Tunnels, Cuttings and Embankments

Impacts on ancient woodland

WTML/Keith Huggett

Construction of HS2 will require large amounts of earthworks in the form of cuttings, embankments and tunnels.

From our work on Phase 1, we know that it is HS2 Ltd's intention to reuse as much as possible of the material excavated to form embankments, bunds and green tunnels along the route of the railway. You may wish to check where HS2 Ltd proposes to store this type of material in your area.

Effects from the earthworks will be both temporary, such as noise and dust during construction, and permanent, such as destruction of habitats.

Temporary and permanent effects can be physical or chemical. Chemical effects include the pollution of ground and surface water, reduction in air quality and damage to soil.

Physical effects can include the fragmentation of habitats as a result of vegetation clearance and ongoing disturbance as a result of noise and artificial lighting. Both have implications for wildlife habitats along the line, including ancient woodland.

Further information on the effects of development on ancient woodland can be found in the Woodland Trusts' publication: *Impacts of Nearby Development on Ancient Woodland*[1].

Tunnels

There are two types of tunnel construction proposed as part of HS2:

- longer, deeper tunnels will be bored with tunnel boring machines (TBMs). Examples of these on Phase 1 include the proposed sections between Euston and Old Oak Common and the M25 and South Heath.
- shallower tunnels will be constructed using a cut and cover technique. An example of this from Phase 1 is the tunnel at Greatworth.

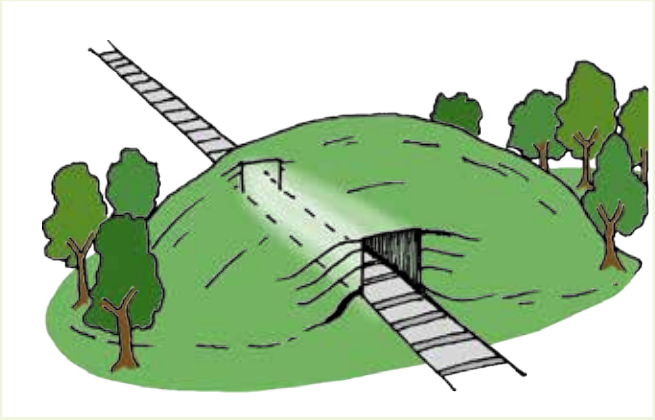
Cut and cover tunnels

Cut and cover tunnels are also referred to as, green, tunnels. They are used to mitigate noise and visual impact of a railway by hiding it from view.

The cut and cover technique is used to build shallow tunnels and, as part of HS2, it will also be used to construct the entrances and exits of bored tunnels and consists of three distinct parts: trench excavation, tunnel construction and soil covering. This type of tunnel can be constructed from the top down or bottom up.

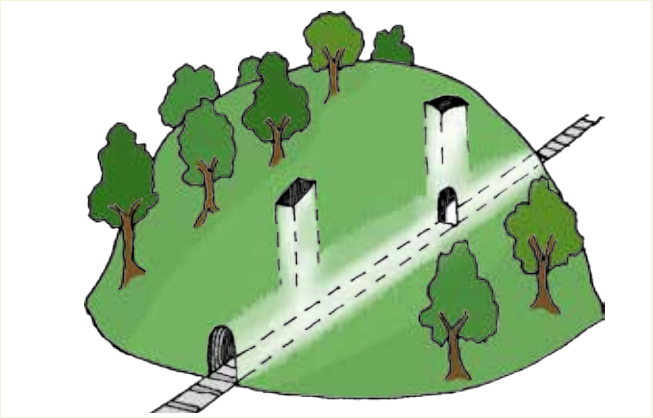
Construction can be very environmentally damaging because it involves digging a huge trench. This will cause fragmentation and degradation of the existing environment, which disrupts environmental networks, and makes it difficult for species to move through the landscape.

WTML/Jim Smith-Wright



Cut and cover tunnels

Superficially a better method, the removal and replacement of the soil still means the unique interrelationships between species are lost forever over the same wide area.



Tunnels

Probably the least destructive method of traversing a sensitive natural habitat, a tunnel still needs ventilation and construction is not possible without serious disturbance.

Noise and dust will also be generated during the construction phase, and this can cumulatively add to the effect of fragmentation as many woodland species are sensitive to disturbance.

Furthermore, the cut and cover technique produces much more spoil than bored tunnels and this will require proper handling and disposal.

After the construction phase is complete the surface of the tunnel can be re-vegetated, but this is usually with grass for ease of maintenance.

