Proof of Evidence of Professor Sir John Lawton CBE FRS

for the Yorkshire Wildlife Trust

15th October 2019

Biography

1.1 I am Professor Sir John Lawton. I am an ecological scientist and conservation biologist. I am also a passionate natural historian (and have been since the age of seven) with a particular love of birds, plants, butterflies and dragonflies, but I am basically fascinated by most living things. For present purposes the significant parts of my biography are:

Career and Positions Held

Department of Zoology, University of Durham: Undergraduate1962-1965 (1st Class Honours Degree, 1965); Research student 1965-68 (PhD 1969)

Demonstrator in Animal Ecology, Department of Zoology, Oxford University, (1968-71)

Lecturer, University of York (1971-78); Senior Lecturer (1978-82); Reader (1982-85); Professor (personal chair) (1985-89)

Director, NERC Centre for Population Biology and Professor of Community Ecology, Imperial College of Science, Technology and Medicine, London (1989-99)

Chief Executive, Natural Environment Research Council (1999- 2005)

Chairman, Royal Commission on Environmental Pollution (2005-11)

Selected Honours and Prizes

Elected Fellow of the Royal Society of London 1989

CBE in The Queen's Birthday Honours List 1997

Knighted in the New Year Honours list 2005

Foreign Associate of US National Academy of Science 2008

Foreign Honorary Member of American Academy of Arts and Sciences 2008

Japan Prize, Science and Technology for Conservation of Biodiversity 2004. (The Japan Prize is widely regarded as the Nobel Prize in the Environmental Sciences)

Honorary degrees: Lancaster1993; Birmingham 2005; York 2005; Aberdeen 2006; East Anglia 2006; Fellowship of Imperial College 2006. Honorary Fellow, University College Durham, 2004.

President's Gold Medal of the British Ecological Society 1987

ECI Prize Winner in the Field of Terrestrial Ecology 1996

British Ecological Society's Marsh Award for Ecology 1996

Kempe Award for Distinguished Ecologists, Sweden 1998

Zoological Society of London Frink Medal 1998

Honorary Life Member, Royal Entomological Society 2001

Society for Conservation Biology La Roe Award 2002 (a US based society)

Elected member Academia Europaea 2006

Ramon Margalef Prize in Ecology and Environmental Science, Catalonia 2006

Honorary Fellow of the Zoological Society of London 2007

Fellow of WF-UK 2008 - 2018

Honorary Member of the British Ecological Society 2009

The RSPB Medal for outstanding achievements in wild bird protection and countryside

conservation 2011. (The RSPB medal means a lot to me, recognising as it does, many years of amateur, voluntary work for conservation)

National Biodiversity Network John Burnett Memorial Lecture and Medal 2012

Chartered Institute of Ecology and Environmental Management Medal 2017. (This is CIEEM's highest award, with just one being given every year)

Selected Current and Previous (from 1999) External Professional-Related Activities

Vice President, British Trust for Ornithology 1999-2007

Trustee, WWF-UK 2002-2008, and Chair of Programme Committee 2003-08

President British Ecological Society 2005-07

Vice President, Royal Society for the Protection of Birds 1999-ongoing

Trustee and Vice Chairman Yorkshire Wildlife Trust 2007-09; Chairman 2009-14; President 2014-

Vice President environmental protection uk 2008-10

Non-executive Board Member, Food and Environment Research Agency 2009-15

Patron, Wiltshire Wildlife Trust 2010-ongoing

Chairman Norwich Research Park Scientific Advisory Board 2011-2014

Chairman, Endangered Landscapes Programme (funded by Arcadia through Cambridge Conservation Initiative) 2017-ongoing

Chairman, Tees-Swale Naturally Connected (funded by HLF through Yorkshire Dales NP and North Pennine AONB) 2018 – ongoing

Patron, National Biodiversity Network 2018 - ongoing

Selected Other Professional Activities (1990 onwards)

