Habitats Regulations Assessment of the Broxbourne Emerging Local Plan

Appropriate Assessment

March 2018

LEPUS CONSULTING
LANDSCAPE, ECOLOGY, PLANNING & URBAN SUSTAINABILITY

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HRA Appropriate Assessment

Final

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Photo: Northern Shoveler by Horoumono

About this report & notes for the reader

Lepus Consulting Ltd (Lepus) has prepared this report for the use of Broxbourne Borough Council. There are a number of limitations which should be borne in mind when considering the results and conclusions of this report. No party should alter or change this report without written permission from Lepus.

HRA is a tool for predicting potential significant effects. The actual effects may be different from those identified. Prediction of effects if made using an evidence based approach and incorporates a judgement.

The assessments are based on the best available information, including that provided to Lepus by the Council and information that is publicly available. No attempt to verify secondary data sources have been made and they are assumed to be accurate as published.

Every attempt has been made to predict effects as accurately as possible using the available information. Many effects will depend on the size and location of development, building design, construction, proximity to sensitive receptors and the range of uses that takes place. The report was prepared between May 2017 and March 2018 and is subject to, and limited by, the information available during this time.

The report is not intended to be a substitute for Environmental Impact Assessment or Strategic Environmental Assessment.

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Acronyms

AA	Appropriate Assessment
AQMA	Air Quality Management Area
CAMS	Catchment Area Management Strategy
DEFRA	Department for Environment, Food, and Rural Affairs
EA	Environment Agency
ERF	Energy Recovery Facility
EU	European Union
GIS	Geographic Information Systems
HRA	Habitats Regulations Assessment
IPENS	Improvement Programme for England's Natura 2000 sites
IROPI	Imperative Reasons of Overriding Public Interest
JNCC	Joint Nature Conservation Committee
LPA	Local Planning Authority
LPR	Local Plan Review
LSE	Likely Significant Effect
MENE	Monitor of Engagement with the Natural Environment
MoU	Memorandum of Understanding
NE	Natural England
NPPF	National Planning Policy Framework
RSPB	Royal Society for the Protection of Birds
ppSPA	Possible Potential Special Protection Area
SAC	Special Area of Conservation
SANGS	Suitable Alternative Natural Greenspace
SIP	Site Improvement Plan
SNH	Scottish Natural Heritage
SPA	Special Protection Area
SSSI	Site of Special Scientific Interest
SuDS	Sustainable Drainage Systems
WRMP	Water Resource Management Plan
WRZ	Water Resource Zone

Executive Summary

E1 Lepus Consulting Ltd (Lepus) has prepared this Habitat Regulations Assessment (HRA) Appropriate Assessment (AA) report of the emerging Broxbourne Local Plan 2018 – 2033 (Local Plan) on behalf of Broxbourne Borough Council. This is a requirement of Regulation 102 of the Conservation of Habitats and Species Regulations 2010[1] (the Habitats Regulations). This follows the outcome of the HRA Screening Report completed in December 2016 by Lepus.

E2 The Screening Report concluded that a Likely Significant Effect (LSE) on Lee Valley SPA, as a result of increased public access and associated disturbances caused by the Broxbourne Local Plan, could not be objectively ruled out. In particular, these related to the increase in visitors and dog walkers at the SPA and the likely disturbance this would cause for northern shoveler, great bittern and gadwall populations and habitats. Natural England agreed with this conclusion and that the LSE would require further consideration in the form of an AA. Natural England also advised that an LSE at Epping Forest SAC could not be objectively ruled out at this stage. This is due to potential air pollution impacts at Epping Forest SAC caused by cumulative increases in traffic on nearby roads that may result from the Local Plan in-combination with other plans and projects. Lastly, Natural England also advised that there was insufficient evidence in the Screening Report to rule out an LSE on Wormley Hoddesdonpark Woods SAC when cumulative impacts of the Local Plan with other plans and projects are considered in-combination.

E3 This AA has considered each European Site and the following LSEs closely:

- Public access associated disturbances LSE at Lee Valley SPA caused by the Broxbourne Local Plan alone;
- Air pollution and public access LSEs at Epping Forest SAC caused by the Broxbourne Local Plan in-combination; and
- Public access associated disturbances LSE at Wormley Hoddesdonpark Woods SAC caused by the Broxbourne Local Plan in-combination.

E4 Development proposed for the Borough could potentially lead to significant increases in the number of visitors and pet dogs being walked at the area of Lee Valley SPA that overlaps with Turnford & Cheshunt Gravel Pits SSSI. Residents at the 1,990 dwellings proposed for Delamare Road, which is within 400m of the SPA and currently has very limited access to suitable alternative natural green spaces (SANGS), could potentially rely on the SPA for regular use. The Council is therefore

[1] UK Government, (2010), The Conservation of Habitats and Species Regulations 2010

committed to a mitigation strategy for the SPA to ensure an adverse effect caused by the Local Plan does not arise. This strategy is laid out in detail in this AA report and was developed in conjunction with the Council, Natural England, the Lee Valley Regional Park Authority and developers. The strategy focusses on managing visitor numbers, the provision of SANGS and the creation of new habitat for the SPA's qualifying features. **It is concluded that an LSE on Lee Valley SPA can be objectively ruled out at this stage because of the Council's adopted mitigation strategy.**

E5 It is concluded that the scope for public access associated disturbances at Epping Forest SAC, caused by existing and prospective residents of Broxbourne is severely limited, with just 0.34% of visitors at the Forest travelling from Broxbourne.

E6 Development proposed in the Local Plan could potentially increase traffic on roads that run within 200m of Epping Forest SAC. This SAC is currently exposed to atmospheric nitrogen deposition levels that exceed the forest's 'critical load' and its conservation status may become further undermined by additional pollution. A Memorandum of Understanding (MoU) has been produced by several local authorities to investigate, monitor, avoid and mitigate air pollution at the SAC. Air pollution is a transboundary and in-combination effect and this MoU is considered to be the most appropriate strategy for protecting the conservation status of the SAC. Broxbourne Council are committed to signing the MoU and positively contributing towards the strategy for protecting the SAC from air pollution. **It is concluded that, based on the continued development of a monitoring and mitigation strategy for the SAC through the MoU, no adverse effect on the integrity of the SAC will occur due to the emerging Broxbourne Local Plan alone or in-combination.**

E7 The potential for an adverse effect on the integrity of Wormley Hoddesdonpark Woods SAC as a result of the Broxbourne Local Plan, alone and in-combination, has been considered closely in this report. Overall, the SAC is in good ecological condition and it is unlikely that the Plan will exacerbate the SAC's threats and pressures. **It is concluded that an LSE on the SAC, as a result of the Plan alone and in-combination, can be objectively ruled out at this stage.**

E8 The HRA AA for the Broxbourne Local Plan concludes that, based on the Council's continued adoption and progress of the relevant monitoring and mitigation strategies, all potential LSEs on EU sites caused by the Broxbourne Local Plan alone or in-combination can be objectively ruled out at this stage.

1 Introduction

1.1 Background

1.1.1 Lepus Consulting has prepared this Habitat Regulations Assessment (HRA) Appropriate Assessment (AA) report of the emerging Broxbourne Local Plan 2018 – 2033 (Local Plan) on behalf of Broxbourne Borough Council.

1.1.2 This AA follows the HRA Screening Report[2] completed in December 2016 by Lepus Consulting on behalf of Broxbourne Borough Council. The Screening Report carefully considered the conservation objectives of European Sites that might be associated with activities and projects as part of the Local Plan. It explored the extent to which the Local Plan is likely to undermine the conservation objectives of each European Site by exacerbating pressures and threats they are known to be vulnerable to.

1.1.3 European Sites provide valuable ecological infrastructure for the protection of rare, endangered or vulnerable natural habitats and species of exceptional importance within Europe. These sites consist of Special Areas of Conservation (SACs), designated under European Directive 92/43/EEC *on the conservation of natural habitats and of wild fauna and flora* (the Habitats Directive), and Special Protection Areas (SPAs), classified under European Directive 2009/147/EC *on the conservation of wild birds* (the Birds Directive). Additionally, Government policy requires that sites listed under the Ramsar Convention (The Convention on Wetlands of International Importance, especially as Waterfowl Habitat) are to be treated as if they are fully designated European sites for the purpose of considering development proposals that may affect them. The requirements of the Habitats and Birds Directives are transposed into UK law through Regulation 102 of the Conservation of Habitats and Species Regulations 2010[3] (the Habitats Regulations).

[2] Lepus Consulting (2016) Habitat Regulations Assessment of the Broxbourne Local Plan, Screening Report, December 2016

[3] UK Government, (2010), The Conservation of Habitats and Species Regulations 2010

1.1.4 The following European Sites were identified within 15km of the Borough of Broxbourne during the HRA Screening Report:

- Epping Forest SAC;
- Wormley Hoddesdonpark Woods SAC; and
- Lee Valley SPA & Ramsar.

1.1.5 The Screening Report concluded that an LSE of the proposed development in the Local Plan, on the conservation objectives of Lee Valley SPA caused by public access and associated disturbances, could not be objectively ruled out based on the currently available information. These findings were submitted to Natural England, the relevant Statutory Body, for their consideration and comments.

1.1.6 Natural England agreed in their response (ref: 204552, dated 29 January 2017, see **Appendix C**), that an LSE on Lee Valley SPA as a result of public access and associated disturbances could not be objectively ruled out at this stage and recommended the preparation of an AA. They also concluded that an LSE at Epping Forest SAC could not be objectively ruled out at this stage. This is due to potential air pollution caused by cumulative increases in traffic that may result from the Local Plan *in-combination* with other plans and projects. Lastly, Natural England advised that there was insufficient evidence in the Screening Report to rule out an LSE on Wormley Hoddesdonpark Woods SAC when the cumulative impacts of the Local Plan in-combination with other plans and projects is considered.

1.1.7 During this AA the LSEs identified during screening, as well as the LSEs highlighted by Natural England, will be evaluated in detail to precisely address their potential nature, magnitude and permanence. Should an adverse effect be certain, consideration will then be given to mitigating these impacts. This report will therefore look closely into the following concerns:

- Public access associated disturbances LSE at Lee Valley SPA caused by the Broxbourne Local Plan alone;
- Air pollution and public access LSEs at Epping Forest SAC caused by the Broxbourne Local Plan in-combination; and

- Public access associated disturbances LSE at Wormley Hoddesdonpark Woods SAC caused by the Broxbourne Local Plan in-combination.

1.1.8 Should there be sufficient doubt that an adverse effect cannot be ruled out, then the precautionary and preventive principles will come into play.

1.1.9 This report constitutes the Appropriate Assessment stages of **Figure 2.1**.

1.2 Appropriate Assessment Outputs

1.2.1 The outputs of this report include information in relation to:

- The HRA process;
- Methodology for HRA;
- Assessment of likely significant effects on European Sites;
- Considerations of how to mitigate likely adverse impacts; and
- Conclusions and recommendations.

1.3 Regulations, Guidance and Methodology

1.3.1 The application of HRA to land-use plans is a requirement of the Conservation of Habitats and Species Regulations 2010, the UK's transposition of the Habitats Directive. HRA applies to plans and projects, including all Local Development Documents in England and Wales.

1.3.2 This AA has been informed by the following guidance:

- Assessment of Plans and Projects Significantly Affecting Natura 2000 Sites' - European Commission, 2001[4];
- The Habitat Regulations Assessment Handbook - David Tyldesley and Associates, 2013 (in particular Part F: '*Practical Guidance for the Assessment of Plans under the Regulations*'); and
- The Appropriate Assessment of Spatial Plans in England – A Guide to

[4] Assessment of plans and projects significantly affecting European sites. Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC. European Commission Environment DG, November 2001

How, When and Why to do it - RSPB, 2007.

1.4 About the Local Plan

1.4.1 The Local Plan is a development strategy for the homes, jobs, shops, leisure, transport and infrastructure of the Borough of Broxbourne for the next 15 years. This version of the emerging Local Plan was prepared under Regulation 19 of the Town and Country Planning (Local Planning) (England) Regulations 2012. It includes proposals for the provision of approximately 7,718 homes and 6,000 – 7,000 jobs by 2033. Policies of the Local Plan will replace those of the Local Plan 2005.

1.4.2 Each proposal for development in the Local Plan was considered in the preparation of the HRA Screening Report and was either screened in or out of the assessment. This AA report assesses the extent to which those policies that were screened in will undermine the integrity of a European Site.

2 Methodology

2.1 Habitats Regulations Assessment Methodology

2.1.1 HRA is a rigorous precautionary process centered on the conservation objectives of a Site's qualifying interests. It is intended to ensure that designated European sites are protected from impacts that could adversely affect their integrity, as required by the Birds and Habitats Directives. A step-by-step guide to this methodology is outlined in the Practical Guidance and has been reproduced in **Figure 2.1**, of which this report constitutes the Appropriate Assessment stages.

2.1.2 Should a significant effect on a European Site be considered likely, AA is usually required. This provides a better understanding of potential effects and their nature, magnitude and permanence. The findings of the AA inform the decision making of planners on how to intervene.

2.1.3 The hierarchy of intervention is important: where significant effects are likely or uncertain, plan makers must firstly seek to avoid the effect through, for example, a change of policy. If this is not possible, mitigation measures should be explored to remove or reduce the significant effect. If neither avoidance nor mitigation is possible, alternatives to the Plan should be considered. Such alternatives should explore ways of achieving the Plan's objectives that do not adversely affect European sites.

2.1.4 Measures should be proportionate to the level of risk, and to the desired level of protection. They should be provisional in nature pending the availability of more reliable scientific data. If no suitable alternatives exist, plan-makers must demonstrate under the conditions of Regulation 103 of the Habitats Regulations that there are Imperative Reasons of Overriding Public Interest (IROPI) in order to continue with the proposal.

2.1.5 Natural England, or the relevant statutory body, is also consulted over the findings of the HRA.

2.2 Dealing With Uncertainty

2.2.1 Uncertainty is an inherent characteristic of HRA and decisions can be made only on the currently available and relevant information. This concept is reinforced in the 7th September 2004 'Waddenzee' ruling[5]:

"*However, the necessary certainty cannot be construed as meaning absolute certainty since that is almost impossible to attain. Instead it is clear from the second sentence of Article 6(3) of the habitats directive that the competent authorities must take a decision having assessed all the relevant information which is set out in particular in the Appropriate Assessment. The conclusion of this assessment is, of necessity, subjective in nature. Therefore, the competent authorities can, from their point of view, be certain that there will be no adverse effects even though, from an objective point of view, there is no absolute certainty*."

2.3 Precautionary Principle

2.3.1 Because there is an element of uncertainty, the HRA process is characterised by the Precautionary Principle. This is described by the European Commission as being:

"*If a preliminary scientific evaluation shows that there are reasonable grounds for concern that a particular activity might lead to damaging effects on the environment, or on human, animal or plant health, which would be inconsistent with protection normally afforded to these within the European Community, the* ***Precautionary Principle*** *is triggered.*"

2.4 Likely Significant Effect

2.4.1 The Local Plan and its component policies are assessed to determine and identify any potential for **'likely significant effect'** (LSE) upon European sites. The guidance provides the following interpretation of LSE:

[5]EC Case C-127/02 Reference for a Preliminary Ruling 'Waddenzee' 7th September 2004 Advocate General's Opinion (para 107)

2.4.2 "*In this context, 'likely' means risk or possibility of effects occurring that cannot be ruled out on the basis of objective information. 'Significant' effects are those that would undermine the conservation objectives for the qualifying features potentially affected, either alone or in-combination with other plans or projects… even a possibility of a significant effect occurring is sufficient to trigger an 'Appropriate Assessment'.*"[6]

2.4.3 With reference to a species given conservation status in the Habitats or Birds Directives, the following examples would be considered to constitute a significant effect:

- Any event which contributes to the long-term decline of the population of the species on the site;
- Any event contributing to the reduction or to the risk of reduction of the range of the species within the site; and
- Any event which contributes to the reduction of the size of the habitat of the species within the site.

2.5 Limitations

2.5.1 This report has been prepared using the best available data. References are cited in the text where appropriate. The assessment was also informed by a site visit to Lee Valley SPA conducted by Lepus in June 2017.

[6]Tyldesley, D. (2013) The Habitats Regulations Assessment Handbook – Chapter F. DTA Publications

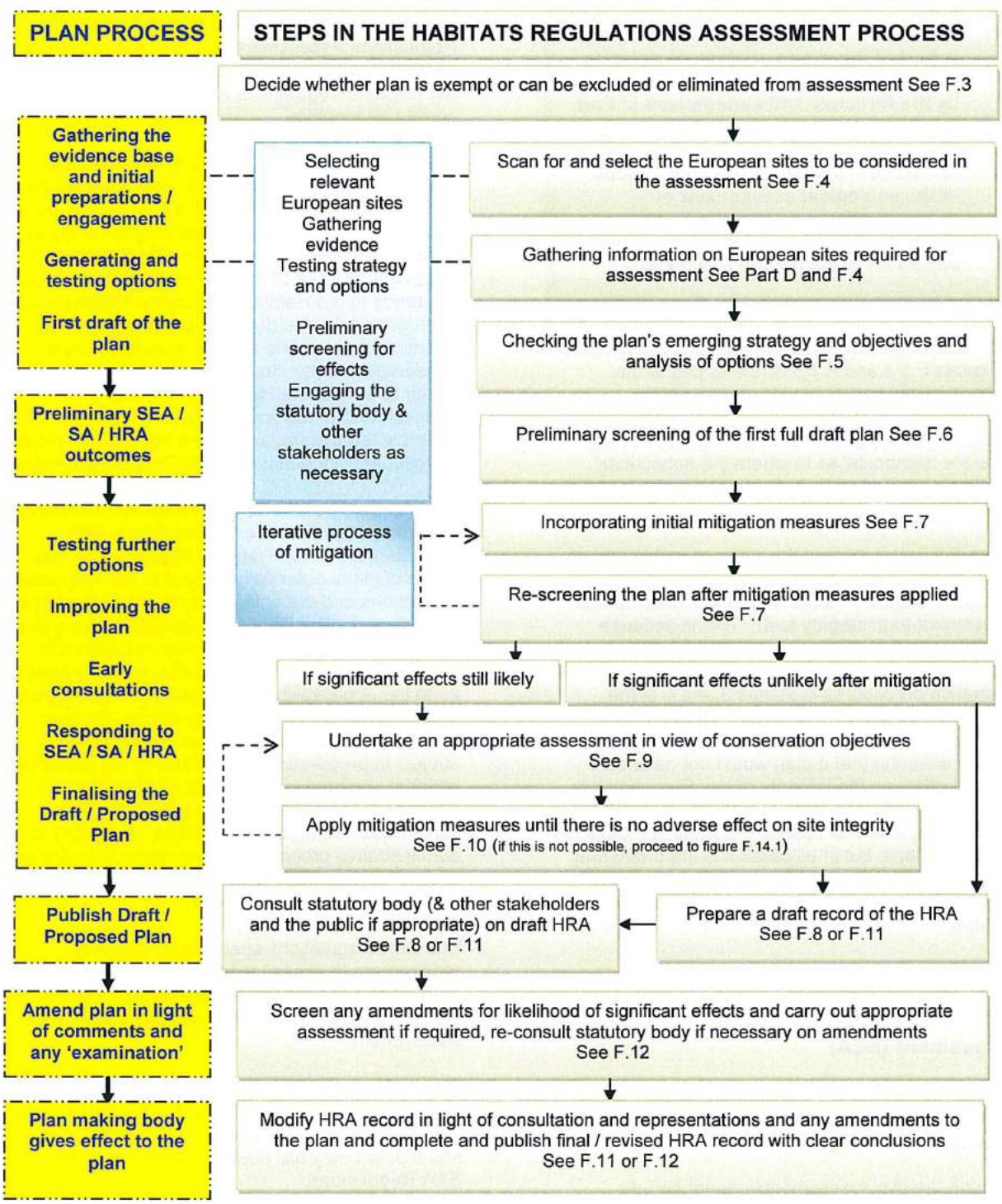


Figure 2.1: Relationship of steps in the Habitats Regulations Assessment with a typical plan-making process (reproduced from DTA, 2013[7])

[7] Tyldesley, D. (2013) The Habitats Regulations Assessment Handbook – Chapter F. DTA Publications

3 European sites

3.1 About European sites

3.1.1 Each site of European importance has its own intrinsic qualities, besides the habitats or species for which it has been designated, that enables the site to support the ecosystems that it does. An important aspect of this is that the ecological integrity of each site can be vulnerable to change from natural and human induced activities in the surrounding environment (pressures and threats).

3.2 Identification of relevant European sites

3.2.1 During the HRA Screening process, as a starting point to explore and identify which European sites might be affected by the Local Plan, a 15km area of search was applied from the boundary of the Borough of Broxbourne. The following European Sites were identified (see **Figure 3.1**):

- Epping Forest SAC;
- Lee Valley SPA;
- Lee Valley Ramsar; and
- Wormley Hoddesdonpark Woods SAC.

3.2.2 The Screening Report identified an LSE on the qualifying features of Lee Valley SPA & Ramsar as a result of increases in public access and associated disturbances. Lee Valley SPA & Ramsar therefore features significantly in this AA. Natural England advised that more evidence is required to determine if an LSE on Epping Forest SAC can be objectively ruled out at this stage. They also advised that more evidence is required before an LSE on Wormley Hoddesdonpark Woods SAC, due to the cumulative impacts of the Broxbourne Local Plan in-combination with other plans and projects, can be objectively ruled out.

3.2.3 This report will therefore look closely into the following concerns:

- Public access associated disturbances LSE at Lee Valley SPA caused

by the Broxbourne Local Plan alone;

- Air pollution LSE at Epping Forest SAC caused by the Broxbourne Local Plan in-combination; and
- Public access associated disturbances LSE at Wormley Hoddesdonpark Woods SAC caused by the Broxbourne Local Plan in-combination.

3.2.4 The conservation objectives and qualifying features of each European site are listed in **Appendix A**. All of the threats and pressures these sites are vulnerable to are listed in **Appendix B**. This information is drawn from the Joint Nature Conservancy Council (JNCC) and Natural England (NE).

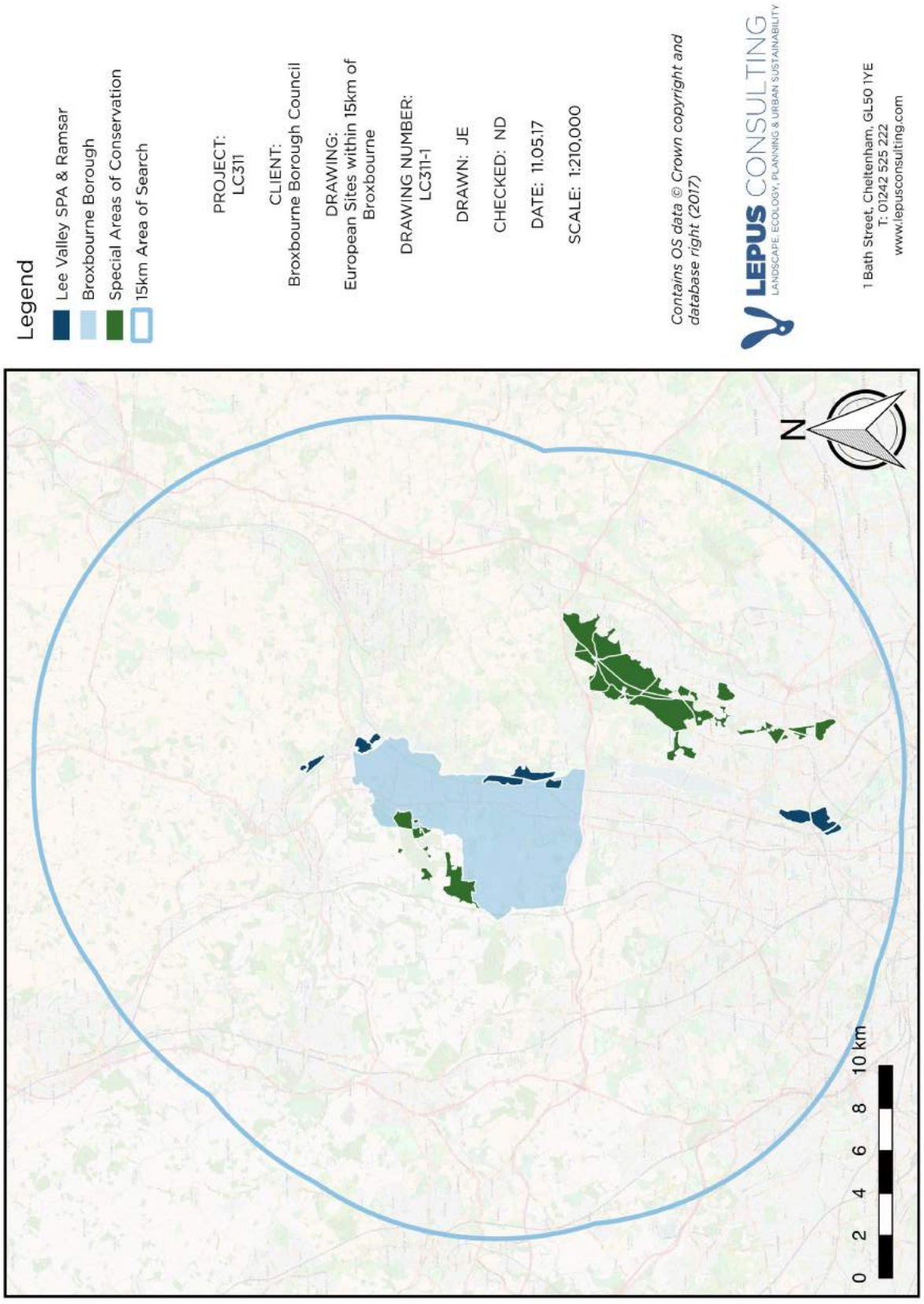


Figure 3.1: European Sites within 15km of Broxbourne, including Lee Valley SPA & Ramsar, Epping Forest SAC (south east of boundary) and Wormley Hoddesdonpark Woods SAC (north west of boundary)

4 Lee Valley SPA & Ramsar

4.1 Background

4.1.1 Lee Valley SPA & Ramsar represents the closest water body EU site for the residents of the Borough, lying either side of the Borough's eastern border as well as just north of the northern border (see **Figures 4.1** to **4.3**).

