

Nottinghamshire Minerals Plan HRA Screening Report

Nottinghamshire County Council

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Quality information

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Table of Contents

1. Introduction	5
Background to the Project.....	5
Legislation.....	5
Report Structure.....	6
2. Methodology	7
Introduction.....	7
A Proportionate Assessment.....	7
The Process of HRA.....	8
Physical Scope.....	8
In Combination Scope.....	9
Stage One: Likely Significant Effects Test (Screening).....	10
3. Pathways of Impact	11
Introduction.....	11
Direct Landtake.....	11
Disturbance.....	12
Air Quality.....	13
4. Likely Significant Effects Test	16
Introduction.....	16
Direct Landtake.....	16
Disturbance.....	17
Air Quality.....	17
5. In Combination Effects	18
6. Recommendations for Sherwood ppSPA and minerals site Bestwood II	20
European Sites.....	20
Possible European Sites.....	20
7. Conclusions	22
Appendix A European Sites Background	23
Birklands and Billaugh SAC.....	23
Hatfield Moor SAC and Thorne and Hatfield Moors SPA.....	25
Sherwood Possible pSPA.....	27
Appendix B Screening of Site Allocations	29
Appendix C Map of Site Allocations and Relevant European Sites	31

1. Introduction

Background to the Project

1.1 AECOM was appointed by Nottinghamshire County Council to assist in undertaking Habitats Regulations Assessment (HRA) of its Minerals Local Plan (hereafter referred to as the 'Plan'). The objectives of the assessment are to:

- Identify any aspects of the Plan that would cause a likely significant effect on any Natura 2000 sites, otherwise known as European Sites, which include Special Areas of Conservation (SACs), candidate SACs (cSACs), Special Protection Areas (SPAs) and potential SPAs (pSPAs) and as a matter of Government policy, Ramsar sites, both in isolation and in combination with other plans and projects; and
- Determine whether appropriate assessment (AA) would be required in order to identify potential adverse effects on the integrity of any European sites.

Legislation

1.2 The need for Habitats Regulations Assessment is set out within Article 6 of the EC Habitats Directive 1992, and interpreted into British law by the Conservation of Habitats and Species Regulations 2017 (as amended). The ultimate aim of the Directive is to “*maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest*” (Habitats Directive, Article 2(2)). This aim relates to habitats and species rather than the European sites themselves, although the sites have a significant role in delivering favourable conservation status.

1.3 The Habitats Directive applies the precautionary principle to European sites. Plans and projects can only be permitted having ascertained that there will be no adverse effect on the integrity of the site(s) in question. Plans and projects with predicted adverse effects on European sites may still be permitted if there are no alternatives to them and there are Imperative Reasons of Overriding Public Interest (IROPI) as to why they should proceed. In such cases, compensation would be necessary to ensure the overall integrity of the site network.

1.4 In order to ascertain whether or not site integrity will be affected, a Habitats Regulations Assessment should be undertaken of the plan or project in question:

Box 1. The legislative basis for appropriate assessment

Habitats Directive 1992

Article 6 (3) states that:

“Any plan or project not directly connected with or necessary to the management of the site but likely to have a significant effect thereon, either individually or in combination with other plans or projects, shall be subject to appropriate assessment of its implications for the site in view of the site's conservation objectives.”

Conservation of Habitats and Species Regulations 2017 (as amended)

The Regulations state that:

“A competent authority, before deciding to ... give any consent for a plan or project which is likely to have a significant effect on a European site ... shall make an appropriate assessment of the implications for the site in view of that site's conservation objectives... The authority shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the European site.”

- 1.5 Over the years the phrase ‘Habitats Regulations Assessment’ has come into wide currency to describe the overall process set out in the Conservation of Habitats and Species Regulations 2017 (as amended) from screening through to IROPI. This has arisen in order to distinguish the process from the individual stage described in the law as an ‘appropriate assessment’. Throughout this report we use the term Habitats Regulations Assessment for the overall process.
- 1.6 In 2018, the ‘People Over Wind’ European Court of Justice (ECJ) ruling¹ determined that ‘mitigation’ (i.e. measures that are specifically introduced to avoid or reduce the harmful effects of a plan or project on European sites) should not be taken into account when forming a view on likely significant effects. Mitigation should instead only be considered at the appropriate assessment stage. Appropriate assessment is not a technical term: it simply means ‘an assessment that is appropriate’ for the plan or project in question. As such, the law purposely does not prescribe what it should consist of or how it should be presented; these are decisions to be made on a case by case basis by the competent authority.
- 1.7 Also in 2018, the Holohan ECJ ruling² was handed down. This determined that an HRA must catalogue (i.e. list/identify) all the features for which a European site is designated. It also determined that a European site must be considered within the context of its functional relationships in terms of a) whether any interest features of the European site may be located outside the site boundary and could be affected by the plan or project, and b) whether habitats and species for which the European site is *not* designated are nonetheless fundamental to the ability of that site to achieve its conservation objectives and could be affected by the plan or project. This HRA report considers those issues.

Report Structure

- 1.8 Section 2 of this report summarises the methodology for the assessment. Section 3 identifies the possible pathways by which adverse effects on European sites could arise. Section 4 discusses the results of the test of likely significant effects. Possible effects in combination with other relevant plans and documents are examined in Section 5. Section 6 provides recommendations based on the outcome of screening, and conclusions are detailed in Section 7. Background Information on the European sites discussed in this report, including a catalogue of their interest features (as required by the Holohan ruling), is provided in Appendix A. Full screening of site allocations undertaken in the likely significant effects test is included as Appendix B. Appendix C presents a map of the European sites and site allocations assessed in this report.

¹ People Over Wind and Sweetman v Coillte Teoranta (C-323/17).

² Case C-461/17.

2. Methodology

Introduction

2.1 This section sets out our approach and methodology for undertaking the HRA. Habitats Regulations Assessment itself operates independently from the Planning Policy system, being a legal requirement of a discrete Statutory Instrument.

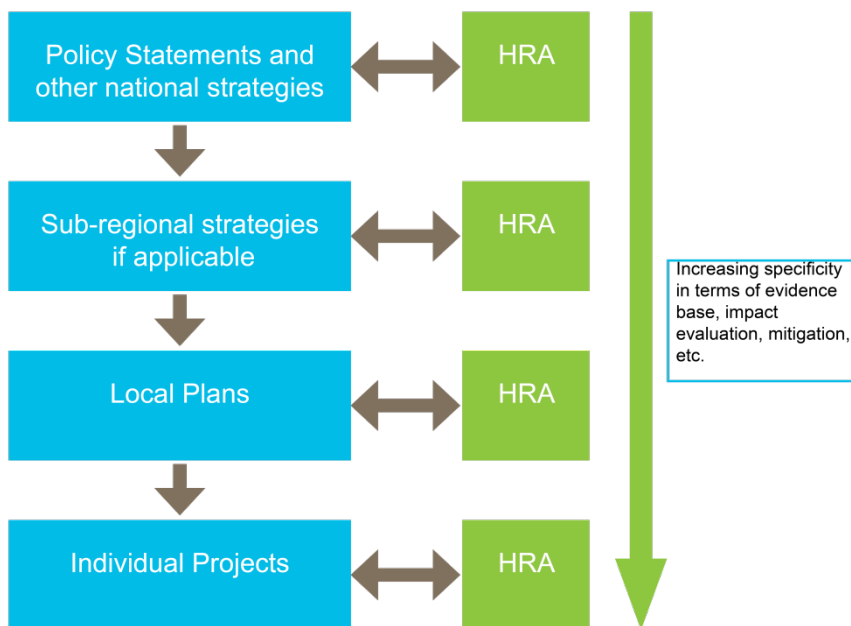
A Proportionate Assessment

2.2 Project-related HRA often requires bespoke survey work and novel data generation in order to accurately determine the significance of adverse effects. In other words, to look beyond the risk of an effect to a justified prediction of the actual likely effect and to the development of avoidance or mitigation measures.

2.3 However, the draft MHCLG guidance³ makes it clear that when implementing HRA of land-use plans, the HRA should be undertaken at a level of detail that is appropriate and proportional to the level of detail provided within the plan itself:

2.4 *'The comprehensiveness of the [appropriate] assessment work undertaken should be proportionate to the geographical scope of the option and the nature and extent of any effects identified. An AA need not be done in any more detail, or using more resources, than is useful for its purpose. It would be inappropriate and impracticable to assess the effects [of a strategic land use plan] in the degree of detail that would normally be required for the Environmental Impact Assessment (EIA) of a project.'*

2.5 In other words, there is a tacit acceptance that appropriate assessment can be tiered and that all impacts are not necessarily appropriate for consideration to the same degree of detail at all tiers (Box 2).



Box 2. Tiering in HRA of land use plans

2.6 For a land use plan, the level of detail concerning the developments that will be delivered is usually insufficient to make a highly detailed assessment of the significance of effects. For example, precise and full determination of the impacts and significant effects of a new settlement will require extensive details concerning its design, including the layout of greenspace and type of development to be delivered in particular locations, yet these data will not be finalised until subsequent stages.

