EXHIBIT LIST

Reference No: HOC/10516
Petitioner: Wednesday_23_Sept_2015 Petitioners
Published to Collaboration Area: Monday 21-Sep-2015

Vibration.

5. The LOAELs and the SOAELs are derived from evidence base for the effects of noise on people. The health and quality of life effects caused by noise from the Proposed Scheme are not dependent on effects caused by the existing ambient sound environment. The Promoter has taken into account the Explanatory Note appended to NPSE by applying different LOAELs and SOAELs for different noise sources, for different receptors, and at different times.

6. Dwellings where the noise level is forecast to exceed a SOAEL have been identified individually in the Environmental Statement as being likely to experience a significant adverse noise effect. This is an indication that noise insulation will be offered as a means of aiming to avoid any significant noise adverse effect on the health and quality of life of those living there caused by airborne operational or construction noise.

7. With respect to the effects of noise on outdoor recreational and leisure spaces and facilities including bridleways, footpaths, canal towpaths, sports grounds, racecourses, golf courses, show grounds, nature reserves, principally because of the transitory nature of their use, no likely significant adverse noise effects on people, wildlife, horses and livestock have been identified. There is further detail in the ES, Volume 5, Sound, Noise and Vibration: Methodology, Assumptions and Assessment (route-wide), Appendix SV-001-000, ES 3.5.0.10 Annexes F and G. Such facilities and spaces may benefit collaterally from measures provided to reduce impacts at dwellings and other noise sensitive receptors in the vicinity.

Vibration effects on buildings

8. Rayleigh waves, vibration effects on buildings and so called tunnel boom are concerns that are also raised from time to time. These phenomena are well understood and the Proposed Scheme is able to design out such effects. There is further detail in the ES, Volume 5, Sound, Noise and Vibration: Methodology, Assumptions and Assessment (route-wide), Appendix SV-001-000, ES 3.5.0.10.

9. In accordance with the draft Code of Construction Practice (CoCP), the contractors appointed to construct the Proposed Scheme will be required to employ 'Best Practicable Means' as defined by the Control of Pollution Act 1974 to control noise and vibration. The measures proposed will be detailed in the prior consent application to the relevant local authority under Section 61 of the Control of Pollution Act 1974. Monitoring will be undertaken as necessary to demonstrate compliance with the commitments made.

Noise and vibration: impact on listed buildings

10. If specific mitigation or monitoring is necessary for listed buildings during construction this will be for consideration by the nominated undertaker and the local authority as part of the Section 61 process described above. In relation to monitoring, paragraphs 8.3.1-8.3.2 the draft CoCP state:

> 'Risk assessments, appropriate structural or condition surveys and vibration monitoring will be undertaken at sites of archaeological or built heritage interest adjacent to the construction site prior to, during and following construction works. The risk assessments will include, but not be limited to, specific buildings identified in the ES.
>
> The nominated undertaker will require its contractors to implement appropriate monitoring of the consequences of construction work on all cultural heritage assets

THE CHESHAM SOCIETY

HS2 Engineering proposals for AoNB Roads

Vn 1.0, 24-Jan-2013

Source material

Comments are based on maps & spreadsheets distributed at the Wendover forum (13-Nov-2012) and the Central Chilterns forum (27-Nov-2012).
In several instances, the information on the maps and spreadsheets are in conflict, or items are omitted from one or the other ; these are noted in italics in the table.

Additional Information

It is difficult to assess the proposed design without the following information –

- Approximate costings for the various proposed features and any alternative solutions
- Estimates of the construction traffic generated by each section of the route, and likely peak daily HGV movements
- Existing traffic flows, as measured by HS2 last year
- Proposed mitigation measures, their efficiency (in reducing noise levels) and likely visual impact.
- Resolution of conflicts & provision of absent data

Some items require HS2 to undertake additional work to evaluate proposed alternatives – these are listed as 'Further Actions' in the table.
We anticipate submitting a revised response, as more information becomes available. However, some proposals appear questionable, even as presented.

Disclaimer

While assessing the route through the AoNB, it should be borne in mind that-

- The entire HS2 project is misguided and a waste of money. It is also premature to implement the rail infrastructure before deciding on an aviation policy
- Running the line on the surface through the AoNB shows a disregard for the protection supposedly provided by the AoNB designation. Only an extension of the bored tunnel beyond Wendover can provide appropriate mitigation

The suggestions below are only making the best of a bad job.