4.1.2 Lee Valley SPA & Ramsar is within the Lee Valley Regional Park (LVRP), a highly popular Park that attracts over six million visitors a year with a customer satisfaction rate of 83%[8]. The LVRP was established by Parliament in 1967 to address the recreation, leisure and nature conservation needs of London, Hertfordshire and Essex. The LVRP covers a total area of 4,000ha, 429ha of which lies within the Borough of Broxbourne. It offers a variety of amenity services to Broxbourne, including the Olympic facilities at the Lee Valley White Water Centre, the River Lee, the Lee Navigation and a network of lakes, woodlands, wetlands, paths and wildlife habitats.

4.1.3 Of the 4,000ha park, 447.87ha has been classified as a SPA & and listed as a Ramsar site, and consists of the following habitats:

- Inland water bodies (67%);
- Improved grassland (10%);
- Broad leaved deciduous woodland (10%);
- Humid or mesophile grassland (8%);
- Bogs, marshes, water fringed vegetation and fens (4%); and
- Other land (1%).

[8] Lee Valley Regional Park Authority (2011) Annual Authority Meeting, 7 July 2011, Performance Management, Annual Report

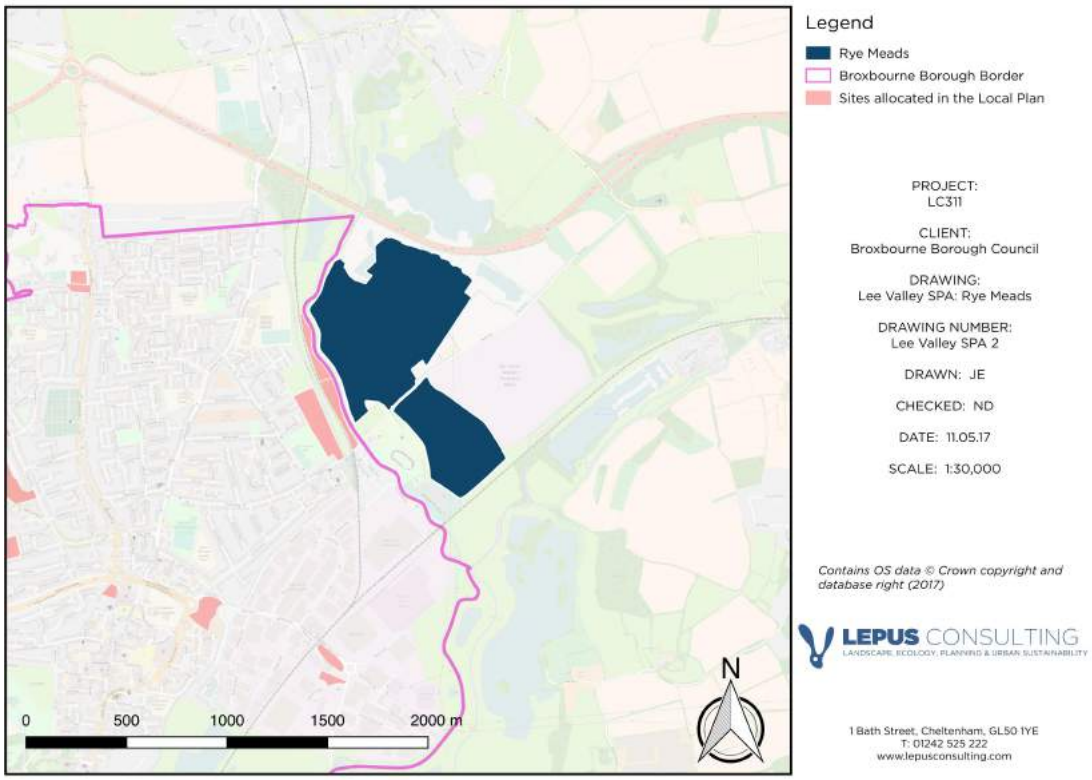


Figure 4.1: Portion of Lee Valley SPA that overlaps with Rye Meads SSSI and Rye Meads Nature Reserve, lying adjacent to the north eastern border of Broxbourne.

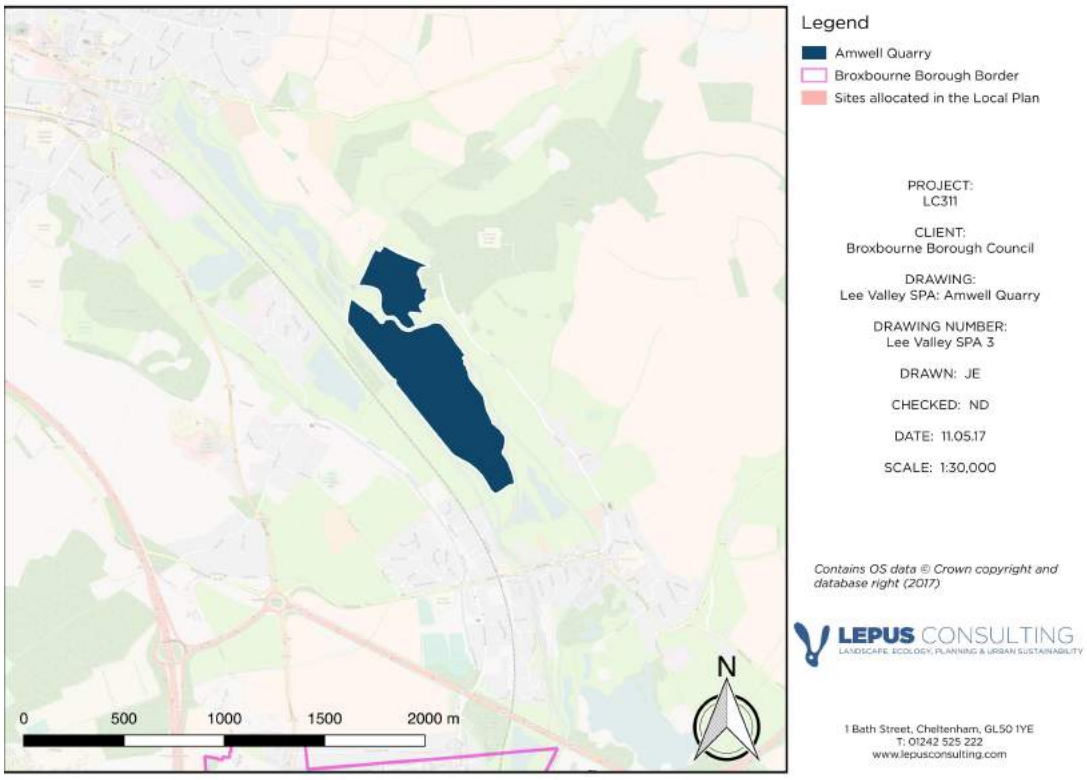


Figure 4.2: Portion of Lee Valley SPA that overlaps with Amwell Quarry SSSI and Amwell Quarry Nature Reserve, approximately 1km north of the northern border of Broxbourne.

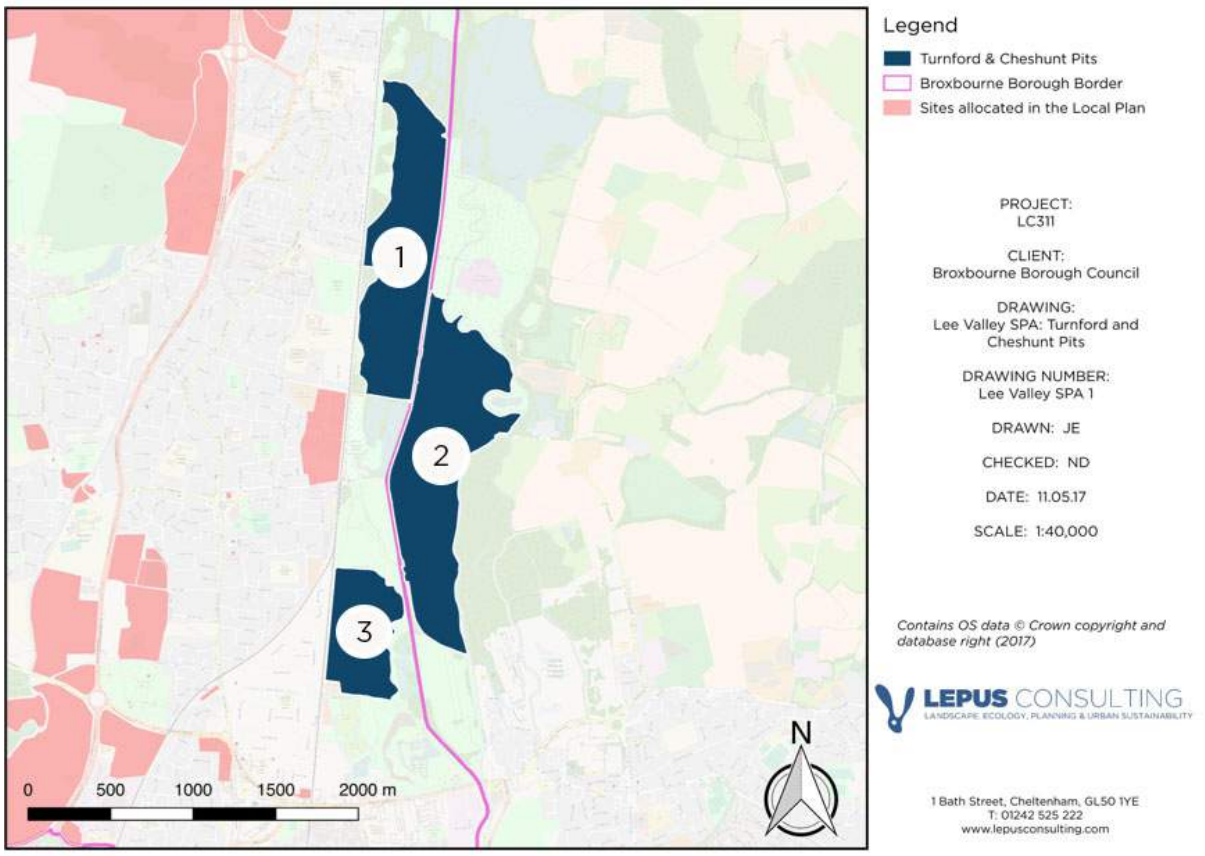


Figure 4.3: Portion of Lee Valley SPA that overlaps with Turnford & Cheshunt Gravel Pits SSSI, lying on either side of the eastern border of Broxbourne. The three different pits making up this portion of the SPA are labelled 1, 2 and 3. Pit 1 is the 'North Metropolitan Pit', pit 2 is the 'Seventy Acres Lake' and pit 3 is 'Bowyers Water'.

4.2 Qualifying features

4.2.1 These habitats of Lee Valley were classified as SPA and designated as Ramsar because they are considered to support the following:

- 6% of the UK population of great bittern (*Botaurus stellaris*);
- 1% (1.9% according to Ramsar) of the UK population of wintering northern shoveler (*Anas clypeata*); and
- 1.5% (2.6% according to Ramsar) of the UK population of wintering gadwall (*Anas strepera*).

4.2.2 The great bittern (*Botaurus stellaris*) is a wading bird of the heron (*Ardeidae*) family, restricted almost entirely to reed-dominated wetlands where they feed on fish, amphibians and other small mammals or water animals. They are also regularly found in small wetlands with relatively small areas of common reed (*phragmites)*[9]. During the spring breeding season, the booming call of the male bittern can often be heard in reed beds and thick vegetation near water bodies (hence the folk name 'bull of the bog'). Bitterns have a thick, brown and bright plumage covering their bodies. The UK is thought to be home to 600 wintering bittern individuals and 80 breeding males[10]. They are currently on the RSPB Amber List.

4.2.3 The intricate pattern of black, white, grey and brown hairs give the gadwall ducks (*Anas strepera*) an overall grey appearance, with black rear ends and a white wing patch on display during flight. They usually migrate to the UK during winter to avoid the harsher winter on the continent, and are most likely to be found in pits, lakes and coastal wetlands. They nest in low numbers and prefer to breed in the shallow edges of lakes and pits where vegetation is ample. The UK is thought to be home to 25,000 wintering gadwall individuals and 690 – 1,730 annual breeding pairs[11]. They are currently on the RSPB Amber List.

4.2.4 The northern shoveler (*Anas clypeata*), often referred to simply as the shoveler, is a surface feeding duck with a broad, rounded and narrow based bill (not dissimilar to a shovel). Males are predominantly green and chestnut brown whilst females are mottled brown. Shovelers feed by dabbling for plant food and aquatic invertebrates and thus mud bottomed marshes rich in invertebrate life are usually their habitat of choice. Shovelers prefer to nest on grassy land away from open water and in shallow depressions lined with plant matter. The UK is thought to be home to approximately 18,000 wintering shoveler individuals and 310 – 1,020 annual breeding pairs[12].

[9] Wotton. S., Grantham. M., Moran. N. and Gilbert. G (2011) Eurasian Bittern distribution and abundance in the UK during the 2009/10 winter. British Birds (104) November 2011 . 636-641
[10] RSPB (2017) Great bittern Available online at: https://www.rspb.org.uk/birds-and-wildlife/bird-and-wildlife-guides/bird-a-z/b/bittern/ Accessed 12.07.17
[11] RSPB (2017) Gadwall Available online at: https://www.rspb.org.uk/birds-and-wildlife/bird-and-wildlife-guides/bird-a-z/g/gadwall/ . Accessed 03.07.17
[12] RSPB (2017) Northern shoveler. Available online at: https://www.rspb.org.uk/birds-and-wildlife/bird-and-wildlife-guides/bird-a-z/s/shoveler/ Accessed 08.07.17

4.2.5 Gadwalls and northern shovelers that winter at Lee Valley SPA & Ramsar are not confined to the geographical boundaries of the European Site and are considered to be likely to be also relying on supporting habitat up to 2km away.

4.2.6 The British Trust for Ornithology (BTO) calculate and provide Wetland Bird Survey Data (WeBS). This includes data for counts of gadwall, bittern and shoveler at 'Lee Valley Gravel Pits'. This location includes the North Metropolitan Pit, the Seventy Acres Lake and Bowyers Water, as well as nearby supporting habitats such as Holyfield Marshes, Hooks Marsh and Waltham Marsh. Counts are made at all wetland habitats in the area, including lakes, ponds, reservoirs, gravel pits, rivers, marshes, canals, coast and estuaries. Counts for bittern at Lee Valley Gravel Pits were made using a supplementary visit, which used the same WeBS Core Count methodology, to ensure the WeBS count is representative of the true value at the location. Counts of gadwall, shoveler and bittern are displayed in **Table 4.1**.

Movements of bittern, gadwall and shoveler

4.2.7 In 2009/10 there were a minimum of 600 wintering bittern in the UK, approximately 208 of which were resident[13]. The bittern is partially migratory, generally heading southwest from Nordic and Baltic countries in response to winter conditions, arriving in the UK (usually the southeast of the UK) from late summer onwards[14].

4.2.8 The gadwall is largely migratory throughout North America, northern China and locally in Europe, but resident in most of western and southern Europe. Some breeding gadwalls of Britain migrate to western Europe and the Mediterranean, although many remain sedentary . By the end of September, most gadwalls from Iceland, northern Europe and Russia have migrated to the west of Europe, including Britain[15]. The overall impact is that populations of gadwall in Britain have swelled by November.

[13] Wotton. S., Grantham. M., Moran. N. and Gilbert. G (2011) Eurasian Bittern distribution and abundance in the UK during the 2009/10 winter. British Birds (104) November 2011 . 636-641
[14] White G, Purps J and Alsbury S (2006) The bittern in Europe: a guide to species and habitat management. The RSPB, Sandy
[15] BTO – Gadwall (Anas strepera) movements. Available online at: https://www.bto.org/ai/pdfs/66move.pdf . Accessed 01.08.17

4.2.9 The UK supports a resident and breeding population of northern shoveler. Their migration is predominantly determined by food accessibility and competition[16]. In the winter, many shovelers migrate from the north of the UK to either the south of the UK or southern Europe. At the same time, shovelers of northern Europe migrate southwards to the UK. The overall impact being that shoveler populations in the UK swell just prior to the onset of winter[17].

Table 4.1: Data on the presence of bittern, gadwall and shoveler at Lee Valley Gravel Pits[18]. Gadwall and shoveler were counted via the core counts method, wherein an observer familiar with these species surveys the entire Lee Valley Gravel Pits area on a predetermined priority date.

Species	Count month	2014/15 count	2015/16 count	Five year average
Great bittern (*Botaurus stellaris*)	October	2	5	4
Gadwall (*Anas strepera*)	November	628	677	725
Northern shoveler (*Anas clypeata*)	October	372	238	332

4.2.10 The great bittern (*Botaurus stellaris*), gadwall (*Anas strepera*) and northern shoveler (*Anas clypeata*) are all listed in Annex 1 of the Birds Directive. At Lee Valley SPA & Ramsar, these birds are currently under pressure from public access and associated disturbances such as hikers, dog walkers, angling and water sports.

4.3 Conservation of Lee Valley SPA

4.3.1 In order to maintain the integrity of Lee Valley SPA & Ramsar, and to ensure it continues to contribute to the aims of the Birds Directive, it is necessary to maintain and restore:

- The extent and distribution of the habitats of gadwall, great bittern and northern shoveler;
- The structure and function of the habitats of the gadwall, great bittern and northern shoveler;

[16] Dalby. L., Fox. A. D., Peterson. I. K., Delaney. S. & Svenning JC (2012) Temperature does not dictate the wintering distributions of European dabbling duck species. IBIS International journal of avian science 25 July 2012
[17] Bird Life International – Northern Shoveler Spatula clypeata available online at: http://datazone.birdlife.org/species/factsheet/Northern-Shoveler . Accessed 01.08.17
[18] British Trust for Ornithology (BTO) (2016) Wetland Bird Survey (WeBS) Site: Lee Valley Gravel Pits. Available online at: https://app.bto.org/webs-reporting/?tab=numbers&locid=LOC658837 Accessed 09.07.17

- The supporting processes on which these habitats rely;
- The population of gadwall, great bittern and northern shoveler; and
- The distribution of gadwall, great bittern and northern shoveler within the site.

4.3.2 With these key environmental conditions in mind, the following effects would be considered to be significant:

- Any event which contributes to the long-term decline of the population of gadwall, great bittern and/or northern shoveler;
- Any event contributing to the reduction, or to the risk of reduction, of the range of the gadwall, great bittern and/or northern shoveler within the site; and
- Any event which contributes to the reduction of the size of the habitat of the gadwall, great bittern and/or northern shoveler within the site.

4.3.3 As per Article 6(2) of the Habitats Directive, "*Disturbance of a species occurs on a site when the population dynamics data for this site show that the species could no longer constitute a viable element of it in comparison to the initial situation*."

4.4 Management Regimes

4.4.1 There are four areas of Lee Valley SPA & Ramsar within 15km of Broxbourne and considered in this AA. Each of these areas overlaps with an SSSI, namely:

- Walthamstow Reservoirs SSSI;
- Rye Meads SSSI (see **Figure 4.1**);
- Amwell Quarry SSSI (see **Figure 4.2**); and
- Turnford & Cheshunt Gravel Pits SSSI (see **Figure 4.3**).

4.4.2 Each of these areas of Lee Valley SPA & Ramsar is host to a range of habitats and population dynamics of the qualifying fauna. They're also under different management regimes that offer varying public access.

Walthamstow Reservoirs SSSI

4.4.3 Only a relatively minor portion of these SSSIs are within 15km of Broxbourne. The remainder are between 15km and 20km away. Recreational access to the reservoirs is controlled via permits and it is therefore considered highly unlikely that the Local Plan would affect these reservoirs in any way. They are therefore not included any further in this assessment.

Rye Meads SSSI

4.4.4 Rye Meads SSSI is 58.5ha and predominantly comprised of flood meadows and lagoons that host important UK populations of gadwall, great bittern and northern shoveler. It lies adjacent to the northern border of the Borough (see **Figure 4.1**).

4.4.5 The SSSI also overlaps with the Rye Meads Nature Reserve, which is managed by the RSPB and Herts & Middlesex Wildlife Trust. Entry to Rye Meads is free for the public all year round. The reserve is laid out in considerable detail with a network of ten hides, designed to allow visitors to bird watch whilst causing minimal disturbance. Clearly marked footpaths and boardwalks with screening vegetation direct visitors away from sensitive areas. This allows for potentially high numbers of visitors whilst minimising the potential for disturbance. Dogs are not allowed entry to the reserve (apart from registered assistance dogs). The wet, marshy and open water nature of this portion of the SPA makes exploring off the designated footpath more difficult and less appealing for visitors. Swimming is actively discouraged by the Herts & Middlesex Wildlife Trust.

Amwell Quarry SSSI

4.4.6 Amwell Quarry is the 36.96ha portion of the SPA north of the Borough, designated as both SSSI and a Nature Reserve (see **Figure 4.2**). Comprised of six former gravel pits that are now lakes, it hosts important populations of gadwall, northern shoveler and great bittern.

4.4.7 Amwell Quarry is managed by the Herts & Middlesex Wildlife Trust and is open to the public all year round with free entry. Recreational visits are actively encouraged and marketed, particularly for the popular Dragonfly Trail that's open from May to September each year. Amwell Quarry is laid out in considerable detail with a network of three hides, clearly marked footpaths and boardwalks with screening vegetation. The route is designed to direct visitors away from the sensitive areas and minimise disturbance from the high number of visitors it can accommodate. The wet, marshy and open water nature of this portion of the SPA makes exploring off the designated footpath relatively difficult and unappealing for visitors. Swimming is actively discouraged by the Herts & Middlesex Wildlife Trust. Dogs are not allowed on the boardwalk leading to the White Hide or on the Dragonfly Trail.

Turnford & Cheshunt Gravel Pits SSSI

4.4.8 Turnford & Cheshunt Gravel Pits is comprised of 10 former gravel pits with a combined 7.2km shoreline. It is recognised as being one of the centre pieces of the River Lee Country Park, and lies on either side of the eastern border of Broxbourne (see **Figure 4.3**). The three lakes of the SPA which overlap with the SSSI are the North Metropolitan Lake, Seventy Acres Lake and Bowyer's Water.