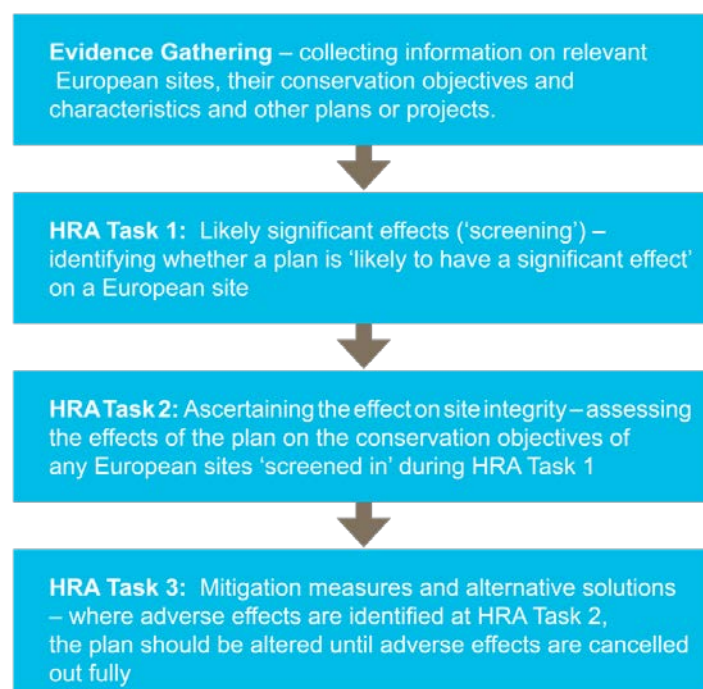
³ CLG. (2006) Planning for the Protection of European Sites, Consultation Paper

2.7 On these occasions the advice of Advocate-General Kokott⁴ to the European Court of Justice is worth considering. She commented that: *“It would ...hardly be proper to require a greater level of detail in preceding plans [rather than planning applications] or the abolition of multi-stage planning and approval procedures so that the assessment of implications can be concentrated on one point in the procedure. Rather, adverse effects on areas of conservation must be assessed at every relevant stage of the procedure to the extent possible on the basis of the precision of the plan. This assessment is to be updated with increasing specificity in subsequent stages of the procedure”*[emphasis added].

The Process of HRA

2.8 The HRA has been carried out in the continuing absence of formal Government guidance. CLG (now MHCLG) released a consultation paper on the appropriate assessment of plans in 2006⁵. As yet, no further formal guidance has emerged.

2.9 Box 3 below outlines the stages of HRA according to current draft MHCLG guidance. The stages are essentially iterative, being revisited as necessary in response to more detailed information, recommendation and any relevant changes to the plan until no significant adverse effects remain.



Box 3. Four-stage approach to HRA

2.10 In practice, this broad outline requires some amendment in order to feed into a developing land use plan. The following process has been adopted for carrying out the HRA.

Physical Scope

2.11 The physical scope of the assessment (i.e. the range of European sites to be considered) is based on a combination of tracing impact pathways and using distances derived from various studies.

2.12 The European sites of relevance to this HRA are shown in Table 1. Full details of reasons for their designation (in accordance with the Holohan ruling), conservation objectives and key vulnerabilities are presented in Appendix A. The locations of these European sites in relation to Nottinghamshire County are presented in Figure 1.

⁴ Opinion of Advocate-General Kokott, 9th June 2005, Case C-6/04. Commission of the European Communities v United Kingdom of Great Britain and Northern Ireland, paragraph 49.

<http://curia.europa.eu/juris/document/document.jsf?docid=58359&doclang=EN>

⁵ Ibid

Table 1. European sites of relevance to HRA of the Plan

European site	Site summary	Proximity to Nottinghamshire County
Birklands and Bilhaugh SAC	270.5ha comprising old acidophilous oak woodland (the most northerly site selected for this habitat).	Within County
Hatfield Moor SAC/Thorne and Hatfield Moors SPA	Hatfield Moor SAC (overlaps Thorne and Hatfield Moors SPA) covers 1359.5ha comprising various habitats, designated primarily for its degraded raised bogs still capable of natural regeneration Thorne and Hatfield Moors SPA consists of two moors covering a combined 2449.2ha. The site is an extensive lowland raised mire system, of particular interest for nightjar (<i>Caprimulgus europaeus</i>).	Approximately 2.7km north

In addition, Nottinghamshire County contains the following possible pSPA (ppSPA) (Table 2).

Table 2. Possible European sites of relevance to HRA of the Plan

Possible European site	Site summary	Proximity to Nottinghamshire County
Sherwood ppSPA	A portion of the Sherwood Forest supporting significant populations of bird species of European importance; specifically nightjar and woodlark (<i>Lullula arborea</i>).	Within County

Until the Sherwood Forest area is formally proposed by government as a pSPA there is no legal obligation to undertake HRA of this site. However, if Sherwood ppSPA were to be formally proposed as a pSPA, plans and projects would have to be subject by law to the provisions under the Conservation of Habitats and Species Regulations 2017(as amended) that apply to assessment of impacts on all European sites. Natural England (NE) still advises that in order to reduce future risks should the site ever be proposed, it is logical for Local Authorities to satisfy themselves that current planning applications contain *'sufficient objective information to ensure that all potential impacts on the breeding nightjar and woodlark populations have been adequately avoided or minimised'*. In doing so, NE advises that this should be done *'using appropriate measures and safeguards'*, in order to *'ensure that any future need to review outstanding permissions under the 2010 Regulations is met with a robust set of measures in place'* (letter from Natural England, 28 June 2010 updated July 2011, September 2012, and March 2014).

In addressing the above, Natural England advises that local authorities take a *'risk-based approach'* to forward planning and decision making, such that, development plans and proposals are accompanied by an *'additional and robust assessment of the likely impacts arising from the proposals on any breeding nightjar and woodlark in the Sherwood Forest area.'* It should be noted that the current possible boundary of the ppSPA may be subject to change in the event that the site is designated.

In accordance with Natural England's advice, as reinforced by the Secretary of State, an informal HRA screening opinion is provided in this report. Caution should be placed on the fact that Sherwood Forest is not an SPA or a pSPA (i.e. neither designated nor formally proposed for designation), such that the strict application of Regulation 105 is not required. Comments are provided, as best is possible, to address this alongside this HRA (particularly in Section 6 of this report).

In Combination Scope

- 2.13 It is a requirement of the Conservation of Habitats and Species Regulations 2017 (as amended) that the impacts and effects of any plan being assessed are not considered in isolation but 'in combination' with other plans and projects that may also affect the European sites(s) in question.
- 2.14 In practice, in combination assessment is of greatest importance when the plan would otherwise be screened out because the individual contribution is inconsequential. The principal other plans and projects of relevance regarding in combination effects are:

- Amber Valley Borough Draft Local Plan (2017);
- Anglian Water Revised Draft Water Resources Management Plan (2019);
- Ashfield Local Plan (2002); to be replaced by the Emerging Local Plan (withdrawn February 2018);
- Barnsley, Doncaster & Rotherham Joint Waste Plan (2012);
- Bassetlaw Draft Local Plan (2019);
- Bolsover District Local Plan (submitted 2018);
- Broxtowe Local Plan (2014);
- Central Lincolnshire Local Plan (2017);
- Charnwood Local Plan (2015);
- Doncaster Draft Local Plan (2018);
- Erewash Core Strategy (2014);
- Gedling Plan (2018);
- Mansfield District Local Plan Draft (2018);
- Melton Local Plan 2018;
- Newark and Sherwood Amended Core Strategy (2018) and Preferred Approach – ‘Sites and Settlements’ and ‘Town Centres and Retail’ (2017);
- North Lincolnshire Local Plan (2003); to be replaced by the Local Development Framework;
- North West Leicestershire Local Plan (2017);
- Nottingham City Aligned Core Strategy (2014) and Local Plan Part 2 (submitted 2018);
- Rotherham Core Strategy (2014) and Site and Policies (2018);
- Rushcliffe Local Plan Part 1: Core Strategy (2014) and Local Plan Part 2: Land and Planning Policies (currently under examination);
- Severn Trent Draft Water Resource Management Plan (2018); and
- South Kesteven Pre-submission Local Plan (2018).

Stage One: Likely Significant Effects Test (Screening)

2.15 The first stage of any HRA is a likely significant effects (LSE) test. This is essentially a high level assessment to decide whether the full subsequent stage known as appropriate assessment is required. The essential question is:

‘Is the Plan, either alone or in combination with other relevant projects and plans, likely to result in a significant effect upon European sites?’

2.16 The objective is to ‘screen out’ those plans and projects (or allocations/policies) that can, without any detailed appraisal, be said to be unlikely to result in significant adverse effects upon European sites, usually because there is no mechanism or pathway for an adverse interactions with European sites. This stage is undertaken in Section 4 of this report.

2.17 It is important to determine the various ways in which a plan can affect European sites by following any potential impact pathways from policies and site allocations. Briefly defined, pathways are routes by which a change in activity associated with a policy can lead to an effect upon an internationally designated site.

2.18 In evaluating significance, AECOM has relied on professional judgement as well as the results of previous stakeholder consultation regarding development impacts on the European sites considered within this assessment.

3. Pathways of Impact

Introduction

3.1 When carrying out an HRA it is important to determine the various ways in which land use plans can affect internationally designated sites. This means studying the pathways along which development can be connected with internationally designated sites, in some cases many kilometres distant. Briefly defined, pathways are routes by which a change in activity associated with a plan document or development can lead to an effect upon an internationally designated site. Given that this plan will be delivering minerals development, the following pathways have been identified as requiring further analysis in this HRA:

- Direct landtake;
- Disturbance; and
- Air quality

3.2 Minerals workings can also affect local water quality and flows/levels, both in terms of locally lowered water tables through dewatering of excavations and in terms of sediment impacts on those watercourses that receive the abstracted water when it is returned to the environment. However, none of the European sites, or possible European sites, within Nottinghamshire is dependent on a high water table, or good water quality. They are essentially dry, well-drained habitats. Hatfield Moor SAC is dependent on a locally high water table, but is sufficiently far from the nearest site allocation, Bawtry Road West (approximately 8.7km south of the SAC) that minerals workings in Nottinghamshire will not affect this European site.

