
- Inability to use existing transport corridors
- Power consumption and carbon emissions
- Aerodynamic impacts
- Rayleigh wave

Problems of meeting the journey time objective

Consequencies of pushing the speed envelope

- Track stability and trueness
- Maintenance
- Aerodynamic noise
- Train path capacity

Problems of meeting the journey time objective

Of £57.7bn transport user benefits claimed for HS2 £45bn (79%) are attributed to time savings

- Berkhamsted "WCML" corridor - +1.5 mins
- Chiltern Line/M40 - +3.5 mins
- M1 corridor - +5 mins
- Midland Main Line corridor - +9 mins

Source: HS2 Ltd (FOI10-067)

Problems of meeting the capacity objective

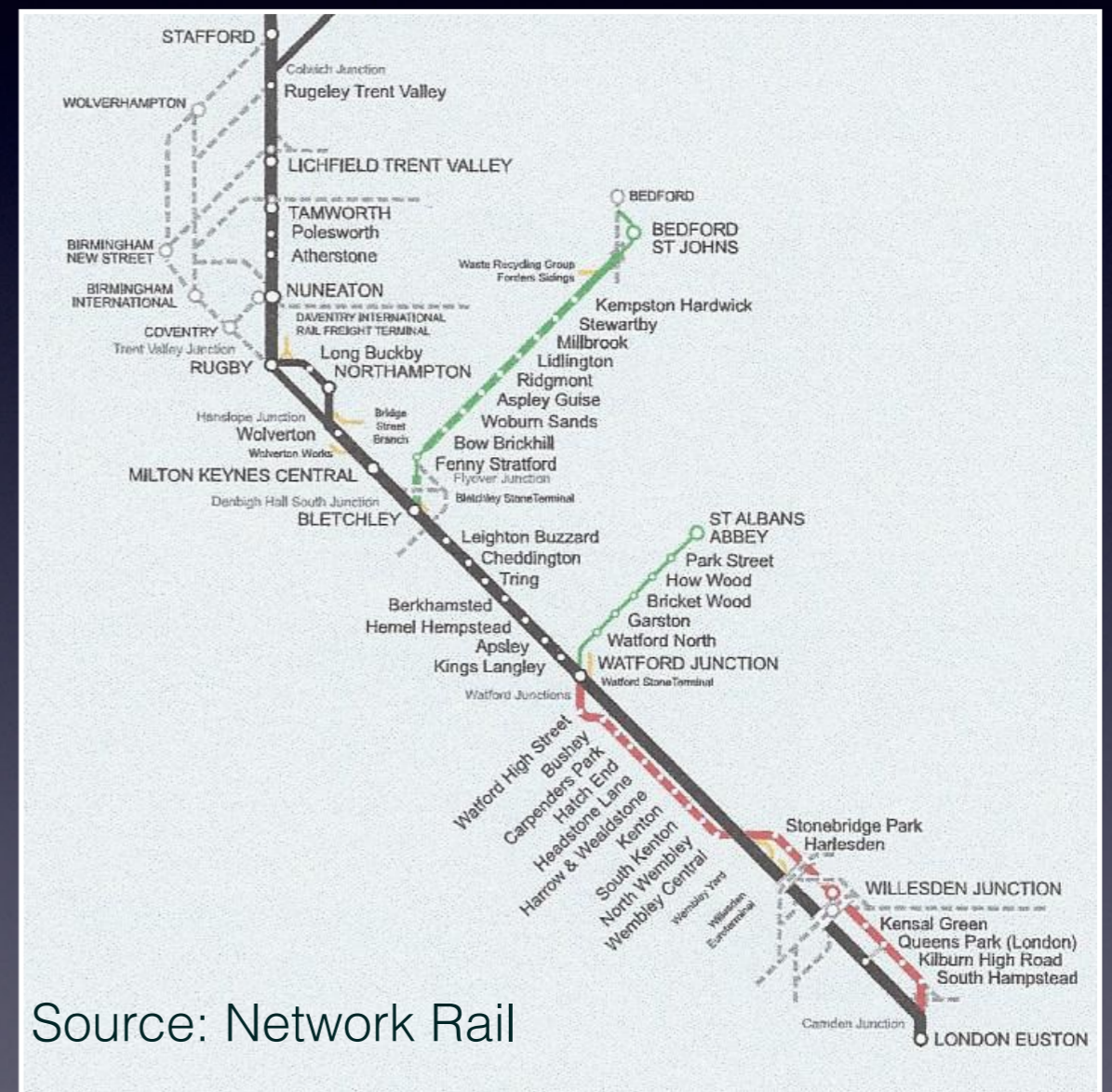
"The real argument about HS2 isn't speed it is capacity. The line is full - we need a new line." David Cameron Prime Minister

HS2 Phase 1 and the West Coast Main Line (WCML)

Problems of meeting the capacity objective

WCML Services

- Express passenger (Virgin Trains)
- Commuter (London Midland)
- Freight



Problems of meeting the capacity objective

Overcrowding indicators

- All-day load factor
- Peak occupancy
- Number of standing passengers
- Unavailability of new train paths

