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Habitats Regulations Assessment of Harlow Local Development Plan

Draft Pre-Submission Strategic and Development Management Policies February 2018

Harlow Council

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Quality information

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Revision History

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1. Introduction

Background to the Project

1.1 AECOM has been appointed by Harlow District Council to assist the Council in undertaking a Habitats Regulations Assessment of its Local Development Plan Draft Pre-Submission Strategic Sites and Development Management Policies (December 2017) (hereafter referred to as the 'Plan', 'Local Plan' or 'LDP'). The objective of this assessment is to identify any aspects of the Plan that would cause an adverse effect on the integrity of Natura 2000 sites, otherwise known as European sites (Special Areas of Conservation (SACs), Special Protection Areas (SPAs) and, as a matter of Government policy, Ramsar sites), either in isolation or in combination with other plans and projects, and to advise on appropriate policy mechanisms for delivering mitigation where such effects were identified.

1.2 An assessment of housing need across the West Essex and East Herts Housing Market Area (HMA) has been conducted, which has been used as the basis for developing the LDP. The HMA covers Harlow, Epping Forest, East Hertfordshire and Uttlesford District Councils. The HMA developed a series of different Options for quanta and distribution of housing in each of the authority boundaries, focussed on growth within the broad Harlow area. To underpin this, traffic modelling and an air quality impact assessment regarding impacts on Lee Valley SPA and Ramsar site and Epping Forest SAC was undertaken of each of the Options in 2016. Data from that analysis is used to inform the air quality section of this HRA as the best data currently available. However, given the quantum and location of growth in Harlow (and adjacent Epping Forest District) has now been confirmed beyond the level of detail available in 2016, this modelling (and thus this HRA) is programmed to be updated. The intention is for this to take place prior to commencement of the Examination of the Harlow Local Plan. Following that, the relevant aspects of this HRA will also be updated.

Current Legislation

1.3 The need for Appropriate Assessment is set out within Article 6 of the EC Habitats Directive 1992[1], and interpreted into British law by the Conservation of Habitats and Species Regulations 2017[2]. The ultimate aim of the Directive is to "*maintain or restore, at favourable conservation status, natural habitats and species of wild fauna and flora of Community interest*" (Habitats Directive, Article 2(2)). This aim relates to habitats and species, not the European sites themselves, although the sites have a significant role in delivering favourable conservation status.

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

1.5 In order to ascertain whether or not site integrity will be affected, an Appropriate Assessment should be undertaken of the plan or project in question:

[1] http://jncc.defra.gov.uk/page-1374 (accessed 21/12/2017
[2] https://www.legislation.gov.uk/uksi/2017/1012/contents/made [accessed 21/12/2017]

Box 1: The legislative basis for Appropriate Assessment

Habitats Directive 1992

Article 6 (3) states that:

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

Conservation of Habitats and Species Regulations 2017

The Regulations state that:

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

1.6 Over time the phrase 'Habitats Regulations Assessment' (HRA) has come into wide currency to describe the overall process set out in the Habitats Directive from screening through to Imperative Reasons of Overriding Public Interest (IROPI). This has arisen in order to distinguish the process from the individual stage described in the law as an 'Appropriate Assessment'. Throughout this report we use the term 'Habitats Regulations Assessment' for the overall process and restrict the use of 'Appropriate Assessment' to the specific stage of that name.

Scope of the Project

1.7 There is no pre-defined guidance that dictates the physical scope of a HRA of a Plan document. Therefore, in considering the physical scope of the assessment, we were guided primarily by the identified impact pathways rather than by arbitrary 'zones'. Current guidance suggests that the following European sites be included in the scope of assessment:

- All sites within the Harlow District boundary; and
- Other sites shown to be linked to development within the District boundary through a known 'pathway' (discussed below).

1.8 Briefly defined, pathways are routes by which a change in activity provided within a Local Plan document can lead to an effect upon an internationally designated site. Guidance from the former Department of Communities and Local Government[3] states that the HRA should be '*proportionate to the geographical scope of the [plan policy*]' and that '*an AA need not be done in any more detail, or using more resources, than is useful for its purpose*' (CLG, 2006, p.6). More recently, the Court of Appeal [4] ruled that providing the Council (competent authority) was duly satisfied that proposed mitigation could be '*achieved in practice'* to satisfied that the proposed development would have no adverse effect, then this would suffice. This ruling has since been applied to a planning permission (rather than a Core Strategy document)[5]. In this case the High Court ruled that for '*a multistage process, so long as there is sufficient*

[3] CLG (2006) Planning for the Protection of European Sites, Consultation Paper. http://webarchive.nationalarchives.gov.uk/20061101113831/http:/www.communities.gov.uk/staging/embedded_object.asp?id=1502353
[4] No Adastral New Town Ltd (NANT) v Suffolk Coastal District Council Court of Appeal, 17th February 2015
[5] High Court case of R (Devon Wildlife Trust) v Teignbridge District Council, 28 July 2015

information at any particular stage to enable the authority to be satisfied that the proposed mitigation can be achieved in practice it is not necessary for all matters concerning mitigation to be fully resolved before a decision maker is able to conclude that a development will satisfy the requirements of the Habitats Regulations'.

1.9 No European sites are located within the District boundary. There are four European sites that lie beyond the District boundary but are located within sufficient proximity that the LDP could provide linking impact pathways that could impact the integrity of those European sites. These are:

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

1.10 The reasons for designation of these sites, together with current trends in habitat quality and pressures on the sites, are indicated in Appendix A. All the European sites are illustrated in **Appendix B, Figure B1**.

1.11 In order to fully inform the screening process, a number of relevant studies have been consulted to determine likely significant effects that could arise from the LDP. These include:

- Final Water Resources Management Plan, 2015-2040. Affinity Water. June 2014
- Rye Meads Water Cycle Study (Hyder Consultancy, October 2009)
- Local Plans (and HRAs) for Epping Forest District, East Hertfordshire District, Chelmsford, Brentwood, Havering, Redbridge, Waltham Forest, Enfield and Broxbourne District, and Uttlesford District.
- Recreational activity, tourism and European site recreational catchment data – where available have used data that exists for individual European sites but in many cases these do not exist. In such circumstances have used appropriate proxy from other European sites designated for similar features and in similar settings;
- The UK Air Pollution Information System (www.apis.ac.uk); and
- Multi Agency Geographic Information for the Countryside (MAGIC)and its links to SSSI citations and the JNCC website (www.magic.gov.uk)

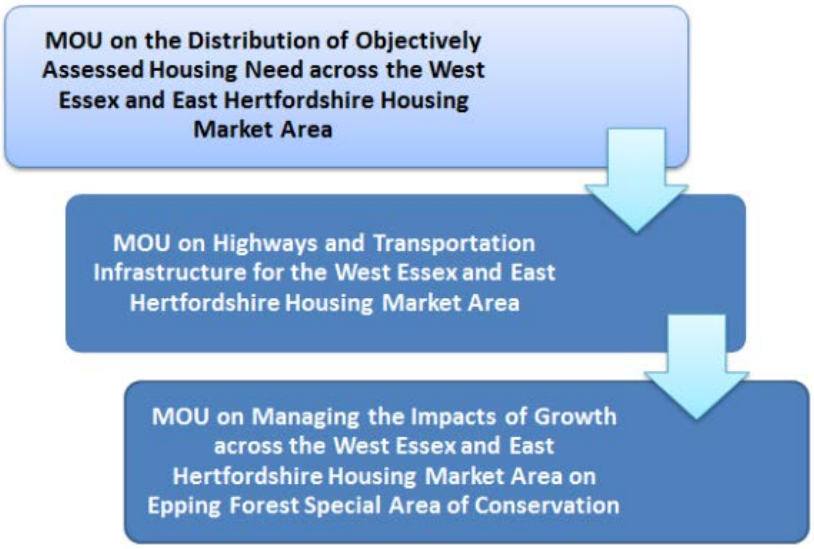
Memoranda of Understanding

1.12 Harlow Council is a signatory to three Memoranda of Understanding (MoU). These MoU's have been prepared to support development within Uttlesford District, Epping Forest District, East Hertfordshire District and Harlow (also signed by Essex County Council, Hertfordshire County Council the City of London and relevant authorities including Natural England and Highways England). These are:

- Memorandum of Understanding on managing the impacts of growth within the West Essex / East Hertfordshire Housing Market Area on Epping Forest Special Area of Conservation (draft September 2016);
- Memorandum of Understanding on distribution of Objectively Assessed Housing. Need across the West Essex/East Hertfordshire; and
- Memorandum of Understanding on highways and Transport Infrastructure for the West Essex/ East Hertfordshire Housing Market Area.

1.13 These three MoU documents are interrelated as shown in Figure 1.

Figure 1: Inter-related Memorandum of Understanding[6]



1.14 The MoU documents will be referred to within this HRA report.

This Report

1.15 Chapter 2 of this report explains the process by which the HRA has been carried out. Chapter 3 explores the relevant pathways of impact. Chapter 4 contains an initial sift of Plan policies to determine which present potential scope for impacts on European sites. Chapters 5 to 8 then provide more detailed screening (likely significant effects assessment) of each impact pathway. An assessment of the Plan in respect of each European site is then carried out mitigation strategies are proposed where necessary[7]. The key findings are summarised in Chapter 9 which provides overall conclusions including a summary of recommendations.

[6] Taken from the MoU's
[7] Legal precedent confirms that it is perfectly acceptable to reference mitigation measures at the screening stage of HRA, if that is the stage at which they can be identified.

2. Methodology

Introduction

2.1 The HRA has been carried out in the continuing absence of formal central Government guidance, although general EC guidance on HRA does exist[8]. The former Department of Communities and Local Government (DCLG) released a consultation paper on the Appropriate Assessment of Plans in 2006[9]. As yet, no further formal guidance has emerged. However, Natural England has produced its own internal guidance[10] as has the RSPB[11]. Both of these have been referred to in undertaking this HRA.

2.2 **Figure 2** below outlines the stages of HRA according to current draft DCLG guidance. The stages are essentially iterative, being revisited as necessary in response to more detailed information, recommendations and any relevant changes to the plan until no significant adverse effects remain.

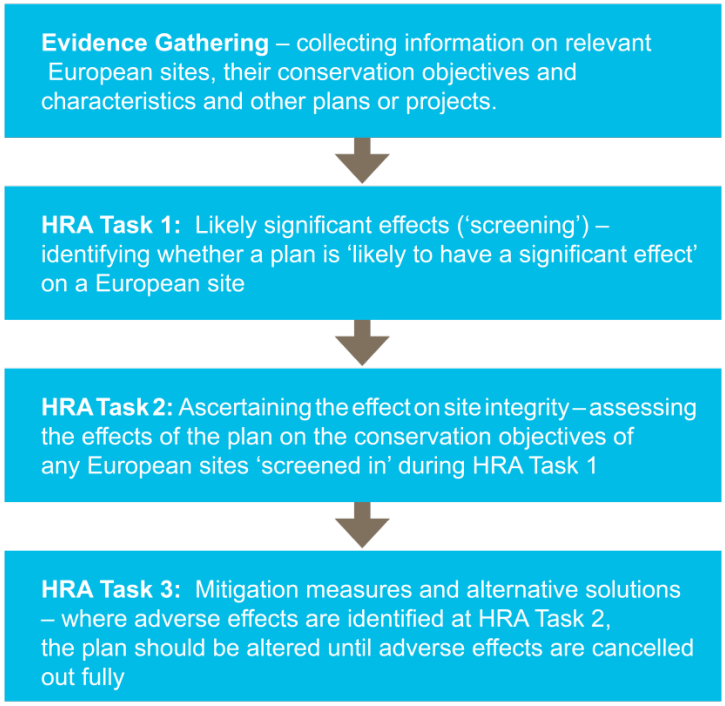


Figure 2: Four Stage Approach to Habitats Regulations Assessment. Source CLG, 2006[12].

HRA Task 1: Likely Significant Effects (LSE)

2.3 Following evidence gathering, the first stage of any Habitat Regulations Assessment and the purpose of this assessment is a Likely Significant Effect (LSE) test - essentially a risk assessment to decide whether the full subsequent stage known as Appropriate Assessment is required. The essential question is:

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

[8] European Commission (2001): Assessment of plans and projects significantly affecting Natura 2000 Sites: Methodological Guidance on the Provisions of Article 6(3) and 6(4) of the Habitats Directive.
[9] CLG (2006) Planning for the Protection of European Sites, Consultation Paper. http://webarchive.nationalarchives.gov.uk/20061101113831/http:/www.communities.gov.uk/staging/embedded_object.asp?id=1502353
[10] http://www.ukmpas.org/pdf/practical_guidance/HRGN1.pdf
[11] Dodd A.M., Cleary B.E., Dawkins J.S., Byron H.J., Palframan L.J. and Williams G.M. (2007). *The Appropriate Assessment of Spatial Plans in England: a guide to why, when and how to do it.* The RSPB, Sandy.
[12] CLG (2006) Planning for the Protection of European Sites, Consultation Paper. http://webarchive.nationalarchives.gov.uk/20061101113831/http:/www.communities.gov.uk/staging/embedded_object.asp?id=1502353

2.4 The objective is to 'screen out' those plans and projects that can, without any detailed appraisal, be said to be unlikely to result in significant adverse effects upon European sites, usually because there is no mechanism for an adverse interaction with European sites.

2.5 Case law has established that it is legally permissible to take mitigation measures into account in drawing a conclusion on likely significant effects. Therefore, where such measures are already included in the Local Plan or related initiatives, these have been taken into account in determining whether an adequate policy framework is in place to ensure no effects will result.

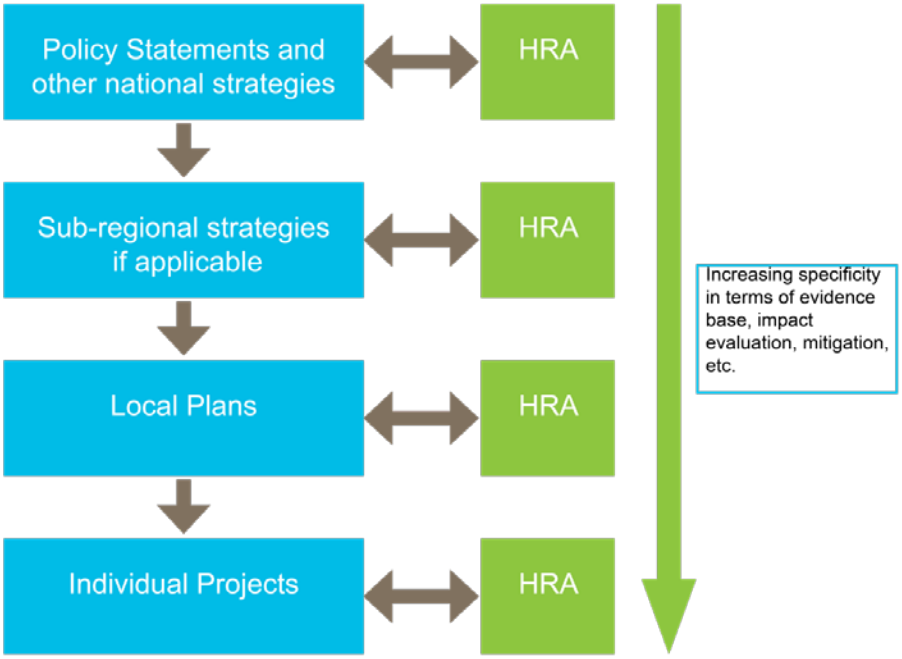
HRA Task 2: Appropriate Assessment (AA)

2.6 Where it is determined that a conclusion of 'no likely significant effect' cannot be drawn, the analysis has proceeded to the next stage of HRA known as Appropriate Assessment. Case law has clarified that 'Appropriate Assessment' is not a technical term. In other words, there are no particular technical analyses, or level of technical analysis, that are classified by law as belonging to appropriate assessment rather than determination of likely significant effects. Therefore it is legal to undertake the fullest level of technical assessment possible and still term the analysis an investigation into likely significant effects. Drawing the line between the studies that belong in the 'likely significant effects' section of analysis and those that belong in the 'appropriate assessment' of the analysis is therefore a judgment to be made by each competent authority. The ultimate legal requirement is that, whether the analysis is termed an investigation into likely significant effects or an appropriate assessment, the analysis supports the conclusion.

2.7 In this case, Natural England's response to the HRAs of the Local Plan's for surrounding authorities such as Epping Forest District indicated that they would prefer the air quality analysis at Epping Forest SAC to be classified as 'appropriate assessment'. That approach has therefore been followed in this report.

2.8 In making judgments regarding mitigation, it is important to note that mitigation measures can be tiered. This 'tiering' of assessment is summarised in **Box 2.**

Box 2: Tiering in HRA of Land Use Plans



Task 3: Avoidance & Mitigation

2.9 Where necessary, measures will be recommended for incorporation into the Plan in order to avoid or mitigate adverse effects on European sites. There is considerable precedent concerning the level of detail that Plan documents needs to contain regarding mitigation for recreational impacts on European sites. The implication of this precedent is that it is not necessary for all measures that will be deployed to be fully developed prior to adoption of the Plan, but the Plan must provide an adequate policy framework within which these measures can be delivered.

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

2.11 When discussing 'mitigation' for a Plan document, one is concerned primarily with the policy framework to enable the delivery of such mitigation rather than the details of the mitigation measures themselves since Local Plan document is a high-level policy document.

Principal Other Plans and Projects That May Act 'In Combination'

2.12 It is neither practical nor necessary to assess the 'in combination' effects of the Plan within the context of all other plans of neighbouring authorities within Essex and Hertfordshire. In practice therefore, in combination assessment is of greatest relevance when the plan would otherwise be screened out because its individual contribution is inconsequential. For the purposes of this assessment, we have determined that, due to the nature of the identified impacts, the key other plans and projects relate to the additional housing and commercial/industrial allocations proposed for other relevant Essex and Hertfordshire authorities over the lifetime of the District Plan, particularly East Hertfordshire, Epping Forest and Uttlesford authorities.

Table 1: Housing levels to be delivered across Epping Forest District and surrounding authorities, provided for context.

Local Authority	Total housing provided
Uttlesford	These three authorities with Harlow are working together as part of a HMA. Where impacts in combination such as air quality impacts are considered, these assessments will be based on the level of development provided within the HMA.
East Hertfordshire	
Epping Forest	
Broxbourne	7,718 (2016-2033)[13]
Chelmsford	18,515 (to 2036)[14]
Brentwood	7,240 (to 2033) [15]
Havering	17,550 (2016 - 2031) [16]
Redbridge	16,845 (2015-2030)[17]
Waltham Forest	10,320 (2012 - 2026)[18]
Enfield	13,480 (to 2030)[19]

[13] https://www.broxbourne.gov.uk/sites/default/files/Documents/Planning/pp_PreSubmission%20Local%20Plan%20-%20Track%20Changes%20version%20V2.pdf [accessed 05/12/2017]
[14] https://www.chelmsford.gov.uk/planning-and-building-control/planning-policy-and-new-local-plan/new-local-plan/developing-the-new-local-plan/?entryid1139=67198 [accessed 05/12/2017]
[15] https://brentwood.jdi-consult.net/localplan/readdoc.php?docid=8&chapter=5&docelemid=d1160#d1160 [accessed 05/12/2017]
[16] http://havering.objective.co.uk/file/4645335http://havering.objective.co.uk/file/4645335 [accessed 05/12/2017]
[17] https://www.redbridge.gov.uk/media/2268/final-web-pdf_redbridge-local-plan_reduced.pdf [accessed 05/12/2017]
[18] https://branding.walthamforest.gov.uk/Documents/adopted-core-strategy.pdf [accessed 31/10/2017]
[19] https://new.enfield.gov.uk/services/planning/planning-policy/local-plan/planning-policy-information-enfield-core-strategy.pdf [accessed 31/10/2017]

2.13 The Minerals and Waste Development Plans for Hertfordshire, Essex, London and Cambridgeshire are also of some relevance, since these may well contribute to increased vehicle movements on the road network within Epping (and thereby contribute to air quality impacts). The, Essex, Hertfordshire and Cambridgeshire Local Transport Plans to 2031 will also be important in in terms of encouraging sustainable transport in the short term. However, the major impact is likely to be that of housing and commercial development within the surrounding districts as set out in Local Plans and these have therefore been the main focus of cumulative 'in combination' effects with regard to this HRA.

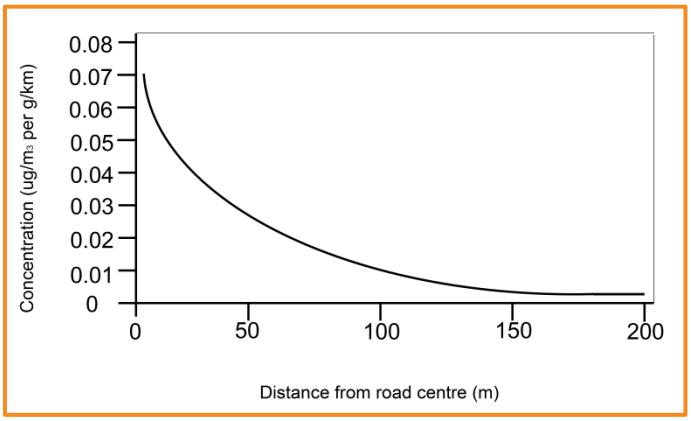
2.14 In relation to recreational activity, the following documents have been consulted for their plans and projects that may affect European sites in combination with development in Harlow: Lee Valley Regional Park Authority Site management Plan and Epping Forest Management Plan and visitor surveys.

Air Quality Impact Assessment

2.15 To support the 2016 HMA Options, traffic modelling and air quality impact assessment was undertaken in 2016 in line with the standard Design Manual for Roads and Bridges (DMRB) methodology[20] This modelled the predicted change in vehicle flows on roads within 200m of Epping Forest SAC and Lee Valley SPA and Ramsar site as a result of the all expected growth over the plan period (i.e. the development Options identified within the HMA, background population growth due to growth in surrounding authorities and delivery of existing consents within the HMA authorities).

2.16 As a general rule vehicle exhaust emissions are considered to only have a local effect within a narrow band along the roadside; typically within 200m of the centreline of the road. Beyond 200m emissions should generally have dispersed sufficiently that atmospheric concentrations are essentially background levels. The rate of decline is steeply curved rather than linear. In other words concentrations will decline rapidly as one begins to move away from the roadside, slackening to a more gradual decline over the rest of the distance up to 200m.

