HOUSE OF LORDS SELECT COMMITTEE
HS2 (LONDON – WEST MIDLANDS) BILL
15 November 2016

Petitioner –

The Chiltern Society

No. 081

Chiltern Society Presentation

1. About the Chiltern Society
2. AONB issues
3. Water related issues
4. Construction & traffic
5. Tunnel Design
6. Mitigation Hierarchy
7. Chiltern Society's Conclusion

1. About the Chiltern Society

- Founded over 50 years ago
- Objectives
  - conserve and enhance the Chiltern Hills
  - footpath maintenance – incl. donate-a-gate
  - management of 13 sites
  - rivers and wetlands enhancement
  - encourage use of footpaths and cycleways
- Registered charity
- 7,000 members

500 volunteers – the largest group in any AONB

Why is the Chiltern Society petitioning?

- Irreversible damage to the Chilterns AONB
- Severance of the Chilterns
- Disregard of long-standing AONB national planning principles
- Failure to apply higher standards within the AONB
- Risk to the Chilterns Aquifer and River Misbourne
- Impact on wildlife
- Impact on countryside recreation and tourism
- Impact on communities

2. AONB Issues

- Chilterns AONB
- Damage to Chilterns AONB
- Irreversible damage to ancient countryside

Chiltern Hills AONB –

- Designated in 1965
- Only AONB on entire HS2 route
- Closest AONB to London
- Unique ancient countryside

Severance of the Chilterns

HS2 cuts through the AONB at its widest point

Damage to the Chilterns AONB

- Irreversible damage to unique ancient English landscape
- Loss of part of Grim's Ditch - a scheduled ancient monument
- Permanent loss of 212 ha (530 acres) of farmland
- Introduction of noise and light
- Adverse impact on the Chilterns' footpath network
- Loss of wildlife habitat -
  - 22km of hedgerows
  - animal migration routes
  - ancient woodland

Damage to the Chilterns AONB

Construction of –

5 vent shafts

1 cut and cover tunnel

2 viaducts, high embankments

Deep cutting

19 balancing ponds

Security fencing and signage

Catenary towers

Temporary spoil dump at Hunts Green Farm

6m sound barrier at Wendover

Ancient landscape

with very little change over hundreds of years

- Chequers estate map of 1620
- The Ridgeway National Trail
- 19 Hill forts
- Roman villas every 2 - 3 km
- Living heritage for future generations

The Historic Landscape Today

3. AONB Planning Policy

- Long established principles
- Major developments in AONBs
- Failure to satisfy the key tests

Countryside and Rights of Way Act 2000

Long established principles

AONB designation recognises the highest quality of English landscape (same as for the National Parks)

National Planning Policy Framework 2014 requires that –

- Great weight should be given to conserving landscape and scenic beauty in National Parks, the Broads and AONBs

Consistent with long standing principles to protect natural beauty, established by –

- National Parks and Access to the Countryside Act 1949
- Countryside and Rights of Way Act 2000

Major developments in AONBs –

The thrust of public policy

Successive planning guidance & policy identified four key tests in AONBs –

- Major developments, including those that raise issues of national significance, should not take place in AONBs except in '***exceptional circumstances'***
- They should be subject to the '***most rigorous examination***'
- The cost and scope for '***developing elsewhere outside of the designated area'*** should be assessed
- They should be demonstrated to be in the '***national interest'*** before being allowed to proceed

Failure to satisfy the key tests

The **'rigorous examination'** test has not been met because HS2 Ltd has not adequately assessed a route that does not cross the Chilterns AONB – i.e. a **'non - AONB alternative'**

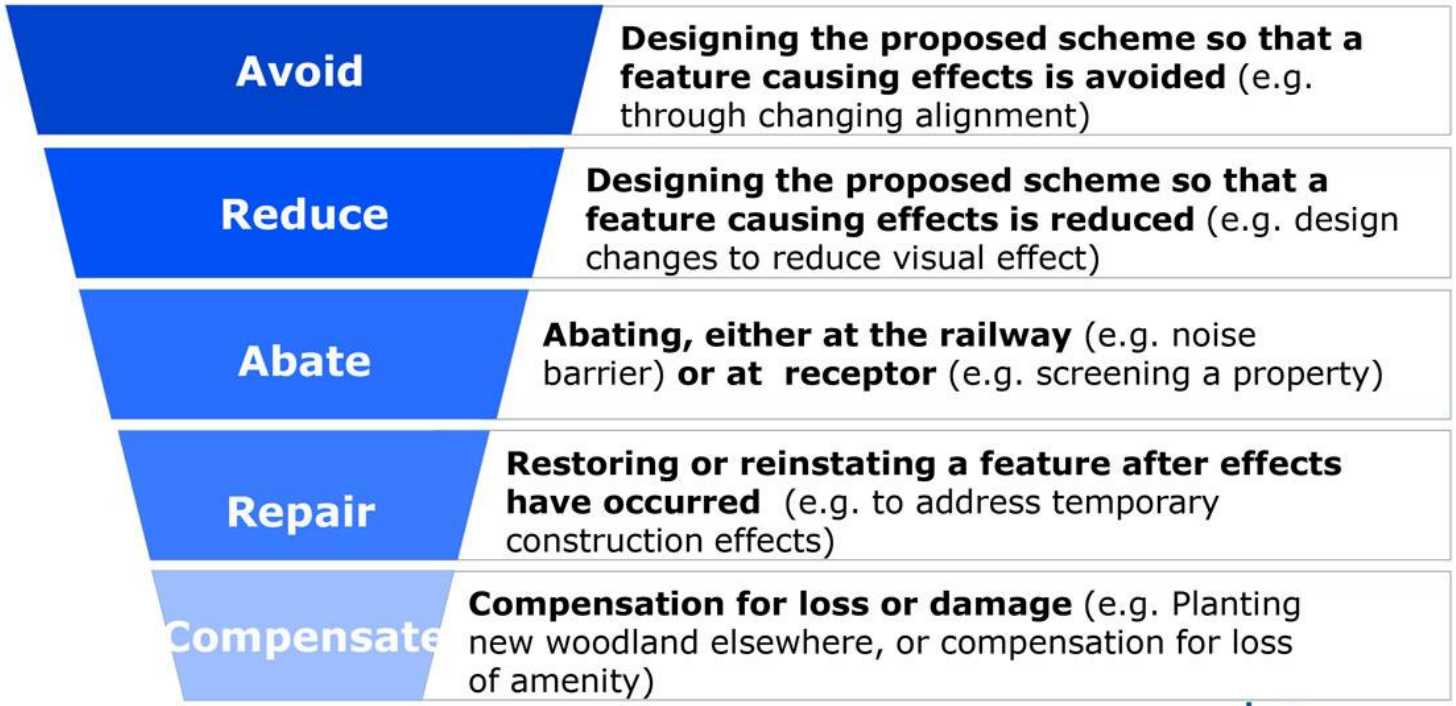
As a consequence, Parliament *is not in a position* to assess whether **'exceptional circumstances'** exist

Parliament cannot therefore be satisfied that –

- A **'national interest'** test has been properly applied
- The Government's obligation to **'conserve and enhance the natural beauty'** of the Chilterns AONB has been met

