

Habitats Regulations Assessment Screening of Epping Forest District Council Regulation 18 Local Plan

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1 Introduction

1.1 Background to the Project

- 1.1.1 AECOM was appointed by Epping Forest District Council to assist the Council in undertaking a Habitat Regulations Screening Assessment of its Regulation 18 Local Plan (hereafter referred to as the 'Plan' or 'Local Plan'). 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.
- 1.1.2 An assessment of housing need across the East Herts and West Essex Housing Market Area (HMA) has been conducted, which was then used as the basis for developing the Local Plan. The HMA covers Epping Forest District Council, Harlow Council, East Herts District Council and Uttlesford District Council. 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/Ramsar site and Epping Forest SAC was undertaken of each of the Options. Data from that analysis is used to inform this HRA.

1.2 Current Legislation

- 1.2.1 The need for Appropriate Assessment is set out within Article 6 of the EC Habitats Directive 1992, and interpreted into British law by the Conservation of Habitats and Species Regulations 2010. 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.
- 1.2.2 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.
- 1.2.3 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:

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 2010

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”.

1.2.4 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 Habitat Regulations Assessment for the overall process and restrict the use of Appropriate Assessment to the specific stage of that name.

1.3 Scope of the Project

1.3.1 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 Epping Forest District boundary; and
- Other sites shown to be linked to development within the District boundary through a known ‘pathway’ (discussed below).

1.3.2 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 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 Appeal¹ 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)². In this case the High Court ruled that for ‘a multistage process, so long as there is sufficient 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’.

1.3.3 There are three European sites that lie partly within Epping Forest District:

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

¹ No Adastral New Town Ltd (NANT) v Suffolk Coastal District Council Court of Appeal, 17th February 2015

² High Court case of R (Devon Wildlife Trust) v Teignbridge District Council, 28 July 2015

- 1.3.4 Outside the District, the following site also requires consideration because there is potential for impacts stemming from the Local Plan to create significant effects even though the site lies outside the authority boundary:
- Wormley-Hoddesdonpark Woods SAC located 2.2km west of the District.
- 1.3.5 The reasons for designation of these sites, together with current trends in habitat quality and pressures on the sites, are indicated in Chapters 4 to 8. All the European sites are illustrated in Appendix A Figure A1.
- 1.3.6 In order to fully inform the screening process, a number of recent studies have been consulted to determine likely significant effects that could arise from Epping Forest Regulation 18 Local Plan. These include:
- Final Water Resources Management Plan, 2015-2040. Affinity Water. June 2014
 - Local Plans (and HRAs) for Harlow, 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)

1.4 This Report

- 1.4.1 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 Local Plan policies to determine which present potential scope for impacts on European sites. Chapters 5 to 9 then provide more detailed screening (likely significant effects assessment) of each impact pathway. Each chapter begins with a consideration of the interest features and ecological condition of the site(s) and of the environmental processes essential to maintain their integrity. An assessment of the Plan in respect of each European site is then carried out mitigation strategies are proposed where necessary³. The key findings are summarised in Chapter 10: Overall Conclusions.

³ 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

2.1 Introduction

- 2.1.1 The HRA has been carried out in the continuing absence of formal central Government guidance, although general EC guidance on HRA does exist⁴. The former Department of Communities and Local Government (DCLG) released a consultation paper on the Appropriate Assessment of Plans in 2006⁵. As yet, no further formal guidance has emerged. However, Natural England has produced its own internal guidance⁶ as has the RSPB⁷. Both of these have been referred to in undertaking this HRA.
- 2.1.2 Figure 1 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.

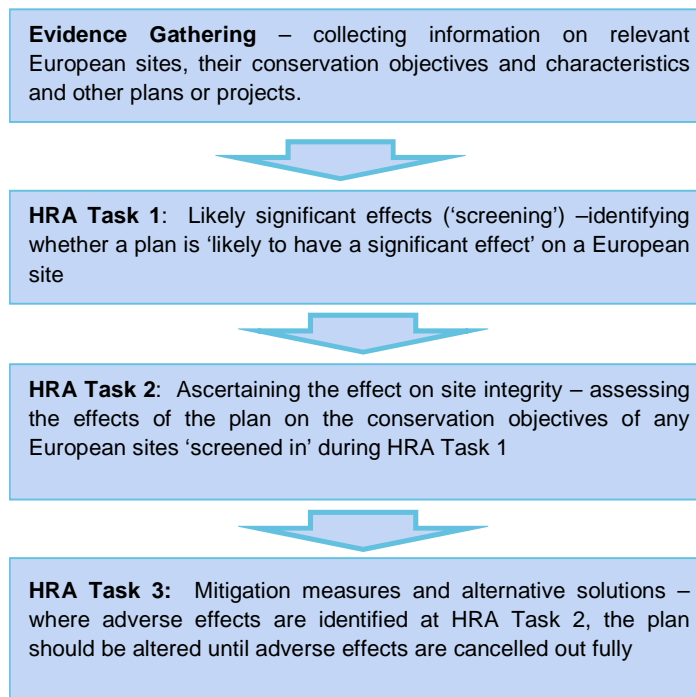


Figure 1: Four Stage Approach to Habitats Regulations Assessment. Source CLG, 2006.

⁴ 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.

⁵ CLG (2006) Planning for the Protection of European Sites, Consultation Paper

⁶ http://www.ukmpas.org/pdf/practical_guidance/HRGN1.pdf

⁷ 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.

2.2 HRA Task 1 - Likely Significant Effects (LSE)

2.2.1 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:

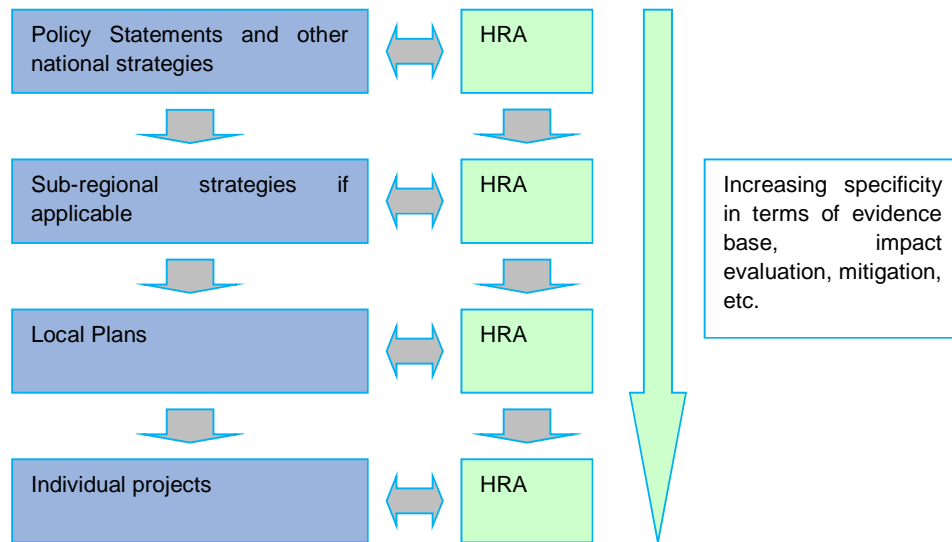
“Is the Plan, either alone or in combination with other relevant projects and plans, likely to result in a significant effect upon European sites?”

2.2.2 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.

2.2.3 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.