Figure 3: Traffic contribution to concentrations of pollutants at different distances from a road (Source: DfT)[21]



2.17 There are two measures of particular relevance regarding air quality impacts from vehicle exhausts (although a third, ammonia concentrations, is also being modelled for Epping Forest SAC). The first is the concentration of oxides of nitrogen (known as NO_x) in the atmosphere. The main importance is as a source of nitrogen, which is then deposited on adjacent habitats (including directly onto the plants themselves) either directly (known as dry deposition) or washed out in rainfall (known as wet deposition). The deposited nitrogen can then have a range of effects, primarily growth stimulation or inhibition[22], but also biochemical and

[20] Design Manual for Roads and Bridges, Volume 11, Section 3 Part 1 (HA207/07) and subsequent Interim Advice Notes
[21]
[22] The addition of nitrogen is a form of fertilization, which can have a negative effect on habitats over time by encouraging more competitive plant species that can force out the less competitive species that are more characteristic of such habitats.

physiological effects such as changes to chlorophyll content. NO_x may also have some effects which are un-related to its role in total nitrogen intake (such as the acidity of the gas potentially affecting lipid biosynthesis) but the evidence for these effects is limited and they do not appear to occur until high annual concentrations of NO_x are reached. The guideline atmospheric concentration of NO_x advocated by Government for the protection of vegetation is 30 micrograms per cubic metre (μgm^{-3}), known as the Critical Level. This is driven by the role of NO_x in nitrogen deposition and in particular in growth stimulation and inhibition. If the total NO_x concentration in a given area is below the critical level, it is unlikely that nitrogen deposition will be an issue unless there are other sources of nitrogen (e.g. ammonia). If it is above the critical level then local nitrogen deposition from NO_x could be an issue and should be investigated.

2.18 The second important metric is a direct determination of the rate of the resulting nitrogen deposition. Calculating nitrogen deposition rates rather than relying purely on scrutiny of NO_x concentrations has the advantage of being habitat specific (the critical level for NO_x is entirely generic; in reality different habitats have varying tolerance to nitrogen) and, for many habitats, of being directly relatable to measurable effects on the ground through scrutiny of published dose-response relationships that do not exist for NO_x. Unlike NO_x, the nitrogen deposition rate below which current evidence suggests that effects should not arise is different for each habitat. The rate (known as the Critical Load) is provided on the UK Air Pollution Information System website (www.apis.ac.uk) and is expressed as a quantity (kilograms) of nitrogen over a given area (hectare) per year ($kgNha^{-1}yr^{-1}$). More recently, there has also been research compiled[23] which investigates nitrogen dose-response relationships in a range of habitats.

2.19 For completeness, rates of acid deposition were also calculated. Acid deposition derives from both sulphur and nitrogen. It is expressed in terms of kiloequivalents (keq) per hectare per year. The thresholds against which acid deposition is assessed are referred to as the Critical Load Function. The principle is similar to that for a nitrogen deposition Critical Load but it is calculated very differently.

2.20 For the 2016 modelling, a series of road links within 200m of Epping Forest SAC and the Lee Valley SPA and Ramsar site were identified for further investigation. In their consultation response on the 2016 draft HRA for Epping Forest Local Plan Natural England confirmed that they were satisfied that the area of the Lee Valley SPA being analysed (Rye Meads) was not susceptible to atmospheric pollution from road traffic. That site is therefore not discussed further and the discussion focusses on Epping Forest SAC. Road links in proximity to Epping Forest SAC are identified in Table 2.

Table 2: Location of Road Links analysed within 200m of Epping Forest SAC in 2016

Road Link	Ecological Site	Distance of Link from Designated Site
A121 (two sections)	Epping Forest SAC	Adjacent
A104	Epping Forest SAC	Adjacent
B1393	Epping Forest SAC	Adjacent
B172	Epping Forest SAC	Adjacent
Theydon Road	Epping Forest SAC	Adjacent

2.21 In April 2017 a High Court judgment[24] (colloquially known as the Ashdown Forest Judgment) partially quashed the Lewes District and South Downs National Park Joint Core Strategy. This was on the basis that the HRA supporting the Joint Core Strategy only considered its own contribution to changes in traffic flows (and specifically whether such flows would exceed 1000 Annual Average Daily Traffic) in determining whether there would be a likely significant air quality effect on Ashdown Forest SPA. The judge ruled that the HRA had thus explicitly failed

[23] Compiled and analysed in Caporn, S., Field, C., Payne, R., Dise, N., Britton, A., Emmett, B., Jones, L., Phoenix, G., S Power, S., Sheppard, L. & Stevens, C. 2016. Assessing the effects of small increments of atmospheric nitrogen deposition (above the critical load) on semi-natural habitats of conservation importance. Natural England Commissioned Reports, Number 210.
[24] http://www.bailii.org/ew/cases/EWHC/Admin/2017/351.html [accessed 26/10/2017]

to undertake any form of assessment 'in combination' with growth in other authorities that would affect the same road links and that this was in contravention of the Conservation of Habitats and Species Regulations 2010.

2.22 The air quality modelling undertaken for the South Essex/East Hertfordshire HMA authorities in 2016 avoided the problems that led to the successful Ashdown Forest Judicial Review for three reasons:

- The modelling was undertaken for a group of four authorities around Epping Forest SAC rather than for a single authority;
- Even when the change in flows due to the HMA growth options was forecast to be below 1,000 AADT air quality modelling was still undertaken; and
- The air quality modelling undertaken for the 2016 HRA was in accordance with standard methodology in Volume 11 of the Design Manual for Roads and Bridges. This method inherently involves modelling growth in surrounding authorities outside the HMA (such as Redbridge, Waltham Forest and Broxbourne) to generate a forecast of future flows known as the 'Do Minimum' scenario. HMA growth was then factored into the Do Minimum scenario to create the 'Do Something' scenario. Therefore, the Do Something scenario reported in Appendix C represented the forecast total flows expected by 2033 based on the traffic modelling available in 2016, irrespective of source.

2.23 This modelling is due to be updated in 2018 and a programme of air quality monitoring has also been commenced that will enable future air quality along roads through Epping Forest SAC to be tracked as the Local Plan housing and employment delivery takes place. The Do Minimum scenario drew upon a government database tool called the National Trip End Model Presentation Programme (TEMPro). This contains data for each local authority district in England regarding expected changes in population, households, workforce and employment (in addition to data such as car ownership). The traffic modellers used this to forecast the change in traffic flows that would occur due to growth other than the HMA Local Plans over the period to 2033 (e.g. that arising from Redbridge, Broxbourne, Waltham Forest and further afield), onto which were added outstanding permissions in the HMA authorities. The result was the Do Minimum scenario. Growth in the HMA Local Plans was then modelled and factored into the Do Minimum scenario to create the Do Something scenario. Comparing the Do Something scenario with the Base case therefore enables one to see the effect of all forecast traffic growth on the roads in question 'in combination' using the 2016 data, within the context of forecast improvement in vehicle emission factors and background nitrogen deposition rates over the same timescale.

2.24 Traditionally, the implications of the 'in combination' scenario would only have been discussed if the forecast change in flows due to the HMA Local Plans exceeded either 1,000 AADT or 1% of the critical level (for NO_x) or load (for nitrogen and acid deposition). In the light of the Ashdown Forest case AECOM now generally begins the examination of the air quality modelling with a discussion of the 'in combination' scenario, irrespective of the contribution made by HMA growth.

2.25 Using the generated traffic scenarios, and information on average vehicle speeds and percentage heavy duty vehicles (both of which influence the emissions profile), air quality specialists calculated expected NO_x concentrations, nitrogen deposition rates and acid deposition rates for those road links where traffic flows were forecast to increase as a result of all forecast traffic growth. For some road sections (particularly around Wake Arms Roundabout) multiple transects were modelled to account for the influence of the predominant wind direction and emissions from the other nearby road links.

2.26 The predictions of nitrogen deposition and annual mean NO_x concentrations are based on the assessment methodology presented in Annex F of the Design Manual for Roads and Bridges (DMRB), Volume 11, Section 3, Part 1 (HA207/07)[25] for the assessment of impacts on

[25] Design Manual for Roads and Bridges, HA207/07, Highways Agency

sensitive designated ecosystems due to highways works. Background data for the predictions for 2033 were sourced from the Department of Environment, Food and Rural Affairs (Defra) background maps for 2013 projected forward to 2033[26]. Background nitrogen deposition rates were sourced from the Air Pollution Information System (APIS) website[27].

2.27 Guidance note HA207/07[28] advises that background rates are reduced by 2% per year to allow for an improvement in background air quality over the Local/District Plan period (2033) as a result of ongoing national initiatives to improve emissions and the expected improvement in vehicle emissions over that period. However, due to the uncertainty in the rate with which projected future vehicle emission rates and background pollution concentrations are improving, the assumption was made in the 2016 modelling that conditions in 2023 (the midpoint between the base year and the year of assessment) are representative of conditions in 2033 (the year of assessment). This approach is accepted within the professional air quality community and accounts for known recent improvements in vehicle technologies (new standard Euro 6/VI vehicles), whilst excluding the more distant and therefore more uncertain projections on the future evolution of the vehicle fleet.

2.28 Annual mean concentrations of NO_x were calculated at two 200m transects modelled at 1m, 10m, 20m, 50m, 100m, 150m, and 200m back from all Links. Predictions were made using the latest version of ADMS-Roads using emission rates derived from the Defra Emission Factor Toolkit (version 6.0.2) which utilises traffic data in the form of 24-hour Annual Average Daily Traffic (AADT)[29], detailed vehicle fleet composition and average speed. The end of the Local/District Plan (2033) period was selected for the future scenario as this is the point at which the total emissions due to Plan traffic will be at their greatest.

2.29 It should be noted that the data in **Appendix C** are the results of the *2016* modelling. As a result of that modelling and broader discussion with Natural England and City of London Corporation, the HMA authorities have agreed that a mitigation strategy should be devised[30]. Since that commitment was made governance arrangements are in place and traffic modellers have been working on potential traffic mitigation scenarios. These are shortly to be tested through updated air quality modelling, which will also take account of queuing traffic at Wake Arms Roundabout and ammonia emission from traffic. That modelling will supercede the modelling presented in this document. This HRA will therefore be updated in the light of new modelling to ensure it remains up to date. While development in Harlow District will have some influence on traffic flows through Epping Forest SAC, flows arising from local sources are likely to be influenced more by the quantum and distribution of additional housing and employment growth in local authorities closer to the SAC such as Epping Forest District and the London Boroughs of Waltham Forest and Redbridge.

2.30 A programme of long-term air quality monitoring has also been commissioned with input from the City of London Corporation. This will be useful in air quality model verification but its main value will be in tracking the expected improvement in emissions over the plan period. This can feed into any regular reviews of housing/employment quantum and mitigation measures over the plan period.

[26] Air Quality Archive Background Maps. Defra, 2013. Available from: http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html
[27] Air Pollution Information System (APIS) www.apis.ac.uk
[28] Design Manual for Roads and Bridges, HA207/07, Highways Agency
[29] Derived from Peak Flow data
[30] The MoU states that '*It is intended this Joint Strategy will be in agreed and published prior to the determination of any of the planning applications on sites around Harlow that are part of The Spatial Option detailed in the "Distribution of OAN across West Essex and East Hertfordshire" MoU. If the Joint Strategy is not in place when planning applications are submitted, applicants will be required to submit the necessary information to ascertain whether any adverse impacts will be caused in Epping Forest, and if necessary any mitigation measures that may be necessary*'.

3. Pathways of Impact

Introduction

3.1 In carrying out an HRA it is important to determine the various ways in which land use plans can impact on internationally designated sites by following the pathways along which development can be connected with internationally designated sites, in some cases many kilometres distant. Briefly defined, pathways are routes by which a change in activity associated with a development can lead to an effect upon an internationally designated site. Following screening of the Plan, the following impact pathways are considered within this document.

Disturbance from Recreational Activities

3.2 Recreational use of an internationally designated site has potential to:

- Cause damage through mechanical/ abrasive damage and nutrient enrichment;
- Cause disturbance to sensitive species, particularly ground-nesting birds and wintering wildfowl; and
- Prevent appropriate management or exacerbate existing management difficulties.

3.3 Different types of internationally designated sites are subject to different types of recreational pressures and have different vulnerabilities. Studies across a range of species have shown that the effects from recreation can be complex.

Mechanical/Abrasive Damage and Nutrient Enrichment

3.4 Most types of terrestrial internationally designated site can be affected by trampling, which in turn causes soil compaction and erosion. Walkers with dogs contribute to pressure on sites through nutrient enrichment via dog fouling and also have potential to cause greater disturbance to fauna as dogs are less likely to keep to marked footpaths and move more erratically. Motorcycle scrambling and off-road vehicle use can cause serious erosion, as well as disturbance to sensitive species.

3.5 There have been several papers published that empirically demonstrate that damage to vegetation in woodlands and other habitats can be caused by vehicles, walkers, horses and cyclists:

- Wilson & Seney (1994)[31] examined the degree of track erosion caused by hikers, motorcycles, horses and cyclists from 108 plots along tracks in the Gallatin National Forest, Montana. Although the results proved difficult to interpret, it was concluded that horses and hikers disturbed more sediment on wet tracks, and therefore caused more erosion, than motorcycles and bicycles.
- Cole et al (1995a, b)[32] conducted experimental off-track trampling in 18 closed forest, dwarf scrub and meadow and grassland communities (each tramped between 0 – 500 times) over five mountain regions in the US. Vegetation cover was assessed two weeks and one year after trampling, and an inverse relationship with trampling intensity was discovered, although this relationship was weaker after one year than two weeks indicating some recovery of the vegetation. Differences in plant morphological characteristics were found to explain more variation in response between different vegetation types than soil and topographic factors. Low-growing, mat-forming grasses regained their cover best after two

[31] Wilson, J.P. & J.P. Seney. 1994. Erosional impact of hikers, horses, motorcycles and off road bicycles on mountain trails in Montana. *Mountain Research and Development* 14:77-88

[32] Cole, D.N. 1995a. Experimental trampling of vegetation. I. Relationship between trampling intensity and vegetation response. *Journal of Applied Ecology* 32: 203-214
Cole, D.N. 1995b. Experimental trampling of vegetation. II. Predictors of resistance and resilience. *Journal of Applied Ecology* 32: 215-224

weeks and were considered most resistant to trampling, while tall forbs (non-woody vascular plants other than grasses, sedges, rushes and ferns) were considered least resistant. Cover of hemicryptophytes and geophytes (plants with buds below the soil surface) was heavily reduced after two weeks, but had recovered well after one year and as such these were considered most resilient to trampling. Chamaephytes (plants with buds above the soil surface) were least resilient to trampling. It was concluded that these would be the least tolerant of a regular cycle of disturbance.

- Cole (1995c)[33] conducted a follow-up study (in 4 vegetation types) in which shoe type (trainers or walking boots) and trampler weight were varied. Although immediate damage was greater with walking boots, there was no significant difference after one year. Heavier tramplers caused a greater reduction in vegetation height than lighter tramplers, but there was no difference in effect on cover.
- Cole & Spildie (1998)[34] experimentally compared the effects of off-track trampling by hiker and horse (at two intensities – 25 and 150 passes) in two woodland vegetation types (one with an erect forb understorey and one with a low shrub understorey). Horse traffic was found to cause the largest reduction in vegetation cover. The forb-dominated vegetation suffered greatest disturbance, but recovered rapidly. Higher trampling intensities caused more disturbance.

3.6 The total volume of dog faeces deposited on sites can be surprisingly large. For example, at Burnham Beeches National Nature Reserve over one year, Barnard[35] estimated the total amounts of urine and faeces from dogs as 30,000 litres and 60 tonnes respectively. The specific impact on Epping Forest SAC has not been quantified from local studies; however, the fact that habitats for which the SAC is designated appear to be subject already to excessive nitrogen deposition, suggests that any additional source of nutrient enrichment (including uncollected dog faeces) will make a cumulative contribution to overall enrichment. Any such contribution must then be considered within the context of other recreational sources of impact on sites.

Disturbance

3.7 Concern regarding the effects of disturbance on birds stems from the fact that they are expending energy unnecessarily and the time they spend responding to disturbance is time that is not spent feeding[36]. Disturbance therefore risks increasing energetic output while reducing energetic input, which can adversely affect the 'condition' and ultimately the survival of the birds. In addition, displacement of birds from one feeding site to others can increase the pressure on the resources available within the remaining sites, as they have to sustain a greater number of birds[37].

3.8 The potential for disturbance may be less in winter than in summer, in that there are often a smaller number of recreational users. In addition, the consequences of disturbance at a population level may be reduced because birds are not breeding. However, winter activity can still cause important disturbance, especially as birds are particularly vulnerable at this time of year due to food shortages, such that disturbance which results in abandonment of suitable feeding areas through disturbance can have severe consequences. Several empirical studies have, through correlative analysis, demonstrated that out-of-season (October-March) recreational activity can result in quantifiable disturbance:

[33] Cole, D.N. (1995c) Recreational trampling experiments: effects of trampler weight and shoe type. Research Note INT-RN-425. U.S. Forest Service, Intermountain Research Station, Utah
[34] Cole, D.N., Spildie, D.R. (1998) Hiker, horse and llama trampling effects on native vegetation in Montana, USA. *Journal of Environmental Management* 53: 61-71
[35] Barnard, A. (2003) Getting the Facts - Dog Walking and Visitor Number Surveys at Burnham Beeches and their Implications for the Management Process. *Countryside Recreation*, 11, 16 - 19
[36] Riddington, R. *et al*. 1996. The impact of disturbance on the behaviour and energy budgets of Brent geese. *Bird Study* 43:269-279
[37] Gill, J.A., Sutherland, W.J. & Norris, K. 1998. The consequences of human disturbance for estuarine birds. *RSPB Conservation Review* 12: 67-72

- Underhill et al[38] counted waterfowl and all disturbance events on 54 water bodies within the South West London Water bodies Special Protection Area and clearly correlated disturbance with a decrease in bird numbers at weekends in smaller sites and with the movement of birds within larger sites from disturbed to less disturbed areas.
- Evans & Warrington[39] found that on Sundays total water bird numbers (including shoveler and gadwall) were 19% higher on Stocker's Lake LNR in Hertfordshire, and attributed this to displacement of birds resulting from greater recreational activity on surrounding water bodies at weekends relative to week days.
- Tuite et al[40] used a large (379 site), long-term (10-year) dataset (September – March species counts) to correlate seasonal changes in wildfowl abundance with the presence of various recreational activities. They found that on inland water bodies shoveler was one of the most sensitive species to disturbance. The greatest impact on winter wildfowl numbers was associated with sailing/windsurfing and rowing.
- Pease et al[41] investigated the responses of seven species of dabbling ducks to a range of potential causes of disturbance, ranging from pedestrians to vehicle movements. They determined that walking and biking created greater disturbance than vehicles and that gadwall were among the most sensitive of the species studied.
- In a three-year study of wetland birds at the Stour and Orwell SPA, Ravenscroft[42] found that walkers, boats and dogs were the most regular source of disturbance. Despite this, the greatest responses came from relatively infrequent events, such as gun shots and aircraft noise Birds seemed to habituate to frequent 'benign' events such as vehicles, sailing and horses, but there was evidence that apparent habituation to more disruptive events related to reduced bird numbers – i.e. birds were avoiding the most frequently disturbed areas. Disturbance was greatest at high tide and on the Orwell, but birds on the Stour showed greatest sensitivity.

3.9 A number of studies have shown that birds are affected more by dogs and people with dogs than by people alone, with birds flushing more readily, more frequently, at greater distances and for longer. In addition, dogs, rather than people, tend to be the cause of many management difficulties, notably by worrying grazing animals, and can cause eutrophication near paths. Nutrient-poor habitats such as heathland are particularly sensitive to the fertilising effect of inputs of phosphates, nitrogen and potassium from dog faeces[43] .

3.10 Underhill-Day[44] summarises the results of visitor studies that have collected data on the use of semi-natural habitat by dogs. In surveys where 100 observations or more were reported, the mean percentage of visitors who were accompanied by dogs was 54.0%.

3.11 However the outcomes of many of these studies need to be treated with care. For instance, the effect of disturbance is not necessarily correlated with the impact of disturbance, i.e. the most easily disturbed species are not necessarily those that will suffer the greatest impacts. It has been shown that, in some cases, the most easily disturbed birds simply move to other feeding sites, whilst others may remain (possibly due to an absence of alternative sites) and thus suffer greater impacts on their population[45]. A literature review undertaken for the

[38] Underhill, M.C. *et al.* 1993. Use of Waterbodies in South West London by Waterfowl. An Investigation of the Factors Affecting Distribution, Abundance and Community Structure. Report to Thames Water Utilities Ltd. and English Nature. Wetlands Advisory Service, Slimbridge

[39] Evans, D.M. & Warrington, S. 1997. The effects of recreational disturbance on wintering waterbirds on a mature gravel pit lake near London. International Journal of Environmental Studies 53: 167-182

[40] Tuite, C.H., Hanson, P.R. & Owen, M. 1984. Some ecological factors affecting winter wildfowl distribution on inland waters in England and Wales and the influence of water-based recreation. *Journal of Applied Ecology* 21: 41-62

[41] Pease, M.L., Rose, R.K. & Butler, M.J. 2005. Effects of human disturbances on the behavior of wintering ducks. *Wildlife Society Bulletin* 33 (1): 103-112.

[42] Ravenscroft, N. (2005) Pilot study into disturbance of waders and wildfowl on the Stour-Orwell SPA: analysis of 2004/05 data. Era report 44, Report to Suffolk Coast & Heaths Unit.

[43] Shaw, P.J.A., K. Lankey and S.A. Hollingham (1995) – Impacts of trampling and dog fouling on vegetation and soil conditions on Headley Heath. *The London Naturalist*, **74**, 77-82.

[44] Underhill-Day, J.C. (2005). A literature review of urban effects on lowland heaths and their wildlife. Natural England Research Report 623.

[45] Gill et al. (2001) - Why behavioural responses may not reflect the population consequences of human disturbance. *Biological Conservation,* **97**, 265-268

RSPB[46] also urges caution when extrapolating the results of one disturbance study because responses differ between species and the response of one species may differ according to local environmental conditions. These facts have to be taken into account when attempting to predict the impacts of future recreational pressure on internationally designated sites.

3.12 Disturbing activities are on a continuum. The most disturbing activities are likely to be those that involve irregular, infrequent, unpredictable loud noise events, movement or vibration of long duration (such as those often associated with construction activities). Birds are least likely to be disturbed by activities that involve regular, frequent, predictable, quiet patterns of sound or movement or minimal vibration. The further any activity is from the birds, the less likely it is to result in disturbance.

3.13 The factors that influence a species response to a disturbance are numerous, but the three key factors are species sensitivity, proximity of disturbance sources and timing/duration of the potentially disturbing activity.

3.14 The Site Improvement Plan (SIP)[47] for the Lee Valley SPA identifies that '*Areas of the SPA are subject to a range of recreational pressures including watersports, angling and dog walking. This has the potential to affect SPA populations directly or indirectly'*. It does not conclude that current recreational activity on the site is unsustainable; rather it identifies a project to first '*Investigate whether there is a need for change to access management'*. The SIP for Epping Forest identifies that '*Epping Forest is subject to high recreational pressure. There is a high general level of footfall in Epping Forest throughout the year, including periods of significant use, and resulting in a diverse range of impacts which include mountain biking and unmanaged fires. Population and visitor numbers are likely to continue to increase'*. As such these sites have the potential to be sensitive to any increases in recreational pressure stemming from new development.

3.15 It should be emphasised that recreational use is not inevitably a problem. Many internationally designated sites are also nature reserves managed for conservation and public appreciation of nature. The Lee Valley Regional Park that encompasses the SPA and Ramsar sites is such an example. At these sites, access is encouraged and resources are available to ensure that recreational use is managed appropriately.