Problems of meeting the capacity objective

All-day load factor

- Virgin Trains 35% (approx) before lengthening
"Intercity West Coast is unique because it has a considerable amount of unused capacity ..."
First Group
- London Midland 43%
- Freight not applicable

Problems of meeting the capacity objective

Peak occupancy

- Virgin Trains 52% before lengthening
- Suburban commuter 76%
- Freight not applicable

Problems of meeting the capacity objective

Number of standing passengers in evening peak

- Virgin Trains 1%
- London Midland 19%
- Freight not applicable

Problems of meeting the capacity objective

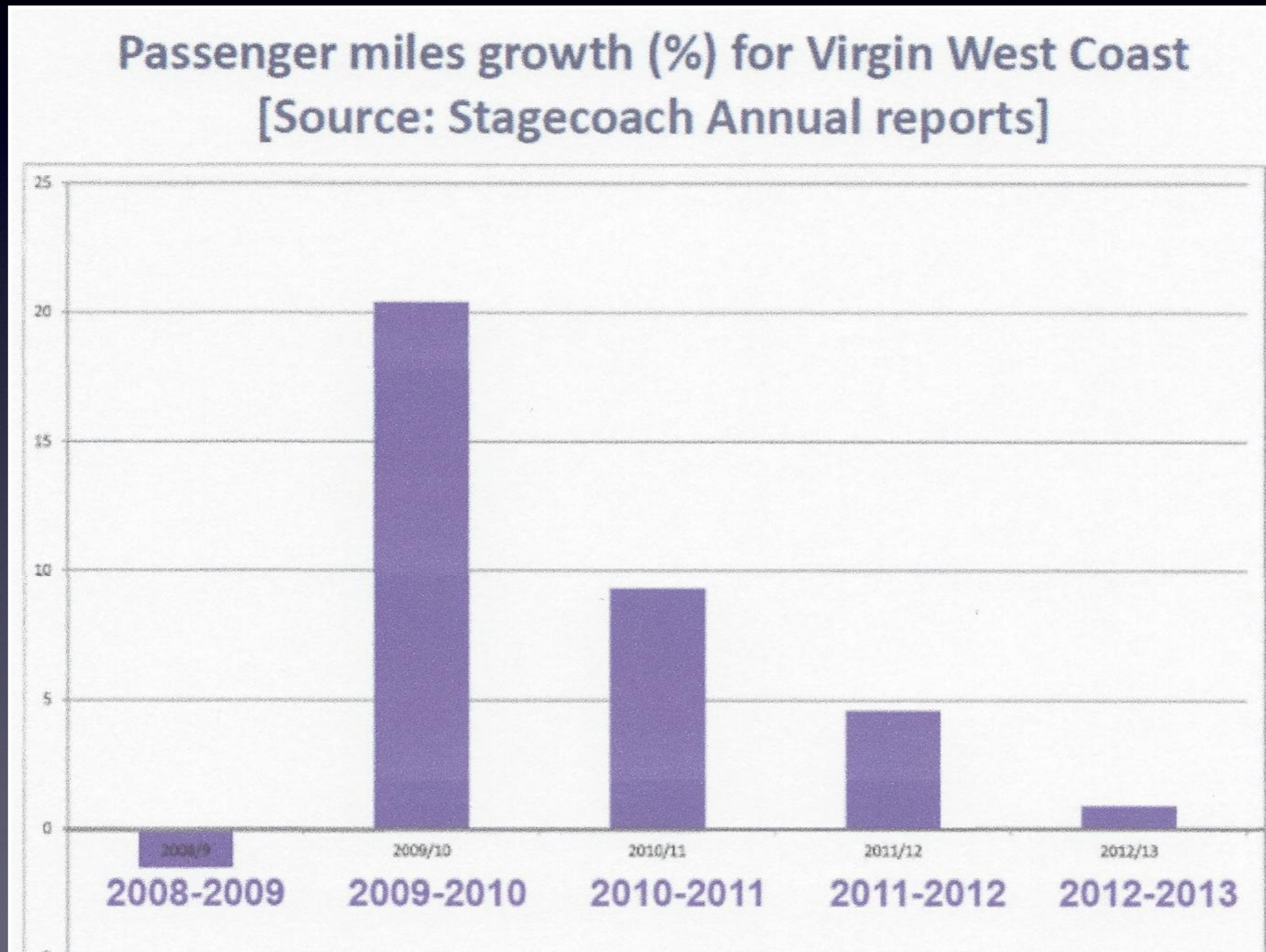
Unavailability of train paths
Anecdotal evidence

Virgin Trains problems with London-Shrewsbury service

"Freight volumes will probably grow about 40% in the next ten years and it is mostly intermodal, which is containers on trains. Much of that growth will be on the main routes between centres of population or consumption, or ports. Of course, the main one is the WCML." Lord Berkeley

Problems of meeting the capacity objective

What about growth?