2.2.4 The level of detail in land use plans concerning developments that will be permitted under the plans will never be sufficient to make a detailed quantification of adverse effects. Therefore, we have again taken a precautionary approach (in the absence of more precise data) assuming as the default position that if an adverse effect cannot be confidently ruled out, avoidance or mitigation measures must be provided. This is in line with the former Department of Communities and Local Government guidance and Court rulings that the level of detail of the assessment, whilst meeting the relevant requirements of the Conservation Regulations, should be ‘appropriate’ to the level of plan or project that it addresses. This ‘tiering’ of assessment is summarised in Box 2.

Box 2: Tiering in HRA of Land Use Plans



2.2.5 When discussing ‘mitigation’ for a Local 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 the Local Plan document is a high-level policy document.

2.3 Principal Other Plans and Projects That May Act ‘In Combination’

2.3.1 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 Herts, Harlow and Uttlesford.

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

| Local Authority | Total housing provided |
|--------------------|--|
| Uttlesford | These three authorities with East Hertfordshire are working together as part of a SMA. Where impacts in combination such as air quality impacts are considered, these assessments will be based in the level of development provided within the SMA. |
| East Hertfordshire | |
| Harlow | |
| Broxbourne | 7,123 ⁸ (2014-2031) |
| Chelmsford | 14,000 (to 2036) ⁹ |
| Brentwood | 7,240 (to 2033) ¹⁰ |
| Havering | 6,420 (to 2020) ¹¹ |
| Redbridge | 16,875 (2015-2030) ¹² |
| Waltham Forest | 10,320 (to 2026) ¹³ |
| Enfield | 13,480 (to 2030) ¹⁴ |

2.3.2 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 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.

2.3.3 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 Epping Forest: Lee Valley Regional Park Authority Site management Plan and Epping Forest Management Plan and visitor surveys¹⁵.

2.4 Air Quality Impact Assessment

2.4.1 To support the HMA Options, traffic modelling and air quality impact assessment in line with the standard Design Manual for Roads and Bridges (DMRB) methodology¹⁶ was undertaken comparing the predicted change in vehicle flows on roads within 200m of Epping Forest SAC and Lee Valley SPA/Ramsar site as a result of the development Options identified within the HMA, with that which would be expected to occur over time due to background population growth and delivery of existing consents.

2.4.2 Since vehicle exhausts are situated very close to the ground the emissions only have a local effect within a narrow band along the roadside, well within 200m of the centreline of the road. Beyond 200m emissions will have dispersed sufficiently that atmospheric concentrations are essentially background

⁸ Regulation 18 full draft Local Plan for Broxbourne(2016)

⁹ Local Plan currently in preparation.

¹⁰ Draft Local Development Plan For Brentwood Borough (January 2016)

¹¹ Core Strategy and Development Control Policies Development Plan Document Adopted 2008

¹² The Redbridge Local Plan 2015-2030 Pre-Submission Draft (July 2016)

¹³ London Borough of Waltham Forest Local Plan Core Strategy. Adopted March 2012

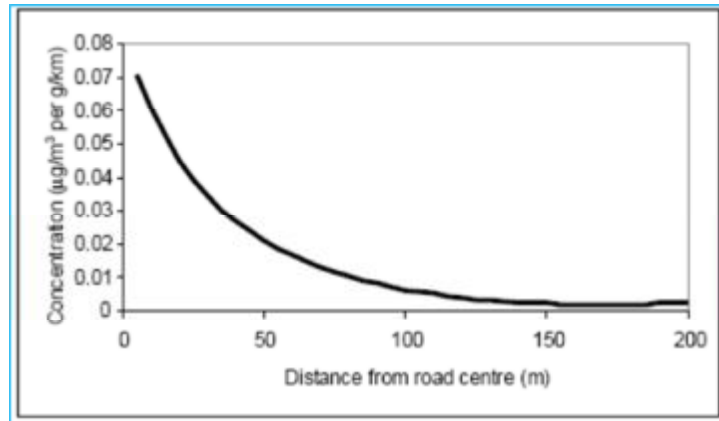
¹⁴ The Enfield Plan Core Strategy 2010-2025 (Adopted November 2010)

¹⁵ At time of writing the Corporation of London have commissioned an analysis of their existing visitor survey data which is likely to identify a requirement for further surveys to refine the recreational catchment of Epping Forest SAC

¹⁶ Design Manual for Roads and Bridges, Volume 11, Section 3 Part 1 (HA207/07) and subsequent Interim Advice Notes, coupled with reference to Air Quality Technical Advisory Group (AQTAG) and Institute of Air Quality Management guidance

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 2: Traffic contribution to concentrations of pollutants at different distances from a road (Source: DFT)



- 2.4.3 There are two measures of relevance regarding air quality impacts from vehicle exhausts. 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 from turbulence (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 inhibition¹⁷, but also biochemical and 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 (µg m⁻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 unrelated to the road (e.g. ammonia). If it is above the critical level then local nitrogen deposition from road traffic could be an issue and should be investigated.
- 2.4.4 The second important metric is a direct determination of the rate of the resulting nitrogen deposition. Unlike NO_x in atmosphere, the nitrogen deposition rate below which we are confident effects would 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⁻¹yr⁻¹).
- 2.4.5 For completeness, rates of acid deposition have also been 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.
- 2.4.6 Design Manual for Roads and Bridges and the Air Quality Technical Advisory Group guidance advises that where the concentration within the emission footprint [i.e. the Process Contribution (PC), the contribution of the scheme in question] in any part of the European site(s) is 1% of the relevant long-term benchmark (Critical Level or Critical Load) or less, the emission is 'inconsequential' (in the words of AQTAG) and 'imperceptible' (in the words of DMRB) and not likely to have a significant effect alone or in combination with other projects and plans irrespective of the background levels¹⁸.

¹⁷ 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.

¹⁸ Design Manual for Roads and Bridges Interim Advice Note (IAN) 174/13 (2013) Updated advice for evaluating significant local air quality effects for users of DMRB Volume 11, Section 3, Part 1 Air Quality (HA207/07) states that 'Where the difference in concentrations [between the Do Minimum and Do Something Scenarios] are less than 1% of the air quality threshold then the change at these receptors is considered to be imperceptible and they can be scoped out of the judgement on significance'.

AQTAG position regarding In-combination guidance and assessment. Correspondence between AQTAG and PINS. March 2015 states that: 'AQTAG is confident that a process contribution [the difference between Do Minimum and Do Something

- 2.4.7 A series of road links within 200m of Epping Forest SAC and the Lee Valley SPA/ Ramsar site were identified for further investigation. Road links in proximity to European designated sites are identified in Table 2.

Table 2: Location of Road Links analysed within 200m of Epping Forest SAC and Lee Valley SPA/Ramsar site

| 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 |
| A414 | Lee Valley SPA/ Ramsar site | 25 metres |

- 2.4.8 For each of these roads and each of the HMA Options, transport modellers calculated the following scenarios:
- Do Minimum (i.e. traffic flows expected by 2033, without new (i.e. currently unpermitted) development identified within the HMA)
 - Do Something (i.e. traffic flows expected by 2033 with the level of new development identified within the HMA)
- 2.4.9 Annual Average Daily Traffic (AADT) for each of these link locations was modelled based AADT information gathered in 2014. This is referred to as the Base Case.
- 2.4.10 Using these 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 the HMA options. 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. All Links pass immediately adjacent to the Epping Forest SAC, except for the A414 which at its closest is located 25m from Lee Valley SPA/ Ramsar site.
- 2.4.11 The difference between the Do Minimum and Do Something scenarios is the contribution of the HMA (and thus the four Local/District Plans taken collectively: East Herts, Epping Forest, Harlow and Uttlesford) since the difference between Do Minimum and Do Something reflects the effect the adoption of the Local/District Plans would have compared to the situation that would arise anyway due to background population growth across the region and delivery of existing planning permissions. This difference is essentially the Process Contribution (PC).
- 2.4.12 The predictions of nitrogen deposition and annual mean NO_x concentrations for the PC 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)¹⁹ for the assessment of impacts on 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 2033²⁰. Background nitrogen deposition rates were sourced from the Air Pollution Information System (APIS) website²¹.
- 2.4.13 Guidance note HA207/07 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 has been made 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.