3.16 The Epping Forest SAC and Lee Valley SPA and Ramsar site lies within the District boundary, whilst Wormley-Hoddesdonpark Woods SAC is located 2.2km from the District boundary. As such they are potentially vulnerable to the effects of recreational pressure and/ or disturbances from construction activities resulting from development within Harlow.

3.17 It is therefore necessary to perform an initial screening exercise to determine whether the Local Plan contains policy measures that could lead to a likely significant effects, either alone or 'in combination' with other plans and projects, through recreational pressure, on these internationally designated sites.

Wormley-HoddesdonPark Woods SAC

3.18 Wormley-HoddesdonPark Woods SAC is located 6.3km from the boundary of Harlow District. The SAC is a large, attractive area of ancient woodland with extensive public access and close to large urban centres. The majority of the woods in the complex are in sympathetic ownership, with no direct threat (Wormley-Hoddesdonpark Wood, for example, is managed by The Woodland Trust). No visitor survey data that identifies the recreational catchment could be sourced for Wormley-Hoddesdonpark Woods. However, data does exist for other large woodland European sites, such as Ashdown Forest[48] and Epping Forest SAC. These indicate

[46] Woodfield & Langston (2004) - Literature review on the impact on bird population of disturbance due to human access on foot. *RSPB research report* No. 9.
[47] http://publications.naturalengland.org.uk/file/5788502547496960 [accessed 17/01/2018)
[48] Clarke RT, Sharp J & Liley D. 2010. Ashdown Forest Visitor Survey Data Analysis (Natural England Commissioned Reports, Number 048) and subsequent analyses
UE Associates and University of Brighton. 2009. Visitor Access Patterns on the Ashdown Forest: Recreational Use and Nature Conservation

that core visitor catchments (i.e. the zone within which the majority (c. 75%) of regular, frequent visitors are concentrated) tend to lie between c. 5km (Epping Forest) and 6-7km (Ashdown Forest) from the site. If the more precautionary figure of 7km is used for Wormley Hoddesdonpark Woods in the absence of bespoke visitor data for this site, the zone would include small portions of the built up areas in the west of Harlow such as Eastend which is largely industrial, but none of the larger residential areas.

3.19 Natural England's Site Improvement Plan (SIP)[49] indicates that the site is heavily used by the public for recreational purposes. However, it also indicates that recreational activity is generally well-managed. 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. As such, general recreational pressure is not indicated in the Site Improvement Plan as a current or future obstacle to achieving or maintaining favourable conservation status and preserving the integrity of the SAC.

3.20 Recreation is actively promoted on this site and most recreation is concentrated on well-established paths. Most of the complex is covered by a High Forest Zone Plan (Hertfordshire County Council 1996) which sets out a framework for woodland management across the whole area. It aims to restore a varied age structure and natural stand types through sustainable forestry.

3.21 Based on the issues identified in the Site Improvement Plan[50] and the fact that concerns about recreational pressure on this site have not been flagged by Natural England during the preparation of the Local Plan and its HRA, which commenced in 2012, there is no basis to conclude that such an increase would result in a likely significant effect on the SAC.

3.22 Additionally, Wormley-Hoddesdonpark Woods SAC is located within the borough of Broxbourne. The screening assessment of Broxbourne's draft Local Plan[51] (undertaken in December 2016) enabled this impact pathway to be screened out alone and in combination with other projects and plans. Based on these conclusions and the quantum and location of new housing within Epping Forest District it is considered that it would not result in a likely significant effect in combination.

3.23 As recreational pressure is the only potentially impact pathway linking the LDP to this SAC, it can be concluded that the LDP will not impact on the SAC in isolation or combination and as such is not discussed further within this document.

3.24 As such impacts relating to recreational pressure are discussed with regards to Epping Forest SAC and Lee Valley SPA and Ramsar site later in this document.

Atmospheric Pollution

3.25 The main pollutants of concern for European sites are oxides of nitrogen (NO_x), ammonia (NH_3) and sulphur dioxide (SO_2). Ammonia can have a directly toxic effect upon vegetation and research suggests that this may also be true for NO_x at very high concentrations. More significantly, greater NO_x or ammonia concentrations within the atmosphere will lead to greater rates of nitrogen deposition to vegetation and soils. An increase in the deposition of nitrogen from the atmosphere is generally regarded to lead to an increase in soil fertility, which can have a serious deleterious effect on the quality of semi-natural, nitrogen-limited terrestrial habitats.

[49] http://publications.naturalengland.org.uk/file/6541134543192064 [accessed 05/12/2017]
[50] http://publications.naturalengland.org.uk/file/6541134543192064 [accessed 05/12/2017]
[51] https://www.broxbourne.gov.uk/sites/default/files/Documents/Planning/pp_LC-218_Broxbourne_HRA_Screening_8_051216JE-compressed.pdf [accessed 05/12/2017]

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

Pollutant	Source	Effects on habitats and species
Acid deposition	SO_2, NO_x and ammonia all contribute to acid deposition. Although future trends in S emissions and subsequent deposition to terrestrial and aquatic ecosystems will continue to decline, it is likely that increased N emissions may cancel out any gains produced by reduced S levels.	Can affect habitats and species through both wet (acid rain) and dry deposition. Some sites will be more at risk than others depending on soil type, bed rock geology, weathering rate and buffering capacity.
Ammonia (NH_3)	Ammonia is released following decomposition and volatilisation of animal wastes. It is a naturally occurring trace gas, but levels have increased considerably with expansion in numbers of agricultural livestock. Ammonia reacts with acid pollutants such as the products of SO_2 and NO_x emissions to produce fine ammonium (NH_4+) - containing aerosol which may be transferred much longer distances (can therefore be a significant trans-boundary issue.)	Adverse effects are as a result of nitrogen deposition leading to eutrophication. As emissions mostly occur at ground level in the rural environment and NH_3 is rapidly deposited, some of the most acute problems of NH_3 deposition are for small relict nature reserves located in intensive agricultural landscapes.
Nitrogen oxides ($NO_{x)}$	Nitrogen oxides are mostly produced in combustion processes. About one quarter of the UK's emissions are from power stations, one-half from motor vehicles, and the rest from other industrial and domestic combustion processes.	Deposition of nitrogen compounds (nitrates (NO_3), nitrogen dioxide (NO_2) and nitric acid (HNO_3)) can lead to both soil and freshwater acidification. In addition, NO_x can cause eutrophication of soils and water. This alters the species composition of plant communities and can eliminate sensitive species.
Nitrogen (N) deposition	The pollutants that contribute to nitrogen deposition derive mainly from NO_X and NH_3 emissions. These pollutants cause acidification (see also acid deposition) as well as eutrophication.	Species-rich plant communities with relatively high proportions of slow-growing perennial species and bryophytes are most at risk from N eutrophication, due to its promotion of competitive and invasive species which can respond readily to elevated levels of N. N deposition can also increase the risk of damage from abiotic factors, e.g. drought and frost.
Ozone (O_3)	A secondary pollutant generated by photochemical reactions from NO_x and volatile organic compounds (VOCs). These are mainly released by the combustion of fossil fuels. The increase in combustion of fossil fuels in the UK has led to a large increase in background ozone concentration, leading to an increased number of days when levels across the region are above 40ppb. Reducing ozone pollution is believed to require action	Concentrations of O_3 above 40 ppb can be toxic to humans and wildlife, and can affect buildings. Increased ozone concentrations may lead to a reduction in growth of agricultural crops, decreased forest production and altered species composition in semi-natural plant communities.

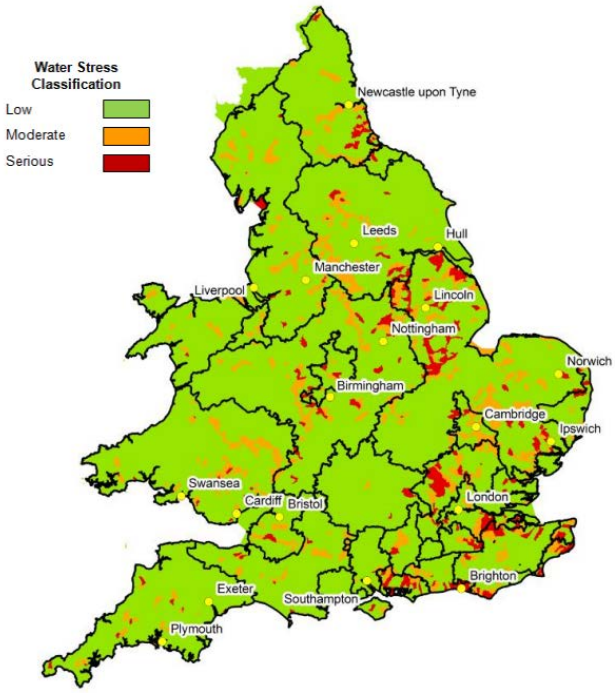
	at international level to reduce levels of the precursors that form ozone.	
Sulphur Dioxide (SO_2)	Main sources of SO_2 emissions are electricity generation, industry and domestic fuel combustion. May also arise from shipping and increased atmospheric concentrations in busy ports. Total SO_2 emissions have decreased substantially in the UK since the 1980s.	Wet and dry deposition of SO_2 acidifies soils and freshwater, and alters the species composition of plant and associated animal communities. The significance of impacts depends on levels of deposition and the buffering capacity of soils.

3.26 Sulphur dioxide emissions are overwhelmingly influenced by the output of power stations and industrial processes that require the combustion of coal and oil. Ammonia emissions are dominated by agriculture, with some chemical processes also making notable contributions. NO_x emissions, however, are dominated by the output of vehicle exhausts (more than half of all emissions). Within a 'typical' housing development, by far the largest contribution to NO_x (92%) will be made by the associated road traffic. Other sources, although relevant, are of minor importance (8%) in comparison[52]. Emissions of NO_x could therefore be reasonably expected to increase as a result of greater vehicle use as an indirect effect of the plan.

Water Abstraction

3.27 The East of England is generally an area of high water stress. It is particularly vulnerable to climate change now and in the future. It is already the driest region in the country and the predicted changes will affect the amount and distribution of rainfall, and the demand for water from all sectors. The average natural summer flows of rivers could drastically reduce; the period where groundwater resources are replenished could be shorter; and resources could become much more vulnerable.

Figure 4: Areas of water stress within England. [53]



[52] Proportions calculated based upon data presented in Dore CJ et al. 2005. UK Emissions of Air Pollutants 1970 – 2003. UK National Atmospheric Emissions Inventory. http://www.airquality.co.uk/archive/index.php

[53] Figure adapted from Environment Agency. 2013. Water stressed areas – final classification https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/244333/water-stressed-classification-2013.pdf

3.28 Climate change is expected to result in variations in patterns and frequencies of drought, floods and other extreme weather conditions which are likely to result in a reduction in potable water resources[54]. The reliability of existing reservoirs, groundwater extractions and river intakes will change. The delivery of housing and economic development throughout the region could therefore result in adverse effects on many internationally designated sites in the region including those listed in preceding sections.

3.29 Harlow District lies within the Affinity Water supply area, specifically their Central Region, WRZ 5. Under Affinity Water's current Water Resource management Plan[55] 60% of the Central Region's water supply comes from groundwater sources (chalk and gravel aquifers) and 40% comes from surface water sources and imports from neighbouring water companies (Thames Water, Anglian Water and Cambridge Water). Water is also exported to South East Water and Cambridge Water[56].

Water Quality

3.30 The quality of the water that feeds European sites is an important determinant of the nature of their habitats and the species they support. Poor water quality can have a range of environmental impacts:

3.31 At high levels, toxic chemicals and metals can result in immediate death of aquatic life, and can have detrimental effects even at lower levels, including increased vulnerability to disease and changes in wildlife behaviour.

- Eutrophication, the enrichment of plant nutrients in water, increases plant growth and consequently results in oxygen depletion. Algal blooms, which commonly result from eutrophication, increase turbidity and decrease light penetration. The decomposition of organic wastes that often accompanies eutrophication deoxygenates water further, augmenting the oxygen depleting effects of eutrophication. In the marine environment, nitrogen is the limiting plant nutrient and so eutrophication is associated with discharges containing available nitrogen.
- Some pesticides, industrial chemicals, and components of sewage effluent are suspected to interfere with the functioning of the endocrine system, possibly having negative effects on the reproduction and development of aquatic life.

3.32 Sewage and some industrial effluent discharges contribute to increased nutrients in the European sites and in particular to phosphate levels in watercourses. Rye Meads SSSI component of the Lee Valley SPA and Ramsar site is situated 2.6km to the west of Harlow and is particularly sensitive to eutrophication (nutrient enrichment) resulting from the discharge of treated sewage effluent from Rye Meads STW. The draft detailed Rye Meads Water Cycle Study has indicated that the growth in the Stevenage and East Hertfordshire areas is constrained by the environmental capacity of the River Lee and associated Lee Valley SPA and by wastewater infrastructure issues in terms of timescale for delivery.

3.33 Diffuse pollution (for example from agricultural practices or urban runoff) is a key contributor to water pollution in rivers. Through its Review of Consents process, the Environment Agency has identified diffuse pollution to be a major factor in causing unfavourable conservation status of European sites. Although agriculture remains a primary source of eutrophication and pollution, urban runoff is a significant source of aquatic contamination. The rate of conversion of land to residential use has been shown to be related to poor water quality.

[54] The Affinity Water (2014) Final Water Resource management Plan, 2015-2040 identifies that within the Affinity Water catchment there will be a reduction of 32.31 peak DO Ml/d to 2040.
[55] Affinity Water (2014) Final Water Resource management Plan, 2015-2040.
[56] Affinity Water (2014) Final Water Resource management Plan, 2015-2040.

4. Initial Policy Sift

Screening of LDP Policies

4.1 **Table 4** presents an initial sift of policies within the LDP, from the point of view of HRA. Where Policies have been coloured green in the 'HRA Screening Implications' column, this indicates that the Policies do not contain potential impact pathways linking to European designated sites and have been screened out from further consideration. Where Policies have been coloured orange in the 'HRA Screening Implications' column, this indicates that the Policies have potential impact pathways linking to European sites and have been screened in for further consideration in this report.

Table 4: Screening Assessment of Local Development Plan Policies

Policy	Policy Detail	HRA Screening Implications
HGT1 Development and Delivery of Garden Communities in the Harlow and Gilston Garden Communities	Four strategic Garden Communities are planned in the Harlow and Gilston Garden Communities and the relevant site/s are allocated in the Harlow, Epping Forest and East Hertfordshire District Local Plans: (a) South of Harlow (Latton Priory) – delivering approximately 1,050 dwellings over the Local Plan period (within Epping Forest District); (b) West of Harlow (Water Lane Area) – delivering approximately 2,100 dwellings over the Local Plan period (within Epping Forest District); (c) East of Harlow – delivering approximately 3,350 dwellings over the Local Plan period (750 dwellings within Epping Forest District and approximately 2,600 dwellings within Harlow District); (d) Gilston - delivering approximately 3,000 dwellings over the Local Plan period with a further 7,000 dwellings beyond the Plan period (within East Herts District). Provides development principals with which all each Garden Community must accord/ these include: • Pro-active and collaborative working with the public and private sector; • Community and stakeholder engagement and a long-term community engagement strategy; • Provision of sustainable long-term governance and stewardship arrangements for the community assets including Green Infrastructure; • Provision of a Strategic Masterplan; • Provision of on-site and off-site infrastructure ahead or in tandem with the proposed development; • Provides for housing mix, promotes small scale employment generation;	**Potential HRA implications.** This policy provides for 2,600 new dwellings on the strategic site to the east of Harlow town during the Plan period, and another 13,500 dwellings across the remainder of Harlow and Garden Communities located in East Hertfordshire and Epping Forest Districts. It also encourages small scale employment, but does not identify any location or quantum. This policy provides for 2,600 dwellings within Harlow District at an allocation (East of Harlow) that is located more than 9km from a European site. **Potential linking impact pathways are:** • **Recreational Pressure** • **Atmospheric pollution** • **Water quality** • **Water abstraction** It is noted that this policy does provide

	• Create a change in modal shift towards Sustainable Transport Modes that maximises the use of sustainable transport modes including walking, cycling and use of public and community transport, and creating walkable communities	positive provision of a modal shift towards sustainable transport such as walking, cycling and public and community transportation which has potential to reduce atmospheric pollution contributions. Supporting text states '*5.16… Aspirations include a modal travel shift towards 60% by sustainable modes of transport and 40% car-based*.' This policy also provides for the delivery of infrastructure ahead or in tandem with the delivery of development which has the potential to prevent impacts on a sensitive designated site. **Nonetheless this policy cannot be screened out alone.** It is noted that this policy includes the provision of development beyond the District boundary that is to be located within the neighbouring districts of Epping Forest District and East Hertfordshire District Council. Following the Housing Market Area HMA assessment (that includes Harlow Council, Epping Forest District Council, East Herts District Council and Uttlesford District Council),under the Duty to Cooperate (DtC), the neighbouring authorities are working with Harlow District Council to accommodate Harlow's housing need. However, the development provided outside of Harlow District boundary is not specifically allocated within this plan document, but rather the plan documents of the relevant neighbouring authorities (and their HRAs). As such in combination consideration will be required.
SD1 Presumption in Favour of Sustainable Development	Development that accords with the Local Plan will normally be supported, unless material considerations indicate otherwise. Where there are no policies specifically relevant to the proposed development, it	No HRA implications. A Development management (DM) policy providing criteria under which the Council

	will normally be supported, unless material considerations indicate otherwise and/or either of the following apply: (a) any adverse impacts arising from the development would significantly and demonstrably outweigh the benefits, when assessed against national planning policies; (b) specific national policies indicate that the development should be restricted.	will/ will not support development. There are no HRA implications.
HS1 Housing Delivery	The Local Plan identifies sites to deliver at least 9,200 dwellings for the period of 1 April 2011 to 31 March 2033.	**Potential HRA implications** Provides for 9,200 dwellings in Harlow District Council boundary during the Plan period (2011 to 2033). **Potential impact pathways present are:** • **Recreational pressure** • **Atmospheric pollution** • **Water quality** • **Water abstraction** **This policy cannot be screened out**
HS2 Housing Allocations	See screening **Table 5 provided in Chapter 4** for site by site analysis	**Potential HRA implications** Provides residential site allocations during the Plan period (2011 to 2033). Screening for individual allocations undertaken in **Table 5 of Chapter 4 i**dentifies that all allocations can be screened out in isolation. However in combination the residential allocations could provide the following linking impact pathways: • **Recreational pressure** • **Atmospheric pollution** • **Water quality** • **Water abstraction**
HS3 Strategic Housing Site East of Harlow	Provides for 2,600 dwellings and associated infrastructure is allocated on land to the east of Harlow. Identifies the need for Master Planning to be provided in partnership with stakeholders, including infrastructure providers. Provides for highway solutions to address impacts on the wider road network (including new Junction 7a on the M11). Provides the relevant infrastructure (this policy does not limit the infrastructure	**Potential HRA implications** Provides for 2,600 dwellings in Harlow District Council boundary during the Plan period (2011 to 2033). This site is located more than 9km from both Epping Forest SAC and Lee Valley SPA/ Ramsar site. Potential impact pathways present are:

<table>
<tr>
<td></td>
<td>type.
Provides for footpaths, cycleways and bridleways
Provide sustainable drainage solutions and flood mitigation measures for areas of the site which are identified in the Strategic Flood Risk Assessment.
Infrastructure must be delivered at a pace which meets the needs of the proposed and developers will be expected to contribute towards the strategic highway and other infrastructure requirements.</td>
<td>• Recreational Pressure
• Atmospheric pollution
• Water quality
• Water abstraction

This policy provides positive provision for the inclusion of partnerships with stakeholders including infrastructure providers, provision of footpaths and cycleways that could lead to a reduction in atmospheric pollution contributions; and developer contributions towards infrastructure required for development. Nonetheless this policy cannot be screened out</td>
</tr>
<tr>
<td>HS4 Gypsies and Travellers</td>
<td>To fulfil the need for nine pitches for the Travelling Community in Harlow, 12 pitches at Fern Hill Lane site will be restored.
Applications for additional pitches over the remainder of the Local Plan period will be assessed for suitability using criteria in Development Management policy H10.</td>
<td>Potential HRA implications
Identifies the provision of 12 pitches at Fern Hill Lane. Fern Hill Lane is located more than 6km from both Epping Forest SAC and Lee Valley SPA and Ramsar site.
It also provides DM criteria under which additional pitches would be assessed but no location or quantum is identified.
Whilst this policy provides for a small quantum of development in combination implications relating to atmospheric pollution exist.</td>
</tr>
<tr>
<td>ED1 Future Employment Floorspace</td>
<td>Provides for 18.8ha of B1 uses at Harlow Business Park at the Pinnacles and at the Harlow Enterprise Zone at London Road.
2.2ha of land will be delivered for employment uses at Templefields.
These employment sites are allocated on the Policies Map with the following reference numbers.
<table>
<tr><td>Ref</td><td>Location</td><td>Capacity</td></tr>
<tr><td>ED1-01</td><td>Harlow Business Park, The Pinnacles</td><td>4.6ha</td></tr>
</table>
</td>
<td>Potential HRA implications
Provides for approximately 20ha of new employment space. See screening Table 5 provided in Chapter 4 for detailed assessment.

Potential impact pathways present are:
• Atmospheric pollution
• Water quality
• Water abstraction</td>
</tr>
</table>

	<table><tr><td>ED1-02</td><td>London Road</td><td>14.2ha</td></tr><tr><td>ED1-03</td><td>East Road, Templefields</td><td>2.2ha</td></tr><tr><td></td><td>**Total Employment Provision**</td><td>**20ha**</td></tr></table> Opportunities for office floorspace in Harlow Town Centre will be identified through the Harlow Town Centre Area Action Plan.	
ED2 Protecting Existing Employment Floorspace	Provides for the retention of existing strategic employment sites at The Pinnacles, Templefields and London Road. Growth will be supported at The Pinnacles (ED01) and Templefields (ED03). Provides for the protection and provision of smaller employment units.	No HRA implications. This policy provides for the protection of existing employment sites and supports growth and development, however no quantum is provided. There are no impact pathways present
ED3 Developing a Skills Strategy for Harlow	A Skills Strategy which improves the skills and education attainment of Harlow residents will be prepared and delivered in partnership with existing and new businesses, Harlow College and University Centre and other partners including the education authority and Education and Skills Funding Agency.	No HRA implications. A strategy relating to the delivery of a strategy to develop skills within Harlow. There are no impact pathways present.
ED4 Developing a Visitor Economy	A visitor economy will be developed, building upon the district's arts and cultural attractions, the 'Sculpture Town' status, the New Town heritage and natural features such as the River Stort. Proposals which enhance Harlow's visitor economy will be supported where they are of a scale, type and appearance appropriate to the locality, provide local economic benefits and are underpinned by appropriate infrastructure.	**Potential HRA implications** A DM policy supporting the development of the visitor economy. This type of development has potential to link to the **following impact pathways are:** • **Recreational pressure** • **Atmospheric pollution** • **Water quality** • **Water abstraction**
RS1 Retail Hierarchy	Provides the retail hierarchy.	No HRA implications. A DM policy relating to retail hierarchy. There are no impact pathways present.