Chainage	
44.7 – 47.35	**Mantles Wood – Frith Hill** Given the extent of the construction envisaged in this short stretch of line, it is clear that the additional tunnelling added in January 2012 (following the consultation) was badly planned, and as a minimum the bored tunnel should be continued at least as far as the exit of the current 'Green' (Cut & Cover) tunnel beyond Frith Hill. This would avoid the construction of 3 bridges (Hyde Lane, Chesham Road, Frith Hill), the diversion of Kings Lane and between 2.5 to 5.5 years of construction works to construct the cut & cover tunnel. **Further Action:** We request a comparison of the cost of the proposed works between Mantels Wood and Frith Hill, and the cost of extending the bored tunnel by an additional 2.65 km
44.7	**Chilterns Tunnel Portal (Mantles Wood)** Proposed access is via A413, B485, Hyde Heath Road and (existing) farm track (Grid Ref 927005) A temporary road access could be constructed, leaving the A413 before the Deep Mill railway bridge, and crossing the Chiltern line as it runs through a shallow cutting, just west of the existing footbridge (Ref 921994), then proceeding through the field up to the tunnel portal (approximately 1.5km in all) **Further Action:** Evaluate impact of proposed & alternative routes – environmental, loss of ancient woodland, traffic congestion
45.8	**Hyde Heath Overbridge** *Proposed realignment not shown on map.* **Construction Compound** *Is shown on map, not on spreadsheet* – might now be at 46.4 ? Access from Hyde Heath lane would be inadequate.
46.3 - 47.10	**Chesham Road, Frith Hill** *Proposed realignments not shown on map.* Kings Lane is unsuitable as a diversion – narrow & residential. Need to ensure at least one of Chesham Road & Frith Hill is open at all times, and both are open if Kings Lane is closed. **Kings Lane** The new road should be constructed before the old is removed to avoid interrupting traffic flow. Road could be reinstated on existing alignment over cut & cover tunnel. The road shape as indicated on the map is illogical and the transition from the existing Kings Lane needs to be smooth and not a sharp left turn.

46.4, 47.4	**South Heath Tunnel** (Cut & Cover) *Compounds not shown on map.* Time envisaged for construction of cut & cover tunnel (2.5 to 5.5 years, depending on whether work is from one or both ends) would cause extensive disruption . Residents will require guarantees that construction traffic movements will be restricted during morning and evening rush hour periods and end of school hours to allow free access to South Heath, Great Missenden and Chesham **Further Action:** Evaluate wider economic & environmental impacts of the proposed construction
48.7	**Leather Lane** It should be possible to provide access to the compound via the haul road for all traffic, to as good a standard as Leather Lane. Access via Kings Lane / Potter Row for any purposes is unacceptable. The road is single track – impose one way traffic for duration of construction ? What does "removal of old road" entail ? Ancient landscape features (hedgerows etc) should be preserved
50.1	**Bowood Lane Compound** Is surely in the wrong place ? Should be nearer the end of the viaduct (50.5) , rather than beside a glorified footbridge 400m down the line ? All access should be via haul road, as for Leather Lane compound
50.1	**Bowood Lane bridge** Retained cutting for this section of the line would reduce length (& impact) of bridge. The (single track) road should also be one way during construction
51.0	**Wendover Dean Viaduct (compound)** *Not shown on the map*
51.9	**Rocky Lane Compound** .. and access point for all construction traffic between Leather Lane & Smalldean ? **Further Action:** Consider a temporary access road directly from A413, rather than via Rocky Lane, and traffic lights at junction with A413, *or* direct access to haul road where the line crosses the A413, to reduce impact on local traffic (on Chartridge & Rocky lanes) between Chesham and Wendover, Aylesbury .
51.9	**Rocky Lane Underbridge** Is this realignment necessary ? What is bridge height with & without realignment - since Rocky Lane is unsuitable for HGVs (narrow & winding), a height restriction might be an appropriate solution. Alternative access for over height agricultural traffic could be provided by a track under the viaduct, or via Bowood Lane **Further Action:** Demonstrate necessity of this road realignment

52.4 – 52.9	**A413** Unclear (from map) what is proposed for 500m either side of the viaduct crossing the A413. **Further Action:** Clarify proposals for Smalldean viaduct area

managers that integrated action at a 'landscape scale' is often the best way to achieve multiple benefits.

Working at a 'landscape scale'

There is no single accepted definition of 'landscape scale'; rather, it is a term commonly used to refer to action that covers a large spatial scale, usually addressing a range of ecosystem processes, conservation objectives and land uses.

The 'right scale' might need to take account of the particular interest of those involved locally, aesthetic or cultural characteristics, natural features such as river catchment areas or particular habitats, or recognised areas such as the 159 National Character Areas.

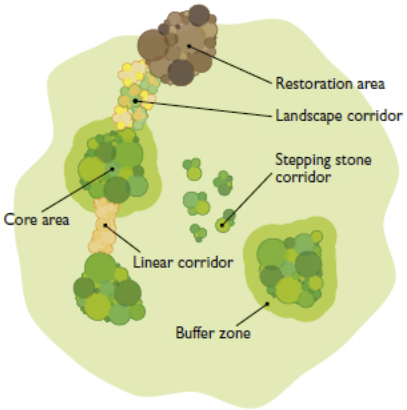
Landscape scale conservation is characterised by the pursuit of multiple benefits across a defined area (e.g. water quality, biodiversity and access). The best examples also make links to wider economic and social priorities, where enhancing nature can provide benefits to the local economy and quality of life.

There are strong links between the landscape scale approach and an 'ecosystems approach', which encourages an integrated approach to land management, considering the costs and benefits of land use decisions, and pursuing those that minimise risks and maximise opportunities for people, for nature and for the economy.

