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Executive Summary

This Technical Note has been produced to provide details of the peak or maximum noise levels that would be anticipated during construction in the vicinity of Hintlesham Woods Site of Special Scientific Interest (SSSI) and the effects of this on breeding birds using the SSSI, including nightingale (*Luscinia megarhynchos*). This technical note supplements the information provided in the Environmental Statement.

This Technical Note was prepared for Deadline 3 but has been updated at Deadline 9 to include the results of further assessment work undertaken in response to discussions with Natural England and the Royal Society for the Protection of Birds (RSPB) and to include the commitments that have been agreed through these discussions.

The further assessment work presented at Deadline 9 has included a review of the activities that would need to take place during an electrical outage and within the bird breeding season. This has identified that temporary pylon RB12T could be constructed and later removed outside of the bird breeding season, but that permanent pylon RB11 would need to be constructed during bird breeding season. The Applicant has updated the wording of embedded measure EM-AB09 to reflect this:

EM-AB09: *For the construction works in and around Hintlesham Woods (between pylons 4YL011 and 4YL017A) construction works will be undertaken outside of bird breeding season except for the following activities which need to take place within agreed outages:*

- *Install conductors / transposition works; and*
- *Construction of pylon 4YL012A and RB11, and removal of the existing pylon 4YL012.*

The construction of pylon RB11 is the closest new pylon to be constructed to the SSSI boundary in the bird breeding season and construction of its foundations are potentially the noisiest activity to be undertaken. The **average** noise levels predicted at the edge of Hintlesham Woods SSSI due to the construction of the foundations of pylon RB11 using percussive piling were modelled as approximately 57 dBA at 260m from the source (see ES Chapter 7: Biodiversity [REP6-009]). This is below the 70dB threshold level identified by Cutts *et al.*, (2009) where a behavioural response by birds to noise could be expected.

The calculation of **maximum** sound levels from the construction of the foundations of RB11 using percussive piling was higher than the 70dB threshold in the absence of any best practicable means (BPM) and using the worst-case (hard ground) scenario. Therefore, the Applicant has reviewed the available geotechnical ground investigation results around Hintlesham Woods SSSI and has committed to using an alternative (lower noise) foundation construction method than percussive piling at RB11 and 4YL012A, as both would need to be constructed during an outage.

The following measure (EM-AB14) has been added to the Register of Environmental Actions and Commitments: *'Percussive piling will not be used to construct the foundations of pylons RB11 (607007, 243509) and 4YL012A (607097, 243668), to reduce the maximum (peak) noise levels associated with this construction method to avoid subsequent disturbance on breeding birds at Hintlesham Woods SSSI.'*

The Applicant acknowledges that there will be construction activities within bird breeding season both within Hintlesham Woods SSSI (e.g. conductor works) and for new pylons around the woods. Noise will be generated from these activities, the Applicant has therefore made two further commitments relating to noise levels at Hintlesham Woods SSSI as follows:

- *EM-AB19: Breeding bird surveys of Schedule 1 bird species and nightingale will take place at Hintlesham Woods (Ramsay Wood and Hintlesham Little Wood only) in the bird breeding season: prior to construction; during construction; and for one year after construction subject to landowner agreement. Three surveys will be undertaken each season and the data shared with Natural England and RSPB on completion of the third survey each season.*
- *EM-AB20: A Hintlesham Woods SSSI Construction Noise Monitoring Plan will be developed for the construction activities taking place in bird breeding season around Hintlesham Woods SSSI. The plan will be submitted to Natural England and the Royal Society for the Protection of Birds prior to construction works commencing in this area during bird breeding season. The Noise Monitoring Plan will include:*
 - *Details of the noise monitoring to be undertaken (including location of monitoring equipment, frequency of noise peaks and duration); and*
 - *Additional mitigation that would be implemented should noise levels exceed 70dB at the SSSI boundary from construction of pylon RB11 (see EM-AB14).*

The commitments are secured in the REAC which has been updated at Deadline 9 (**document 7.5.2 (F)**).

1. Introduction

1.1 Purpose of the Technical Note

1.1.1 This Technical Note has been produced to provide details of the peak or maximum noise levels that would be anticipated during construction in the vicinity of Hintlesham Woods Site of Special Scientific Interest (SSSI) and the effects of this on breeding birds using the SSSI. Natural England noted in their relevant representation [RR-042], that the assessment of noise effects on breeding birds in the application for development consent presented average noise levels rather than maximum noise levels.

1.1.2 Natural England's Relevant Representation [RR-042] stated the following:

'The noise assessment in ES Chapter 14: Noise and Vibration (application document 6.2.14) and the interpretation of this assessment in Document 6.3.7.1.2: ES Appendix 7.1 – Annex B Hintlesham Woods SSSI Assessment, should be revised to include peak values as well as average sound power values. This is because sudden, unpredictable loud noises are more likely to startle birds and cause an escape flight response. It would be expected that peak sound power levels would be provided to determine the impact from noise disturbance on breeding birds. The potential 'startle effect' can be assessed using maximum noise level (L_{Amax}) and peak sound pressure (L_{Apeak}). The difference between L_{Apeak} and L_{Amax} shows the 'rise time' of the noise signal, which is likely to be an important factor with respect to the potential for the noise to disturb birds.