Scenarios] < 1% of the relevant critical level or load (CL) can be considered inconsequential and does not need to be included in an in-combination assessment'

¹⁹ Design Manual for Roads and Bridges, HA207/07, Highways Agency

²⁰ Air Quality Archive Background Maps. Defra, 2013. Available from: <http://laqm.defra.gov.uk/review-and-assessment/tools/background-maps.html>

²¹ Air Pollution Information System (APIS) www.apis.ac.uk

- 2.4.14 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 except the A414 which was measured at 25m, 50m, 100m, 150m, 200m from the Link. 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)²², detailed vehicle fleet composition and average speed. The end of the Local/District Plan (2033) period has been selected for the future scenario as this is the point at which the total emissions due to Plan traffic will be at their greatest.
- 2.4.15 The tables in Appendix C and Appendix D present the calculated changes in NO_x concentration, nitrogen deposition and acid deposition due to the modelled Options on each of the Links resulting from development from the HMA compared to that which would occur in any case over the Plan period (2033). In these tables 'Baseline' refers to the current (2014) baseline flows. The key column/row is that which shows the difference between the DM and DS Scenarios (Change) – this identifies the contribution of development provided in the HMA, i.e. the Process Contribution.
- 2.4.16 For NO_x, if the numbers in the Change column fall on or below 0.3 µg_m⁻³ (i.e. 1% of the generic Critical Level for vegetation of 30 µg_m⁻³) then impacts can be screened out without further discussion. For nitrogen deposition, if the numbers in this column fall on or below 0.1 kgNha⁻¹yr⁻¹ (1% of the lowest point in the Critical Load range) then it can also be screened out.

²² Derived from Peak Flow data

3 Pathways of Impact

3.1 Introduction

3.1.1 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.

3.1.2 Impact pathways for consideration are:

- Disturbance from recreational activities
- Urbanisation
- Atmospheric pollution
- Water abstraction
- Water quality

3.2 Disturbance from Recreational Activities and Urbanisation

3.2.1 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.

Recreational pressure

3.2.2 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

3.2.3 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.

3.2.4 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)²³ 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)²⁴ 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

²³ 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

²⁴ 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

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 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)²⁵ 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 trampers caused a greater reduction in vegetation height than lighter trampers, but there was no difference in effect on cover.
- Cole & Spildie (1998)²⁶ 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.

3.2.5 The total volume of dog faeces deposited on sites can be surprisingly large. For example, at Burnham Beeches National Nature Reserve over one year, Barnard²⁷ estimated the total amounts of urine and faeces from dogs as 30,000 litres and 60 tonnes respectively. The specific impact on Epping Forest 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

3.2.6 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 feeding²⁸. 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 birds²⁹.

3.2.7 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:

- Underhill et al³⁰ 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

²⁵ 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

²⁶ 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

²⁷ 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

²⁸ Riddington, R. et al. 1996. The impact of disturbance on the behaviour and energy budgets of Brent geese. *Bird Study* 43:269-279

²⁹ Gill, J.A., Sutherland, W.J. & Norris, K. 1998. The consequences of human disturbance for estuarine birds. *RSPB Conservation Review* 12: 67-72

³⁰ 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

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 & Warrington³¹ 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 al³² 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 al³³ 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, Ravenscroft³⁴ 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.

3.2.8 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 faeces³⁵.

3.2.9 Underhill-Day³⁶ 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%.

3.2.10 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 population³⁷. A literature review undertaken for the RSPB³⁸ 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.

3.2.11 Disturbing activities are on a continuum. The most disturbing activities are likely to be those that involve irregular, infrequent, unpredictable loud noise events, movement or vibration of long duration (such as those often associated with construction activities). Birds are least likely to be disturbed by

³¹ 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

³² 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

³³ 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.

³⁴ 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.

³⁵ 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.

³⁶ Underhill-Day, J.C. (2005). A literature review of urban effects on lowland heaths and their wildlife. Natural England Research Report 623.

³⁷ Gill et al. (2001) - Why behavioural responses may not reflect the population consequences of human disturbance. *Biological Conservation*, 97, 265-268

³⁸ Woodfield & Langston (2004) - Literature review on the impact on bird population of disturbance due to human access on foot. *RSPB research report* No. 9.

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.

- 3.2.12 The factors that influence a species response to a disturbance are numerous, but the three key factors are species sensitivity, proximity of disturbance sources and timing/duration of the potentially disturbing activity.
- 3.2.13 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.
- 3.2.14 Where increased recreational use is predicted to cause adverse impacts on a site, avoidance and mitigation should be considered. Avoidance of recreational impacts at internationally designated sites involves location of new development away from such sites; Local Development Frameworks (and other strategic plans) provide the mechanism for this. Where avoidance is not possible, mitigation will usually involve a mix of access management, habitat management and provision of alternative recreational space.
- Access management – restricting access to some or all of a internationally designated site - is not usually within the remit of the Council and restriction of access may contravene a range of Government policies on access to open space, and Government objectives for increasing exercise, improving health etc. However, active management of access may be possible, for example as practised on nature reserves.
 - Habitat management is not within the direct remit of the Council. However the Council can help to set a framework for improved habitat management by promoting cross-authority collaboration and S106 funding of habitat management. Provision of alternative recreational space can help to attract recreational users away from sensitive internationally designated sites, and reduce pressure on the sites. For example, some species for which internationally designated sites have been designated are particularly sensitive to dogs, and many dog walkers may be happy to be diverted to other, less sensitive, sites. However the location and type of alternative space must be attractive for users to be effective. In the case of both Epping Forest and Lee Valley SPA and Ramsar sites, dog-walking, walking and cycling are likely to be the major site usages, and so alternative space needs to cater for this.
- 3.2.15 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 theoretically vulnerable to the effects of recreational pressure and/ or disturbances from construction activities resulting from development within Epping Forest.
- 3.2.16 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.

Urbanisation

- 3.2.17 This impact is closely related to recreational pressure, in that they both result from increased populations within close proximity to sensitive sites. Urbanisation is considered separately as the detail of the impacts is distinct from the trampling, disturbance and dog-fouling that results specifically from recreational activity. The list of urbanisation impacts can be extensive, but core impacts can be singled out:
- Increased fly-tipping - Rubbish tipping is unsightly but the principle adverse ecological effect of tipping is the introduction of invasive non-native species with garden waste. Non-native species can in some situations, lead to negative interactions with habitats or species for which internationally designated sites may be designated. Garden waste results in the introduction of invasive non-native species precisely because it is the 'troublesome and over-exuberant' garden plants that are typically thrown out³⁹. Non-native species may also be introduced deliberately or may be bird-sown from local gardens.
 - Cat predation - A survey performed in 1997 indicated that nine million British cats brought home 92 million prey items over a five-month period⁴⁰. A large proportion of domestic cats are found in urban situations, and increasing urbanisation is likely to lead to increased cat predation

³⁹ Gilbert, O. & Bevan, D. 1997. The effect of urbanisation on ancient woodlands. *British Wildlife* 8: 213-218.