4.4.9 This area of the SPA hosts important populations of gadwall, northern shoveler and great bittern. Being a part of the LVRP, it's managed by the statutory body Lee Valley Regional Park Authority (LVRPA). The LVRPA has a management plan and wide remit which includes being responsible for *"regenerating derelict and neglected land into high quality public open spaces and wildlife habitats of ecological importance".* Policy LV1: Lee Valley Regional Park of the 2005 Local Plan will support the LVRPA in this regard, as the policy states *"The Council will support the Lee Valley Regional Park authority in the continuing improvement of the Regional Park."*

4.4.10 Visitor accommodation is available at the Lee Valley YHA, just south west of Cheshunt Lake. Recreational activity at this portion of the SPA is similarly regulated through the zoning of water bodies, although is generally more informal than at other areas and the provision of formal recreational facilities is limited. The wet, marshy and open water nature of this portion of the SPA makes exploring off the designated footpath relatively difficult and unappealing for visitors (see **Appendix E**). Dogs are allowed at this location of the SPA.

4.5 Impact Pathways

Rye Meads Sewage Treatment

4.5.1 There is currently sufficient capacity at Rye Meads Sewage Treatments until at least 2026 to cope with development proposed in the Local Plan. Capacity post-2026 is as yet unconfirmed, and development could therefore potentially lead to overcapacity issues at the sewage treatment works. Rye Meads is connected to Lee Valley SPA via above and below ground water. Issues with sewage treatment here could potentially result in an adverse impact on the SPA, such as through a reduction in water quality.

4.5.2 In order to ensure that development proposed in the Local Plan does not lead to over-capacity issues at Rye Meads Sewage Treatment Works, the Council has reworded Policy INF 9: Utilities Statements accordingly. It states that development which requires capacity at Rye Meads Sewage Treatment Works will only be supported by the Council if sufficient capacity exists. As such, it is concluded that an adverse impact on the SPA caused by over-capacity issues at Rye Meads Sewage Treatment Works will be avoided.

Public access and pet cats

4.5.3 There are two other key impact pathways considered in this assessment, namely pet cat predation and associated disturbances as well as public access and associated disturbances.

4.5.4 Whilst the SPA lies in close proximity to the Borough, various obstacles are considered to limit the potential routes by which residents and their pets can access, and subsequently have an impact upon, the SPA.

4.5.5 The nearest development to the Turnford & Cheshunt Gravel Pits area of the SPA is the strategic Cheshunt Lakeside development proposal. Running adjacent to the eastern border of this site are four railway tracks. The site is located on Delamare Road, nestled between Cadmore Lane and Windmill Lane. Both these lanes previously offered a level crossing over the railway line and thereby provided a route of access in to the SPA for residents (see **Figure 4.4**). However, Cadmore Lane has closed and Windmill Lane may close in the near future.

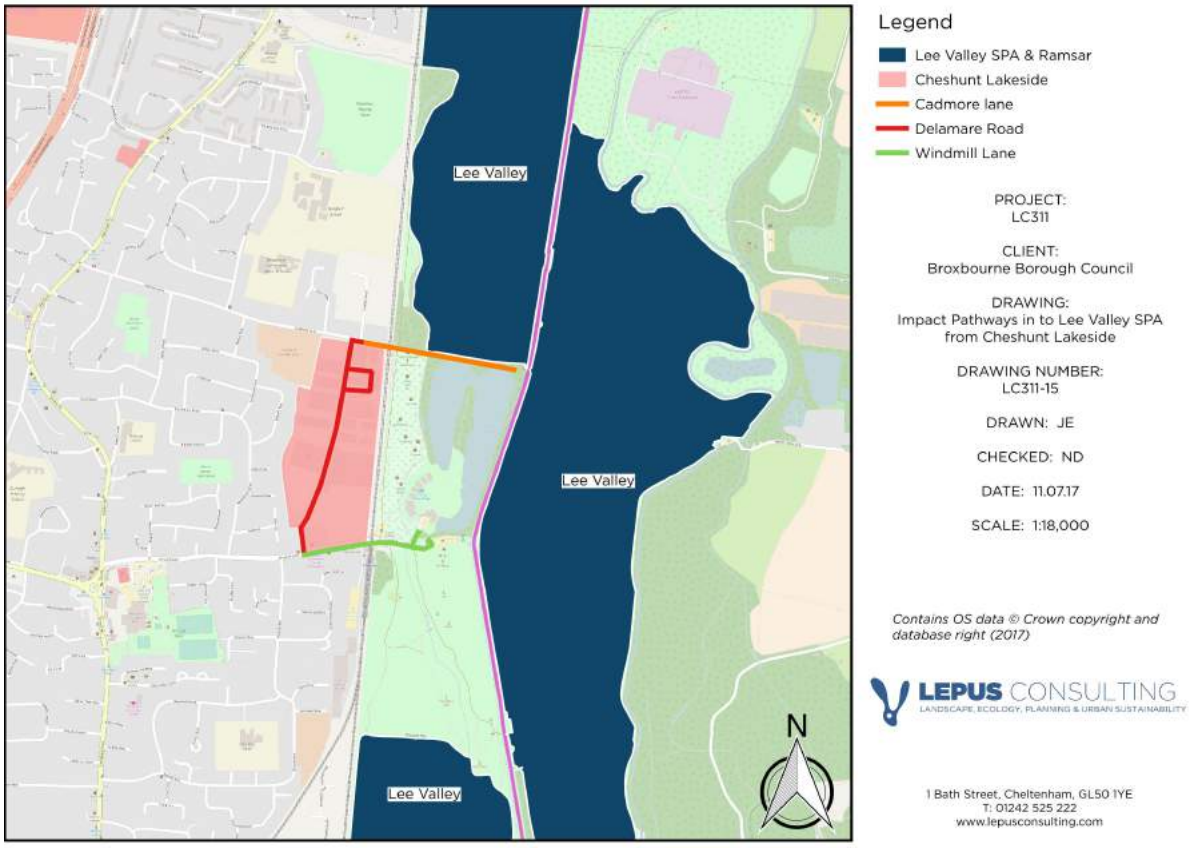


Figure 4.4: Impact pathways from the proposed Cheshunt Lakeside development into the Turnford & Cheshunt Gravel Pits SSSI area of Lee Valley SPA. Cadmore Lane has closed whilst Windmill Lane may close in the near future, reducing access for residents and their pets in to this area of the SPA.

4.5.6 Should both level crossings (Windmill Lane and Cadmore Lane) be closed, access will need to be provided into the Herts Young Mariner facility and regional park carpark. This new crossing would be likely to also offer users with a direct route of access into the SPA. The alternative route of access for visitors and residents would be to travel approximately 800m north of the site and use the pedestrian bridge or approximately 2km south of the site and use the A121 road.

4.5.7 Impact pathways in to the Amwell Quarry SSSI and Rye Meads SSSI areas of Lee Valley SPA can be seen in **Figure 4.5**. Rye Meads SSSI has a short and clear route of access for residents. Reaching the Amwell Quarry SSSI areas is a lengthier journey of a less obvious route for residents.

4.5.8 Lee Valley Regional Park is a popular attraction that receives over six million visitors a year. Data being prepared by the LVRPA indicates that the Park receives 2.5 – 7.4 visits a year per head of population from residents of Broxbourne, more than it receives from other riparian and neighbouring authorities. The Park, including the various areas of the SPA, offer Broxbourne's residents a range of experiences (from water sports to bird watching), many of which are not available elsewhere in the Borough or its surrounding area. Despite the railway tracks, fences and waterbodies which impede pedestrian access in some places, the Park and the SPA can generally be conveniently accessed by Broxbourne's residents by road and car from most locations, such as via the A121 or via Nazeing New Road. Visitors to waterbodies and lakes often travel up to five miles to reach their destination (see **Table 4.2**). It is considered that a significant portion of Broxbourne's new and existing residents will be within five miles of the Park and SPA.

Table 4.2: Percentage of visitors willing to travel certain distances to reach certain natural attractions[19]

	Percentage of visitors travelling the distance to visit		
Distance travelled	A woodland or forest	Mountain, hill or moorland	A river, lake or canal
Less than 1 mile	39%	21%	33%
1 or 2 miles	25%	18%	27%
3 to 5 miles	19%	19%	19%
6 to 10 miles	9%	15%	8%
11 to 20 miles	5%	11%	6%
21 to 40 miles	3%	2%	4%

[19] Natural England (2014) MENE survey, available online at: http://naturalengland.tns-global.com/Default.aspx . Accessed 06.07.17

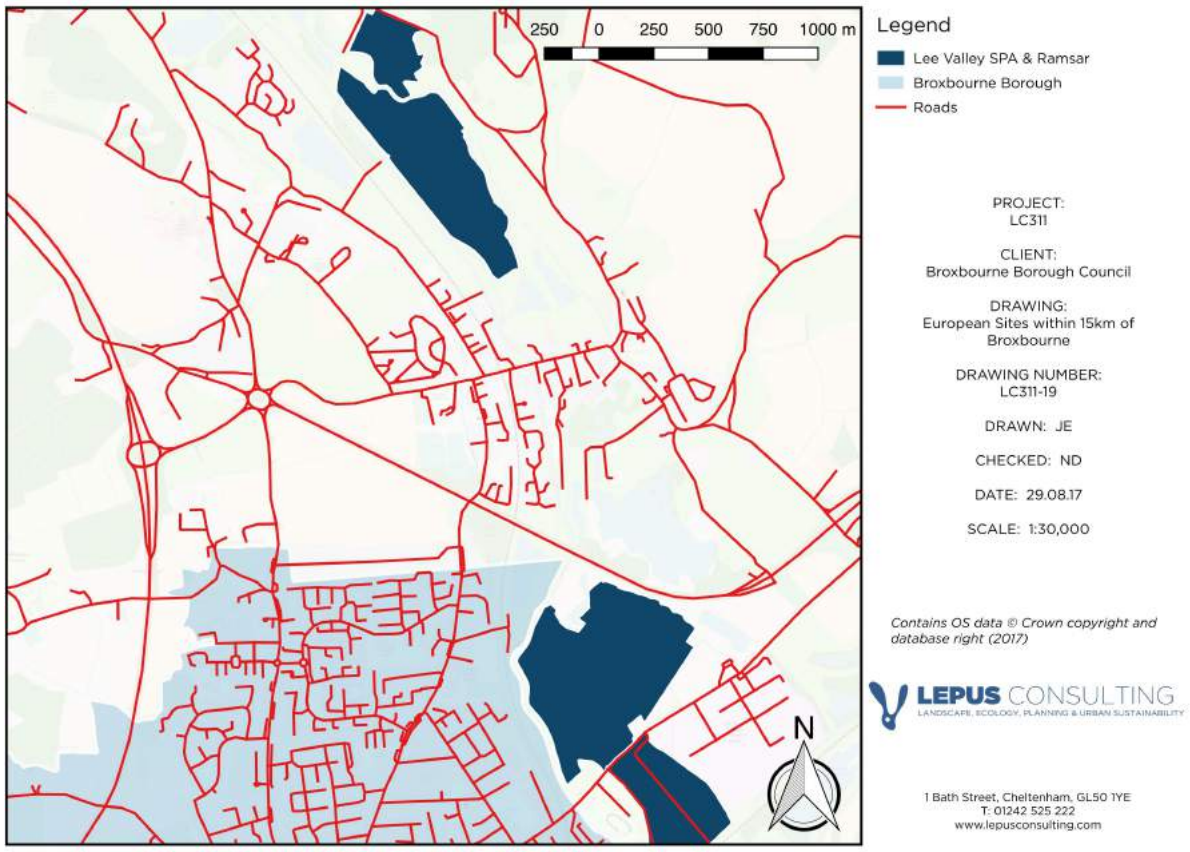


Figure 4.5: Network of roads providing access into the Rye Meads SSSI and Amwell Quarry SSSI areas of Lee Valley SPA from the Borough.

4.6 Public Access and associated disturbances caused by the Local Plan

4.6.1 The Local Plan proposes the construction of 7,718 homes by 2033 in Broxbourne, up to 1,990 of which will be within 400m of the SPA (Policy CH1: Cheshunt Lakeside).

4.6.2 The extent to which the qualifying features of the SPA & Ramsar are adversely affected by public access and recreational disturbances is influenced by a range of factors, including accessibility, management regime and the resilience of the qualifying features.

4.6.3 The potential impacts associated with recreational disturbances vary between locations, seasons, species and individuals. Impacts may be direct, such as birds being forced to flee oncoming boats, or indirect, such as the destruction of habitats. Disturbances may lead to behavioural changes, such as the avoidance of particular areas or changes to feeding habits, and physiological changes, such as quicker heartbeat rates. Whilst recreational activities are reduced during winter, food is scarce at this time of year and so interruptions to foraging birds can be particularly damaging.

4.6.4 The adverse effects of unnecessary expenditure of energy by birds flying away from oncoming threats, coupled with the reduction in their intake of energy as a result of less time spent foraging, can be significant for the balance between birth/immigration and death/emigration[20].

4.7 Pet cats (*Felis catus*)

4.7.1 It is necessary to consider the impacts of pet cats (*Felis catus*) and in particular, cat predation. Approximately one quarter of households in the UK have been recorded as housing at least one cat[21], although this figure has also been recorded at 17%[22]. For every 1,000 households, 320 – 330 pet cats have been recorded, with some regional variation[23]. Rural and suburban households are known to generally house more cats than urban households[24].

[20] Arlettaz, R., Nusslé, S., Baltic, M., Vogel, P., Palme, R., Jenni-Eiermann, S., ... & Genoud, M. (2015). Disturbance of wildlife by outdoor winter recreation: allostatic stress response and altered activity–energy budgets. Ecological Applications, 25(5), 1197-1212.
[21] Barratt, D.G. (1997) Home range size, habitat utilisation and movement patterns of suburban and farm cats Felis catus. *Ecography*, 20, 271-280.
[22] Pet Food Manufacturer's Association (PFMA) 2016 Pet Population 2016. Available online at: http://www.pfma.org.uk/pet-population-2016. Accessed 15.05.17
[23] English Nature Research Reports Number 623 (2005) A literature review of urban effects on lowland heaths and their wildlife, J C Underhill-Day, RSPB
[24] Lepczyk. C. A., Mertig. A. G. and Liu. J. (2003) Landowners and cat predation across rural-to-urban landscapes. Biological Conservation. 115. 191-201

4.7.2 The roaming distance for cats can vary and reach up to and over 1,500m[25]. At least 60% of cats are thought to roam up to 400m, and hence Thames Basin Heaths SPA prohibits buildings within 400m of its boundary to protect its qualifying bird populations[26].

4.7.3 A cat's range can be determined by a variety of factors, such as the presence of waterbodies and busy roads, the spatial density of all cats in the area utilising food resources, personality and social dominance of the individual cat and the location of favoured hunting and/or resting sites[2728]. Movements of more than 100m to 200m beyond the suburban edge are considered most likely to be made at night[29].

4.7.4 Studies have recorded the average number of prey/per cat/per year as ranging from between 10.2 to 33[30,31,32,33,34] The quantity of prey is highly contextual. In some locations there is a greater availability of prey. Younger cats are known to hunt more than older cats[35].

[25] Barratt, D.G. (1997) Home range size, habitat utilisation and movement patterns of suburban and farm cats Felis catus. *Ecography*, 20, 271-280.
[26] Barratt, D.G. (1997) Home range size, habitat utilisation and movement patterns of suburban and farm cats Felis catus. *Ecography*, 20, 271-280.
[27] D. G. Barratt (1995) Movement patterns and prey habits of house cats Felis catus in Canberra, Australia, A thesis submitted in fulfilment of the requirements of the Degree of Master of Applied Science at the University of Canberra
[28] Barratt, D.G. (1997) Home range size, habitat utilisation and movement patterns of suburban and farm cats Felis catus. *Ecography*, 20, 271-280.
[29] Ibid
[30] Churcher, P.B. & Lawton, J.H. (1987) Predation by domestic cats in an English village. Journal of Zoology, London, 212, 439-455.
[31] Woods. M., McDonald. A. R., and Harris. S. (2003) Domestic Cat Predation on Wildlife. The Mammal Society.
[32] Ibid
[33] Howes, C. (1982) What's the cat brought in? Bird Life, 1982 (January-February), 26.
[34] Barratt, D.G. (1998) Predation by house cats, Felis catus (L.), in Canberra, Australia. II. Factors affecting the amount of prey caught and estimates of the impact on wildlife. Wildlife Research, 25, 475-487.
[35] Ibid

4.7.5 A small reduction in reproduction due to cat predation can potentially lead to significant reductions in bird abundance[36]. Approximately 22% of prey is considered to be birds[37]. Nests are victims of predation significantly more often when within 225m of a path[38] - the longer the path, the greater the correlation[39]. Predated nests are also associated with reduced vegetation cover, a greater proportion of bare ground and less gorse[40].

4.7.6 The developments in the north of Broxbourne proposed at the Turnford Surfacing Site and Lea Road Industrial Works are within 400m of the area of Lee Valley SPA that overlaps with Rye Meads SSSI (see **Figure 4.1**). As such, residential development is proposed within the distance that pet cats can be reasonably expected to travel, hunt and subsequently negatively impact on bird populations. However, lying in between these proposed developments and the SPA is the River Lee Navigation. With the only nearby bridge being the walled off and narrow Rye Road, this 36m wide river will constrain pet cat movements and is thereby anticipated to protect the flora and fauna situated at this area of the SPA from potential pet cat predation.

4.7.7 The only other proposed development in the Local Plan that is considered to be within 400m of the SPA is the Cheshunt Lakeside proposal on Delamare Road. **Figure 4.4** shows the development lying within 400m of the area of the SPA that overlaps with Turnford & Cheshunt Gravel Pits SSSI.

[36] Turner, D. C., and O.Meister.1988. Hunting behaviour of the domestic cat. Pages 111–121 *in* D. C. Turner and P. Bateson, editors. The domestic cat: the biology of its behaviour. Cambridge University Press, Cambridge, UK
[37] Ibid
[38] English Nature Research Reports Number 623 (2005) A literature review of urban effects on lowland heaths and their wildlife, J C Underhill-Day, RSPB
[39] English Nature Research Reports Number 623 (2005) A literature review of urban effects on lowland heaths and their wildlife, J C Underhill-Day, RSPB
[40] Taylor, E. (2002) Predation risk in woodlark Lullula arborea habitat: the influence of recreational disturbance, predator abundance, nest site characteristics and temporal factors. MSc. Dissertation. University of East Anglia

4.7.8 Up to 1,990 homes are proposed at this location, which could potentially equate to the introduction of more than 338 pet cats[41] within 400m of the SPA. However, access to this area of the SPA for cats is anticipated to be significantly restricted. In between Delamare Road and the SPA are four railway tracks comprised of the West Anglia Main Line and the Lea Valley Line. The West Anglia Main Line, which runs between Kings Lynn in the north and London Liverpool Street in the south, is considered to be a relatively busy line[42]. It provides leisure seekers with access to Stansted airport and commuters with access to London and Cambridge. The Lea Valley Line, which is also considered to be relatively busy, is part of the London and South East Commuter Line and is double tracks for the majority of its length[43]. Cats are expected to avoid the railway track when trains are present and/or oncoming.

4.7.9 Additionally, on either side of the busy railway tracks are security fences approximately two metres tall with spiked tops (see **Appendix E**). In some areas there are up to four security fences in between the Cheshunt Lakeside development and the SPA. It is considered to be likely that some cats will be physically capable of overcoming the security fences, whether by climbing over or burrowing under. However, the combined impact of wide and busy railway tracks and two lines (or more) of security fencing is considered to be very likely to significantly inhibit potential cat movements into the SPA.

4.7.10 Cats at Delamare Road have very limited alternatives to traversing the railway tracks in order to reach the SPA. Until recently they could have potentially walked down Cadmore Lane or Windmill Lane, however Cadmore Lane was recently closed and Windmill Lane is due to be closed in the near future (see **Figure 4.3**).

[41] Pet Food Manufacturer's Association (PFMA) 2016 Pet Population 2016. Available online at: http://www.pfma.org.uk/pet-population-2016. Accessed 15.05.17
[42] Network Rail (date unavailable) Anglia Route Study West Anglia Main Line Update. Available online at: http://lscc.co/wp-content/uploads/2016/05/Network-Rail-WATF-Event.pdf accessed 12.07.17
[43] Network Rail (2009) Connecting local communities. Available online at: http://archive.nr.co.uk/browse%20documents/StrategicBusinessPlan/RoutePlans/2009/Route%205%20-%20West%20Anglia.pdf Accessed 12.07.17

4.7.11 An alternative road may potentially be built that connects Delamare Road with the opposing side of the railway tracks as a part of the Cheshunt Lakeside development masterplan. Details on this alternative road are currently limited, and may change, but it is anticipated to be predominantly used by those accessing the Herts Young Mariners club, a carpark and allotment holders. This would be the only feasible route by which cats at Delamare Road could potentially access the SPA without crossing the tracks and fences. The number of pet cats that would do so is thought likely to be relatively negligible. Should the road have busy or congested periods, it would switch from being a potential route of access to a barrier to the movement of cats[4445].

Cat Predation Conclusion

4.7.12 Overall, it is concluded that an LSE on Lee Valley SPA, as a result of cat predation and associated disturbances caused by development proposed in the Local Plan, can be objectively ruled out at this stage.

4.8 Pet dogs (*Canis familiaris*)

How many dogs?

4.8.1 The development proposed in the Local Plan is considered to be very likely to lead to an increase in the number of pet dogs (*Canis familiaris*) being walked at Lee Valley SPA. Rates of dog ownership is complex and in the absence of detailed resident surveys it is not possible to state the precise increase in dogs that can be expected in the Borough as a result of the Local Plan.

[44] D. G. Barratt (1995) Movement patterns and prey habits of house cats Felis catus in Canberra, Australia, A thesis submitted in fulfilment of the requirements of the Degree of Master of Applied Science at the University of Canberra
[45] Barratt, D.G. (1997) Home range size, habitat utilisation and movement patterns of suburban and farm cats Felis catus. *Ecography*, 20, 271-280.

4.8.2 In 2015 there were approximately 8.5 million pet dogs in the UK[46]. Studies have found the percentage of households that are home to *at least* one dog to range between 24% and 31%, with an increased likelihood of dog ownership where households are in rural locations and/or have gardens and/or are not located in London[47,48,49,50].

4.8.3 The Local Plan proposes the construction of 7,718 homes. Assuming a rate of 30% of households homing at least one dog, this could potentially equate to an additional 2,314 homes in the Borough being home to at least one dog by 2033.

4.8.4 The increase in dogs in the Borough will be more concentrated in some locations than in others. For example, the proposed Cheshunt Lakeside development on Delamare Road could potentially deliver up to 1,990 dwellings. Assuming a rate of 30%, this development could result in an additional 597 dwellings on Delamare Road housing at least one dog. This site is within 400m west of Lee Valley SPA.

Dog walking

4.8.5 The frequency and duration of dog walks vary greatly depending on a range of circumstances, although it is generally accepted that healthy dogs require exercise at least once a day, sometimes for over two hours[51]. There could potentially be less visitors and dog walkers at the SPA during the colder winter months, although the extent to which this could be the case is currently unclear.

[46] RSPCA (2015) Facts and figures. Available online at: https://media.rspca.org.uk/media/facts . Accessed 17.05.17
[47] Pet Food Manufacturer's Association (2015/16) Regional pet population 2016. Available online at: http://www.pfma.org.uk/regional-pet-population-2016. Accessed 17.05.17.
[48] Pet Food Manufacturer's Association (2015/16) Pet population 2016. Available online at: http://www.pfma.org.uk/pet-population-2016 . Accessed 17.05.17
[49] Murray J. K., Browne W. J., Roberts M. A., Whimarsh A. and Gruffydd-Jones T. J. (2010) Number and ownership profiles of cats and dogs in the UK. Veterinary record 177, 163-168
[50] Westgarth, C., Pinchbeck, G. L., Bradshaw, J. W., Dawson, S., Gaskell, R. M., & Christley, R. M. (2007). Factors associated with dog ownership and contact with dogs in a UK community. BMC Veterinary Research, 3(1), 5.
[51] PDSA (2017) How much exercise does my dog need? Available online at: https://www.pdsa.org.uk/get-involved/our-current-campaigns/why-weight/keep-your-pet-healthy/how-much-exercise-does-my-dog-need . Accessed 30.08.17

4.8.6 Natural England fund the Monitor of Engagement with the Natural Environment (MENE) survey, which collects information on how the public engage with the natural environment. They found that 49% of visitors to a river, lake or canal were walking with at least one dog[52]. A survey of Thames Basin Heaths SPA recorded 4,314 dogs for 5,452 adults and 957 children, which suggests that 80% of visitors to the SPA are walking dogs[53]. According to the MENE, 92% of these people walking their dogs travel up to 8km (4.9 miles) to reach the dog walking location, although 79% of dog walkers travel no further than 3km[54].