2.12 *Making Space for Nature* set out a practical vision for addressing the fragmentation of our natural environment by restoring ecological networks across the country. The approach is based on five components, to be implemented at a landscape scale working with existing land uses and economic activities:

- **core areas of high nature conservation value** which contain rare or important habitats or ecosystem services. They include protected wildlife sites and other semi-natural areas of high ecological quality;
- **corridors and 'stepping stones'** enabling species to move between core areas. These can be made up of a number of small sites acting as 'stepping stones' or a mosaic of habitats that allows species to move and supports ecosystem functions;
- **restoration areas**, where strategies are put in place to create high-value areas (the 'core areas' of the future) so that ecological functions and wildlife can be restored;
- **buffer zones** that protect core areas, restoration areas and 'stepping stones' from adverse impacts in the wider environment; and
- **sustainable use areas**, focused on the sustainable use of natural resources and appropriate economic activities. Together with the maintenance of ecosystem services, they 'soften' the wider countryside, making it more permeable and less hostile to wildlife.

The components of ecological networks



2.13 A huge amount of work is already under way to restore nature at a landscape scale. The Wildlife Trusts' Living Landscapes, RSPB's Futurescapes, and the eight Integrated Biodiversity Delivery Area pilots are examples of this approach, as are many independent partnerships operating around the country. The England Biodiversity Group has drawn together the lessons learned from examples both in this country and overseas in the *ThinkBIG* report.[22] Published in tandem with this White Paper, *ThinkBIG* suggests ways in which local authorities, communities, businesses, landowners, farmers and government can help ecological restoration at a landscape scale.

Supporting natural networks: a new institutional framework

2.14 We want to create a resilient and coherent ecological network at national and local levels across England. Achieving this will require a fundamental shift in approaches to conservation and land management.

Growing a green economy

8. Economic growth and the natural environment are mutually compatible. Sustainable economic growth relies on services provided by the natural environment, often referred to as 'ecosystem services'. Some of these are provided directly, such as food, timber and energy. Others are indirect, such as climate regulation, water purification and the productivity of soil.

9. The Economics of Ecosystems and Biodiversity study shows that protected natural areas can yield returns many times higher than the cost of their protection. There are multi-million pound opportunities available from greener goods and services, and from markets that protect nature's services.

10. Too many of the benefits we derive from nature are not properly valued. The value of natural capital is not fully captured in the prices customers pay, in the operations of our markets or in the accounts of government or business. When nature is undervalued, bad choices can be made.

11. We will put natural capital at the centre of economic thinking economic thinking and at the heart of the way the way we measure economic progress nationally. We will indude natural capital within the UK Environmental Accounts. We will establish an independent Natural Capital Committee to advise the Government on the state of natural capital in England.

12. Government alone cannot create a greener economy. Markets that trade sustainably in natural goods and services are essential. More businesses should benefit from new market opportunities, and from using natural capital more sustainably in their own supply chains. Government and business have a shared interest in protecting natural capital and should work together. Action we are taking includes the following:

- We will publish an action plan to expand markets and schemes in which payments are made by the beneficiary of a natural service to the provider of that service.
- We will set up a business-led Ecosystem Markets Task Force to review the opportunities for UK

Reconnecting people and nature

13. The NEA and the Marmot Review, *Fair Society, Healthy Lives*, demonstrate the positive impact that nature has on mental and physical health. High-quality natural environments foster healthy neighbourhoods; green spaces encourage social activity and reduce crime. The natural environment can help children's learning.

14. Human activity can, in return, enrich nature. Voluntary activity to improve wildlife habitats or remove litter increases the value of nature. Well-informed choices made by people in their everyday lives – for example as shoppers, householders and gardeners – also have a positive impact. These connections are good for people and good for nature.

15. We need to make enhancing nature a central goal ofsocial action across the country. We want to make it easier for people to do the right thing, with action in the health and education systems and in our communities. Particular action includes the following:

- To help local authorities use their new duties and powers on public health, Public Health England will publish practical evidence about improving health, including through access to a good natural environment.
- We will remove barriers to learning outdoors and increase schools' abilities to teach outdoors when they wish to do so.
- We will create a new 'Local Green Areas' designation to allow local people to protect the green areas that are important to them.
- We will establish a Green Infrastructure Partnership with civil society to support the development of green infrastructure in England.
- We will launch a new phase of the Muck In4Life campaign, offering volunteering opportunities to improve the quality of life in towns, cities and the countryside.

