

BRIDGWATER TO SEABANK UNDERGROUNDING WORKSHOP 10TH DECEMBER 2010

ATTENDEES

Bob Corns and Chris Mayes, Natural England
Barry James, Tony Serjeant, Bob Croft and Steve Membury, Somerset County Council
Rob Shuttleworth, Janette Burton and Paul Sobczyk, Sedgemoor District Council
Kenneth Taylor, West Somerset Council
Jonathan Richards, Mendips AONB Management Unit
Gillian Ellis-King, South Gloucestershire Council
Graham Quick, Vince Russet, Dr Nick Michael and Kevin Carlton, North Somerset Council
Caroline Power, English Heritage
Mike Barker, Arup

PROJECT TEAM:

Steve Knight-Gregson (SKG), Principal Specialist Major Projects, National Grid
Richard Walsh (RW), Consents Officer, National Grid
Aileen Smith (AS), Consents Officer, National Grid
Tony Dyas (TD), Cable Engineer, National Grid
Ian Grimshaw (IJG), Planning & Environmental Consultant, TEP
Chris Chadwick (CC), Planning & Environmental Consultant, TEP
Tracy Snell (TS), Planning & Environmental Consultant, TEP
Rob Graham (RG), Consultation Consultant, 3G
Martyn Shaw (MS), Consultation Consultant, 3G

PURPOSE:

To identify, on each of the Bridgwater to Seabank route corridors, where are the particularly sensitive/constrained/difficult sections and where National Grid should focus consideration of specific mitigation including low height towers, alternative tower designs and potential use of underground cables.

WELCOME AND INTRODUCTIONS

SKG opened the workshop with a welcome and introductions.

PROPOSED AGENDA

SKG briefly discussed and confirmed attendees' agreement of the agenda and format for the day. SKG asked consultees whether they wished to be split into two groups for the workshop event focusing on the northern and southern parts of the corridors or if one group was preferable. It was agreed that all attendees would participate as one group looking at the complete connection between Bridgwater and Seabank.

PROJECT RECAP AND OBJECTIVES

RW gave a short overview of the project to date primarily for the benefit of representative attendees standing in for colleagues who were unable to make the workshop and other attendees who had previously not attended workshops or consultation held by National Grid.

MITIGATION

IJG gave a short presentation introducing different types of mitigation that could be employed to reduce the potential visual impact of overhead lines, including off-site planting, low height towers and alternative tower designs.

WHY NOT UNDERGROUND ALL ASSETS?

SKG outlined the technical and engineering considerations associated with 400kV underground cabling and explained National Grid's statutory duties, again largely for the benefit of those unfamiliar with the project or attending on behalf of other colleagues.

INITIAL QUESTIONS FROM ATTENDEES

1. Is National Grid still considering sub-sea connections?

Response: SKG explained that a range of options were considered for the connection of the proposed Hinkley C Power Station including sub-sea connections. National Grid is reviewing the feedback on these connection options received during Stage 1 consultation and will make clear in its Statement of Preferred Connection why certain options were not taken forward.

2. What are the differences between low height towers and standard towers.

Response: SKG outlined that standard height towers are approximately 46-50m high, have a footprint of approximately 10m by 10m and have a typical span (distance between towers) of 360m. In contrast, low height towers are typically 36m high and have a span of approximately 300m. The reduction in the height of these towers is made possible by two circuits being installed on the lower of two arms. This means that the towers are wider than the standard tower by approximately 11m.

SKG explained that low height towers have been installed on the transmission network in a number of locations across the UK. The closest example to this area is a line which crosses the A46 and runs parallel with the M4 north of Bath, although these are of a slightly heavier 'L6' tower type/design carrying quad conductor bundles with 'V' string insulators, compared to the towers likely to be used for a Bridgwater to Seabank connection which would be slightly lighter structures with single insulator strings and either twin or triple conductor bundles. An example of these type of low height towers can be seen close the A19 east of Thirsk in North Yorkshire.

3. What are the health implications of underground cables compared with 400kV overhead lines?

Response: Electric and Magnetic Fields (EMFs) are produced wherever electricity is used, and there have been suggestions that exposure to these fields might be a cause of ill health. National Grid fully recognises people's concerns and the uncertain scientific position on this subject. An overhead line will produce both an electric and a magnetic field, an underground cable will only produce a magnetic field, the electric field being shielded by the cable sheath which is an integral part of the cable.