⁴⁰ Woods, M. et al. 2003. Predation of wildlife by domestic cats *Felis catus* in Great Britain. *Mammal Review* 33, 2 174-188

- 3.2.18 The most detailed consideration of the link between relative proximity of development to internationally designated sites and damage to interest features has been carried out with regard to the Thames Basin Heaths SPA.
- 3.2.19 After extensive research, Natural England and its partners produced a 'Delivery Plan' which made recommendations for accommodating development while also protecting the interest features of the internationally designated site. This included the recommendation of implementing a series of zones within which varying constraints would be placed upon development. While the zones relating to recreational pressure expanded to 5km (as this was determined from visitor surveys to be the principal recreational catchment for this internationally designated site), that concerning other aspects of urbanisation (particularly predation of the chicks of ground-nesting birds by domestic cats) was determined at 400m from the SPA boundary. The delivery plan concluded that the adverse effects of any development located within 400m of the SPA boundary could not be mitigated since this was the range over which cats could be expected to roam as a matter of routine and there was no realistic way of restricting their movements, and as such, no new housing should be located within this zone.
- 3.2.20 As such, screening is undertaken to determine whether the Plan could lead to likely significant effects upon Lee Valley internationally designated site, either alone or 'in combination' with other plans and projects, through impacts of urbanisation. This uses the 400m precedent as an indicator that urbanisation may be a consideration.

3.3 Atmospheric Pollution

- 3.3.1 The main pollutants of concern for European sites are oxides of nitrogen (NO_x), ammonia (NH₃) and sulphur dioxide (SO₂). NO_x can have a directly toxic effect upon vegetation. In addition, greater NO_x or ammonia concentrations within the atmosphere will lead to greater rates of nitrogen deposition to soils. An increase in the deposition of nitrogen from the atmosphere to soils 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.

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 at international level to reduce levels of the precursors that form ozone. | 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. |
| 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. |

3.3.2 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 comparison⁴¹. 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.

3.4 Water abstraction

3.4.1 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. By 2050, climate change could reduce water resources by 10 -15% on an annual average basis, and reduce summer river flows by 50 -80%. Drought and floods may become more frequent in the future. 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.

3.4.2 Epping Forest District lies within the Affinity Water supply area, specifically their Central region, WRZ 5. Approximately 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 Water⁴².

3.5 Water quality

3.5.1 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:

3.5.2 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

⁴¹ 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>

⁴² Affinity Water (2014) Final Water Resource management Plan, 2015-2040.

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.

3.5.3 Sewage and some industrial effluent discharges contribute to increased nutrients in the European sites and in particular to phosphate levels in watercourses.

3.5.4 The Plan provides for development within the following settlements that are served by the following Wastewater Treatment Works (WwTW):

Table 4: Wastewater Treatment Works with Catchments Serving Settlements Identified to Provide New Development in the Local Plan.

| WwTW Catchment | Settlements to Provide Residential Development and Quantum | HRA implications |
|-----------------|--|--|
| Rye Meads | Roydon – ~ 40 dwellings, Lower Sheering - ~30 dwellings Harlow - ~ 3,900 | Discharges into watercourses such as the Tollhouse Stream (ultimately entering the River Lee) |
| Deephams | Waltham Abbey – 779 dwellings Nazeing – ~220 dwellings Buckhurst Hill – 85 new dwellings | Discharges into the Salmon Brook, a tributary of the River Lee, but is not connected to the Lee Valley SPA/Ramsar site |
| Theydon Bois | Theydon Bois – 354 dwellings | Discharges into the River Roding which discharges into the River Thames near Barking, 16.2 km from the discharge point (in a straight line) |
| Fiddlers Hamlet | Epping – 1538 dwellings (it is not known how much new development will be located within this catchment) | Discharges into Brookhouse Brook, and then the River Roding which discharges into the River Thames near Barking, 18.9 km from the discharge point (in a straight line) |
| Thornwood | Epping – 1538 dwellings (it is not known how much new development will be located within this catchment) | Discharges into a ditch, then to Cripsey Brook, and then the River Roding which discharges into the River Thames near Barking, 23.5 km from the discharge point (in a straight line) |
| Stanford Rivers | Chipping Ongar - ~500 dwellings | Discharges into the River Roding which discharges into the River Thames near Barking, 20.5 km from the discharge point (in a straight line) |
| Moreton | Fyfield - ~ 90 dwellings | Discharges into a drain and then the River Roding which discharges into the River Thames near Barking, 26.3 km from the discharge point (in a straight line) |
| Abbess Roding | Sheering - ~ 120 dwellings | Discharges into a drain and then the River Roding which discharges |

| | | |
|---------|---|---|
| | | into the River Thames near Barking, 30.7 km from the discharge point (in a straight line) |
| Beckton | Loughton – 1160 dwellings Chigwell - 424 dwellings | Discharges into the River Thames close to the site near Barking ⁴³ |

3.5.5 Rye Meads WwTW is the only WwTW that serves Epping Forest that is to receive an increase in housing numbers that has potential to link to an internationally designated site (identified in orange in Table 4). This will be discussed later in this document.

⁴³ Beckton WwTW I one of Europe's largest WwTW. Upgrades are underway to increase capacity by 60%

4 Initial Policy Sift

4.1.1 The tables below present an initial sift of policies and allocations within the District Plan, from the point of view of HRA.

Table 5: Screening Assessment of Development Management Policies

| Policy number/ name | Policy detail | HRA implications |
|---|---|---|
| Draft Policy SP 1: Presumption in Favour of Sustainable Development | The Council will take a positive approach to the consideration of development proposals, reflecting the presumption in favour of sustainable development contained in the National Planning Policy Framework. The Council will work proactively with applicants to find solutions for development proposals that help to improve the economic, social and environmental conditions in the District. | No HRA implications. By definition sustainable development will not result in likely significant effects upon internationally designated sites. There are no impact pathways present. |
| Draft Policy SP 2: Spatial Development Strategy 2011-2033 | Within the period 2011-2033 a net additional increase of approximately 11,400 new homes and net additional increase of approximately 10,000 new jobs will be provided for through the Local Plan. They will broadly be located as follows: | Potential HRA implications This policy provides for both residential and employment growth within the Borough. It identifies broad locations for the delivery of new dwellings and some employment areas (Harlow Enterprise Zone). Further, the settlements of Buckhurst Hill, Epping, Loughton, Nazeing, Roydon, Theydon Bois, and Waltham Abbey are located within sufficient proximity to internationally designated sites to have potential to contain the following linking impact pathways This type of development has potential to result in the following linking impact pathways: <ul style="list-style-type: none"> • Recreational pressure • Urbanisation • Atmospheric pollution • Water Abstraction • Water Quality. |

| Sites around Harlow | ~ 3,900 |
|---------------------|---------|
| Buckhurst Hill | ~ 90 |
| Chigwell | ~ 430 |
| Chipping Ongar | ~ 600 |
| Coopersale | 50 |
| Epping | ~ 1,640 |
| Fyfield | ~ 90 |
| High Ongar | ~ 10 |
| Loughton | ~ 1,190 |
| Lower Sheering | ~ 30 |
| Nazeing | ~ 220 |
| North Weald Bassett | ~ 1,580 |
| Roydon | ~ 40 |
| Stapleford Abbots | ~ 10 |
| Sheering | ~ 120 |
| Theydon Bois | ~ 360 |
| Thornwood | ~ 130 |
| Waltham Abbey | ~ 800 |

Development will be permitted within settlement boundaries, rural exception sites in accordance with Policy H 3, delivery of sites per Neighbourhood Plans, making best use of land, generally not permitting net loss of homes.