Further assessment of the impacts of construction works on birds during the breeding season is required. Natural England is particularly concerned about the impact to the nightingale population, which Natural England has been notified by the RSPB has declined significantly. Paragraph 4.3.8 of Hintlesham Woods SSSI Assessment (document 6.3.7.1.2) suggests the woodland would buffer some of the construction noise. However, this is not the case for the nightingale, which the surveys reported in the Species Baseline Report (document 6.3.7.2) have identified are located on the edge of the woodland on the side where the works will occur.

Mitigation – Following the mitigation hierarchy, the first preference would be for all works to be completed outside the bird breeding season (March to August, inclusively). However, Natural England acknowledges there are constraints due to some works having to be undertaken during power outages during the summer months. We would therefore advise that the schedule of works during the bird breeding season is further considered to avoid all construction works between April and June, which is the peak breeding season for nightingale. Avoidance of July would also be recommended due to the potential for second broods'.

1.1.3 The Royal Society for the Protection of Bird (RSPB) has noted in the Statement of Common Ground (SoCG) [REP1-028] that the noise assessment should be based on maximum noise levels, rather than average noise levels, as impulsive noise is likely to have the greatest impact and that mitigation should be proposed to avoid impacts as far as possible.

1.2 Updates to the Technical Note

1.2.1 This Technical Note was prepared for Deadline 3 but has been updated at Deadline 9 to include the results of further assessment work undertaken in response to discussions with Natural England and RSPB and to include the commitments that have been agreed through these discussions.

1.2.2 To avoid and reduce effects on breeding birds at Hintlesham Woods, National Grid committed to limiting the activities that can take place within the bird breeding season (March to August, inclusive) to those works that would require an electrical outage. Embedded measures are detailed in the Register of Environmental Actions and Commitments (REAC) (**document 7.5.2 (F)**).

1.2.3 The further assessment work undertaken for Deadline 9 has included a review of the construction activities that would need to take place during an electrical outage which may align with the bird breeding season. This review has identified that temporary pylon RB12T could be constructed and later removed outside of the bird breeding season, but that permanent pylon RB11 would need to be constructed during an electrical outage. RB11 is further away from the SSSI boundary than temporary pylon RB12T and is a permanent pylon so would not require a later removal. The Applicant has updated the wording of embedded measure EM-AB09 in the REAC to reflect this:

For the construction works in and around Hintlesham Woods (between pylons 4YL011 and 4YL017A) construction works will be undertaken outside of bird breeding season except for the following activities which need to take place within agreed outages:

- *Install conductors / transposition works; and*
- *Construction of pylon 4YL012A and RB11, and removal of the existing pylon 4YL012.*

1.3 Existing Information

Breeding Bird Baseline

1.3.1 This Technical Note considers the noise effects on woodland breeding birds in general, which could be present anywhere within the woods. However, Natural England notes in its Relevant Representation [**RR-042**], that it is particularly concerned about the impact to the nightingale (*Luscinia megarhynchos*) population at Hintlesham Woods SSSI. Environmental Statement (ES) Figure 7.2.4 [**APP-149**] shows nightingale to be present along the north-east edge of the woods. This Figure is reproduced in Appendix A of this Technical Note for ease of reference. Therefore, the assessment in this Technical Note in some places references the shortest distance to the woodland (for breeding birds in general) and also the distance to the nightingale habitat, where different.

1.3.2 Nightingale, migrate to the UK to breed between April and June. Migration back to African wintering grounds starts in July. Joys and Crick (2004) suggest that first egg clutches of nightingale occur between the 5 May and 6 June, most likely in mid-May. Incubation of eggs takes around 14 days while the fledging period is an additional 13 days (British Trust of Ornithology (BTO), 2023).

Noise Assessment (Average Noise Levels)

- 1.3.3 Information regarding construction noise levels is provided in ES Appendix 14.1: Construction Noise and Vibration Data [APP-136]. These values were provided as average noise levels, based on data provided in British Standard (BS) 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise (BS 5228-1).
- 1.3.4 The **average** noise levels predicted in the ES at the edge of Hintlesham Woods SSSI due to the construction of the foundations of pylon RB11 (which is the closest noisy activity that would occur within the bird breeding season) were approximately 57dBA. This is shown on ES Figure 7.1.8 [APP-149], which is reproduced in Appendix A of this Technical Note. This noise level assumed percussive piling of the foundations as a reasonable worst-case. Average noise levels during conductor tensioning would be 52dBA. The calculations assumed hard ground as a reasonable worst-case.
- 1.3.5 The potential impact of average noise on breeding birds at Hintlesham Woods SSSI is presented in ES Appendix 7.1 Annex B: Hintlesham Woods SSSI Assessment (**document 6.3.7.1.2 (B)**) and in ES Chapter 7: Biodiversity [REP6-009], specifically paragraphs 7.6.20 to 7.6.28. This concluded in paragraph 7.6.28 that *‘although works would unavoidably need to be scheduled during bird breeding season, the potentially disturbing construction activities would be at distance where disturbance to breeding birds would be limited. As a result, there would be an impact of small magnitude which would result in a minor adverse effect, which would be not significant’*.

2. Methodology

2.1 Scope of the Assessment (Maximum Noise Levels)

- 2.1.1 This Technical Note describes the prediction of maximum (peak) sound levels at Hintlesham Woods SSSI associated with the works that need to take place within bird breeding season (i.e. those exceptions in EM-AB09). It focuses on the construction of pylon RB11, which lies approximately 260m to the north of Hintlesham Wood SSSI, and approximately 360m to the east of Ramsey Wood, which is known to support nightingale. Pylon RB11 is the closest new pylon to the SSSI boundary that relies on an electrical outage for construction and therefore would need to be constructed during bird breeding season.
- 2.1.2 This Technical Note also considers the maximum noise levels associated with the removal of pylons, the installation of conductors, and the transposition works.