High-voltage underground cables produce magnetic fields in the same way that overhead lines do, although the fields fall more quickly with distance as you move away from the cable. Directly above an underground cable buried around 1m below ground there will often be a higher magnetic field than will be found under an equivalent overhead line which at 400kV would be at least 7.6m above ground.

4. Is it possible to vary the spans of overhead towers to make a regular spacing or rhythm in the landscape?

Response: It is technically feasible to vary the spans between overhead line towers and in some instances it is necessary to vary the span distances between towers to accommodate changes in levels, clearance over features such as roads or motorways and to accommodate land use requirements. Where span differences vary tower height often need to alter slightly to be able to maintain minimum ground clearances and accommodate different loadings.

5. How many wires will the towers have?

Response: The connection required for the project would be a double circuit 400kV overhead line with up to three conductors (wires) suspended from each of the six arms of each tower.

6. Do higher voltage towers take up a larger area in the ground for the foundations and what is the difference between 400kV foundations and 132kV foundations?

Response: The foundations for a 400kV overhead line are larger than those for the 132kV overhead line. A standard height 400kV tower has a footprint of approximately 10m by 10m compared with around 6.5m to 7m square for a standard height tower on a 132kV overhead line. It is not possible to build a new 400kV pylon on the foundations of a 132kV pylon and there are fewer 400kV pylons per kilometre than 132kV pylons. As an approximate guide, a 132kV overhead line will typically have 4 pylons per kilometre as compared to 3 per kilometre for a 400kV overhead line.

7. What are the ground safety clearances for overhead lines?

Response: The ground clearance for a 400kV overhead line is approximately 7.6m. This is the minimum height at an overhead lines lowest 'sag' point approximately half way between towers.

8. How does drainage work for underground cables and how is farming affected by the presence of such cables?

Response: When underground cables are installed, land drainage is also installed to ensure that the pre-existing drainage remains unimpeded. This is generally in the formal agreement National Grid enters into with the landowner. Restrictions are placed on above ground activities over underground cables which restrict the planting of trees and shrubs within 3m of the underground cable and deep cultivation is also not allowed to prevent damage to cables.

9. Would the towers leading into Hinkley Point C be the low or standard height towers?

Response: National Grid will look at all options for the line entries at Hinkley Point including alternative designs as part of ongoing consultation for this project. It is acknowledged that as there are many existing standard towers (pylons) at Hinkley Point and relatively few changes are required, it is likely that standard towers will be most consistent.

WORKSHOP SESSION

IJG, CC and TS led the main workshop session, as outlined under 'Purpose' above. The entire route was discussed in a number of sections with each corridor discussed for each section. Sections are fairly loosely defined lengths of route corridor or study are agreed during the workshops as convenient to discuss and sharing similar characteristics. Sections discussed included: Hinkley Line Entries; Bridgwater to Mendip Hills; Mendip Hills (Loxton to Sandford); North of the Mendips to Tickenham; and Tickenham to Seabank. The information presented below includes general points that apply along the whole of the connection, followed by section specific points where comments could relate to all Corridors and finally Corridor specific points.

General Points

- Undergrounding was considered to offer landscape benefits in certain sensitive areas, notably the Mendip Hills AONB and the Somerset Levels. In considering undergrounding, assessment should acknowledge the ecological and archaeological values which may be compromised by undergrounding. Corridor specific references to undergrounding are covered in detail below.
- The setting and views to and from Scheduled Monuments, Conservation Areas, Listed Buildings and other known heritage assets needs to be considered. The inter-relationship between assets was also noted as being of importance and requiring assessment. Attention was drawn to the English Heritage consultation document 'The Setting of Heritage Assets: English Heritage guidance' issued in August 2010 for consultation. In addressing setting of heritage assets a document produced by the Malvern Hills AONB: View Analysis and Setting was considered a good guidance document to use in the assessment.

- Townscape views were considered to be important, particularly the relationship between the setting of settlements and the wider landscape. Reference to private views and visual impact was also raised.
- Consultees noted that this is a difficult and complex project and that environmental impact assessment would be required before the views of consultees could be fully expressed.
- Some consultees considered that an overhead line through the landscape would extend the perception of the urban fringe of Bristol south into Somerset.