HS2 Mitigation Hierarchy

The approach to mitigation adopted for HS2 has a hierarchy, whereby priority is given to avoiding or preventing effects



hs2 engine for growth

Chiltern Society 50 YEARS 1965-2015

3. Water related issues

- Threat to the River Misbourne
- Risk to the public water supply
- Environmental risks
- Risk reduction

Witness
Dr Haydon W. Bailey

- Chartered Geologist
- PhD in Chalk Stratigraphy
- Consultant micropalaeontologist - oil and gas industry for over 35 years
- Specialises in Upper Cretaceous Chalk stratigraphy
- Honorary lecturer, MSc course in Applied and Petroleum Micropalaeontology, University of Birmingham
- Past President - Geologists' Association
- Chairman - Hertfordshire Geological Society
- Past Chairman & Honorary Member - The Micropalaeontology Society
- Written over 25 peer reviewed articles, mainly about Cretaceous chalks

Threat to the River Misbourne

- A globally rare chalk stream
- One of nine main Chiltern chalk streams
- Key feature of the Misbourne Valley
- Feeds Shardeloes Lake
- Highly vulnerable to changes in the chalk aquifer

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Risks to public water supply

Pollution of the aquifer

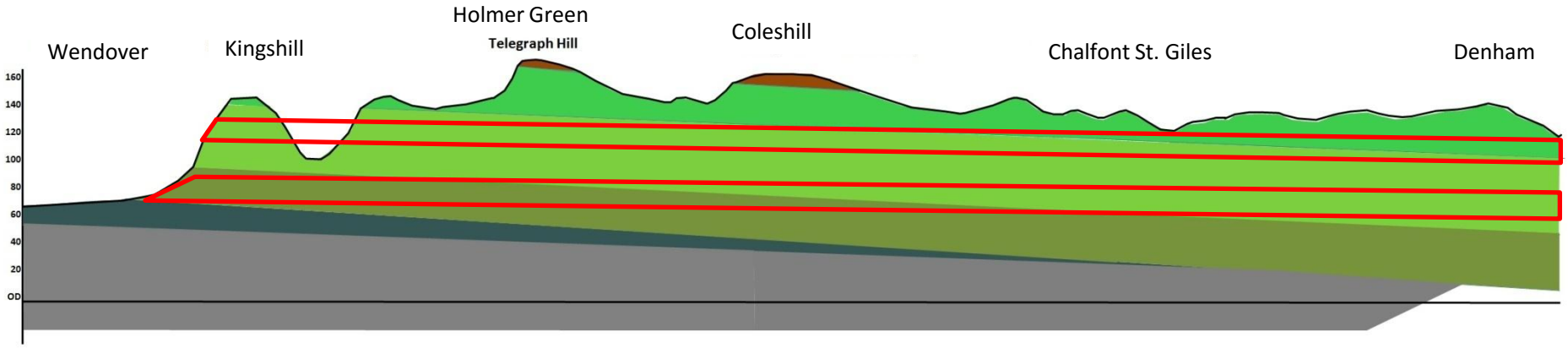
- The construction proposed in the Colne Valley presents a risk to water quality in the Colne Catchment Area
- 22% of London's water supply comes from the Colne Catchment area
- Could lead to loss of water supplied by the Great Missenden, Amersham and Chalfont St Giles pumping stations

Environmental risks

- Loss of the Misbourne, and Shardeloes Lake
- Water being diverted away from the Colne Valley & Weston Turville SSSIs
- Settlement along proposed route, particularly Chalfont St Giles

Risk reduction

- The upper levels of the Chiltern aquifer have a number of fractures through which the water flows. The deeper one goes into the aquifer the chalk is more clay rich and less permeable.
- Drilling deeper in the aquifer reduces the risk of
  - Settlement along proposed route
  - Diverting the water away from the River Misbourne
  - Damage to the aquifer
  - Affecting the public water supply



Clay with flints

Upper Chalk
Middle Chalk
- White Chalk

Lower Chalk
- Grey Chalk

Gault Clay

Jurassic (undifferentiated)

Good aquifer: Flints common – difficult to tunnel

Moderate aquifer: Few flints , intensely fractured– easier to tunnel

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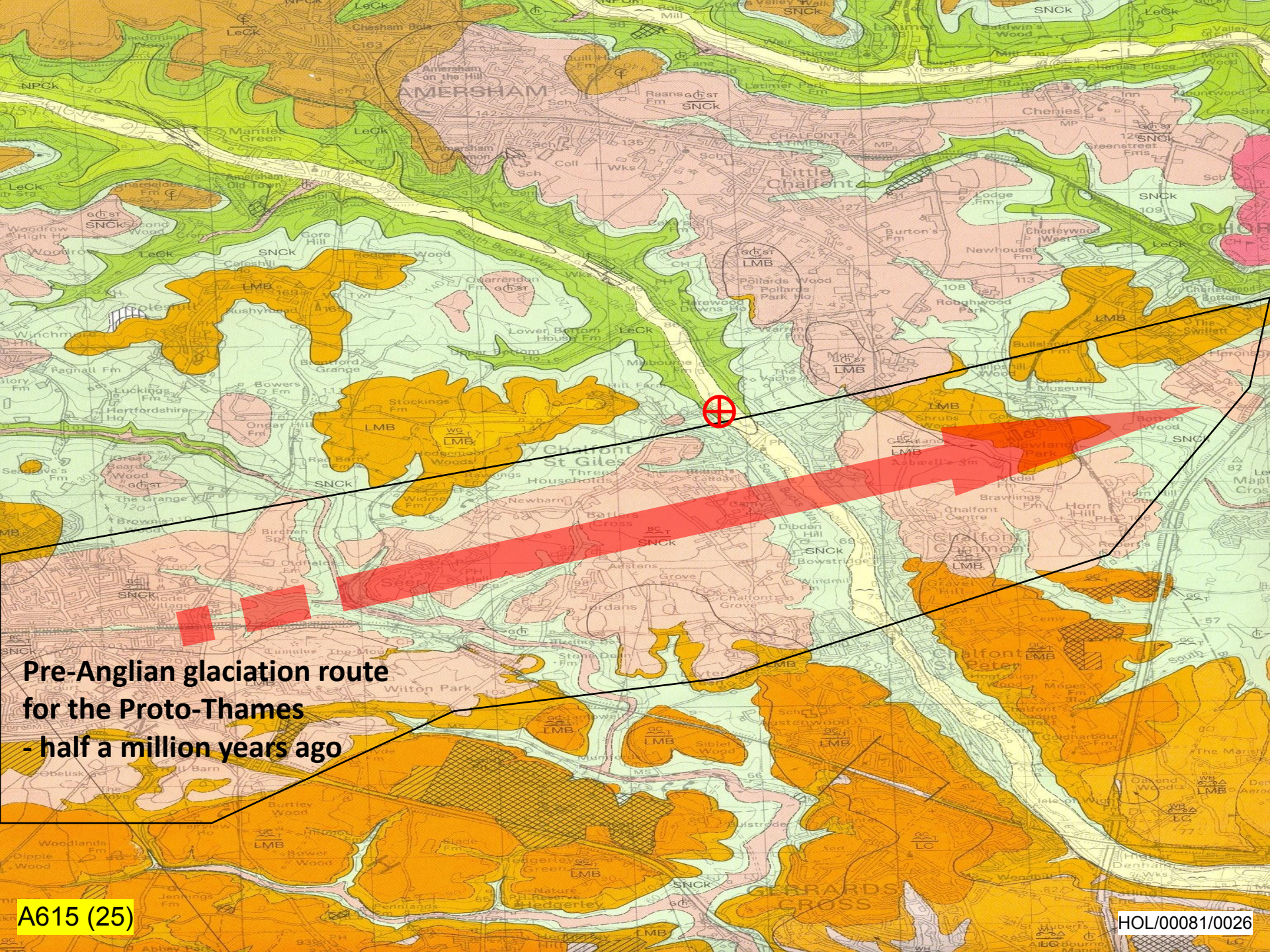
Poor aquifer: No flints – easiest to tunnel