Problems of meeting the capacity objective

Targets

- Suburban commuters
- Long-distance commuters
- Freight paths

Problems of meeting the capacity objective

Passengers with access to HS2 - Phase 1

Passenger journeys to/from London
2009/10 (000's)

Milton K 3,000	Northampton 1,160	Birmingham Int 800	Preston 510
Manchester P 2,700	Hemel H 1,120	Queens P 690	Glasgow C 510
Birmingham NS 2,320	Berkhamsted 1,070	Harrow & W 580	Wembley C 500
Watford J 1,650	Coventry 980	Rugby 550	Tring 460
Liverpool LS 1,240	Leighton B 970	Stockport 530	Kilburn HR 440

Source: Network Rail

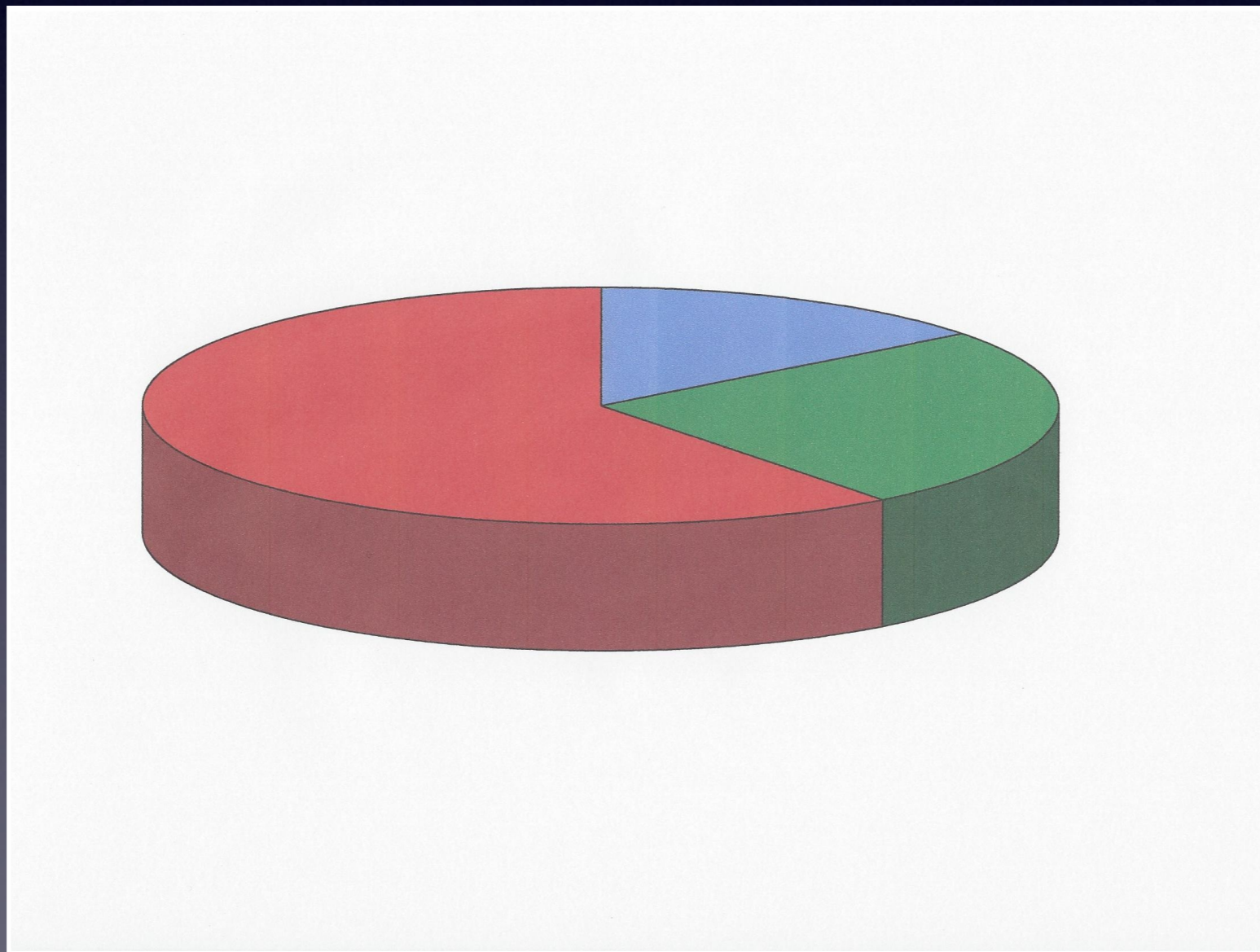
Problems of meeting the capacity objective

The impact of HS2 Phase 1 on passenger numbers

Direct HS2 service 14.3%

HS2 via WCML 25.2%

No HS2 service 60.5%



Problems of meeting the capacity objective

What will HS2 Phase 1 mean for the WCML?