2.2 Noise Modelling

- 2.2.1 The calculation of maximum sound levels has been based on the methodology described in Annex F of BS 5228-1, which predicts average noise levels from construction activities, with corrections added to convert to maximum sound levels. There are no direct relationships between average and maximum sound levels from construction noise. As such, maximum sound levels have been predicted at the edge of Hintlesham Woods SSSI based on available information, empirical formulas, and professional judgement.
- 2.2.2 The predicted average sound levels considered in the application for development consent, considered the percentage 'on-time' of each plant item. Maximum sound levels would be the same irrespective of the percentage 'on-time'. As such, a 100% 'on-time' is assumed when considering maximum levels to remove the effect of averaging over the assessment period required for a 'standard' construction noise assessment.
- 2.2.3 With regards to percussive piling activities, the methodology set out in Section 8.5.2.5 of BS 5228-1 has been used to convert average sound levels from piling activities ($L_{Aeq,T}$) into $L_{A01,T}$ values, which is the sound level exceeded for only 1% of the time. This may be regarded as a 'typical' maximum. The $L_{A01,T}$ value is dependent on the number of blows per minute, whereas the maximum value would be relative static. As such, the worst-case correction value of 11dB has been added to average value, which will therefore tend towards the maximum value. Actual maximum values would be expected to be slightly higher by between 2 and 5dB based on professional judgement.
- 2.2.4 For most non-percussive activities, such as for standard foundation construction or non-percussive piling foundation construction and conductor pulling, noise levels would be expected to be relatively steady during works when the plant is operating. As noted above, assuming a 100% 'on-time' removes the effects of averaging over the assessment period and would therefore be considered a typical maximum. However, some natural variation in noise level would be expected which would lead to maximum noise levels slightly higher than the 100% 'on-time' level. Actual maximum values would be expected to be slightly higher by up to approximately 5dB based on professional judgement.
- 2.2.5 There are certain activities which may involve 'clanking' or loading activities with 100% 'on-time', maximum values would be expected to be approximately 10dB higher than average levels based on professional judgement.

2.2.6 For the purposes of the initial assessment, it is assumed that the ground is acoustically hard, as a worst-case. It is also assumed that there is no mitigation applied in the calculations. With mitigation in the form of best practicable means (BPM), noise levels would be lower.

2.3 Disturbance Levels

2.3.1 As detailed in paragraph 7.6.23 of ES Chapter 7: Biodiversity [REP6-009], although there is limited published guidance on disturbance thresholds for woodland birds, there is advice on 100m to 250m buffer considerations for a range of British raptor species such as red kite, buzzard and hobby (Goodship *et al.*, 2002) in Scottish forests. Goodship *et al.*, (2022), while not publishing the size of disturbance buffer zones required around nightingale nests, do provide indicative distances for nightjar *Caprimulgus europaeus* which are similarly ground nesting and summer migrant birds that breed in this region of the UK. The advised buffer zone for nightjar is 150m.

2.3.2 A study on the effects of construction noise for waterbirds identified 70dB and above as generating an impact on bird activity (Cutts *et al.*, 2009). Sound levels of 70dB L_{Amax} were considered to be above the level that would initiate a behavioural response by birds and below the level that initiates flight responses in most cases. Sound levels above 85dB would cause bird movement with them still remaining on site (see Table 2.1 below). In addition, commercial bird scarers are sold with effectiveness over 100dB (with possible reaches of 155dB) (Rutland County Council, n.d.) suggesting that sound levels lower than 100dB from these are unlikely to generate the desired response.

2.3.3 Wright *et al.*, (2010) specifically considered impulsive sources of noise such as piling and also identified 70dB as a level that could cause flight responses with return to original locations in the majority of species. Postlethwaite and Stephenson (2012) concluded that 70dB would be very precautionary, and a level 10dB higher would still be a precautionary level indicator of bird behavioural changes in relation to percussive piling noise. A historical report, (Owens, 1977), showed that the first gunshots at a nearby gun range caused birds to disperse from their site but they quickly returned and ignored subsequent firings that day. The 70dB level was used in ES Chapter 7: Biodiversity [REP6-009] as a precautionary threshold level.

Table 2.1 – Noise Impact Criteria – Construction Noise (from Cutts *et al.*, 2009)

Impact	L_{Amax}
No impact	Below 50 dB
Behavioural changes (alarm calls, heads up, change in feeding/roosting activity)	Equal or less than 70 dB
Movement within area	Above 70 dB
Movement out of area but remaining on site	Above 85 dB
Movement off site	Not defined

2.3.4 The links between visual and audible stimuli are evident throughout (Cutts *et al.*, 2009) and it is clear that noise by itself is not necessarily a cause for disturbance if not accompanied by a perceived visual threat. Blumstein *et al.*, (2005) identified that across 150 avian species, that larger species had greater alert distances than smaller species. As a smaller species, certainly smaller than that majority of water birds, it would be anticipated that nightingale would have a higher tolerance to such potential disturbance.