Direct Landtake

3.3 European sites and their supporting ('functionally linked') habitat are vulnerable to direct loss of land to development. Loss of habitat is likely to have adverse impacts on populations of SPA bird species, which depend on sufficiently large areas of suitable foraging and nesting habitat. A reduction in the area of suitable habitat also increases the vulnerability of bird populations to other threats and pressures (e.g. fires, changes in habitat structure).

3.4 Direct landtake is of particular concern regarding functionally linked habitat to European sites. Species for which European sites may be designated will often also use habitat outside of the boundary of the European site. As such, this habitat may be important to the long-term success of the European site's population of the species in question. Therefore where developments are proposed near to European sites, it is necessary to assess the suitability of the site of the proposed development and adjacent affected land to provide functionally linked habitat to the European site with respect to species for which the European site is designated.

3.5 The requirement to consider potential effects on functionally linked habitat was recently reinforced by the Holohan ruling⁶. In the case of Nottinghamshire, the nature of Birklands & Bilhaugh SAC and Hatfield Moor SAC means their ability to achieve their conservation objectives depends entirely on land within the boundary of the SACs. With regard to Sherwood ppSPA and Thorne & Hatfield Moors SPA, the nightjar and woodlark populations are heavily dependent on two habitats: rotationally managed plantation and heathland/acid grassland. This HRA therefore considers the potential for impacts on these two habitats even when present outside the ppSPA (or SPA) boundary.

3.6 In the case of plantation woodland, research undertaken in the Breckland Forest area⁷ has identified that nightjar are most likely to use conventionally managed plantation during the first c. 20 years of the c. 60 year forestry cycle, including the initial 2 year 'felled unplanted' period. Population densities are highest during the restock phase (plantation age of 0-5 years), although significant densities can also be supported during the pre-thicket (6-10 years) and thicket (11 – 20 years) stages. The research also identifies that woodlark are most likely to use conventionally managed plantation during its first seven years (including the initial 2 year felled unplanted period), particularly the restock phase (plantation age of

⁶ Case C-461/17

⁷ Dolman PM & Morrison C, 2012. Temporal change in territory density and habitat quality for Breckland Forest SSSI woodlark and nightjar populations, Unpublished report for Forestry Commission and Natural England.

0-5 years). They *may* also be found during the pre-thicket (6-10 years stage) but the density of woodlark in pre-thicket plantation is very low.

- 3.7 Due to the fact that nightjar and woodlark only use the habitat during certain parts of the forestry cycle, their absence from a given parcel of plantation, or the fact that the plantation is not in a suitable phase for colonisation, at a given point in time cannot be used as a basis to conclude nightjar and woodlark will not use the land. If the birds are known to be present in the broad area (as they are here) any conventionally managed plantation could support them and its permanent loss would therefore reduce the overall potential nesting resource available to both species.

Disturbance

- 3.8 Mineral extraction and quarrying activities within sites can have significant disturbance impacts on birds. Disturbance can take many forms, including noise (e.g. from blasting/rock crushing (where undertaken), vehicle movements), visual (e.g. from vehicle movements) and vibration (e.g. from blasting, where undertaken).
- 3.9 Concern regarding the effects of disturbance on birds stems from the fact that they are expending energy unnecessarily and the time they spend responding to disturbance is time that is not spent feeding⁸. Disturbance therefore risks increasing energetic output while reducing energetic input, which can adversely affect the 'condition' and ultimately survival of the birds. In addition, displacement of birds from one feeding site to others can increase the pressure on the resources available within the remaining sites, as they have to sustain a greater number of birds⁹. Moreover, the more time a breeding bird spends disturbed from its nest, the more its eggs are likely to cool and the more vulnerable they are to predators.
- 3.10 Human activity can affect birds either directly (e.g. through causing them to flee, incurring an energetic cost) or indirectly (e.g. through damaging their habitat). This can lead to behavioural changes (e.g. alterations in feeding behaviour, avoidance of certain areas etc.) and physiological changes (e.g. an increase in heart rate) that, although less noticeable, may ultimately result in major population-level effects by altering the balance between immigration/birth and emigration/death¹⁰.
- 3.11 Disturbing activities are on a continuum. The most disturbing activities are likely to be those that involve irregular, infrequent, unpredictable loud noise events, movement or vibration of long duration. Birds are least likely to be disturbed by activities that involve regular, frequent, predictable, quiet patterns of sound or movement or minimal vibration. The further any activity is from the birds, the less likely it is to result in disturbance.
- 3.12 The factors that influence a species' response to a disturbance are numerous, but the three key factors are species sensitivity, proximity of disturbance sources and timing/duration of the potentially disturbing activity. The distance at which a species takes flight when approached by a disturbing stimulus is known as the 'tolerance distance' (also called the 'escape flight distance') and differs between species to the same stimulus and within a species to different stimuli.
- 3.13 There is usually no need for blasting at sand and gravel extraction sites¹¹ but only at rock quarries. As such, the noisiest typical activities associated with minerals extraction in Nottinghamshire are likely to be noisy outdoor machinery and conveyors, which at their loudest is likely to produce noise levels below 100dB (A) at 1m from source. Noise in atmosphere attenuates by 6dB for every doubling in distance from source. Therefore, even these noisiest activities are likely to result in noise levels below 70 dB at c. 100m from source. This is relevant because research (primarily conducted on waterfowl but broadly transferable to other bird species) indicates that birds typically exhibit a flight response at noise levels exceeding 84dB, while at levels below 55 dB there is no effect.¹² These therefore define the two extremes. It is also generally advised that an activity will not have disturbance effects on birds if the maximum noise level (at the bird) is below 70dB¹³.

⁸ Riddington, R. *et al.* 1996. The impact of disturbance on the behaviour and energy budgets of Brent geese. *Bird Study* 43:269-279

⁹ Gill, J.A., Sutherland, W.J. & Norris, K. 1998. The consequences of human disturbance for estuarine birds. *RSPB Conservation Review* 12: 67-72

¹⁰ Riley, J. (2003) Review of Recreational Disturbance Research on Selected Wildlife in Scotland. Scottish Natural Heritage.

¹¹ <https://www.gov.scot/publications/blasting-surface-mineral/>

¹² Cutts N. & Allan J. (1999) Avifaunal Disturbance Assessment. Flood Defence Works: Saltend. Report to Environment Agency.

¹³ Cutts, N., Phelps, A. & Burdon, D. (2009) Construction and waterfowl: Defining Sensitivity, Response, Impacts and Guidance. Report to Humber INCA, Institute of Estuarine and Coastal Studies, University of Hull.

- 3.14 In addition to noise, there is also the possibility of visual disturbance and some species of bird are understood to be sensitive to visual stimuli at considerable distances. Thorne and Hatfield Moors SPA and Sherwood ppSPA are designated (or proposed for designation) for their features of ornithological interest: specifically populations of nightjar and woodlark. Liley and Clarke^{14,15} found that the density of European nightjar was directly related to the amount of surrounding development, with sites surrounded by higher levels of development supporting fewer nightjars. The species' breeding success appears to be much higher at less visited sites¹⁶, with path proximity correlating strongly with nest failure up to 225m from the path edge. Research suggests that within heathland nightjars typically do not settle within 250-500m of development land¹⁷, although there are exceptions to this situation. Similarly, woodlark is affected by disturbance. Mallord estimated that, for 16 sites in southern England, 34% more woodlark chicks would be raised if all sites were free from disturbance^{18,19}. The disturbance effect on these species is, however, likely to be strongly associated with the presence of dogs which are perceived as predators by sensitive ground-nesting birds. Clearly, recreational activity generally and dog walking in particular will not be associated with minerals development.
- 3.15 Given this, it is considered that a sufficiently cautious distance to use in this HRA is to assume that extraction and quarrying activities *might* result in disturbance to nightjar and woodlark where they occur within 500m of the bird population in question. In practice it is expected that this distance is highly precautionary.

Air Quality

- 3.16 Mineral extraction and quarrying activities have the potential for air quality impacts on European sites, both by increasing levels of pollutants (e.g. through increased vehicle use) and through the spread of dust.

Nitrogen deposition

- 3.17 Other than dust, the main pollutants of concern for European sites are oxides of nitrogen (NO_x), ammonia (NH₃) and sulphur dioxide (SO₂). Ammonia can be directly toxic to vegetation, and research suggests that this may also be true for NO_x at very high concentrations. More significantly, greater NO_x or ammonia concentrations within the atmosphere lead to greater rates of nitrogen deposition to vegetation and soils. An increase in the deposition of nitrogen from the atmosphere is generally regarded to increase soil fertility, which can have a serious deleterious effect on the quality of semi-natural, nitrogen-limited terrestrial habitats. Further information on the sources and effects of air pollutants is provided in Table 3.

Table 3. Main sources and effects of air pollutants on habitats and species

Pollutant	Source	Effects on habitats and species
Acid deposition	SO ₂ , NO _x and ammonia all contribute to acid deposition. Although future trends in SO ₂ emissions and subsequent deposition to terrestrial and aquatic ecosystems will continue to decline, it is likely that increased NO _x emissions may cancel out any gains produced by reduced SO ₂ levels.	Can affect habitats and species through both wet (acid rain) and dry deposition. Some sites will be more at risk than others depending on soil type, bed rock geology, weathering rate and buffering capacity.
Ammonia (NH ₃)	Ammonia is released following decomposition and volatilisation of animal wastes. It is a naturally occurring trace gas, but levels have increased considerably with the expansion in agricultural livestock numbers. Ammonia reacts with acid pollutants such as the products of SO ₂ and NO _x emissions to	Adverse effects are as a result of nitrogen deposition leading to eutrophication. As emissions mostly occur at ground level in the rural environment and NH ₃ is deposited rapidly, some of the most acute problems of NH ₃ deposition are for small relict nature reserves located in intensive agricultural landscapes.