Disturbance from dogs

4.8.7 Birds are considered to be more wary of dogs than people alone, and flush from their nest more readily, more frequently and at greater distances when disturbed by dogs[55].

4.8.8 Dogs regularly flushing birds from their nests often leads to abandoned nest attempts. It has been well recorded that disturbance reduces the mean reproductive success rate[56]. Research across 90 sites has found dog walking causes bird numbers to drop by an average of 41%, whilst the number of bird species fell by an average of 35%, despite dogs being kept on leads[57].

4.8.9 Passive disturbances likely occur at an even greater distance. The presence of dogs delays the arrival of birds at feeding areas, makes them depart feeding areas earlier and reduces the amount they eat whilst there due to increased vigilance[58,59,60,61]. Dogs may also prey on ground nesting birds and/or trample their nest[62].

[52] Natural England (2015) Monitor of Engagement with the Natural Environment. Available online at: http://naturalengland.tns-global.com/Default.aspx. Accessed 09.07.17
[53] Natural England (2013) Thames Basin Heaths Special Protection Area – visitor survey. Footprint Ecology, Natural England commissioned survey
[54] Natural England (2015) Monitor of Engagement with the Natural Environment. Available online at: http://naturalengland.tns-global.com/Default.aspx . Accessed 09.07.17
[55] Murison, G. (2002) The impact of human disturbance on the breeding success of nightjar Caprimulgus europaeus on heathlands in south Dorset, England. English Nature, Peterborough.
[56] Hockin, D., et al. "Examination of the effects of disturbance on birds with reference to its importance in ecological assessments." Journal of Environmental Management 36.4 (1992): 253-286.
[57] University of New South Wales (2007) "A Dog in The Hand Scares Birds In The Bush." ScienceDaily. ScienceDaily, 12 September 2007
[58] Yalden, P. E. and Yalden, D. W. (1990). Recreational disturbance of breeding golden plovers Pluvialis apricarius. Biological Conservation 51, 243-262.

4.8.10 It only takes one dog to potentially disturb large areas of breeding habitat for gadwall, shoveler and/or bittern[63]. The level of disturbance, and the impact this disturbance has on the birds, is significant whether it is due to one dog or a group of dogs. It is therefore necessary that the distribution of dogs in sensitive birds areas is as carefully managed as the quantity of dogs, particularly as each dog could potentially be causing disturbances for up to two hours on a daily basis.

Dogs at Lee Valley SPA

4.8.11 The LVRPA have advised that whilst they actively encourage visitors to use the site, dogs have proved to be a particular issue through reed disturbance and entering the water. The area of Lee Valley SPA within 400m of the proposed Cheshunt Lakeside development is designed to be a nature based and informal recreational experience. The provision of formal recreation facilities is deliberately limited.

4.8.12 Footpaths are numerous and frequently in close proximity to the lakes and bodies of water (see **Appendix E**). In some locations, lying in between the footpaths and waterbodies are habitats suitable for the qualifying bird species, such as reedbeds. It is therefore common for dogs chasing sticks or balls to run through the reeds or crash into the water, thereby impacting on the qualifying habitats and potentially disturbing the birds themselves.

Access to Alternative Green Spaces

4.8.13 Ease of access into the SPA will likely improve following the adoption of the Local Plan. Policy TM1: Sustainable Transport of the Local Plan proposes to protect and enhance pedestrian routes to, and within, the Lee Valley Regional Park and connections to other open spaces.

[59] Lafferty, Kevin D. "Birds at a Southern California beach: seasonality, habitat use and disturbance by human activity." Biodiversity and Conservation 10.11 (2001): 1949-1962.
[60] Lord, Andrea, et al. "Effects of human approaches to nests of northern New Zealand dotterels." Biological conservation 98.2 (2001): 233-240.
[61] Miller, Scott G., Richard L. Knight, and Clinton K. Miller. "Wildlife responses to pedestrians and dogs." Wildlife Society Bulletin (2001): 124-132.
[62] Murison, G. (2002) The impact of human disturbance on the breeding success of nightjar Caprimulgus europaeus on heathlands in south Dorset, England. English Nature, Peterborough.
[63] Woodfield, E. & Langston, R.H. (2004) A study of the effects on breeding nightjars of access on foot to heathland. English Nature, Peterborough

4.8.14 However, it is unlikely that all new dogs introduced into the Borough will be walked at Lee Valley SPA. Broxbourne is considered to currently offer a high quantity and quality of natural and open spaces to its residents (see **Figure 4.6**). In addition to these areas are the River Lee Navigation, several cemeteries, numerous golf courses and small neighbourhood playgrounds. When residents of Broxbourne were asked what the best thing about living in Broxbourne was, 33% of respondents said it was the parks and open spaces whilst 26% said it was the fresh air and being green[64].

4.8.15 Five green spaces in the Borough have been awarded the Green Flag status in recognition of their quality. A 2008 open space study found there to be 0.284ha of parks and gardens per 1,000 population, 1.26ha of natural and semi-natural open space and 0.46ha of amenity greenspace[65].

4.8.16 Most new residents to the Borough are therefore anticipated to have excellent access to high quality green spaces suitable for recreational activities and dog walking.

4.8.17 Natural England's MENE found that 42% of dog owners recorded the location of their engagement with the natural environment as being a park in a town or city (see **Box 4.1**). Only 11% recorded the destination as being a river, lake or canal.

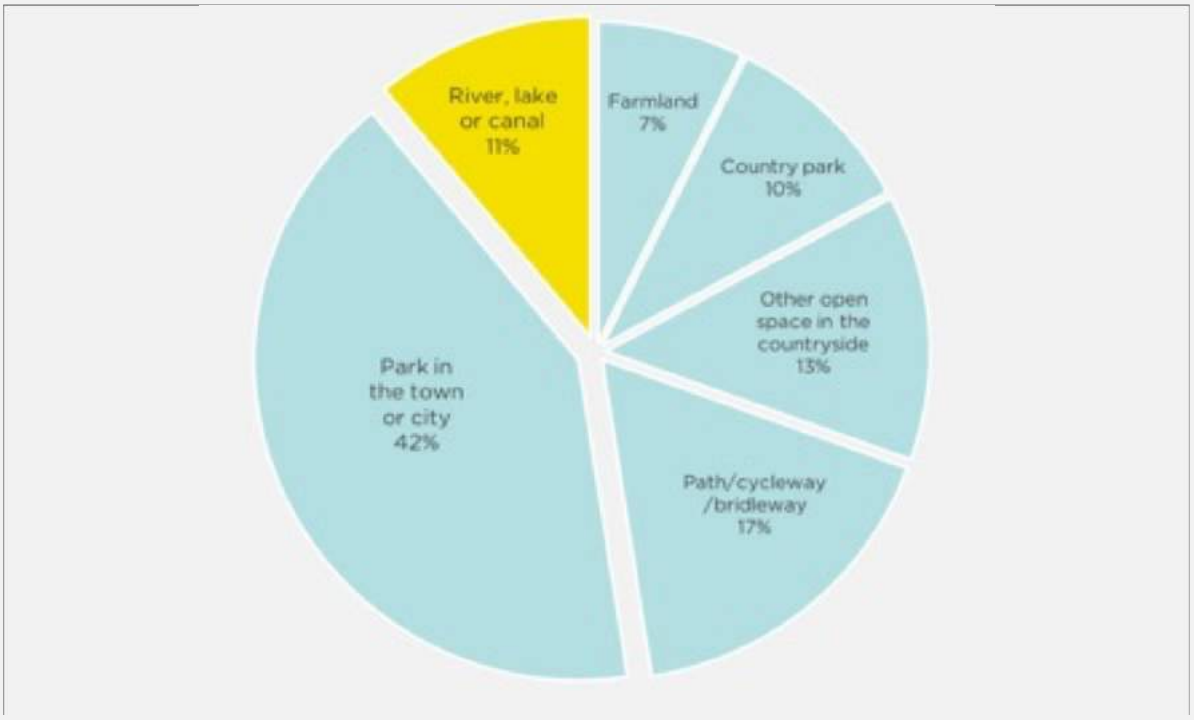
[64] Broxbourne Borough Council (2015) Green, Pleasant & Safe Strategy for Broxbourne 2015-17 , March 2015, Available online at: https://www.broxbourne.gov.uk/sites/default/files/meetings/MS-2015-03-24-Cabinet-GreenStrategyReport.pdf
[65] PMP Consultants (2008) PPG17 Technical Study A draft report by PMP, May 2008

4.8.18 Results from the MENE could suggest that, when parks, paths and open spaces are accessible and are suitable dog walking locations, residents are much more likely to visit these locations than they are canals, lakes and rivers[66].

Box 4.1: Results of Natural England's Monitor of Engagement with the Natural Environment for the question *"Which of the following list of types of place best describe where you spent your time during your visit?"*

These results could suggest that, where local parks are available in towns and cities, residents are significantly more likely to take their dogs there than they are to rivers, lakes and canals.

Local parks can be highly accessible, in close proximity to residential areas and meet the requirements for dog walking.



4.8.19 It is therefore necessary to ensure that residents of the Borough have suitable access to green spaces as alternatives to Lee Valley SPA to help limit the increase in the number of dog walkers there.

[66] Natural England (2016) Monitor of Engagement with the Natural Environment. Available online at: http://naturalengland.tns-global.com

4.8.20 The proposed Cheshunt Lakeside development on Delamare Road is particularly close to the SPA (see **Figure 4.4**). Currently, access to public open green spaces and parks from Delamare Road is limited, with the only options within 500m being Moxon Avenue Open Space and Penton Drive Open Space. Being surrounded by residential streets on all sides these open spaces likely already cater to a large number of residents.

4.8.21 The proposed Cheshunt Lakeside development could potentially introduce 4,500 residents and over 500 dogs to Delamare Road. It will be a high density development, and is unlikely to comply with the Councils' minimum requirements for amenity and open space. These residents would be anticipated to have very limited access to natural green space on the site and are considered very likely to rely relatively heavily on Lee Valley SPA for their day to day recreational and health purposes, including dog walking.

4.8.22 When adopting a precautionary approach, it is considered that the impacts of this significant quantity of residents relying on the Lee Valley on a regular basis for their day to day recreational, amenity and open space needs could undermine the conservation status of the qualifying features of the SPA. This daily use of the SPA to satisfy basic amenity needs is likely to have a different impact to that of traditional visitors to the Lee Valley Park seeking to use the park for sports, games or a nature-based experience – which are the main purposes of the park.

4.8.23 It is therefore recommended that new development is in line with Natural England's Accessible Natural Greenspace Standard (ANGSt) sets a range of standards for accessibility to natural sites and areas within easy reach of people's homes[67] (see **Box 4.2**).

4.8.24 The underlying principles of ANGSt are to improve access to green spaces, improve the naturalness of green spaces and to improve connectivity between green spaces. The Green Flag Award continues to promote the national quality standard for all parks and green spaces.

[67] Natural England (2010) 'Nature Nearby' Accessible Natural Greenspace Guidance

4.8.25 It is considered that most residents of the Borough have adequate access to open and green spaces. However, the proposed Cheshunt Lakeside development at Delamare Road, as currently configured, fails to meet minimum amenity and open space standards and relies almost entirely on the Lee Valley as accessible natural green space for residents. Given the lack of alternative open space at this location, the impacts of the 4,500 Cheshunt Lakeside residents' potentially intensive use of the Lee Valley SPA needs to be investigated, monitored and avoided or mitigated.

Box 4.2: Natural England Access to Natural Green Space Standard

Natural England recommends that everyone, wherever they live, has access to natural greenspace sites of varying sizes:

1. 2ha site within 300m/five minute walk;
2. 20ha site within 2km;
3. 100ha site within 5km of home;
4. 500ha site within 10km of home; and
5. A minimum of 1ha of Local Nature Reserve per 1,000 population.

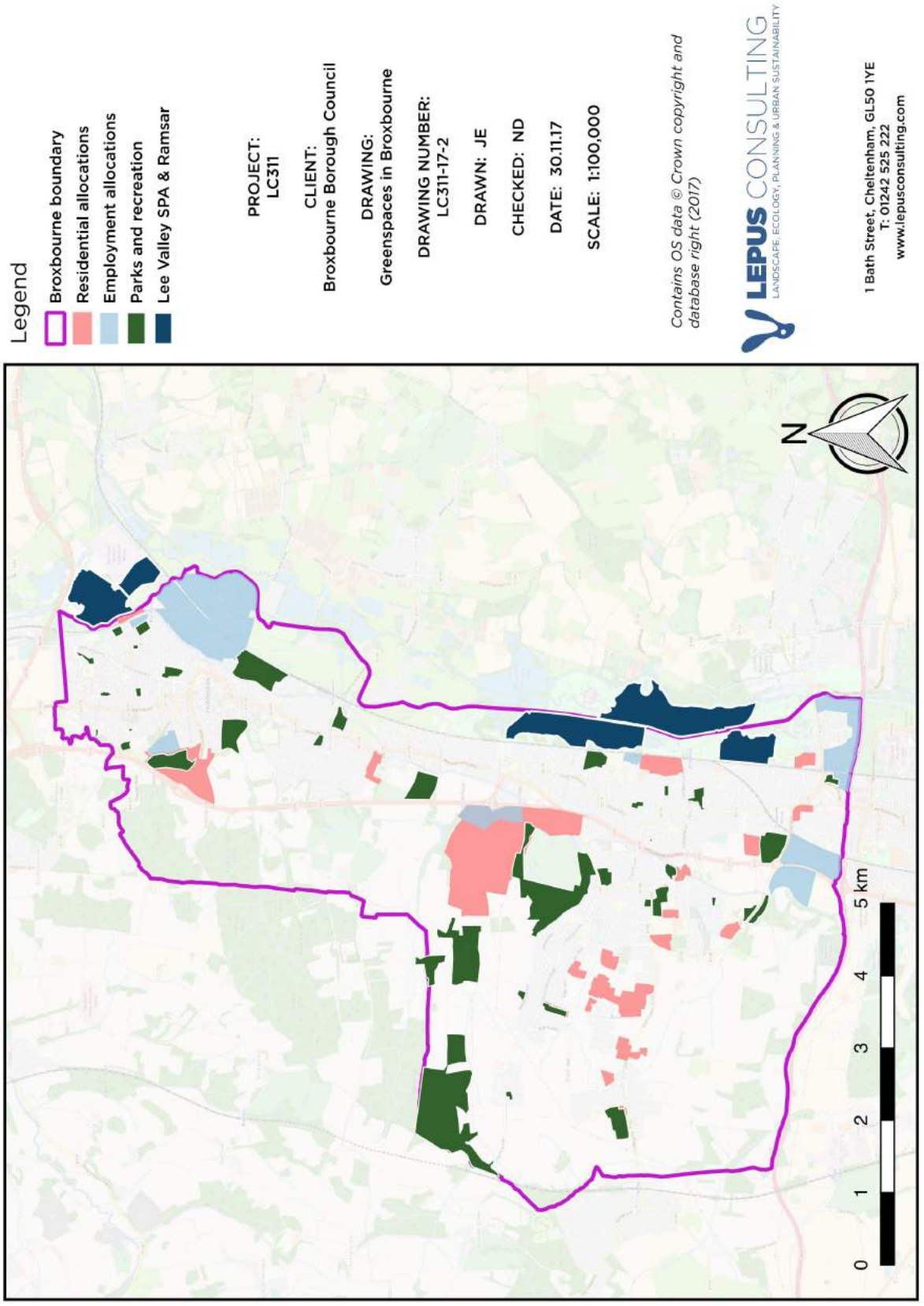


Figure 4.6: Map illustrating the sites allocated in the Local Plan in relation to Lee Valley SPA & Ramsar and parks and recreational spaces. This map does not include cemeteries, school fields, some local playgrounds, private gardens and some waterways.

4.8.26 Overall, in the absence of mitigation, an LSE caused by the direct impact of a significant increase in the nature and intensity of recreational use and additional dogs being walked at the SPA cannot be objectively ruled out. The Council is committed to ensuring that the qualifying features of the SPA are adequately protected. Policy CH1: Cheshunt Lakeside needs to include a framework for addressing the impacts of the proposed development on the SPA. This policy should require the provision of open space and formal recreational facilities, including children's play areas and fitness equipment such as trim trails, as well as a dog park, on the site in order to provide a range of recreational opportunities for residents, on-site, within a landscaped area.

4.8.27 Because of the scale of the development proposed for Cheshunt Lakeside, the provision of new and improved habitat for qualifying species, particularly new reed bed and islands; will be necessary in order to improve the resilience of the qualifying species to the change in the SPA's environment. This should help avoid an adverse effect on the qualifying species, provided it is implemented in advance of the first occupation of the Delamare Road/Cheshunt Lakeside development.

4.8.28 Policy CH1 should also include a commitment to require off-site mitigation within the SPA and LVRP at a level necessary to mitigate any residual impacts on the SPA of an increased intensity of recreational use. Off-site mitigation should include visitor infrastructure aimed at managing increased recreational use. Such infrastructure could include a new visitor centre; information boards; directional signs; seating; and paths which encourage activity in certain areas of the LVRP, away from the qualifying features.

4.9 Effects of the Local Plan in-combination

4.9.1 It is necessary to consider the cumulative impacts of the Broxbourne Local Plan in-combination with other plans and projects on public access and associated disturbances of Lee Valley SPA & Ramsar. Neighbouring districts of Broxbourne in relation to European sites are illustrated in **Figure 4.7**. Development planned in these districts could potentially act in-combination with the Broxbourne Local Plan to have a cumulative impact on Lee Valley SPA. Each district is at varying stages of preparing and/or adopting their development plans (usually a Local Plan), with varying extents of development proposed (see **Table 4.3**).

Table 4.3: Development proposed in neighbouring districts

District authority	Development document	Proposed developments	Conclusions in HRA (if available)
Harlow Council	Local Development Plan	12,000 – 15,000 homes by 2031	n/a
Hertsmere Borough Council	Local Plan 2012 – 2027	3,896 homes by 2027	Appropriate Assessment[68] (2016) concluded that the Hertsmere Local Plan is unlikely to have a significant effect on any European site, habitat or species
Welwyn Hatfield Borough Council	Local Plan	12,000 homes by 2032	Appropriate Assessment[69] concluded that the Local Plan would not have adverse effects on the integrity of Lee Valley SPA, either alone or in-combination, and additional recreational pressures, caused by the Plan, on any European Sites are considered unlikely.
Enfield Council	Local Plan	34,500 homes by 2036	2014 HRA concluded that all likely significant effects alone or in-combination, on European sites, have been avoided.
East Herts district Council	District Plan	16,390 homes by 2033	The HRA[70] concluded that, should all new development deliver greenspace in line with NE's ANGSt, Lee Valley SPA remains adequately protected.
Epping Forest District Council	Local Plan	11,400 new homes by 2033	The HRA[71] of the Epping Forest Local Plan concluded that an LSE will not occur on any European site. This is based on the assumption that the MoU for the Epping Forest SAC will deliver a mitigation strategy that successful protects the SAC's conservation objectives from significant effects associated with air pollution and public access.

4.9.2 By 2036, these six districts propose to build at least 90,186 – 93,186 homes in addition to the 7,718 proposed in Broxbourne.

[68] Hertsmere Borough Council (2016) Sustainability Appraisal Scoping Report – Appropriate Assessment chapter. Available online at: https://www.hertsmere.gov.uk/Documents/09-Planning--Building-Control/Planning-Policy/Local-Plan/Scoping-Report-with-additional-SPDs.pdf
[69] Land Use Consultants (2016) Welwyn and Hatfield Proposed Submission Local Plan 2016 Habitat Regulations Assessment, August 2016
[70] AECOM (2016) East Herts District Plan Habitats Regulations Assessment, September 2016 . Available online at: http://democracy.eastherts.gov.uk/documents/s35911/Habitat%20Regulations%20Assessment%20-%20ERP%20B%20HRA.pdf
[71] http://www.efdclocalplan.org/wp-content/uploads/2017/12/Epping-Forest-District-HRA-November-2017-Non-Technical-Summary.pdf

4.9.3 Development in Epping Forest District is anticipated to be focused in the urban areas of Chipping Ongar, Epping, Loughton and North Weald Bassett. Epping and Loughton are approximately 9km from Lee Valley SPA, whilst Chipping Ongar and North Weald Bassett are 18km and 12km east of the SPA respectively. A significant proportion of the development is also proposed for sites around Harlow. It is considered likely that some residents of Epping Forest will visit Lee Valley SPA. However, given the distance they would need to travel it is not anticipated to be a significant increase on existing levels, particularly during the colder winter months when the qualifying birds of the SPA are present.

4.9.4 The mitigation strategy the Council is committed to adopting (see **Section 4.8** and **Section 4.10**) is anticipated to adequately protect the SPA from an LSE due to recreational pressures, when the Broxbourne Local Plan is considered alone as well as in-combination.

4.10 Lee Valley SPA & Ramsar: Conclusion

4.10.1 To ensure the adequate protection of Lee Valley SPA and its qualifying features, an appropriate mitigation strategy is presented in **Section 4.10**. The Council is committed to this mitigation strategy, which is expected to protect the SPA's conservation status from a significant effect associated with public access. This is supported in the Local Plan by Policy CH1 Cheshunt Lakeside. At the time of writing, bird surveys are currently underway as part of the mitigation strategy to better establish the distribution of the SPA's qualifying features in the proximity of Broxbourne.

4.10.2 It is considered that an LSE caused by public access associated disturbances at Lee Valley SPA, due to development proposed in the Local Plan, can be objectively ruled out at this stage.

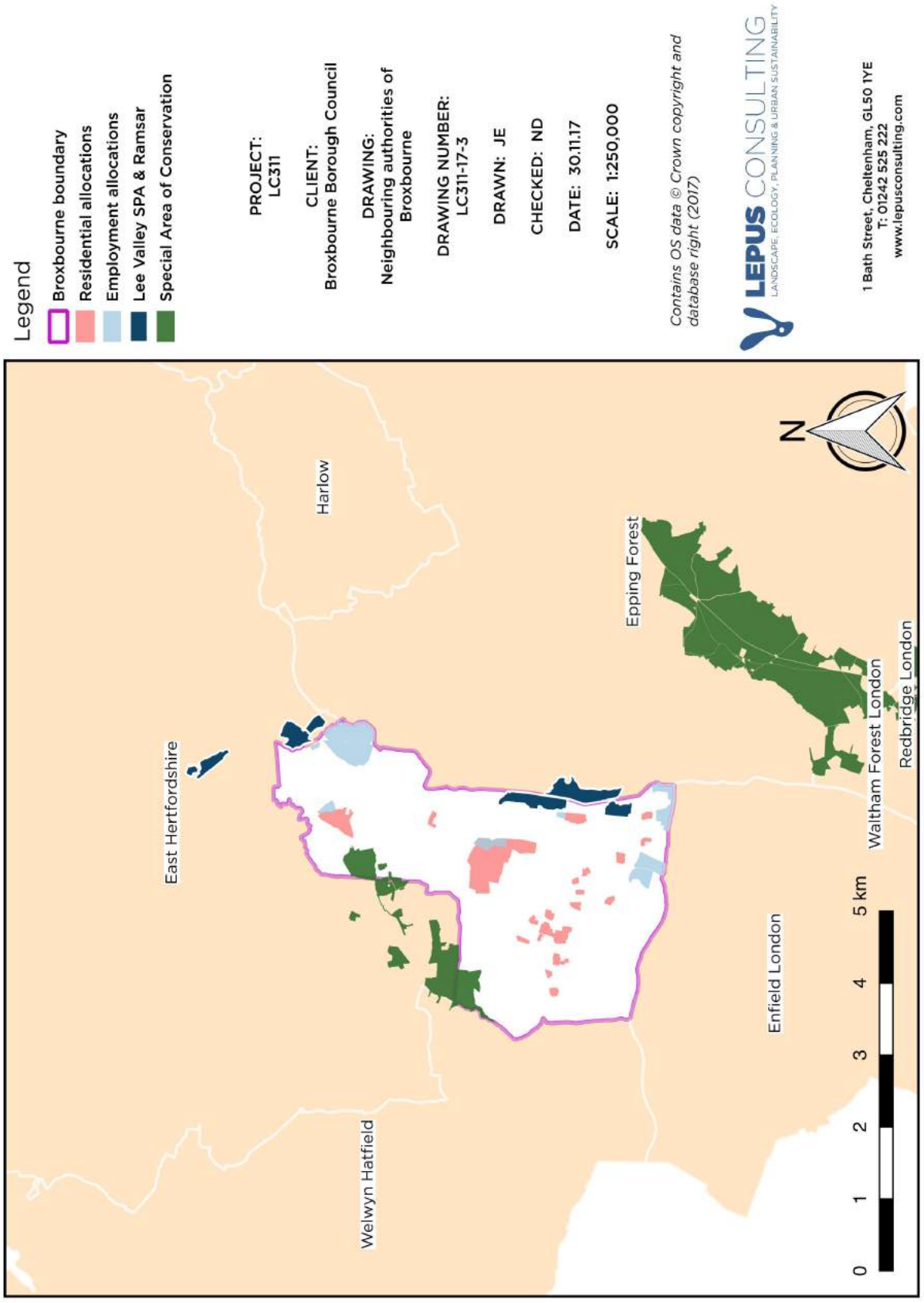


Figure 4.7: Map illustrating the neighbouring districts and boroughs of Broxbourne. The cumulative impact of future development of these districts and boroughs may adversely affect European Sites in-combination.