Chesham, Bucks

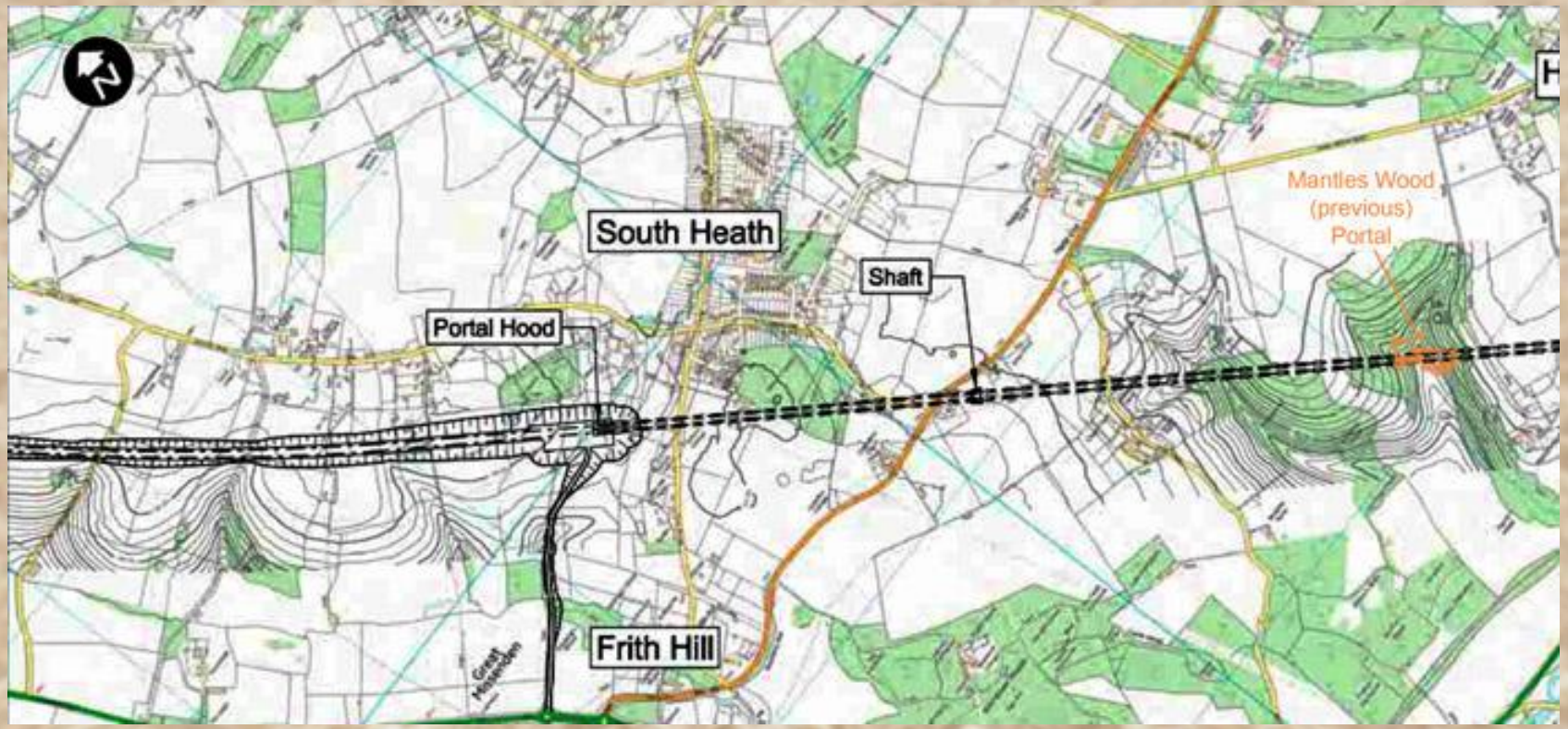
A market town in the Chilterns
Area of Outstanding Natural Beauty

A1413 (1)

HOC/10516/0009

The REPA C6 announcement

We are of course aware that the committee has instructed HS2 to evaluate an extension of the Chiltern Tunnel to Frith Hill



If the C6 proposal is not adopted, we expect to be allowed another hearing, on the works between Mantles Wood and South Heath.

A1413 (2)

The REPA C6 announcement

We should like to bring the Chesham Society's report of January 2013 to the attention of the committee –

Chainage	
44.7 – 47.35	**Mantles Wood – Frith Hill** Given the extent of the construction envisaged in this short stretch of line, it is clear that the additional tunnelling added in January 2012 (following the consultation) was badly planned, and as a minimum **the bored tunnel should be continued at least as far as the exit of the current 'Green' (Cut & Cover) tunnel beyond Frith Hill.** This would avoid the construction of 3 bridges (Hyde Lane, Chesham Road, Frith Hill), the diversion of Kings Lane and between 2.5 to 5.5 years of construction works to construct the cut & cover tunnel. **Further Action:** We request a comparison of the cost of the proposed works between Mantels Wood and Frith Hill, and the cost of extending the bored tunnel by an additional 2.65 km

The Environmental Statement

- Lack of adequate cross-referencing, or an index to the entire document set, created unnecessary difficulties for petitioners.
- There are only 5 references to Chesham in the ES –
  - Air Quality on Berkhamstead Road
  - Bucks CC Surface Water management plan
  - Pottery finds (three references, in heritage)
- Only 2 minor changes (to road layouts) were made as a result of the 'Community Forum' consultations

Operational Impact

During operation, HS2 will cause

- **Noise impacts, at different classes of receptor.**
- **Visual impacts, of the different proposed structures.**
- **Landscaping impacts caused by the destruction (and addition) of landscape features.**
- **Ecological impacts.**

A1413 (5)

HOC/10516/0013

Lanes and Footpaths

The dense network of lanes and footpaths are characteristic of the Chilterns, attracting walkers, runners, cyclists and horse riders to the area.

Recreational users are hardly recognised in the ES; only 'residential receptors' are considered for noise mitigation.