¹⁴ Liley, D. & Clarke, R.T. (2003) The impact of urban development and human disturbance on the numbers of nightjar *Caprimulgus europaeus* on heathlands in Dorset, England. *Biological Conservation*, 114: 219-230.

¹⁵ Liley, D. & Clarke, R.T. (2002) The impact of human disturbance and human development on key heathland bird species in Dorset. Sixth National Conference (eds Underhill, J.C. & Liley, D.). RSPB, Bournemouth.

¹⁶ Murison, G. (2002) The Impact of Human Disturbance on the Breeding Success of the Nightjar *Caprimulgus europaeus* on Heathlands in South Dorset, England. *English Nature*.

¹⁷ Liley, D & Clarke, R.T. 2003. The impact of urban development and human disturbance on the numbers of nightjar *Caprimulgus europaeus* on heathlands in Dorset, England. *Biological Conservation* 114: 219-230.

¹⁸ Mallord, J. (2005) Predicting the consequences of human disturbance, urbanisation and fragmentation for a woodlark *Lullula arborea* population. PhD Thesis, University of East Anglia, Norwich, UK.

¹⁹ Liley, D. (2005) A summary of the evidence base for disturbance effects to Annex 1 bird species on the Thames Basin Heaths & research on human access patterns to heathlands in southern England. *Footprint Ecology/English Nature*.

	produce fine ammonium (NH ₄ ⁺) - containing aerosol which may be transferred much longer distances (and can therefore be a significant trans-boundary issue).	
Nitrogen oxides (NO _x)	Nitrogen oxides are mostly produced in combustion processes. About one quarter of the UK's emissions are from power stations, one half from motor vehicles, and the rest from other industrial and domestic combustion processes.	Deposition of nitrogen compounds (e.g. nitrates (NO ₃), nitrogen dioxide (NO ₂) and nitric acid (HNO ₃)) can lead to soil and freshwater acidification. In addition, NO _x can cause eutrophication of soils and water. This alters the species composition of plant communities and can eliminate sensitive species.
Nitrogen (N) deposition	The pollutants that contribute to nitrogen deposition derive mainly from NO _x and NH ₃ emissions. These pollutants cause acidification (see also acid deposition) as well as eutrophication.	Species-rich plant communities with relatively high proportions of slow-growing perennial species and bryophytes are most at risk from nitrogen eutrophication, due to its promotion of competitive and invasive species which can respond readily to elevated nitrogen levels. Nitrogen deposition can also increase the risk of damage from abiotic factors (e.g. drought, frost).
Ozone (O ₃)	A secondary pollutant generated by photochemical reactions from NO _x and volatile organic compounds (VOCs). These are mainly released by the combustion of fossil fuels. The increased combustion of fossil fuels in the UK has led to a large rise in background ozone concentration, increasing the number of days when levels across the region are above 40ppb. Reducing ozone pollution is believed to require action at an international level to reduce levels of the precursors that form ozone.	Concentrations of O ₃ above 40ppb can be toxic to humans and wildlife and can affect buildings. Increased ozone concentrations may lead to a reduction in growth of agricultural crops, decreased forest production and altered species composition in semi-natural plant communities.
Sulphur dioxide (SO ₂)	Main sources of SO ₂ emissions are electricity generation, industry and domestic fuel combustion. May also arise from shipping and increased atmospheric concentrations in busy ports. Total SO ₂ emissions have decreased substantially in the UK since the 1980s.	Wet and dry deposition of SO ₂ acidifies soils and freshwater, and alters the species compositions of plant and associated animal communities. The significance of impacts depends deposition levels and the buffering capacity of soils.

- 3.18 Sulphur dioxide emissions are overwhelmingly influenced by the output of power stations and industrial processes that require the combustion of coal and oil. Ammonia emissions are dominated by agriculture, with some chemical processes also making notable contributions. However, emissions of nitrogen oxides are dominated by the output of vehicle exhausts, while diesel generators associated with some mineral activities will also emit NO_x. Emissions of nitrogen oxides could therefore be reasonably expected to be associated with any increase in net vehicle movements as an indirect effect of the Plan.
- 3.19 According to the Department of Transport's Transport Analysis Guidance, "beyond 200m, the contribution of vehicle emissions from the roadside to local pollution levels is not significant"²⁰. This distance has therefore been used in this HRA to determine whether European sites are likely to be significantly affected by Plan site allocations (Figure 2).

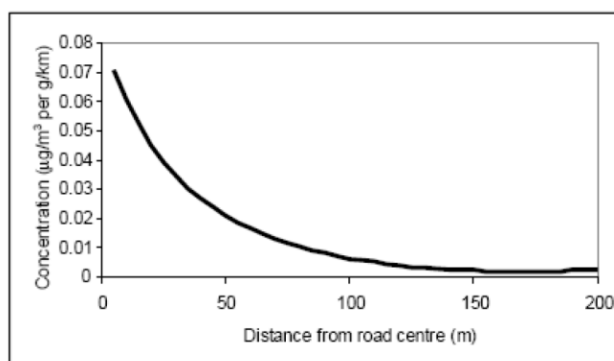


Figure 2. Traffic contribution to pollutant concentrations in relation to the distance from a road (DfT)

²⁰ www.webtag.org.uk/archive/feb04/pdf/feb04-333/pdf

- 3.20 According to the World Health Organisation, the critical NO_x concentration (critical threshold) for the protection of vegetation is 30 µgm⁻³; the threshold for sulphur dioxide is 20 µgm⁻³. In addition, ecological studies have determined 'critical loads'²¹ of atmospheric nitrogen deposition (that is, NO_x combined with ammonia NH₃).
- 3.21 This assessment therefore considers the effects of traffic movements on European sites where a minerals site may be associated with a net increase in annual average daily traffic (AADT) within 200m of a sensitive European site (primarily Birklands & Bilhaugh SAC) including the strategic road network. At the same time, it must be borne in mind that a minerals site allocation may be associated with the extension in years of operation for an existing minerals site, rather than a net increase in minerals extraction activity and thus may not be associated with any forecast net change in AADT.

Dust

- 3.22 Atmospheric pollutants generated by minerals sites also include dust emissions. The effects of dust will depend on the prevailing wind direction, and the transport distance is related to particle size. Dust particle size and chemical composition is important as smaller particles can enter or block stomata and thus interfere with gas exchange, while sufficient coverage may prevent light penetration to the chloroplasts. In prolonged cases, death can result.
- 3.23 In the absence of control measures, dust generation is most likely to occur during soil stripping (and from wind blow of associated spoil heaps), extraction or rock blasting, screening, crushing, track out and operation of conveyors. It may also occur during soil manipulation as part of site restoration. For the purposes of screening, according to guidance from the Institute of Air Quality Management²², with respect to possible effects due to dust, *"an assessment will normally be required where there is...an 'ecological receptor' within: 50m of the boundary of the site; or 50m of the route(s) used by construction vehicles on the public highway, up to 500m from the site entrance(s)"*. Site allocations that lie more than 50m from the European site and do not have scope for large scale production of dust have therefore been 'screened out' as being unlikely to contribute significant dust impacts, even without special mitigation such as 'wetting'.

²¹ The critical load is the rate of deposition beyond which research indicates that adverse effects can reasonably be expected to occur.

²² IAQM. (2016) *Guidance on the assessment of dust from demolition and construction*. The Institute of Air Quality Management. Version 1.1.

4. Likely Significant Effects Test

Introduction

4.1 The Plan includes the following minerals allocations, which require screening to determine if there is potential for likely significant effects on European sites (the locations of which are shown in Figure 1):

- Bawtry Road West;
- Scrooby Thompson Land;
- Scrooby North;
- Langford Lowfields North;
- Besthorpe East;
- Mill Hill near Barton in Fabis;
- Bestwood II North;
- Scrooby Top North; and
- Bantycok South.

4.2 Based on the impact pathways discussed in Section 3, the following European sites (including possible European sites) and impact pathways have been identified as being relevant to this assessment, in combination with other plans and projects:

- Birklands and Bilhaugh SAC: this European site would be vulnerable to air quality impacts from increased vehicle traffic on roads within 200m and activities producing dust (e.g. mineral extraction, quarrying) within 50m of the site.
- Hatfield Moor SAC/Thorne and Hatfield Moors SPA: this European site would be vulnerable to air quality impacts from increased vehicle traffic on roads within 200m and activities producing dust (e.g. mineral extraction, quarrying) within 50m of the site. The nightjar population for which the SPA is designated is potentially vulnerable to disturbance (particularly noise and visual disturbance) from activities within 500m of the site. These vulnerabilities also apply to functionally linked habitat to Thorne and Hatfield Moors SPA, which may be used by this nightjar population.
- Sherwood ppSPA: this possible European site would be vulnerable to disturbance (particularly noise and visual disturbance) from activities within 500m of the site, which could negatively affect nightjar and woodlark populations. The habitats supporting these species (plantation woodland) may also be susceptible to changes in vegetation structure resulting from air quality impacts due to increased vehicle traffic on roads within 200m of the site, or from activities producing dust (e.g. mineral extraction, quarrying) within 50m of the site. These vulnerabilities also apply to functionally linked habitat to the European site, which may be used by these nightjar and woodlark populations.

Direct Landtake

4.3 None of the nine site allocations will occur within land covered by a European designation, or in habitat that is functionally linked to any European sites. With respect to possible European sites, one site allocation has potential for indirect likely significant effects on Sherwood ppSPA:

- Bestwood II North – this site is approximately 800m west of the possible European site. This site allocation is for extension of the existing Tarmac Bestwood II Quarry: specifically a northern extension in which approximately 750,000 tonnes of sandstone will be excavated over a 6 year period. The extension at Bestwood II North will take place *within* Longdale Plantation. Plantation woodland is a favoured habitat for nightjar and woodlark (for which Sherwood ppSPA is proposed for designation). The land in which the Bestwood II North extension will take place could therefore comprise functionally linked habitat to the ppSPA, in which case this site allocation could result in direct landtake (i.e. habitat loss) of functionally linked habitat to the ppSPA.