- HS2 will not replace any train paths directly
- Reduced demand on WCML will require less frequent services and more stops, freeing some train paths
- The removal of express services from WCML will equalise fast line services to make more train paths possible
- HS2 will not benefit suburban commuter services on the slow line
- There are no plans for HS2 to carry freight

Problems of meeting the capacity objective

Possible winners and losers from HS2

- Direct passengers Birmingham/London willing to pay the (probable) fare premium will benefit
- Passengers from some stations (e.g. Coventry, Rugby, Stafford) to/from London will lose out with fewer and slower services
- Long distance commuter service frequency will be improved, reducing overcrowding
- Suburban commuters will see no difference
- The degree to which freight capacity will be improved is unclear

Problems of meeting the capacity objective

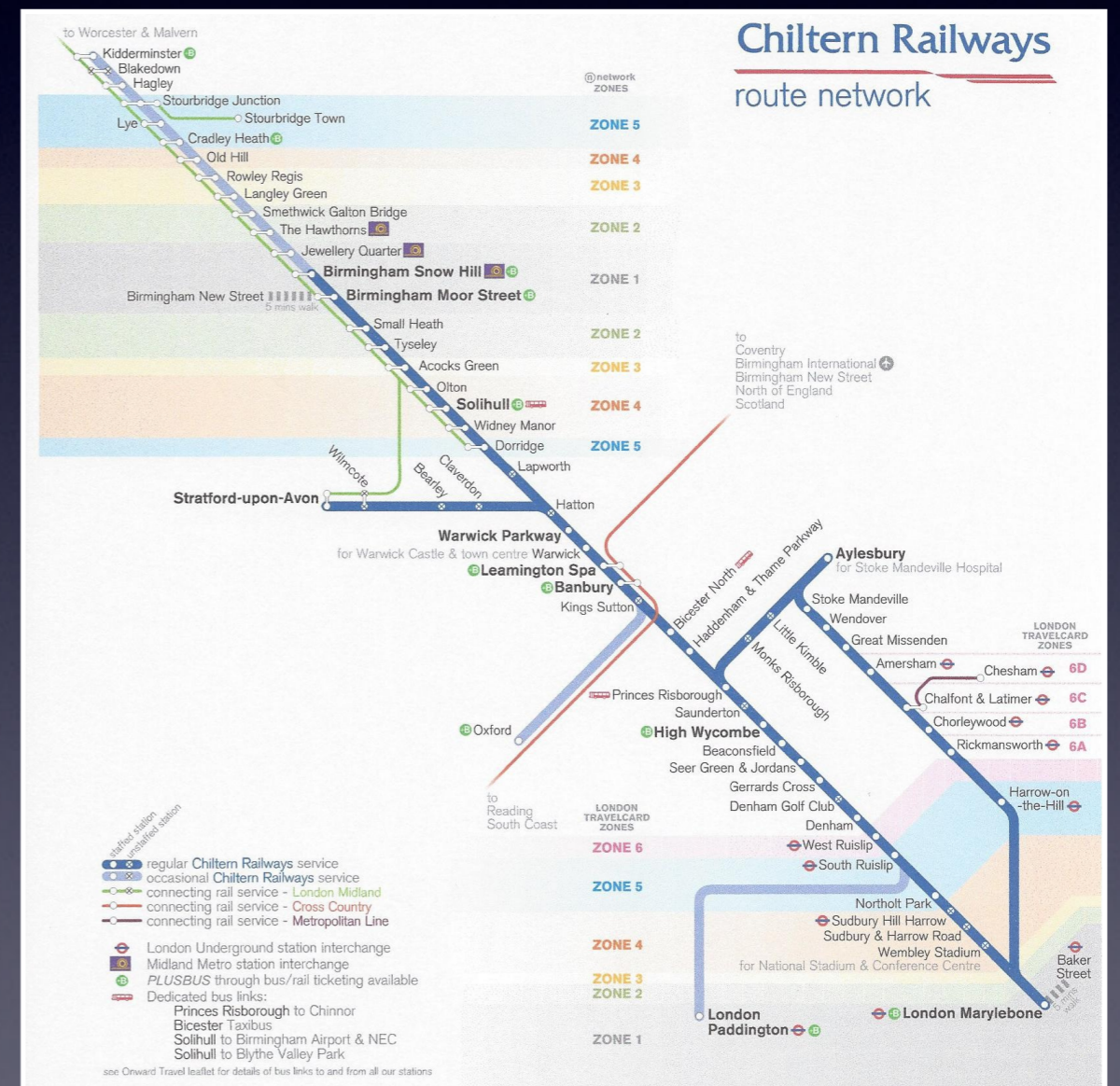
Is HS2 Phase 1 capacity over-provisioned?

- London/Birmingham 3 trains per hour each way - assume 744 trains per week
- A 200m HS2 train will have about 550 seats
- That's about 21 million seats a year
- Current demand from the two Birmingham stations is 3.1 million passengers a year
- That's only 14.6% occupancy at current demand levels (assuming all passengers transfer to HS2)

Problems of meeting the capacity objective

There is already a HS2 by-pass - the Chiltern Line

- Fairly direct route
- Popular service
- Would benefit from electrification
- Scope for further improvements and capacity upgrades?
- Ignored in HS2 plans



Resilience

- Star network - the failure of the Birmingham Interchange/London section would be critical
- Twin tracks - two maintenance loops only by-pass facility
- Alternative routes only accessible by classic compatible rolling stock
- Classic compatible delays may prejudice HS2 throughput