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<td>
Retail development must be directed to Harlow Town Centre first, followed by the centres set out in the retail hierarchy below.
<table>
<tr><th></th><th>POSITION IN RETAIL HIERARCHY</th><th>RETAIL CENTRE</th></tr>
<tr><td>TOP</td><td>Town Centre</td><td>Harlow Town Centre</td></tr>
<tr><td></td><td>Neighbourhood Centres</td><td>Bush Fair
Old Harlow
Staple Tye
The Stow
Church Langley</td></tr>
<tr><td></td><td>Hatches</td><td>Burgoyne
Crawley
Clifton
Colt
Coppice
Elm
Fishers
Katherines
Manor
Maunds
Mill
Prentice Place
Pollards
Pypers
Sherards
Slacksbury
Sumners
Ward</td></tr>
<tr><td>BOTTOM</td><td>Out-of-Centre Retail Parks
(on Edinburgh Way)</td><td>Queensgate Centre
St James Centre
Harlow Retail Park
The Oaks
Princes Gate</td></tr>
</table>
Harlow's Retail Centres are identified on the Policies Map.
</td>
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<tr>
<td>RS2 Future Retail Floorspace</td>
<td>There is an identified need to provide up to 18,100sqm of comparison floorspace and up to 3,200sqm of convenience floorspace in Harlow up to 2026.
In order to plan for residential development coming forward in the Harlow and Gilston Garden Communities beyond this period, an indicative requirement for up to 40,200sqm of comparison floorspace and up to 5,500sqm of convenience floorspace has been identified.
Identifies that a Town Centre Area Action Plan will be prepared for Harlow Town Centre. The HTCAAP will look to deliver a significant proportion of the retail floorspace requirements through site redevelopment and regeneration opportunities, and will identify the future retail floorspace capacity of the town centre.
The remaining floorspace requirement will be delivered through redevelopment opportunities in the district's Neighbourhood Centres and Hatches.</td>
<td>Potential HRA implications.
The provision of increased retail floorspace has the potential to increase the need for goods to be transported and thus result in increased traffic flows.
Potential impact pathways present are:
• Atmospheric pollution</td>
</tr>
<tr>
<td>RS3 Protecting and Enhancing Existing Retail Centres</td>
<td>Protects and enhances existing retail centres.
This policy does support residential development.</td>
<td>No HRA implications.
A DM policy relating to the protection and enhancement of existing retail centres. No quantum is identified.
There are no impact pathways</td>
</tr>
</table>

		Present.
WE1 Strategic Green Infrastructure	The Strategic Green Infrastructure in Harlow includes the Green Belt, Green Wedges and Green Fingers which will be protected and enhanced. Other Open Spaces, landscaping, trees and hedgerows which contribute to the Green Infrastructure will also be protected and enhanced. New Green Infrastructure must be planned into new development and, where possible, linked to existing Green Infrastructure. The new linear 'Stort Riverpark', connecting the Lee Valley Regional Park to Bishop's Stortford through Harlow, will be delivered by contributions from new development.	**Potential HRA implications.** Whilst this policy provides positive provision of the protection and enhancement of existing green infrastructure and the inclusion of new GI in all new development, it also provides for 'Stort Riverpark' that connects with the Lee Valley Regional Park and thus potentially also the Lee Valley SPA. **Potential linking impact pathways are:** • **Increased recreational pressure** It is noted that not the entirety of the Regional Park comprises European sites, as such this policy does have the positive ability to funnel people into the regional park that could also serve to spread out visitor activity if delivered appropriately.
WE2 Green Wedges and Green Fingers	Provides for Green Wedges. These are to provide Green Infrastructure, including open spaces for sport, recreation and quiet contemplation, wildlife corridors, footpaths, cycleways and bridleways amongst other provisions. Provides for Green Fingers. These are to provide Green Infrastructure, wildlife corridors, footpaths, cycleways and bridleways.	No HRA implications. This is a positive DM policy providing for green Wedges and Green Fingers (i.e. increased GI). There are no impact pathways present.
WE3 Biodiversity and Geodiversity	All biodiversity and geodiversity assets in the district will be preserved and enhanced. Assets of sufficient importance have a designation. The types of asset designations are: • National designations (e.g. Sites of Special Scientific Interest) • Local designations (e.g. Local Wildlife Site) • Ancient woodland • Aged or veteran trees outside ancient woodland Nationally and locally designated assets are identified on the Policies Map.	No HRA implications. A DM policy relating to Biodiversity and Geodiversity. ***For robustness it is recommended that this policy also provides for the protection of internationally designated wildlife sites both within and outside of the District as impact pathways stemming from Harlow have the potential to interact with European sites located within surrounding authorities.***
WE4 Heritage	Provides for the preservation and enhancement of heritage assets as follows:	No HRA implications

<table>
<tr><td></td><td>• Conservation Areas
• Scheduled Monuments
• Listed buildings and their curtilage
• Historic parks and gardens
• Archaeological remains</td><td>A DM policy relating to heritage assets.
There are no impact pathways present.</td></tr>
<tr><td>SIR1 Infrastructure Requirements</td><td>The Council will work with infrastructure and service providers, other statutory bodies and neighbouring local authorities to deliver the timely provision of infrastructure necessary to support development in Harlow and Harlow and Gilston Garden Town.
An IDP identifies and prioritises infrastructure projects required in the LP.
Details funding mechanisms for infrastructure development.
Individual development proposals will be required to secure related infrastructure both on and off site necessary to make the development acceptable in accordance with Development Management policy IN6.
The following infrastructure items have land use implications:

<table><tr><td>Ref</td><td>Infrastructure Item</td></tr><tr><td>SIR1-01</td><td>North-South Sustainable Transport Corridor and River Stort Crossing to Eastwick Roundabout</td></tr><tr><td>SIR1-02</td><td>East-West Sustainable Transport Corridor</td></tr><tr><td>SIR1-03</td><td>Second River Stort Crossing at River Way</td></tr><tr><td>SIR1-04</td><td>Access route for Strategic Housing Site East of Harlow</td></tr><tr><td>SIR1-05</td><td>Cemetery extension</td></tr><tr><td>SIR1-06</td><td>New allotment provision</td></tr></table></td><td>No HRA implications.
A positive DM policy relating to the delivery and timely provision of new infrastructure to support development.
This policy also identifies priority infrastructure projects in line with the IDP. The DM policy identifies funding mechanisms for these projects.
There are no impact pathways present.</td></tr>
<tr><td>SIR2 Enhancing Key Gateway Locations</td><td>The following gateway locations have been identified in the district:
1. Routes to and from Junction 7a of the M11 along Gilden Way
2. The A414 where it meets with Junction 7 of the M11
3. River Stort Crossing where Fifth Avenue enters and exits the Harlow district boundary
4. Eastern Stort Crossing which enters Templefields Employment Area at River Way
5. The southern terminus of the Sustainable Transport Corridor where it first enters Harlow from development sites in Epping</td><td>No HRA implications
This policy provides for the enhancement of gateways. There are no linking impact pathways present.</td></tr>
</table>

	6. Vehicular and pedestrian access points to the north of the Town Centre 7. Vehicular and pedestrian access points at as you first enter the strategic employment sites The gateway locations above will be seamlessly integrated within the wider transport and green infrastructure network of Harlow and enhanced and improved.	
SIR3 Waste and Minerals	The Council will work with Essex County Council to bring forward the Waste and Minerals DPD. These documents form part of the Development Plan for Harlow and include Site SIR3-1 Harlow Mill Rail Station which is safeguarded as a Transhipment Site and Coated Stone Plant.	No HRA implications. A policy detailing he provision of a Waste and Minerals DPD
PL1 Design Principles for Development	Details the expectation of high standard of urban and architectural design for all development. Development will be supported if it provides criteria. These include: protecting, enhancing and providing Green Infrastructure	No HRA implications. A DM policy relating to design principles. There are no impact pathways present.
PL2 Amenity Principles for Development	Development which protects or improves the level of amenity of existing and future occupants and neighbours in the local area will be supported.	No HRA implications. A DM policy relating to amenity principles for development. There are no impact pathways present.
PL3 Sustainable Design, Construction and Energy Usage	New development will be expected to deliver high standards of sustainable design and construction and efficient energy usage. Such development will be supported where it meets or exceeds the minimum standards required by Building Regulations.	No HRA implications. A positive policy that provides for efficient energy use. This has potential to reduce atmospheric pollution contributions. There are no impact pathways present.
PL4 Green Wedges and Green Fingers	Provides criteria under which development on land designated as Green Wedge or Green Finger will be supported.	No HRA implications. A DM policy relating to development on Green Wedge and Green Finger land There are no impact pathways present.
PL5 Other Open Spaces	Provides criteria under which development on Other Open Spaces will be supported. *'Development on Other Open Spaces will be supported unless one or more of the following criteria are met:* *(a) the development would compromise the landscape character, openness, biodiversity or urban design principles of the town and/or the surrounding area;* *(b) the development would remove access to an open space which, in*	**Potential HRA implications** Loss of publically accessible open space has the potential to increase recreational pressure within sensitive European sites. **Potential impact pathways present include:** • **Increased recreational pressure.**

	accordance with the current evidence, is of high quality and/or high public value in providing opportunities for sport and recreation; *(c) the development would prejudice the potential for comprehensive development of adjacent land.*'	
PL6 Trees and Hedgerows	Development and tree works applications, which ensure that trees and hedges are protected and enhanced, will be supported. Where development has a negative impact on existing trees and hedges, the proposal will be assessed based criteria listed. Development which includes the planting of new trees and hedges will be supported where criteria are met.	No HRA implications. A DM policy relating to trees and hedgerows. There are no linking impact pathways present.
PL7 Green Infrastructure and Landscaping	Green Infrastructure and landscaping must be protected and enhanced as part of development. Development will be supported where all the following criteria are met: (a) new Green Infrastructure and landscaping are well planned, taking into consideration the practicalities and requirements of future management and maintenance, and providing appropriate footpaths, cycleways and bridleways; (b) existing Green Infrastructure and landscaping are, where possible, protected and enhanced and in all cases are sympathetically integrated into the development; and (c) development makes connections wherever possible to landscaping and Green Infrastructure outside of the site.	No HRA implications A positive DM policy providing for the protection and enhancement of GI. There are no impact pathways present.
PL8 Biodiversity and Geodiversity Assets	Development should contribute to and enhance biodiversity or geodiversity assets. The potential harm caused by development on these assets and their surroundings will be assessed based on the harm caused by the development. The greater the significance of the asset, the greater the weight that is given to the asset's protection.	No HRA implications. A DM policy relating to Biodiversity and Geodiversity Assets. There are no impact pathways present.
PL9 Pollution and Contamination	All development proposals must minimise and, where possible, reduce all forms of pollution and contamination. This includes impacts on noise, light, air quality and the natural environment amongst others. Where it can be demonstrated that pollution and/or contamination is unavoidable, appropriate measures must mitigate the negative effects of the development.	No HRA implications. A positive DM policy relating to pollution and contaminants. This policy identifies the need to minimise and reduce pollution and that development will not be supported if it will result in unacceptable impacts from pollutants (alone or in combination). It also identifies for the need for mitigation where pollution and contamination are

		unavoidable. There are no impact pathways present.
PL10 Water Quality, Water Management, Flooding and Sustainable Drainage Systems	1. Water Quality Development will be supported unless it adversely affects water quality. 2. Water Management To minimise impact on the water environment, all new dwellings should achieve the Optional Technical Housing Standard for water efficiency of no more than 110 litres per person per day as described by Building Regulations. 3. Flooding All development proposals will be considered against the NPPF (including application of the sequential test and, if necessary, the exception test) and against the European Water Framework Directive (or any subsequent equivalent). Development must follow a risk-based and sequential approach, so that it is located in the lowest flood risk area. If this cannot be achieved, the exception test must be applied and the appropriate mitigation measures must be undertaken. 4. Sustainable Drainage Systems Provides criteria which development must meet relating to flooding and provides criteria relating to requirement of SuDS.	No HRA implications. A positive DM policy relating to water management. This policy provides for increased efficiency in water use, prevents development adversely affecting water quality, and provides for the use of SuDS. There are no linking impact pathways present.
PL11 Heritage Assets and their Settings	Provides DM policy relating to Heritage Assets and their Settings	No HRA implications. A DM policy relating to Heritage Assets and their Settings. There are no impact pathways present.
PL12 Advertisements	Provides DM Policy relating to Advertisements	No HRA implications. A DM policy relating to Advertisements. There are no impact pathways present.
H1 Housing Allocations	Provides support for Strategic Housing sites and other housing sites allocated within the Strategic polices. Development of the Strategic Housing Site will require a Master Plan to be submitted which takes into consideration the relevant policies in the Local Plan.	No HRA implications. A DM policy supporting housing provision. This policy does not itself provide for any quantum or location of housing development, as such there are no linking impact pathways present.
H2 Residential Development	Supports residential development including infill development, the sub-division of garden plots, minor redevelopment schemes and the development of vacant plots provided it meets criteria listed	No HRA implications. A DM policy providing criteria which residential development is required to

		meet. Whilst the type of residential development supported by this policy could result in an increase in population. However, this policy does not identify any quantum or location of development and as such there are no linking impact pathways present.
H3 Houses in Multiple Occupation	Supports the creation or conversion of a dwelling to a House in Multiple Occupation (HMO) provided it meets criteria stated.	No HRA implications. A DM policy providing criteria which creation or conversion of HMO must meet. Whilst the type of residential development supported by this policy could result in an increase in population, it is likely that this increase will be small. Additionally this policy does not identify any quantum or location of development and as such there are no linking impact pathways present.
H4 Loss of Housing	Provide criteria where loss of housing will be supported.	No HRA implications. A DM policy providing criteria where loss of housing will be supported. There are no linking impact pathways present.
H5 Accessible and Adaptable Housing	Identifies requirements relating to accessible and adaptable housing including the need to provide at least Building Control Part M4(2), Building Control Part M4(3) and The provision of specialist housing developments will be supported on appropriate sites that will meet the needs of older people and other such groups.	No HRA implication. A DM policy relating to accessible and adaptable housing. Whilst the type of residential development supported by this policy could result in an increase in population, it is likely that this increase will be small. This policy does not identify any quantum or location of development and as such there are no linking impact pathways present.
H6 Housing Mix	A range of housing types and sizes, across a range of tenures, must be provided in major residential development. The Council will support community-led housing developments on appropriate sites.	No HRA implications. A DM policy relating to housing mix. There are no linking impact pathways present.

H7 Residential Annexes	Provision for a domestic annex will be supported where it meets criteria listed.	No HRA implication. A DM policy relating to residential annexes. Whilst the type of residential development supported by this policy could result in an increase in population this policy does not identify any quantum or location of development and as such there are no linking impact pathways present.
H8 Affordable Housing	Major residential development will be supported where affordable housing is provided at a rate of at least 30%. Reduction of this rate will require an independent viability assessment.	No HRA implications. A DM policy relating to affordable housing. There are no linking impact pathways present.
H9 Self-build and Custom-build Housing	Provides criteria under which self/ custom build housing plots should be made available. It also provides criteria relating to the provision of self build housing	No HRA implication. A DM policy relating to custom and self build housing. Whilst the type of residential development supported by this policy could result in an increase in population this policy does not identify any quantum or location of development and as such there are no linking impact pathways present.
H10 Travellers' Pitches and Plots	If evidence indicates there is a need for additional pitches or plots, new sites will be supported providing criteria listed are met.	No HRA implication. A DM policy relating to Traveller's Pitches and Plots. Whilst the type of residential development supported by this policy could result in an increase in population, this policy does not itself identify any quantum or location of development and as such there are no linking impact pathways present.
PR1 Development within Employment Areas	Supports development in employment areas provided it is for: B1 (Business - Offices (other than those that fall within A2), research and development of products and processes, light industry appropriate in a residential area); B2 (General industrial - Use for industrial process other than one falling within class B1 (excluding incineration purposes, chemical treatment or landfill or hazardous waste)); and B8 (Storage or distribution). Provides criteria under which other	No HRA implications A DM policy relating to development within employment areas. Whilst this policy supports development, no type, quantum or location is identified.

	types of development will be supported	There are no linking impact pathways present.
PR2 Development within Neighbourhood Service Areas	Supports development in Neighbourhood Service Areas (NSA) provided it meets criteria. This includes: the provision of offices, light industrial uses and start-up units falling within use class B1; it is for uses other than B1 and evidence has been provided to demonstrate that the unit has been vacant and actively marketed to the satisfaction of the Council for at least 12 months or for an appropriate period of time agreed with the Council, and that there is no realistic prospect of B1 uses occupying the unit or any other more suitable alternative sites being available for the proposal; and/ or it does not involve the amalgamation of units in Neighbourhood Service Areas into larger units and meets other criteria	No HRA implications. A DM policy relating to development within NSAs. This policy does not identify any location, type or quantum of development. There are no linking impact pathways present.
PR3 Employment Development Outside Employment Areas and Neighbourhood Service Areas	Employment development outside Employment Areas and Neighbourhood Service Areas will be supported where it meets criteria. Development resulting in the loss of B1, B2, B8 and waste uses will not be supported outside of the district's Employment Areas and Neighbourhood Service Areas unless it meets criteria identified	No HRA implications. A DM policy relating to development outside of NSA and Employment Areas. This policy does not identify any location type or quantum of development. There are no linking impact pathways present.
PR4 Improving Job Access and Training	For major development, provision through planning obligations will be sought for: 1. employment of local people; 2. work related training provision; 3. education opportunities; 4. affordable childcare.	No HRA implications A DM policy to relating to improving job access and training. There are no linking impact pathways present.
PR5 The Sequential Test and Principles for Main Town Centre Uses	A DM Policy providing criteria concerning the Sequential Approach to Main Town Centre Uses and the General Principles for Main Town Centre Uses	No HRA implications. A DM Policy providing the Sequential Approach to Main Town Centre Uses and the General Principles for Main Town Centre Uses. There are no linking impact pathways present.
PR6 Primary and Secondary Frontages in the Town Centre	A DP policy providing criteria where development in the Town Centre primary frontages will be supported and that Main Town Centre Uses (with the exception of office uses), evening and night-time uses will be supported in the Town Centre secondary frontages.	No HRA implications A DM Policy relating to development of Primary and Secondary Town Centre frontages. There are no linking impact pathways present.

PR7 Sub-division and Internal Alteration of Town Centre Units	The sub-division of retail units in the Town Centre and the internal alteration of existing retail units will be supported where both the criteria listed are met.	No HRA implications A DM policy relating to the sub-division and internal alteration of Town Use units. This policy does not identify and type, location or quantum of development. There are no linking impact pathways present.
PR8 Primary and Secondary Frontages in Neighbourhood Centres	Provides criteria where development of Primary and Secondary frontages in Neighbourhood Centres will be supported.	No HRA implications. A DM policy providing criteria where development of Primary and Secondary frontages in Neighbourhood Centres will be supported. There are no linking impact pathways present.
PR9 Development in Hatches	Development in Hatches will be supported where it meets both the following criteria: (a) development at ground floor level falls within use classes A1 (shops), A2 (financial and professional services), A3 (restaurants and cafes), A4 (drinking establishments), A5 (hot food takeaways), D1 (non-residential institutions) or D2 (assembly and leisure) or a mix of these uses and does not result in the loss of all convenience facilities, public houses and community facilities; and (b) development on the first floor or above falls within use classes B1(a) (business) or C3 (dwelling houses).	No HRA implications. A DM policy concerning development in Hatches. This policy does not identify any location, type or quantum of development. There are no linking impact pathways present
PR10 Development in Retail Parks	Provides criteria under which the Council will support development in retail parks. For sub-division, evidence must be provided to demonstrate that the existing unit has been actively marketed, to the satisfaction of the Council, for at least twelve months.	No HRA implications. A DM policy relating to development in Retail Parks. This policy does not identify any location, type or quantum of development. There are no linking impact pathways present.
PR11 Evening and Night Time Economy	1. Sequential Test Evening and night time uses must be directed to the Town Centre first, then to Neighbourhood Centres and then to Hatches, and applicants must demonstrate that this sequential approach has been undertaken. 2. Development Principles Evening and night time uses will be supported where they meet criteria detailed	No HRA implications. A DM policy relating to the evening and night time economy. There are no linking impact pathways present.

L1 Open Spaces, Play Areas and Sporting Provision and Facilities in Major Development	In major development, public open space, allotments, play space and sporting provision and facilities are to be required, together with their management and maintenance.	No HRA implication. A positive DM policy identifying the need for major development to provide public open space and other outdoor amenities which have the potential to divert recreational activity away from sensitive designated sites. There are no linking impact pathways present.
L2 The Provision and Loss of Recreational, Sporting, Cultural and Community Facilities	Provides criteria where the provision of recreational, sporting, cultural and community uses and/or facilities, including playing fields, play spaces, allotments and sports clubs will be supported. Identifies that the loss of all or part of any recreation, sports, cultural or community uses and/or facilities will not be supported unless it meets one or more of the criteria listed	No HRA implications. A DM policy relating to the provision and loss of recreational, sporting, cultural and community facilities. It is noted that the provision of recreational facilities has the potential to reduce recreational pressure on sensitive designated sites, whilst the loss of it could increase recreational pressure. However, no location or extent of development gain/ loss is identified. There are no linking impact pathways present.
L3 Development Involving the Provision or Relocation or Loss of Public Art	1. Provision of Public Art in Major Developments In major developments, public art should be provided. 2. Development Involving the Provision, Relocation or Loss of Public Art The commissioning, maintenance and de-commissioning of public art must be agreed with the Council.	No HRA implications. A DM policy concerning public art. There are no linking impact pathways present.
IN1 Development and Sustainable Modes of Travel	1. Sustainable Accessibility All development should have regard to the modal hierarchy as set out in the Strategic policies. New developments including redevelopments, changes of use and Town Centre and transport interchange improvements will be required to link to the existing cycleway, footway, public right of way and bridleway network. Where appropriate this will include cycleways, footways and bridleways within the development, and contribute to the improvement of these facilities 2. Provision of Electric Charging Points for Vehicles Development must provide electric vehicle charging points (EVCPs) in accordance with the latest government guidance.	No HRA implications. A positive DM policy providing for the inclusion of sustainable transport modes including cycleways, footpaths and bridleways and the provision of EVCPs. These provisions have the potential to reduce the need for use of polluting vehicles and reduce atmospheric pollution contributions. There are no linking impact pathways present

IN2 Impact of Development on the Highways Network including Access and Servicing	Development will be supported where it meets all the following criteria: (a) it would not cause a significant detrimental impact on road congestion and movement; (b) it would not cause a detrimental impact on the safety of all road users including pedestrians and cyclists; and (c) the development provides for adequate, safe and convenient loading and servicing arrangements, access points and drop-off areas and consideration has been given to the movement and turning of emergency vehicles and refuse vehicles.	No HRA implications. A DM policy relating to the impact pf development on the Highways Network. This policy does not identify any location or type of development. There are no linking impact pathways present.
IN3 Parking Standards	Vehicle parking must be provided in accordance with the adopted Essex Vehicle Parking Standards, unless otherwise indicated elsewhere in the Local Plan and/or supporting documents.	No HRA implications. A DM policy associated with parking standards. There are no linking impact pathways present
IN4 Broadband and Development	1. Broadband Provision in Major Development Major development should contribute towards the provision of infrastructure suitable to enable the delivery of high-speed broadband services across the Harlow area. 2. Broadband Infrastructure Development Broadband infrastructure development will be supported where a report is submitted which meets criteria including that pertinent to adverse impacts on the natural built environment.	No HRA implications. A positive DM Policy associated with broadband provision and development. This policy has the potential to reduce the need for journeys and as such could reduce atmospheric pollution contributions. There are no linking impact pathways present.
IN5 Telecommunications Equipment	Development of telecommunications equipment will be supported where it meets both the following criteria: (a) evidence has been provided to show that opportunities have been explored to share existing masts or sites with other providers; and (b) where equipment has become redundant it is removed before it is replaced, or if not replaced it is removed within a time period to be agreed with the Council	No HRA implications. A DM policy associated with telecommunications equipment. No location or type of development is identified. There are no linking impact pathways present.
IN6 Planning Obligations	Planning permission will only be granted for development if the provision is secured for related infrastructure, affordable housing, services, facilities and environmental protection which are necessary to make the development acceptable in planning terms, directly related to the development, and fairly and reasonably related in scale and kind. The provision of such requirements shall be secured either as part of development proposals, through the use of conditions attached to planning permissions, or through planning obligations. Where it can be demonstrated that	No HRA implications. A DM policy associated with Planning Obligations. There are no linking impact pathways present.

	provision on site is not feasible then provision elsewhere, or a contribution towards this provision, will be required. Where a planning application extends beyond the district boundary, prior agreement for the provision and location of any necessary obligations will need to be obtained from relevant parties.	