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Chalfont Borehole - Original drillers log

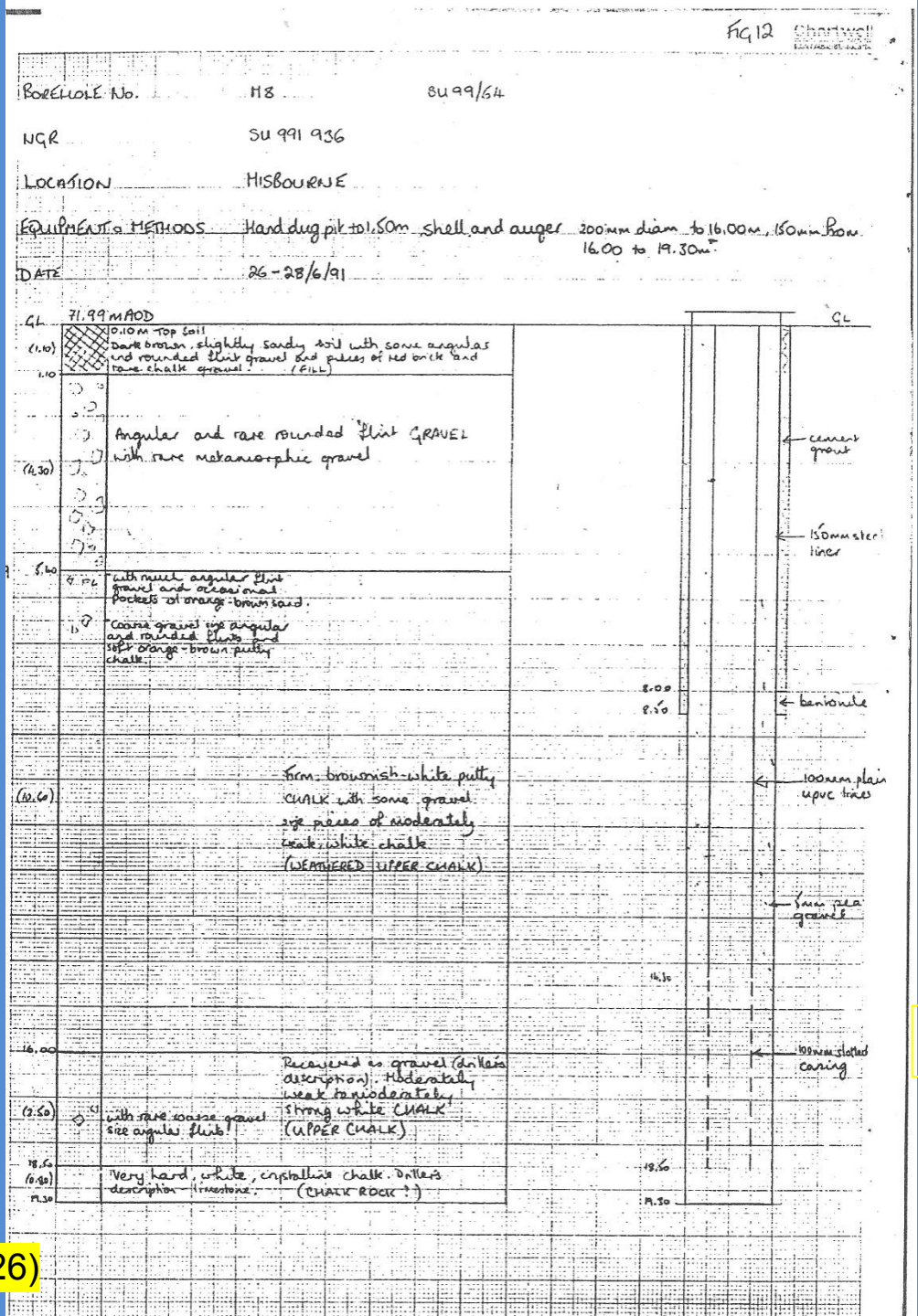

FIG 12 Chartwell

BOREHOLE No. H8 SU 99/64

NGR SU 991 936

LOCATION HISBOURNE

EQUIPMENT & METHODS Hand dug pit to 1.50m, shell and auger 200mm diam to 16.00m, 150mm from 16.00 to 19.30m

DATE 26-28/6/91

GL 71.99 mAOD

(1.10) 1.10 0.10m Top soil. Dark brown, slightly sandy soil with some angular and rounded flint gravel and pieces of red brick and some chalk gravel. (FILL)

Angular and rare rounded flint GRAVEL with rare metamorphic gravel

(4.30) 5.40

with much angular flint gravel and occasional pockets of orange-brown sand.

Coarse gravel size angular and rounded flints and soft orange-brown putty chalk.

firm brownish-white putty CHALK with some gravel size pieces of moderately weak white chalk (WEATHERED UPPER CHALK)

(10.60) 16.00

Recovered as gravel (drillers description). Moderately weak to moderately strong white CHALK (UPPER CHALK)

(2.50) with rare coarse gravel size angular flint

18.50 (0.80) 19.30

Very hard, white, crystalline chalk. Drillers description - limestone. (CHALK ROCK ?)

