An introduction to HS2 Ltd's approach to managing noise

Community Forums, Sept 2012

Presentation aims

- Provide a non-technical introduction to noise
- Aid community understanding of the subject
- Provide an overview of the assessment programme
- Explain design methods that are used to minimise noise effects

Measuring noise

- How sound is measured and evaluated?
  - Energy - $L_{pAeq,T}$
  - Maximum sound levels for trains
- Local authority experience will be used to inform:
  - noise sensitive areas
  - monitoring locations

Baseline sound

- Baseline monitoring of existing sound is the means by which we better understand the local sound environment, to enable assessment of impacts and effects
- Data is needed at locations where noise assessments relate to construction phase and railway operation
- Baseline data will be gathered in a number of phases through 2012 and 2013
- In any one area, measurements may be required at different locations, different times of the day and on different days.
- Noise due to the project will be assessed at all sensitive receivers along the route (homes, schools, places of worship, public spaces etc) within spatial scope

Principal sources of noise

Temporary sources –

Construction phases

Permanent sources –

Direct noise - operational railway & supporting systems

Indirect noise – changes on existing road and rail networks

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Iterative approach to noise mitigation

- Snap-shot of railway design will enable the start of noise modelling and assessment
- Initial assessment of snap-shot scheme will identify where mitigation is likely to be needed
- Engagement will continue with local environmental health professionals
- Envisaged mitigation will be discussed at community forums
- Envisaged mitigated railway design will be included in the Draft ES consultation - spring 2013

Reporting of our assessments

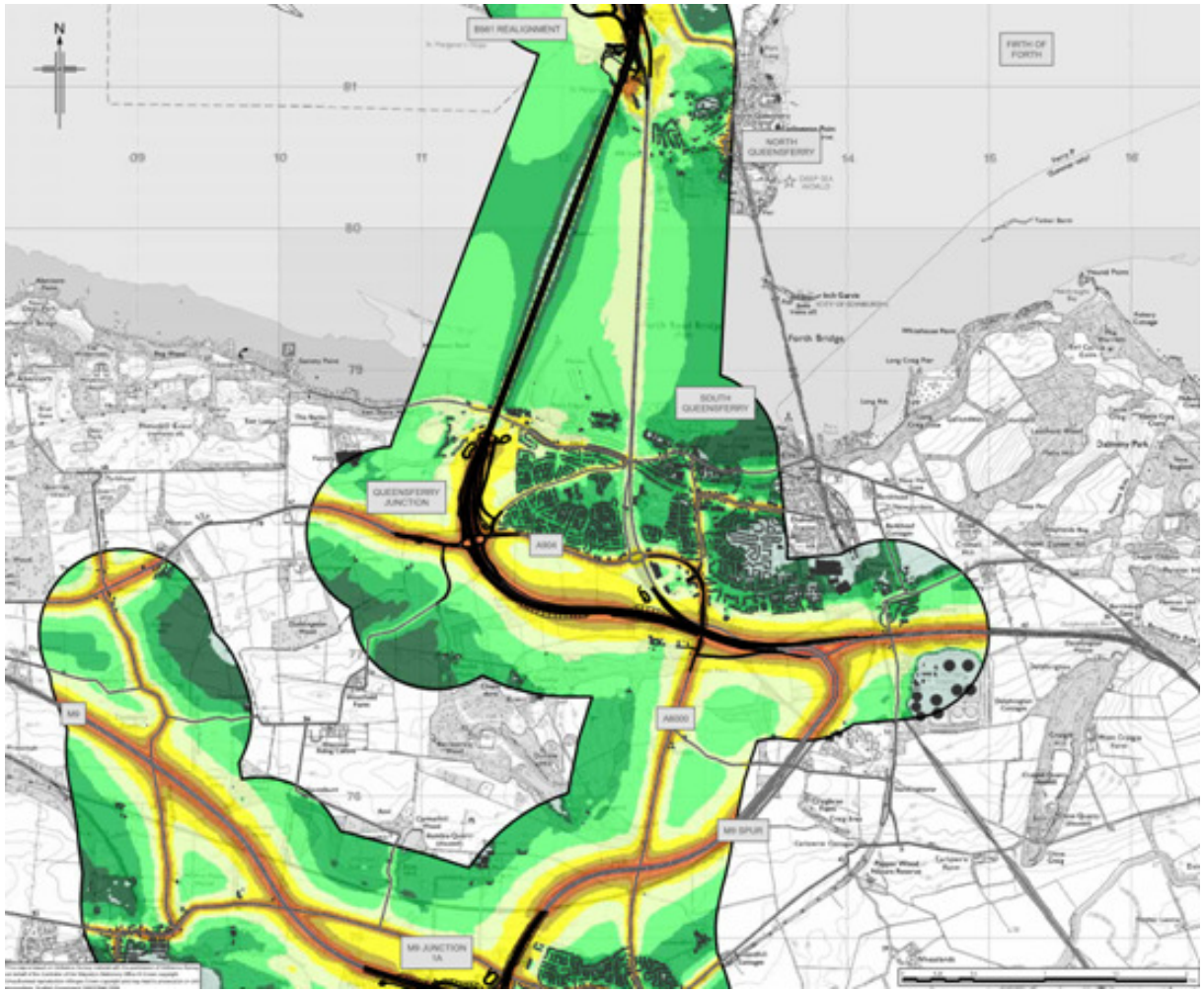
Environmental Statement (ES) will:

- state what the likely significant effects are and the measures that can be used to mitigate them
- allow some inbuilt flexibility for HS2 Ltd to promote innovative solutions to control noise

Presentation of information

- Draft envisaged mitigation design will be described the Draft ES – Spring 2013
- Draft ES will report at the local area level – based on Community Forum areas
- Train operation noise will be described in in plans and tables, accompanied by sound contour maps

Example sound contour map



Legend

Noise study area

Modelled road network

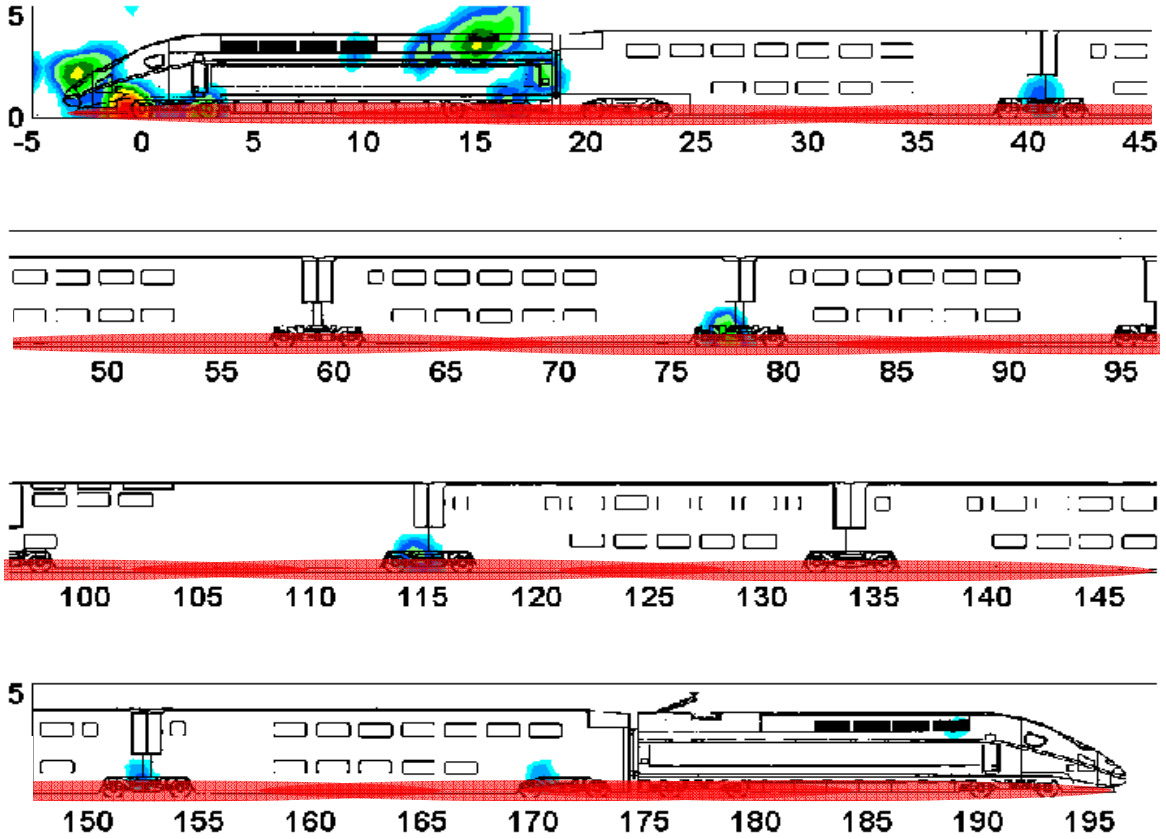
Predicted absolute noise level in dB, $L_{A10,\ 18\ Hr}$ free-field at 4m above local ground level.