Royal Commission on Environmental Pollution Member 1990-96; Chairman 2005-11

Council Member of the Royal Society for the Protection of Birds 1987-93; Chairman of Council 1993-98; Vice President 1999-

Member of Scientific Advisory Board, US National Center for Ecological Analysis & Synthesis, Santa Barbara, CA 1995-97

Member of NERC Council, Resources and Strategy Group, and Chairman, Terrestrial and Freshwater Science and Technology Board 1995-99

Chairman Imperial College Environment Office 1998-99

Graduate Students

48 graduate students successfully completed their PhDs under my supervision.

Research Interests

Theoretical and experimental population dynamics and community ecology. Impacts of global environmental change on populations, communities and ecosystems. Biological pest control. The use of controlled environment facilities for ecological research. Large scale patterns and processes in ecology. Biodiversity and conservation. Biodiversity and ecosystem processes. The environmental science/policy interface.

Publications

Over 320 papers, articles and book chapters, including 17 refereed papers in *Nature* and 7 in *Science*; 6 books and edited symposia

8th most cited European ecologist, and most highly cited per paper 1997-2007 (*Bulletin, British Ecological Society,* March 2011)

International Standing

Recognition of my contributions to ecological science and conservation biology is not just confined to the UK but is international. As well as being elected as a Foreign Member of the US National Academy, and the American Academy of Arts and Sciences, and being a member of the Advisory Board of US National Center for Ecological Analysis & Synthesis, Santa Barbara (as listed above) I was for nearly a decade an Adjunct (i.e visiting) Scientist at the In Institute of Ecosystem Studies in New York State. Several of my listed honours and prizes are from overseas (see above). In Europe I am an Elected Member of Academia Europaea, won the Ramon Margalef Prize in Spain, and the Kempe Award in Sweden. The Japan Prize is the highest international award in my field. I currently chair the Endangered Landscapes Programme (see above) with a $30m endowment from Arcadia to invest in wildlife conservation across the continent of Europe. At the invitation of national governments, their agencies or institutions I have also worked extensively in South Africa, Australia, New Zealand, Canada, Singapore, Hong Kong, Argentina and Brazil.

Summary of my Proof of Evidence

We argue that the proposed development will markedly increase the isolation of Askham Bog Site of Special Scientific Interest in two ways. The housing development itself will be a significant barrier to many species trying to move through land to the north of the bog; and the proposed 3m high barrier (designed to prevent people and pets from entering the reserve) will, by definition, reduce or prevent a wide range of non-flying animals from entering the bog from the north side. Ecological theory and empirical data show that increased isolation of the site is bound to lead to the extinction of species currently occurring in the reserve.

Proposing to increase the isolation of a nationally important protected site is in direct contradiction to current Government policy (which is, wherever possible, to enhance the connectivity the protected area network, according to the "Lawton Principles"), and flies in the face of NPPF 2018 guidance, paras 170 and 174. The application is an existential threat to the wildlife of Askham Bog and should be rejected.

Making Space for Nature

2.1 In 2010 a panel I chaired produced a report for Defra (the Department of Environment, Food and Rural Affairs in the Westminster Government) entitled *Making Space for Nature: A review of England's wildlife sites and ecological network*[1]. The work was commissioned in 2009 by the then Secretary of State Hilary Benn. In his letter asking me to take on the Chair he perceptively pointed out: "With the effects of climate change and other pressures on our land, now is the time to see how we can enhance ecological England further. Linking together areas to make ecological corridors and a connected network, could have real benefits in allowing nature to thrive."

2.2 Hilary Benn was a Labour Party Minister, and after Labour lost the General Election in May 2010, a new Conservative Secretary of State (Caroline Spelman) was appointed. Caroline Spelman agreed that my panel should carry on its work, and she received my report in September that year.