Bridgwater to Mendip Hills

Comments on this section of the route generally related to both corridors rather than being corridor specific. General comments are summarised below.

- Rationalisation of existing low voltage overhead lines should be considered wherever possible as this can offer benefits to a wider section of the community.
- All types of tower should be analysed for their effects on landscape and views not just standard design towers.
- There are a number of wind turbine and solar farm applications particularly on the former ammunitions base at Puriton. The potential for cumulative effects with these projects needs to be considered.
- Appreciating that the description of the effects of a new overhead line would be presented referring to different sections, consultees stated that the sections should reflect the ridgelines that occur in the Somerset Levels as they provide natural separation and are a recognisable and distinctive feature of the landscape.
- The Somerset Levels as a whole are considered to be sensitive with no particular landscape character distinction between the corridors National Grid has identified.
- The Somerset Levels have high concentrations of heritage assets. An overhead line would have adverse effects on the setting of these assets. Consultees stated that it is not just the setting of each individual asset that needs consideration but the interaction and intervisibility between assets.
- The landscape heritage and setting of the Levels as a whole needs to be considered making reference to the different ages which are important to the understanding and interpretation of the Levels.
- Undergrounding should be considered within the Somerset Levels. The landscape is flat with open long distance views. Undergrounding would avoid effects on the setting of villages and heritage assets. Consultees stated that the benefits of effects on setting and views could outweigh the adverse effects on buried archaeology and ecology. National Grid needs to demonstrate a robust assessment of views and setting as compared to ecology and buried archaeology when looking at an underground or an overhead line connection through this area.
- The effects on the Somerset Levels should be considered at both the local level and across a wider area to ensure that affects are appropriately addressed.
- The landscape of the Levels is important. When siting overhead lines it is important to interpret the grain and pattern of the landscape. The landscape has a strong co-axial pattern E-W and N-S. Settlements also reflect this pattern. When establishing alignments they should seek to orientate and integrate with the grain through, for example, orientating along drainage ditches. However consultees noted that in some places it may be more appropriate to contrast with this grain where straight continuous lines may be over dominant.
- The ridges within the Somerset Levels are particularly sensitive.
- When considering types of mitigation, low height towers were considered unsuitable for the Somerset Levels. It was considered that they would be too 'horizontally dominant' for this wide, flat and open landscape.
- The hills bordering the Somerset Levels are a series of tors. They are distinctive individually and collectively. Potential effects on the views to, from and between these areas of high ground were noted.

- Views from the Polden Hills/Polden Ridge were highlighted as being of importance.
- Opportunities for mitigation should consider installing bird boxes or bat boxes on towers.
- The Great Crane Project on the Somerset Levels was highlighted as being important. A view was expressed that mitigation for a connection should support or investigate opportunities for synergy with that or similar projects.
- Bird migration on the levels could be affected by an overhead line. Assessments should analyse effects and the corridor with least effects be taken forward.
- Brent Knoll is an important Scheduled Monument and landmark. Potential effects on the setting and views to and from Brent Knoll were noted. Intervisibility between Brent Knoll and other high ground such as Crook Peak was also noted as being important.

Mendip Hills Area of Outstanding Natural Beauty (AONB)

- This is a nationally designated landscape; its statutory protection indicates high landscape value.
- It was considered that any connection through the AONB should be via underground cables as the whole of this designated landscape is extremely sensitive and national policy requires its protection.
- Soil depths were raised as being particularly shallow in the AONB which may provide constraint to underground cables. Soil depth analysis will be required. It was noted that this is generally on higher ground therefore a connection on lower ground along Corridor 1 or the eastern spur of Corridor 2 may be preferable.
- Mitigation through the AONB should include enhancement of the landscape consistent with the AONB Management Plan.
- Undergrounding should extend beyond the AONB boundary, respecting its setting and views from and to the AONB.
- The potential for visual impact of cables sealing end compounds (where underground cables connect to overhead lines) had been shown during the presentation on undergrounding. These potential effects either side of the AONB if underground cables were installed were discussed. Consultees suggested that these should be sited away from the M5 and that if underground cables were used in the Mendip Hills, consideration should be given to continuing to use them for the connection through the Somerset Levels.
- Historic quarries, usually from lead mining, are an important feature in the Mendip Hills with the resultant uneven ground known locally as 'gruffy ground'. This historic character is addressed in a Historic Landscape Policy. Consultees reinforced that it is important to not adversely affect these features.
- Views in and out of the AONB are important. Consultees stated that more receptors experience views to the northern edge of the AONB and could be adversely affected by the presence of a new 400kV overhead line.
- Cumulative adverse effects on the AONB of a new overhead line in combination with the M5 were noted as being important to consider.