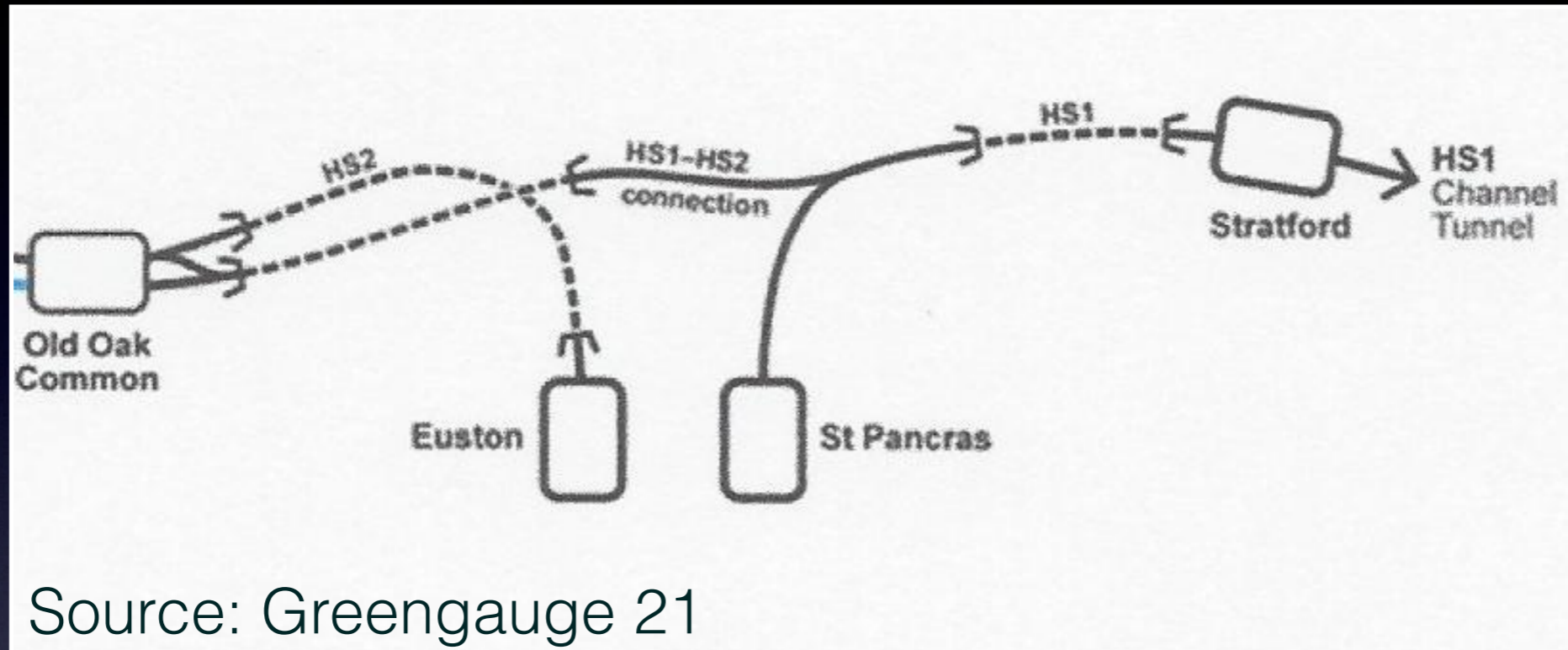
Train path requirement

Links to/from London in 2033

- Birmingham 3
- Liverpool 2, Preston 1 (both classic compatible)
- Manchester 3, Leeds 2
- Scotland 2, York 1 (both classic compatible)
- Newcastle 2 (classic compatible)
- Total 16, but does not include Heathrow or international.
Design maximum is 18 (contentious)

Source: HS2 Ltd

International services



Source: Greengauge 21

- Single track
- Conventional speed
- Disruption to London Overground and Camden
- Border checks at Old Oak Common (?)

International services

Problems?

- Border checks (Schengen)
- Business case
- Mixed trains (impact on Euston services)
- Shortage of train paths for dedicated international trains
- Capacity of proposed link