Tony Molesworth - 749

- Chairman of the Chesham Society
- Member of the Association of North Thames Amenity Societies and Civic Voice, the national association amenity societies in England
- Secretary of the Chiltern Harriers Athletic Club and race director of two of their major events
- Secretary of the Friends of St Mary's Chesham

A1413 (7)

HOC/10516/0015

Chiltern Harriers AC

- **Over 500 members**
- **Use South Bucks way, Chiltern Link and other footpaths in the Misbourne valley for events and training;**
  - **Shardeloes 10k – Amersham, Little Missenden, Mop End**
  - **Herberts Hole (a local footpath !) – Lowndes Park to South Heath**
- **Chiltern triathletes and Arctic One (association to support disabled, and able bodied sports people) also use this area for events and training**

A1413 (8)

HOC/10516/0016

Operational Impact – Noise Mitigation

Receptor	Requested Mitigation
Hyde Heath, Hyde Lane, South Heath – Tunnel Boom from Mantles Wood and South Heath 'Green' tunnel portals	*Mitigated by REPA C6 extension ?*
South Heath, Potter Row - Tunnel Boom from Chilterns tunnel + C6 portal and train noise	**Chilterns Long Tunnel, REPA C5 extension or (Fallback)** ▪ **'Porous' tunnel portals constructed to highest possible specification** ▪ **Deeper cuttings** ▪ **Adequate noise barriers for remainder of the track**
Recreational users of the AONB – Walkers, Runners, Cyclists and Equestrian	**Chilterns Long Tunnel or REPA (C5,C6) and (Fallback)** ▪ **provide adequate noise barriers;** ▪ **do not route PROWs alongside the railway** ▪ **provide noise insulation and 'Green' bridges where bridleways cross the line**

Visual and Landscape Impacts

Feature	Impacts	Mitigation
Cuttings	Now too shallow to conceal line	•Restore 2012 depth •Use retained cuttings
Overbridges – Leather and Bowood Lanes	Now higher and more obtrusive; alters character of the lanes	
Embankments and Viaducts– Bowood Lane to Smalldean;	Extreme visual intrusion; No practical noise mitigation	Lower the horizontal alignment
Bunds, Noise barriers	Will these provide sufficient mitigation to compensate for the detrimental changes to the natural landform which they produce ?	**Restore planning authority control over these features**
Temporary or permanent Spoil Dump, Landfill or 'Sustainable Placement area' at Hunts Green	This intrusion has no place in the AONB – an area of **natural** beauty.	Excess spoil should be removed by rail – an option which was not considered in the ES.
Offset planting	It is not clear that the destruction of woodland in one location is in any way mitigated by planting rows of trees on arable land in another – particularly where this will alter the present pattern of fields and woods.	Offset planting should be restricted to providing screening in the immediate vicinity of the line.

Local Authority Powers

There is a delicate compromise to be reached between the mitigation of noise (for recreational users) and the minimisation of visual impact. We request that this be addressed by returning powers to the relevant planning authorities, i.e. **by the deletion of Schedule 16 3 (7) & (10), so that the planning authority (in consultation with representative of the users) may impose conditions, on earthworks and noise screens in particular**, without the agreement of the nominated undertaker, and where the works relate to the disposal of waste or spoil.

The principal undertaker is otherwise at liberty to dump excess spoil where convenient, under the pretext of creating noise barriers.

Andrea Polden

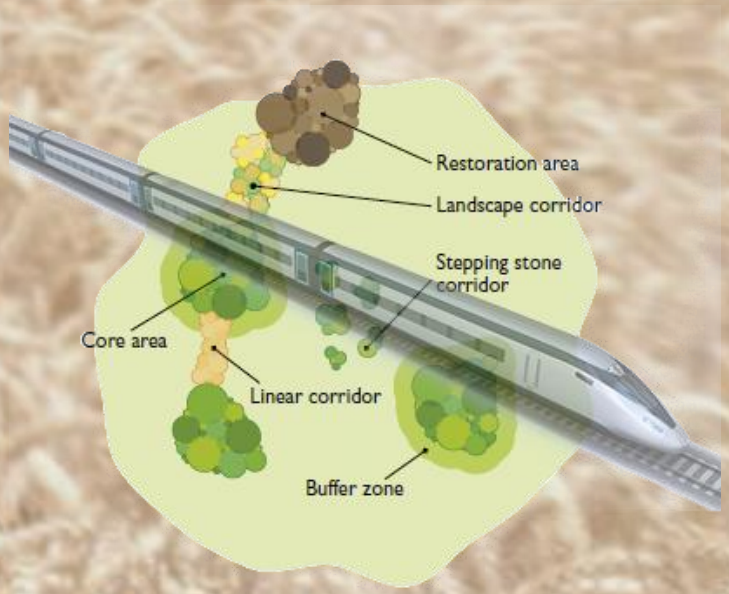
- **Vice Chair, Chesham & District Natural History Society**

A1413 (12)

HOC/10516/0020

Ecological Impacts

- **Member of Woodland Trust, BBOWT, RSPB … , who are locally active in the 'Living Landscapes' enterprise**
- **The line will form a barrier to the movement of wildlife, dividing populations and reducing their viability**
- **"Phantom Road" experiments show that noise alone has a significant effect on wildlife habitats**



Other Concerns

- Lack of mitigation for recreational users proposed in the Environmental Statement
- Air pollution levels, near the Berkhamstead Road (A416)
- Increased traffic on the B485 / Church Street
- Lack of protection afforded by the AONB legislation

Landscape Valuation

Local group assessment of impacts of tunnel options in contruction and during operation