North of Mendip Hills to Tickenham

- This is a landscape with a planned and organic pattern. Effects on the pattern of the landscape could result from an overhead line and routeing and pylon positions need careful consideration.
- Importance of the County Wildlife Sites (CWS) was raised and the need for them to be considered in future work was highlighted. Nationally protected species are often present in CWS particularly where they border the rhyne and ditch SSSIs.
- Use of underground cables in this area could have adverse effects on the SSSIs. These are noted for the importance of rhyne and ditches for invertebrates and plants.
- Opportunities for rationalisation of the low voltage electricity network should be reviewed as a form of mitigation.

Tickenham to Seabank

- The potential for cumulative effects of a new overhead line and wind farms in Avonmouth was highlighted.
- Opportunity for rationalisation of overhead lines was raised by consultees. National Grid should seek to reduce concentrations of lines through this area or as a minimum not increase the number of lines present.
- The importance of Mere Bank Scheduled Monument was highlighted.
- Rationalisation of lines around Portbury Nature Reserve should be investigated and opportunities considered to enhance the existing wildlife corridor.
- Consultees considered it important that Bristol City Council and North Somerset Council be involved in discussions on this area, English Heritage offered to host a meeting to discuss this section of the route in more detail.

Corridor Specific Points

Hinkley Line Entries

- The importance of the setting of Pixies Mound Scheduled Monument was noted and overhead line alignments should seek to maximise distance from it.
- The issue of visual effects on properties at Wick was raised and that these would increase if lines are moved further south to minimise effects on the setting of Pixies Mound.
- There is currently no breeding bird interest in the area of the line entries and so interests of the SPA/SAC are not likely to be directly affected. However bird interest may potentially increase through the ground becoming wetter due to implementing management agreements with landowners or through climate change.
- Visual impact related to the decommissioning of the existing nuclear power station was raised and timescales for operations queried. The timescale for when the remaining sections of lines would become redundant was also queried, with National Grid stating that the present overhead lines would be required for the Hinkley Point C connection but specific requirements would be reviewed as generation and demand changed.
- Presence of unknown archaeological assets was raised and the need for assessment was noted. On a previous underground pipeline project it was highlighted that evidence of Roman settlement was found approximately every kilometre along the route.
- Potential effect on bat movements resulting from the new overhead lines was raised.
- Consultees suggested that the lines should be sited on low ground close to Holford Stream (a culverted watercourse) to minimise visual effects.
- When siting towers National Grid should try and follow field patterns.
- Potential visual clutter created by the range of different tower designs at the site (including EDFs pylons) was highlighted. Coordination of design with EDF was considered to be important and opportunities for rationalisation and consistency of tower types should be investigated further by National Grid.
- Careful pylon siting was considered important to minimise visual effects resulting from the three line entries.
- Alternative tower designs were discussed to reduce visual effects. However it was noted that any alternative tower design employed at the line entries would also need to apply along the entire existing line to Bridgwater for consistency which it was agreed could introduce adverse effects particularly during dismantling the existing line and constructing a replacement. All agreed that it was important to keep the line design simple and coordinated rather than have different tower designs which would contribute to visual clutter.
- Assessment of visual impact of line entries should be carried out for different tower designs.
- The landscape here is a transition between the wild, natural coastline and planned and organised farmland and the connection design should respond appropriately.