2.3 *Making Space for Nature* (now widely cited as "the Lawton report") argued that in order to halt and then reverse the depressing and on-going declines of UK wildlife (documented in detail in the first *State of Nature report* in 2013, using much of the data we had drawn on to write our report) we needed a step-change in England's approach to wildlife conservation, moving on from trying to hang on to what we have left (important as that still is) to one of large-scale habitat restoration and recreation, underpinned by the re-establishment of ecological processes and ecosystem services, for the benefits of both people and wildlife.

2.4 The 'executive summary' of our recommendations was "More, Bigger, Better and Joined." We need more, bigger and better managed protected sites, all in a joined up network. It worked, and nearly a decade later it has become the guiding principle underpinning wildlife conservation in both the voluntary and statutory sectors across the UK, and increasingly in continental Europe. For example my contribution has been recognised by the Arcadia Foundation (see my CV) with a $30m endowment to fund the Endangered Landscapes Programme that I chair, to deliver ecological networks across Europe.

2.5 In June 2011, partly in response to *Making Space for Nature*, the Westminster Government published what Caroline Spelman described in the Foreword as "the first [White Paper] on the natural environment for over 20 years", with an accompanying new England Biodiversity Strategy entitled *Biodiversity* 2020.

2.6 In 2018 The Westminster government went further with the publication of *A Green Future. Our 25 Year Plan to Improve the Environment*[2], in which it explicitly aspires to create a "nature recovery network" based on the "Lawton principles", including the creation and restoration of 5,000km^2 of wildlife-rich habitats.

2.7 “More, bigger, better and joined” has also struck a chord in other ways, and is the key theme running through an important new book on *Planning, Sustainability and Nature*[3].
Among other guidance, Paragraph 170 of the NPPF (2019) states:

> “*Planning policies and decisions should contribute to and enhance the natural and local environment by:*
>
> *a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan)*
>
> *and*
>
> *d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures”*

2.7 Basically, the four key ideas (“More, Bigger, Better and Joined”) laid out in *Making Space for Nature* have now become deeply embedded in the wildlife conservation and environmental management principles guiding all work by the statutory and voluntary sectors.

2.8 This submission focuses on “coherent ecological networks”, i.e. the “joined” in *Making Space for Nature*. The proposed housing development fundamentally challenges the principle of linking protected areas in an ecological network, because it markedly increases the isolation of Askham Bog.

Isolation is a direct threat to biodiversity

3.1 Ecologists have known that isolated sites have an impoverished flora fauna since the publication of R.H. MacArthur and E.O. Wilson’s seminal book *The Theory of Island Biogeography* over 50 years ago in 1967. There are now hundreds of scientific papers (mathematical theory, empirical observations and field experiments) confirming their initial findings. We summarised key parts of this evidence in *Making Space for Nature*, and the need for a coherent ecological (“joined up”) network has never been challenged as far as I am aware over the subsequent nine years since my report was published. Indeed, it is Government Policy (see paras 2.5 and 2.6 above).

3.2 There follow some direct quotes from *Making Space for Nature,* with paragraph numbers as [*MSfN xx.x*]. The large number of supporting scientific papers and books underpinning the arguments have not been included in this submission, but can be found in that report. *Text in italics has been added to make explicit reference to Askham Bog.*

3.3 [*MSfN 4.3.*4] Species’ distributions are often dynamic. Indeed, many species’ populations exist not as spatially isolated groups but as meta-populations, [that is] sets of local populations linked by the dispersal and movement of individuals to adjacent populations. Butterflies on traditionally coppiced woodland or chalk-downland habitats *or sites such as Askham Bog,* form meta-populations – individual colonies (often in protected areas) linked by

the movement of individuals from adjacent colonies…..(S)pecies that appear to exist as meta-populations include bumblebees and several freshwater species, including amphibians and molluscs (*typical of many of the taxa for which Askham is important)*.