- > 83.5
- 80.5 - 83.4
- 77.5 - 80.4
- 74.5 - 77.4
- 71.5 - 74.4
- 68.5 - 71.4
- 65.5 - 68.4
- 62.5 - 65.4
- 59.5 - 62.4
- 56.5 - 59.4
- 53.5 - 56.4
- 50.5 - 53.4
- 47.5 - 50.4
- < 47.5

Construction mitigation

- ES will report on the effects of large and longer term construction activities
- Code of Construction Practice (CoCP) provides the key means by which construction noise will be controlled , monitored and minimised
- CoCP ensures “best practicable means” used to minimise noise and vibration

High speed train sound (360km/hr)



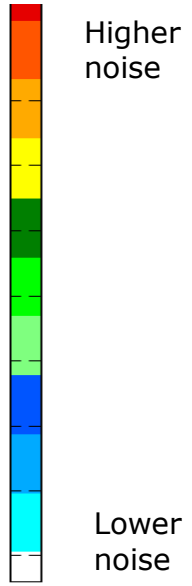


Image based on SNCF 1/3 Octave Noise Map of TGV at 360km/hr modified to represent L_{pAeq} using output from TWINS modelling

Mitigation of noise effects

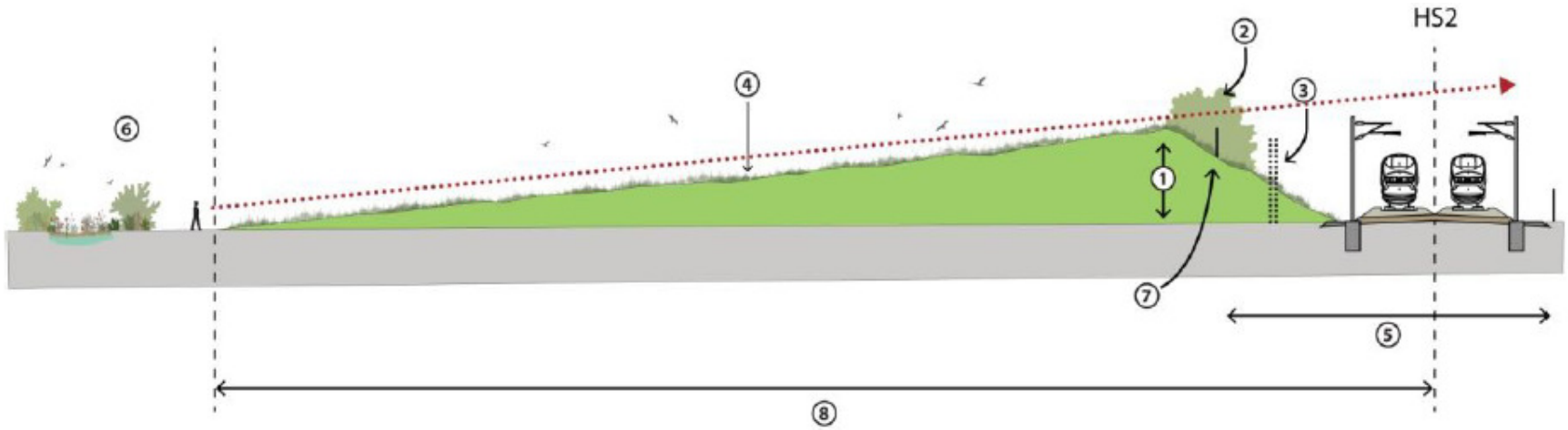
Minimising noise effects uses a hierarchical approach:

- The initial design (e.g. vertical and horizontal alignment)
- Additional noise mitigation:
  - At the track and train interface (e.g. track bed, train design)
  - Between the train and property (e.g. noise barriers, bunds)
  - At property (e.g. acoustic glazing)

Initial design – operational mitigation

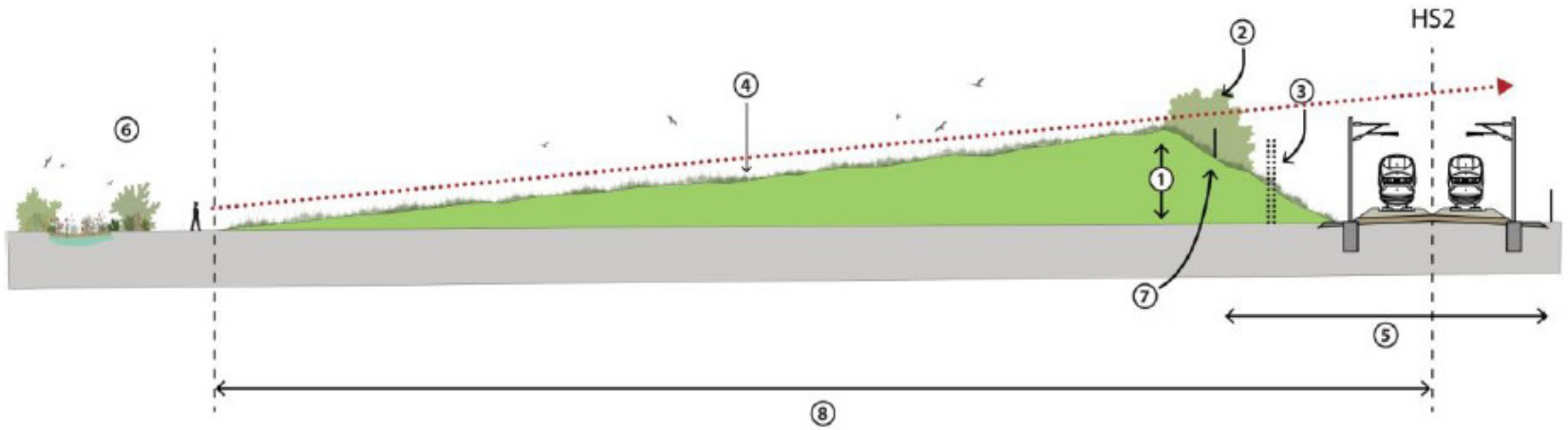
- Incorporated mitigation: location of alignment and its height, green tunnels
- Use of established + proven designs to reduce effects (HS1)

Mitigation between railway and property: Landscape earthworks



1. Build in visual screening (earthworks)
2. Used in combination with planting for effective screening
3. In rural sections - use earthworks to minimise noise barrier height or use
4. Use appropriate gradients to allow land to be returned to former use (e.g. 1:13 arable, 1:8 livestock)
5. Minimise HS2 width and reduce land take and long term maintenance by allowing land use up to the railway corridor.
6. Earthwork proposals to take into account current land use; designated landscapes; sensitive environments; ecological and archaeological areas etc
7. Conceal railway fencing within earthworks and apply screening treatments
8. Need to include land required (temporary or permanent) to deliver landscape proposal.