Provision of 18 pitches and 1 yard to accommodate the needs of Gypsies, Travellers and Travelling Showpeople as per site allocations and in accordance with Policy H 4.

Delivery of new jobs via retaining, enhancing and extending existing employment sites, and allocating new employment land.

The Council will: encourage and support town centre development and regeneration; promote and support the food production and glasshouse industry; and the tourism industry and visitor economy; attract new business, encourage start-ups and help growing businesses

| | <p>Development proposals will be required to demonstrate that they accord with all other policies of the plan.</p> | | | | | | | | | | | | | | | | |
|--|---|--|----------|-------------------------|--------|---------------------------------|--|--------|--------------|---------------------------|--------|-----------------|---------------------------|--------|----------------|---|---|
| <p>Draft Policy SP 3 Strategic Allocations around Harlow</p> | <p>Allocation of the following sites in support of Policy SP2:</p> <table border="1" data-bbox="724 321 1287 829"> <thead> <tr> <th>Site Reference</th> <th>Location</th> <th>Housing to be delivered</th> </tr> </thead> <tbody> <tr> <td>SP 3.1</td> <td>Latton Priory and Riddings Lane</td> <td>Approximately 1,050 homes (1,000 Latton Priory and 50 Riddings Lane)</td> </tr> <tr> <td>SP 3.2</td> <td>West Sumners</td> <td>Approximately 1,000 homes</td> </tr> <tr> <td>SP 3.3</td> <td>West Katherines</td> <td>Approximately 1,100 homes</td> </tr> <tr> <td>SP 3.4</td> <td>East of Harlow</td> <td>Approximately 750 homes and the potential relocation of Princess Alexandra Hospital</td> </tr> </tbody> </table> <p>Make provision for an appropriate level of employment, retail, and community uses in accordance with other policies within the Plan. Site are also required to provide infrastructure (including highways and open space and green infrastructure)</p> <p>Each site will be required to provide land for 0.5ha (up to 5 pitches), in order to accommodate the future needs of Gypsies, Travellers and Travelling Show people in the District, in accordance with the sequential approach set out within Draft Policy SP 2.</p> <p>Infrastructure requirements must be delivered at a rate and scale to meet the needs that arise from the proposed development.</p> | Site Reference | Location | Housing to be delivered | SP 3.1 | Latton Priory and Riddings Lane | Approximately 1,050 homes (1,000 Latton Priory and 50 Riddings Lane) | SP 3.2 | West Sumners | Approximately 1,000 homes | SP 3.3 | West Katherines | Approximately 1,100 homes | SP 3.4 | East of Harlow | Approximately 750 homes and the potential relocation of Princess Alexandra Hospital | <p>Potential HRA implications The closest of these sites is 4.3km from Epping Forest SAC (SP3.3), 6.3km from Wormley-Hoddesdonpark Woods SAC (SP3.3), and 3.km from Lee Valley SPA and Ramsar site (SP3.3). Full screening of the Site Allocations can be found in Table 6. Potential impact pathways present include:</p> <ul style="list-style-type: none"> • Recreational pressure • Atmospheric pollution • Water Abstraction • Water Quality. <p>Locations are illustrated on Figure A2.</p> |
| Site Reference | Location | Housing to be delivered | | | | | | | | | | | | | | | |
| SP 3.1 | Latton Priory and Riddings Lane | Approximately 1,050 homes (1,000 Latton Priory and 50 Riddings Lane) | | | | | | | | | | | | | | | |
| SP 3.2 | West Sumners | Approximately 1,000 homes | | | | | | | | | | | | | | | |
| SP 3.3 | West Katherines | Approximately 1,100 homes | | | | | | | | | | | | | | | |
| SP 3.4 | East of Harlow | Approximately 750 homes and the potential relocation of Princess Alexandra Hospital | | | | | | | | | | | | | | | |
| <p>Draft Policy SP 4 Place Shaping</p> | <p>This policy identifies place shaping principles that site allocations and Strategic Masterplans must adhere to. These relate to vision, leadership and community engagement, long term stewardship, mix and tenure of housing, design of housing including provision of gardens and accessible amenity space, ensure a robust</p> | <p>No HRA implications This is a development management policy. It does not identify any location, quantum or type of development. Provision within this policy are positive as it provides for green infrastructure which has potential to divert recreational pressure away from internationally</p> | | | | | | | | | | | | | | | |

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| | <p>range of employment opportunities for a variety of jobs within an easy commuting distance, generous, well connected and biodiversity rich green space provision; extend, enhance and reinforce strategic green infrastructure and public open space; ensure that development enhances the natural environment; provide for sustainable movement and access to local and strategic destinations (including rail, bus and pedestrians/cycling); and to positively respond to sustainable water management</p> | <p>designated sites, encourages sustainable transport which has potential to improve air quality, and to positively respond to sustainable water management which has potential to reduce water abstraction and improve water quality.</p> <p>There are no impact pathways present.</p> |
| Draft Policy SP 5 Green Belt and District Open Land | <p><u>Green Belt</u> Sets out the extent of the Green Belt and provides for the protection of the Green Belt.</p> <p><u>District Open Land</u> The same level of protection will be applied to District Open Land as is applied to Green Belt.</p> | <p>No HRA implications.</p> <p>This is a development management policy that provides for the protection of the green Belt and District Open Land.</p> <p>There are no impact pathways present.</p> |
| Draft Policy SP 6 The Natural Environment, Landscape Character and Green Infrastructure | <p>The Council will protect the natural environment, enhance its quality and extend access to it. The Council aims to create a comprehensive network of green corridors and places, appropriate to the specific rural or urban setting. In so doing, it seeks to connect and enrich biodiversity through habitat improvement and protection at all scales, and extend access to and maximise the recreation opportunities of, our countryside and urban open spaces.</p> <p>Provides text relating to The Natural Environment, Landscape Character and Green Infrastructure and the countryside, and towns and smaller settlements.</p> <p>Provides for the extension, maintenance and enhancement of green infrastructure within towns and smaller settlements. It also provides for the extension, maintenance and enhancement of Green Infrastructure.</p> <p>The Council will expect all development proposals, where appropriate, to contribute towards the delivery of new green infrastructure which develops and enhances a network of multi-functional green+ and blue assets* throughout the District. This will be proportionate to the scale of the proposed development and the rural or urban context. The Council will support development which contributes to the District's existing green infrastructure and where possible, enhances and protects networks. It will secure additional provision where deficiencies have been identified. Where on site</p> | <p>No HRA implications.</p> <p>This is a positive policy as it provides for the retention and extension of green infrastructure which has potential to divert recreational pressure away from internationally designated sites.</p> <p>There are no impact pathways present.</p> |