- 2.3.5 There is likely to be some existing impulsive noise disturbance from ongoing agricultural activities around Hintlesham Woods SSSI. For example, commonly used farm machinery used for seeding, spraying, fertilising and harvesting arable land, such as to the north of Hintlesham Woods SSSI, are likely to generate noise around 80dB (sound level of tractor at 10m as detailed in BS 5228-1, Table C.4 ref: 74). Some of these agricultural activities are likely to take place during bird breeding season.
- 2.3.6 Deer cull activity has also been confirmed within Hintlesham Woods SSSI which, depending on deer species, can occur during the bird breeding season. Should this occur, impulsive noise disturbance from gunfire would be in the order of 115dB approximately 1m from source and exceeding 70dBA within approximately 200m.

2.4 Assumptions and Limitations

- 2.4.1 Sound levels are based on available plant data from BS 5228-1 or manufacturers data, as appropriate. The maximum noise level calculation methodology is described in Section 2.2. The initial assessment assumes no mitigation (e.g. screening, alternative methods). In practice, mitigation in the form of BPM would be employed to reduce noise levels.
- 2.4.2 The published guidance around disturbance thresholds on birds is centred around waterbirds. However, this is deemed appropriate to use in relation to passerine species, as a precautionary approach, in the absence of specifics relating to woodland bird species.

2.5 Soft Ground Reduction

- 2.5.1 The type of ground over which the sound is travelling effects the propagation of sound. Acoustically 'soft' ground, (such as grassland, ploughed fields etc.) is more absorbent of sound energy than acoustically 'hard' surfaces (e.g. concrete, water, paved areas). Consequently, noise propagating over acoustically hard ground results in a higher noise level than over acoustically soft ground at the same distance. The rate in reduction of noise level depends on the frequency of the sound and the qualities of the ground it interacts with.
- 2.5.2 For the purposes of this assessment, it is assumed that the ground is acoustically hard as a worst-case, as this may be the case if the ground is wet or frozen. However, in practice the ground would typically be considered acoustically soft and frozen ground would be highly unlikely during the bird breeding season. As such, resultant noise levels would be expected to be lower by approximately 0dB at 25m, 3dB 100m, and 5dB at 300m, based on the sound propagation calculation methodology described in Annex F of BS 5228-1.

3. Noise Assessment

3.1 Pylon Construction

Design Assumptions

- 3.1.1 The assumption used in the ES in relation to pylon construction was that the foundations would be constructed using percussive piling. This was assumed in the ES to be a worst-case assumption. This construction method is assumed to have a maximum noise level at a distance of 10m of 103dBA (based on an average noise level of 88 dBA at 11m based on data from Annex C of BS 5228-1, reference C3.8, plus a correction of 15dB to estimate the maximum sound level).
- 3.1.2 Pylon RB11 (located at NGR 607007, 243509) is now considered to be the closest pylon to the SSSI boundary that relies on an electrical outage for construction and therefore may need to be constructed during bird breeding season. RB11 is approximately 260m away from Hintlesham Woods SSSI at the closest point and 360m from the north-eastern edge of Ramsey Wood. This pylon (RB11) is shown on ES Figure 7.1.8 [APP-149], which is reproduced in Appendix A of this Technical Note.
- 3.1.3 The initial assessment presented below assumes percussive piling would be required to construct pylon RB11, using the assumptions described in paragraph 3.1.3 above. The initial assessment also assumes no mitigation (e.g. screening, alternative methods) or BPM.

Noise Assessment

- 3.1.4 Assuming a 100% 'on-time' (see Section 2.), the average noise level from percussive piling would be 57dBA at the edge of Hintlesham Woods SSSI, at a distance of 260m (see Table 3.1). Maximum values would be expected to be in the order of 78dB $L_{Amax,T}$ at the edge of the woods. Noise levels would be lower at greater distances.

Table 3.1 – Modelled Noise (dB) for Percussive Piling

Distance from Noise source	Average Activity Noise at Receptor, dB $L_{Aeq,T}$	100% 'on-time' average, dB $L_{Aeq,T}$	Predicted Maximum Activity Noise Level, dB $L_{Amax,T}$	
			Hard Ground	Soft Ground
260m	57	63	78	73
360m	54	60	75	70

3.2 Pylon Dismantling/Removal

Design Assumptions

- 3.2.1 Existing pylon 4YL012 would be removed as part of the works. This would involve dismantling of the pylon and associated conductors and fittings, cutting up of the pylon structure for removal from site and removal of the concrete foundation. Pylon 4YLA012 is located at NGR 607071, 243649 approximately 360m away from Hintlesham Woods SSSI at the closest point and 490m from the north-eastern edge of Ramsey Wood. This pylon is shown on ES Figure 7.1.8 [APP-149], which is reproduced in Appendix A of this Technical Note.

Noise Assessment

- 3.2.2 Assuming a 100% 'on-time' (see Section 2), the highest average noise level from pylon dismantling and removal would be 57dBA from the loading of dump trucks, at the edge of Hintlesham Woods SSSI at a distance of 360m (see Table 3.2). Maximum sound levels would be expected to be approximately 10dB higher due to 'clanking' (as described in paragraph 2.2.5) and would therefore be expected to be in the order of 67dB $L_{Amax,T}$ at the edge of the woods. Noise levels would be lower at greater distances.
- 3.2.3 Maximum noise levels from pylon dismantling, cutting up of steel, and breaking concrete would be expected to be in the order of 55dB, 64 dB, and 59dB, respectively, at the edge of Hintlesham Woods.