Landscape earthworks



- Effective barriers
- Sympathetic to existing landscape
- Better for: return of community land / agriculture / planting / ecology …

- Sustainable
- Community input needed (additional land required temporarily)

Noise Barriers

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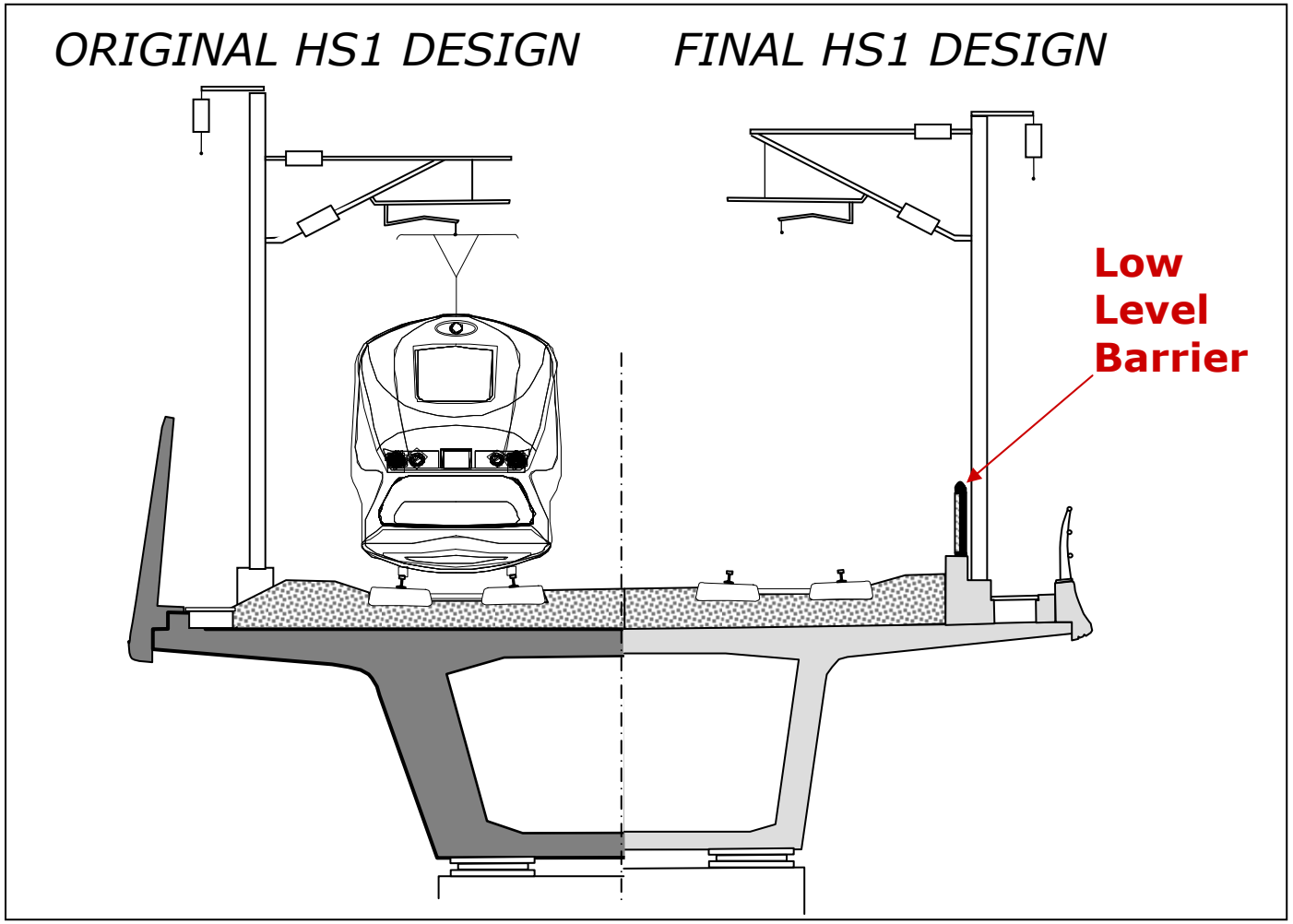
HS1 Viaducts



UK experience in minimising effects

- Channel tunnel rail link (HS1) : through rural/urban/AONB
- Extensive mitigation
- Virtually no complaints about noise & vibration since the start of HS1 operation
- High speed rail can be delivered with manageable effects and effective mitigation

Questions