4.4 Whilst there is no legal obligation to conduct an HRA of the potential for adverse effects on possible (as opposed to formally proposed or officially designated) European sites, Natural England advises that local authorities take a *'risk-based approach'* to forward planning and decision making, such that development plans and proposals are accompanied by an *'additional and robust assessment of the likely impacts arising from the proposals on any breeding nightjar and woodlark in the Sherwood Forest area'*. It should be noted that the People over Wind ECJ ruling mentioned earlier (prohibiting the consideration of mitigation in the screening stage of HRA) does not apply to Sherwood ppSPA because this site is not an SPA (or even a formally proposed SPA). Therefore, mitigation recommendations with respect to possible loss of functionally linked land for Sherwood ppSPA are made in Section 6.

Disturbance

4.5 None of the nine site allocations have potential for likely significant effects on European sites through disturbance due to their distance. All site allocations are far in excess of 500m from any European sites. As such, disturbance effects on European sites can be screened out. With respect to possible European sites, one site allocation has potential for likely significant effects on Sherwood ppSPA:

- Bestwood II North – approximately 800m west of the possible European site (see site allocation description in Subsection 4.4 above). The 800m distance far exceeds that over which disturbance impacts can be reasonably expected to occur, even using the highly precautionary 500m screening distance in this HRA. However, as discussed in Subsection 4.4, land in which the extension at Bestwood II North will take place consists of plantation woodland ('Longdale Plantation'), which may comprise functionally linked habitat to the ppSPA such that any nightjar and woodlark nesting within c. 100m of the quarry at the time the extension is being worked could be displaced elsewhere.

4.6 Recommendations with respect to possible disturbance impacts on Sherwood ppSPA are made in Section 6.

Air Quality

4.7 None of the European sites are located within 200m of any of the allocated minerals sites or within 200m of roads that are likely to experience an increase in traffic as a result of proposed extraction and quarrying activities. Hatfield Moor SAC is well over 300m from the nearest A road (the A614). The only road within 200m of Birklands & Bilhaugh SAC is Swinecote Road (B6034) located in the town of Edwinstowe in Newark and Sherwood District. This is a minor road remote from any of the minerals sites and will not constitute a route for minerals traffic. While parts of the Sherwood ppSPA are within 200m of major roads (such as the A617 in the Mansfield area), all of the allocated sites constitute sequential spatial/temporal extensions to existing minerals operations that will not be worked until the current resource is exhausted. As such, they are unlikely to be associated with a net increase in minerals traffic compared to current levels.

4.8 None of the nine site allocations are within 50m of a European site. Therefore, air quality impacts relating to dust are not anticipated. As such, air quality impacts on European sites can be screened out. With respect to possible European sites, one site allocation has potential for likely significant effects on Sherwood ppSPA:

- Bestwood II North – approximately 800m west of the possible European site (see site allocation description in Subsection 4.4 above). As the site allocation is over 50m from the ppSPA possible air quality impacts on the possible European site due to dust can be screened out at this stage. However, as discussed in Subsection 4.4 above, the Bestwood II North extension is proposed to take place within Longdale Plantation, which comprise functionally linked habitat to the ppSPA for nightjar and woodlark. Air quality impacts on this habitat due to dust cannot be screened out.

4.9 Recommendations with respect to possible air quality impacts on Sherwood ppSPA are made in Section 6.

5. In Combination Effects

- 5.1 It is a requirement of the Conservation of Habitats and Species Regulations 2017 (as amended) that the impacts and effects of any plan being assessed are not considered in isolation but 'in combination' with other plans and projects that may also affect the European sites(s) in question.
- 5.2 The local plans for the following districts overlap with the Sherwood possible SPA or associated plantations and areas of acid grassland: Mansfield, Newark & Sherwood, Ashfield and Bassetlaw. They propose the delivery of housing and employment land over a period leading up to approximately 2033. Delivery of housing in particular could lead to increased recreational pressure on the accessible parts of the Sherwood possible SPA. However, all four local plans have undertaken HRAs which consider impacts on the possible SPA from recreational pressure, and all conclude no adverse effect on integrity due to a combination of measures that all the authorities are introducing.
- 5.3 The Sherwood Forest Country Park is the part of the possible SPA most likely to receive additional visitors due to population growth. The Country Park is taking measures to plan for the expected increase in visitor numbers, and also to help deliver the vision of a proposed Sherwood Regional Park. The recent relocation of the Sherwood Forest Visitor Centre is itself expected to result in an increase in visitors to the Country Park, which is compared to current visitor numbers of approximately 350,000. The planned visitor centre will include a number of new attractions and increased visitor facilities.
- 5.4 The Sherwood Forest Living Legends project informs plans for a proposed Sherwood Forest Regional Park. The HRA report for the Sherwood Living Legend project, which included plans for the relocation of the visitor's centre, found no likely significant effect associated with this planned development. The key conclusions were that existing paths and visitor facilities have the ability to cope with some further visitor numbers, but also, improvements are proposed to the management of paths and to visitor management in order to ensure no likely significant effect.
- 5.5 The Sherwood Forest Country Park is located within Newark and Sherwood District. Newark and Sherwood District Council's HRA of the Newark & Sherwood Amended Core Strategy (June 2018) concluded that new residential development at all settlements with Newark and Sherwood District would have the potential for cumulative impact on the possible SPA, due to proximity of development (within 20km) of the site and its popularity with visitors. New policy wording was devised to enable mitigation to be delivered. This wording was included in both the Core Strategy and Development Management plans and through wording in relation to specific allocations. The main purpose of these policies has been to ensure that there is adequate provision of Suitable Alternative Natural Greenspace (SANGs) in Newark and Sherwood District (Policy DM7 and Core Policy 12). As a result, the latest HRA of the Newark & Sherwood Amended Core Strategy concluded that "due to the landscapes surrounding the district, including green infrastructure, open space and woodland, these 'should help to offset increases in recreational pressures on the [possible SPA] as well as Birkland & Bilhaugh SAC'".
- 5.6 The Ashfield District Council Local Plan went through examination in 2017 and has Main Modifications Consultation in 2018. The HRA of the local plan (2016) identifies the large amounts of alternative recreational natural greenspace already existing in Ashfield District (other than the possible SPA) and concludes that "Even in light of a potential increase in visitors to the [possible SPA], it is considered that the existing raft of management initiatives referred to above and the relocation of the visitors centre in Sherwood Forest will be sufficient to avoid a significant effect on the [possible SPA] in the foreseeable future, and in any event within the life of the Local Plan." Paragraph 1.9 of Ashfield District Council's written statement regarding Matter 1 of the examination made it clear that the local plan was considered not to have a likely significant effect on the Sherwood possible SPA and that Natural England concurred with that conclusion. Although the Ashfield Local Plan has since been withdrawn from examination with a view to preparing a new local plan, this was not due to considerations regarding the Sherwood possible SPA.
- 5.7 Mansfield District Council identified in their HRA the need for the following components to address recreational pressure on the possible SPA (and land supporting nightjar and woodlark lying beyond the possible SPA):
 - improving (and promoting) natural green space nearby;

- providing improved access management (including ranger services);
 - providing improved visitor education and information; and
 - alternative habitat creation (without public access) for nightjar and woodlark.
- 5.8 Since each local authority has introduced mechanisms to address recreational pressure and formed a conclusion of no adverse effect in their local plans, there will be no likely significant effect 'in combination' with the Nottinghamshire Minerals Local Plan.
- 5.9 Nottinghamshire County is bordered by the following statutory authorities, each with their own local plans:
- Amber Valley Borough Draft Local Plan (2017);
 - Barnsley, Doncaster & Rotherham Joint Waste Plan (2012);
 - Bolsover District Local Plan (submitted 2018);
 - Broxtowe Local Plan (2014);
 - Central Lincolnshire Local Plan (2017);
 - Charnwood Local Plan (2015);
 - Doncaster Draft Local Plan (2018);
 - Erewash Core Strategy (2014);
 - Melton Local Plan 2018;
 - North Lincolnshire Local Plan (2003); to be replaced by the Local Development Framework;
 - North West Leicestershire Local Plan (2017);
 - Rotherham Core Strategy (2014) and Site and Policies (2018); and
 - South Kesteven Pre-submission Local Plan (2018).
- 5.10 The majority of these plans relate to local authority areas that are sufficiently distant to the European sites and possible European sites that could potentially be affected by Plan site allocations that there is no scope for in combination effects due to disturbance. The Doncaster Draft Local Plan (2018) covers the area encompassing Hatfield Moor SAC and the Hatfield Moor unit of Thorne and Hatfield Moors SPA. However, this European site is over 8km from the nearest Plan site allocation. In combination effects due to disturbance are not therefore anticipated.
- 5.11 Similarly, none of these plans propose development sufficiently close to any European sites or possible European sites of relevance to the Plan that in combination air quality impacts due to dust are a concern.

6. Recommendations for Sherwood ppSPA and minerals site Bestwood II

European Sites

6.1 The test of likely significant effects described in Section 4 identified no linking impact pathways between site allocations proposed in the Plan and European sites, in isolation or in combination with other plans. There is therefore no need for appropriate assessment or further recommendations with respect to European sites.

Possible European Sites

6.2 Eight of the nine site allocations were screened out with respect to likely significant effects on Sherwood ppSPA due to the lack of linked impact pathways.