4.2 **Table 4** identifies that LDP policies provide potential linking impact pathways to European sites. These policies are:

- HGT1 Development and Delivery of Garden Communities in the Harlow and Gilston Garden Communities
- HS1 Housing Delivery
- HS2 Housing Allocations
- HS3 Strategic Housing Site East of Harlow
- HS4 Gypsies and TravellersED1 Future Employment Floorspace
- ED4 Developing a Visitor Economy
- RS2 Future Retail Floorspace
- WE1 Strategic Green Infrastructure
- PL5 Other Open Spaces

4.3 Potential linking impact pathways identified include:

- Disturbance from recreational activities (Lee Valley SPA and Ramsar site and Epping Forest SAC)
- Atmospheric pollution (Epping Forest SAC)
- Water abstraction (Lee Valley SPA and Ramsar site)
- Water quality (Lee Valley SPA and Ramsar site)

4.4 These impact pathways are discussed further in relation to Epping Forest SAC, and Lee Valley SPA and Ramsar site in **Chapters 5 to 8**.

Screening of Site Allocations

4.5 **Table 5** presents an initial sift of Residential Site Allocations within the LDP from the point of view of HRA, whilst **Table 6** represents the initial sift of Employment Site Allocations.

4.6 Where Site Allocations have been coloured green in the 'HRA Screening Implications' column, this indicates that the Allocations do not contain potential impact pathways linking to European designated sites and have been screened out from further consideration. Where Site Allocations have been coloured orange in the 'HRA Screening Implications' column, this indicates that the Site Allocations have potential impact pathways linking to European sites and have been screened in for further consideration in this report.

4.7 For Residential and Traveller Site Allocations, impacts relating to recreational pressure in combination have been screened out for Allocations located more than 6.2km from Epping Forest SAC or Lee Valley SPA and Ramsar site. The reasoning for these distances is discussed in Chapter 5.

Table 5: Screening Assessment of Residential Site Allocations

Site Allocation Reference	Site Allocation Name	Capacity	Distance from Epping Forest SAC	Distance from Lee Valley SPA/ Ramsar	HRA implications
HS2-1	Princess Alexandra Hospital	650	More than 7km from Epping Forest SAC	Located less than 6km (between 4km and 5km) from Lee Valley SPA/ Ramsar	**Potential HRA implications.** Due to the distances involved **recreational pressure on Lee Valley SPA/Ramsar is a potential linking impact pathway.**
HS2-4	Lister House, Staple Tye Mews, Staple the Depot and The Gateway Nursery	42	More than 7km from Epping Forest SAC	Less than 6km from Lee Valley SPA/ Ramsar	**Potential HRA implications.** Due to the distances involved **recreational pressure on Lee Valley SPA/Ramsar is a potential linking impact pathway.**
HS2-6	Ridding Lane	35	Between 6km and 7 km from Epping Forest SAC	More than 7km from Lee Valley SPA/ Ramsar	Due to the distances involved there are no linking impact pathways present. This site can be screened out.
HS2-7	Kingsmoor Recreation Centre	35	Between 6km and 7 km from Epping Forest SAC	Located less than 6km from Lee Valley SPA/ Ramsar (4.9km)	**Potential HRA implications** Located within an area of existing recreational land associated with Kingsmoor Recreational Centre. Freely available online mapping indicates that this land is used for recreational activities that have the potential to divert recreational pressure away from sensitive designated sites. Loss of this land could result in increased recreational pressure. Due to the distances involved **recreational pressure on Lee Valley SPA/Ramsar is a potential linking impact pathway.**

Site Allocation Reference	Site Allocation Name	Capacity	Distance from Epping Forest SAC	Distance from Lee Valley SPA/ Ramsar	HRA implications
HS2-8	The Evangelical Lutheran Church, Tawneys Road	35	More than 7km from Epping Forest SAC	More than 6km from Lee Valley SPA/ Ramsar	Due to the distances involved there are no linking impact pathways present. This site can be screened out.
HS2-9	Land east of 144-154 Fennells	23	6.1km from Epping Forest SAC	Located less than 6km (although more than 5km) from Lee Valley SPA/ Ramsar	**Potential HRA implications** This land parcel is located adjacent to Kingsmoor Recreation Ground and Parndon Wood Nature Reserve. It is 6.1km from Epping Forest SAC. From review of freely available online mapping, imagery identifies that this land parcel is part of the Nature reserve. The imagery also indicates that the site is used for recreational activities. As such, the loss of this land parcel could result in increased recreational pressure within sensitive designated sites. Due to the distances involved **recreational pressure on Lee Valley SPA/Ramsar site and Epping Forest SAC is a potential linking impact pathway**
HS2-10	Pollard Hatch plus garages and adjacent land	20	More than 7km from Epping Forest SAC	Located less than 6km (between 4km and 5km) from Lee Valley SPA/ Ramsar	**Potential HRA implications.** Due to the distances involved **recreational pressure on Lee Valley SPA/Ramsar is a potential linking impact pathway.**
HS2-11	Land between Second Avenue and St. Andrews Meadow	16	More than 7km from Epping Forest SAC	More than 6km from Lee Valley SPA/ Ramsar	This allocation is located in a land parcel that from review of freely available online mapping appears to be used as recreational green space connecting Netteswell Pond and the Recreation Ground. Loss of this land could result in increased recreational pressure. However, due to the distance of this site from designated sites, it is considered that this site can be screened out.
HS2-12	Coppice Hatch and garages	16	More than 7km from Epping Forest SAC	Located less than 6km (although more than 5km) from Lee Valley SPA/ Ramsar	**Potential HRA implications.** Due to the distances involved **recreational pressure on Lee Valley SPA/Ramsar is a potential linking impact pathway.**
HS2-13	Sherards House	15	More than 7km from Epping Forest SAC	Located less than 6km (between 4km and 5km) from Lee Valley SPA/ Ramsar	**Potential HRA implications.** Due to the distances involved **recreational pressure on Lee Valley SPA/Ramsar is a potential linking impact pathway.**
HS2-14	Elm Hatch and public house	13	More than 7km from Epping Forest SAC	Located less than 6km (between 4km and 5km) from Lee Valley SPA/ Ramsar	**Potential HRA implications.** Due to the distances involved **recreational pressure on Lee Valley SPA/Ramsar is a potential linking impact pathway.**
HS2-15	Playground west of 93	12	More than 7km	More than 8km from	Due to the distances involved there are no linking impact pathways

Site Allocation Reference	Site Allocation Name	Capacity	Distance from Epping Forest SAC	Distance from Lee Valley SPA/ Ramsar	HRA implications
	- 100 Jocelyns		from Epping Forest SAC	Lee Valley SPA/ Ramsar	present. This site can be screened out.
HS2-16	Fishers Hatch	10	More than 7km from Epping Forest SAC	More than 6km from Lee Valley SPA/ Ramsar	Due to the distances involved there are no linking impact pathways present. This site can be screened out.
HS2-17	Slacksbury Hatch and associated garages	10	More than 7km from Epping Forest SAC	Located less than 6km (between 4km and 5km) from Lee Valley SPA/ Ramsar	**Potential HRA implications.** Due to the distances involved **recreational pressure on Lee Valley SPA/Ramsar is a potential linking impact pathway.**
HS2-18	Garage blocks adjacent to Nicholls Tower	10	More than 7km from Epping Forest SAC	More than 7km from Lee Valley SPA/ Ramsar	Due to the distances involved there are no linking impact pathways present. This site can be screened out.
HS2-19	Stewards Farm	10	More than 6.2km from Epping Forest SAC	More than 6km from Lee Valley SPA/ Ramsar	Due to the distances involved there are no linking impact pathways present. This site can be screened out.
HS2-20	Land between Barn Mead and Five Acres	10	More than 7km from Epping Forest SAC	Partially located less than 6km from the SPA/ Ramsar (3.9km)	**Potential HRA implications.** Due to the distances involved **recreational pressure on Lee Valley SPA/Ramsar is a potential linking impact pathway.**
HS2-21	Pypers Hatch	10	More than 7km from Epping Forest SAC	More than 6km from Lee Valley SPA/ Ramsar	Due to the distances involved there are no linking impact pathways present. This site can be screened out.
HS2-2	The Stow Services Bays	70	More than 7km from Epping Forest SAC	More than 6km from Lee Valley SPA/ Ramsar	Due to the distances involved there are no linking impact pathways present. This site can be screened out.
HS2-3	Land east of Katherines Way, west of Deer Park	69	More than 7km from Epping Forest SAC	Located less than 6km (between 4km and 5km) from Lee Valley SPA/ Ramsar	**Potential HRA implications** This allocation is located in a land parcel that from review of freely available online mapping appears to be used as recreational green space. Loss of this land could result in increased recreational pressure. Due to the distances involved **recreational pressure on Lee Valley SPA/Ramsar is a potential linking impact pathway**
HS2-5	Land, south of Clifton Hatch	36	More than 7km from Epping Forest SAC	More than 7km from Lee Valley SPA/ Ramsar	This allocation is located in a land parcel that from review of freely available online mapping appears to be used as recreational green space. Loss of this land could result in increased recreational pressure.

Site Allocation Reference	Site Allocation Name	Capacity	Distance from Epping Forest SAC	Distance from Lee Valley SPA/ Ramsar	HRA implications
					However, due to the distance of this site from designated sites, it is considered that this site can be screened out.
HS3	Strategic Housing Site East of Harlow	2,600	More than 9km from Epping Forest SAC	More than 9km from Lee Valley SPA/ Ramsar	Due to the distances involved there are no linking impact pathways present. This site can be screened out.

4.8 **Table 5** identifies Residential Site Allocations that are located within 6km of Lee Valley SPA and Ramsar site and as such cannot be screened out due to the potential linking impact pathway of recreational pressure. These are: HS2-1, HS2-4, HS2-7, HS2-9, HS2-10, HS2-12, HS2-13, HS2-14, HS2-17, HS2-20, and HS2-3. Additionally, four of these sites are located within parcels of land that appear to be currently used for recreational activity, so loss of these could exacerbate an increase of recreational pressure within a sensitive European site. In contrast, only one housing allocation is located within 6.2km of Epping Forest SAC.

Table 6: Screening Assessment of Employment Site Allocations

Allocation Ref.	Allocation name	Employment Area	HRA Screening Implications
ED1-01	Harlow Business Park, The Pinnacles	4.6ha	No HRA implications Located 3km from Lee Valley SPA/ Ramsar and more than 9km from Epping Forest SAC. Can be screened out in isolation
ED1-02	London Road	14.2ha	No HRA implications Located more than 7km from Lee Valley SPA/ Ramsar and more than 9km from Epping Forest SAC. Can be screened out in isolation
ED1-03	East Road, Templefields	2.2ha	No HRA implications Located 7km from Lee Valley SPA/ Ramsar and more than 10km from Epping Forest SAC. Can be screened out in isolation

4.9 Screening of the Employment Site Allocations undertaken in **Table 6** does not identify any potential impact pathways linking to European sites beyond in combination affects relating to changes in air quality as a result of increase traffic movement resulting from development provided by the LDP.

5. Recreational Pressure

5.1 The following LDP Policies could not be dismissed in the initial sift from potentially impacting the integrity of the Lee Valley SPA and Ramsar site as a result of increased recreational pressure affects. These LDP Policies are therefore discussed further in this Chapter:

Policies

- HS1 Housing Delivery: provides for 9,200 new dwellings between 2011 to 2033
- HS3 Strategic Housing Site East of Harlow – screen in and then dismiss later as it lies outside core catchment.
- HGT1 Development and Delivery of Garden Communities in the Harlow and Gilston Garden Communities
- HS2 Housing Allocations
- ED4 Developing a Visitor Economy
- WE1 Strategic Green Infrastructure
- PL5 Other Open Spaces

Site Allocations

5.2 Residential site allocations provided by the Plan include land parcels that from review of freely available online imagery appear to be currently used as publically accessible recreational spaces. These are:

- HS2-3: Land east of Katherines Way, west of Deer Park
- HS2-5: Land south of Clifton Hatch
- HS2-7 Kingsmoor Recreation Centre
- HS2-9: Land east of 144-154 Fennells
- HS2-11: Land between Second Avenue and St. Andrews Meadow

5.3 Loss of these recreational spaces could increase recreational pressure on sensitive European sites. However, due to the distances involved (see **Table 5** for distances of individual site allocations from European sites; the closest allocation to a European site is HS2-3: Land east of Katherines Way, west of Deer Park located 4.3km from Lee Valley SPA and Ramsar site) it is unlikely that people displaced from HS2-3: Land east of Katherines Way, west of Deer Park would choose the European site as an alternative. This impact pathway can be screened out alone.

5.4 Policy L2 (The Provision and Loss of Recreational, Sporting, Cultural and Community Facilities) is a DM policy relating to the provision and loss of such facilities. The provision of recreational facilities has the potential to reduce recreational pressure on sensitive designated sites, whilst the loss of it could increase recreational pressure. However, loss of recreational facilities will only be supported under certain criteria including where:

'(a) it can be demonstrated that the use and/or facility is surplus to requirements and an alternative replacement is not required;

(b) replacement uses and/or facilities of equivalent or better quantity and quality are provided in a suitable location before the existing use and/or facility is replaced. The replacement should be provided in an agreed location;

(c) such a development is ancillary or will support and enhance the existing use and/or facility;

(d) the development would redress the deficiency of other recreational provision within the locality.'

5.5 With this policy framework in place it can be concluded that the loss of the above mentioned recreational spaces will not result in a net loss of usable recreational provision and this impact pathway relating to loss of recreational amenity can be screened out.

Positive Policy Provision

5.6 It is noted that the Plan includes positive policies that have the potential to reduce recreational pressure on sensitive European sites. These are:

- WE1 Strategic Green Infrastructure: provides for the protection and enhancement of existing green infrastructure and that new GI '***must*** *be planned into new development'*.
- WE2 Green Wedges and Green Fingers: provides for green Wedges and Green Fingers. The role of Green Wedges and Fingers are to '…*provide Green Infrastructure, including open spaces for sport, recreation and quiet contemplation, wildlife corridors, footpaths, cycleways and bridleways;…'*
- PL7 Green Infrastructure and Landscaping: provides for the protection and enhancement of GI.
- L1 Open Spaces, Play Areas and Sporting Provision and Facilities in Major Development: identifies the need for '*major development'* to provide public open space and other outdoor amenities which have the potential to divert recreational activity away from sensitive designated sites.
- L2 The Provision and Loss of Recreational, Sporting, Cultural and Community Facilities: a DM policy relating to the provision and loss of recreational, sporting, cultural and community facilities. It is noted that the provision of recreational facilities has the potential to reduce recreational pressure on sensitive designated sites, whilst the loss of it could increase recreational pressure. Loss of recreational facilities will only be supported under certain criteria.

5.7 Due to the distances from Harlow to sensitive European sites (the nearest site to Epping Forest SAC is HS2-9: Land east of 144-154 Fennells located 6.1 km away, whilst the nearest to Lee Valley SPA and Ramsar site is HS2-3: Land east of Katherines Way, west of Deer Park located 4.3km away), individual residential site allocations in Harlow are unlikely to result in an impact due to increased recreational pressure alone. As such only in combination assessment is required in relation to impacts from increased recreational pressure and that is the subject of the remainder of this chapter.

Lee Valley SPA and Ramsar Site (In Combination)

5.8 The following SSSI's are components of the SPA and Ramsar site:

- Rye Meads SSSI is the closest component of the European site to Harlow. It is located approximately 2.6 km west of the District. The site is a Nature Reserve and is owned by Thames Water and the RSPB who manage the site with Hertfordshire and Middlesex Wildlife Trust.
- Amwell Quarry SSSI is located 4km north west of the District. The site is a National Nature Reserve. It is owned and managed by Herts and Middlesex Wildlife Trust.
- Turnford & Cheshunt Pits SSSI is located more than 7km south west of the District. Most of the site is owned by the Lee Valley Regional Park Authority and is managed as a Country Park (River Lee Country Park).

5.9 At its closest Harlow district is located 2.6km from Lee Valley SPA and Ramsar site (Rye Meads), although the closest residential site allocation (HS2-3: Land east of Katherines Way, west of Deer Park, allocated for 69 dwellings) is located 4.3km from the European site. Visiting Rye Meads from Harlow is convoluted (rather than via a simple measure of 'as the crow flies') due to the intervening railway line and River Stort and the existence of a toll on Rye Road[57]. As such, the toll-free route requires one to drive north onto the A414, west along the A414 and then south into Hoddesdon to reach the reserve.

5.10 This analysis considers that recreational pressure effects on this site from development in Harlow are unlikely to be significant even 'in combination' for the following reasons:

- Amwell Quarry SSSI (Amwell Nature Reserve) and Rye Meads SSSI (Rye Meads Nature Reserve) are both laid out in considerable detail with a network of hides (ten at Rye Meads, three at Amwell) and clearly marked footpaths/boardwalks with screening vegetation that are specifically laid out and designed to route people away from the sensitive areas and minimise disturbance while at the same time accommodating high numbers of visitors. Additionally, no dogs are allowed (except registered assistance dogs) and the wet and marshy/open water nature of the habitats on site inherently limits off-track recreational activity, rendering it difficult to accomplish and unappealing. For these reasons it is considered that the vulnerability of Amwell Nature Reserve and Rye Meads Nature Reserve to the potential adverse effects of recreational activity that can affect other less well-managed sites is very low. In Turnford and Cheshunt Pits SSSI, recreational activity is similarly regulated through zoning of water bodies. The majority of the site is already managed in accordance with agreed management plans in which nature conservation is a high or sole priority.
- Gadwall and shoveler are the most widely distributed and numerous faunal species for which the SPA and Ramsar site are designated and thus the most likely to encounter visitors). These species are not inherently highly sensitive to disturbance and are readily able to adapt (habituate) to the presence of shore-based human recreational activities without being flushed (as opposed to water-based activities which are potentially highly disturbing).
- Turnford & Cheshunt Pits is located within the Lee Valley Country Park, which is part of the Lee Valley Regional Park. In their response to the HRAs for Epping Forest Local Plan and East Herts Local Plan the Lee Valley Regional Park Authority did not raise any concerns regarding ability to manage future recreational pressure on the SPA from growth.

[57] Although the toll is modest (currently £0.5) it is nonetheless likely to discourage casual visitors from regularly using that route.

– Various investigations into the habits of recreational visitors to nationally and internationally important wildlife sites have found that the majority of dog walkers and casual walkers are generally disinclined to walk very far to visit sites for recreation. For example, in one of the most thorough studies visitor surveys were conducted at the Thames Basin Heaths Special Protection Area. The study found that the average distance between the visitor's home postcode and Thames Basin Heaths SPA when arriving by foot was 0.8 km, with 75% of foot-based visitors living within a 0.9 km straight line distance from the visitor survey point. Other surveys show a similar broad pattern, since there is a natural limit as to how far most people are prepared to walk to visit a particular countryside site, even when it is large and appealing. As identified above the nearest site allocation to the SPA in Harlow is more than 4km distant. The Thames Basin Heaths is also extensively visited by people travelling by car, who typically live 5km from the SPA. However, that site has an abundance of parking whereas parking in the vicinity of Rye Meads, Turnford & Cheshunt Pits and Amwell Quarry will naturally restrict the number of car-based visitors at any time and, unlike Epping Forest SAC, opportunities for informal roadside verge parking are very limited.

5.11 As such it is considered that development provided by the LDP will not affect the integrity of the Lee Valley SPA and Ramsar site via increased recreational pressure alone or in combination.

Epping Forest SAC (In Combination)

5.12 Epping Forest SAC receives a great many visits per year (estimated at over 4 million) and discussions with the City of London Corporation have identified long-standing concerns about increasing recreational use of the forest resulting in damage to its interest features. A programme of detailed formal visitor surveys has been undertaken and has identified that 75% of visitors to Epping Forest SAC arise from within approximately 6km (6.2km) of the site. This is relevant because the 75th percentile is often used to define the core recreational catchment of a European site. Within that 6.2km zone visitors are not evenly spread; the vast majority of Essex-resident visitors live within 3km of the SAC with few living further afield; the 6.2km distance appears to be influenced particularly by residents to the south of the SAC in north London who are dispersed over a wider area.

5.13 The updated survey will inform a formal Mitigation Strategy and a more refined assessment of impacts and mitigation solutions will be required within the scope of the strategic commitment that all the HMA authorities have made in a Memorandum of Understanding (MoU) between the HMA authorities and Essex County Council, Hertfordshire County Council, Natural England and the City of London Corporation.

5.14 However, it can be seen that, based on the visitor survey report, only one residential site allocation proposed in the Harlow Local Plan is located within 6.2km of the SAC. This is site HS2-9: Land east of 144 – 154 Fennells, allocated for 23 dwellings, and is located 6.1km from the SAC boundary at its closest. Based on current data therefore, all but one of the Local Plan allocations are located beyond the indicated core recreational catchment for Epping Forest SAC and even that site is located on the periphery of the recreational catchment of the SAC. The vast majority of Harlow District within 6.2km of the SAC consists of greenspace and woodland with no housing development, and this is unlikely to change.

5.15 Notwithstanding the distance of Harlow District and its allocations from Epping Forest SAC, the Council have signed up to delivering the HMA-wide commitment set out in the Epping Forest SAC Memorandum of Understanding to collaboratively devise strategic mitigation solutions (such as access management contributions and, alternative recreational natural greenspace as necessary). This commitment is also detailed within the Plan as follows: '*1.31: …Additionally, a MoU has been prepared, focussing on the management of growth from development on the Epping Forest Special Area of Conservation.* For robustness and clarity

with regard to recreational pressure on Epping Forest SAC and the commitment of the Council to work collaboratively to protect the site from adverse effects on integrity, it was recommended in an earlier draft of this HRA that paragraph 1.31 be amended to state: '… *Additionally, a MoU has been prepared, focussing on the management of growth from development on the Epping Forest Special Area of Conservation to ensure no adverse effects on integrity of the SAC'* in order to reflect the explicit objective of the management of growth (i.e. prevention of adverse effects on the SAC). For the submitted version of the LDP this change has been made.