4.11 Lee Valley SPA & Ramsar: Recommendations

4.11.1 The Council's commitment to protecting and enhancing the biodiversity of the Borough is illustrated in Policy NEB 1. This policy proposes to assess all opportunities to better connect habitats in the Borough and to help ensure new development results in net gains in perpetuity for biodiversity. Where adverse impacts on important biodiversity assets are anticipated, developers would be expected to follow the avoid > mitigate > compensate hierarchy. Should this policy be successfully adopted, it is anticipated that an LSE on Lee Valley SPA will be avoided.

4.11.2 The Local Plan also necessitates protection of international sites of important biodiversity, such as Lee Valley SPA, in Policy NEB2. Additionally, policy CH1 Cheshunt Lakeside includes the commitment for on-site and off-site measures to avoid and mitigate potential adverse effects on the SPA.

4.11.3 If the development proposed in the Local Plan is to proceed and remain in accordance with policies NEB1 and NEB2, particularly that which is proposed at Delamare Road, it is necessary that a sufficient mitigation strategy is adopted. A strategy is recommended in **Table 4.4 – Table 4.7**. This mitigation strategy should:

- Be in place before any adverse impact arises;
- Be assessed for their impacts on the SPA & Ramsar;
- Be legally enforceable;
- Result in a net gain for biodiversity; and
- Be adequately monitored to determine their effectiveness.

4.11.4 It is important to note that the mitigation measures will be informed by results from the currently underway bird surveys (as recommended in **Table 4.4)** to ensure that new habitats and signage are located as effectively as possible.

4.11.5 On the basis that these mitigation measures are being adopted, it is considered that an LSE on Lee Valley SPA as a result of development proposed in the Local Plan will be avoided and can be objectively ruled out at this stage.

4.11.6 Bi-annual monitoring reports will be necessary to[72,73]:

- Validate the findings of the HRA process;
- Determine the effectiveness of adopted mitigation measures;
- Inform the next scheduled review of the Local Plan;
- Provide an early warning if the adverse impacts on the SPA & Ramsar are worse than anticipated; and
- Provide a means of response to any significant changes after the Local Plan is adopted.

4.11.7 It is possible that the monitoring will highlight unexpected adverse effects or that some effects are not as significant as anticipated. Better scientific understanding will likely emerge over time and a bi-annual monitoring report enables the Council to address any problems or insufficiencies in the mitigations strategy early, potentially during a Local Plan review.

[72] DTA (2013) Practical Guidance for the Assessment of Plans under the Regulations Chapter E.18 Monitoring
[73] RSPB (2007) The Appropriate Assessment of Spatial Plans in England A guide to why, when and how to do it

Table 4.4: Visitor surveys, ecological surveys and post-development monitoring

Information Gathering, surveys and monitoring
1. A survey of visitors to the Turnford & Cheshunt Pits SSSI area of the SPA: A baseline survey will be required as part of any development led, project level AA to established how the SPA is currently being used. Following the commencement of the Cheshunt Lakeside development, a survey will be necessary every two-three years[74] during the Local Plan lifetime to establish visitor access and behaviour, and patterns of behaviour in relation to dog walkers. It is recommended that the survey methodology follows that used by English Nature[75] in the visitor analysis of Dorset Heaths. It is considered to be particularly important to establish: • The quantity, distribution and duration of stay of visitors and dog walkers; • The catchment area for visitors and dog walkers to the SPA; and • The awareness of visitors to the SPA of its qualifying bird species.
2. Bird survey of North Metropolitan Pit, Seventy Acres Lake and Bowyers Water lakes and their supporting habitat: This is necessary to establish data on the movement of gadwall, shoveler and bittern within the SPA. An initial structure of surveys would preferably be completed during site visits over the autumn of 2017 and the winter of 2018 to establish robust baseline data on the population, distribution and movements of bittern, gadwall and shoveler within the Lee Valley Gravel Pits area of the SPA. It is recommended that bird surveys are completed on a biannual basis to inform the biannual report (see below).
3. A biannual monitoring report: This is necessary to establish whether the development in the Local Plan is having adverse impacts on the qualifying features of the SPA or if the adopted mitigation strategy is sufficient. This annual monitoring report should include the following: • WeBS data on counts of gadwall, shoveler and bittern at Lee Valley Gravel Pits for each year post-adoption of the Local Plan for the entire Local Plan period; • Any results of biannual ecological surveys on the movement of gadwall, shoveler and bitterns within the SPA; and • Visitor survey results.

[74] Office for National Statistics (ONS) (2010) Measuring Tourism Locally, Guidance Note Three: Undertaking Visitor Surveys
[75] English nature (2006) Visitor access patterns on the Dorset heathlands, England Nature Research Reports, 2006

Table 4.5: Ensuring residents of the Borough have adequate access to dog walking locations

Ensure residents have adequate access to alternative dog walking locations
1. **Residents in the Borough should have adequate access to natural green spaces** Ideally, all new residential development will be in line with the Natural England ANGSt, which is discussed in **Box 4.2**. Of particular importance is access to a 2ha site within 300m and a 20ha site within 2km. Reliance on important biodiversity assets for recreational green space use should be avoided.

Table 4.6: Establishing new island and reedbed habitat

Creation of new habitat to support qualifying features of the SPA
1. **New habitat suitable for supporting breeding and feeding populations of the qualifying bird species should be created in the North Metropolitan Pit, Seventy Acres Lake or Bowyers Water lakes, including**: • new reedbed habitat on an existing area of open water; • new islands with early successional conditions and shallow margins; • on-going management of the new reedbed and island to prevent succession of the habitat. It is recommended that new and suitable habitat is created as a matter of priority to ensure adverse effects, particularly those caused by strategic development proposed on Delamare Road, are avoided. The new reedbed and island habitats should be located away from areas most frequently visited by dogs, preferably away from footpaths, but also where the reedbed and islands will not be isolated from other important bird habitats in the local area. Determining the most effective location for new habitat would be a process best informed by bird surveys, as recommended in **Table 4.5**. If initial surveys are successfully completed during 2017 into early 2018, new reedbed and island habitats could begin to be established in mid-2018. This is prior to the significant majority of development proposed in the Local Plan entering the construction phase. WeBS data suggests that there is great scope to support bittern populations in the local area, with numbers currently thought to be low. Focusing on high quality reedbed may therefore be preferable. Details of the new island and reedbed habitat should be established in conjunction with Natural England whilst it is anticipated that the LVRPA could provide useful oversight of new habitat creation and management. It is anticipated that funding would be sourced from development.

Table 4.7: Minimising adverse impacts of visitors and dogs at the SPA

Minimise adverse impacts of visitors and dog walkers on qualifying features of the SPA
1. Erect new signage at the important bird areas of North Metropolitan Pit, Seventy Acres Lake and Bowyers Water which clearly state that: • The visitor is now entering an important bird area in relation to the SPA; • Dogs running through reed beds and/or crashing into the water can significantly disturb sensitive bird habitats and/or individuals; • Owners should be encouraged to prevent their dogs from running off designated footpaths. This will be easier if owners refrain from throwing balls or sticks long distances and by keeping dogs on leads – particularly in more sensitive bird habitat areas; and • Encourage visitors to challenge any dog walkers ignoring best practice. Determining the quantity and location of signs is a process best informed by the results of visitor surveys, as recommended in **Table 4.4**. In the absence of visitor survey results, it is recommended informative signs are erected at entrances to the Cheshunt Gravel Pits, along footpaths and near the car parks.

5 Epping Forest SAC

5.1 Background

5.1.1 Epping Forest SAC is a large ancient wood-pasture habitat of high nature conservation value. Habitats at the SAC include extensive and ancient semi-natural woodland, old grassland plains including a variety of unimproved acid grasslands, wet and dry heathland and scattered wetlands.

5.1.2 The Forest is subject to high recreational pressure. There is a high level of footfall throughout the year, including some periods of significant use, which is having a diverse range of impacts including mountain biking and unmanaged fires.

5.1.3 Good air quality is recognised as a key environmental condition for the SAC. At the site, wet heathland with cross leaved heath and beech forests on acid soils habitats are under pressure from poor air quality, with atmospheric nitrogen deposition a particular concern.

5.1.4 Elevated atmospheric nitrogen deposition can have a range of adverse impacts on woodland ecologies, including soil acidification, nitrogen immobillisation, nitrogen accumulation and nitrification of soil, altered tree growth, abiotic stress and diminished biodiversity[76].

5.2 Public access associated disturbances

5.2.1 In the December 2016 HRA Screening Report of the Broxbourne Local Plan (ref: LC218) an LSE on Epping Forest SAC as a result of public access associated disturbances caused by the Broxbourne Local Plan, alone and in-combination, was ruled out. This conclusion was not disputed by Natural England in their responses to the Screening report and the initial draft of this AA report (see **Appendix C**).

[76] Stevens, C., Jones, L., Rowe, E., Dale, S., Payne, R., Hall, J., Evans, C., Caporn, S., Sheppard, L., Menichino, N., Emmett, B. 2013.Review of the effectiveness of on-site habitat management to reduce atmospheric nitrogen deposition impacts on terrestrial habitats. CCW Science Series Report No: 1037 (part A), 186pp, CCW, Bangor.

5.2.2 Currently, a Memorandum of Understanding (MoU) is underway in order to survey, monitor and mitigate the impacts of public access associated disturbances, as well as air pollution, at Epping Forest SAC. In order to inform the MoU, visitor survey data is currently being prepared by Footprint Ecology as an update to the 2014 survey. The final results from this latest visitor survey have not been available during the preparation of the HRA Screening and AA, although an early indication of some results has been provided.

5.2.3 Based on an early draft format of this latest visitor survey, the results do not appear to indicate significant change in the location (by post code) visitors to the SAC are travelling from in comparison with previous surveys, and only three responders provided a Broxbourne post code. Based on this survey, the MoU has established a Zone of Influence for public access disturbances at the SAC which accounts for 75% of distances from survey point to post code and within which it has included the south eastern corner of Broxbourne. Whilst the MoU, at the time of writing, has included a portion of Broxbourne in this ZoI, it is still considered that a public access associated disturbance LSE caused by the Broxbourne Local Plan at the SAC, alone and in-combination, should be ruled out at this stage.

5.2.4 Previous surveys of the forest have found that 95% of visitors live within 2km. Broxbourne is up to 13km from the Forest and no closer than 4km. The 2014 visitor survey[77] found that the significant majority of visitors live near the centre and the south of the forest where there are better public transport links and a more dense local population. The forest's centre receives 33% of visitors, the south receives 55% and the north receives just 12%.

5.2.5 The disparity in spatial distribution of visitors at the forest emphasizes how the significant majority of visitors to the SAC are coming from the densely populated urban areas surrounding the centre and the south of the park. It is therefore expected that the impact of visitors will be most intense in these areas.

[77] Conservators of Epping Forest (2014) Epping Forest Visitor Survey 2014, Results Report

5.2.6 The 2014 survey of 885 visitors found only three responders who travelled from Broxbourne. Adjacent to Broxbourne's eastern perimeter is Lee Valley SPA and adjacent to its western perimeter is Wormley Hoddesdonpark Woods SAC. It is thought to be likely that these internationally renowned nature designations are the primary nature attractions for Broxbourne's residents. In contrast, reaching Epping Forest SAC from Broxbourne would require leaving the Borough, heading south east and crossing over the M25. The extra time and effort required to reach the SAC may be likely to deter Broxbourne's residents from using it for regular or daily purposes such as dog walking. Those who do visit the SAC from Broxbourne may be more likely to primarily visit the north of the forest, where visitor pressures are currently less severe and which is closer and easier for them to reach, although there is no data to support this.

5.2.7 Overall, it is clear that the scope for public access associated disturbances at Epping Forest SAC caused by existing and prospective residents of Broxbourne is severely limited. To require Broxbourne to contribute towards efforts to investigate, monitor and mitigate public access disturbances at the Forest, where approximately just 0.34% of visitors (3 of 885) are from Broxbourne, would be clearly disproportionate.

5.3 Advice from Natural England on Air Pollution

5.3.1 The December 2016 HRA Screening Report of the Broxbourne Local Plan (ref: LC218) concluded, with regards to the risk of air pollution at Epping Forest SAC, that:

"*...increases in traffic in the immediate vicinity of the site as a result of the Local Plan are expected to be negligible. It is therefore considered that based on the information currently available, a likely significant effect on Epping Forest SAC due to air pollution can be objectively ruled out*."

5.3.2 Natural England, the relevant statutory body, was consulted on the findings of this HRA Screening Report. With regards to air pollution at Epping Forest SAC they advised in their response dated 29 January 2017 (ref: 204552) that:

"Natural England acknowledges that any increases in traffic in the immediate vicinity of the SAC as a result of the plan alone are unlikely to be significant but further consideration and evidence should be provided before likely significant effects can be ruled out in-combination."

5.3.3 In previous consultation with Natural England, it has been made apparent that the four step process for determining if there will be an LSE from air pollution is as follows:

1. If there are no new roads, or no increases in the number of cars on roads within 200m of a SAC/SPA, then the issue can be screened out;

2. If there is a new road, or there is anticipated to be an increase in the number of cars on a road within 200m, then further consideration is needed *only* if the number of additional car movements exceeds 1000 per day;

3. Traffic and air quality modelling is used to determine if, based on Air Pollution Information System (APIS) data[78], there is going to be an increase in deposition loads of more than 1% on background levels;

4. If there is an increase of more than 1%, then mitigation measures are required.

5.4 Local Plan induced traffic increases

5.4.1 The Design Manual for Roads and Bridges (DMRB) suggests that air quality impacts from vehicles are most likely to occur within 200m of a road[79]. It is therefore important to establish an idea of the increase in vehicular movements on roads within 200m of Epping Forest SAC as a result of the development proposed in the Local Plan. **Figure 5.1** displays the SAC in relation to the M25. Just south west of the town of Epping, the SAC sits within 50m of the M25 between Junction 26 (J26) and Junction 27 (J27).

[78] Air Pollution Information System (APIS) Accessed online at: http://www.apis.ac.uk/srcl

[79] The Highways Agency, Transport Scotland, Welsh Assembly Government, The Department for Regional Development Northern Ireland (2007) Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1: Air Quality

5.4.2 It is important to note that portion of the SAC that is within 200m of the M25 is relatively minor in relation to the size of SAC. Additionally, a large portion of the road which is within 200m of the SAC runs under a tunnel. The significant majority of the SAC is therefore unlikely to be exposed to poor air quality as a result of vehicular emissions stemming from the M25.

5.4.3 A network of roads runs throughout the SAC, most notably near Wake Arms Roundabout where there are existing traffic and congestion issues and through which at least 45,000 vehicles run daily[80].

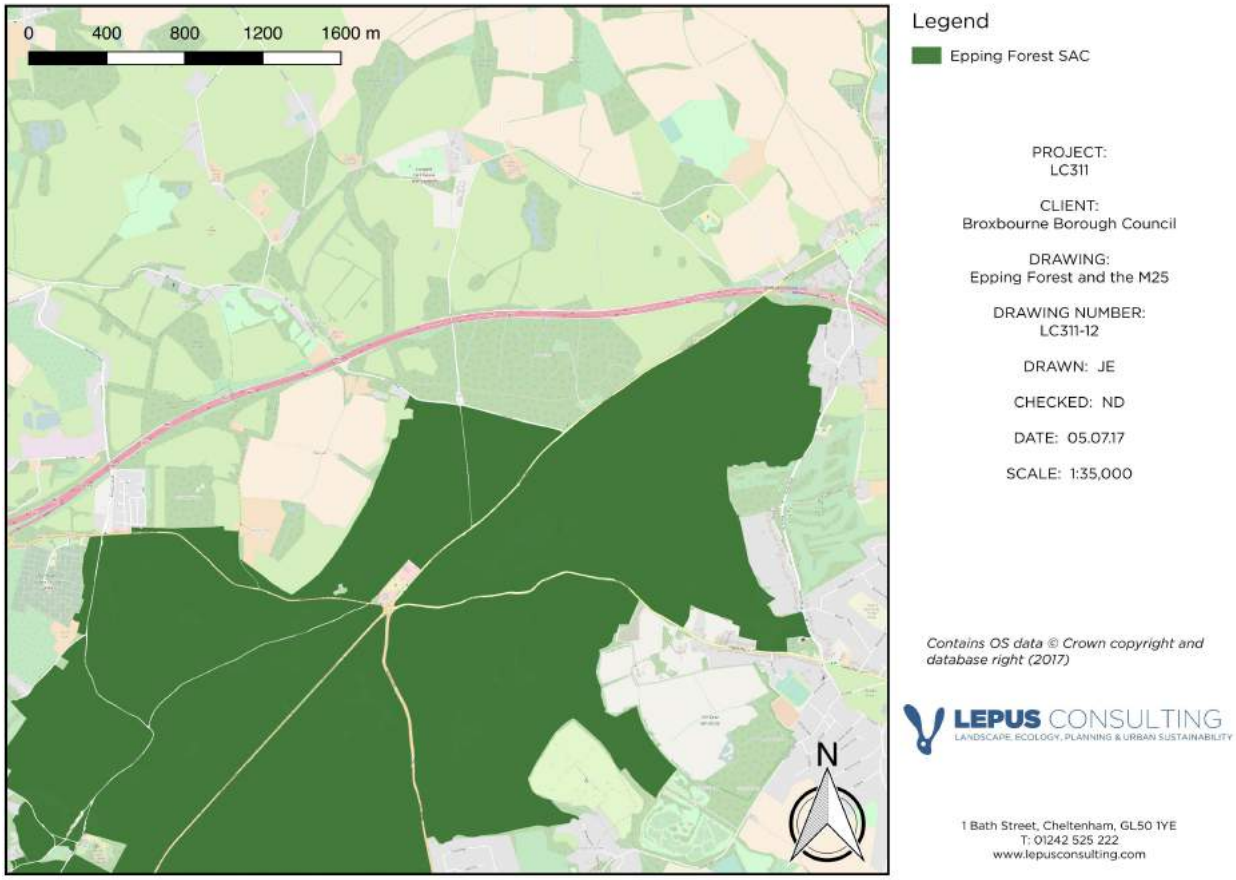


Figure 5.1: Epping Forest SAC in relation to the M25 (the pink line running horizontally through the map). This is just south west of the town of Epping and south east of Waltham Cross.

[80] Epping Forest – The next 10 years (2013). Accessed online at: consult.cityoflondon.gov.uk

Commuting into Broxbourne

5.4.4 2011 Census data indicates 64.8% of people drive a car or motorcycle to work in Hertfordshire[81]. The delivery of 6,000 - 7,000 jobs in Broxbourne by 2033 could therefore potentially lead to an additional 3,888 – 4,536 people driving a car or motorcycle to work each day.

5.4.5 2011 UK Census data indicates that 61% of workers in Broxbourne live outside the Borough and commute in. If 6,000 – 7,000 jobs are created in the Borough, 3,660 – 4,270 may therefore potentially be taken by workers commuting in to the Borough, 2,372 – 2,767 of which via car or motorcycle.

5.4.6 Based on commuting data in **Table 5.1**, it is considered that approximately 29% of workers that commute in to Broxbourne drive between J26 and J27 of the M25.

5.4.7 If the Local Plan increases the number of people driving to work in Broxbourne by 2,372 – 2,767, an extra 689 – 802 commuters may be expected to be driving within 200m of Epping Forest SAC twice a day. This equates to an increase in the AADF of 1,378 – 1,604.

Commuting out of Broxbourne

5.4.8 The Local Plan also proposes up to 7,718 dwellings. At 2.3 people per dwelling, 7,718 dwellings may be expected to increase the population of Broxbourne by 17,751. 2011 census data indicates 45% of Broxbourne's residents are employed, and so the introduction of 7,718 dwellings may therefore increase the number of employed residents in Broxbourne by 7,988 (45% of 17,751). 2011 census data indicates 75% of people employed in Broxbourne commute out of the Borough for work. A 7,988 increase in the number of employed people in the Borough may therefore increase the number of people commuting out of the Borough by 5,991 (75% of 7,988). Assuming the rate of people driving cars and motorcycles to work is 64.8%, approximately 3,882 (64.8% of 5,991) people will be driving cars or motorcycles to places of work outside of the Borough, as a result of the construction of 7,718 dwellings.

[81] Office for National Statistics (2011) UK Census 2011 - Table - CT0015 and HCTS 2015 Figure 4.20

5.4.9 Commuting data (see **Table 5.1**) indicates 23% of people commuting out of Broxbourne travel via J26 and J27 of the M25. The delivery of 7,718 dwellings in Broxbourne could therefore potentially increase the number of workers commuting to their place of work via J26 and J27 of the M25 (i.e. within 200m of Epping Forest SAC) by approximately 893 twice a day, equating to an AADF increase of 1,786.

5.4.10 Overall, the combined impact of the 6,000 – 7,000 jobs and 7,718 dwellings proposed in the Local Plan for Broxbourne could potentially increase the AADF on the M25 within 200m of Epping Forest SAC by 3,164 – 3,390.

5.4.11 This calculation is relatively crude and contains some degree of uncertainty. It does not account for the increase in the AADF that may be caused by people driving for recreational purposes. It also does not include the potential increase in heavy goods vehicles, such as for construction purposes or delivering goods to residents, which often emit more and worse pollutants. Additionally, it does not account for the cumulative impact on traffic caused by the Broxbourne Local Plan in-combination with the development plans of neighbouring Districts.

5.4.12 However, this desktop study has made it evident that a 1,000+ AADT increase within 200m of the SAC cannot be ruled out at this stage whilst an increase of several thousand is probably plausible.

Table 5.1: Number of workers commuting to/from Broxbourne, the location they're commuting to/from and whether or not these commuters are thought likely to use the M25 between J26 and J27. Data originates from the 2011 UK Census.

Location	Commuting to Broxbourne from…	Commuting from Broxbourne to…	Likely to use J26 – J27?
Broxbourne	11,623	11,623	No
Central Bedfordshire	261	27	No
East Hertfordshire	3,601	3,553	No
Epping Forest	**1,781**	**1,576**	**Yes**
Harlow	3,601	1,003	No
Hertsmere	254	675	No
Luton	220	59	No
North Hertfordshire	442	177	No
St Albans	330	328	No
Stevenage	439	304	No
Uttlesford	285	188	No
Welwyn Hatfield	722	1,526	No
Barnet, Camden & Hackney	578	1,977	No
Enfield	2,203	5,002	No
Haringey & Islington	445	1,670	No
Redbridge	**260**	**165**	**Yes**
Southwark	**62**	**289**	**Yes**
Tower Hamlets	**83**	**639**	**Yes**
Waltham Forest	**363**	**399**	**Yes**
Westminster, London	**44**	**2,837**	**Yes**
Rest of East	**1,642**	**810**	**Yes**
Rest of London	**1,066**	**1,458**	**Yes**
Elsewhere in UK	1,715	801	No
Mainly work from home	-	3,949	No
No fixed place	-	5,364	No
Offshore or abroad	-	82	No
Total	**29,817**	**46,481**	
Total	**5,301**	**8,173**	

5.5 Current situation

5.5.1 Epping Forest SAC is currently exposed to nitrogen deposition levels that significantly exceed its critical load[82] (see **Table 5.2**). Road vehicles are considered to be the second biggest contributor of nitrogen deposition at the SAC (see **Figure 5.2**). Annual Average Daily Flow (AADF) between J26 and J27 of the M25, which sits within 200m of the SAC, totaled 135,453 vehicles in 2016 (see **Table 5.3**).