Table 3.2 – Modelled Noise (dB) for Pylon Dismantling/Removal at 4YL012

Activity	Distance from Noise source	100% 'on-time' average, dB $L_{Aeq,T}$	Predicted Maximum Activity Noise Level, dB $L_{Amax,T}$	
			Hard Ground	Soft Ground
Pylon dismantling	360m	45	55	49
Cutting up steel	360m	54	64	58
Breaking concrete base	360m	44	59	53
Loading dump trucks	360m	57	67	61

3.3 Installation of Conductors and Transposition Works

Design Assumptions

- 3.3.1 Conductors would be installed in sections between angle/tension pylons where the overhead line changes direction. A pulling site would be established at one end of the section with the conductors running out from a tensioning site at the other end of the section. In order to install the conductors, pilot wires would be run along the length of the section between the pulling site and the tension site. At each intermediate pylon the pilot wire would go up through the running wheels located either at the end of the insulator set or under the pylon cross arm. The tensioning machine keeps the pilot wire and conductors off the ground and clear of any obstacles.

- 3.3.2 When the conductor is installed for the section, it would be fastened at its finished tension and height above ground by construction workers working from temporary platforms on the pylons. The conductor would be tensioned to provide the correct sag profile and the ends jointed onto the tension insulators. The pulling machine sites are normally placed at a position approximately 1-2 times the pylon height, at a position in line with, and behind, the first and last pylons in the section being pulled.
- 3.3.3 Pulling and tensioning would be required on the northern circuit to the north of Hintlesham Woods and also on the circuit through the woods. Pulling and tensioning is proposed at pylons RB10 (NGR 607286, 243684) and RB16 (NGR 606275, 241894). Pylon RB10 is located approximately 330m from Hintlesham Woods SSSI to the north at the closest point and 700m away from the eastern edge of the SSSI which contains records of the presence of breeding nightingale. Pylon RB16 is located south-west of Hintlesham Woods SSSI, approximately 700m from the closest edge of the woods. Pylon RB10 and RB16 are shown on ES Figure 7.1.8 [APP-149], which is reproduced in Appendix A for ease of reference.

Noise Assessment

- 3.3.4 There would be some variation in noise levels during the conductor tensioning processing. In the Scenario above, assuming a 100% 'on-time' for all plant, this would result in a predicted average noise level of 53dBA at the nearest edge of Hintlesham Woods SSSI (see Table 3.3). However, it is anticipated that there would be some natural variation in noise level during these activities, resulting in slightly higher maximum values. It is assumed that this value would be in the order of 5dB. Maximum sound levels are likely to be in the order of 58dB $L_{Amax,T}$ at the edge of Hintlesham woods SSSI. Sound levels would be lower at greater distances. Records of breeding nightingale are at additional distance (approximately 360m) and therefore would experience reduced exposure to the noise source.
- 3.3.5 There would be some variation in noise levels during the conductor processing fitting. Assuming a 100% 'on-time' for all plant, this would result in a predicted average noise level of 56dBA for RB11 at the nearest edge of Hintlesham Woods SSSI. However, it is anticipated that there would be some natural variation in noise level during these activities, resulting in higher maximum values for potentially very short durations. It is assumed that this value would be in the order of 10dB due to potential for 'clanking'.

Table 3.3 – Modelled Noise (dB) for Conductor Tensioning

Activity	Distance from Noise source	100% 'on-time' average, dB $L_{Aeq,T}$	Predicted Maximum Activity Noise Level, dB $L_{Amax,T}$	
			Hard Ground	Soft Ground
Cable Tensioning	330m (existing pylon RB10)	53	58	52
	700m (proposed pylon RB16)	46	51	44

4. Impact Assessment

4.1 Pylon Construction

- 4.1.1 The closest boundary edge of the Hintlesham Woods SSSI (supporting the breeding bird assemblage, including nightingale) to pylon RB11 construction (noise source) is approximately 260m. The maximum noise levels from the pylon foundation construction using percussive piling at this distance is 78dB (Table 4.1) without mitigation. 78dB exceeds the 70dB disturbance threshold published by Cutts *et. al.* (2009). where behavioural changes may be seen by birds but there would be no active movement away from the area, at the edge of the woodland. Therefore, further assessment has been undertaken to consider alternative construction techniques that could be used instead of percussive piling (a worst case scenario assumed in the EIA) to construct the foundations at this pylon.
- 4.1.2 An alternative method using standard foundations (see paragraph 4.6.9 in ES Chapter 4: Project Description [APP-072]) could be used to construct pylon RB11. Similarly, non-percussive piling techniques may be used, such as rotary bored piles. The maximum noise levels associated with these methods are presented in Table 4.1. This shows that the noise levels would be considerably lower than the 70dB disturbance threshold published by Cutts *et. al.* (2009).

Table 4.1 – Modelled Noise (dB) for Alternative Construction Techniques at RB11

Method	Distance from Noise source	100% 'on-time' average, dB L _{Aeq,T}	dB L _{Amax,T} (Hard Ground)	dB L _{Amax,T} (Soft Ground)
Pad foundation	360m	48	53	47
	260m	54	59	54
Rotary Bored	360m	48	53	47
	260m	51	56	51

- 4.1.3 The Applicant has reviewed the available ground investigation results in the location of pylons RB11 and 4YL012A. This shows that standard foundations or non-percussive piling (which is much quieter) would be suitable in the expected ground conditions rather than the worst case (percussive piling) foundation construction method assumed in the EIA. The Applicant can therefore commit to using an alternative (lower noise) method than percussive piling for foundation construction at these pylons. The Applicant has updated EM-AB14 in the REAC submitted at Deadline 9 (**document 7.5.2 (F)**) to say:

'Percussive piling will not be used to construct the foundations of pylon RB11 (607007, 243509) and 4YL012A (607097, 243668), to reduce the maximum (peak) noise levels associated with this construction method to avoid subsequent disturbance on sensitive species at Hintlesham Woods SSSI.