Corridor 1, Option 1A

Bridgwater to Mendip Hills

- Views from M5 are considered important for visitors to Somerset and where possible an overhead line should be sited further from the motorway.
- One line through the landscape was considered to be preferable to two lines when considering effects on ecology.
- Views from properties and roads and public land in Mark village are sensitive to an overhead line which may pass very close to properties (as does the existing 132kV line). Modelling should be carried out to appropriately site towers.
- Mark Causeway was identified as an area where use of underground cables could reduce visual effects.
- Brent Knoll is an important Scheduled Monument and landscape feature. Its setting is important. An overhead line in Corridor 1 would need to be sited away from the motorway in the eastern part of the corridor to reduce effects on Brent Knoll.

Mendip Hills

- Max Bog SSSI is fed by a spring; if underground cables are to be installed assessment of effects on the SSSI would need to be considered.

North of Mendip Hills to Tickenham

- Corridor 1, Option 1A may involve the least scale of change and fewer effects on ecology as the 132kV line would be removed and the new 400kV line installed along its route.
- Rationalisation of lines around Nailsea was noted as being important. Where an existing line oversails properties it was highlighted as an opportunity to use underground cables and site new lines sited further from the settlement.
- Removal of both 132kV overhead lines and replacement with a single higher voltage line if possible was highlighted as potentially offering benefits to the current situation.

Tickenham to Seabank

- No specific comments were raised for Corridor 1, Option 1A in this section.

Corridor 1, Option 1B

Bridgwater to Mendip Hills

- Comments for this section related to Corridor 1 more generally and have been described above for Corridor 1, Option 1A although it was generally considered that one line would be preferable to the two lines which would result if this option was taken forward.

Mendip Hills

- Consultees expressed concerns on adverse effects on the AONB from a second line and considered this to be unacceptable within a nationally designated landscape.

North of Mendip Hills to Tickenham

- No specific comments relating to this option were raised, comments relating to Corridor 1 in general are described for Corridor 1, Option 1A above.

Tickenham to Seabank

- No specific comments were raised for Corridor 1, Option 1B in this section.

Corridor 2

Bridgwater to Mendip Hills

- There are some Roman buildings of heritage importance north of King Sedgemoor Drain. This area is known to have high archaeological potential with an Iron Age settlement having recently been discovered. This area is sensitive and would require full archaeological assessment.

- Corridor 2 is close to the Somerset Levels and Moors Ramsar, SPA, SSSI and Ramsar and may have greater effects than Corridor 1 for bird strike particularly at night. Further assessment of this is required.
- Effects on bats may also be greater along this corridor although effects will vary depending on species.
- Potential for intact buried archaeology is typically higher on peat based ground which is more concentrated in Corridor 2 although also present in parts of Corridor 1. It could also pose greater challenges to construction of towers.
- It was noted that one overhead line was better than two. However if an option taken forward resulted in two lines then they should be routed as far apart as possible.

Mendip Hills

- Consultees expressed concerns on potential adverse effects on the AONB from a second line and considered this to be unacceptable within a nationally designated landscape.
- Effects on views and the perception of the AONB and Somerset if a line was close to the M5 was raised. It was felt that the line should be sited away from the M5.
- The western spur of Corridor 2 passes close to Banwell Caves SSSI and SAC. Risk of adverse effects on Greater Horseshoe Bat movements between the cave, Crooke Peak and Cheddar were highlighted.

North of Mendip Hills to Tickenham

- Effects of new lines in the landscape were considered to be greater along Corridor 2 with lines potentially urbanising the countryside.
- Consultees queried whether corridors could be 'mixed and matched' to allow alignments to avoid ecologically sensitive sites.
- The view to Clevedon from Tickenham Ridge was considered to be an important approach into Somerset. Siting an overhead line close to the motorway would introduce adverse effects on these views.
- The settlements of Backwell and Nailsea are particularly sensitive to a new overhead line.
- Potential effects on Greater Horseshoe Bats were highlighted.
- Potential effects on Tyntesfield Registered Park and Garden were noted particularly along Corridor 2 where a line would be across the top of Tickenham Ridge and could give rise to greater effects than Corridor 1.
- Corridor 2 avoids more designated ecological sites so could have less effects on ecology. However this needs to be balanced by the adverse effects created by an additional overhead line in the landscape.
- Land close to the motorway was considered to be sensitive and would be adversely affected by a line along this corridor.

Tickenham to Seabank

- No specific comments were raised for Corridor 2 in this section.