5.16 Whilst the LDP itself only provides for 9,200 new dwellings over the Plan period, the wider HMA provides for 51,710 new dwellings between the four Districts of East Hertfordshire, Epping Forest, Uttlesford and Harlow to 2033. Most of the larger housing allocations located outside of Harlow District (i.e. the garden communities) are located on the outskirts of Harlow under a Memorandum of Understanding (MoU)[58]. As such it is recommended that Harlow is rendered effectively recreationally 'self-sufficient' to help to minimise impacts from increased recreational pressure stemming from the LDP to assist the neighbouring authorities deliver the quantum of housing in close proximity to Harlow. Policy WE1 Strategic Green Infrastructure does identify the need for new Green Infrastructure to be planned into all new development. In line with this, the garden communities being created around Harlow should deliver a suitably large amount of natural accessible greenspace to maximise their recreational self-sufficiency which could be achieved through a green infrastructure strategy[59]. Ultimately the quantum of Green Infrastructure required and achievable will be dependent on the layout of these larger developments and detail will need to be established for individual planning applications[60]. Further mitigation measures may be devised for these sites as the strategic recreational management strategy for the SAC develops.

5.17 It is concluded that the recreational pressure impact pathway can be screened out in isolation and in combination, firstly because available data suggests that Harlow is likely to lie on the fringes of the core catchment of the SAC and secondly because there is a framework in place via both the MoU and a Local Plan commitment to manage the effects of growth on Epping Forest SAC collaboratively with the other MoU authorities.

[58] Memorandum of Understanding on Distribution of Objectively Assessed Housing Need Across the West Essex/ East Hertfordshire Housing Market Area (March 2017) Between East Hertfordshire District Council. Epping Forest District Council, Harlow District Council and Uttlesford District Council.

[59] It is noted that the Gilston Area Concept Framework (September 2016) provides Aspirational Objectives including to '*Create major publically accessible parklands, as well as extensive hard and soft landscaping within the villages. Every house within 300m of open space;'*

[60] The use of Natural England's ANGST standards would be a good starting point in determining a quanta of green infrastructure required.

6. Air Quality

6.1 Due to the large distances involved, it is considered very unlikely that any individual site allocations (either employment or residential) in Harlow, would affect the integrity of a European site in isolation; however in combination effects with other plans and projects require further consideration. The following policies could not be dismissed in the initial sift (see **Table 4**) from potentially impacting the integrity of Epping Forest SAC, as a result of increased atmospheric pollution contributions. Therefore further discussion is contained in this Chapter.

Policies

6.2 The key drivers for potential increased atmospheric pollution as a result of the LDP stem from increased residential development (approximately 9,200 dwellings), and increased employment development (approximately 18.8ha of floorspace). Additionally, and to a lesser extent, an increased visitor economy has the potential to increase road traffic within Harlow District and possibly more widely. This is considered in the context of an additional 51,710 net new dwellings identified to be provided in Harlow, Uttlesford, East Hertfordshire and Epping Forest Districts under the HMA. This type of development is provided within the following Plan policies:

- HGT1 Development and Delivery of Garden Communities in the Harlow and Gilston Garden Communities
- HS1 Housing Delivery
- HS2 Housing Allocations
- HS3 Strategic Housing Site East of Harlow
- ED1 Future Employment Floorspace
- ED4 Developing a Visitor Economy
- RS2 Future Retail Floorspace

6.3 In addition to those policies which promote delivery of development, the following policies within the Plan that provide a positive contribution to atmospheric improvements:

- HGT1 Development and Delivery of Garden Communities in the Harlow and Gilston Garden Communities: this policy provides positive provision to '(i) *Create a step change in modal shift by contributing to the delivery of the Sustainable Transport Corridors and establishing an integrated, accessible and safe transport system which maximises the use of the sustainable high quality transport modes of walking, cycling and the use of public and community transport to promote healthy lifestyles'.*
- HS3 Strategic Housing Site East of Harlow: provides positive provision of '*footpaths, cycleways and bridleways'* that could lead to a reduction in atmospheric pollution contributions
- PL3 Sustainable Design, Construction and Energy Usage: provides for efficient energy use. This has potential to reduce atmospheric pollution contributions. *'New development will be expected to deliver high standards of sustainable design and construction and efficient energy usage...'*
- PL9 Pollution and Contamination: identifies the need to for all development proposals to '*minimise and where possible reduce all forms of pollution'* and that development will not be supported if it will result in unacceptable impacts from pollutants (alone or in combination).

It also identifies for the need for mitigation where pollution and contamination are unavoidable.

– IN1 Development and Sustainable Modes of Travel: providing for the inclusion of sustainable transport modes including cycleways, footpaths and bridleways and that *'Development must provide electric vehicle charging points (EVCPs) in accordance with the latest government guidance'*. These provisions have the potential to reduce the need for use of polluting vehicles and reduce atmospheric pollution contributions.

– IN4 Broadband and Development: provision of broadband infrastructure has the potential to reduce the need for journeys and as such could reduce atmospheric pollution contributions.

6.4 Supporting text also provides for a modal shift in transport types used during the Plan period as follows: '*5.16… Aspirations include a modal travel shift towards 60% by sustainable modes of transport and 40% car-based.*'

6.5 Within the context of these LDP policies and supporting text, air quality on each European site is discussed below.

Epping Forest SAC

Likely Significant Effects

6.6 Epping Forest SAC is known to be adversely affected by relatively poor local air quality alongside the roads that traverse the SAC and this has been demonstrated to have negatively affected the epiphytic lichen communities of the woodland. The nature of the road network around Epping Forest SAC is such that journeys between a number of key settlements around the Forest by car, van or bus effectively necessitate traversing the SAC. Modelling undertaken for the West Essex/East Hertfordshire Housing Market Area authorities (which Harlow District is part of) in 2016 (see **Appendix C** for full detail) indicates that even on B roads through the SAC vehicle flows are substantial (e.g. a 2014 base case of c.20,000 AADT on the B1393 with roadside NO_x concentrations of 60µgm^{-3}, twice the critical level) while the A121 between Wake Arms Roundabout and the M25 had 2014 base flows of 25,000 AADT. Moreover, lengthy queues are known to build around most arms of Wake Arms Roundabout, which increases emissions compared to the same volume and composition of free-flowing traffic.

Appropriate Assessment

6.7 The critical level for NO_x is set at 30 µgm^{-3} in order to capture the role of NO_x in nitrogen deposition, and particularly in growth effects. The critical level for NO_x is currently exceeded on most links indicating that existing traffic is likely to be making a meaningful contribution to nitrogen deposition and the 2016 modelling indicated that the critical level was likely to continue to be exceeded on most links by 2033. Since the principal role of NO_x on vegetation is as a source of nitrogen, nitrogen deposition rates were forecast in order to examine the potential effect directly.

6.8 Comparing Do Something with Base in each table in **Appendix C**, it can be seen that the 2016 modelling forecast a net improvement in both NO_x concentrations and nitrogen deposition on the modelled links over the period to 2033 even allowing for forecast growth in traffic due to all sources. In other words the scale of improvement was forecast to more than offset any additional emissions from the 'in combination' increase in road traffic. This net improvement was forecast even though the allowance made for such improvements in the 2016 modelling was considerably more conservative than that advised in Defra guidance. Comparing Do Something with Do Minimum (rather than Base) then enabled identification of the relative contribution of HMA growth to any retardation of that improvement. For nitrogen

deposition, the 2016 data indicated that the role of the HMA Local Plans in retarding the expected improvement was forecast to be very small.

6.9 For NO_x on all roads other than Theydon Road, there was forecast to be an increase in NO_x concentration up to 10-20m from the roadside (depending on link modelled) varying from 0.4 μgm^{-3} (1.3% of the Critical Level) at the furthest distance, up to a maximum of 1.5 μgm^{-3} (5% of the Critical Level) immediately adjacent to the A104. DMRB Interim Advice Note 174/13[61] classifies this as a 'small' change (which it defines in line with Institute of Air Quality Management practice as a change equivalent to 5% of the critical level or less). Effects of NO_x that may arise other than through its role as a source of nitrogen could include biochemical effects e.g. enzyme activity, chlorophyll content and physiological effects e.g. CO_2 assimilation or stomatal conductivity, although many of these changes may still be due to increased nitrogen rather than other effects of the gas such as acidity.

6.10 Based on those studies, the physiological and biochemical effects of NO_x do not appear to occur until much higher annual concentrations are reached than those forecast 'in combination' at Epping Forest SAC. Even in epiphytic plants, no research has been sourced that indicates effects, other than via nitrogen, at lower concentrations. This is reflected in WHO (2000) which states that the '*general effect threshold … would be substantially higher if biomass production* [i.e. growth stimulation] *of crops is not assumed to be an adverse effect*'. Reference to the data provided within the WHO report suggests that exposure to annual average concentrations below 100 μgm^{-3} are unlikely to cause direct biochemical or physiological effects based on the available studies and it may be that concentrations considerably above 100 μgm^{-3} would be required in the field before an effect was observed. From the tables above, the highest 'in combination' (Do Something) 2033 NO_x concentration predicted on the modelled links in 2016 was 56.5 μgm^{-3} immediately adjacent to the A121 between the Wake Arms Roundabout and the M25. This is certainly high enough for nitrogen deposition to be well above the minimum critical load but is well below the likely minimum NO_x concentration at which other effects, unrelated to growth stimulation and nitrogen deposition, are likely to occur.

6.11 Notwithstanding the results of the 2016 modelling, the authorities (highway authorities, Natural England and City of London Corporation, the HMA authorities including Harlow) recognised the uncertainties inherent in any forecasting, the absence of ammonia forecasts from the 2016 work (not a standard component of road traffic impact assessment, but specifically requested in this case) and the inability at the time the 2016 modelling was undertaken to factor in the effect of queuing traffic at Wake Arms Roundabout. They also recognised that the air quality on many links was still forecast to be higher than the critical level and critical load even allowing for the improvement attributable to changes in vehicle emissions. The authorities thus considered that it was appropriate for them to take active steps to minimise the increase in traffic flows and improve air quality, rather than rely entirely on the (inter)national initiatives such as improvements in emission factors.

6.12 As a result of that modelling and broader discussion with Natural England and City of London Corporation, the HMA authorities (including Harlow) agreed that a mitigation strategy be devised[62]. This commitment is also detailed within the Plan as follows: '*1.31: …Additionally, a MoU has been prepared, focussing on the management of growth from development on the Epping Forest Special Area of Conservation.* For robustness and clarity with regard to air quality and recreational pressure on Epping Forest SAC and the commitment of the Council to

[61] The Design Manual for Roads and Bridges (Interim Advice Note 174/13 Updated advice for evaluating significant local air quality effects for users of DMRB Volume 11, Section 3, Part 1 'Air Quality (HA207/07))

[62] The MoU states that '*It is intended this Joint Strategy will be in agreed and published prior to the determination of any of the planning applications on sites around Harlow that are part of The Spatial Option detailed in the "Distribution of OAN across West Essex and East Hertfordshire" MoU. If the Joint Strategy is not in place when planning applications are submitted, applicants will be required to submit the necessary information to ascertain whether any adverse impacts will be caused in Epping Forest, and if necessary any mitigation measures that may be necessary*'.

work collaboratively to protect the site from adverse effects on integrity, it was recommended in an earlier draft of this HRA that paragraph 1.31 be amended to state: '… *Additionally, a MoU has been prepared, focussing on the management of growth from development on the Epping Forest Special Area of Conservation to ensure no adverse effects on integrity of the SAC'* in order to reflect the explicit objective of the management of growth (i.e. prevention of adverse effects on the SAC). For the submitted version of the LDP this change has been made.

6.13 Since that commitment was made governance arrangements are in place and traffic modellers have been working on potential traffic mitigation scenarios. These are shortly to be tested through updated air quality modelling, which will also take account of queuing traffic at Wake Arms Roundabout and ammonia emission from traffic. That modelling will supercede the modelling presented in this document. This HRA will therefore be updated in the light of new modelling to ensure it remains up to date. While development in Harlow District will have some influence on traffic flows through Epping Forest SAC, flows arising from local sources are likely to be influenced more by the quantum and distribution of additional housing and employment growth in local authorities closer to the SAC such as Epping Forest District and the London Boroughs of Waltham Forest and Redbridge.

6.14 A programme of long-term air quality monitoring is also about to commence within input from the City of London Corporation. This will be useful in air quality model verification but its main value will be in tracking the expected improvement in emissions over the plan period. This can feed into any regular reviews of housing/employment quantum and mitigation measures over the plan period.

6.15 The updating of traffic and air quality modelling and the testing and securing of specific mitigation measures will be an iterative process. Now that Harlow's precise site allocations are defined the strategic transport modelling should be updated to ensure that it reflects the latest distribution of housing. This should be an ongoing process following submission, to be completed prior to commencement of Examination. Although that work is ongoing, it is considered that the firm commitment by surrounding authorities (including Harlow) provided by the MoU and Local Plan references[63] to the development of mitigation strategies to address air quality around Epping Forest SAC and avoid an adverse effect on integrity, the commencement of work on those solutions, the development of a programme for devising and testing those strategies, and the authorities commitment to monitor the efficacy of those strategies put a sufficient framework in place to ensure no adverse effect arose on the integrity of the SAC in combination.

6.16 **In addition to the reference in the text of the plan, it is recommended that the Local Plan also provide explicit policy reference to the strategic framework in place to address air quality at Epping Forest, including specific reference to a multi-authority mitigation strategy and a timetable for the production of that strategy (e.g. prior to adoption). This will enable the Council to make contributions to the strategic mitigation that is proportionate to the Plans atmospheric pollution contributions.**

6.17 With the implementation of this recommendation, it is considered that the Plan and associated Council initiatives (such as the MoU and resulting mitigation strategies) would present a sufficiently robust framework to ensure that the Plan will not affect the integrity of sensitive European sites, although the detailed development of a mitigation strategy is ongoing.

[63] MoU on Manging the impacts of growth within the West Essex/ East Hertfordshire Housing Market Area on Epping Forest Special Area of Conservation (draft September 2016)

7. Water Abstraction

7.1 The following policies could not be dismissed in the initial sift from potentially posing likely significant effects upon the Lee Valley SPA and Ramsar site as a result of changes to water levels due to abstraction for public water supply. They are therefore discussed further in this Chapter:

Policies

- HGT1 Development and Delivery of Garden Communities in the Harlow and Gilston Garden Communities
- HS1 Housing Delivery
- HS2 Housing Allocations
- HS3 Strategic Housing Site East of Harlow
- ED1 Future Employment Floorspace
- ED4 Developing a Visitor Economy

Site Allocations

- All residential and employment sites in combination

7.2 Policies within the Plan do provide a positive contribution towards reducing the need for water supply as follows:

- PL10 Water Quality, Water Management, Flooding and Sustainable Drainage Systems: provides for increased efficiency in water use, prevents development adversely affecting water quality, and provides for the use of SuDS.

Lee Valley SPA and Ramsar Site

7.3 All urban areas of Harlow District receive their potable water supply through Affinity Water within its Central Region. Within its catchment Affinity Water abstracts water from tributaries of Lee Valley SPA and Ramsar site.

7.4 The Lee Valley SPA and Ramsar site consists of four Sites of Special Scientific Interest (SSSI), of which Turnford and Cheshunt Pits SSSI, Rye Meads SSSI and Amwell Quarry SSSI all lie on the Hertfordshire/Essex border. Walthamstow Reservoirs SSSI lies within London Borough of Waltham Forest. Walthamstow Reservoirs is a sealed storage reservoir and part of the public water supply infrastructure for London. Rye Meads is unlikely to ever suffer from a shortage in water quantity due to its close relationship with Rye Meads Wastewater Treatment Works (WwTW). However, the quarries could theoretically be adversely affected if groundwater abstraction for public water supply was sufficiently great to cause drawdown of water levels.

7.5 The Water Cycle Study (WCS) undertaken to support the preparation of the Plan[64] identifies that within the Upper Lee Catchment Abstracts Management Strategy area water is only available for abstraction 10% to 11% of the time with the Environment Agency recommending water storage reservoirs to prolong water availability. The WCS states '*Across the Upper Lee CAMS area, water availability is very low, with abstraction tightly restricted. Recent actual abstractions have resulted in lower water levels than allocated for the environment (Ecological Flow Indicator, or EFI)… As a consequence, no further consumptive licences are available. New consumptive surface water abstractions will only be considered at times of very high flows, however these are infrequent in groundwater-fed watercourses.'.*

7.6 The WCS recommends the following water management practices to increase water efficiency and manage demand:

- Testing the level of water efficiency before granting an abstraction licence,
- Promoting efficient use of water,
- Taking actions to limit the demand,
- Reducing leakage; and
- Embedding policies for low-water consumption design in new buildings into spatial plans.

7.7 Not all of these are within the remit of a Local Plan.

7.8 Affinity Water's current Water Resource Management Plan (WRMP)[65] covers the period up to 2040 and states that an HRA of the WRMP has been undertaken and that they have been able to demonstrate sufficient alternative supply options to ensure that adverse effects on European sites can be avoided. As such, it can be concluded that delivery of the Harlow LDP will not result in adverse effects on Lee Valley SPA and Ramsar site through excessive water drawdown, either in isolation or in combination.

7.9 Additionally Affinity Water is in the process of updating its WRMP. The Affinity Water Draft WRMP[66] covers the period from 2020 to 2080, with planned adoption in 2019. The Draft WRMP. It identified options to maintain the supply-demand balance. This includes metering, managing leakages, options relating to water efficiency, water re-use and the creation of new water storage facilities. The Draft WRMP concluded '*The WRMP demonstrates the pressures on water resources in the Affinity Water supply zones with increasing demand, population growth, resource uncertainty, the impacts of climate change and the need to reduce environmental impacts.'* However *'the overall RAG [Red / Amber / Green] assessment for Harlow water resources is green, on the basis that there is sufficient time to address the supply demand issues identified in the WRMP.*

7.10 As such it is can still be concluded that the Harlow LDP will not result in adverse effects on Lee Valley SPA and Ramsar site through excessive water drawdown, either in isolation or in combination.

[64] JBA Consulting (2018) Harlow Council Water Cycle Study update (Draft Report)
[65] Affinity Water (2014) Final Water Resource management Plan, 2015-2040
[66] Affinity Water (2018) Draft Water Resources Management Plan.
https://www.affinitywater.co.uk/docs/Draft_Water_Resources_Management_Plan_2020-2080_March%202018.pdf [accessed 01/05/2018]

8. Water Quality

8.1 The following policies could not be dismissed in the initial sift from potentially posing likely significant effects upon the Lee Valley SPA and Ramsar site internationally designated sites as a result of changes to water quality from treated wastewater discharge. They are therefore considered further in this Chapter:

Policies

- HGT1 Development and Delivery of Garden Communities in the Harlow and Gilston Garden Communities
- HS2 Housing Allocations
- HS3 Strategic Housing Site East of Harlow
- ED1 Future Employment Floorspace
- ED4 Developing a Visitor Economy

Site Allocations

- All residential and employment sites in combination

8.2 Policies within the Plan do provide a positive contribution towards good water quality as follows:

- PL10 Water Quality, Water Management, Flooding and Sustainable Drainage Systems: This policy provides for increased efficiency in water use ('*no more than 110 litres per person per day*'), prevents development adversely affecting water quality, and provides for the use of SuDS.
- HS3 Strategic Housing Site East of Harlow: This positive policy provision for the inclusion of partnerships with stakeholders including infrastructure providers and the provision of infrastructure in line with development delivery.
- SIR1 Infrastructure Requirements: A positive DM policy relating to the delivery and timely provision of new infrastructure to support development. '*Individual development proposals will be required to secure related infrastructure both on and off site necessary to make the development acceptable in accordance with Development Management policy IN6*.'

Lee Valley SPA and Ramsar Site

8.3 Change in water quality is the main pathway through which the Lee Valley SPA and Ramsar site could be adversely affected. The SPA and Ramsar site is located 2.6km from the Harlow District boundary, and as such impacts from run off are not feasible. However, Rye Meads consists of non-operational land at and around the Rye Meads WwTW. Parts of the SPA consist of open water but other parts consist of fen or marsh vegetation that would theoretically be susceptible to nutrient enrichment from treated wastewater.

8.4 'Poor fens' (i.e. acidic fens) are strongly nitrogen limited. In other words, nitrogen availability is the factor which ultimately controls vegetation response to other nutrients and a small change in nitrogen inputs can result in a major change in the vegetation composition. In contrast, other types of fen with a relatively alkaline pH (called 'rich' fens) such as those at Rye Meads are phosphorus-limited, meaning that phosphorus availability is the factor which ultimately controls vegetation response to other nutrients. This also applies to fluvial flood-plain grasslands like those at Rye Meads SSSI. In a phosphorus limited system, high nitrogen availability will not result in a deleterious effect on vegetation provided that phosphorus availability is controlled[67]. That is not to say that nitrogen inputs would therefore be irrelevant, but it does mean that when nitrogen is already in excess (and phosphorus inputs can be controlled) a proportionate response must be made to the risk posed by small additional nitrogen inputs. Effluent discharges from Rye Meads WwTW into Tollhouse Stream. The stream flows through the SSSI and has been known to back up into the marsh grassland parts of the SSSI during periods of high flow.

8.5 The current discharge consent for Rye Meads WwTW has been subjected to a review by the Environment Agency and Thames Water (Review of Consents) specifically for the purpose of determining whether the current consented phosphorus limits on the discharge are leading to an adverse effect on the Lee Valley SPA and Ramsar site, and if so, to amend the consent in order to avoid such an effect. Additionally Rye Meads WwTW is undergoing an upgrade in treatment capacity and to improve discharge quality standards (up to 447,131 Population Equivalent) that is due for completion in 2018[68]. As such, provided effluent from new development within the Rye Meads catchment can be accommodated within the existing volumetric discharge consent for the WwTW it can be concluded with confidence that an adverse effect on the SPA and Ramsar site is unlikely to occur from this pathway.

8.6 The Harlow WCS[69] undertook a headroom assessment of Rye Meads WwTW in relation to committed and planned future growth scenarios with Harlow and six neighbouring authorities (East Herefordshire, North Hertfordshire, Stevenage, Welwyn Hatfield, Epping Forest and Broxbourne). The catchment of Rye Meads WwTW is expected to accommodate growth within Harlow as well as a large portion of development within the neighbouring six authorities. The WCS states: the *'headroom assessment undertaken by JBA … indicates that Rye Meads has capacity to accommodate growth within Harlow and surrounding authorities over the plan period, within the current permitted DWF discharge of 110 ML/d.*

8.7 *The TWUL RAG assessment classifies Rye Meads WwTW as "green". This reflects the existing WwTW capacity, as well as the treatment capacity of 447,134 Population Equivalent (PE) to be provided by planned upgrades to the WwTW within AMP Cycle 6 (2015 - 2020).'* Even up to the end of AMP9 (i.e. 2035) Rye Meads WwTW has been modelled to continue to have headroom (11% headroom capacity will remain). Additionally permitted levels of ammonia discharged can be managed (i.e. resulting in no deterioration) via the tightening of permits within technically possible limits.