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| | provision is not feasible then the use of CIL/S106 agreements will be sought to contribute to green infrastructure. | |
| Draft Policy H 1 Housing Mix and Accommodation Types | Provides for housing mix and type of accommodation to be provided. | No HRA implications. This is a development management policy relating to the mix and type of housing to be provided. This policy does not identify any location or quantum of development. There are no impact pathways present. |
| Draft Policy H 2 Affordable Housing | Provides for affordable housing at sites of more than 11 homes. | No HRA implications. This is a development management policy relating to the provision of affordable housing. This policy does not identify any location or quantum of development. There are no impact pathways present. |
| Draft Policy H 3 Rural Exceptions | This provides for small scale affordable housing in smaller settlements as an exception to the normal policy of restraint under specific criteria. It includes reference to the need for no significant grounds for objection on highways, infrastructure or other planning grounds. | No HRA implications. It is noted that this policy provides for new housing beyond that previously identified, however this is small scale housing in exceptional circumstances. This policy does not provide for any location or quantum (other than small scale) for development. As such there are no impact pathways present. |
| Draft Policy H 4 Traveller Site Development | Provides for plots and/ or pitches as part of allocations set out in SP 2, SP 3 and Chapter 5. Where planning proposals for the development of Travellers sites are received other than those allocated, 'they will only be permitted where: i) There is no adverse impact upon local amenity and the natural and historic environment;' | Potential HRA implications. Whilst this policy relates to provision of new Traveller sites, it does not itself identify any quantum or location. In addition, it ensures that no adverse impact upon the natural environment will occur. As such there are no HRA implications. |
| Draft Policy E 1 Employment Sites | <u>Existing Employment sites</u> Seeks the retention, enhancement and expansion of employment sites/ premises. <u>New Employment sites</u> The Council will allocate new sites for employment uses to meet any remaining future floorspace requirements of the District in accordance with Policy SP 2. In accordance with policy SP 3, Strategic Allocations (SP 3.1 – SP 3.4) will be required to make provision for an appropriate level of employment floorspace. In addition, the Council will allocate new employment land at other locations across the District to provide a flexible supply of future sites to cater for needs. The Council will support and encourage the development of flexible local employment space to meet the employment and | Potential HRA implications The closest of the strategic allocations mentioned in policies SPA3.1 – SP3.4 is 4.3km from Epping Forest SAC (SP3.3), 6.3km from Wormley-Hoddesdonpark Woods SAC (SP3.3), and 3.km from Lee Valley SPA and Ramsar site (SP3.3). Full screening of the Site Allocations can be found in Table 6.Potential impact pathways present include: <ul style="list-style-type: none"> • Atmospheric pollution • Water Abstraction • Water Quality. Locations are illustrated on Figure A2. |

| | economic needs of the District. | |
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| Draft Policy E 2 Centre Hierarchy/Retail Policy | <p>Town Centre:</p> <ul style="list-style-type: none"> • Epping • Loughton High Road <p>Small District Centre:</p> <ul style="list-style-type: none"> • Waltham Abbey • Loughton Broadway • Chipping Ongar • Buckhurst Hill <p>Provides for retail, leisure, entertainment, offices, art and culture, tourism development in Centres where they maintain and enhance the vitality and viability of the Centre.</p> <p>Provides policy relating to Primary and Secondary Retail Frontage.</p> <p>Provides policy for Out of Centre uses.</p> | <p>No HRA implications.</p> <p>This is a development management policy relating to Centre Hierarchy and Retail.</p> <p>This policy does not identify any type or location of development.</p> <p>There are no impact pathways present.</p> |
| Draft Policy E 3 Food Production and Glasshouses | <p>Provides for new or replacement glasshouses and associated packhouse development under certain criteria.</p> <p>This policy provides for the requirement for adequate water resources are available or can be provided onsite, such as above ground reservoirs and water harvesting.</p> | <p>No HRA implications.</p> <p>This is a development management policy relating to food production and glasshouses. This policy does not identify and location or quantum of development. It does provide the requirement for adequate water resources. It should be noted that food production uses lots of water. At this stage it is not possible to assess the impacts of any new food production and glasshouse development. Any increase in water abstraction for commercial reasons would be required to gain an abstraction license from the Environment Agency for the specific development.</p> <p>There are no impact pathways present.</p> |
| Draft Policy E 4 The Visitor Economy | <p>Provides for sustainable development for the visitor economy.</p> <p>Provides support for the development of high quality visitor accommodation in terms of new hotels in settlements, accommodation linked to outdoor sport and activity hubs in the Lee Valley Regional Park, and rural accommodation of an appropriate scale and type.</p> <p>Supports retention and improvement, and upgrading existing visitor attractions.</p> <p>Encourages sustainable tourism in rural areas and</p> | <p>Potential HRA implications.</p> <p>This policy has potential to increase visitor numbers to internationally designated sites and to lead to impact pathways such as increased water abstraction and atmospheric pollution, and reduction in water quality. However, by definition sustainable development, sustainable tourism and sustainable transport would not result in likely significant effects upon internationally designated sites. Further, this policy does not identify any location, type or scale of development.</p> <p>There are no impact pathways present.</p> |

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| | <p>supports improvements to sustainable transport.</p> <p>Supports the year round visitor economy.</p> | |
| Draft Policy T 1: Sustainable Transport Choices | <p>The Council will work in partnership to promote a safe, efficient and convenient transport system.</p> <p>This includes improvements to strategic road and rail connections, promotion of transport choice by improving public transport and providing a coherent and direct cycling and walking network to provide a genuine alternative to the car and facilitate a modal shift.</p> <p>Development should seek to minimise the need to travel, promote opportunities for sustainable transport modes, improve accessibility to services and support the transition to a low carbon future.</p> <p>Development proposals that generate significant amounts of movement, as identified in the Council's Planning Application Validation Requirements Checklist, must be supported by a Transport Statement or Transport Assessment and will normally be required to provide a Travel Plan.</p> <p>Provide electrical car charging points.</p> | <p>Potential HRA implications</p> <p>By definition sustainable transport would not result in likely significant effects upon internationally designated sites. Further, this policy does not identify any location, type or scale of development. This policy does not identify any scale or location of any transport schemes. It contains positive text to encourage modal shift away towards cycling, walking and use of public transport and electric cars which all have potential to reduce atmospheric pollution.</p> <p>There are no impact pathways present.</p> |
| Draft Policy T 2: Safeguarding of Routes and Facilities | <p>Provides for the protection of safeguarded land for schemes such as transport schemes and supporting facilities such as petrol stations.</p> | <p>No HRA implications.</p> <p>This is a development management policy relating to safeguarding land for future schemes.</p> <p>There are no impact pathways present.</p> |
| Draft Policy DM 1 Habitat Protection and Improving Biodiversity | <p>This policy provides for a development to seek to deliver net biodiversity gain, integrate biodiversity through their design and layout, including, where appropriate, through the provision of connections between networks. It provides for the protection of Protected Species, Priority Species and Priority Habitats, and where development is to adversely impact an ecological feature, alternatives must have been considered and mitigation, compensation and offsetting will be required.</p> <p>'Development proposals must protect and enhance natural habitats and areas of biodiversity, and should not negatively impact upon areas of international or national designation.'</p> | <p>No HRA implications.</p> <p>This is a development management policy relating to the protection of habitats and improving biodiversity. It includes text that explicitly identifies the needs to 'not negatively impact upon areas of international or national designation.'</p> <p>There are no impact pathways present.</p> |
| Draft Policy DM 2 Landscape Character and Ancient Landscapes | <p>Provides for the protection of landscape character and ancient landscapes.</p> | <p>No HRA implications.</p> <p>This is a development management policy relating to</p> |