This type of proposed land use will not adequately connect areas of ancient woodland back together.

Even if the surface is planted with trees, ancient woodland habitat will never be recreated.

Bored tunnels

Bored tunnels are constructed using tunnel boring machines. This technique is used for long, deep tunnels and is less damaging to the environment than cut and cover because the majority of the work occurs underground.

Noise and dust are greatly reduced during construction, and underground boring does not fragment the habitat in the same way as a cut and cover tunnel.

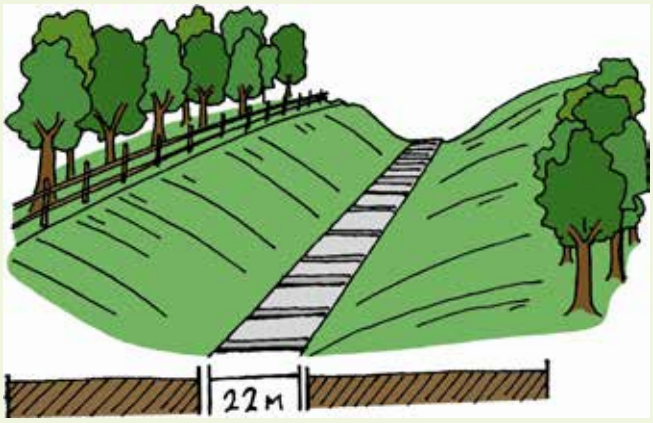
Long tunnels need ventilation shafts at regular intervals. This does involve surface disturbance, as does the construction of the tunnel entrance and exit, which is likely to use the cut and cover technique.

If located in sensitive areas, the construction of ventilation shafts will require careful management to avoid disturbance to and fragmentation of the habitat. It is likely temporary roads will need to be laid to facilitate the construction of the shafts. If ancient woodland is removed to create temporary roads the habitat lost cannot be replicated by planting new trees after construction.

Ancient woodland is an irreplaceable habitat, developed over centuries through a combination of factors owing to its location and history. The habitat will be permanently fragmented.

Cuttings and embankments

Cuttings are used as part of railway construction to reduce noise, reduce visual impact and to keep the track level. Embankments will be constructed using spoil from tunnels and cuttings and are used to keep the track level. Construction will cause fragmentation of habitat patches.

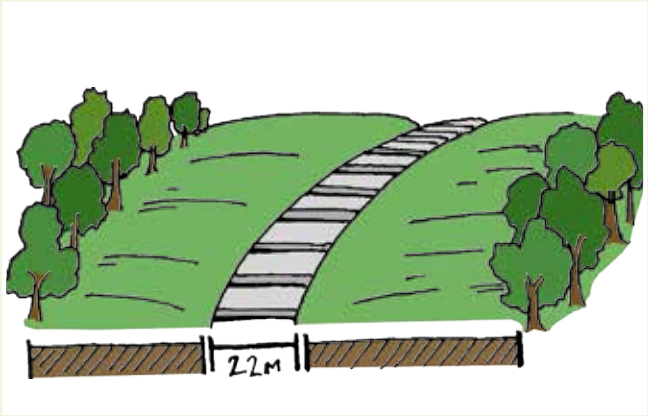


Cuttings

The railway trackbed in this cutting is 22 metres wide but the total loss of woodland is considerably wider. The deeper the cutting, the greater the destruction.

Once built, the fragmentation remains because the track and sides of the structure have to be kept clear of woody vegetation. It is not clear how wide these structures will be, but given on Phase 1 the track is at least 19m wide, it is safe to assume that the area cleared will have a significant effect on the movement of species between patches. Plants and animals typical of woodland are particularly sensitive to disturbance and can find it very difficult or impossible to adapt to fragmentation. There is often a lag between the disturbance occurring and a species response, making any effects difficult to predict or mitigate for. For example, many woodland bird species will remain faithful to a wood for years after disturbance but their breeding success is adversely affected and eventually the species declines.

Cuttings and embankments also increase the amount of edge habitat, while decreasing core habitat, which is the main refuge for the specialist species dependent on ancient woodland. Edge effects can be reduced by dense planting but this type of mitigation cannot reduce the impact of fragmentation caused by the type of linear clearing typical of cuttings and embankments.



Embankments

As with cuttings, embankments multiply the loss of ancient woodland habitat. Disturbance caused by the construction of both cuttings and embankments may also be irreparable.

References

1. The Woodland Trust, Ryan, L. (2013): *The Impacts of Nearby Development on Ancient Woodland*

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