5.5.2 Of the 38 SSSI units that overlap with the SAC, nine of them are recorded as having some degree of unfavourable conservation status, primarily due to air pollution. Excess nitrogen deposition has become noticeable throughout the forest, with trees showing signs of stress, canopies thinning and shoots dying back. The enhanced rate of bramble and nettle growth is not ideal whilst grasses are also outgrowing broad-leaved species.

5.5.3 Lichens are a sensitive and natural indicator of air pollution. The number of lichen species in Epping Forest SAC reduced from initial levels of over 150 to approximately 90 by the end of the nineteenth century. In 1970 when, air pollution was at its worst, there were only 28 species remaining. Today there are thought to be around 60 nitrogen pollution tolerant species in the SAC.

[82] APIS (2017) Site relevant critical loads: Epping Forest, available online at: http://www.apis.ac.uk/srcl/select-a-feature?site=UK0012720&SiteType=SAC&submit=Next

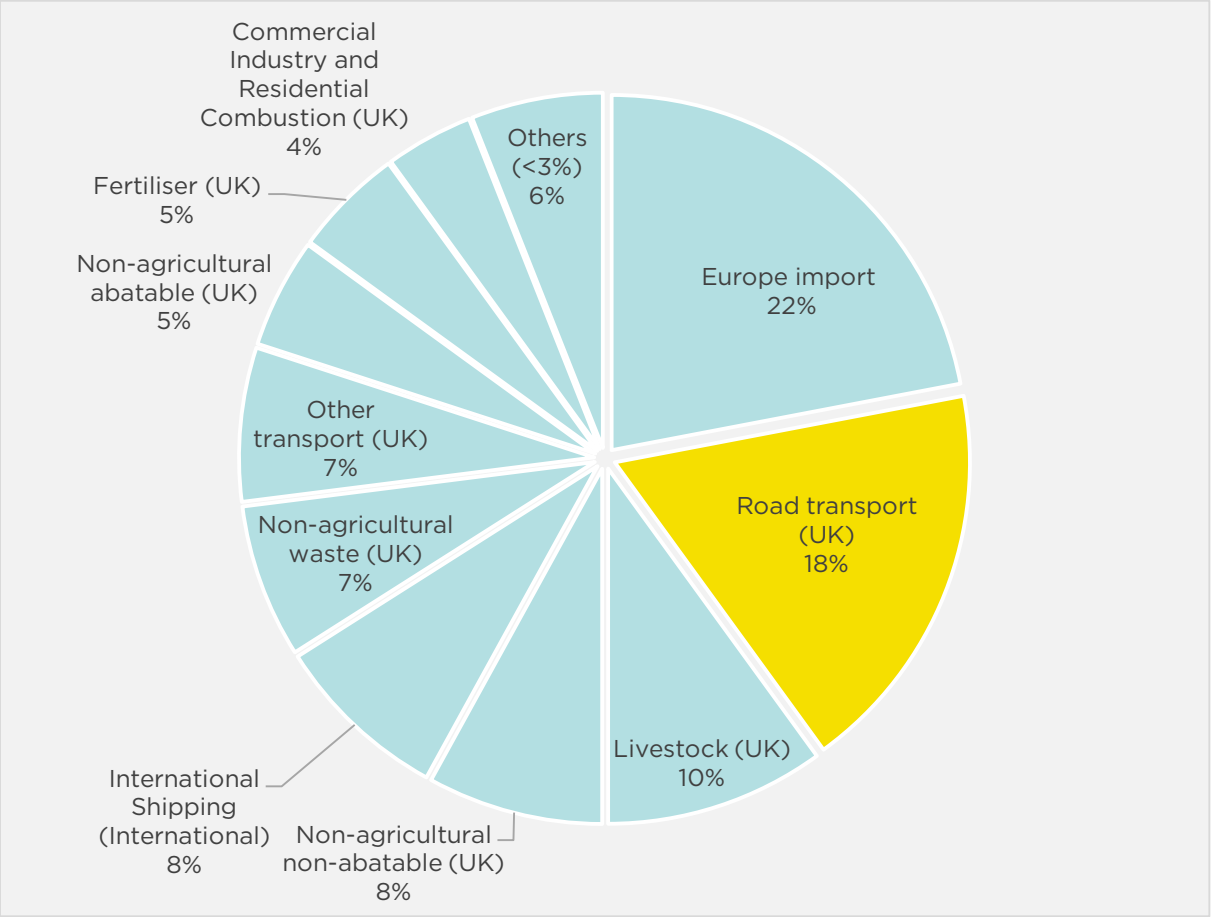


Figure 5.2: Sources of nitrogen deposition at Epping Forest SAC[83]

Table 5.2: Nitrogen deposition levels at Epping Forest SAC. Data derived from Air Pollution Information Systems.

Feature	Critical load (kg/N/ha/year)	Existing deposition levels (kg/N/ha/year)
Northern wet heath: *Erica tetralix* dominated wet heath	10 – 20	Average: 16.2 / Minimum: 14.7 / Maximum: 28.8
Lucanus cervus – Stag Beetle	10 – 20	Average: 29.2 / Minimum: 25.6 / Maximum: 52.5
Atlantic acidophilous beech forests with *Ilex* & sometimes *Taxus* in the shrublayer	10 – 20	Average: 29.2 / Minimum: 25.6 / Maximum: 52.5
European dry heaths	10 – 20	Average: 16.6 / Minimum: 14.7 / Maximum: 28.8

[83] Air Pollution Information Systems (2017) Epping Forest SAC Source Attribution. Available online at: http://www.apis.ac.uk/srcl/source-attribution?submit=Source+Attribution&sitetype=SAC&sitecode=UK0012720&sitename=Epping+Forest

Table 5.3: Number of cars and taxis, and the annual average daily flow (AADF) which considers all vehicle types, utilizing the 7km strip of the M25 between Junction 26 and Junction 27

Year	Number of cars and taxis	Annual average daily flow (AADF)[84]
2000	77,180	109,756
2001	80,036	113,710
2002	76,565	108,421
2003	79,038	108,342
2004	75,557	111,145
2005	77,301	111,944
2006	61,614	111,944
2007	82,434	115,783
2008	72,584	107,795
2009	78,642	113,028
2010	63,213	97,683
2011	63,087	98,042
2012	79,521	114,216
2013	78,037	111,541
2014	75,243	114,815
2015	77,099	119,383
2016	**91,521**	**135,453**

5.5.4 The Department for Transport (DfT) supplies annual average daily flow (AADF) data for roads throughout the UK[85]. AADF figures for the M25, between J26 and J27, are displayed in **Table 5.3**. The total number of vehicles using this 7km stretch of road was relatively stable between the years 2000 and 2013, but has increased substantially in the last two years. The figures in **Table 5.3** were counted manually at DfT Count Point 28049, although in 2011 and 2015 the AADF figures had to be estimated using the previous year's data. In 2016, there was considered to be an AADF of 135,453 vehicles.

[84] Department for Transport (2016) Traffic counts for Essex. Available online at: https://www.dft.gov.uk/traffic-counts/area.php?region=East+of+England&la=Essex Accessed 11.07.17
[85] Department for Transport (2016) Traffic counts for Essex. Available online at: https://www.dft.gov.uk/traffic-counts/area.php?region=East+of+England&la=Essex Accessed 11.07.17

5.5.5 An increase in the AADF between J26 and J27 of 3,164 – 3,390 would therefore constitute a 2.3% - 2.5% rise.

5.5.6 As can be seen in **Figure 5.1**, there are a network of minor roads running throughout the SAC. An estimated 45,000 vehicles pass through the Wake Arms roundabout in the centre of the SAC every weekday[86].

5.5.7 It is anticipated that the cumulative impact of air pollution from these roads, in-combination with the M25, are advancing the decline in the ecosystem health of Epping Forest SAC.

Conclusion on traffic increases near Epping Forest SAC

5.5.8 It is clear that, if mitigation measures are not adopted, an LSE at Epping Forest SAC caused by road transport associated air pollution cannot be ruled out. A strategy to carefully investigate, mitigate and monitor atmospheric nitrogen deposition at this internationally important Ancient Woodland will be required.

5.6 Memorandum of Understanding

5.6.1 Taking on board the advice of Natural England to address the potential issue of air pollution at Epping Forest SAC, Broxbourne Borough Council approached the West Essex/East Hertfordshire Housing Market Area partnership. This partnership has been working to prepare a Memorandum of Understanding (MoU) to cooperatively manage the potential impacts of growth on Epping Forest SAC.

5.6.2 The purpose of the MoU is to ensure these authorities work in partnership to fulfil the following requirements:

- Collect and analyse data related to the impacts of proposed development and growth under Local Plans;
- Commit to prepare a joint strategy, based on relevant available data and evidence; and
- The joint strategy will address the requirement for Local Plan development to avoid, or effectively mitigate, adverse impacts on the integrity of Epping Forest SAC.

[86] Epping Forest – The next 10 years (2013). Accessed online at: consult.cityoflondon.gov.uk

5.6.3 Data to inform the joint strategy includes:

- Allocated housing and commercial development sites, including delivery timeframes; Highways infrastructure changes;
- Public transport developments;
- Visitor numbers and behaviour, purposes of visits and distances travelled;
- Forecast change in traffic flows, and subsequent impacts on air quality including continued monitoring of the Bell Common Air Quality Management Area; and
- Forecast change to visitor pressures, and any significant positive or negative impacts.

5.6.4 At the time of writing, the MoU has established a long term plan for monitoring air quality using 14 transects, which should provide a comprehensive understanding of spatial and temporal variations in air quality at the SAC. Signatories of the MoU intend to proceed with the development of a viable and effective mitigation strategy for tackling the identified air pollution issues.

5.6.5 Through the MoU traffic increases on roads within 200m of the SAC, and the impact this has on air quality at the SAC, will be closely investigated and monitored. It is anticipated that the mitigation strategy developed, adopted and pursued through the MoU will ensure that the integrity of the SAC's qualifying features are not undermined as a result of air pollution. The Council is committed to helping ensure appropriate measures are adopted to protect the SAC through the MoU.

5.6.6 Contingent on the continued adoption and development of a viable and effective mitigation strategy through the MoU, it is considered that an adverse effect on the integrity of the SAC as a result of air pollution caused by the Local Plan (alone and in-combination) will not occur.

5.7 Potential mitigation measures for Epping Forest SAC

5.7.1 The MoU for Epping Forest SAC will be required to establish a mitigation strategy which will successfully protect the SAC's conservation status. The mitigation strategy could potentially include measures presented in the following sections.

5.8 Trip Reduction

5.8.1 Anticipated increases in AADF between J26 and J27 of the M25 are not an unavoidable eventuality and there is some scope for off-site measures which limit these increases. A bipartite approach could be adopted:

- Limit increases in the number of residents relying on personal car use to commute to their place of work east out of the Borough; and
- Limit increases in the number of workers relying on personal car use to commute into the Borough from the east.

5.8.2 The Local Plan proposes designated employment areas. Two of these are in the south of the Borough and adjacent to the M25 (see **Figure 5.3**), namely the 34.2ha Waltham Cross Business Park and the 53.9ha Park Plaza sites. Each of these two designated employment areas provides a mass of employment opportunities that will likely attract commuters from throughout and beyond the Borough.

5.8.3 Currently, Waltham Cross Business Park has excellent sustainable transport access, including bus stops within a very short walk along the A121 and Waltham Cross Railway Station on the western perimeter of the park. In contrast, the designated employment areas in Park Plaza have very limited access to sustainable transport links. The nearest bus stops are currently those located up to 1.7km and a 30 minute walk north east in Waltham Cross Town Centre. The nearest Railway Station to Park Plaza is also Waltham Cross, up to 1.5km and a 30 minute walk east. Reaching Waltham Cross from Park Plaza by foot or cycle is further impeded by the railway line and the A10.

5.8.4 The existing Public Rights of Way (PRoW) network at Park Plaza is good, although access over the M25, A10 and railway line is limited to pedestrian bridges (see **Figure 5.4**). The nearest electric car charging points to both designated areas of employment are between 2.5km and 4km away, located in Cheshunt Station Car Park, the Glyn Hopkin Nissan Dealership and Ordnance Road Library. Additionally, Crossrail 2 could potentially improve railway links in the Borough and early four tracking of the West Anglia mainline is being considered, however Crossrail 2 is not scheduled to be fully operational until 2033.

5.8.5 Overall, it is anticipated that the designated employment areas in Park Plaza and Waltham Cross Business Park will be responsible for a significant portion of increases in the number of people commuting into Broxbourne via J26 – J27 of the M25.

5.8.6 To help reduce the reliance on personal car use of workers commuting into and out of the Borough, recommendations are put forward in **Box 5.1**.

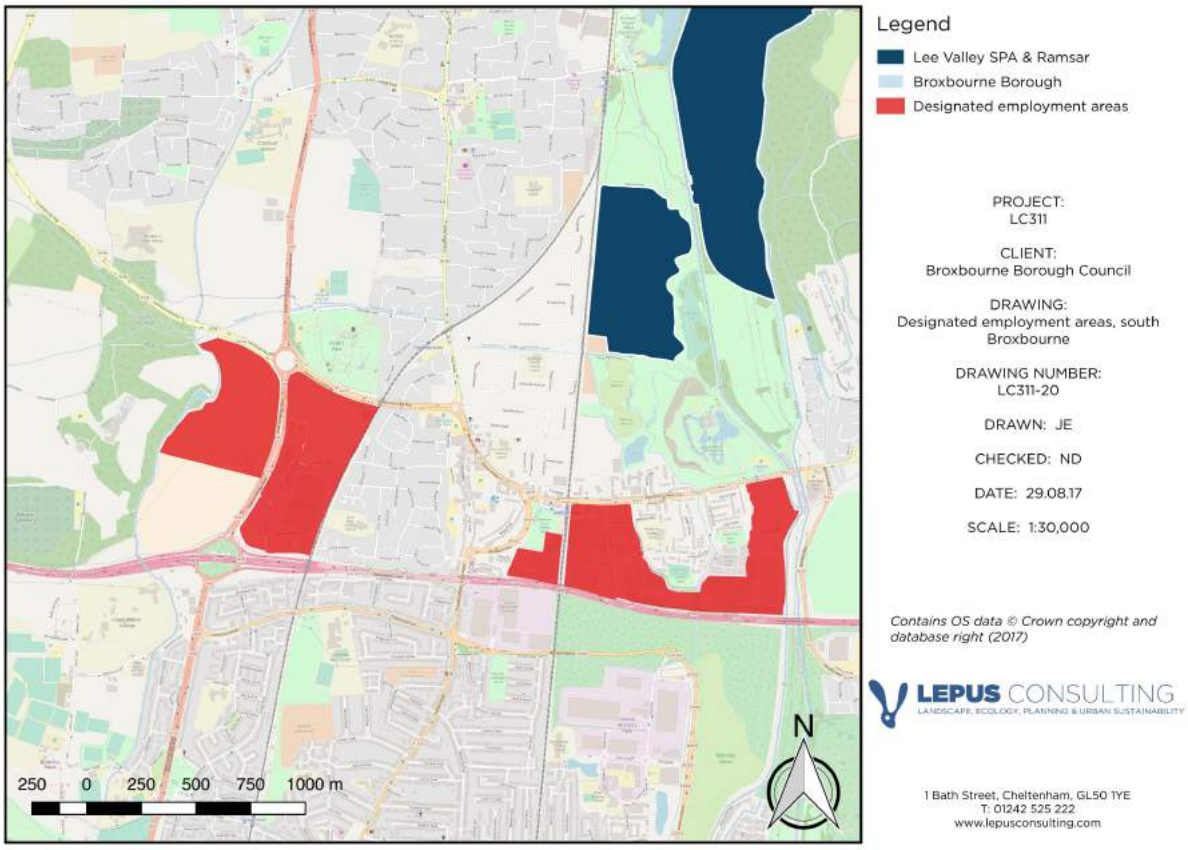


Figure 5.3: Designated employment areas in the south of the Borough and adjacent to the M25, including Waltham Cross business Park and Park Plaza.

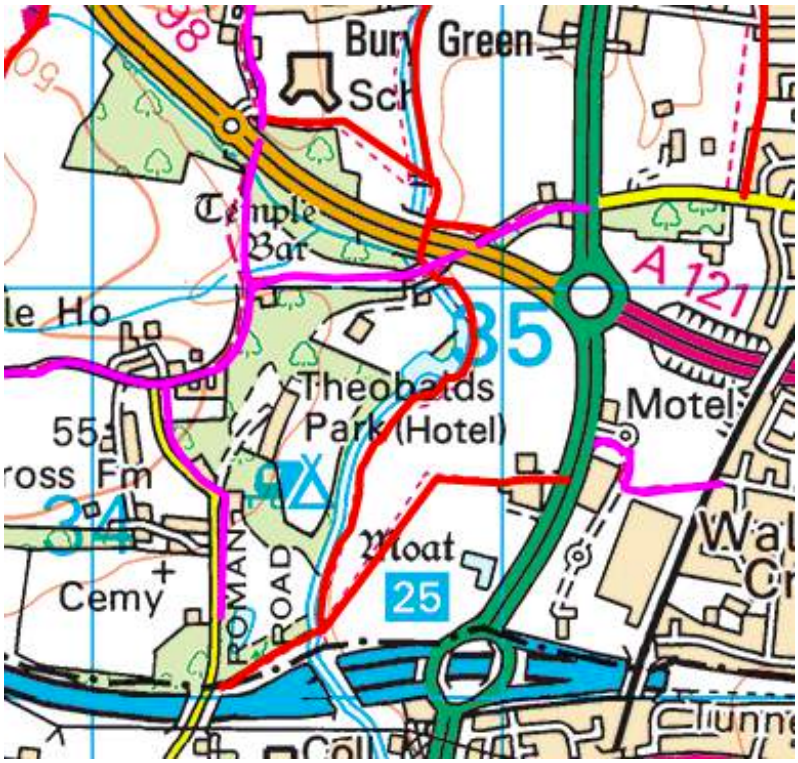


Figure 5.4: PRoW network in the Park Plaza area, showing bridleways in pink and footpaths in red.

Sustainable transport in the Local Plan

5.8.7 The Local Plan addresses the issue of sustainable transport in various policies. It is also preparing a Transport Strategy to address the effects of Local Plan development on the transport network. Development at Park Plaza should be in accordance with Policy TM1: Sustainable Transport, which would require new development to explore ways to reduce the use of cars. Development will require a Transport Assessment and supporting Travel Plan submitted with any planning applications. In accordance with the policy, new development will also need to demonstrate how pedestrian movements and connections have been provided and prioritized.

5.8.8 Policy INF6 includes the reinstatement of bus services between Park Plaza and Waltham Cross. Policies INF 6 and PP1 should be extended to include expansion of existing commuter services, for example by increasing their frequency and extending the new route 66 - which runs from Loughton and Debden to Waltham Cross - to include a stop at Park Plaza West. The scope for a subsidized or dedicated bus service should also be considered for the PP1 policy.

5.8.9 The Local Plan also suggests that a new Railway Station located at Park Plaza is being considered, as well as a new crossing over the railway line to better connect the site with the town centre.

5.8.10 Policy INF7 states a Walking and Cycling Strategy will be produced by the Council during the first five years of the plan period. The production of this document is currently underway and is anticipated to be completed in 2018. This strategy will be likely to help facilitate and fund infrastructure development aimed at reducing commuter trips.

5.9 Nitrogen management

5.9.1 On-site management practices have been shown to be effective in offsetting the impacts of nitrogen deposition. However, to ensure the resilience of habitats is not undermined, effective emissions controls are required alongside on-site measures[87], which could potentially include:

- Closer review of the data on the relationship between transport movements and air quality at Epping Forest SAC;
- Devising a strategy based on projected levels of NO2 deposition that works towards reducing emissions. This would include adopting measures which reduce nitrogen deposition. Proposals for policy mitigation could include an increase in the minimum number of electric vehicle charging points required at development sites.

5.9.2 Reductions in nitrogen deposition are likely to be the only long-term sustainable method of reducing impacts[88]. However, on-site strategies to mitigate damage in the short and medium term can also be effective[89].

[87] Stevens, C., Jones, L., Rowe, E., Dale, S., Payne, R., Hall, J., Evans, C., Caporn, S., Sheppard, L., Menichino, N., Emmett, B. 2013.Review of the effectiveness of on-site habitat management to reduce atmospheric nitrogen deposition impacts on terrestrial habitats. CCW Science Series Report No: 1037 (part A), 186pp, CCW, Bangor.
[88] Fenn, M.E., Allen, E.B., Weiss, S.B., Jovan, S., Geiser, L.H., Tonnesen, G.S., Johnson, R.F., Rao, L.E., Gimeno, B.S., Yuan, F., Meixner, T. and Bytnerowicz, A. (2010). Nitrogen critical loads and management alternatives for N-impacted ecosystems in California.Journal of Environmental Management,91, 2404-2423.
[89] Stevens, C., Jones, L., Rowe, E., Dale, S., Payne, R., Hall, J., Evans, C., Caporn, S., Sheppard, L., Menichino, N., Emmett, B. 2013.Review of the effectiveness of on-site habitat management to reduce atmospheric nitrogen deposition impacts on terrestrial habitats. CCW Science Series Report No: 1037 (part A), 186pp, CCW, Bangor.

5.9.3 Habitat management in Epping Forest SAC is the responsibility of the Epping Forest Conservators. Their task is complicated by the size of the forest and the number of roads passing through that fragment habitats and pollute the air. The Conservators receive a grant under Natural England's Environment Stewardship Scheme for their wood-pasture, heathland and grassland habitat work.

5.9.4 Currently, the conservators are limited by financial and human resources and are facing significant new social and environmental constraints such as increasing visitor numbers, worsening air pollution and new invasive species. They are unable to manage all areas of the SAC that require intervention, and focus instead on conserving 1,200 specially selected 'keystone' trees[90].

5.9.5 Measures to support the conservators, either in terms of financial and/or human resources, could therefore be of significant benefit to the SAC and help ensure its integrity is not undermined in the face of nitrogen deposition levels continuing to exceed critical loads. Financial contributions from development could potentially be used to support the on-site work of the conservators aimed at reducing the effects of poor air quality on the forest.

5.10 Epping Forest SAC: Conclusions

5.10.1 Overall, it is clear that the scope for public access associated disturbances at Epping Forest SAC caused by existing and prospective residents of Broxbourne is severely limited and it is considered that a public access LSE can be objectively ruled out.

5.10.2 It is considered that, on the basis that the Council will be a signatory of the MoU, Epping Forest SAC will be adequately protected from air pollution caused by development proposed in the Broxbourne Local Plan and an LSE can be objectively ruled out.

[90] City of London . Epping Forest – the next 10 years. Available online at: https://consult.cityoflondon.gov.uk/consult.ti/EF_Management_Plan_1/view?objectId=6710580 . Accessed 20.08.17

Box 5.1: Protecting the integrity of Epping Forest SAC

1. **Limiting increases in AADF between J26 and J27 on the M25 caused by development proposed in the Local Plan**

- Ensure that designated employment areas and new housing developments have access to affordable, frequent and sustainable modes of transport, including:
    - Extending bus services to create more frequent access to proposed employment sites
    - Affordable, accessible and frequent bus links to railway stations;
    - Pedestrian and cycle links, particularly for Park Plaza employment areas and strategic residential sites, to town centres and railway stations;
    - Requiring provision of a greater number of electric car charging points for all new development.

- Businesses at Park Plaza employment areas and Waltham Cross Business Park should adopt programmes designed to reduce the frequency and duration of commuting trips of their employees. These programmes could potentially include:
    - Carpooling and/or vanpooling schemes;
    - Shuttle bus services;
    - Cycle-to-work schemes;
    - Enabling employees to work from home; and/or
    - Adopting online meetings as a standard practice
    - Subsidized or dedicated bus services to serve the workforce.