6.3 However, the Bestwood II North site allocation, while over 800m from the Sherwood ppSPA, is to take place within plantation woodland ('Longdale Plantation') which potentially provides suitable habitat for nightjar and woodlark. This land may therefore constitute functionally linked land to the possible European site. As required by the Holohan ruling, a European site must be considered within the context of its functional relationships in terms of whether any interest features of the European site may be located outside the site boundary and could be affected by the plan or project under assessment. The proposed development of this land raises potential for likely significant effects due to:

- Direct take (and therefore loss) of potential functionally linked habitat to the possible European site that may be used by nightjar and woodlark;
- Disturbance effects (e.g. noise, visual disturbance) due to excavation activities immediately adjacent to potential functionally linked habitat to the possible European site that may be used by nightjar and woodlark; and
- Air quality impacts: from increased nitrogen deposition, due to increased vehicle use within 200m of potential functionally linked habitat for nightjar and woodlark; and from dust, due to excavation activities within 50m of potential functionally linked habitat for nightjar and woodlark.

6.4 As stated in Section 4, there is no legal obligation to conduct an appropriate assessment of the potential for adverse effects on the integrity of 'possible' (rather than officially proposed or formally designated) European sites. However, Natural England advises that local authorities take a '*risk-based approach*' to forward planning and decision making, such that development plans and proposals are accompanied by an '*additional and robust assessment of the likely impacts arising from the proposals on any breeding nightjar and woodlark in the Sherwood Forest area*'. Moreover, Regulations 10(2) and 10(3) of the Conservation of Habitats and Species Regulations 2017 (as amended) place a duty on Local Authorities and other public bodies to preserve, maintain and re-establish habitats for wild birds and to ensure that these areas are not further degraded. How this duty is implemented is at the discretion of each public body.

Direct landtake and disturbance

6.5 HRA screening undertaken in Section 4 identified the potential for direct take of land that may form functionally linked habitat to the ppSPA. Of the approximately 36ha covered by Longdale Plantation (located approximately 350m west of Sherwood ppSPA at the nearest point), approximately 7ha (19% of Longdale Plantation) is included within the redline boundary of the Bestwood II North site allocation.

6.6 In addition, HRA screening undertaken in Section 4 identified potential for disturbance impacts on land at Longdale Plantation, beyond the area to be physically lost, which could comprise functionally linked habitat to the ppSPA used by nightjar and woodlark. The highest risk of disturbance will be in areas of plantation located within 100m of the extension.

- 6.7 Tarmac's submission for the extensions at Bestwood II Quarry (the 'Bestwood II North' site allocation) acknowledges that the extension areas comprise woodland. In view of this, Tarmac states that *"The extension area is proposed to be restored to nature conservation after uses to complement restoration at the existing quarry, including heathland acid grassland, seasonally wet and marshy areas and retention of woodland plantations and sandstone faces along the extraction boundaries"*.
- 6.8 Furthermore, Tarmac states that *"a habitat mitigation scheme is being prepared in the context of ongoing consultation on the current planning application with Nottinghamshire Wildlife Trust in respect of the proposed loss of the woodland plantation, as well as a long-term habitat management scheme to ensure delivery of habitat creation through the restoration scheme"*.
- 6.9 In order to ensure that impacts on potential functionally linked land for nightjar and woodlark are investigated and mitigated before that land is lost, it is recommended that the Minerals Plan places the following restrictions on the extension:
- 1) The applicant must confirm whether, at the time of the extension (i.e. 2029), the trees in the area of plantation to be lost (and a buffer zone within 100m to account for disturbance impacts) will be over 20 years old. If so then it would not support nesting nightjar or woodlark for another 40 years anyway (i.e. after the trees are felled and the forestry cycle recommences). In which case restoring the site to a habitat appropriate for nightjar/woodlark on cessation of works would be acceptable, as there will be no current use to be addressed.
 - 2) If it is confirmed that the plantation to be lost (and the buffer zone within 100m) will be less than 20 years old at the time of the extension, then it will already form a suitable potential resource for nesting nightjar (and possibly woodlark if it is young enough plantation). In this eventuality a robust survey should be undertaken in the preceding nesting season in order to confirm if either nightjar or woodlark is nesting. If not then (1) will still apply. If either species is nesting, the site promoters will need to:
 - a) wait until October-February before removing the trees and overburden to ensure no conflict with tree or ground nesting birds; and
 - b) At the same time create an appropriate area of replacement habitat for nightjar and woodlark to ensure no net loss of nesting resource.

Dust

- 6.10 Regarding air quality impacts from dust, excavation activities are proposed immediately adjacent to potential functionally linked habitat to Sherwood ppSPA that may be used by nightjar and woodlark. Considering that Institute of Air Quality Management guidance²³ advocates assessment for possible dust impacts within 50m of the site boundary of the dust-generating activity, possible dust impacts are only an issue for a relatively small area of Longdale Plantation. Nonetheless, if significant dust generating activities are to occur, and that dust is likely to coat the vegetation in the adjacent plantation, appropriate dust control measures as outlined in the Institute of Air Quality Management document 'Guidance on the Assessment of Minerals Dust Impacts for Planning'²⁴ should be implemented. This should be a condition imposed on the expansion of this site and should therefore be a commitment in the Minerals Plan.

²³ IAQM. (2016) *Guidance on the assessment of dust from demolition and construction*. The Institute of Air Quality Management. Version 1.1.

²⁴ http://www.iaqm.co.uk/text/guidance/mineralsguidance_2016.pdf

7. Conclusions

- 7.1 Three European sites were considered within the scope of this HRA: Birklands and Billaugh SAC, Hatfield Moor SAC and Thorne and Hatfield Moors SPA. The test of likely significant effects identified no linking impact pathways between site allocations proposed in the Plan and these European sites. The potential for likely significant effects can therefore be screened out at the first stage of HRA alone or in combination with other projects and plans. Further appropriate assessment and/or mitigation are not required.
- 7.2 One possible proposed European site, Sherwood ppSPA, was considered within the scope of this HRA. This European site is expected to be proposed on account of its significant populations of nightjar and woodlark. One parcel of the ppSPA is located approximately 800m east of the Bestwood II North site allocation, which proposes two extensions to Bestwood II Quarry by Tarmac. Due to the distance between Bestwood II quarry and the ppSPA, and the nature of the activities proposed in the Bestwood II North site allocation, there are not considered to be linking impact pathways for likely significant effects on the ppSPA directly. However, the Bestwood II North site allocation is to take place within plantation woodland (Longdale Plantation) which potentially provides suitable habitat for nightjar and woodlark. This land may therefore constitute functionally linked land to the possible European site. The proposed development of this land raises potential for likely significant effects on SPA bird populations due to direct landtake (of up to 7ha; 19% of Longdale Plantation) and disturbance (e.g. noise, visual disturbance).
- 7.3 There is no legal obligation to conduct an appropriate assessment of the potential for adverse effects on the integrity of possible European sites. However, Natural England advises that local authorities take a 'risk-based approach' to forward planning and decision making, such that development plans and proposals are accompanied by an *'additional and robust assessment of the likely impacts arising from the proposals on any breeding nightjar and woodlark in the Sherwood Forest area'*.
- 7.4 In order to ensure that impacts on potential functionally linked land for nightjar and woodlark are investigated and mitigated before that land is lost, it is recommended that the Minerals Plan places the following restrictions on the northern extension of Bestwood II:
- 1) The applicant must confirm whether, at the time of the extension (i.e. 2029), the trees in the area of plantation to be lost (and a buffer zone within 100m to account for disturbance impacts) will be over 20 years old. If so then it would not support nesting nightjar or woodlark for another 40 years anyway (i.e. after the trees are felled and the forestry cycle recommences). In which case restoring the site to a habitat appropriate for nightjar/woodlark on cessation of works would be acceptable, as there will be no current use to be addressed.
 - 2) If it is confirmed that the plantation to be lost (and the buffer zone within 100m) will be less than 20 years old at the time of the extension, then it will already form a suitable potential resource for nesting nightjar (and possibly woodlark if it is young enough plantation). In this eventuality a robust survey should be undertaken in the preceding nesting season in order to confirm either nightjar or woodlark is nesting. If not then (1) will still apply. If either species is nesting, the site promoters will need to:
 - a) Wait until October-February before removing the trees and overburden to ensure no conflict with tree or ground nesting birds; and
 - b) At the same time create an appropriate area of replacement habitat for nightjar and woodlark to ensure no net loss of nesting resource.
- 7.5 Moreover, if significant dust generating activities are to occur as a result of the Bestwood II northern extension, and that dust is likely to coat the vegetation in the adjacent plantation, appropriate dust control measures as outlined in the Institute of Air Quality Management document 'Guidance on the Assessment of Minerals Dust Impacts for Planning'²⁵ should be implemented. This should be a condition imposed on the expansion of this site and should therefore be a commitment in the Minerals Plan.

²⁵ http://www.iagm.co.uk/text/guidance/mineralsguidance_2016.pdf

Appendix A European Sites Background

Birklands and Billaugh SAC

Introduction

Birklands and Billaugh SAC covers 270.5ha, predominantly comprising broad-leaved deciduous woodland (89%). It is the most northerly site selected for old acidophilous oak woods.

Conservation Objectives²⁶

With regard to the SAC and the habitats for which the site has been classified (the 'Qualifying Features' listed below), and subject to natural change:

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:

- The extent and distribution of qualifying natural habitats;
- The structure and function (including typical species) of qualifying natural habitats; and
- The supporting processes on which qualifying natural habitats rely.