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| | | landscape character and ancient landscapes. There are no impact pathways present. |
| Draft Policy DM 3 Epping Forest SAC and the Lee Valley SPA | <p>The pre-able to this policy includes reference to the need for projects or plans to undertake HRA as required.</p> <p>'A. The Council will expect all relevant development proposals to assist in the conservation and enhancement of the biodiversity, character, appearance and landscape setting of the Epping Forest Special Area of Conservation (SAC) and the Lee Valley Special Protection Area (SPA).</p> <p>B. Where appropriate the Council will expect development to enhance the green links between the two internationally important sites of the Epping Forest SAC and the Lee Valley SPA and to ensure easy and sustainable access opportunities to new and existing green spaces across the District. Links between the District's other green spaces, the Epping Forest and the Lee Valley will be strengthened and enhanced, where possible, to provide safe green corridors for people and wildlife.'</p> | <p>Potential HRA implications</p> <p>In general this is a positive policy as it expects all relevant development to assist in the conservation and enhancement of the biodiversity of Epping Forest SAC and Lee Valley SPA.</p> <p>The second part of this policy provides for enhanced green links between the SAC and SPA and other green spaces within the District and to provide easy access opportunities providing a green corridor for wildlife and people. The preamble to this policy states that improving links to these designated sites via other green spaces/ links, will act to divert recreational pressure away from the sensitive designated sites and spreading the impacts of recreational pressure over a larger area. This is definitely possible but care should be taken to ensure that these increased links do not <u>increase</u> recreational pressure upon the designated sites.</p> |
| Draft Policy DM 4 Suitable Accessible Natural Green Space and Corridors | <p>'A. To mitigate against potential or identified adverse impacts of additional development on the Epping Forest SAC the Council will ensure the provision of Suitable Accessible Natural Green Spaces and Corridors (SANGSC) in relation to additional development. Providing appropriate SANGSC will involve:</p> <ul style="list-style-type: none"> i) providing new green spaces; ii) improving access to green spaces; iii) improving the naturalness of green spaces; iv) improving connectivity between green spaces.' | <p>No HRA implications</p> <p>This is a positive policy as it explicitly provides for the Council to deliver Suitable Accessible Natural Green Spaces and Corridors (SANGSC). This space seeks to divert any new recreational activity away from internationally designated sites.</p> <p>There are no impact pathways present.</p> |
| Draft Policy DM 5 Green Infrastructure Design of Development | <p>Provides for retention and where possible, enhancement of existing green infrastructure, including trees, hedgerows, woods and meadows, green lanes, ponds and watercourses, incorporate green assets or space and enhance connectivity and integration by cycleways, foot paths and bridleways.</p> <p>Development proposals should be supported by sufficient evidence relating to tree preservation.</p> <p>The requirement for Strategic Allocations to include proposed green infrastructure/ links to the wider</p> | <p>No HRA implications</p> <p>This is a positive policy as it provides for green infrastructure for recreational use which can potential divert recreational pressure away from the designated sites.</p> <p>There are no impact pathways present.</p> |

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| | landscape in a Strategic Masterplan. | |
| Draft Policy DM 6 Designated and Undesignated Open Spaces | <p>'A. Where appropriate development proposals will be expected to provide open space, or links to open space in accordance with the standards (currently being developed).</p> <p>B. Development on open spaces (including those allocated in this plan) will only be permitted if it does not result in the total loss of open space.</p> <p>C. In circumstances where partial loss of the space is considered justified, the predominantly open nature of the remainder of the site should be maintained and enhanced together with the visual amenity and its function as appropriate for active play and recreation.'</p> | <p>Potential HRA implications.</p> <p>This is a positive policy as it provides for open spaces that can detract recreational pressure away from internationally designated sites and ensures that there is no net loss of open space.</p> |
| Draft Policy DM 7 Heritage Assets | <p>A development management policy relating to heritage assets including Registered Parks and Gardens.</p> <p>'Registered Parks and Gardens: Any proposed development within or conspicuous from a Registered Park or Garden will be permitted provided that it does not harm the significance of the asset, unless it can be fully justified and demonstrated that the harm is necessary to achieve substantial public benefits.'</p> | <p>Potential HRA implications.</p> <p>A development management policy relating to heritage assets including Registered Parks and Gardens. These spaces can act to divert recreational pressure away from internationally designated sites.</p> |
| Draft Policy DM 8 Heritage at Risk | <p>A development management policy relating to Heritage at Risk.</p> | <p>No HRA implications</p> <p>A development management policy relating to Heritage at Risk.</p> <p>There are no impact pathways present.</p> |
| Draft Policy DM 9: High Quality Design | <p>A development management policy relating to high quality design. It includes text that new development incorporates sustainable design and construction principles to enable a minimal environmental impact.</p> | <p>No HRA implications.</p> <p>This is a development management policy relating to design. It is a positive policy as it includes text relating to sustainable design, which by definition would not have an impact upon designated sites.</p> <p>There are no impact pathways present.</p> |
| Draft Policy DM 10 Housing Design and Quality | <p>A development management policy relating to housing design and quality. It includes the provision of garden/ amenity space, enhanced provision of green infrastructure and where a site allows additional open space. It also provides for minimum space standards for new residential development (including extensions).</p> | <p>No HRA implications.</p> <p>This is a positive policy as it encourages the inclusion of amenity/ garden space, green infrastructure and open space. These have potential to divert recreational pressure away from internationally designated sites.</p> <p>There are no impact pathways present.</p> |
| Draft Policy DM 11 Waste Recycling Facilities on New Development | <p>This is a development management policy relating to waste recycling storage facilities on new development sites.</p> | <p>No HRA implications.</p> <p>This is a development management policy relating to waste recycling storage facilities on new development sites. This is a positive policy as it is likely to reduce any occurrences of fly tipping within an internationally designated site as a result of new development.</p> <p>There are no impact pathways present.</p> |

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| Draft policy DM 12 Subterranean, Basement Development and Lightwells | This is a development management policy relating to subterranean, basement development and lightwells. | Potential HRA implications. This is a development management policy relating to subterranean, basement development and lightwells. This policy ensures that new development should have regard to local geological conditions, thus ensuring that new development will not impact upon subterranean hydrological systems. There are no impact pathways present. |
| Draft policy DM 13 Advertisements | This is a development management policy relating to advertisements. | No HRA implications. This is a development management policy relating to advertisements. There are no impact pathways present. |
| Draft policy DM 14 Shopfronts and on Street Dining | This is a development management policy relating to shopfronts and on street dining. . | No HRA implications. This is a development management policy relating to shopfronts and on street dining. . There are no impact pathways present. |
| Draft Policy DM 15 Managing and reducing flood risk | <p>A development management policy relating to management and reduction of flood risk.</p> <p>Policy text preserves overland flood and flow routes and ensures there is no net loss of flood storage; and provide adequate flood storage and compensation on site, or if this is not possible, provided off site.</p> <p>All proposals for new development will be required to:</p> <ul style="list-style-type: none"> i) manage and reduce surface water run-off, in line with Policy DM 16 (Sustainable Drainage Systems); ii) manage water and waste water discharges, in line with Policy DM 18 (On-site Management of Waste Water and Water Supply); | No HRA implications This is a positive development management policy relating to management and reduction of flood risk. It provides for the requirement for new development to manage and reduce surface run-off and waste water discharges. There are no impact pathways present. |
| Draft Policy DM 16 Sustainable Drainage Systems | <p>A development management policy relating to sustainable drainage systems.</p> <p>New development must seek to manage surface water as close to its source as possible in line with the drainage hierarchy.</p> <p>The Council will encourage the use of green, brown and blue roofs.</p> <p>Sustainable Drainage Systems (SuDS) are to be sensitively incorporated into new development: this includes measures resulting in net improvements in water quality discharge to a sewer and improving water quality.</p> | No HRA implications. By definition, sustainable drainage systems would not result in likely significant effects upon internationally designated sites. This is a positive policy as it aims to improve water quality and reduce runoff. There are no impact pathways present. |