3.4 [*MSfN 4.3.*4 cont.] Meta-populations have some surprising, but well understood properties. If one or more of the linked patches of habitat are lost (either because the habitat is destroyed, or even if it deteriorates through poor management, *or it is disconnected from adjacent patches*), surviving populations on adjacent patches may decline (and even go extinct), even if surviving patches remain in good condition. Individual populations in a meta-population can 'come and go', like lights blinking on and off. And as the distance between individual populations increases, larger (or better quality) habitats are needed to maintain viable individual populations.

3.5 [*MSfN* 4.3.4 cont.] The geographic scales over which meta-populations operate vary hugely with the nature of the species under consideration. For tiny invertebrates living in moss-covered rocks it may only be a few square meters; for butterflies a few square km; and the expanding meta-population of England's Red kites may eventually encompass the whole of the country. Plant species may exist as meta-populations linked by either seed or pollen dispersal, but the importance of these processes in sustaining plant populations is unclear and plants may show other dynamic patterns of distribution.

3.6 [*MSfN* 4.3.4 cont.]Species may also require to move between sites for other reasons, in particular:

(i) species whose ranges are expanding or shifting due to climate change;
(ii) species using resources that are only temporary in the landscape (such as pioneer plant species or species using seasonal ponds);
(iii) species in which the individuals have large ranges; and
(iv) species that are migratory or which use different habitats at different stages of their life cycles.

3.7 [*MSfN* 4.3.4 cont.] Many of England's species need to be able to move for one or more of these reasons. Mobile species require both suitable core habitat patches to move to and they need to be able to move between patches. In some situations this will require physical linkages in the form of corridors and stepping stones, but for others it may be more appropriate to ensure the land between sites – the matrix - is permeable to wildlife, through environmentally-friendly farming techniques. *The latter applies exactly to the land proposed for housing development.*

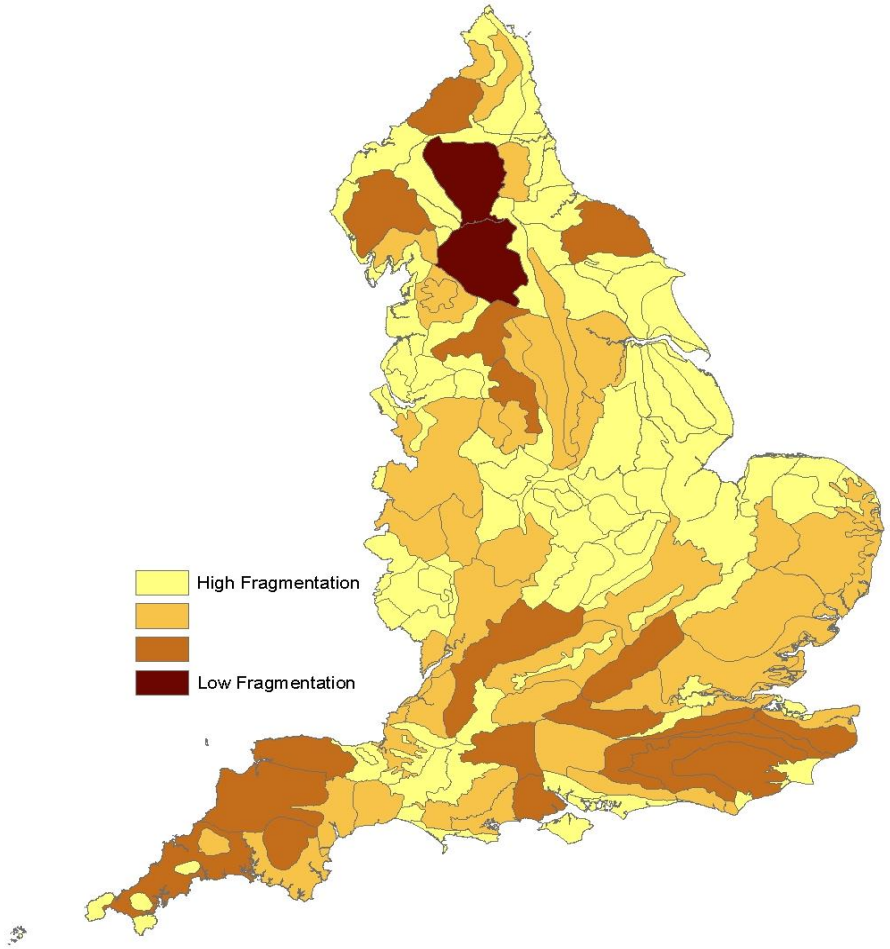
3.8 There are some obvious messages for the design of an effective ecological network:

(a) Maintaining fragments of surviving semi-natural habitats in good condition matters, not only for the species and individuals currently within them, but also for those on adjacent habitat patches linked as a meta-population, and for other mobile and wide-ranging species.

(b) Connectivity matters. As populations in a meta-population or of mobile species become more and more isolated, it is harder and harder to maintain them, even with excellent local habitat management.

3.9 Habitat connectivity is already very low in the Vale of York. MSfN provides a map with the evidence:

Levels of habitat fragmentation across National Character Areas.
This analysis takes account of habitat extent and permeability land between habitat patches to produce a ranking from areas where habitats are most fragmented (lighter) to less fragmented and more connected (darker). From an analysis carried out by Dr. R. Catchpole, Natural England as reproduced in *Making Space for Nature.*



3.10 [*MSfN 4.3.4*cont.] <u>Connections through the wider countryside</u>
Species will often need to move between wildlife sites or habitat patches so via stepping stones or the wider environment, without using continuous corridors. In this section (*see map* above) we present the results of a new analysis which ranks the connectivity of English landscapes on a qualitative scale from 'most fragmented and isolated' to 'well connected'. The analysis takes account of the extent of core habitat patches, how isolated the patches are, which habitats are next to each other, and the ease with which species are able to move

through the surrounding landscape. It makes some simple, but robust assumptions about the dispersal abilities of focal species, but since the index of fragmentation is a relative ranking, the results are broadly unchanged by using different dispersal rates.

3.11 In making comparisons of this sort, we also need an appropriate geographical framework, which takes account of both natural and cultural heritage, including historic land use, hydrology, soils, geology and ecology. National Character Areas provide this framework and we have mapped the relative fragmentation of different parts of England using them (Figure on page 8 above, from *MSfN*). It confirms that major differences exist in landscape connectivity across England, with clear implications for what needs to be done to create a more resilient ecological network in different parts of England. *Increasing the isolation of Askham Bog is exactly the wrong thing to do on the Vale of York.*

3.12 [*MSfN 2.2.1*] Much of England's wildlife is now restricted to certain places, our wildlife sites, consisting largely of semi-natural habitats moulded by millennia of human-use (*Askham is an excellent example*). These sites are essential for the survival of many plants and animals and will remain important even if the species and habitats within them change. Surviving in small, isolated sites is, however, difficult for many species, and often impossible in the longer term, because they rarely contain the level of resources or the diversity of habitats needed to support sustainable populations. However, re-creating large expanses of continuous natural habitat is not a feasible option over most of England. An alternative approach is to secure a suite of high quality sites which collectively contain the range and area of habitats that species require and ensure that ecological connections exist to allow species, or at least their genes, to move between them.