Qualifying Features²⁷

The following features are reasons for designation as an SAC:

Annex I habitats that are a primary reason for selection of this site:

- Old acidophilous oak woods with *Quercus robur* on sandy plains for which this is one of only four known outstanding localities in the UK and is the most northerly site selected for old acidophilous oak woods. The site is notable for its rich invertebrate fauna, particularly spiders, and for a diverse fungal assemblage including *Grifoa sulphurea* and *Fistulina hepatica*.

Condition Assessment²⁸

As of August 2013, 96.87% of the site was in 'unfavourable recovering' condition. This condition is applied to areas of the SSSI/SAC which do not currently meet the criteria for favourable condition but are progressing towards that state and are expected to meet them in the future. The woodlands have been identified as benefiting from improved management, including improving and maintaining the structure and function of the woodland system and a continuity of dead-wood habitats. There are older trees and younger trees but none in middle age classes to replace the veteran/ancient trees as they die off. Targeting the composition and structure of trees present would make a big difference to the health of the identified features of interest. Pollution and climate change are also contributing factors to poor health and likely to exacerbate stresses²⁹. These impacts may be more difficult to address directly, except through policy and indirectly through continued habitat management.

Environmental Vulnerabilities Relevant to the Plan³⁰

The threats and pressures likely to affect the SAC are listed below:

- Public access/disturbance: the location of the current visitor centre complex is preventing necessary restoration of the full extent of the oak woodland. SAC use as a public park can cause localise soil

²⁶ <http://publications.naturalengland.org.uk/publication/5179475394297856> [Accessed 13/02/2019]

²⁷ <http://jncc.defra.gov.uk/ProtectedSites/SACselection/sac.asp?EUCODE=UK0012740> [Accessed 13/02/2019]

²⁸ <https://designatedsites.naturalengland.org.uk/ReportConditionSummary.aspx?SiteCode=S1003476&ReportTitle=Birklands%20and%20Billaugh%20SSSI> [Accessed 15/02/19]

²⁹ Aspeden, L, *et al.* 16 Aug 2013. Assessing the potential consequences of climate change for England's landscapes: Sherwood. Natural England Research Report NERR049.

³⁰ <http://publications.naturalengland.org.uk/publication/6727956374224896> [Accessed 13/02/2019]

compaction, nutrient enrichment, direct loss of trees (vandalism, health and safety), introduction of non-native species (including diseases) and altered ecological succession.

- Changing land management: the previous lack of management has led to a very large age gap between the ancient trees and the next generation cohort. Without intervention this will result in localised extinction of invertebrate species and an alteration to vegetation structure.
- Physical modification: recent deep seam coal extraction immediately beneath the SAC has resulted in surface fissuring which could potentially impact ancient trees.
- Disease: woodland within the site is threatened by the spread of pathogens (often through movement of timber).
- Invasive species: the site is threatened by non-native invasive plants, notably Himalayan balsam (*Impatiens glandulifera*). Japanese knotweed (*Fallopia japonica*) appears to be under control following treatment. Rhododendron (*Rhododendron ponticum*) management is necessary to prevent the spread of the pathogen *Phytophthora*.
- Air pollution: nitrogen deposition in excess of habitat-specific critical loads risks detrimental effects on the functioning of habitats for which the SAC is designated (e.g. by encouraging the growth of more vigorous species at the expense of slower growing species of impoverished soils). According to Air Pollution Information System (APIS) data from 2013-2015³¹, levels of nitrogen deposition exceed the habitat-specific critical loads for the old acidophilous oak woods with *Quercus robur* on sandy plains (average nitrogen deposition = 27.9kg N/ha/yr; critical load = 10-15kg N/ha/yr).

³¹ <http://www.apis.ac.uk/src/select-a-feature?site=UK0012740&SiteType=SAC&submit=Next> [accessed 13/02/19]

Hatfield Moor SAC and Thorne and Hatfield Moors SPA

Introduction

Hatfield Moors SAC covers 1359.5ha comprising varied habitats including bog and fen (12%), heath and scrub (9%) and broad-leaved deciduous woodland (6%). The site is of particular note for its bog and fen habitats which are a remnant of once-extensive peatlands within the Humberhead Levels. These are notable for invertebrate fauna including the highly localised mire pill beetle (*Curimopsis nigrita*).

Thorne and Hatfield Moors SPA consists of two moors covering a combined 2449.2ha. One of the moors, Hatfield Moor, is also included (to a greater extent) within Hatfield Moors SAC. With respect to bird populations of European importance, the Site supports a significant nightjar population.

Conservation Objectives^{32,33}

With regard to the SAC and the natural habitats and/or species for which the site has been designated (the 'Qualifying Features' listed below), and subject to natural change:

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the Favourable Conservation Status of its Qualifying Features, by maintaining or restoring:

- The extent and distribution of qualifying natural habitats and the habitats of the qualifying features;
- The structure and function (including typical species) of qualifying natural habitats and the habitats of qualifying features;
- The supporting processes on which qualifying natural habitats and the habitats of qualifying features rely;
- The population of each of the qualifying features; and
- The distribution of the qualifying features within the site.

Qualifying Features^{34,35}

Annex I habitats that are a primary reason for selection of Hatfield Moor SAC:

- Degraded raised bogs still capable of natural regeneration.

Bird species for which Thorne and Hatfield Moors SPA is selected:

- Nightjar: 66 pairs representing at least 1.9% of the breeding population in Great Britain (5 count peak mean 1993, 1995-1998).

Condition Assessment³⁶

During its most recent assessment, 92.23% of the SAC (which includes the area of Hatfield Moor included within Thorne and Hatfield Moors SPA) was in 'unfavourable recovering' condition. This condition is applied to areas of the SSSI/SAC which do not currently meet the criteria for favourable condition but are progressing towards that state and are expected to meet them in the future. 6.50% of the site was in 'unfavourable – no change' condition. Areas of designated habitat continue to suffer from scrub encroachment, which is encouraged by drying of bog and mire habitats.

³² <http://publications.naturalengland.org.uk/publication/4872212687355904> [Accessed 14/02/19]

³³ <http://publications.naturalengland.org.uk/publication/6503407711944704> [Accessed 14/02/19]

³⁴ <http://jncc.defra.gov.uk/ProtectedSites/SACselection/sac.asp?EUCode=UK0030166> [Accessed 14/02/19]

³⁵ <http://jncc.defra.gov.uk/page-1988-theme=default> [Accessed 14/02/2019]

³⁶ <https://designatedsites.naturalengland.org.uk/ReportConditionSummary.aspx?SiteCode=S1000536&ReportTitle=Hatfield%20Moors%20SSSI> [Accessed 14/02/19]

Environmental Vulnerabilities Relevant to the Plan³⁷

The threats and pressures likely to affect the SAC and SPA are listed below:

- Drainage: achieving stable water levels near to ground level and preventing further decline of raised mire habitat requires the improvement and reconfiguring of the artificial drainage system around the site.
- Inappropriate scrub control: in drier areas secondary scrub has developed in place of peatland, covering large areas of the moor. This increases water loss from this designated habitat. Large-scale scrub control is required.
- Atmospheric pollution: nitrogen deposition in excess of habitat-specific critical loads risks detrimental effects on the functioning of habitats for which the SAC is designated (e.g. by encouraging the growth of more vigorous species at the expense of slower growing species of impoverished soils). According to Air Pollution Information System (APIS) data from 2013-2015³⁸, levels of nitrogen deposition exceed the habitat-specific critical loads for the degraded raised bogs still capable of natural regeneration (average nitrogen deposition = 19.5kg N/ha/yr; critical load = 5-10kg N/ha/yr).
- Public access/disturbance: disturbance affects nightjar breeding success (e.g. through increased predator pressure).
- Planning permission: in the wider area (especially north and west of the site), windfarms have been erected or are proposed. The potential impacts of this on nightjar are poorly understood and require further investigation.
- Peat extraction: in few locations planning permissions remain in place relating to peat extraction, drainage and service area use.
- Invasive species: the site's peripheral drain contains New Zealand pygmyweed (*Crassula helmsii*). This can spread rapidly, outcompeting native plant species.

³⁷ <http://publications.naturalengland.org.uk/publication/6489780632158208> [Accessed 14/02/19]

³⁸ <http://www.apis.ac.uk/src/select-a-feature?site=UK0030166&SiteType=SAC&submit=Next> [accessed 14/02/19]

Sherwood Possible pSPA

Introduction

A portion of the Sherwood Forest area is currently being considered as a possible potential Special Protection Area (referred to in this report as a 'ppSPA'), with regard to birds of European importance (nightjar and woodlark) that this area supports.

According to evidence submitted for the Rufford Energy Recovery Facility (ERF) Public Inquiry (February – September 2010), a draft ppSPA boundary was drawn and was based on combined Indicative Core Areas submitted by Natural England and Sherwood Important Bird Areas submitted by RSPB. The updated advice letter submitted by Natural England (March 2014), advises that it is the combined boundaries of these areas that form an informal ppSPA boundary. The Birklands and Bilhaugh SAC is included within this boundary.

Potential Qualifying Features and Conservation Objectives

Draft *Conservation Objectives* and *Qualifying Features of Interest* were submitted by Natural England as part of the ERF public inquiry, of which Natural England has advised that these are used to inform a 'risk-based approach'. These are summarised in Table 4.

Table 4. Sherwood ppSPA probable interest features and conservation objectives

Conservation Objective	'To maintain the species features in favourable condition, which is defined in part in relation to their population attributes. On this site favourable condition requires the maintenance of the population of each species feature. Maintenance also implies restoration, if evidence from condition assessment suggests a reduction in size of population.'
Qualifying Features of Interest	Nightjar and woodlark populations including breeding sites and occupied territories. Nightjar and woodlark habitats including lowland heathland, coniferous woodland with a mosaic of bare ground and low vegetation amongst young scrub, scattered trees or dense stands of young conifer trees.