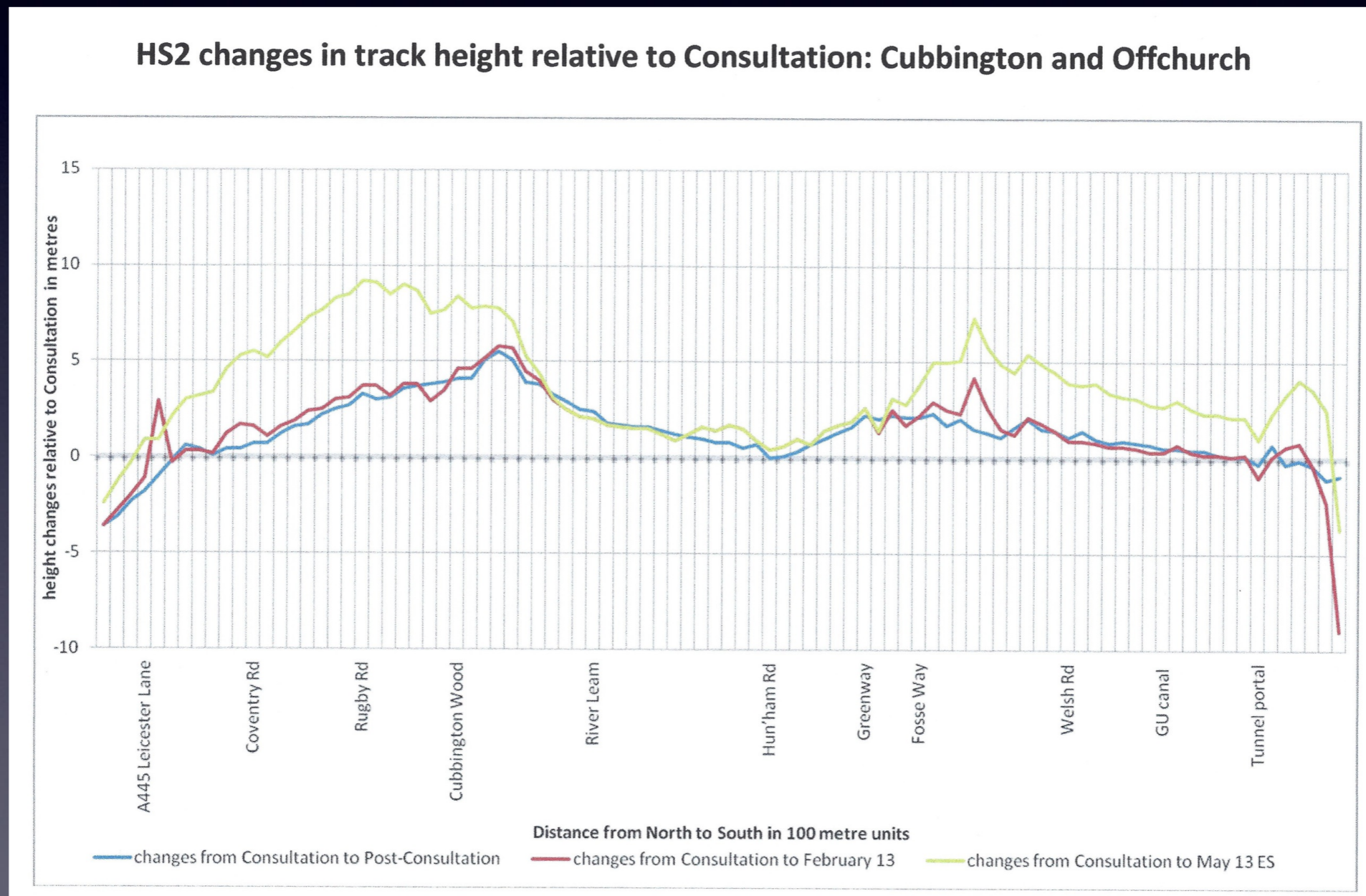
International services

The HS2 Ltd view in December 2009

- "Security requirements dictate that we could not mix domestic and international passengers on the same train."
- "Demand is unlikely to be enough to offer a reasonably frequent service."
- "Unlikely to cover the capital costs of a direct link to HS1."
- "Unlikely to justify the cost of an investment in an international station north of London."

