The Chilterns Conservation Board

High Speed 2

Statement of Environmental Impact on the Chilterns AONB

27.7.2011

Statement of Environmental Impact within the Chilterns AONB

General observations

The route through the Chilterns AONB

The proposed HS2 route will cause serious and irreversible damage to the nationally protected landscape of the Chilterns Area of Outstanding Natural Beauty (AONB).

The route cuts through 20.5 km of the AONB, 10.9 km of this in tunnel. From Chalfont St Giles to the south it runs along the Misbourne Valley to World's End, just north of Wendover.

Inadequate information

The Board believes that the impacts of HS2 on the environment of the AONB - its landscapes, biodiversity, historic environment, amenity, access and natural resources - have not been adequately assessed or costed within the consultation documentation.

Insufficient information is provided on impacts - including those arising from land take and disposal of spoil - to allow an informed view to be reached on the overall impact of the scheme.

Whilst some of the scars during construction will heal, the character of the Misbourne Valley will change for ever. The associated structures are likely to add significantly to the urbanisation of the railway corridor and, in combination with noise generated by passing trains, much reduce the rural character and amenity of the area.

Basis of statement

This statement is the Board's initial view of potential impacts and issues requiring detailed investigation ahead of any decision to proceed. It highlights areas of particular concern at this stage, and should not be viewed as a definitive statement of the Board's views. It is based on national and local data sets, including findings of a field survey carried out by the Board in summer 2010[1], [2]

[1] The survey looked at the route through the AONB from the western end of the Amersham tunnel, recording detailed information on land use, boundary features and significant trees along the HS2 corridor.

[2] For the purpose of this statement and the CCB field survey, the HS2 corridor was defined as the area of land take plus a 30m buffer representing the area within which it is assumed that trees would be felled as part of 'vegetation management' and construction processes.

i) Natural Environment

Woodlands, trees and hedgerows

Table 1: Woodlands potentially impacted by HS2 within AONB		**ha**	**number of woods**
All woodland lost[3]		17.8	19
Ancient woodland lost	Plantations on ancient woodland sites		3
	Ancient semi-natural woodland		5
	Total	10.9	7
Ancient woodland potentially impacted indirectly[4]	within 500m of construction corridor		17
	501 – 1000 m of construction corridor		9
All woodland fragmented[5]		45.0	
Ancient woodland fragmented		35.4	
Isolated woodland fragments		2.5	12

- **Ancient woodlands** have been continuously wooded for over 400 years. The communities of species they support together with archaeological and other historic features are irreplaceable**.**

  3 of the ancient woodland sites which would be lost are classified as plantations on ancient woodlands (PAWS). Such sites may still exhibit important features including woodland boundaries, hornbeam stubs, bluebells and badger setts.

  The Ancient Woodland Inventory is in the process of being updated, and 2 additional woodlands along the route within the AONB have been identified as potential additions, not included here.

- **Woodland fragmentation and isolation**
  The areas destroyed are often parts of larger woodland. The surviving area is, therefore, damaged. Habitats and colonies of both flora and fauna when reduced in size or fragmented and separated, are much less likely to survive and are prone to eventual loss.

  12 isolated areas, although not destroyed, will be completely cut off by the route. Any wildlife left within these small fragments will be isolated from the main woodland areas with little chance of linking to other colonies. Extinction of some colonies is likely.

[3] Woodland lost defined as woodland within construction corridor
[4] In addition to those within construction corridor
[5] Woodland fragmented defined as surviving area of those woods bisected by HS2 corridor

- **Indirect impacts on remaining woodland**
  The Woodland Trust has identified a number of serious impacts on ancient woodland resulting from nearby development[6].

  These include:
  Hydrology –much of the route would be in deep cuttings or tunnelled through the chalk aquifer and it is possible that consequential changes in soil hydrology would be significant both for mature trees and ground flora.

  Air flows – when the edge of a wood is removed or a swathe cut through, the remaining trees are exposed to different air flows. This can have a drying effect (compounding changes in soil hydrology) which will affect trees, moss and lichen communities they support and ground flora. Stressed trees will also be more prone to disease and wind blow.

  Non-native species – ground disturbance through construction, vehicle movement and the combined affects of the above factors are likely to change the species composition within or bordering the remaining woodlands.

  Noise and vibration - both these factors, present during construction and once the route is commissioned, can affect both plant and animal communities. This will apply to both above ground and tunnelled sections (in places the roof of the tunnel may be less than 15m below ground level).