GL

8.00 8.50

14.30

18.50 19.30

cement grout

150mm steel liner

bentonite

100mm plain upvc tube

5mm pea gravel

100mm slotted casing

Surface

Top soil

Flint gravel

Weathered Upper Chalk

16 metres

Top Solid chalk

Chalk Rock

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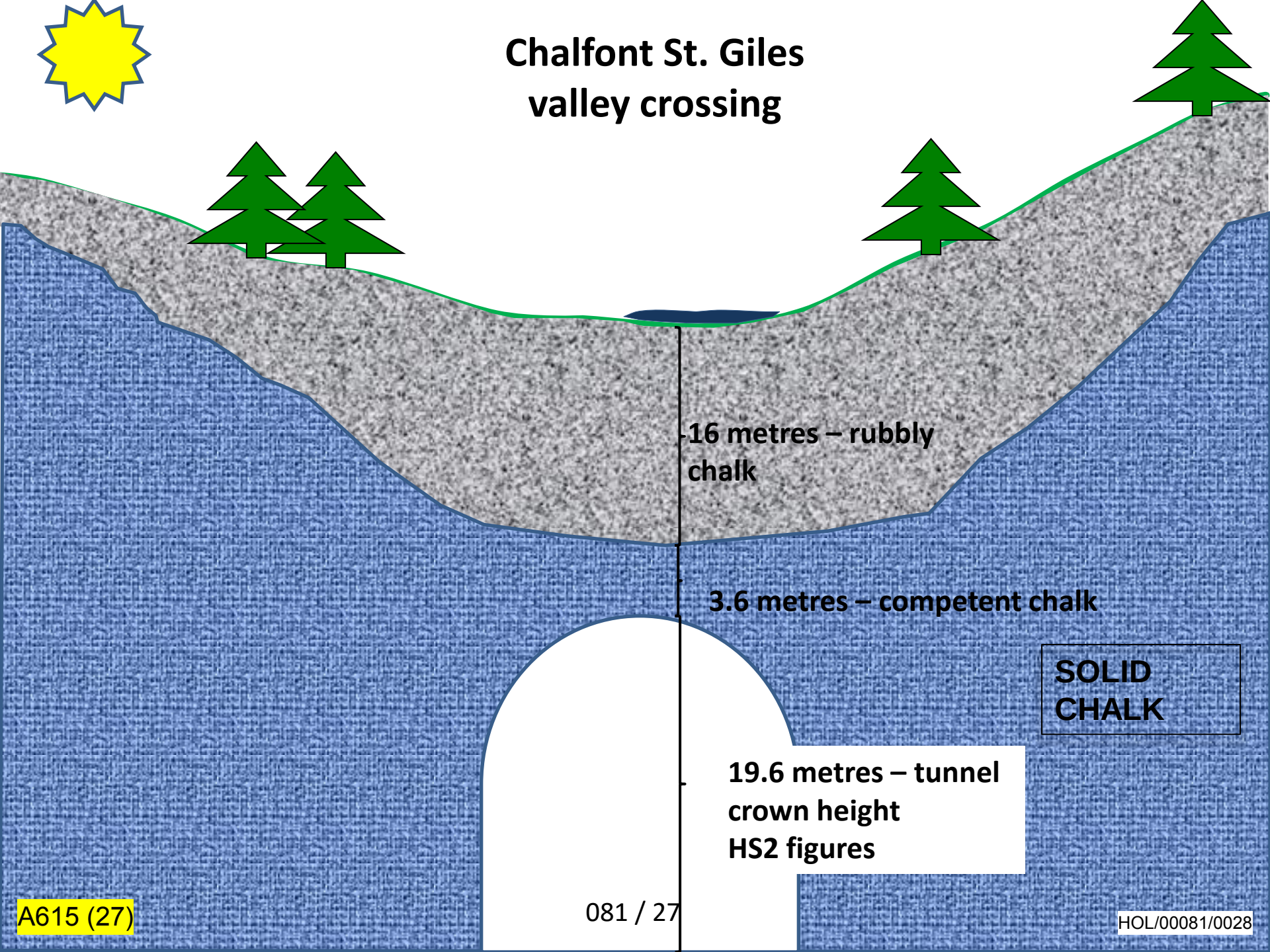
Chalfont St. Giles
valley crossing
16 metres – rubbly chalk
3.6 metres – competent chalk
SOLID CHALK
19.6 metres – tunnel crown height HS2 figures
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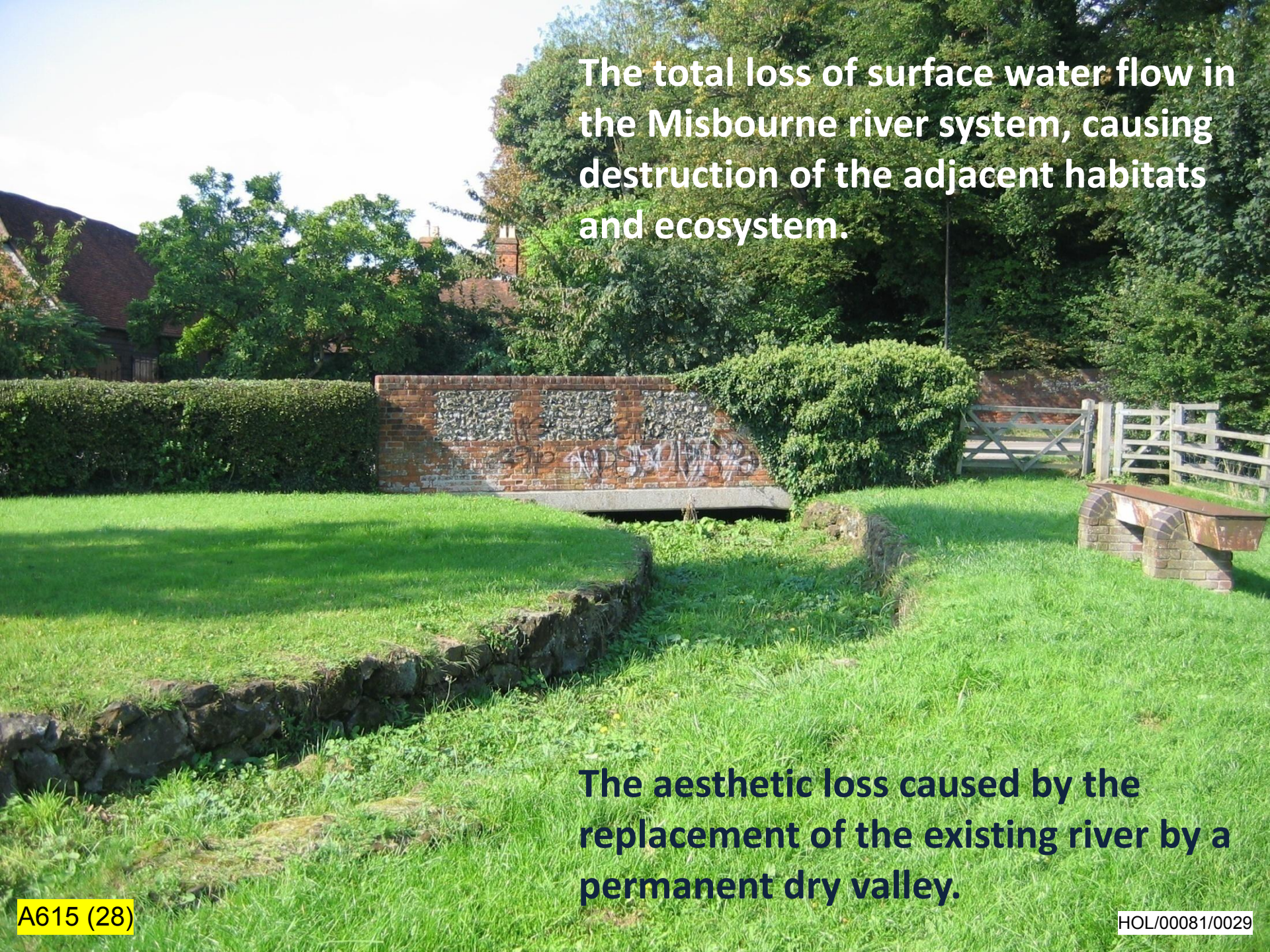

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4. Environmental and Construction Issues