- 4.1.4 With the above measure in place, the maximum sound levels at the SSSI (both closest point and at the locations with nightingales present) is anticipated to be considerably lower than the 70dB disturbance threshold published by Cutts *et. al.* (2009) and would avoid disturbance to breeding birds.

4.2 Pylon Dismantling/Removal

4.2.1 For the dismantling and removal works, noise would be generated in the bird breeding season at pylon 4YL012, which would be approximately 360m away from Hintlesham Woods at its closest point. The highest predicted maximum noise level is 67dB (Table 3.2) from the loading of dump trucks with waste materials. This is below 70dB disturbance threshold published by Cutts *et al.* (2009) and would avoid disturbance to breeding birds.

4.3 Installation of Conductors and Transposition Works

4.3.1 For the installation of conductors and transposition works, noise would be generated in the bird breeding season at pylon locations and at the pulling sites. A pulling site would be located at the new permanent pylon RB10 which would be approximately 330m away from Hintlesham Woods at its closest point. With regards to cable tensioning, at a distance of 330m from pylon RB10, the predicted maximum sound level would be 58dB. A further pulling site would be located at pylon RB16, approximately 700m to the closest edge of the woods. At this distance the predicted maximum noise level would be 51dB. For both pulling locations, the maximum sound level is at least 10dB lower than the 70dB published by Cutts *et al.* (2009).

4.3.2 Pulling and tensioning will also be required on the northern circuit to the north of Hintlesham Woods and the conductor fitting works could also result in short duration 'clanking' at the pylon locations, which could lead to isolated peaks at or around 70dB.

4.3.3 The Applicant acknowledges that there will be construction activities within bird breeding season both within Hintlesham Woods SSSI (e.g. conductor works) and for new pylons around the woods for conductor fitting and pulling sites. Noise will be generated from these activities. National Grid will work with the contractor to understand the likely level, frequency and duration, and the exact working methods and timing within the agreed outage windows. As this information is not currently available, and also due to the limited number of studies that have been undertaken to understand how birds are affected by construction noise, the Applicant has made two further commitments relating to noise levels at Hintlesham Woods SSSI as follows:

- *EM-AB19: Breeding bird surveys of Schedule 1 bird species and nightingale will take place at Hintlesham Woods (Ramsay Wood and Hintlesham Little Wood only) in the bird breeding season: prior to construction; during construction; and for one year after construction subject to landowner agreement. Three surveys will be undertaken each season and the data shared with Natural England and RSPB on completion of the third survey each season.*
- *EM-AB20: A Hintlesham Woods SSSI Construction Noise Monitoring Plan will be developed for the construction activities taking place in bird breeding season around Hintlesham Woods SSSI. The plan will be submitted to Natural England and the Royal Society for the Protection of Birds prior to construction works commencing in this area during bird breeding season. The Noise Monitoring Plan will include:*
 - *Details of the noise monitoring to be undertaken (including location of monitoring equipment, frequency of noise peaks and duration); and*
 - *Additional mitigation that would be implemented should noise levels exceed 70dB at the SSSI boundary from construction of pylon RB11 (see EM-AB14).*

4.3.4 The commitments are secured in the REAC which has been updated at Deadline 9 (**document 7.5.2 (F)**).

5. Conclusion

- 5.1.1 As set out in ES Appendix 7.1 Annex B: Hintlesham Woods SSSI Assessment (**document 6.3.7.1.2 (B)**), the Applicant has sought to limit the works within bird breeding season around Hintlesham Woods SSSI through updating embedded measure EM-AB09 in the REAC (**document 7.5.2 (F)**). However, there are still a limited number of activities that need to take place during an agreed electrical outage when electricity demand is at its lowest and therefore would need to take place during bird breeding season.
- 5.1.2 The following commitments have been made in response to the additional assessment that has been undertaken to further reduce the effects of the project on breeding birds at Hintlesham Woods SSSI and are secured in the REAC (**document 7.5.2 (F)**):
- *EM-AB09: For the construction works in and around Hintlesham Woods (between pylons 4YL011 and 4YL017A) construction works will be undertaken outside of bird breeding season except for the following activities which need to take place within agreed outages:*
 - *Install conductors / transposition works; and*
 - *Construction of pylon 4YL012A and RB11, and removal of the existing pylon 4YL012.*
 - *EM-AB14: ‘Percussive piling will not be used to construct the foundations of pylon RB11 (607007, 243509) and 4YL012A (607097, 243668), to reduce the maximum (peak) noise levels associated with this construction method to avoid subsequent disturbance on sensitive species at Hintlesham Woods SSSI’.*
 - *EM-AB19: Breeding bird surveys of Schedule 1 bird species and nightingale will take place at Hintlesham Woods (Ramsay Wood and Hintlesham Little Wood only) in the bird breeding season: prior to construction; during construction; and for one year after construction subject to landowner agreement. Three surveys will be undertaken each season and the data shared with Natural England and RSPB on completion of the third survey each season.*
 - *EM-AB20: A Hintlesham Woods SSSI Construction Noise Monitoring Plan will be developed for the construction activities taking place in bird breeding season around Hintlesham Woods SSSI. The plan will be submitted to Natural England and the Royal Society for the Protection of Birds prior to construction works commencing in this area during bird breeding season. The Noise Monitoring Plan will include:*
 - *Details of the noise monitoring to be undertaken (including location of monitoring equipment, frequency of noise peaks and duration); and*
 - *Additional mitigation that would be implemented should noise levels exceed 70dB at the SSSI boundary from construction of pylon RB11 (see EM-AB14).*