  Dust and air pollution – these impacts are likely to be particularly significant during construction as a result of all the excavation works and the need to move very large quantities of generated spoil along the route and then out onto the surrounding road network.

Trees, tree belts and hedgerows

Table 2: Individual trees and tree belts potentially impacted		**length km**	**number**
Tree belts lost		0.5	
Tree belts fragmented		1.9	
Loss of significant trees			138
Total hedgerows lost		13.7	159
	Of which species rich	7.6	

- **Woodland strips or tree belts** represent important characteristic landscape features within the AONB which also provide ideal habitat corridors – not least as sheltered feeding corridors for bats.

[6] *Impacts of nearby development on the ecology of ancient woodland'. Corney, P.M., Smithers, R.V., Kirby, J.S., Peterken, G.F., Le Duc, M.G. & Marrs, QR.H. October 2008*

- **Significant Trees**
  There are many trees, significant for their size, location and cultural importance which are not protected, designated or, to date, even identified. The field survey identified and recorded 'significant trees'[7] outside woodland strips and woodlands within the construction corridor. It should be stressed that to qualify as even 'potentially interesting' within the DEFRA methodology, a Common Oak (*Quercus robur)* would have to have a DBH (diameter at breast height) of over 1.02m, to be 'valuable' they would be have to be 1.5m or more. This means that many trees that the general public would recognise as large and impressive have not been recorded – the number of significant trees lost is a conservative figure.

- **Hedgerows**
  Within a farmed and rural environment, hedgerows are for many species a vital part of the ecological network. They are also important habitats in their own right, not least for bird nesting and feeding. Many hedgerows still delineate ancient field patterns and route ways, some dating back to medieval or earlier times, and are a significant feature of the AONB.

  The field survey 2010 provided data on length and number of hedgerows directly impacted. Indirect impacts will include loss of connectivity to the wider hedgerow network - a total of **360** additional hedges were found to link to those directly within the construction corridor.

Chalk streams and the Chilterns aquifer

- **The resource and current issues**
  Chalk streams are a globally rare and vulnerable habitat supporting some of our most threatened species. The river valleys through which they flow are a characteristic element of the Chilterns landscape.

  The chalk aquifer underlying the Chiltern Hills provides drinking water to over one million people.

  Most of the Chilterns chalk streams, including the River Misbourne, are adversely impacted by low flows.

- **HS2 and the River Misbourne**
  HS2 passes in tunnel directly under the River Misbourne, threatening the flow in the river and its water quality.

  The tunnel crosses at a section of the river which is particularly vulnerable to loss of water as it is perched above the water table. The route would be less than 30m underground – and the top of the tunnel potentially less than 15m below the river bed.

[7] Using DEFRA hedgerow survey methodology – 'truly ancient' ,' valuable' or 'potentially interesting' trees.

- **Potential impacts**

Low flows and ground water
Construction in this sensitive area may lead to increased loss of water from the river and /or a change in groundwater flow which may impact on flows further downstream.

Groundwater may be forced to find an alternative route around the tunnels, which could have a significant impact on groundwater flow in the catchment and may affect the productivity of water supply boreholes resulting in the need for increased pumping. This would give rise to increased energy consumption, costs, and carbon emissions.

The tunnel under the river may cause subsidence to the river bed which may lead to increased loss of water through the river bed. This is likely to be exacerbated by the effects of vibration during the construction phase.

Alternative sources of water supply will have to be found and the impacts of this factored in. This has potential to significantly spread the area of environmental impact by HS2. The most likely source would be from within the Chess and Colne catchment, already over abstracted[8]. Additional abstraction will increase stress on these rivers and their associated wildlife.

Pollution
Groundwater pollution arising from construction is another serious concern, with potentially significant impacts on the supply of drinking water and on the ecology of the River Misbourne. Impacts of chalk sediment arising from the tunnelling on, for example, fish eggs, need to be assessed. Pollution may arise from construction processes, work and storage sites and the extensive numbers of vehicle movements (both within the corridor and the surrounding road network).

Near Amersham the tunnel mouth appears to be at a depth that would mean that the track would be below the water table in high groundwater conditions. Any drainage of the site would most likely be to the River Misbourne with ensuing implications to water quality.