- Permanent impacts on communities
- Public Rights of Way network
- Construction Impacts – Traffic
  - Impact on A413 - A355
  - Hunts Green – spoil removal

Dr Jim Conboy

- PhD in High Energy Physics
- Employed as Physicist / Computer Programmer / Data Analyst by University College (~20 years), then by Culham Fusion Energy Centre
- Studied Transport related issues, since the first HS2 community forum meetings

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Permanent impact on communities

- Permanent change to ancient landscapes
- Historic access routes diverted
- Harm to local businesses (e.g. tourism and farming)
- Additional noise – impact on tranquillity
- Impact of overnight maintenance work
- Light pollution

Introduction of noise and light pollution

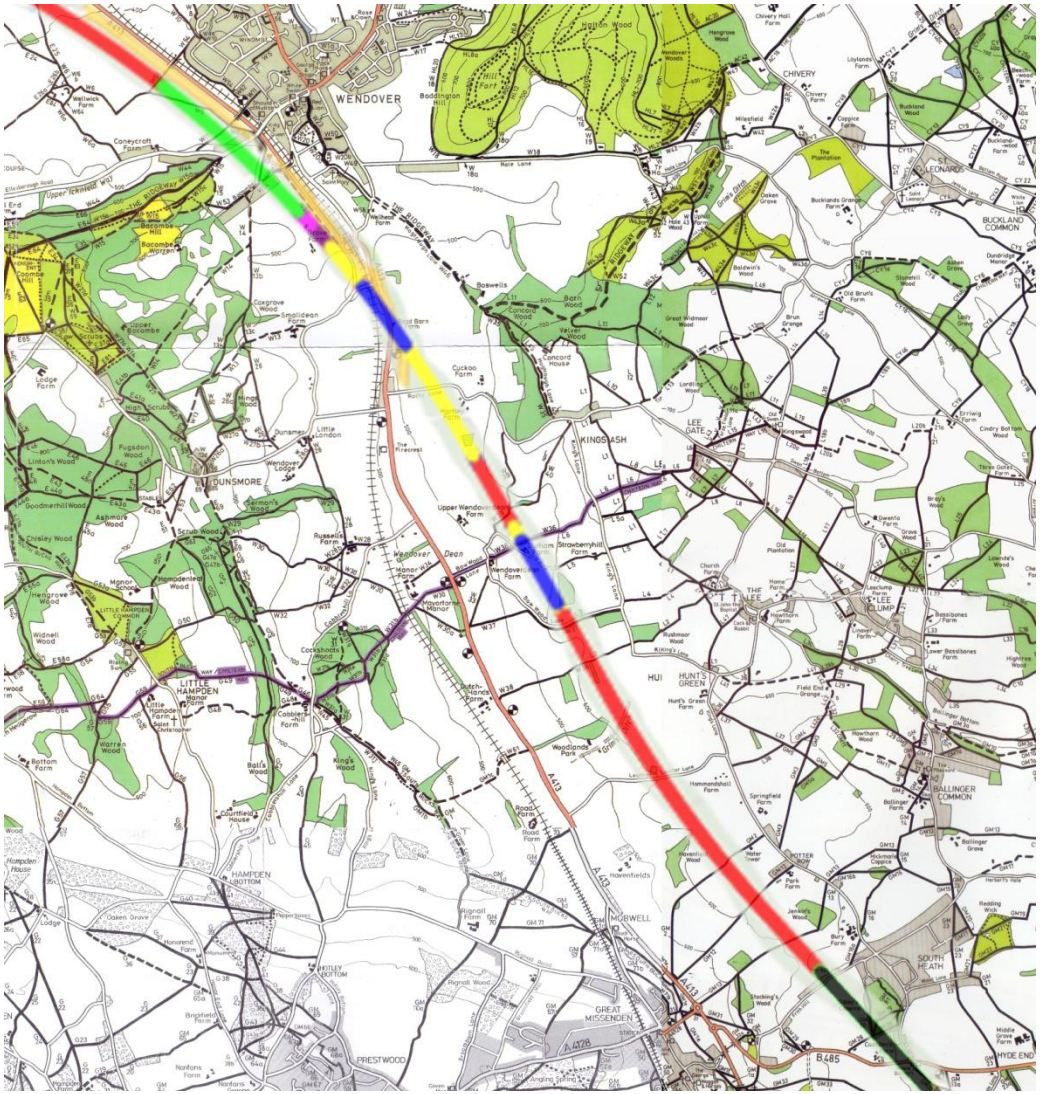
Impact on Business

- Great Missenden is a local business centre
- Hill villages use medical and professional services
- Tourism a main source of income
- Roald Dahl Museum – 80,000 visitors p.a.
- Visitors use the easily accessible footpaths
- High Street businesses benefit from passing trade