TSE HS2 corridor locations	Income £m/a	HS2 Ltd proposal construction Impact 2018	2019	2020	2021	2022	2023	2024	HS2 Ltd proposal operation Impact	Long tunnel construction Impact 2018	2019	2020	2021	2022	2023	2024	Long tunnel operation Impact	REPA tunnel construction Impact 2018	2019	2020	2021	2022	2023	2024	REPA tunnel operation Impact
Chalfont	9.2	some - 2.5/5/10/10/10/5/2.5% impact							None	less than HS2 Ltd proposal (1/4 HS2 Ltd)							None	less than HS2 Ltd proposal (1/4 HS2 Ltd)							None
St Giles		0.23	0.46	0.92	0.92	0.92	0.46	0.23		0.06	0.12	0.23	0.23	0.23	0.12	0.06		0.06	0.12	0.23	0.23	0.23	0.12	0.06	
Amersham	21	Some - as CSt Giles impact							None	less than HS2 Ltd proposal (1/4 HS2 Ltd)							None	less than HS2 Ltd proposal (1/4 HS2 Ltd)							None
		0.53	1.05	2.1	2.1	2.1	1.05	0.53		0.13	0.26	0.53	0.53	0.53	0.26	0.13		0.13	0.26	0.53	0.53	0.53	0.26	0.13	
Great Missenden	18.6	A lot - 10/15/20/25/20/15/10% impact							7.5% impact	Some (depends how much Wendover site uses A413) - say 50% of HS2 Ltd proposal							None	50% of HS2 Ltd proposal							1/3 of HS2 Ltd
		1.86	2.79	3.72	4.65	3.72	2.79	1.86	1.40	0.93	1.40	1.86	2.33	1.86	1.40	0.93		0.93	1.40	1.86	2.33	1.86	1.40	0.93	0.47
Chesham	14.6	Some - 3/4 of Cstgiles impact							None	less than HS2 Ltd proposal (one third)							None	less than HS2 Ltd proposal (one third)							None
		0.27	0.55	1.10	1.10	1.10	0.55	0.27		0.09	0.18	0.37	0.37	0.37	0.18	0.09		0.09	0.18	0.37	0.37	0.37	0.18	0.09	
Wendover	16.2	A lot - 10/15/25/50/25/15/10% impact							10% impact	Quite a lot (but maybe more north of Wendover) - say 50% of HS2 Ltd proposal							1% impact	Same as HS2 Ltd proposal							Same as HS2 Ltd
		1.62	2.43	4.05	8.10	4.05	2.43	1.62	1.62	0.81	1.22	2.03	4.05	2.03	1.22	0.81	0.162	1.62	2.43	4.05	8.10	4.05	2.43	1.62	1.62
Total	**79.6**	**significant**							**Some**	**Some**							**some**	**Some**							**Some**
Total		4.51	7.28	11.89	16.87	11.89	7.278	4.509	3.01686	2.02	3.17	5.01	7.50	5.01	3.17	2.02	0.162	2.83	4.39	7.03	11.55	7.03	4.39	2.83	2.08562
% weighted total		5.7%	9.1%	14.9%	21.2%	14.9%	9.1%	5.7%	3.8%	2.5%	4.0%	6.3%	9.4%	6.3%	4.0%	2.5%	0.2%	3.6%	5.5%	8.8%	14.5%	8.8%	5.5%	3.6%	2.6%
Assumption from local group assessment 10 to 20%									3.80%	5 to 10%							0.2%	5% to 15%							2.5%
Assumption from PBA survey 10 to 20%									5% to 10%																

- **The SQW report represented an attempt to evaluate consequential losses resulting from different schemes, which HS2 appear to have difficulty accepting**
- **We request that funding be made available for an assessment of landscape value using the established 'Stated Preferences' methodology**

A1413 (15)

HOC/10516/0023

Summary

The Chesham Society

Tony Molesworth – 749

Chiltern Harriers

Chiltern Harriers AC, with over 500 members, regularly uses the Chiltern link and S Bucks Ways footpaths and the many footpaths crossing and in-between these main footpaths and bridleways. The Misbourne Valley is one of several areas in the Chilterns which are used.

Many of the senior runners participate in trail running, so the area is used for training and leisure. There are also a large number of non-club runners and indeed visitors from outside the area who use these footpaths.

Cross country running is becoming even more popular and makes a major contribution to health and well being of participants. Disruption by HS2 particularly during construction will have a major detrimental impact on runners who live in Chesham, Amersham, Great Missenden and Prestwood.

putting Chesham first

Andrea Polden, Petition 751

Since I retired, my main interest has been the environment, and it is the damage that HS2 will do to this very beautiful area that is my main objection to it (plus the outrageous cost at a time when all other services are being cut drastically).

Wildlife

I am the Vice Chairman of the Chesham & District Natural History Society (CDNHS), and also belong to a wide variety of societies and charities. Those most relevant to HS2 in the Chilterns AONB are the Woodland Trust, the Berks, Bucks and Oxon Wildlife Trust (BBOWT), RSPB, Butterfly Conservation and Plantlife, the wildflower charity, as well as those of more historical interest such as the National Trust and English Heritage. Many of these organisations have spent a great deal of time and money, including many hours of volunteers' work, in trying to restore some of the damage done to wildlife over the years by linking up scattered habitats, called 'Living Landscapes' by BBOWT - the RSPB has similar programmes. All this work is likely to be undone in many places by HS2, which will cut a wide swathe through the landscape, severing wildlife habitat connections