Infrastructure
The proposed route runs close to several water pumping stations which will have to be shut down once tunnel construction is within 0.5km. They will not reopen until construction is complete and water supplies are free from pollutants.

It is likely that the water companies will need to undertake major engineering works to relay the local mains water infrastructure. The route would cut through a number of major mains and sewers. These include a trunk main

[8] *colne CAMS (Catchment Abstraction Management strategy) - Environment Agency*

from Chalfont St Giles recently installed to alleviate low flows in the River Misbourne.

There are many uncertain impacts on the River Misbourne and chalk aquifer – the Board would expect the precautionary principle to apply.

Species, habitats and wildlife sites

The route would potentially have an impact on a wide range of other valuable wildlife habitats and species in the AONB including chalk grassland, acid grassland and scrub communities (Bacombe and Coombe Hills SSSI), wildlife-rich road verges, water bodies (several ponds / Shardeloes Lake); fen (LWS, Field south of World's End) and lowland wood pasture and parkland (Missenden Abbey).

The line and associated infrastructure (including security fencing) would create a barrier for the movement of many species including deer, fox, badgers and hares. Impacts on individual species are unknown.

Current records do not accurately reflect specie populations (presence or numbers). A survey currently underway has already identified Common Pipistrelle (*Pipistrellus pipistrellus*), Soprano Pipistrelle (*Pipistrellus pygmaeus*), Brown Long-Eared Bat (*Plecotus auritus*) and Natterer's Bat (*Myotis natteri*) as present within woodlands that will be partially destroyed by the HS2 route.

Further detailed survey work needs to be undertaken to accurately assess species that will be impacted if the HS2 proposals proceed.

Table 3: Designated nature conservation sites within AONB potentially impacted

Designation	Within Construction Corridor	Within 500m of construction corridor	500 – 1000m from construction corridor
Sites of Special Scientific Interest	0	1	0
Local Wildlife Sites	4	9	0
Biological Notification Areas	1	13	9

ii) Recreation and Access

The proposed High Speed rail route through the Chilterns will have substantial negative impacts on the accessibility and tranquillity of the surrounding countryside.

The main impacts are:

- **Rights of Way**
  The rights of way network will be affected, with 25 rights of way directly affected (either severed or in some cases substantial sections destroyed). Many more will be affected due to loss of tranquillity and detrimental impact on views. All will be temporarily severed, some are unlikely to be re-opened and others diverted, possibly along roads. Where a right of way is retained it will require a special bridge over the railway line, some of them spanning over 50 metres. These structures are unlikely to add to the amenity of the countryside.

- **Route connectivity** will be affected. Rights of way links between communities and from towns/villages to the surrounding countryside will be adversely impacted. Maintaining a fully integrated network is essential to protect opportunities for the public to enjoy the countryside for recreation and health.

- **Promoted routes**
  Many promoted routes will be affected, ranging from the Ridgeway National Trail, to regional and local routes.

Table 4: Promoted routes impacted by HS2 within AONB

Route type	Number	Includes
National Routes	3	Includes • The Ridgeway National Trail, • The Icknield Way • National Cycle Network Route 57
Regional	7	Includes • The Chilterns Cycleway • The Chiltern Way
Local	5	Includes • Great Missenden circular walk • Chilterns Country Views of the Vale

- **Enjoyment of the countryside**
  The tranquillity and attractiveness of the countryside along the route is a considerable economic asset and a key element within the tourism sector. Five visitor destinations will be particularly affected (Wendover, The Lee, Great Missenden, Little Missenden and Amersham). These are popular destinations which attract visitors because of their scenic locations and the wealth of walking and other recreational opportunities on the doorstep.

Table 5: Countryside sites directly affected

Countryside site [ownership]	**Impacts**
Bacombe Hill Local Nature Reserve (open access) [Local Authority]	Impact on views and tranquillity
Coombe Hill and Low Scrubs (open access), popular and heavily visited countryside site [National Trust]	Impact on views and tranquillity
Wendover Woods major countryside attraction [Forestry Commission]	Impact on views and tranquillity and on Wendover as a gateway
Jenkins Wood (historic interest) [Private]	Impact on views and tranquillity
Sibleys Coppice [Private]	Impact on views and tranquillity despite green tunnel
Farthings Wood [Forestry Commission]	Major impact, HS2 corridor bisects woodland and over half of woodland destroyed.
Mantles Wood (open access) [Forestry Commission]	Major impact, HS2 corridor bisects woodland, 2 rights of way severed, part of woodland destroyed.

iii) Historic Environment

The Chilterns has a wealth of historic features with examples from all era since first settled by man. Much of what is special is not designated or even recorded. It is known that the railway will destroy part of Grim's Ditch Scheduled Ancient Monument. It will pass through part of the Shardeloes Registered Park and Garden near Old Amersham and pass very close to the medieval Parish Church of St.Mary near Wendover.