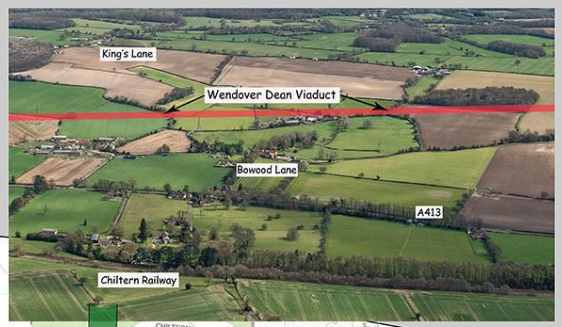
Public Rights of Way

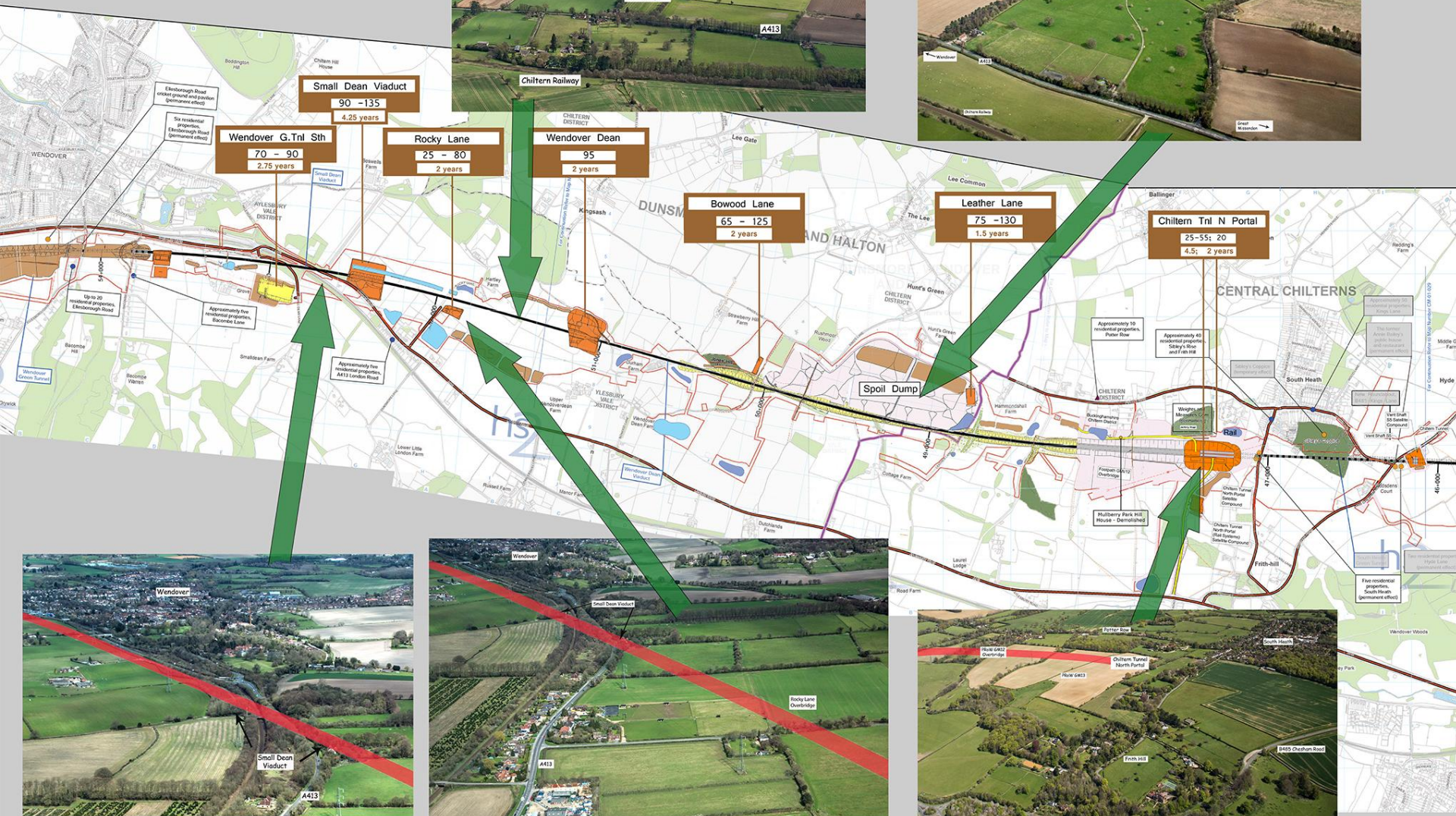
- Over 2000km of footpaths in the Chilterns
- HS2 route crossed by numerous paths
- 18 PRoWs closed temporarily
- One bridleway closed and 3 footpaths diverted permanently
- Impact on views from the Ridgeway and Icknield Way
- No noise mitigation planned for ‘recreational users’

Misbourne Valley footpath network



Works in the Upper Misbourne Valley





Traffic Congestion

Traffic congestion over many years will cause

- **Disruption of children's education**
- **Delayed emergency service response**
- **Commuter and traffic delays**
- **Displaced traffic on minor roads**

- **Severance of hill villages from services**
- **Impact on local businesses**
- **Disconnection of rights of way and amenity areas**

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Major Transport corridors

One of these is not a major transport corridor …

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Chiltern Society 50 YEARS 1965-2015

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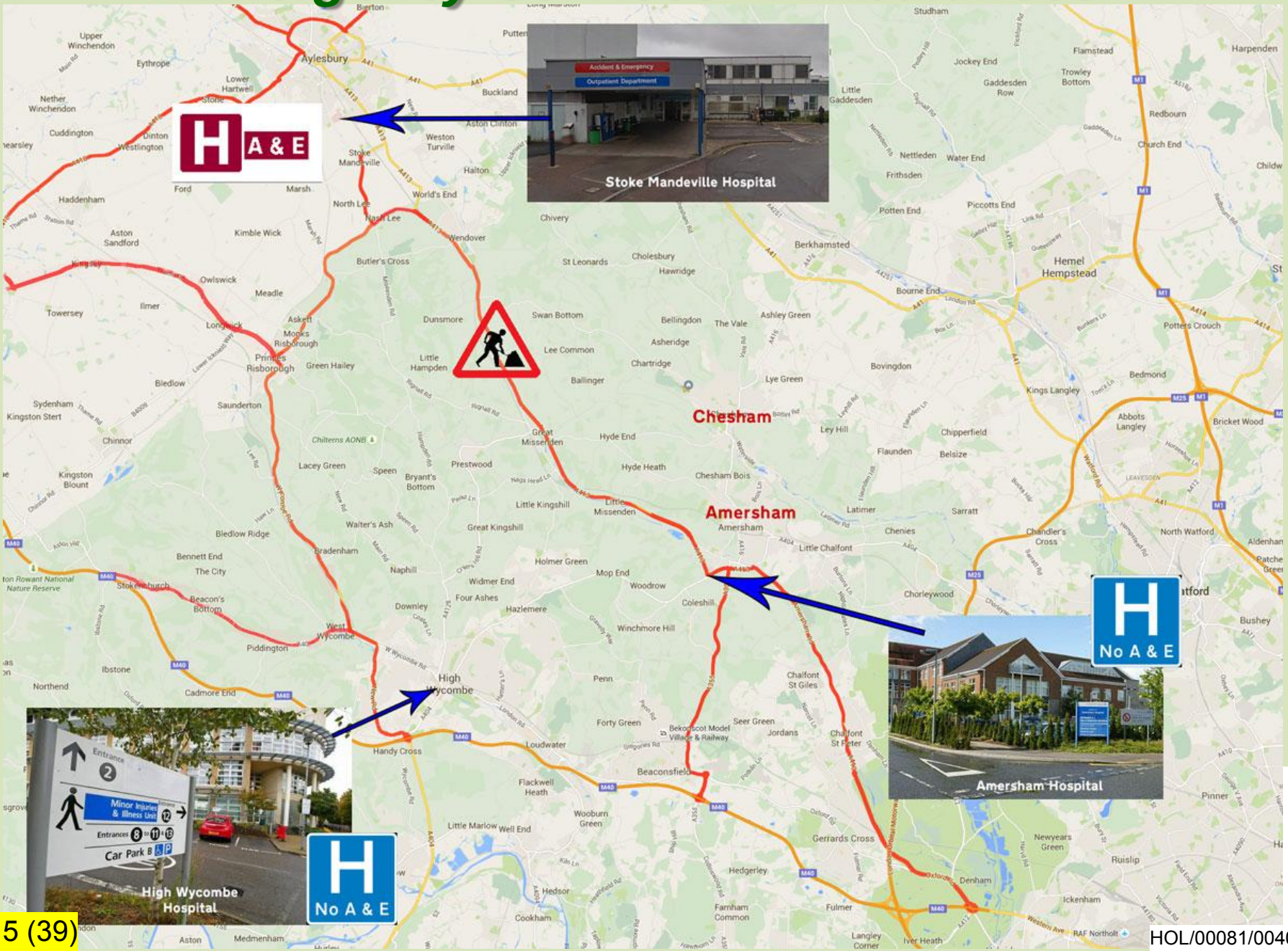
Emergency Services - Ambulances



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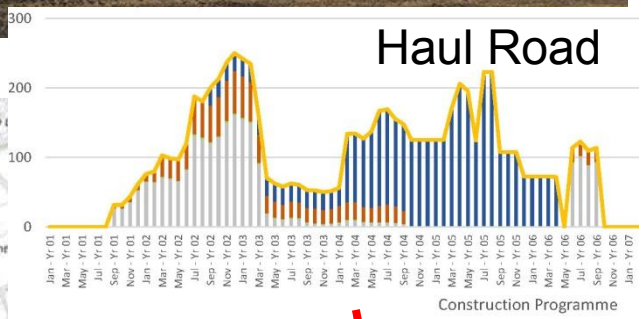
Traffic Surveys