[67] '*In a nutrient limited system, excess of the non-limiting nutrient may not result in any signs of enrichment in the vegetation as the plants are unable to make use of one nutrient without sufficient amounts of the other*'. Source: Understanding Fen Nutrients http://www.snh.gov.uk/docs/A416930.pdf
[68] Thames Water January 2017 Position Statement On Development In The Greater Harlow Area
[69] JBA Consulting (2018) Harlow Council Water Cycle Study update (Draft Report)

8.8 Once the WwTW ceases to have capacity (the Harlow WCS only assessed up to 2036) within its existing discharge consent for effluent from additional dwellings (Thames Water currently expect that Rye Mead WwTW will have sufficient headroom capacity until 2024), it will be necessary for Thames Water to apply to the Environment Agency to increase the consented discharge volume, or direct flows to an alternative treatment facility. The Environment Agency is very unlikely to consent to an increase in discharge volume from the WwTW unless the phosphate concentration within the effluent can be further tightened to ensure no deterioration in water quality in Tollhouse Stream. There is a technical limit (known as the limit of Best Available Technology) to how much phosphorus removal a WwTW can incorporate. If this situation arises, there is a risk that future dwellings within the catchment could not be accommodated at Rye Meads WwTW, requiring an alternative treatment solution that does not as yet exist. Investigating these issues was one of the purposes of the Rye Meads Water Cycle Study (2009)[70]. Water quality is therefore an important pathway to investigate with regard to future development within the Rye Meads WwTW catchment.

8.9 With regard to Harlow, the entire district is located within the catchment of Rye Meads WwTW. The bulk of wastewater volumes treated by the WwTW come from Stevenage, Welwyn Garden City and Harlow, in addition to areas in authorities surrounding Harlow that are planning to deliver large quantities of new residential development adjacent to Harlow District particularly the new Garden Communities around Harlow.

8.10 Using less water per person will reduce the impact the new development on the hydraulic capacity at Rye Meads WwTW, allowing more development to be catered for within the existing capacity and delay the need for a larger volumetric discharge consent. A recent (June 2017) Position Statement issued by Thames Water to Epping Forest and other relevant authorities has clarified that from a final effluent stream point of view (this being the relevant stream in terms of phosphate loading of discharged effluent) Rye Meads WwTW is expected to have headroom until 2036. This is beyond the plan period and therefore no capacity issues should arise for growth in the catchment. However, it will be necessary to ensure that development within the catchment of Rye Meads WwTW to keep pace with the provision of wastewater treatment infrastructure and environmental capacity there.

8.11 It is possible to conclude that the LDP will not result in a water quality effect on Lee Valley SPA and Ramsar site either alone or in combination.

[70] http://www.harlow.gov.uk/sites/harlow-cms/files/files/documents/files/Rye%20Meads%20Water%20Cycle%20Strategy.pdf [accessed 21/12/2017]

9. Summary of Recommendations and Conclusions

9.1 Recommendations are made within this HRA as follows.

9.2 To enable surrounding HMA authorities and MoU signatories to provide the quantum of housing identified within the West Essex/ East Hertfordshire HMA in proximity to Harlow, it is recommended that the garden communities being created around Harlow should deliver a suitably large amount of natural accessible greenspace to maximise their recreational self-sufficiency. Ultimately the quantum of Green Infrastructure required and achievable will be dependent on the layout of these larger developments and detail will need to be established for individual planning applications. This is a recommendation regarding practical design and implementation of these developments, rather than for the Local Plan itself. It matches recommendations made to Epping Forest District Council regarding their Local Plan.

9.3 It is acknowledged that the Harlow Local Plan will not affect the integrity of Epping Forest SAC via atmospheric pollution in isolation, but an adverse effect in combination has been identified without delivery of mitigation, although Harlow are likely to be a more minor contributor than authorities closer to the SAC. The Council already provides a policy hook to address these issues in combination with neighbouring authorities via the cross boundary MoU[71] and the resulting mitigation strategies currently being developed. The strategic transport model is to be rerun and subsequent air quality modelling undertaken prior to commencement of the examination. The modelling will reconfirm the contribution that the plan will provide to atmospheric pollution in Epping Forest and thus its relative contribution to the mitigation strategy. **In addition to the reference in the text of the plan, it is recommended that the Local Plan also provide explicit policy reference to the strategic framework in place to address air quality at Epping Forest, including specific reference to a multi-authority mitigation strategy and a timetable for the production of that strategy (e.g. prior to adoption). This will enable the Council to make contributions to the strategic mitigation that is proportionate to the Plans atmospheric pollution contributions.** With the implementation of this recommendation, it is considered that the Plan and associated Council initiatives (such as the MoU and resulting mitigation strategies) would present a sufficiently robust framework to ensure that the Plan will not affect the integrity of sensitive European sites, although the detailed development of a mitigation strategy is ongoing.

9.4 Provided that the above recommendation is incorporated into the LDP, and the traffic and air quality modelling are updated as discussed and demonstrate that mitigation measures are sufficient to address potential adverse effects on the SAC, it can be concluded that the Harlow LDP has a suitable framework in place to ensure that development delivered will not affect the integrity of any European sites either alone or in combination.

[71] Memorandum of Understanding on managing the impacts of growth within the West Essex / East Hertfordshire Housing Market Area on Epping Forest Special Area of Conservation (draft September 2016)

Appendix A European Designated Sites Background

Epping Forest SAC

Introduction

Epping Forest SAC is located within Epping Forest District. Approximately 70% of the 1,600 hectare site consists of broadleaved deciduous woodland, and it is one of only a few remaining large-scale examples of ancient wood-pasture in lowland Britain. Epping Forest SAC supports a nationally outstanding assemblage of invertebrates, a major amphibian interest and an exceptional breeding bird community.

Reasons for Designation[72]

Epping Forest qualifies as a SAC for both habitats and species. Firstly, the site contains the Habitats Directive Annex I habitats of:

- Beech forests on acid soils with *Ilex* and sometime *Taxus* in the shrublayer.
- Wet heathland with cross-leaved heath; and
- Dry heath

Secondly, the site contains the Habitats Directive Annex II species Stag beetle *Lucanus cervus*, with widespread and frequent records.

Current Pressures and Threats[73]

- Air pollution
- Under grazing
- Public disturbance
- Changes in species distribution
- Inappropriate water levels
- Water pollution
- Invasive species
- Disease

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

[72] JNCC (2015) Natura 200 Standard Data Form: Epping Forest SAC
[73] Natural England (2015). Site Improvement Plan: Epping Forest SAC

- 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

Lee Valley SPA and Ramsar Site

Introduction

The Lee Valley comprises a series of embanked water supply reservoirs, sewage treatment lagoons and former gravel pits along approximately 24 km of the valley. These waterbodies support internationally important numbers of wintering gadwall and shoveler, while the reedbeds support a small but internationally important population of bittern. In addition to the ornithological interest, the site also qualifies as a Ramsar site on account on rare and scarce plants and invertebrates present.

The Lee Valley SPA and Ramsar consists of four Sites of Special Scientific Interest, of which Turnford and Cheshunt Pits SSSI, Rye Meads SSSI and Amwell Quarry SSSI all lie on the Hertfordshire/Essex border. Walthamstow Reservoirs SSSI lies within London Borough of Waltham Forest. The Special Protection Area is managed by the Lee Valley Regional Park Authority and by Thames Water.

Reasons for Designation

The Lee Valley site is designated as an SPA[74]: for its Birds Directive Annex I and Ramsar site under criterion 6[75] for species that over-winter, and these are:

- Bittern Botaurus stellaris;
- Gadwall Anas strepera;
- Shoveler Anas clypeata.

In addition, the site qualifies as a Ramsar under criterion 2[76], by supporting the nationally scarce plant species whorled water-milfoil *Myriophyllum verticillatum* and the rare or vulnerable invertebrate *Micronecta minutissima* (a water-boatman).

Current Pressures and Threats[77]

- Water pollution
- Hydrological changes
- Public disturbance
- Inappropriate scrub control
- Fishing
- Air pollution

[74] http://jncc.defra.gov.uk/page-2047-theme=default [accessed 05/12/2017]
[75] http://jncc.defra.gov.uk/pdf/RIS/UK11034.pdf [accessed 05/12/2017]
[76] Ibid
[77] http://publications.naturalengland.org.uk/file/5788502547496960 [accessed 05/12/2017]

- Inappropriate cutting and mowing
- Invasive species

Conservation Objectives[78]

With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features'), and subject to natural change;

Ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, 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 the habitats of the qualifying features rely
- The population of each of the qualifying features, and,
- The distribution of the qualifying features within the site

Wormley-Hoddesdonpark Woods SAC

Introduction

This SAC consists of two SSSIs – Wormley-Hoddesdonpark Woods North and Wormley-Hoddesdonpark Woods South and is situated on the southern border of East Herts, with part of the SAC in Broxbourne. The semi-natural woodland is of national importance as an example of lowland south-east sessile oak/hornbeam type with the pedunculate oak/hornbeam variant also present. Additionally, small ponds and streams are important habitats for bryophytes.

Reasons for Designation[79]

Wormley-Hoddesdonpark Woods qualifies as a SAC through its habitats, containing the Habitats Directive Annex I habitat:

- Oak-hornbeam forests – this is one of only two outstanding locations for such habitat in the UK.

Current Pressures and Threats[80]

- Disease
- Invasive species
- Air pollution
- Deer
- Illicit vehicle
- Woodland/ forestry management
- Recreation

Conservation Objectives[81]

[78] http://publications.naturalengland.org.uk/file/5168095937167360 [accessed 05/12/2017]
[79] http://jncc.defra.gov.uk/protectedsites/sacselection/sac.asp?EUCode=UK0013696 [accessed 05/12/2017]
[80] http://publications.naturalengland.org.uk/file/6541134543192064 [accessed 05/12/2017]

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

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

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

[81] http://publications.naturalengland.org.uk/file/6475250191564800 [accessed 05/12/2017]

Appendix B Figures

Figure B1: Locations of Site Allocations and Internationally Designated Sites

Appendix C HMA 2016 Air Quality Impact Assessment data

Note that this assessment involves data and modelling from 2016.

Traffic flow data

The transport consultancy Jacobs used a spreadsheet model to generate flow data for the following roads within 200m of Epping Forest SAC:

- A121 (two sections);
- A104;
- B1393;
- B172; and
- Theydon Road

The flow data for each road are presented below as Annual Average Daily Traffic (AADT). Percentage heavy duty vehicles and average vehicle speeds are also provided. For the purposes of these analyses it was assumed that percentage HDV and average vehicle speeds would remain essentially similar to 2033; this is the standard assumption. Baseline is the AADT flow on each link as of 2014. Do Minimum is the change in flows due to delivery of existing planning permissions in the HMA and general background traffic growth as a result of population growth expected to 2033 without any of the HMA Options. The flows due to each HMA option are then shown in Columns 4 to 8. All Options A to E involved the same assumptions about employment traffic.

1	2			3	4	5	6	7	8
	Baseline (2014)			**2033 Do Minimum**	**Option A**	**Option B**	**Option C**	**Option D**	**Option E**
Link (NB = northbound lane etc.)	**AADT**	**% HDV**	**Speed (kph)**	**AADT**	**AADT**	**AADT**	**AADT**	**AADT**	**AADT**
B1393 NB	10593	2.9	62	12861	13719	13699	13713	13422	13827
B1393 SB	9477	1.3	45	12074	12853	12697	12858	12462	12646
B172 EB	3907	2.5	53	4472	4223	4222	4225	4190	4232
B172 WB	4241	4.9	40	4926	4992	4953	4957	4950	5035
A121 between Wake Arms Roundabout and Loughton NB	9980	1.2	19	11859	12075	12063	12051	11843	12181
A121 between Wake Arms Roundabout and Loughton SB	10430	2.1	56	12134	11607	11550	11589	11504	11593
A104 NB	8031	4.0	53	9680	9954	10000	10001	9669	10017
A104 SB	8165	2.7	48	10356	11684	11431	11599	11449	11660
A121 between Wake Arms Roundabout and the M25 EB	12228	2.8	34	13982	14029	13927	14001	14027	14074
A121 between Wake Arms Roundabout and the M25 WB	13008	3.5	40	15798	17075	16974	17023	16632	17130
Theydon Rd NB	4225	1.2	54	5174	5233	5251	5257	5092	5262
Theydon Rd SB	3677	1.5	53	4681	4976	4901	4973	4858	4903

The total change in two-way flows between Options A to E on the one hand and the Do Minimum Scenario on the other tells us the change specifically due to each Option (as distinct from the total change to 2033). These are the data that are used to determine the specific impact of each option in line with the Design Manual for Roads and Bridges.

		Change in two–way AADT compared to DM. Positive numerals mean an increase, negative numerals mean a decrease				
Link	**2033 Do Minimum two way flows**	**Option A**	**Option B**	**Option C**	**Option D**	**Option E**
B1393	24,935	1,637	1,461	1,636	949	1,538
B172	9,398	- 183	- 223	- 216	- 258	- 131
A121 (between Wake Arms Roundabout and Loughton)	23,993	- 311	- 380	- 353	- 646	- 219
A104	20,036	1,602	1,395	1,564	1,082	1,641
A121 (between Wake Arms Roundabout and M25)	29,780	1,324	1,121	1,244	879	1,424
Theydon Rd	9,855	354	297	375	95	310

From examining the changes in flows due to each Option, it can be seen that the change in flows is fairly small in all cases. This is probably because:

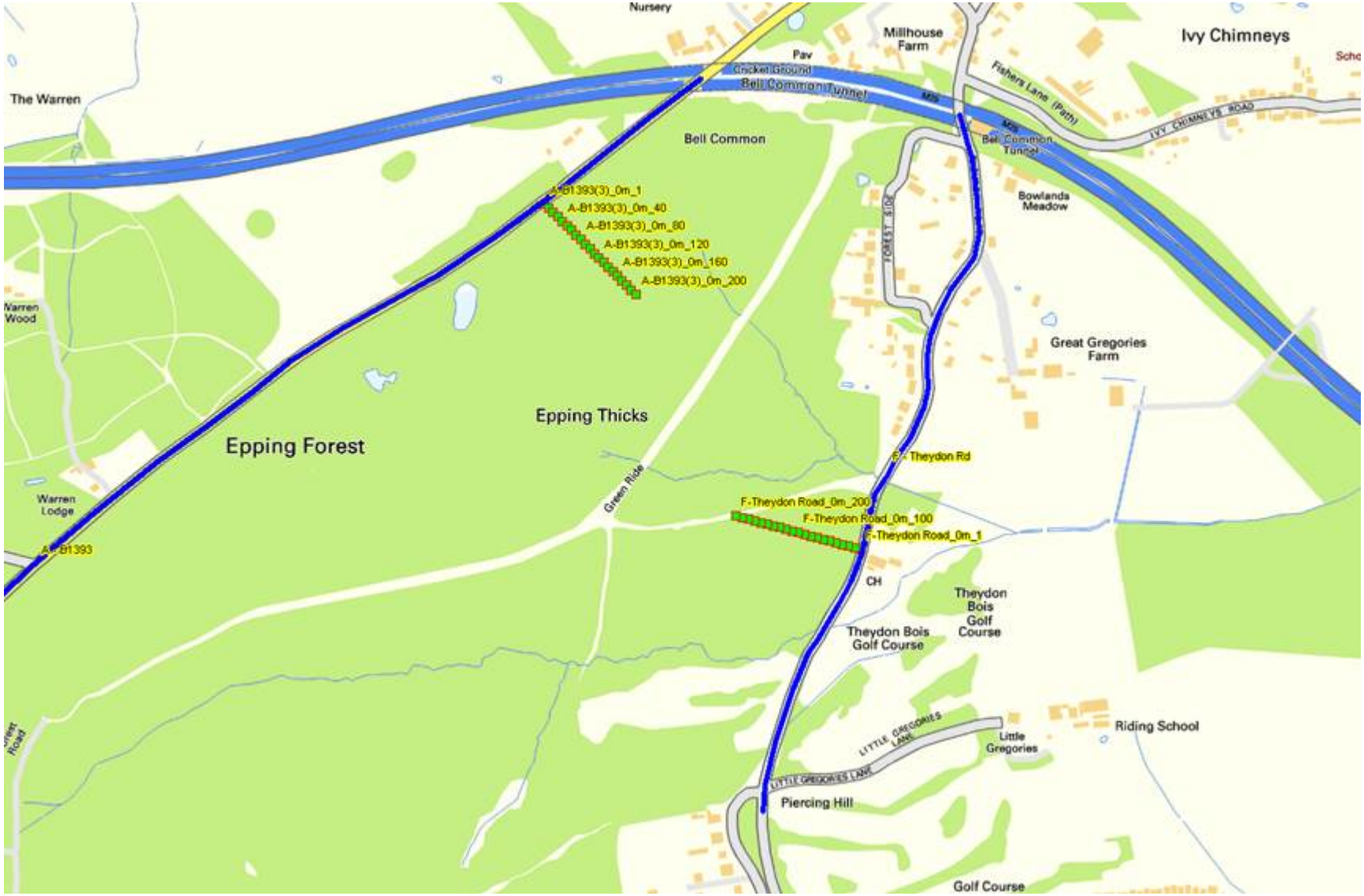
1. Although the total amount of housing being planned under each option is large, a significant proportion of that housing already has planning permission (and is thus counted as part of the Do Minimum Scenario, since it would occur whether or not any of the Scenarios were chosen);
2. Of the housing that does not have planning permission, a large amount in each case is situated between 5km and 10km north of Epping Forest SAC around Harlow, such that there are plenty of opportunities for traffic generated by that housing to disperse across the network before it reaches Epping Forest SAC; and
3. All of these scenarios involve some transport improvements and the model may have predicted that vehicle flows on some links will change due to those. Alternatively, the model may be assuming traffic is redeploying onto other roads for other reasons. For example, scrutiny of the data suggests that under each Option the traffic model expects slightly less traffic to head south from Wake Arms Roundabout to Loughton than would otherwise occur by 2033, but expects slightly more to move between Wake Arms Roundabout and the M25 in both directions.

It is important to remember that the numbers above are the changes in flows due to that option compared to the 2033 flows without that option. So, for example, Option D for Theydon Road is not saying that by 2033 flows will only have increased by 95 vehicles per day compared to 2014, but that a further 95 vehicles per day (average) is the difference which Option D would make compared to background traffic growth and delivery of existing planning permissions.

The two links (B172 and A121 from Wake Arms Roundabout to Loughton) that are predicted to experience an overall reduction in flows by 2033 due to every Option are not presented as air quality calculations below, since clearly the impact of the Options A to E will not be adverse compared to the situation without any Option.

Air quality calculations

For each of the roads air quality transects were calculated up to 200m back from the roadside as below. For some road sections (particularly around Wake Arms Roundabout) multiple transects were modelled to account for the influence of the predominant wind direction and emissions from the other nearby road links. In the summary tables below the worst case results are presented for each road link and option.


Nursery
Millhouse Farm
Ivy Chimneys
Pav
Cricket Ground
Bell Common Tunnel
The Warren
Bell Common
A-B1393(3)_0m_1
A-B1393(3)_0m_40
A-B1393(3)_0m_80
A-B1393(3)_0m_120
A-B1393(3)_0m_160
A-B1393(3)_0m_200
Fishers Lane (Path)
IVY CHIMNEYS ROAD
Bell Common Tunnel
Bowlands Meadow
Warren Wood
Great Gregories Farm
Epping Thicks
Epping Forest
F-Theydon Rd
Green Ride
F-Theydon Road_0m_200
F-Theydon Road_0m_100
F-Theydon Road_0m_1
Warren Lodge
A-B1393
CH
Theydon Bois Golf Course
Theydon Bois Golf Course
LITTLE GREGORIES LANE
Little Gregories
Riding School
Piercing Hill
Golf Course


St Thomas's Quarters
Stable Shaw
Woodredon Farm
Long Running
Car Park
Car Park
Car Park
Wake Arms Roundabout
Oak Hill
Oak Hill Farm
Hollow
Sunshine Plain
Copley Plain
Birch Hal Farm
Deershelter Plain
Car Park
Wake Valley Pond
Hangboy Slade
Birch Wood
Furze Ground
A-B1393(2)_0m_1
A-B1393(2)_0m_40
A-B1393(2)_0m_80
A-B1393(2)_0m_120
A-B1393(2)_0m_160
A-B1393(2)_0m_200
A-B1393(1)_4m_190
A-B1393(1)_4m_160
A-B1393(1)_4m_130
A-B1393(1)_4m_100
A-B1393(1)_4m_70
A-B1393(1)_4m_40
A-B1393(1)_4m_4
B-B172(2)_0m_190
B-B172(2)_0m_170
B-B172(2)_0m_140
B-B172(2)_0m_110
B-B172(2)_0m_90
B-B172(2)_0m_60
B-B172(2)_0m_30
B-B172(1)_0m_30
B-B172(1)_0m_50
B-B172(1)_0m_70
B-B172(1)_0m_90
B-B172(1)_0m_110
B-B172(1)_0m_130
B-B172(1)_0m_150
B-B172(1)_0m_170
B-B172(1)_0m_190
E-A121(2)_0m_200
E-A121(2)_0m_180
E-A121(2)_0m_160
E-A121(2)_0m_140
E-A121(2)_0m_120
E-A121(2)_0m_100
E-A121(2)_0m_80
E-A121(2)_0m_60
E-A121(2)_0m_40
E-A121(2)_0m_20
E-A121(2)_0m_1
E-A121(1)_0m_30
E-A121(1)_0m_50
E-A121(1)_0m_70
E-A121(1)_0m_90
E-A121(1)_0m_110
E-A121(1)_0m_130
E-A121(1)_0m_150
E-A121(1)_0m_170
E-A121(1)_0m_190
D-A104(1)_0m_150
D-A104(1)_0m_120
D-A104(1)_0m_90
D-A104(1)_0m_60
D-A104(1)_0m_30
D-A104(1)_0m_1
C-A121(1)_0m_110
D-A104(2)_0m_1
D-A104(2)_0m_30
D-A104(2)_0m_60
D-A104(2)_0m_90
D-A104(2)_0m_120
D-A104(2)_0m_150
D-A104(2)_0m_180
C-A121(2)_0m_1
C-A121(2)_0m_40
C-A121(2)_0m_70
C-A121(2)_0m_100
C-A121(2)_0m_130
C-A121(2)_0m_170
C - A121

When calculating Do Minimum NOx concentrations, air quality impact assessment guidance from Department for Transport (HA207/07, Annex F) advises that baseline concentrations should be reduced by 2% per annum in order to reflect expected improvements in background air quality in the future. However, we are aware that some regard this as overambitious. Therefore, in the tables below we have made the assumption that that conditions in 2023 (the midpoint between the base year and the year of assessment) are representative of conditions in 2033 (the year of assessment). This approach is accepted within the professional air quality community and accounts for known recent improvements in vehicle technologies (new standard Euro 6/VI vehicles), whilst excluding the more distant and tenuous projections regarding the evolution of the vehicle fleet.