The Buckinghamshire County Archaeological Service has identified the following likely impacts:

- Direct physical destruction/harm to historic buildings, landscapes and sites during the construction phase (including temporary construction compounds, ancillary works and landscaping schemes etc);
- Harmful noise or visual intrusion on the setting (surroundings) of heritage assets permanently affecting the experience of place;

- Loss of historic character through severance - of historic landscape patterns (e.g. historic parks or farms) or linear features such as ancient lanes - or extensive new landscaping, and
- Indirect physical harm from factors such as vibration to nearby historic buildings or alteration of the water table affecting historic water features, trees or some archaeological sites.

Numbers of Heritage Assets recorded in the HS2 Corridor within the Chilterns AONB[1]

		Within 30m of route or structures	Within 500m	500m-1km
Designated heritage assets	Scheduled monuments	1 (Grim's Ditch)	3	3
	Listed buildings (grade I or II*)		11	6
	Listed buildings (grade II)	1(Barns & Outhouses at Hyde Farm; Glebe House,	276	69
	Registered historic parks	1(Shardeloes)		1 (Missenden Abbey)
	Conservation areas		5 *(also includes Chalfont St Giles)*	3
	Registered Common		1	6
Undesignated heritage assets	Archaeological notification sites (denotes areas of known interest)	7	16	14
	Unlisted historic buildings	Not known		Not known
	Significant historic landscape types *Ancient woodland – (See Woodland Section)*			
	Historic settlement	Data not analysed		
	Pre-18th century fields	Data not analysed		
	18th/19th century fields	Data not analysed		
	Pre- 18th century routeways [2]	9	16	16

[1]Includes settlements of Wendover and Amersham
[2]Data is only available for Wendover to Frith Hill. Remaining area not analysed therefore impact will be greater.

It is widely agreed that known archaeology represents about **10%** of that present. This means that the HS2 route is likely to impact **10x** the amount of archaeology currently recorded.

iv) Spoil

The tunnelling and excavation of cuttings will generate approximately 12 million cubic metres of loose spoil. The Conservation Board does not believe that more than a small percentage of this (less than 10%) can be used along the line in or near the AONB for embankments, noise bunds and other landscaping. This will leave a net surplus of approximately 11 million cubic metres of loose spoil. The construction of the route will require this spoil to be stockpiled prior to its removal, almost certainly, by road as it is not logistically possible to use either the new railway or the Chiltern line for this purpose. HS2 Ltd have stated it is their policy to use the spoil arising from the cuttings along the route in the Chilterns. This is not acceptable to the Chilterns Conservation Board.

The outcome may be that over 11 million cubic metres of spoil will be transported in lorries out of the area using local roads, generating, in the process, over 1.5 million lorry movements.

v) Land Take and Land Use

Total above ground within AONB [1]	**73.6 ha** (182 ac.)
Loss of Productive Farmland [2]	**59.9 ha** (148 ac.)
Total Farmland affected [3]	**495.7 ha** (1224 ac.)
Number of holdings affected [4]	i.r.o. **25**

1. The total land take measured directly from the tops of cuttings, bottoms of embankments and edges of other structures. It does not include extra land taken for security fencing or access roads. During construction, land take will include 'Green Tunnels', 'Land Bridges' and construction and storage sites.

2. The loss of farmland is merely that covered by the current HS2 'foot print'. As above, the area lost to agriculture will be considerably more throughout the construction period.

3. The total farmland affected is a measure of the land compartments where current farming will be disrupted. A number of fields will be split to leave areas that are either inaccessible so will be lost to agriculture or will be too small to sustain current operations (the size of modern machinery means that cultivating smaller areas for arable production is less viable).

4. Within the AONB alone, in the region of 25 farm businesses will be affected. Besides loss of productive land as mentioned above, each of these businesses will be severely affected during construction and a number will have fields permanently separated from the main holding. Management of these areas may no longer be viable which may result in land sales and business re-structuring. Some farm businesses may cease to exist.