- New employment opportunities in the Borough should include knowledge based and/or high skilled and/or well-educated opportunities which appeal to local residents;
- Businesses located at Park Plaza employment sites and/or Waltham Cross Business Park should make every effort to acquire robust and accurate data on the commuting habits of their employees, including the distance, frequency and method of commuting; and
- Bus links between the Borough (particularly Cheshunt, Waltham Cross and Park Plaza employment areas) and Epping should be made more appealing to commuters. Bus number 13 currently runs every 90 minutes between Waltham Cross and Epping, takes 36 minutes and costs £6 one-way (in contrast, driving a car from Waltham Cross to Epping takes approximately 23 minutes and approximately £1.35 in fuel). New bus route 66 could be extended to the Park Plaza site and its frequency increased.

2. **Provide financial contributions towards the management of Epping Forest SAC**

- This could potentially involve supporting the work of the Epping Forest Conservators in managing and monitoring the effects of poor air quality on the forest; and
- Contributing to on-site nitrate alleviation measures for short and medium term mitigation

6 Wormley Hoddesdonpark Woods SAC

6.1 Background

6.1.1 Wormley Hoddesdonpark Woods SAC is part of the Broxbourne Woods National Nature Reserve and owned by The Woodland Trust who have plans to sustainably restore the varied age structure and natural stand types. Since 1996 the woods have been covered with a High Forest Zone Plan courtesy of Hertfordshire County Council, which sets out a framework for woodland management. Natural England has found recreational activity at the SAC to be closely managed with visitors predominantly keeping to footpaths.

6.2 Advice from Natural England on In-Combination Effects

6.2.1 Natural England were consulted on the findings of the December 2016 HRA Screening Report. With regards to Wormley Hoddesdonpark Woods SAC they advised in their response dated 29 January 2017 (ref: 204552) that:

"Natural England commends the preparation of a HRA screening but considers that the evidence currently presented is currently insufficient to demonstrate 'no likely significant effects' on Epping Forest Special Area of Conservation (SAC) through air pollution and Wormley Hoddesdon Wood SAC in-combination with other plans and projects."

6.2.2 In response to this Broxbourne Borough Council responded in a letter dated 29 March 2017. They provided further evidence to support the claim that the Local Plan would not have an LSE on Wormley Hoddesdonpark Woods SAC when considered alone or in-combination with other plans and projects. Natural England's response to this letter, dated 25 April 2017 (ref: 212406) stated, with regards to Wormley Hoddesdonpark Woods SAC, that:

"Natural England thanks you for the further information provided and considers the conclusion reached to be appropriate."

6.2.3 This chapter will lay out the evidence that demonstrates the Local Plan is not considered to have an LSE on Wormley Hoddesdonpark Woods SAC, either alone or in-combination with other plans and projects. Districts and boroughs that neighbour Broxbourne are displayed in **Figure 4.7**. The Local Plan stage, and proposed Local Plan residential development, of each district and borough is listed in **Table 4.3**.

6.3 Vulnerabilities of Wormley Hoddesdonpark Woods SAC

6.3.1 The oak hornbeam (*Carpinion betuli*) forests of Wormley Hoddesdonpark Woods led to the woods being designated as a Special Area of Conservation (SAC). Conservation objectives for the SAC are therefore to maintain and restore:

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

6.3.2 The SAC is known to be vulnerable to a range of threats and pressures, presented in their entirety in **Appendix B**. During the HRA Screening Report process, some of these threats and pressures were removed from further consideration in the assessment as they were considered to be beyond the scope of the development proposed in the Local Plan. Ultimately, it is considered that air pollution and public access associated disturbances remain the only threats that the Local Plan could potentially exacerbate and thereby undermine the conservation status of the SAC due to detrimental impacts on the SAC's qualifying features.

Wormley Hoddesdonpark Woods SAC: Air Pollution

6.3.3 The Site Improvement Plan for the SAC states[91]:

"Nitrogen deposition exceeds the site-relevant critical load for ecosystem protection and hence there is a risk of harmful effects, but the sensitive features are currently considered to be in favourable condition on the site."

[91] Natural England (28.04.2015) Site Improvement Plan: Wormley-Hoddesdonpark Woods SAC

6.3.4 The HRA Screening Report concluded that there would be no LSE on the SAC caused by air pollution associated with the Local Plan when it is considered in isolation, with which Natural England agreed. The cumulative impacts of the Local Plan in-combination with other plans and projects will be considered.

Table 6.1: Critical load and existing level of nitrogen deposition at Wormley Hoddesdonpark Woods SAC[92]

Habitat class	Nitrogen Critical Load (kg N/ha/year)	Current Nitrogen Deposition (kg N/ha/year)
Meso- and eutrophic *Quercus* woodland	15-20	Maximum: 31.2 Average: 26.2 Minimum: 25.3

6.3.5 The Joint Nature Conservation Committee (JNCC) has recorded 100% of oak hornbeam habitats of the UK as receiving nitrogen deposition at rates that exceed the critical load[93]. They anticipate this to remain the same by 2020.

6.3.6 Current levels of nitrogen deposition at Wormley Hoddesdonpark Woods SAC significantly exceed what is considered to be the site's critical load (see **Table 6.1**). Whilst a range of 15-20 kg N/ha/yr is given as the critical load for Meso- and eutrophic *Quercus* woodland, 15kg N/ha/yr is recommended as the value to use during a detailed assessment stage. This is based on data from Air Pollution Information Systems which calculated a three year mean for 2013 – 2015. Source attribution data (see **Figure 6.1**) is a breakdown of the sources contributing to nitrogen deposition at the SAC based on 2012 emissions data. APIS uses air dispersion models to determine an estimate of a concentration or deposition of a pollutant emitted from an industrial process or a road[94].

[92] APIS (2015) Site relevant critical loads: Wormley Hoddesdonpark Woods SAC. Available online at: http://www.apis.ac.uk/srcl/select-a-feature?site=UK0013696&SiteType=SAC&submit=Next
[93] Joint Nature Conservation Committee (2007) Second report by the UK under Article 17 on the Implementation of the Habitats Directive from January 2001 to December 2006. Peterborough: JNCC. Available from: http://www.jncc.gov.uk/article17
[94] APIS (2015) Air Pollution Modelling . Available online at: http://www.apis.ac.uk/air-pollution-modelling

6.3.7 The first visible signs of excess nitrogen are usually rapid growth of nitrophilous plants or a decrease in sensitive lichens and bryohpytes. However, the SIP for the SAC suggests that the sensitive features of the woods are in a favourable condition and further investigation into the impacts of nitrogen deposition are therefore necessary.

6.3.8 Whilst conditions may currently be favourable, it is considered likely that continued exposure to nitrogen deposition levels that significantly exceed the site's critical load will eventually lead to the integrity of the SAC being undermined.

6.3.9 The primary source of nitrogen deposition at the SAC is considered to be European imports, wherein polluted air moves over from the continent and deposits nitrogen on the SAC, whilst road transport is thought to be responsible for 16% (see **Figure 6.1**).

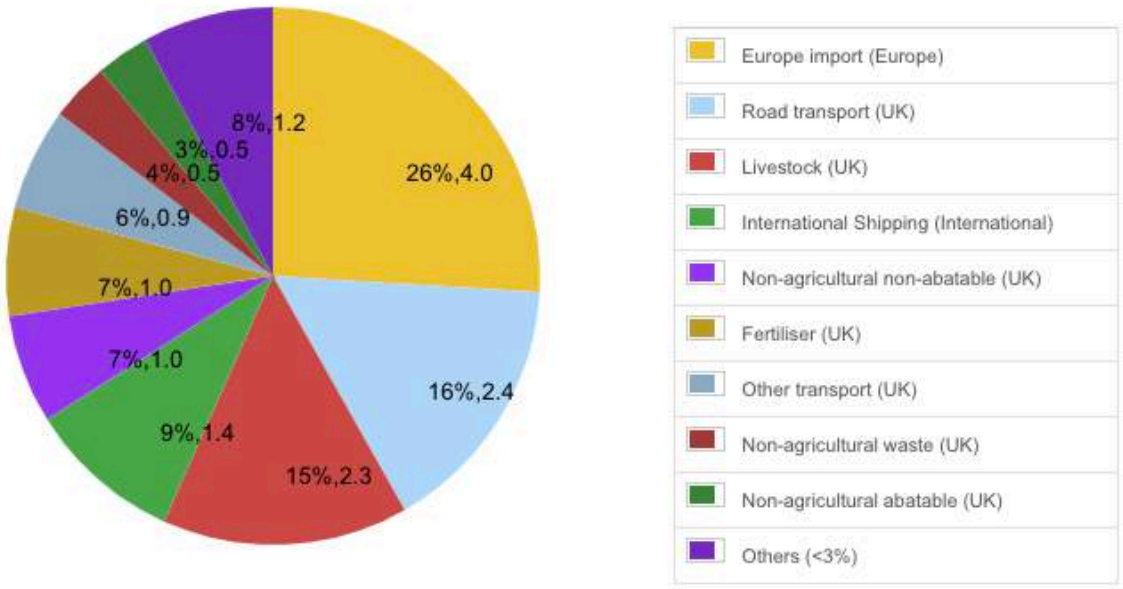


Figure 6.1: Sources of nitrogen deposition at Wormley Hoddesdonpark Woods SAC[95]

[95] Air Pollution Information Systems (APIS) (2015) Source Attribution: Wormley Hoddesdonpark Woods SAC: Nitrogen. Available online at: http://www.apis.ac.uk/srcl/source-attribution?submit=Source+Attribution&sitetype=SAC&sitecode=UK0013696&sitename=Wormley+Hoddesdonpark+Woods

6.3.10 The SAC overlaps with 25 SSSI units, the building blocks of site based nature conservation in the UK. Of these 25 units, 21 are considered to be in a 'Favourable' condition. Two of them are of an 'Unfavourable – recovering' condition whilst two are in an 'Unfavourable – no change' condition. The loss of favourability for four of the SSSI units is not related to air pollution or nitrogen deposition. The six SSSI units of Wormley Hoddesdonpark Woods that are located in Broxbourne are all considered to be in a 'Favourable' condition.

6.3.11 None of the proposed development in the Local Plan is within 200m of the SAC. The nearest, the High Leigh Garden Village proposal, is considered to have a net capacity of 530 dwellings and is 230m east of a northern portion of the Wormley SAC at its nearest point.

6.3.12 Should development proposed in the Local Plan lead to an increase in traffic on roads within 200m of the SAC, it will likely result in an increase in atmospheric nitrogen deposition.

6.3.13 The network of roads that runs in and around Wormley Hoddesdonpark Woods SAC is illustrated in **Figure 6.2**. Overall, the following roads are considered to run within 200m of the SAC in at least one location:

- A10;
- Cock Lane;
- Lord Street;
- White Stubbs Lane;
- Brickenden Green;
- Pembridge Lane;
- West End Road;
- Darnacle Hill;
- A private road; and
- A farm access only road.

6.3.14 Aside from the A10, each of these roads is considered to be a Minor Road and they are illustrated in **Figure 6.3** in relation to the SAC, as well as a 200m buffer zone around each road. A 200m buffer is applied as it is this within this distance that vehicular traffic is considered most likely to impact air quality[96].

6.3.15 Each road that runs within 200m of the SAC is considered in **Appendix D**. It is considered that any increase in traffic on the A10 could not lead to a likely significant effect on the SAC through a reduction in air quality. This is because of the relatively very minor area of the SAC that is within approximately 190m of the SAC. This conclusion was also reached in the HRA of the East Herts District Plan, completed by AECOM in September 2016 and agreed with by Natural England.

6.3.16 The Local Plan is unlikely to increase traffic on the private road or the farm access only road. The remaining roads are minor, non-strategic roads that are frequently narrow country lanes. Increases in traffic on these roads are anticipated to be relatively negligible and therefore an LSE on the SAC is considered unlikely. Policy INF2: Road infrastructure of the Local Plan is anticipated to improve traffic flow on the area of the A10 that runs through an urban area, which could potentially reduce the proportion of vehicles sitting idle on the A10.

[96] The Highways Agency, Transport Scotland, Welsh Assembly Government, The Department for Regional Development Northern Ireland (2007) Design Manual for Roads and Bridges, Volume 11, Section 3, Part 1: Air Quality

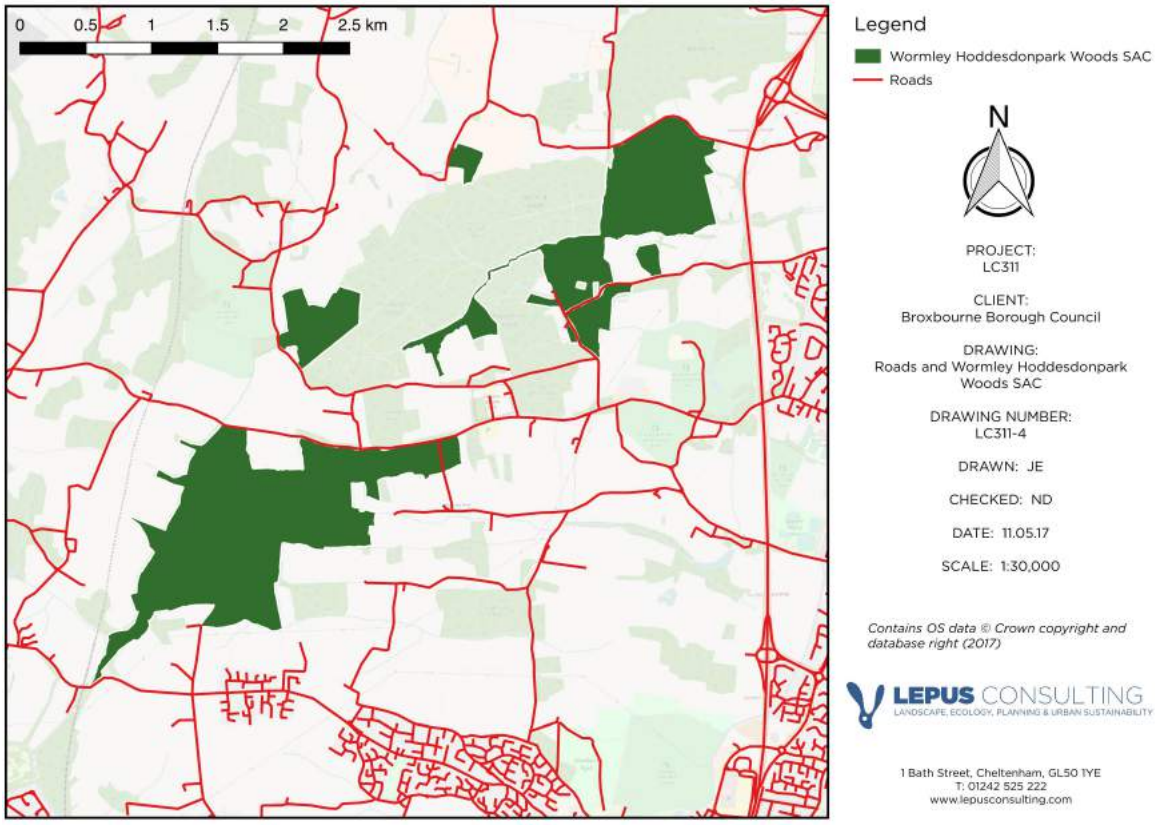


Figure 6.2: Map illustrating the network of roads running in and around Wormley Hoddesdonpark Woods SAC

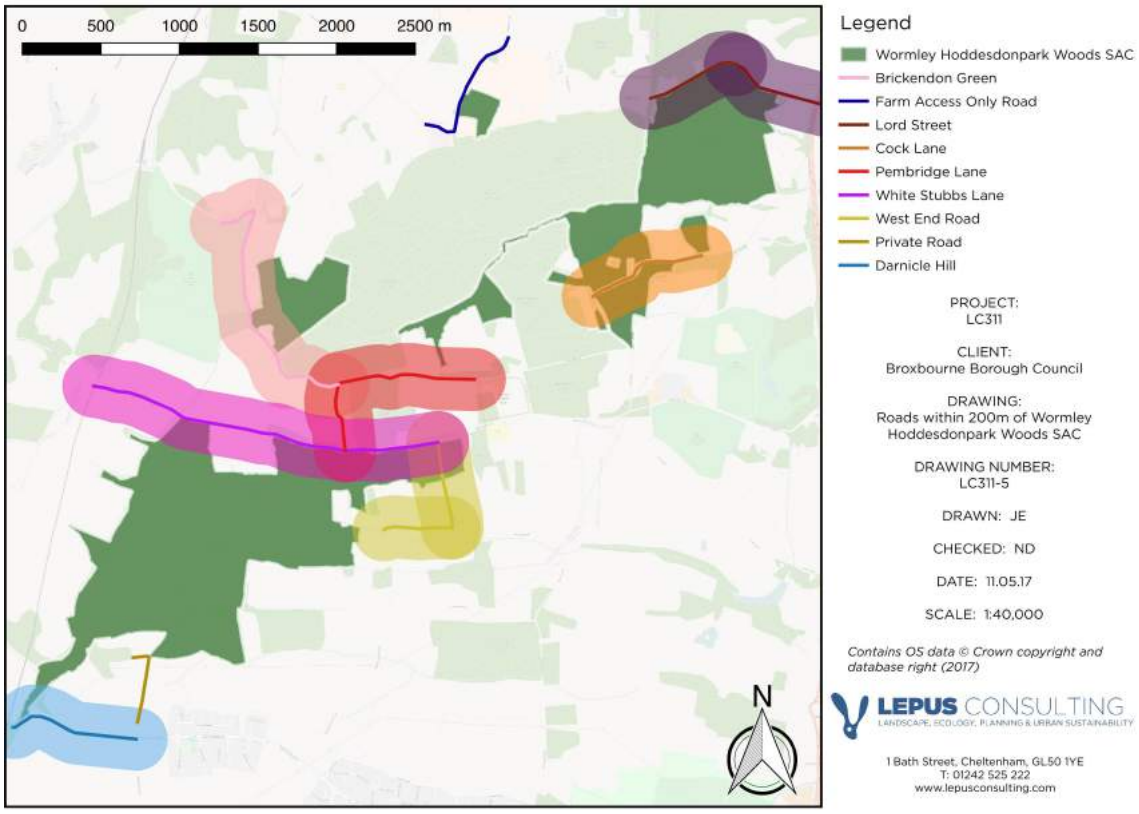


Figure 6.3: Map illustrating roads running within 200m of Wormley Hoddesdonpark Woods SAC and a 200m buffer zone of each road.

Air pollution *in-combination*

6.3.17 The HRA of Welwyn Hatfield Borough's draft Local Plan, completed by Land Use Consultants in 2012, concluded and agreed with Natural England that:

"Air quality impacts are unlikely to lead to a significant effect on Wormley Hoddesdonpark Woods SAC either in relation to Welwyn Hatfield's Emerging Core Strategy alone or in-combination with growth proposals in neighbouring boroughs."

6.3.18 The HRA of the District Plan being prepared by East Herts District Council, completed by AECOM in September 2016, concluded in relation to air pollution at Wormley Hoddesdonpark Woods SAC that:

"Air quality on this site is not considered further. This conclusion was drawn in the initial HRA screening of emerging Local Plan options in 2012 and was accepted by Natural England."

6.3.19 It is concluded that an LSE on Wormley Hoddesdonpark Woods SAC, due to air pollution caused by the Broxbourne Local Plan in isolation and/or in-combination with other plans and projects, can be objectively ruled out at this stage.

6.4 Wormley Hoddesdonpark Woods SAC: Public access and associated disturbances (including illicit vehicles)

6.4.1 With regards to recreational pressures, the Site Improvement Plan for the SAC states:

"The site is a large, attractive area of ancient woodland with extensive public access and close to large urban centres, so it is heavily used by the public for recreational purposes. Sensitive management of access points and routes by the site's main owners has been largely successful in mitigating the potential adverse effects of this high level of use. However, visitor numbers continue to increase, the types of use can change unpredictably and less obvious adverse effects on important flora and fauna could be missed during routine, 'general purpose' monitoring."

6.4.2 With regards to illicit vehicles, the Site Improvement Plan for the SAC states:

"Illegal use of restricted byways and bridleways by off-road vehicles causes localised but sometimes severe rutting and soil compaction, damaging the woodland ground flora, shrubs and trees. Fly-tipping damages the ground flora directly and can introduce toxins and alien species."

6.4.3 The HRA Screening Report concluded that there would be no LSE on the SAC caused by recreational disturbances associated with the Local Plan when considered in isolation, with which Natural England agreed. The cumulative impact of the Local Plan in-combination with other plans and projects will be considered.

6.4.4 The site is split in to the 192.5ha Wormley Hoddesdonpark Woods South SSSI and the 143.9ha Wormley Hoddesdonpark Woods North SSSI. The qualifying features in both areas are predominantly in a favourable condition and no adverse effects have been recorded as a result of recreational pressures. Access points and routes in to the site are closely managed.

6.4.5 Visitor survey data for the SAC is lacking. Data for other large woodland European Sites offers some indication of the distance people would travel to visit the SAC. Surveys of Epping Forest[97] suggest visitors are likely to only travel up to 3km. Natural England's Monitor of Engagement with the Natural Environment (MENE) found that, in 2014/15, 89% of visitors to a woodland or forest travelled less than 5 miles, or 8km, to get there whilst approximately 70% travelled less than 3km[98].

6.4.6 Within 8km of the SAC are the districts and boroughs of Broxbourne, Hertsmere, Welwyn Hatfield, East Hertfordshire, Epping Forest and Enfield, London. A negligible portion of Harlow is within 7km of the SAC and it is therefore not included in the assessment.

[97] City of London (2014) Epping Forest Visitor Survey 2014 Results report
[98] Natural England (2017) Monitor of Engagement with the Natural Environment (MENE) available online at: http://naturalengland.tns-global.com/Default.aspx

6.4.7 The key development plans in each district, and the conclusions of HRA work, are displayed in **Table 4.3**. The various HRA Screening Reports and Appropriate Assessments of these development plans that are currently available have identified no LSEs on EU sites when the proposed development has been considered alone or in-combination.

6.4.8 Policy NEB1 of the Local Plan is anticipated to offer important biodiversity assets some protection from recreational pressures. In accordance with Policy NEB2, development which would harm the nature conservation of internationally important wildlife sites will not be permitted unless it is either:

- A part of the management of the European Site;
- There are Imperative Reasons of Overriding Public Interest; or
- There is no alternative to the development.

6.4.9 In 2014 planning permission was granted to the High Leigh development that included 500 homes, a school and various commercial uses 230 metres from the SAC. Permission was granted based partly on Natural England's conclusion that it would not result in an LSE on the SAC.

6.4.10 **Figure 4.6** displays the some of the various recreational and open spaces available to residents of the Borough. There is also considered to be significant provision of Accessible Natural Green Spaces (ANGS) in the Brookfield and Rosedale Park strategic sites. Many of these open and outdoor spaces can be reached on foot by residents within a matter of minutes. In contrast, the Wormley Hoddesdonpark Woods SAC is on the opposing side of the A10 for the significant majority of residents and would likely require driving to.

6.5 Wormley Hoddesdonpark Woods SAC: Conclusion

6.5.1 The qualifying features of the SAC are considered to be resilient to the effects of public access and are currently in a favourable condition. The proposed development is not anticipated to lead to a significant increase in visitors to the SAC. Furthermore, the SAC is closely managed to the extent that impacts of an increase in visitors would be limited, whilst there are policies in place that offer the SAC protection from issues related to illicit vehicles. Roads running within 200m of the SAC are minor and a significant reduction in air quality as a result of increases in road traffic is therefore not anticipated.

6.5.2 It is considered that an LSE on the SAC, as a result of air pollution and/or public access associated disturbances caused by the Local Plan, can be objectively ruled out. This is considered to be the case when the Local Plan is assessed in isolation and when assessed in-combination with other plans and projects.

6.6 Wormley Hoddesdonpark Woods SAC: Recommendations

6.6.1 It is recommended that the Council commits to strategic initiatives identified in the SIP of the SAC, including further investigation into the impacts of atmospheric nitrogen deposition and lightweight monitoring of sensitive features of the SAC (e.g. nitrogen sensitive bryophytes at selected locations). East Herts District Council was recommended in the HRA of their Local Plan[99] to adopt similar strategic initiatives and it may therefore be practical to work alongside East Herts District Council in this regard.