Evidence that the proposed development will increase the Isolation of the bog

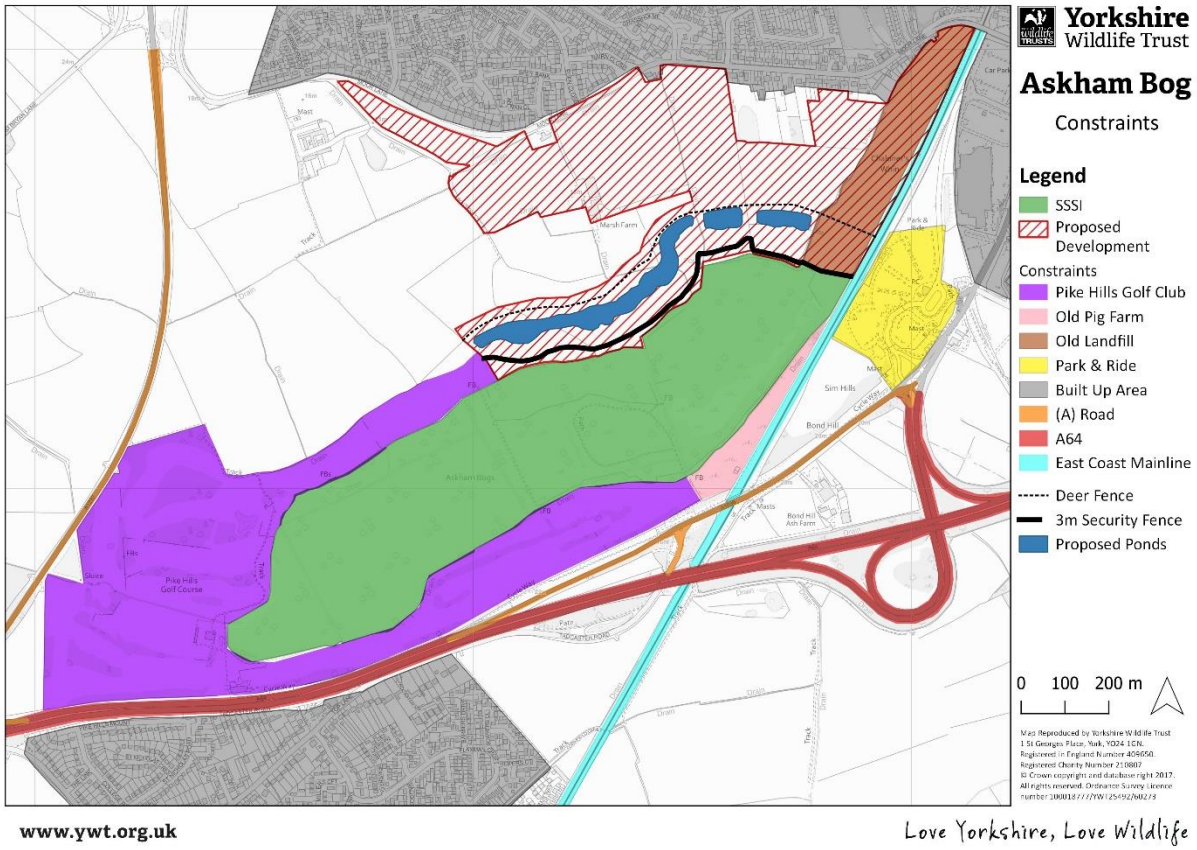
4.1 Askham Bog is already quite isolated, surrounded as it is by the A64 road to the south; the East Coast Main Line to the east; and Pike Hills Golf Course, which 'wraps round it to the south, west and north. (The closely mown greens and fairways of golf-courses are also treated intensively with both herbicides and pesticides and are generally extremely 'wildlife unfriendly').

4.2 Many species will be unable to cross these hostile environments. The proposed development site (hatched in red on the map on page 10 below) essentially obliterates a large area of 'low-intensity' farmland, which is itself reasonably favourable to wildlife and which is much easier for many taxa to traverse.

4.3 A range of farmland-bird species regularly move in and out of the Bog across this farmland, which the development would obliterate. The proposed development also cuts of existing linkages between an old clay-pit (Hogg's Pond) and a small pond to its west.

4.4 Paradoxically, the proposal by the developers to put a major 3m high security fence (the black line on the map) between the north side of the bog and the development (to prevent

ingress of people and pets into the north side of the site), if it is to be effective, can only exacerbate the site's isolation for non-flying animals. But many species that can fly, as well as many that cannot, will also be very unwilling, or unable, to move through a large built-up area.