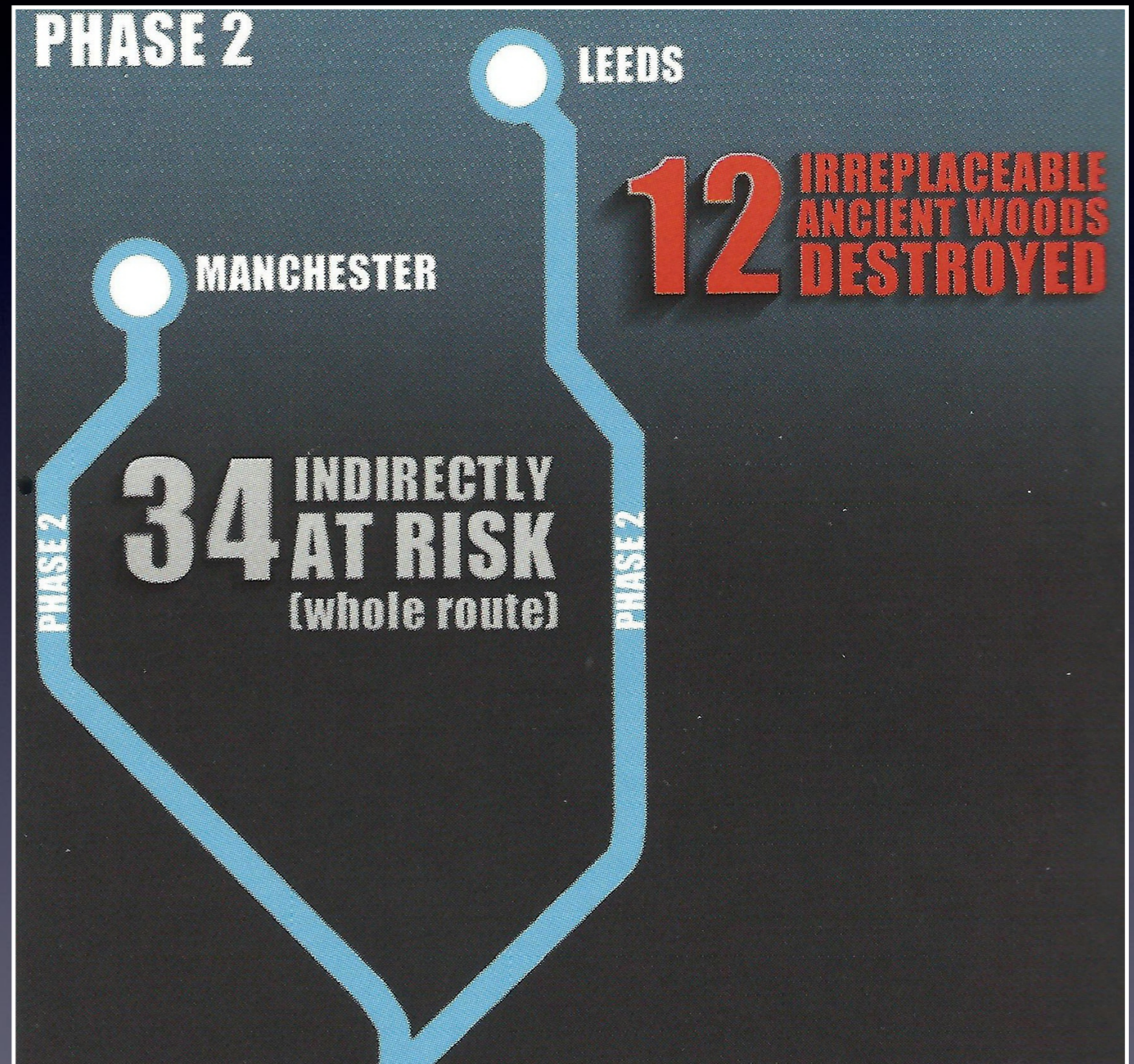
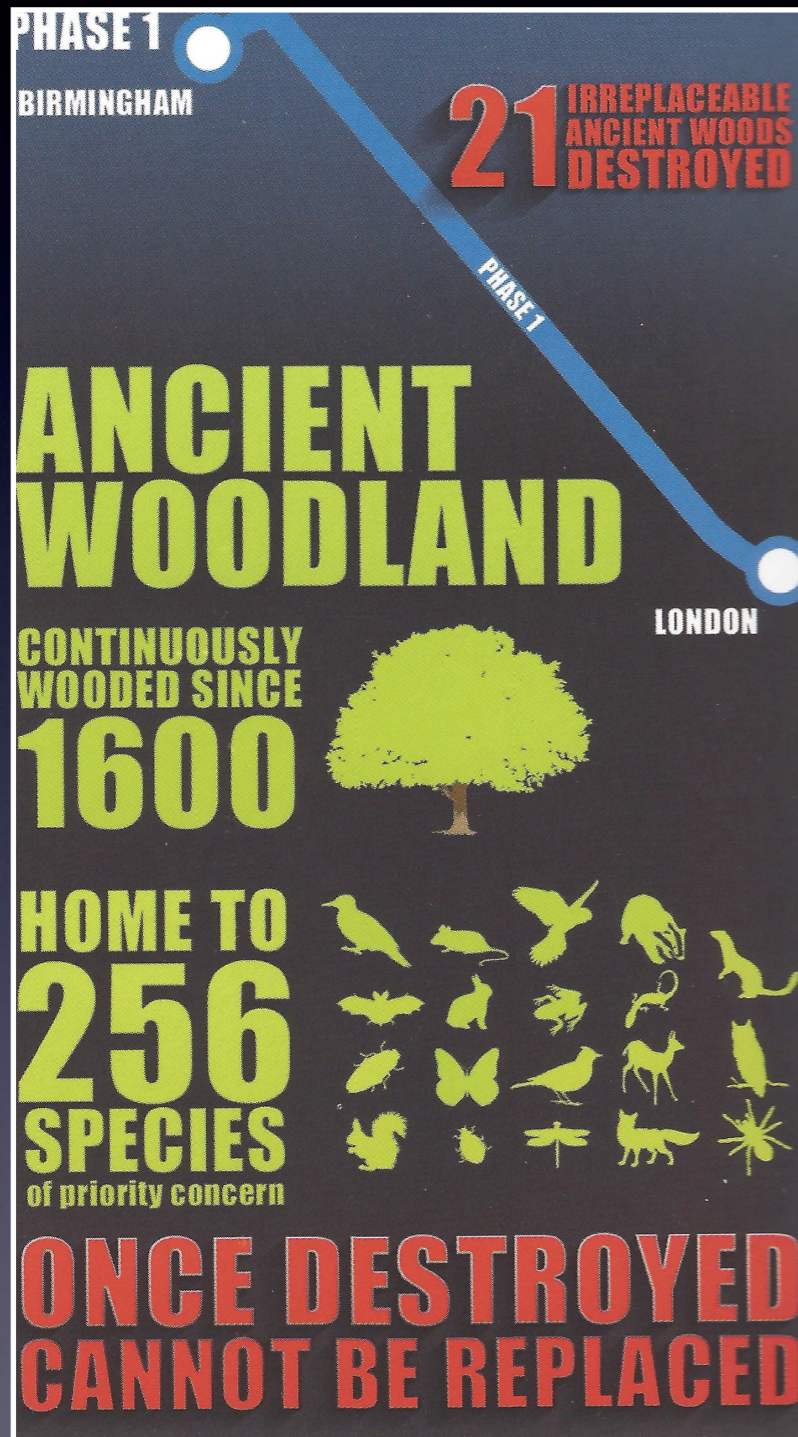
Environmental Consequencices