References

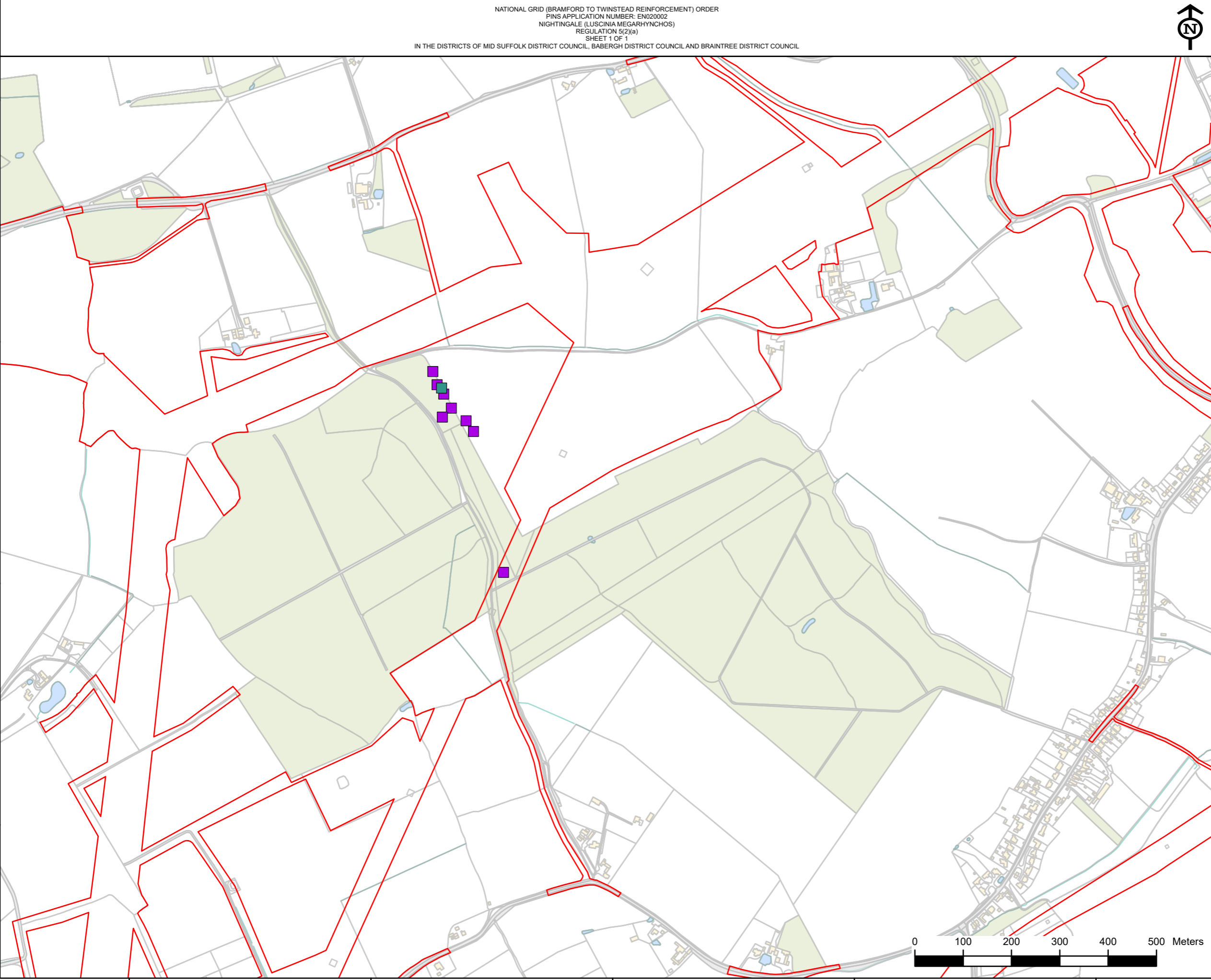
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Appendix A: Figures

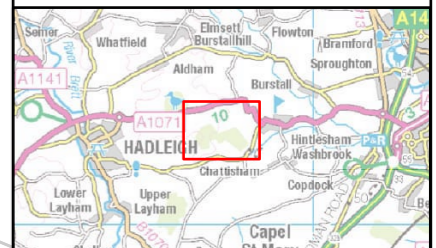


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- Order Limits
- Adult - unidentified sex
- Adult male



NG Investment No. ETX/01142

A	02/2023	Rev A for DCO Application	PM	LG	CW
ISSUE	DATE	REMARKS	DRWN	CHKD	APPD

PROJECT: **Bramford to Twinstead Reinforcement**

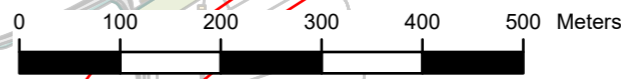


TITLE:
7.2.4 Nightingale
(Luscinia megarhynchos)