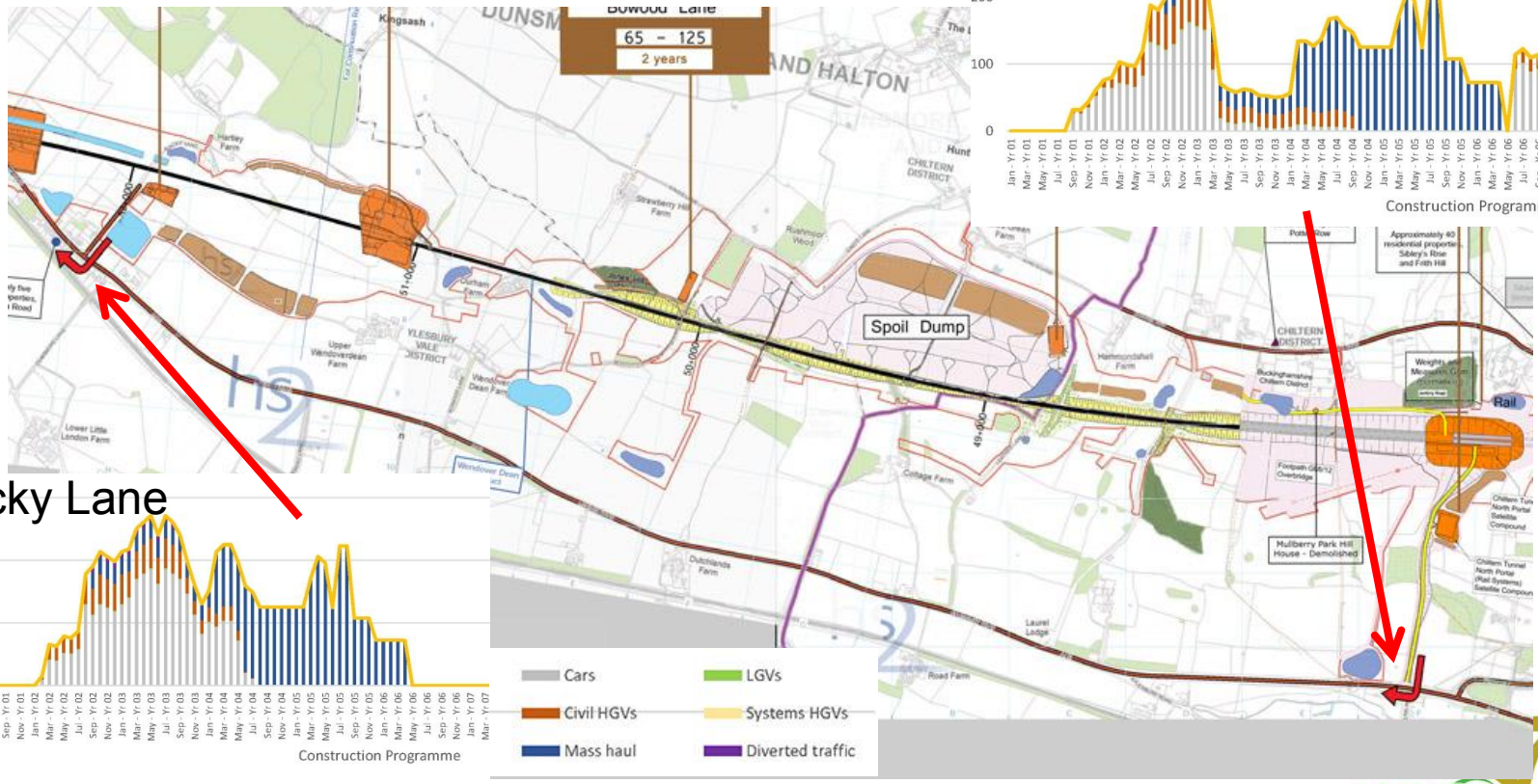
- **2013 Environmental Statement –** only 4 junctions considered in the AONB, no problems reported
- **SES3 –** 23 junctions analysed, 8 loaded beyond capacity at some time. Traffic assessment volume had to be reissued, due to numerous errors.
- HS2 agreed to analyse 40 'priority junctions' for Bucks CC, by 1st October – field work now in progress.
- Piecemeal junction surveys fail to give an overview of the situation, or answer the obvious question – "*How much longer will my journey take ?* "

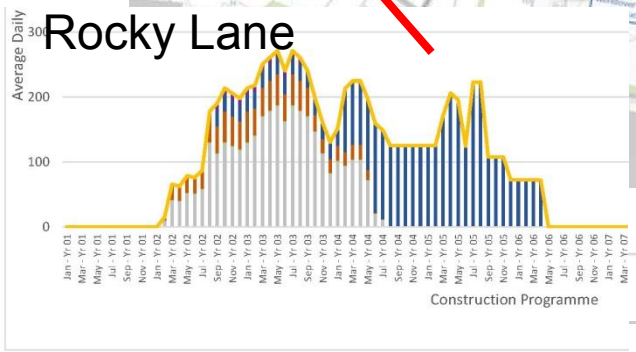
Hunts Green Spoil

- Around 65,000 lorry loads to be shifted via Rocky Lane & the portal haul road
- In both cases, HGVs must turn right at the A413 to proceed northwards to Nash Lee.
- This is incompatible with maintaining the flow of traffic on the A413