Immense efforts have been put into to ensure the survival of Barn Owls as a species, but even HS2 Ltd has admitted that all would be wiped out within nearly one mile of the line It is not just a question of dividing the habitat, however, there is also the problem of noise. An experiment reported in November 2013, conducted by Boise State University[1], set up a 'phantom road' to 'experimentally apply traffic noise to a roadless area at a landscape scale, thus avoiding the other confounding aspects of roads ...' "We documented more than a one-quarter decline in bird abundance and almost complete avoidance by some species between noise-on and noise-off periods along the phantom road," Barber said. "There were no such effects at control sites. This suggests that traffic noise is a major driver of the effects of roads on populations of animals." If this applies to road noise, it will surely be worse with noise from a very loud train passing every couple of minutes. Not only do birds find it more difficult to attract mates, because the sound of their songs is

[1] Early Edition > Heidi E. Ware, doi: 10.1073/pnas.1504710112

masked by the noise, but they cannot hear predators, so have to spend much more time watching for predators instead of feeding.

As well as birds, bats and insects are likely to be severely affected by frequent trains running at very high speeds. Nowhere in the Environmental Statement have I seen any assessment of the shock waves and vortices created by these trains, especially in the vicinity of tunnel entrances. The case of the Bechstein's Bat, an extremely rare and endangered animal present in the Chilterns is the prime example of this.

As an officer of the CDNHS I try to support the society in its activities, including participating in its field meetings. These are likely to be affected by the destruction or interruption of many of the local footpaths. These are also used by many other walkers - Chesham is a 'Walkers are Welcome' town. There are several running clubs in the area, and many horse riders and cyclists, yet the Environmental Statement hardly mentions such recreational users.

Last year one of our field meetings was to the BBOWT reserve Calvert Jubilee, a most beautiful lake, with a varied habitat surrounding the lake, which is severely threatened by HS2. It is home to many species of both songbird and water birds, plus all five species of hairstreak butterfly and fritillaries, some of which are also very rare and in decline. We saw some beautiful green hairstreaks last year and several species of skipper, but unfortunately not its rarest and most threatened bird, the turtle dove, about which there has been much in the press recently. In future, if HS2 decimates this reserve, it will probably not be worth visiting, a sad comment on the way in which our environmental heritage is treated.

Last week happened to be a busy one for me. On Monday evening the CDNHS held its monthly indoor meeting, and the subject of the lecture was the wildlife of the Colne Valley, yet another area not far from Chesham that we visit quite often and which is scheduled to be wrecked by HS2. The variety of wildlife and habitats in this valley is amazing, and we should not forego it lightly. On Tuesday evening I was at the local BBOWT group lecture, on the subject of badgers, another animal under increasing threat, but frequently seen at present in the AONB.

Chesham

I live near the centre of Chesham, in the valley on the Berkhamsted side

of the town, and I am near the A416. This road suffers from a high degree of air pollution and frequently breaches the legal limit. In the past I have suffered from asthma and bronchitis, and have an increasing sinus problems. I am concerned that there will be a considerable increase in traffic once construction starts. Although lorries are banned from using the Church Street route to the B485 Missenden road, doubtless many of the workers will use it, and lorries may have to travel to Amersham using the A416 in order to access the A413, There are no suitable alternatives to this route, and I fear a further increase in air pollution exacerbating my health problems. There will also be an increase in noise levels if there is an increase in traffic. The sides of the hills through the centre of Chesham confine traffic noise and pollution to a very narrow area.

The B485 from Chesham to Great Missenden is a road I use quite frequently, not just to Missenden, but en route to Oxford, the M40 or the M4. It is the only direct route between Chesham and Missenden, yet will be severely affected by road works, the building of the vent shaft at Annie Bailey's and all the extra construction traffic. In the rush-hour traffic can be severely delayed at the roundabouts on the A413, but a nightmare will ensue with the extra traffic.

This area is an Area of Outstanding Natural Beauty, AONB, and this designation is supposed to have the highest level of protection after that of a National Park. What is the point of such a designation if such a destructive project as HS2 can be driven through it? While the extension of the tunnel past South Heath is welcome, the tunnel should be continued under the whole of the AONB.

Mitigation

In mitigation I ask for

- A further extension of the tunnel;
- Close scrutiny of traffic noise and pollution levels throughout Chesham, including prompt attention to these matters if they are found to be in breach of current legislation
- That much more attention should be paid to the preservation of wildlife species and habitats under threat, for the future enjoyment of residents, visitors, and future generations to come. The latter will not thank us if they are born into a deserted, sterile and ruined countryside.