"I'm afraid that we will upset some people, but I appreciate that and we've got to try and do as much as we can to alleviate the damage wherever we can." Rt Hon Patrick McLoughlin MP, Transport Secretary, January 2013



Environmental Consequencices

Ancient woodland



Source: Woodland Trust

Warwick District

Footpath W130

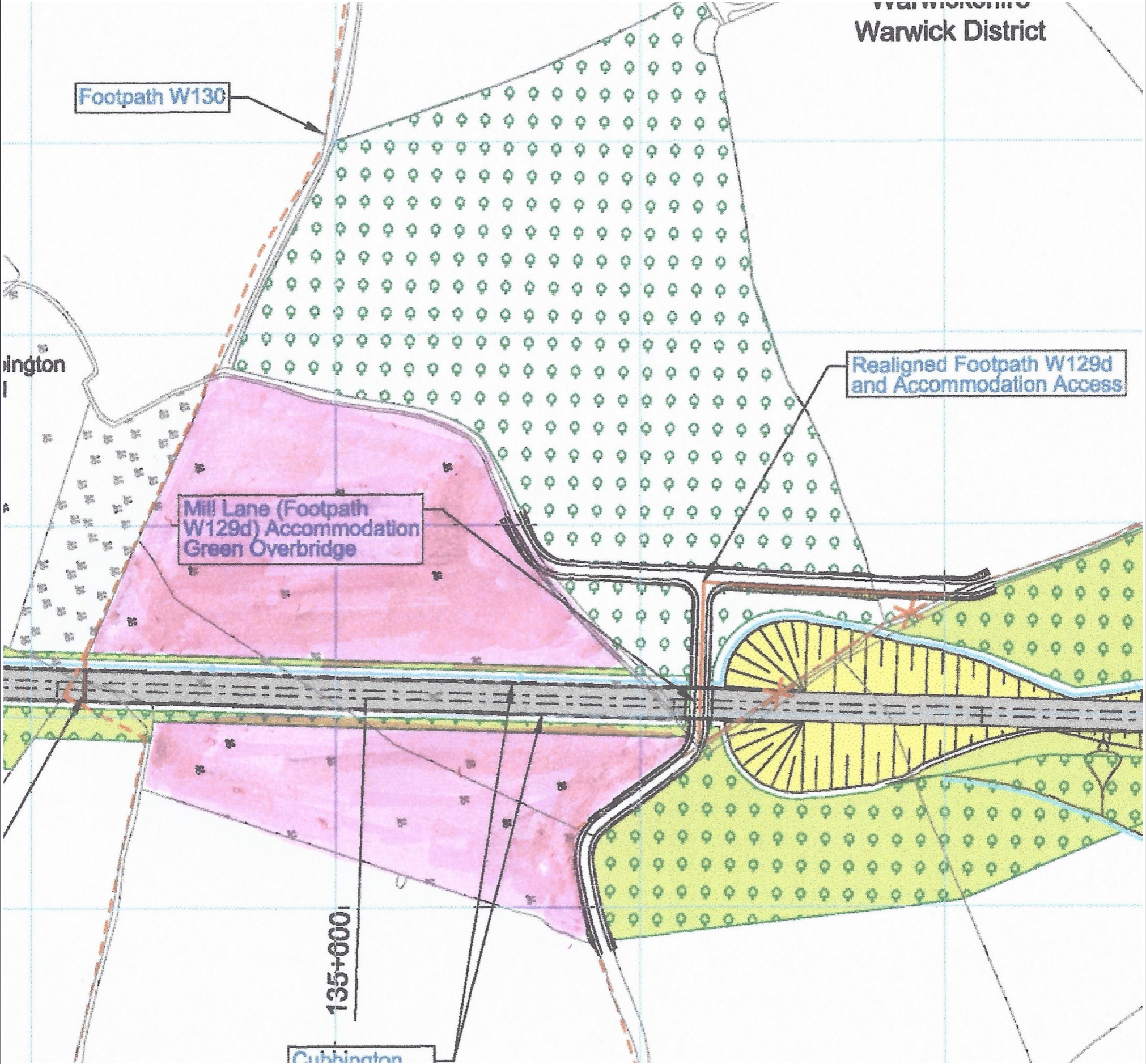
Realigned Footpath W129d
and Accommodation Access

Mill Lane (Footpath
W129d) Accommodation
Green Overbridge

ington

135+000

Cubington









Environmental Consequencencies

The reality



In summary

- Meeting the journey time objective has environmental consequences and involves technical risk
- HS2 is an indirect and inefficient way of partially meeting the capacity objective, and does nothing to solve the worse crowding, which is on suburban commuter routes
- HS2 may deliver overcapacity on some routes
- HS2 has resilience and train path capacity issues
- It is unlikely that direct international services will be offered from stations north of London
- The HS2 design has been cost driven at the expense of the environment

A postscript



Engineering & Technology magazine

Will HS2 be yesterday's technology in 2026?