Based on 2004-2006 survey results, the Sherwood Area contains more than 1% of the UK's population of nightjar and woodlark. This constitutes the 'first step' (Stage 1) towards considering if the area qualifies as an SPA or potential SPA (pSPA)³⁹. This information is currently being assessed along-side a UK-wide review programme led by Defra⁴⁰.

The full SPA selection process has yet to be formally implemented and the formal UK Review of the existing suite of sites for nightjar and woodlark is pending. Accordingly, the Review Panel (JNCC) has not yet formed a view on whether a site within the Sherwood Forest region is one of the 'most suitable territories' for these species and therefore has not so far provided any advice to the Secretary of State on the selection of any SPA in the Sherwood Forest Area.

Potential Environmental Vulnerabilities

Currently, since the site is not officially proposed for designation, there are no formal conservation objectives or site boundaries available; therefore it is difficult to provide the same level of detail regarding site vulnerabilities, as has been given to other European sites discussed in this report. In the absence of this information, a more informal approach has been taken.

Potential threats and pressures likely to affect the ppSPA are listed below:

- Public access/disturbance: ground-nesting nightjar and woodlark are vulnerable to disturbance from people and domestic pets.
- Construction-related disturbance: nightjar and woodlark are susceptible to disturbance by noise, traffic and artificial lighting which could occur during/following construction in close proximity to territories.

³⁹ For more information, see the Joint Nature Conservation Committee's website on SPA classification: <http://jncc.defra.gov.uk/page-1405>

⁴⁰ The time schedule of this UK SPA Review has been changeable. There are many issues included in this review, including a more realistic alignment with the European Habitats Directive. This may have implications for how sites are selected and what complimentary areas are included. For more information, see the Joint Nature Conservation Committee's website (Review of the UK SPA Network): <http://jncc.defra.gov.uk/page-162>

- Inappropriate habitat management: nightjar and woodlark have specific habitat requirements which require appropriate management of plantation habitat.
- Invasive plants: can change the vegetation structure required by SPA bird species.

Appendix B Screening of Site Allocations

Appendix B details the results of likely significant effects testing of site allocations detailed in the Plan (Table 5). Site allocations in yellow have potential for likely significant effects on one or more European sites or possible European sites, and therefore cannot be screened out at this stage. Site allocations in green do not have potential for likely significant effects on any European sites, and are therefore screened out at this stage.

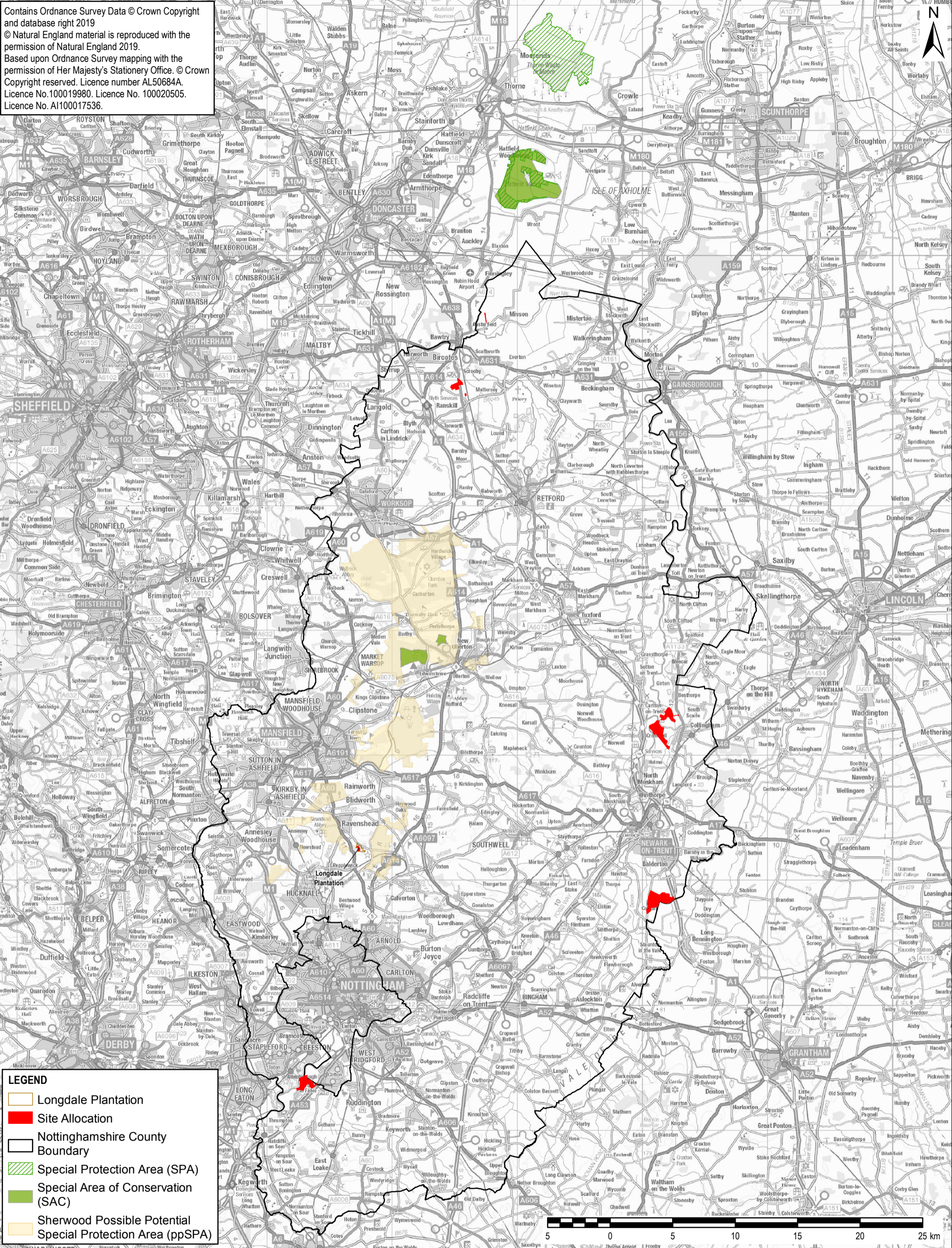
Table 5. Screening table of site allocations in the Plan

Site allocation	Description of development	Screening Outcome
Bawtry Road West	A 3.4ha extension to the existing Misson grey sand quarry, potentially adding up to 180,000 tonnes in reserves and extending the life of the quarry by 5-7 years.	No HRA implications The nearest European sites or possible European site, Hatfield Moor SAC/Thorne and Hatfield Moors SPA is approximately 8.6km north of this site allocation.
Scrooby Thompson Land	An extension to existing sand and gravel excavation at Scrooby, with total reserves estimated at 60,000 tonnes with a life of 2 years. HGV movements are estimated at 12 return movements per day (3,000 per annum) in combination with the Scrooby North excavations (although this may be subject to change following the recent reduction in estimated reserves at Scrooby Thompson Land).	No HRA implications The nearest European site or possible European site, Sherwood ppSPA, would be approximately 7.5km south of this site allocation.
Scrooby North	An extension to existing sand and gravel excavation at Scrooby, with recoverable reserves of 620,000 tonnes with a life of over 20 years (projected output of 15,000-30,000 tonnes of sand and gravel per annum).	No HRA implications The nearest European site or possible European site, Sherwood ppSPA, would be approximately 8.5km south of this site allocation.
Langford Lowfields North	A ~124ha extension to existing gravel excavation at Langford Quarry, with estimated workable reserves of 8 million tonnes and a life of around 18 years (at an output of around 450,000 tonnes per annum). HGV movements are estimated at up to 110 loads per day.	No HRA implications The nearest European site or possible European site, Sherwood ppSPA, would be approximately 14.0km northwest of this site allocation.
Besthorpe East	An extension to existing sand and gravel extraction at Besthorpe Quarry, with estimated workable reserves of 3.3 million tonnes of sand and gravel and a life of approximately 16 years beyond the current permitted extraction (at an output of approximately 200,000 tonnes per annum). HGV movements are estimated at approximately 60 loads per day.	No HRA implications The nearest European site or possible European site, Sherwood ppSPA, would be approximately 14.3km northwest of this site allocation.
Mill Hill near Barton in Fabis	A new extraction site at Mill Hill with estimated reserves of 3.4 million tonnes of sand and gravel and a life of 12-15 years (at an estimated output of approximately 280,000 tonnes per annum). HGV movements are estimated at an average of 114 per day.	No HRA implications The nearest European site or possible European site, Sherwood ppSPA, would be approximately 15.6km north of the site allocation.
Bestwood II North	Two extensions to the existing Bestwood II Quarry covering a combined ~7ha, together accounting for the excavation of approximately 140,000 tonnes of sandstone per annum between 2018 and 2035. HGV movements are estimated at approximately 55 per day.	HRA implications This site allocation is approximately 800m west of Sherwood ppSPA. As this Site is a possible pSPA, there is not currently an obligation to conduct an appropriate

		assessment. However, further consideration of impacts on this site is recommended (see Section 6). The nearest European site, Birklands and Billaugh SAC, is approximately 14.8km north of this site allocation. There are therefore no HRA implications regarding European sites.
Scrooby Top North	A continuation of existing Scrooby sandstone extraction with an estimated output of 120,000 tonnes per annum across a life of approximately 40 years.	No HRA implications The nearest European site or possible European site, Sherwood ppSPA, would be approximately 8.2km south of this site allocation.
Bantycok South	An extension to existing gypsum extraction at Bantycok Quarry with an estimated output of 350,000-500,000 tonnes per annum across a life of 15-24 years.	No HRA implications The nearest European site or possible European site, Sherwood ppSPA, would be approximately 19.4km from this site allocation.

Appendix C Map of Site Allocations and Relevant European Sites

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