Andrea Polden - 751

- **Vice Chair, Chesham & District Natural History Society**

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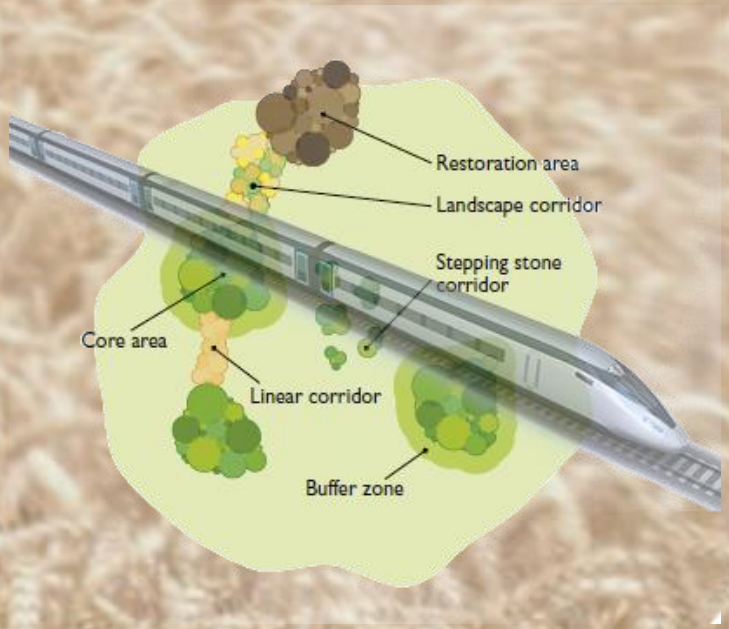
Ecological Impacts

- **Member of Woodland Trust, BBOWT, RSPB … , who are locally active in the 'Living Landscapes' enterprise**
- **The line will form a barrier to the movement of wildlife, dividing populations and reducing their viability**
- **"Phantom Road" experiments show that noise alone has a significant effect on wildlife habitats**



Other Concerns

- Lack of mitigation for recreational users proposed in the Environmental Statement
- Air pollution levels, near the Berkhamstead Road (A416)
- Increased traffic on the B485 / Church Street
- Lack of protection afforded by the AONB legislation

A phantom road experiment reveals traffic noise is an invisible source of habitat degradation

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Significance

Using landscape-scale traffic noise playbacks to create a "phantom road," we find that noise, apart from other factors present near roads, degrades the value of habitat for migrating songbirds. We found that nearly one third of the bird community avoided the phantom road. For some bird species that remained despite noise exposure, body condition and stopover efficiency (ability to gain body condition over time) decreased compared with control conditions. These findings have broad implications for the conservation of migratory birds and perhaps for other wildlife, because factors driving foraging behavior are similar across animals. For wildlife that remains in loud areas, noise pollution represents an invisible source of habitat degradation.

Abstract

Decades of research demonstrate that roads impact wildlife and suggest traffic noise as a primary cause of population declines near roads. We created a "phantom road" using an array of speakers to apply traffic noise to a roadless landscape, directly testing the effect of noise alone on an entire songbird community during autumn migration. Thirty-one percent of the bird community avoided the phantom road. For individuals that stayed despite the noise, overall body condition decreased by a full SD and some species showed a change in ability to gain body condition when exposed to traffic noise during migratory stopover. We conducted complementary laboratory experiments that implicate foraging-vigilance behavior as one mechanism driving this pattern. Our results suggest that noise degrades habitat that is otherwise suitable, and that the presence of a species does not indicate the absence of an impact.

traffic noise pollution | songbird migration | habitat degradation | foraging-vigilance trade-off | perceived predation risk

19. Safe crossing points for animals are also proposed where the railway crosses watercourses on viaducts and overbridges. Route-wide, green bridges and underpasses have been included in the design to create connectivity wherever appropriate for maintaining populations of protected species. The design of the Proposed Scheme includes a number of green bridges along the line of route and although they have primarily been designed for bats, they will also provide safe passage across the route for other species. At detailed design stage the need for specific mammal underpasses will be considered, taking account of all available information.

20. In the section of the scheme between South Heath and Wendover Dean viaduct the South Heath green tunnel will provide habitat connectivity for a 1.2km long section of the Proposed Scheme. The tunnel will be extensively planted as part of a larger compensation package for the loss of ancient woodland, and will also provide for the movement of species across the alignment. Ecological assessment has been undertaken which has guided the identification of wildlife crossing points. In addition to the green tunnel other examples in this section of the proposed route where provision for crossing points have been made include:

- the landscape planting and habitat creation close to the Chiltern tunnel north portal which will link the fragmented southern and western parts of Mantle's Wood Local Wildlife Site (LWS) with the remaining parts of Hedgemoor and Farthings Wood LWS; and
- the planting of the embankments of PRoW and farm accommodation bridges at Hyde Lane, Leather Lane and near Havenfield Wood, which will allow bats to cross the route of the Proposed Scheme.

21. The Promoter considers that the connectivity provided in the Proposed Scheme is sufficient and that no additional measures are required to maintain ecological connectivity at the locations specified.

22. Measures such as the provision of green bridges have been considered at sensitive locations along the route. Such measures have been proposed where it was considered that other means of addressing significant effects would not be effective. Whereas they may be of benefit for road schemes, the Promoter does not believe that amphibian and reptile underpasses are appropriate or necessary for a railway project.

23. Through the measures discussed above the Proposed Scheme includes the appropriate connectivity measures to maintain populations of species.

Barn owls

24. Whilst the ES Volume 3, Section 2 does recognise that there will be 'significant adverse effects' on the barn owl population, including the possibility of train impacts, it also acknowledges that:

> 'to offset the likely loss of barn owl from the vicinity of the Proposed Scheme, opportunities to provide barn owl nesting boxes in areas greater than 1.5km from the route will be explored with local landowners. As the availability of nesting sites is a limiting factor for this species, the implementation of these measures would be likely to increase numbers of barn owl within the wider landscape and thus offset the adverse effect. If the proposed mitigation measures for barn owl are implemented through liaison with landowners, the residual effect on barn owl would be reduced to a level that is not significant'.