[99] AECOM (2016) East Herts District Plan Habitats Regulations Assessment, September 2016

7 Conclusions and Recommendations

7.1 Assessment findings

Wormley Hoddesdonpark Woods SAC Conclusion

7.1.1 It has been concluded that an LSE on Wormley Hoddesdonpark Woods SAC, caused by air pollution and/or recreational pressures resulting from development proposed in the Broxbourne Local Plan, either alone or in-combination with other plans or projects, can be objectively ruled out. This conclusion is in accordance with comments from Natural England.

Wormley Hoddesdonpark Woods SAC Recommendations

7.1.2 It is recommended that the Council commits to strategic initiatives identified in the SIP of the SAC, including further investigation into the impacts of atmospheric nitrogen deposition and lightweight monitoring of sensitive features of the SAC (e.g. nitrogen sensitive bryophytes at selected locations). It may be practical to work alongside East Herts District Council in this regard.

Epping Forest SAC Conclusion

7.1.3 A public access associated LSE on Epping Forest SAC, caused by the Broxbourne Local Plan alone and in-combination, has been objectively ruled out.

7.1.4 It has been concluded that development proposed in the Broxbourne Local Plan, in the absence of mitigation, could potentially reduce air quality at Epping Forest SAC due to increases in traffic it will likely cause on roads within 200m.

7.1.5 However, contingent on the continued adoption and development of a viable and effective mitigation strategy through the MoU, it is considered that an adverse effect on the integrity of Epping Forest SAC as a result of air pollution, caused by the Local Plan (alone and in-combination), will not occur. The Council is committed to working alongside other signatories of the MoU to ensure the integrity of the SAC is not threatened or undermined by future development.

7.1.6 It is concluded on this basis that an LSE on Epping Forest SAC as a result of the Broxbourne Local Plan can be objectively ruled out at this stage.

Epping Forest SAC Recommendations

7.1.7 It is recommended that the Council proceed as planned with the MoU. It is recommended that the measures presented in **Box 5.1** are considered for the purposes of the MoU. Air pollution is a trans-boundary issue resulting from a variety of competing sources and it is therefore likely to be more effective to collaborate with neighbouring districts to investigate, monitor and mitigate the problem.

Lee Valley SPA & Ramsar Conclusion

7.1.8 Development proposed in the Broxbourne Local Plan could potentially result in a significant increase in the number of visitors and dogs visiting the SPA. In particular, the Cheshunt Lakeside development proposed for Delamare Road would be likely to lead to a significant increase in the number of daily users at the Cheshunt Lakes SSSI portion of the SPA.

7.1.9 It is difficult, and potentially unfeasible, to avoid an increase in the number of visitors and dog walkers without contravening a key aim of the LVRPA, which is to make Lee Valley as accessible and permeable to visitors as possible.

7.1.10 The Council is therefore committed to the mitigation strategy presented in **Table 4.4** to **Table 4.7**, and at the time of writing bird surveys at Lee Valley SPA are currently underway as a result.

7.1.11 Broxbourne Borough Council are committed to cooperating with Natural England and the LVRPA to ensure that, through the application of this mitigation strategy, the conservation objectives of the SPA will not be undermined.

7.1.12 It is considered that an LSE on Lee Valley SPA, caused by development proposed in the Local Plan, can be objectively ruled out because of the Council's adopted mitigation strategy.

Lee Valley SPA & Ramsar Recommendations

7.1.13 It is recommended that, as part of any project level appropriate assessment for Cheshunt Lakeside, careful consideration should be given to the potential impacts on the qualifying features of Lee Valley SPA. New development should seek to ensure residents have excellent access to natural green spaces (not including the SPA) in order to help minimize increases in daily users at the SPA.

7.2 Response to statutory consultees

7.2.1 Throughout the preparation of the Local Plan and HRA reports, Natural England have been consulted on at several points. Efforts have been made by the Council and Lepus to ensure the HRA is in line with Natural England's advice and their comments have been carefully considered and taken on board at all relevant junctures. It is considered that policies proposed in the Local Plan, as well as the Council's commitment to the MoU for Epping Forest SAC and the mitigation strategy being pursued for Lee Valley SPA, will help protect and potentially enhance the conservation status of these Natura 2000 sites.

APPENDIX A

Table A.1: European sites and their conservation objectives (where available from Natural

Epping Forest SAC

Conservation objectives:

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

Qualifying Features:

- H4010: Northern Atlantic wet heaths with *Erica tetralix*; Wet heathlands with cross-leaved heath
- H4030: European dry heaths
- H9120: Atlantic acidophilous beech forests with *Ilex* also *Taxus* in the shrublayer (*Quericon robori-petraeae or Ilici-Fagenion*); Beech forests on acid soils
- S1083: *Lucanus cervus*; Stag beetle

Lee Valley SPA

Conservation objectives:

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 the habitats of the qualifying features;
- The structure and function of the habitats of the qualifying features;
- The supporting processes on which qualifying natural habitats rely;
- The population of each of the qualifying features; and
- The distribution of the qualifying features within the site.

Qualifying Features:

- A021 *Botaurus stellaris;* Great bittern (Non-breeding)
- A051 *Anas strepera;* Gadwall (Non-breeding)
- A056 *Anas clypeata;* Northern shoveler (Non-breeding)

Wormley Hoddesdonpark SAC

Conservation objectives:

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 Features:

- H9160: Sub-Atlantic and medio-European oak or oak-hornbeam forests of the *Carpinion betuli*

APPENDIX B

Table B.1: Pressures and threats for qualifying features Epping Forest SAC, Lee Valley SPA & Ramsar and Wormley Hoddesdonpark Woods SAC that may be exacerbated by the Local Plan. AQF stands for All Qualifying Features.

Threats & pressures	Lee Valley SPA & Ramsar	Epping Forest SAC	Wormley Hoddesdonpark SAC
Water pollution	AQF	Wet heathland with cross-leaved heath	
Hydrological changes	AQF	Wet heathland with cross-leaved heath	
Public access	AQF	Wet heathland with cross-leaved heath, European dry heaths & Beech forests on acid soils	AQF
Inappropriate scrub	AQF		
Fish stocking	AQF		
Invasive species	AQF	Wet heathland with cross-leaved heath and Beech forests on acid soils	AQF
Inappropriate mowing	Bittern		
Air pollution	Bittern	Wet heathland with cross-leaved heath and Beech forests on acid soils	AQF
Disease		Beech forests on acid soils	AQF
Deer			AQF
Vehicles: illicit			AQF
Woodland management			AQF
Undergrazing		Wet heathland with cross-leaved heath	
Changing species distribution		Beech forests on acid soils	
Problematic native species			AQF
Aquaculture	AQF		
Changes in biotic conditions		AQF	
Grazing		AQF	
Biocenotic succession	AQF		
Interspecific floral relations			AQF
Other human disturbances			AQF

APPENDIX C: Comments from Natural England and Response

Response

Natural England have been consulted on the HRA of the Broxbourne Local Plan at several stages and have provided invaluable advice for proceeding with it. This has included comments on the HRA Screening Report (on both the draft (dated 29.01.2017) and final versions (dated 25.04.2017)). The Council consulted on the Regulation 19 Local Plan, along with the first version of this HRA Appropriate Assessment report, for which Natural England provided further comments in relation to the HRA (dated 15.01.2018).

These comments are reproduced in the following pages.

The following is intended as a response to the HRA related comments in Natural England's feedback dated 15.01.2018:

1. The Council has updated Policy CH1: Cheshunt Lakeside to reference further evaluation at the project level and to briefly outline potential mitigation measures identified in the HRA AA, which development proposals will need to take account of;
2. Rye Meads Sewage Treatments works can accommodate the currently proposed growth through to at least 2026. Natural England advised that, if there are over capacity issues post-2026, there could potentially be adverse consequences for Lee Valley SPA which it is directly connected to through water. The Council have reworded Policy INF 9: Utilities Statements to ensure that there is capacity at Rye Meads Sewage for any new development post 2026. It is therefore expected that development which requires capacity at Rye Meads Sewage Treatment Works will only be supported by the Council where there is sufficient capacity. Adverse impacts on Lee Valley SPA, caused by a shortage of capacity in sewage treatment, will therefore be avoided.

Date: 29 January 2017
Our ref: 204552 Broxbourne Local Plan HRA
Your ref:

Joseph Evans BSc (Hons) MSc,
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GL50 1YE
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Dear Joseph Evans,

Broxbourne Local Plan: Habitats Regulations Assessment (HRA)

Thank you for your consultation on the above dated 20 December 2016 which was received by Natural England on the same date via email.

Natural England is a non-departmental public body. Our statutory purpose is to ensure that the natural environment is conserved, enhanced, and managed for the benefit of present and future generations, thereby contributing to sustainable development.

Natural England commends the preparation of a HRA screening but considers that the evidence currently presented is currently insufficient to demonstrate 'no likely significant effects' on Epping Forest Special Area of Conservation (SAC) through air pollution and Wormley Hoddesdon Wood SAC in combination with other plans and projects.

Epping Forest SAC – Air Pollution
The report rightly recognises that many of the units of Epping Forest SAC are in unfavourable condition and that air pollution is considered the primary cause. The plan identifies a pathway in that commuters travel both to Epping Forest from Broxbourne and to Broxbourne from Epping Forest for work.

The report makes the assertion that an increase of jobs may decrease the number of Broxbourne residents commuting out of the borough for work. Given that the plan also intends to provide an additional 7000 homes and that there is a current net migration to Broxbourne from Epping Forest a reduction of commuters on the key roads in the vicinity of the SAC appears unlikely and is not evidenced.

Natural England acknowledges that any increases in traffic in the immediate vicinity of the SAC as a result of the plan alone are unlikely to be significant but further consideration and evidence should be provided before likely significant effects can be ruled out in combination.

Wormley Hoddesdon Wood SAC
Consideration needs to be given to potential in combination effects on SAC. The HRA screening should also identify any individual allocations that trigger Natural England's Impact Risk Zones (IRZ). IRZs are a GIS tool developed by Natural England to make a rapid initial assessment of the potential risks posed by development proposals to: Sites of Special Scientific Interest (SSSIs), Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and Ramsar sites. They define zones around each site which reflect the particular sensitivities of the features for which it is notified and indicate the types of development proposal which could potentially have adverse impacts.

We would be happy to comment further should the need arise but if in the meantime you have any queries please do not hesitate to contact us.

For any queries relating to the specific advice in this letter only please contact Jamie Melvin on 020 802 61025. For any new consultations, or to provide further information on this consultation please send your correspondences to consultations@naturalengland.org.uk.

We really value your feedback to help us improve the service we offer. We have attached a feedback form to this letter and welcome any comments you might have about our service.

Yours Sincerely,

Mr Jamie Melvin
Planning Lead Adviser – West Anglia

Date: 25 April 2017
Our ref: 212406 Broxbourne Local Plan HRA (Further Info)
Your ref:

Kim Harding
Principal Policy Planner
Broxbourne Borough Council
By email only: kim.harding@broxbourne.gov.uk

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Dear Kim Harding,

Broxbourne Local Plan: Habitats Regulations Assessment (HRA) Further Information

Thank you for your response to our HRA advice dated the 31st March 2017 and further conversation of the 21st April 2017.

Natural England is a non-departmental public body. Our statutory purpose is to ensure that the natural environment is conserved, enhanced, and managed for the benefit of present and future generations, thereby contributing to sustainable development.

Epping Forest Special Area of Conservation
Natural England is encouraged by the approach your authority is taking regarding the HRA of your local plan and is glad to see that you are engaging with East Hertfordshire District Council; Epping Forest District Council; Harlow District Council and Uttlesford District Council to assess impacts on air quality at Epping Forest Special Area of Conservation. Natural England is also committed to assisting in the process and is a signatory to the Memorandum of Understand. We will be issuing further advice following our meeting with Conservators of Epping Forest in early May and will respond to all further developments as appropriate.

Wormley Hoddesdonpark Woods Special Area of Conservation
Natural England thanks you for the further information provided and considers the conclusion reached to be appropriate.

Lee Valley Special Protection Area
Given the size of the development proposed at Cheshunt Lakeside and the proximity of allocations to the Lee Valley Special Protection Area, Natural England considers that a Likely Significant Effect cannot be ruled out at this point and that a **decision to proceed to Appropriate Assessment would be appropriate**.

For any queries relating to the specific advice in this letter only please contact Jamie Melvin on 020 802 61025. For any new consultations, or to provide further information on this consultation please send your correspondences to consultations@naturalengland.org.uk.

We really value your feedback to help us improve the service we offer. We have attached a feedback form to this letter and welcome any comments you might have about our service.

Yours sincerely,

Mr Jamie Melvin
Planning Lead Adviser – West Anglia

Date: 15 January 2018
Our ref: 231289 Broxbourne LP Submission
Your ref:

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Bishops College, Cheshunt, Waltham Cross EN8 9XF
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Dear Sir/Madam,

Broxbourne Local Plan: Regulation 19 Consultation

Thank you for your consultation on the above dated 18 July 2016 which was received by Natural England on the same date via email.

Natural England is a non-departmental public body. Our statutory purpose is to ensure that the natural environment is conserved, enhanced, and managed for the benefit of present and future generations, thereby contributing to sustainable development.

Natural England is encouraged by the work that has been carried out on the submission draft of the Broxbourne Local Plan. We commend the consideration given to the mitigation of air quality impacts on Epping Forest Special Area of Conservation ('SAC') but agree that the Memorandum of Understanding ('MoU') is the most appropriate mechanism for delivery such a strategy. Natural England advise that the strategic solution for mitigation should be in place before the plan is adopted. Natural England considers that the mitigation strategy for the Lee Valley Special Protection Area ('SPA') and Ramsar is appropriate but advise that amendment to policy is also required.

Natural England raises the following soundness issues:

Policy CH1: Cheshunt Lakeside
Natural England considers this policy to be unsound – not consistent with national policy
Natural England is satisfied that the Habitats Regulations Assessment ('HRA') appropriately identifies potential mitigation measures to offset impacts on the Lee Valley SPA and Ramsar. However to ensure that it is deliverable Natural England considers that further wording within the policy itself would be appropriate. We consider that reference to further evaluation at the project level is advisable along with a brief outline of potential mitigation measures as identified in tables 4.4 – 4.7 of the HRA Appropriate Assessment.

Most importantly Natural England consider that the policy should make it clear that any development proposal must take account of any agreed mitigation strategy and where necessary require the developer to make contributions, financial or otherwise, towards the implementation of this strategy. Natural England is happy to discuss wording further if that is considered necessary.

Policy INF 9: Utilities Statements
Natural England considers this policy to be unsound – not consistent with national policy
Natural England notes from paragraph 17.28 that Rye Meads sewage treatment works can accommodate currently proposed growth through to at least 2026. It does not, however, provide certainty of capacity for the full life of the plan and given that this provides a direct pathway to a European Site this should have been considered in the HRA.

This has the potential to impact on the Lee Valley Special Protection Area. Without a policy commitment to phasing development in line with the capacity of the Sewage Treatment Works at Rye Meads we would not be able to conclude that the plan was compliant with the Habitats Regulations. We advise that this policy should reflect the potential capacity issue with respect to the Rye Meads Sewage Treatment Works post 2026.

Recommended Wording
We suggest wording is including **in policy** along the lines of:

'The Authority will co-operate with utilities and service providers to ensure that appropriate capacity is available to serve new development and ensure new development does not have an adverse effect on the Lee Valley Special Protection Area. New development post 2026 will only be permitted if the required capacity is available at Rye Meads Sewage Treatment Works, including any associated sewer connections.'

For completeness we recommend that reference to this should be made in the HRA document.

Policy NEB2: Wildlife, Wildlife Sites and Biodiversity
Natural England considers this policy to be unsound – not consistent with national policy
Natural England recognises that amendments have been made to the supporting text to acknowledge the hierarchy of sites however the policy itself still treats International and Nationally designates sites equally. A clear distinction should be drawn to demonstrate compliance with the National Planning Policy Framework.

Landscape, Soils and Geodiversity
Natural England considers this policy to be unsound – not consistent with national policy
Natural England would expect the plan to include strategic policies to protect and enhance valued landscapes, along with criteria based policies to guide development, as set out in the National Planning Policy Framework (NPPF). We would also expect to see consideration of soils and geodiversity.

Habitats Regulations Assessment
Natural England notes in paragraph 7.1.5 of the Appropriate Assessment that *'contingent on the Council's commitment to this MoU, it is considered that an LSE on Epping Forest SAC can be objectively ruled out at this stage.'* Natural England advises that at this stage the MoU is not sufficiently progressed to be relied upon and that a mitigation strategy will need to be agreed before the plan is adopted. We note mitigation measures are suggested should the MoU not proceed as planned but given the complexity of the issue we consider that a great deal more work would be required before we could confidently rule out an adverse effect. We must therefore **advise that the plan at this point is unsound** in this regard**.**

We anticipate that there will be a requirement to make reference to the mitigation strategy for impacts on Epping Forest within plan policy and that other as yet unforeseen implications may require further amendments.

Note that Broxbourne is likely to fall partially within the zone of influence for both air quality impacts and recreational pressure.

In addition Natural England has the following comments which it does not wish to raise as questions of soundness:

Policy BR1: Brookfield
Natural England is pleased to see that new community woodland is proposed at this development but would like to see a reference to the protection of existing Ancient and Semi-Natural Woodland and the maintenance of connectivity with the wider landscape included in the policy.

Policy LV4: Spitalbrook
Natural England welcomes the additional aim of delivering environmental improvements including habitat recreation within this policy.

Policy LV5: Lee Valley Park Gateways
We consider that this policy could be improved with reference to the protection and enhancement of ecological features, a commitment to consulting Natural England where appropriate and the potential requirement of a HRA assessment. That notwithstanding we recognise that the policy does not dedicate or promote any specific new route and thus existing safeguards are likely available.

We would be happy to comment further should the need arise but if in the meantime you have any queries please do not hesitate to contact us.

For any queries relating to the specific advice in this letter only please contact Jamie Melvin on 020 802 61025. For any new consultations, or to provide further information on this consultation please send your correspondences to consultations@naturalengland.org.uk.

We really value your feedback to help us improve the service we offer. We have attached a feedback form to this letter and welcome any comments you might have about our service.

Yours faithfully,

Mr Jamie Melvin
Planning Lead Adviser – West Anglia

APPENDIX D: Roads within 200m of Wormley Hoddesdonpark Woods SAC

Table D.1: Roads that run within 200m of Wormley Hoddesdonpark Woods SAC (see **Figure 6.3**). No roads are considered to offer residents of Broxbourne a route to major employment or recreational areas, such as various areas of London, Welwyn Garden City and Harlow.

Road	Size and description	Within Broxbourne Borough?	Route to popular employment location?	Route to popular recreational location?	Increase in traffic because of the Local Plan	Increase in traffic because of the Local Plan in-combination
Cock Lane	Minor road that develops in to an unmarked country lane	Yes, leading in to the countryside, west out of the Borough	No	No	None to negligible	None to negligible
Lord Street	Minor road that develops in to a narrow, unmarked country lane with screening hedgerows on either side	Yes, leading in to the countryside, west out of the Borough	No	No	None to negligible	None to negligible
Pembridge Lane	Minor, unmarked and narrow lane	Lies just west and outside of the Borough	No	No	None to negligible	None to negligible
Brickendon Green	Minor road that develops in to an unmarked and narrow country lane in several locations	It sits outside and just west of the Borough, descending from the village of Brickendon down to Pembridge Lane	No	Access to Brickendon Golf Club	None to negligible	None to negligible

White Stubbs Lane	Minor road with white markings	Runs west out of the centre of the Borough towards Epping Green	No	Access to Paradise Wildlife Park	Negligible	Negligible
West End Road	Minor road that develops in to an unmarked and narrow country lane in several locations	Lies just west and outside of the Borough	No	No	None to negligible	None to negligible
Darnacle Hill	Minor road with white markings	Runs west out of the centre of the Borough towards Newgate Street	No	Access to Millbrook Golf Course and Ponsbourne Park Hotel	Negligible	Negligible

APPENDIX E: Photos taken during site visit to Lee Valley SPA

Plate E1: Security fencing between Turnford & Cheshunt Gravel Pits SSSI area of Lee Valley SPA and the railway line to the west.

Plate E2: This area of the SPA is accessible and attractive in nature for recreational visitors, with a network of footpaths, picnic spots and signage. Footpaths at Turnford & Cheshunt Gravel Pits SSSI/Lee Valley SPA run in close proximity to the waterbodies with no barriers in between.

Plate E3: The marshy nature of the land off the designated footpaths is more difficult and less appealing for visitors to walk across. Whilst it may detract people from straying into important bird areas, it is not likely to detract dogs. This photo was taken at Seventy Acres Lake.

Plate E4: This boardwalk extending out into Bowyer's Water. A highly attractive spot for recreational visitors with clear scope for pet dogs to crash into the water.

Plate E5: This area of the SPA is closely managed but largely designed to attract visitors. For example, near the North Metropolitan Pit lake is an attractively laid out network of boardwalks running through a designated orchid area.

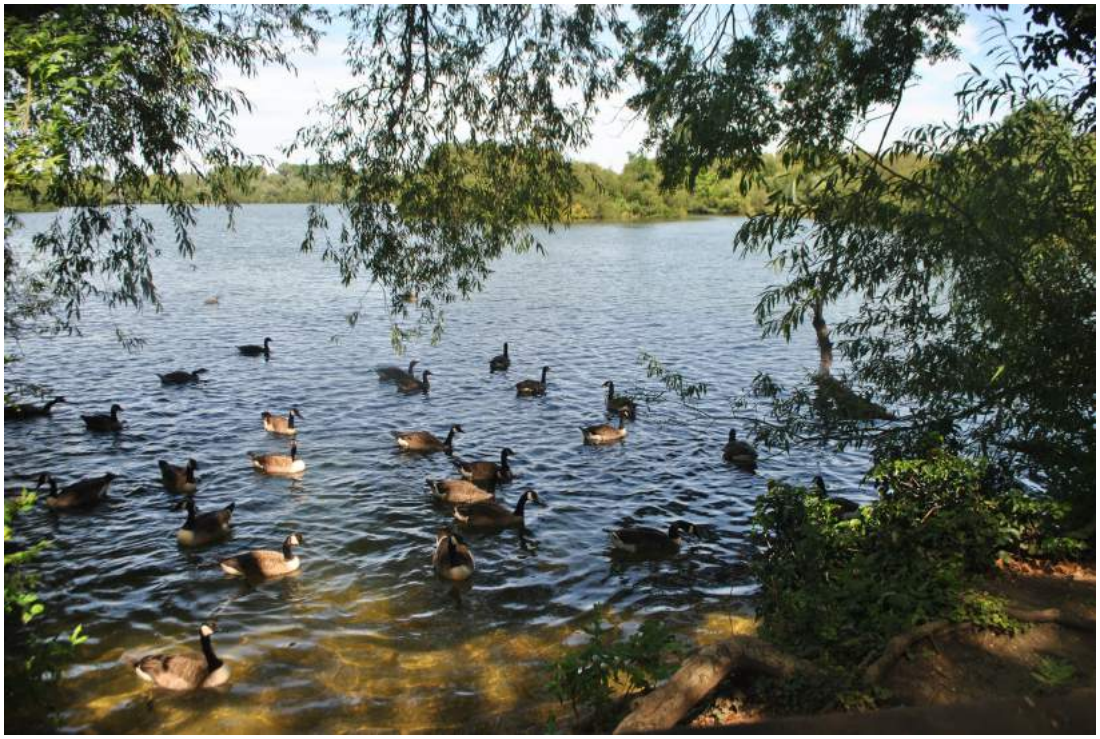

Plate E6: An example of some of the shallow and vegetated margins prevalent in SPA, being utilised in this photo by Canada geese (*Branta canadensis*). This photo was taken on the southern perimeter of the North Metropolitan Pit.

Plate E7: An example of existing signage at the Cheshunt pits area of the SPA. The sign advises visitors that fishing is by permit only. As evidenced here, signs can be clear, informative and congruous with their surroundings. Signage recommended in **Chapter 4** could be of a similar design.

Habitat Regulations Assessments

Sustainability Appraisals

Strategic Environmental Assessments

Landscape Character Assessments

Landscape and Visual Impact Assessments

Green Belt Reviews

Expert Witness

Ecological Impact Assessments

Habitat and Ecology Surveys

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