Spoil removal







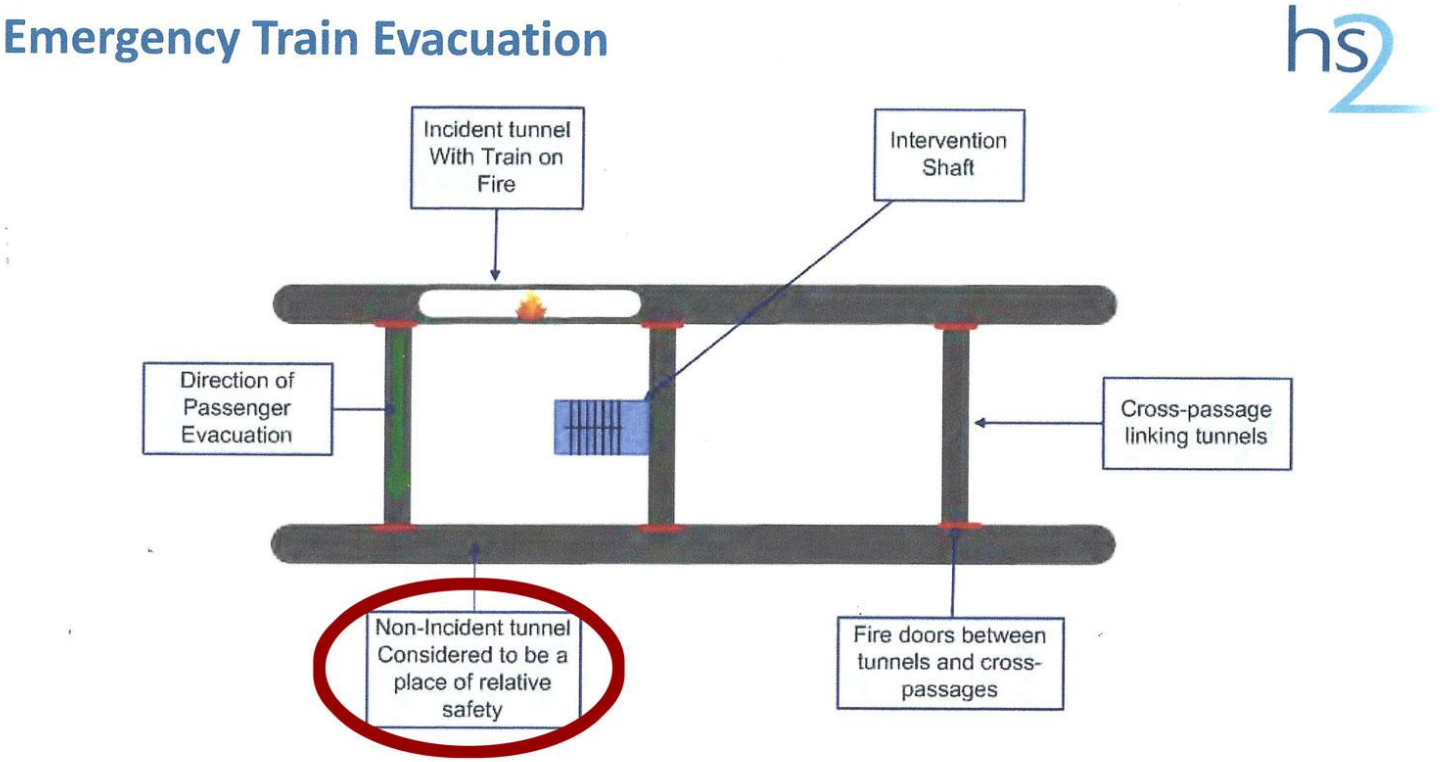
5. Tunnel Safety

- Risk Management
- Reference case Comparatives

In the event of a Fire

- Need to move over 1000 people from incident tunnel to adjacent tunnel, through
- Cross passages every 350m to other tunnel, a place of ‘relative’ safety
- Passengers, including children and the less mobile, need to stand on a walkway 87cm wide with no barrier
- Relies on Train Management System to stop all trains before passengers enter the tunnel

Evacuation to "a place of relative safety" ?



Safety Design

- For new infrastructure a reference case is normally used
- An operational safety assessment is usually prepared to confirm that the new system will be safe in operation

Reference Safety Case

- HS2 have based their reference case on HS1
- Comparison to HS2

	HS1	HS2
▪ No of trains per hour –	7	18
▪ Operating speed - kph	230	360
▪ Longest tunnel - km	6	16
▪ No of passengers and crew	904	1020

Tunnel safety assessment

- It is in the public interest that any higher safety benefits of a three bore tunnel are not rejected in order to achieve lower costs

- This could be assured by requiring all main tunnelling options to be subjected to rigorous comparative safety assessment by independent specialists

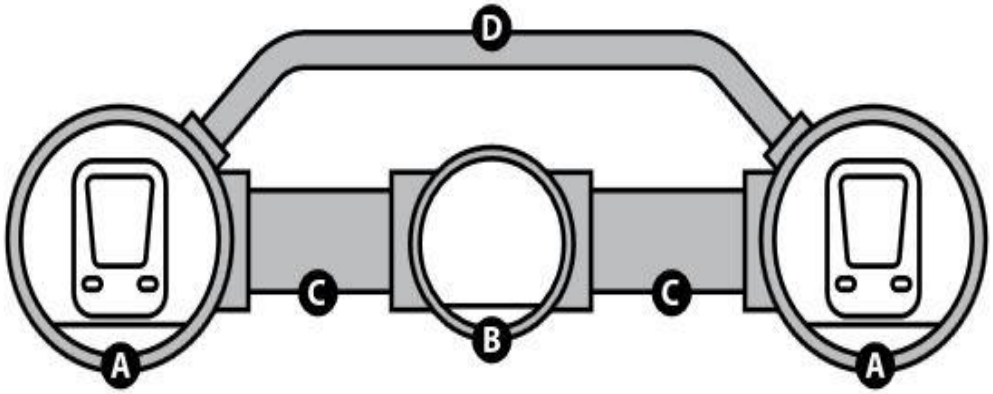
- Key issue for Select Committee –

  Can the prospect of a higher level of public safety provided by a three bore tunnel be discounted?

6. A three bore tunnel under the Chilterns AONB

- Key factors
- Advantages
- Safety - risk management
- Safety - assessment
- Estimated costings

A three bore tunnel – key factors



- Same design concept as Channel Tunnel
- Central tunnel as passenger safety refuge
- No need for intervention gap (fire fighting area)
- No vent shafts
- No need to construct surface evacuation facilities within the AONB

Three bore tunnel - advantages

- Only option which eliminates damage to the AONB
- Greatly reduces risk to the aquifer
- Substantially reduces impacts on local communities
- Removes property blight
- Enables
  - Deeper tunnelling
  - Operational benefits with virtually no incline on the track
  - Development of an alignment avoiding the need to tunnel under the Misbourne
- Reduces public safety risk by providing a sealed safety area independent of the other operational tunnel

7. The Mitigation Hierarchy

- Highest level mitigation
- Desirable level mitigation
- Low level mitigation

Highest Level Mitigation

- The 3 - bore tunnel concept provides the benchmark against which to determine mitigation requirements
- It eliminates adverse impacts on the Chilterns AONB
- Is safer than the Proposed Scheme
- Reduces construction risks
- Substantially reduces the risk of losing River Misbourne
- Only **option** which enables Parliament to fulfil its obligations to conserve and enhance the natural beauty of the Chilterns AONB

Desirable Level of Mitigation

- Maximum length of two bore tunnel
  - Reduces environmental and ancient landscape impacts
- Redesign of 2 bore tunnel concept to minimise 'relative safety' risks

Lowest Level Mitigation

1. Extend Chiltern Tunnel North Portal Haul Road to Leather Lane
2. Lower the current line, so that it is mainly in cutting, and remove right for main undertaker to raise it.
3. Reconnect all footpaths, rights of way and animal migration trails, using green bridges at least 100 metre wide or passages through embankments, and restore lost hedgerows
4. Tunnel deeper under the Misbourne to reduce risks or losing river and damage to the aquifer
5. Require a fully comprehensive Safety Case be produced, with acceptance by ORR before final approval of Phase 1 by Parliament
6. Require an assurance that construction traffic on the A413 – A355 will be managed to prevent unreasonable delays.
7. Promoter to report how spoil movement from Hunts Green can be achieved while complying with assurance 6.
8. Provide air ambulance cover, or a method to suspend HGV movements during emergencies

6. Chiltern Society's Conclusion

If HS2 has to cross the Chilterns AONB and a 3-bore tunnel is not acceptable -

- the only acceptable mitigation is the longest possible 2 – bore tunnel, with exceptional measures to restore the most harmful impacts on the AONB landscape