4.5 Exactly which species will be at increased risk of extinction from increased isolation is hard to say. In my considered opinion some (but by no means all) of the species that have already disappeared from the bog over the last 50-75 years have probably done so because the site has become increasingly isolated over that time. (Other reasons for loss of species probably include deterioration in hydrology, climate-change, successional changes in the vegetation, and so on).

4.6 What we said in *Making Space* is that on the available evidence, isolation is a major factor leading to species-extinctions in so-called "specialist species" – species that require very particular habitats and are typically not very mobile:

[*MSfN 2.1*.3] More generally, and setting climate change aside for the moment to focus on what is happening to native species, at least in well-studied groups it is the habitat specialists that have suffered most of the declines documented in the previous section; generalists (less choosy, more adaptable) species are often holding their own or increasing.
Askham currently still supports a rich variety of habitat specialists, an unknown number of which (but NOT zero) would be threatened by increasing isolation.

4.7 There is one further consequence of increasing the isolation of Askham Bog. Whilst it is (quite correctly) important to focus on the flora and fauna of the bog itself, this completely ignores the consequences for species in the landscapes surrounding the site. Because Askham is such a rich and important site for wildlife, populations of birds, mammals and insects in the surrounding area, linked as a metapopulation with those in the bog, will themselves be threatened with extinction once they are cut off from the site itself. I cannot predict how severe this effect will be, but it is bound to happen to a greater or lesser extent. In other words, the proposed development is totally inconsistent with *A Green Future,* the Government's 25 year plan to improve the environment[2], in which it explicitly aspires to create a "nature recovery network" based on the "Lawton principles". Severing the network directly contradicts these aims.

4.8 Basically in a UK world in which nature is literally struggling to survive, in which species continue to be lost through human actions at an alarming rate, but in which we also know how to reverse these depressing trends, why would any responsible Planning Authority sanction a development that has no benefits what-so-ever for wildlife, and only a downside that cannot be mitigated?

4.9 For this reason alone, the proposed development flies in the face of two parts of NPPF 2019.

Para 170. "Planning policies and decisions should contribute to and enhance the natural and local environment by

a) protecting and enhancing valued landscapes, sites of biodiversity or geological value and soils (in a manner commensurate with their statutory status or identified quality in the development plan);

d) minimising impacts on and providing net gains for biodiversity, including by establishing coherent ecological networks that are more resilient to current and future pressures."

And:

Para 174. "To protect and enhance biodiversity…plans should

b) promote the conservation, restoration and enhancement of priority habitats, ecological networks and the protection of recovery of priority species; and identify and pursue opportunities for securing measurable net gains for biodiversity."

4.10 To repeat myself. This application has no merits under NPPF guidance.

4.11 There is however an obvious use for this land which would have considerable merits, namely to use it to re-create and restore appropriate habitats throughout the land adjacent to the current reserve (new wetlands, wet woodland and grassland for instance), for the benefits of people and wildlife.

References

1. Lawton, J.H., Brotherton, P.N.M, Brown, V.K., Elphick, C., Fitter, A.H., Forshaw, J., Haddow, R.W., Hilborne, S., Leafe, R.N., Mace, G.M., Southgate, M.P., Sutherland, W.A., Tew, T.E., Varley, J., & Wynne, G.R. (2010) *Making Space for Nature: a review of England's wildlife sites and ecological network.* Report to Defra.
2. www.gov.uk/government/publications/25-year-environment-plan
3. Counsell, D & Stoneman, R. (2018) *Planning, Sustainability and Nature.* Lund Humphries, London.

My Availability

I have a number of commitments in November which constrain my availability, for which I apologise. During the enquiry in November I am available on:
Friday 15th
Monday 18th
Tuesday 19th
Monday 25th
Tuesday 26th
Wednesday 27th