In the tables that follow, each option is analysed for each road link. The air quality impact of each option is reflected in the ‘Change’ column, this being the difference between the 2033 Do Minimum Scenario and each HMA Option. The model also shows the ‘in combination’ scenario by comparing the Do Something scenario with the Base scenario. This shows the effect of all forecast additional traffic on the network by 2033 irrespective of source (i.e. not just from within the HMA authorities), taking account of forecast improvements in emission technology.

Option A

A121 between Wake Arms Roundabout and M25												
	Annual Mean Nox Conc. (ug/m3)				Annual Mean N Dep (k N/ha/yr)				Annual Mean A Dep (keq/ha/yr)			
Distance (m)	BL	DM	DS	Change	BL	DM	DS	Change	BL	DM	DS	Change
1	92.1	55.0	56.5	1.5	17.77	13.13	13.20	0.06	1.36	1.24	1.24	0.01
10	60.0	36.9	37.7	0.8	16.47	12.34	12.38	0.04	1.23	1.16	1.16	0.00
20	48.6	30.4	30.9	0.5	15.95	12.03	12.06	0.03	1.17	1.12	1.13	0.00
50	37.8	24.4	24.7	0.3	15.43	11.74	11.75	0.01	1.12	1.09	1.09	0.00
100	32.8	21.7	21.8	0.2	15.19	11.60	11.61	0.01	1.10	1.08	1.08	0.00
150	30.9	20.6	20.7	0.1	15.09	11.55	11.56	0.01	1.09	1.07	1.07	0.00
200	29.9	20.1	20.2	0.1	15.04	11.52	11.53	0.00	1.08	1.07	1.07	0.00
B1393												
	Annual Mean Nox Conc. (ug/m3)				Annual Mean N Dep (k N/ha/yr)				Annual Mean A Dep (keq/ha/yr)			
Distance (m)	BL	DM	DS	Change	BL	DM	DS	Change	BL	DM	DS	Change
1	59.6	38.5	39.8	1.4	16.60	12.51	12.57	0.06	1.24	1.17	1.18	0.01
10	43.0	28.2	28.9	0.7	15.84	12.02	12.06	0.04	1.16	1.12	1.13	0.00
20	36.7	24.3	24.8	0.5	15.54	11.83	11.86	0.03	1.13	1.10	1.11	0.00
50	30.7	20.6	20.8	0.3	15.24	11.64	11.66	0.01	1.10	1.08	1.09	0.00
100	28.0	18.9	19.1	0.1	15.10	11.56	11.57	0.01	1.09	1.08	1.08	0.00
150	27.0	18.3	18.4	0.1	15.05	11.53	11.53	0.01	1.08	1.07	1.07	0.00
200	26.5	18.0	18.1	0.1	15.02	11.51	11.52	0.00	1.08	1.07	1.07	0.00
A104												
	Annual Mean Nox Conc. (ug/m3)				Annual Mean N Dep (k N/ha/yr)				Annual Mean A Dep (keq/ha/yr)			
Distance (m)	BL	DM	DS	Change	BL	DM	DS	Change	BL	DM	DS	Change
1	59.1	37.2	38.8	1.6	16.57	12.42	12.50	0.07	1.24	1.16	1.17	0.01
10	42.2	27.4	28.2	0.8	15.80	11.96	11.99	0.04	1.16	1.12	1.12	0.00
20	36.2	24.0	24.5	0.5	15.50	11.79	11.81	0.03	1.13	1.10	1.10	0.00

50	30.5	20.7	21.0	0.3	15.21	11.62	11.64	0.01	1.10	1.08	1.08	0.00
100	28.0	19.3	19.4	0.2	15.08	11.55	11.56	0.01	1.09	1.07	1.07	0.00
150	27.0	18.7	18.9	0.1	15.04	11.52	11.53	0.01	1.08	1.07	1.07	0.00
200	26.6	18.5	18.6	0.1	15.01	11.51	11.51	0.01	1.08	1.07	1.07	0.00
Theydon Road												
	Annual Mean Nox Conc. (ug/m3)				**Annual Mean N Dep (k N/ha/yr)**				**Annual Mean A Dep (keq/ha/yr)**			
Distance (m)	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**
1	41.3	26.5	26.8	0.3	15.48	11.81	11.83	0.01	1.22	1.19	1.19	0.00
10	34.9	22.4	22.6	0.1	15.16	11.61	11.62	0.01	1.18	1.17	1.17	0.00
20	32.8	21.1	21.2	0.1	15.06	11.55	11.55	0.01	1.17	1.16	1.16	0.00
50	31.0	20.0	20.0	0.1	14.96	11.49	11.49	0.00	1.16	1.16	1.16	0.00
100	30.2	19.5	19.6	0.0	14.92	11.46	11.46	0.00	1.16	1.16	1.16	0.00
150	30.0	19.4	19.4	0.0	14.91	11.45	11.46	0.00	1.16	1.15	1.15	0.00
200	29.9	19.3	19.3	0.0	14.91	11.45	11.45	0.00	1.16	1.15	1.15	0.00

Option B

Theydon Road												
	Annual Mean Nox Conc. (ug/m3)				**Annual Mean N Dep (k N/ha/yr)**				**Annual Mean A Dep (keq/ha/yr)**			
Distance (m)	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**
1	41.3	26.5	26.8	0.2	15.48	11.81	11.83	0.01	1.22	1.19	1.19	0.00
10	34.9	22.4	22.6	0.1	15.16	11.61	11.62	0.01	1.18	1.17	1.17	0.00
20	32.8	21.1	21.2	0.1	15.06	11.55	11.55	0.00	1.17	1.16	1.16	0.00
50	31.0	20.0	20.0	0.0	14.96	11.49	11.49	0.00	1.16	1.16	1.16	0.00
100	30.2	19.5	19.6	0.0	14.92	11.46	11.46	0.00	1.16	1.16	1.16	0.00
150	30.0	19.4	19.4	0.0	14.91	11.45	11.46	0.00	1.16	1.15	1.15	0.00
200	29.9	19.3	19.3	0.0	14.91	11.45	11.45	0.00	1.16	1.15	1.15	0.00
A121 between Wake Arms Roundabout and M25												

	Annual Mean Nox Conc. (ug/m3)				Annual Mean N Dep (k N/ha/yr)				Annual Mean A Dep (keq/ha/yr)			
Distance (m)	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**
1	92.1	55.0	56.2	1.3	17.77	13.13	13.19	0.05	1.36	1.24	1.24	0.01
10	60.0	36.9	37.5	0.7	16.47	12.34	12.37	0.03	1.23	1.16	1.16	0.00
20	48.6	30.4	30.9	0.4	15.95	12.03	12.06	0.02	1.17	1.12	1.13	0.00
50	37.8	24.4	24.6	0.2	15.43	11.74	11.75	0.01	1.12	1.09	1.09	0.00
100	32.8	21.7	21.8	0.1	15.19	11.60	11.61	0.01	1.10	1.08	1.08	0.00
150	30.9	20.6	20.7	0.1	15.09	11.55	11.55	0.00	1.09	1.07	1.07	0.00
200	29.9	20.1	20.1	0.1	15.04	11.52	11.52	0.00	1.08	1.07	1.07	0.00
B1393												
	Annual Mean Nox Conc. (ug/m3)				**Annual Mean N Dep (k N/ha/yr)**				**Annual Mean A Dep (keq/ha/yr)**			
Distance (m)	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**
1	65.8	41.3	42.6	1.3	16.60	12.52	12.57	0.06	1.33	1.26	1.27	0.01
10	47.5	30.1	30.8	0.6	15.78	11.99	12.02	0.03	1.25	1.21	1.21	0.00
20	41.1	26.2	26.6	0.4	15.47	11.80	11.82	0.02	1.21	1.19	1.19	0.00
50	35.0	22.4	22.6	0.2	15.17	11.61	11.62	0.01	1.18	1.17	1.17	0.00
100	32.3	20.7	20.8	0.1	15.03	11.52	11.53	0.01	1.17	1.16	1.16	0.00
150	31.2	20.1	20.2	0.1	14.98	11.49	11.50	0.00	1.16	1.16	1.16	0.00
200	30.7	19.8	19.8	0.1	14.95	11.48	11.48	0.00	1.16	1.16	1.16	0.00
A104												
	Annual Mean Nox Conc. (ug/m3)				**Annual Mean N Dep (k N/ha/yr)**				**Annual Mean A Dep (keq/ha/yr)**			
Distance (m)	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**
1	59.1	37.2	38.6	1.4	16.57	12.42	12.49	0.06	1.24	1.16	1.17	0.01
10	42.2	27.4	28.1	0.7	15.80	11.96	11.99	0.03	1.16	1.12	1.12	0.00
20	36.2	24.0	24.4	0.5	15.50	11.79	11.81	0.02	1.13	1.10	1.10	0.00
50	30.5	20.7	20.9	0.2	15.21	11.62	11.63	0.01	1.10	1.08	1.08	0.00
100	28.0	19.3	19.4	0.1	15.08	11.55	11.56	0.01	1.09	1.07	1.07	0.00

150	27.0	18.7	18.8	0.1	15.04	11.52	11.53	0.01	1.08	1.07	1.07	0.00
200	26.6	18.5	18.6	0.1	15.01	11.51	11.51	0.00	1.08	1.07	1.07	0.00

Option C

Theydon Road												
	Annual Mean Nox Conc. (ug/m3)				**Annual Mean N Dep (k N/ha/yr)**				**Annual Mean A Dep (keq/ha/yr)**			
Distance (m)	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**
1	41.3	26.5	26.8	0.3	15.48	11.81	11.83	0.02	1.22	1.19	1.19	0.00
10	34.9	22.4	22.6	0.2	15.16	11.61	11.62	0.01	1.18	1.17	1.17	0.00
20	32.8	21.1	21.2	0.1	15.06	11.55	11.55	0.01	1.17	1.16	1.16	0.00
50	31.0	20.0	20.0	0.1	14.96	11.49	11.49	0.00	1.16	1.16	1.16	0.00
100	30.2	19.5	19.6	0.0	14.92	11.46	11.46	0.00	1.16	1.16	1.16	0.00
150	30.0	19.4	19.4	0.0	14.91	11.45	11.46	0.00	1.16	1.15	1.15	0.00
200	29.9	19.3	19.3	0.0	14.91	11.45	11.45	0.00	1.16	1.15	1.15	0.00
A121 between Wake Arms Roundabout and M25												
	Annual Mean Nox Conc. (ug/m3)				**Annual Mean N Dep (k N/ha/yr)**				**Annual Mean A Dep (keq/ha/yr)**			
Distance (m)	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**
1	92.1	55.0	56.4	1.4	17.77	13.13	13.19	0.06	1.36	1.24	1.24	0.01
10	60.0	36.9	37.6	0.7	16.47	12.34	12.37	0.04	1.23	1.16	1.16	0.00
20	48.6	30.4	30.9	0.5	15.95	12.03	12.06	0.02	1.17	1.12	1.13	0.00
50	37.8	24.4	24.6	0.3	15.43	11.74	11.75	0.01	1.12	1.09	1.09	0.00
100	32.8	21.7	21.8	0.2	15.19	11.60	11.61	0.01	1.10	1.08	1.08	0.00
150	30.9	20.6	20.7	0.1	15.09	11.55	11.55	0.00	1.09	1.07	1.07	0.00
200	29.9	20.1	20.1	0.1	15.04	11.52	11.53	0.00	1.08	1.07	1.07	0.00
B1393												
	Annual Mean Nox Conc. (ug/m3)				**Annual Mean N Dep (k N/ha/yr)**				**Annual Mean A Dep (keq/ha/yr)**			
Distance (m)	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**

1	59.6	38.5	39.8	1.4	16.60	12.51	12.57	0.06	1.24	1.17	1.18	0.01
10	43.0	28.2	28.9	0.7	15.84	12.02	12.06	0.04	1.16	1.12	1.13	0.00
20	36.7	24.3	24.8	0.5	15.54	11.83	11.86	0.03	1.13	1.10	1.11	0.00
50	30.7	20.6	20.8	0.3	15.24	11.64	11.66	0.01	1.10	1.08	1.09	0.00
100	28.0	18.9	19.1	0.1	15.10	11.56	11.57	0.01	1.09	1.08	1.08	0.00
150	27.0	18.3	18.4	0.1	15.05	11.53	11.53	0.01	1.08	1.07	1.07	0.00
200	26.5	18.0	18.1	0.1	15.02	11.51	11.52	0.00	1.08	1.07	1.07	0.00
A104												
	Annual Mean Nox Conc. (ug/m3)				**Annual Mean N Dep (k N/ha/yr)**				**Annual Mean A Dep (keq/ha/yr)**			
Distance (m)	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**
1	59.1	37.2	38.8	1.5	16.57	12.42	12.49	0.07	1.24	1.16	1.17	0.01
10	42.2	27.4	28.2	0.8	15.80	11.96	11.99	0.04	1.16	1.12	1.12	0.00
20	36.2	24.0	24.5	0.5	15.50	11.79	11.81	0.03	1.13	1.10	1.10	0.00
50	30.5	20.7	21.0	0.3	15.21	11.62	11.64	0.01	1.10	1.08	1.08	0.00
100	28.0	19.3	19.4	0.2	15.08	11.55	11.56	0.01	1.09	1.07	1.07	0.00
150	27.0	18.7	18.8	0.1	15.04	11.52	11.53	0.01	1.08	1.07	1.07	0.00
200	26.6	18.5	18.6	0.1	15.01	11.51	11.51	0.00	1.08	1.07	1.07	0.00

Option D

Theydon Road												
	Annual Mean Nox Conc. (ug/m3)				**Annual Mean N Dep (k N/ha/yr)**				**Annual Mean A Dep (keq/ha/yr)**			
Distance (m)	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**
1	41.3	26.5	26.6	0.1	15.48	11.81	11.82	0.00	1.22	1.19	1.19	0.00
10	34.9	22.4	22.5	0.0	15.16	11.61	11.61	0.00	1.18	1.17	1.17	0.00
20	32.8	21.1	21.2	0.0	15.06	11.55	11.55	0.00	1.17	1.16	1.16	0.00
50	31.0	20.0	20.0	0.0	14.96	11.49	11.49	0.00	1.16	1.16	1.16	0.00
100	30.2	19.5	19.5	0.0	14.92	11.46	11.46	0.00	1.16	1.16	1.16	0.00
150	30.0	19.4	19.4	0.0	14.91	11.45	11.46	0.00	1.16	1.15	1.15	0.00
200	29.9	19.3	19.3	0.0	14.91	11.45	11.45	0.00	1.16	1.15	1.15	0.00
A121 between Wake Arms Roundabout and M25												
	Annual Mean Nox Conc. (ug/m3)				**Annual Mean N Dep (k N/ha/yr)**				**Annual Mean A Dep (keq/ha/yr)**			
Distance (m)	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**
1	92.1	55.0	56.0	1.0	17.77	13.13	13.18	0.04	1.36	1.24	1.24	0.00
10	60.0	36.9	37.4	0.5	16.47	12.34	12.36	0.02	1.23	1.16	1.16	0.00
20	48.6	30.4	30.8	0.3	15.95	12.03	12.05	0.02	1.17	1.12	1.13	0.00
50	37.8	24.4	24.6	0.2	15.43	11.74	11.75	0.01	1.12	1.09	1.09	0.00
100	32.8	21.7	21.8	0.1	15.19	11.60	11.61	0.01	1.10	1.08	1.08	0.00
150	30.9	20.6	20.7	0.1	15.09	11.55	11.55	0.00	1.09	1.07	1.07	0.00
200	29.9	20.1	20.1	0.1	15.04	11.52	11.52	0.00	1.08	1.07	1.07	0.00
B1393												
	Annual Mean Nox Conc. (ug/m3)				**Annual Mean N Dep (k N/ha/yr)**				**Annual Mean A Dep (keq/ha/yr)**			
Distance (m)	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**
1	65.8	41.3	42.2	0.8	16.60	12.52	12.55	0.04	1.33	1.26	1.27	0.00
10	47.5	30.1	30.5	0.4	15.78	11.99	12.01	0.02	1.25	1.21	1.21	0.00
20	41.1	26.2	26.4	0.3	15.47	11.80	11.81	0.01	1.21	1.19	1.19	0.00

50	35.0	22.4	22.5	0.1	15.17	11.61	11.61	0.01	1.18	1.17	1.17	0.00
100	32.3	20.7	20.8	0.1	15.03	11.52	11.53	0.00	1.17	1.16	1.16	0.00
150	31.2	20.1	20.1	0.1	14.98	11.49	11.49	0.00	1.16	1.16	1.16	0.00
200	30.7	19.8	19.8	0.0	14.95	11.48	11.48	0.00	1.16	1.16	1.16	0.00
A104												
	Annual Mean Nox Conc. (ug/m3)				**Annual Mean N Dep (k N/ha/yr)**				**Annual Mean A Dep (keq/ha/yr)**			
Distance (m)	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**
1	59.1	37.2	38.3	1.1	16.57	12.42	12.47	0.05	1.24	1.16	1.17	0.01
10	42.2	27.4	27.9	0.5	15.80	11.96	11.98	0.03	1.16	1.12	1.12	0.00
20	36.2	24.0	24.3	0.4	15.50	11.79	11.80	0.02	1.13	1.10	1.10	0.00
50	30.5	20.7	20.9	0.2	15.21	11.62	11.63	0.01	1.10	1.08	1.08	0.00
100	28.0	19.3	19.4	0.1	15.08	11.55	11.55	0.01	1.09	1.07	1.07	0.00
150	27.0	18.7	18.8	0.1	15.04	11.52	11.53	0.00	1.08	1.07	1.07	0.00
200	26.6	18.5	18.5	0.1	15.01	11.51	11.51	0.00	1.08	1.07	1.07	0.00

Option E

Theydon Road												
	Annual Mean Nox Conc. (ug/m3)				**Annual Mean N Dep (k N/ha/yr)**				**Annual Mean A Dep (keq/ha/yr)**			
Distance (m)	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**
1	41.3	23.3	23.5	0.2	15.48	10.21	10.22	0.01	1.22	1.18	1.18	0.00
10	34.9	20.2	20.3	0.1	15.16	10.06	10.06	0.00	1.18	1.17	1.17	0.00
20	32.8	19.2	19.3	0.1	15.06	10.01	10.01	0.00	1.17	1.16	1.16	0.00
50	31.0	18.3	18.3	0.0	14.96	9.96	9.97	0.00	1.16	1.16	1.16	0.00
100	30.2	17.9	18.0	0.0	14.92	9.95	9.95	0.00	1.16	1.15	1.15	0.00
150	30.0	17.8	17.9	0.0	14.91	9.94	9.94	0.00	1.16	1.15	1.15	0.00
200	29.9	17.8	17.8	0.0	14.91	9.94	9.94	0.00	1.16	1.15	1.15	0.00
A121 between Wake Arms Roundabout and M25												

	Annual Mean Nox Conc. (ug/m3)				Annual Mean N Dep (k N/ha/yr)				Annual Mean A Dep (keq/ha/yr)			
Distance (m)	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**
1	92.1	45.2	46.4	1.3	17.77	11.22	11.27	0.05	1.36	1.20	1.20	0.01
10	60.0	31.3	32.0	0.7	16.47	10.61	10.64	0.03	1.23	1.13	1.14	0.00
20	48.6	26.4	26.8	0.4	15.95	10.37	10.39	0.02	1.17	1.11	1.11	0.00
50	37.8	21.7	22.0	0.2	15.43	10.15	10.16	0.01	1.12	1.08	1.09	0.00
100	32.8	19.7	19.8	0.1	15.19	10.05	10.05	0.01	1.10	1.07	1.08	0.00
150	30.9	18.9	19.0	0.1	15.09	10.01	10.01	0.01	1.09	1.07	1.07	0.00
200	29.9	18.5	18.5	0.1	15.04	9.99	9.99	0.00	1.08	1.07	1.07	0.00
B1393												
	Annual Mean Nox Conc. (ug/m3)				**Annual Mean N Dep (k N/ha/yr)**				**Annual Mean A Dep (keq/ha/yr)**			
Distance (m)	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**
1	59.6	32.4	33.4	1.0	16.60	10.74	10.79	0.05	1.24	1.15	1.15	0.00
10	43.0	24.5	25.0	0.5	15.84	10.37	10.39	0.03	1.16	1.11	1.11	0.00
20	36.7	21.5	21.8	0.4	15.54	10.22	10.24	0.02	1.13	1.09	1.09	0.00
50	30.7	18.6	18.8	0.2	15.24	10.08	10.09	0.01	1.10	1.08	1.08	0.00
100	28.0	17.3	17.5	0.1	15.10	10.02	10.02	0.01	1.09	1.07	1.07	0.00
150	27.0	16.9	17.0	0.1	15.05	9.99	10.00	0.00	1.08	1.07	1.07	0.00
200	26.5	16.7	16.7	0.1	15.02	9.98	9.99	0.00	1.08	1.07	1.07	0.00
A104												
	Annual Mean Nox Conc. (ug/m3)				**Annual Mean N Dep (k N/ha/yr)**				**Annual Mean A Dep (keq/ha/yr)**			
Distance (m)	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**	**BL**	**DM**	**DS**	**Change**
1	59.1	31.6	32.8	1.2	16.57	10.67	10.73	0.06	1.24	1.14	1.14	0.01
10	42.2	24.0	24.6	0.6	15.80	10.32	10.35	0.03	1.16	1.10	1.11	0.00
20	36.2	21.4	21.8	0.4	15.50	10.19	10.21	0.02	1.13	1.09	1.09	0.00
50	30.5	18.9	19.1	0.2	15.21	10.06	10.07	0.01	1.10	1.08	1.08	0.00
100	28.0	17.8	17.9	0.1	15.08	10.01	10.01	0.01	1.09	1.07	1.07	0.00

150	27.0	17.4	17.5	0.1	15.04	9.99	9.99	0.00	1.08	1.07	1.07	0.00
200	26.6	17.2	17.2	0.1	15.01	9.98	9.98	0.00	1.08	1.07	1.07	0.00

THIS DRAWING IS TO BE USED ONLY FOR THE PURPOSE OF ISSUE THAT IT WAS ISSUED FOR AND IS SUBJECT TO AMENDMENT

LEGEND

- Harlow District Boundary
- Employment Allocation
- Housing Allocation
- Ramsar
- Special Area of Conservation (SAC)
- Special Protection Area (SPA)

Purpose of Issue: DRAFT

Client: HARLOW COUNCIL

Project Title: HABITATS REGULATIONS ASSESSMENT SCREENING OF HARLOW LOCAL DEVELOPMENT PLAN

Drawing Title: LOCATION OF SITE ALLOCATIONS AND EUROPEAN DESIGNATED SITES

Drawn	Checked	Approved	Date
TD	JW	IHH	10/01/2018

AECOM Internal Project No.: 60470496
Scale @ A3: 1:50,000

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Drawing Number: FIGURE B1
Rev:

File Name:I:\5004 - Information Systems\60470496-Harlow Local Development Plan and Site Appraisals\02_Maps\Figure B1 - Location of Site Allocations and European Designated Sites.mxd