CIRCUIT / SITE :
Bramford – Pelham & Bramford
– Braintree – Bulls Lodge

ORIGINATOR DRAWING NO.
 AAA_BTT_BreedingBirds_Fig7_2_4_Rev01

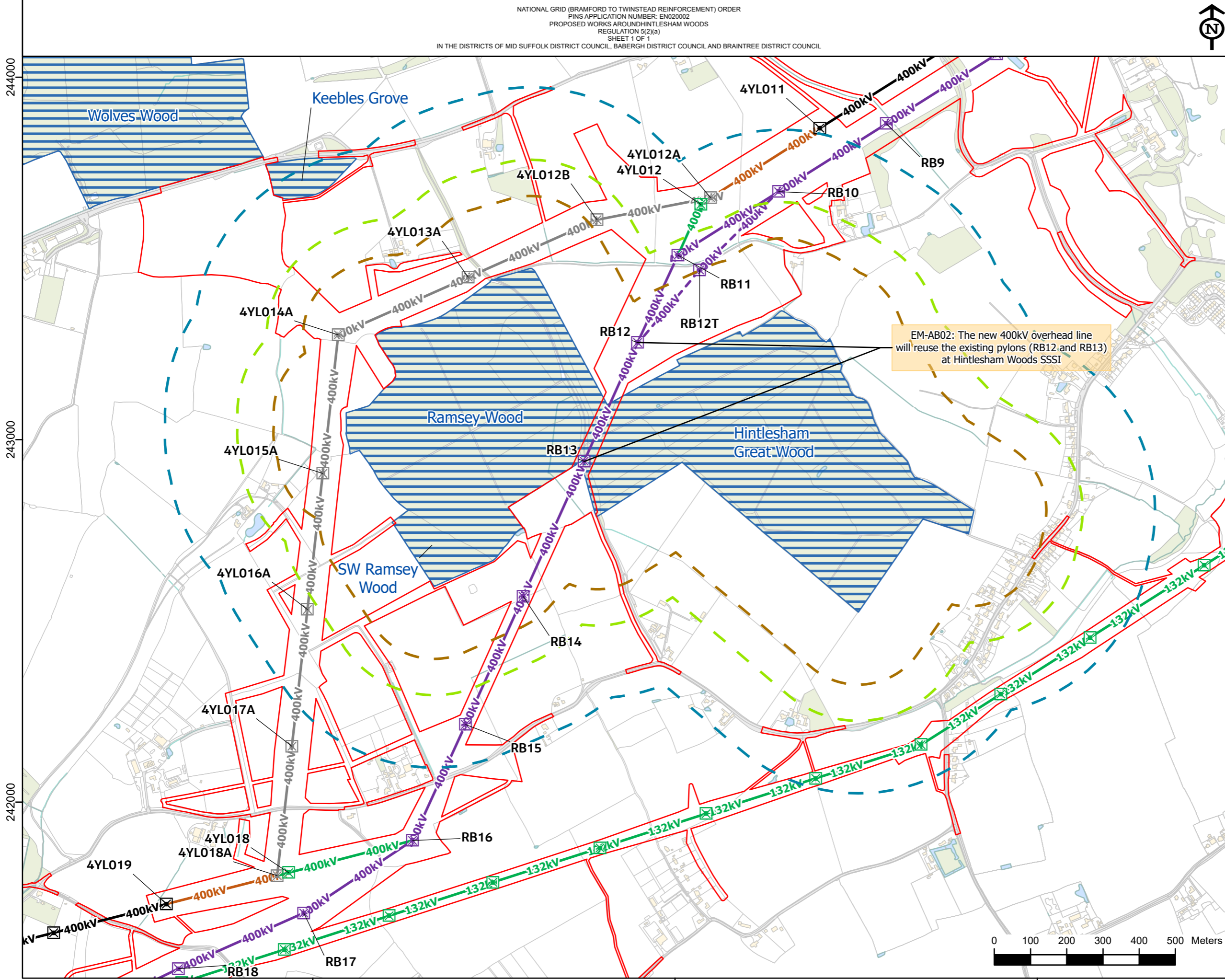
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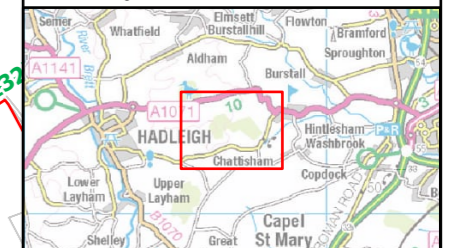


EM-AB02: The new 400kV overhead line will reuse the existing pylons (RB12 and RB13) at Hintlesham Woods SSSI

- Order Limits
- Sites of Special Scientific Interest (SSSI)
- 200m buffer around Hintlesham Woods
- 300m buffer around Hintlesham Woods
- 500m buffer around Hintlesham Woods
- Proposed overhead line
- Existing overhead line
- Proposed modification to overhead line
- Proposed realignment of existing overhead line
- Proposed removal of overhead line
- Temporary overhead line diversion
- Proposed pylon
- Existing pylon
- Proposed pylon realignment
- Proposed pylon removal

Unit	Unit name
001	WOLVES WOOD
002	KEEBLES GROVE
003	RAMSEY WOOD
004	SW RAMSEY WOOD
005	HINTLESHAM GREAT WOOD

Note - The buffers are based on the main construction activities in and around the woods. These exclude areas of planting, which would typically be undertaken outside of bird nesting season.



NG Investment No. ETX/01142				
A	04/2023	Rev A for DCO Application	PM	CW
ISSUE	DATE	REMARKS	DRWN	CHKD

PROJECT: Bramford to Twinstead Reinforcement



TITLE: Figure 7.1.8
Proposed Works around Hintlesham Woods

CIRCUIT / SITE: Bramford – Pelham & Bramford – Braintree – Bulls Lodge

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