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| <p>Draft Policy DM 17 Protecting and Enhancing Watercourses and Flood Defenses</p> | <p>A development management policy relating to the protection and enhancement of watercourses and flood defenses.</p> <p>It provides for an undeveloped buffer zone along main rivers and ordinary watercourses.</p> <p>Provides for the restore culverted watercourses were appropriate and secure environmental enhancement to un-culverted river sections.</p> <p>The Council will resist proposals that would adversely affect the natural functioning of main rivers and ordinary watercourses, including through culverting.</p> <p>Development on or adjacent to a watercourse must not result in the deterioration of the quality of that watercourse and must not impact on the stability of the banks of a watercourse or river.</p> | <p>No HRA implications.</p> <p>This is a positive policy that ensures that development does not lead to deterioration to the quality or stability of a watercourse.</p> <p>There are no impact pathways present.</p> |
| <p>Draft Policy DM 18 On Site Management of Waste Water and Water Supply</p> | <p>The Council will expect applications to set out how they will ensure that there is adequate surface water, foul drainage and treatment capacity to serve their development and demonstrate that it does not impact on the adequacy of existing development in this regard.</p> <p>Where the local public sewer network does not have adequate capacity to serve the existing and proposed development proposals will be required to demonstrate that it provides for suitable alternative arrangements for storing, treating and discharging foul water.</p> <p>Proposals will be required to:</p> <ul style="list-style-type: none"> i) ensure that there is adequate water supply infrastructure capacity both on and off site to serve the development with wholesome water of sufficient quantity, flow rate and pressure, without adversely impacting on existing users; and ii) make provision for the installation and management of measures for the efficient use of mains water and where possible with direct connection to the mains public water supply Refer also Policy DM 19. | <p>No HRA implications.</p> <p>This is a positive development management policy as it ensures that the public sewerage network has sufficient capacity to serve existing and new development, thus preventing a reduction in water quality.</p> <p>There are no impact pathways present.</p> |
| <p>Draft Policy DM 19 Sustainable Water Use</p> | <p>Requires the use of water saving measures and equipment is incorporated in all new development and need to meet water efficiency standards and improve consumption rates.</p> | <p>No HRA implications.</p> <p>This is a positive development management policy that provides for enhanced water use efficiency, thus reducing the need for water abstraction.</p> <p>There are no impact pathways present.</p> |

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| Draft Policy DM 20 Low Carbon and Renewable Energy | <p>Encourages the incorporation of low carbon and renewable energy measures in new and existing development.</p> <p>Low carbon and renewable energy technologies will be permitted provided that they do not have any adverse impact on the integrity of any European sites.</p> | <p>No HRA implications.</p> <p>This is a development management policy relating to low carbon and renewable energy. No type, location or extent of development is identified. In addition, this policy provides explicit protection for European sites. There are no impact pathways present.</p> |
| Draft Policy DM 21 Local Environmental Impacts, Pollution and Land Contamination | <p>This policy provides for no detrimental impacts on the health, safety wellbeing and the amenity of existing and new users or occupiers of the development site, or the surrounding land. These potential impacts can include, but are not limited to, air and water (surface and groundwater) pollution, dust, noise, vibration, light pollution, odours, and fumes as well as land contamination.</p> <p>The Council will: resist development that leads to unacceptable local environmental impacts, including, but not limited to air pollution; and require development proposals to mitigate and reduce to a minimum any adverse local environmental impacts and activities that may have wider cumulative effects.</p> <p>This policy provides for policy relating to land contamination, and construction and demolition and also provides for the use of sustainable design and construction techniques, including where appropriate the local or on-site sourcing of building materials enabling reuse and recycling on site.</p> | <p>No HRA implications.</p> <p>This is a positive development management policy relating to environmental impact, pollution and land contamination. It is a positive policy as it provides for preventing detrimental impacts as a result of environmental conditions resulting from new development such as air quality, and provides for the reuse and recycling of building materials and the use of local products, thus reducing atmospheric pollutants further, and the use of water resources during the manufacturing process.</p> <p>There are no impact pathways present.</p> |
| Draft Policy P 1 Epping | <p>In accordance with Draft Policy SP 2 the following sites are allocated for residential development:</p> <ul style="list-style-type: none"> i. SR-0069 – approximately 79 dwellings ii. SR-0069/33 - approximately 255 dwellings iii. SR-0071 – approximately 115 dwellings iv. SR-0113B – approximately 244 dwellings v. SR-0132Ci – approximately 49 dwellings vi. SR-0153 – approximately 305 dwellings vii. SR-0208 – approximately 66 dwellings viii. SR-0229 – approximately 89 dwellings ix. SR-0333Bi – approximately 24 dwellings x. SR-0347 – approximately 44 dwellings xi. SR-0348 - approximately 54 homes; xii SR-0349 - approximately 41 homes xiii. SR-0445 – approximately 23 dwellings xiv. SR-0555 – approximately 181 dwellings xv. SR-0556 – approximately 42 dwellings | <p>Potential HRA implications.</p> <p>Sites identified in this policy have potential to result in in-combination impacts relating to recreational pressure upon Epping Forest SAC and impacts alone resulting from urbanisation, depending on their location. See Table 6 for detail of individual sites.</p> |

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| | <p>xvi. SR-0587 – approximately 22 dwellings</p> <p>Infrastructure requirements must be delivered at a rate and scale to meet the needs that arise from the proposed development, in accordance with the Infrastructure Delivery Plan.</p> <p>Details town centre uses.</p> | |
| Draft Policy P 2 Loughton | <p>In accordance with Draft Policy SP 2 the following sites are allocated for residential development:</p> <ul style="list-style-type: none"> i. SR-0226 – approximately 114 dwellings ii. SR-0227 – approximately 193 dwellings iii. SR-0289 – approximately 10 dwellings iv. SR-0356 – approximately 304 dwellings v. SR-0358 – approximately 53 dwellings vi. SR-0361 – approximately 195 dwellings vii. SR-0526 – approximately 30 dwellings viii. SR-0527 – approximately 14 dwellings ix. SR-0548 – approximately 35 dwellings x. SR-0565 – approximately 44 dwellings xi. SR-0834 – approximately 30 dwellings xii. SR-0835 – approximately 158 dwellings xiii. SR-0878 – approximately 12 dwellings <p>Infrastructure requirements must be delivered at a rate and scale to meet the needs that arise from the proposed development, in accordance with the Infrastructure Delivery Plan.</p> <p>Details town centre uses and small district centre uses.</p> | <p>Potential HRA implications.</p> <p>Sites identified in this policy have potential to result in alone and in-combination impacts relating to recreational pressure upon Epping Forest SAC and impacts alone resulting from urbanisation, depending on location. See Table 6 for detail of individual sites.</p> |
| Draft Policy P 3 Waltham Abbey | <p>In accordance with Draft Policy SP 2 the following sites are allocated for residential development:</p> <ul style="list-style-type: none"> i. SR-0099 – approximately 463 dwellings (includes GRT-N-07) ii. SR-0104 – approximately 132 dwellings iii. SR-0219 – approximately 44 dwellings iv SR-0381 - approximately 17 swellings iii. SR-0385 – approximately 60 dwellings iv. SR-0541 – approximately 53 dwellings v. SR-0903 – approximately 27 dwellings <p>In accordance with Draft Policy SP 3 the following sites are allocated for traveler accommodation:</p> <ul style="list-style-type: none"> i) GRT-N-07 (Lea Valley Nursery, Crooked Mile) – 5 pitches. | <p>Potential HRA implications.</p> <p>Sites identified in this policy have potential to result in alone and in-combination impacts relating to recreational pressure upon Epping Forest SAC. See Table 6 for detail of individual sites.</p> |

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| | <p>Infrastructure requirements must be delivered at a rate and scale to meet the needs that arise from the proposed development, in accordance with the Infrastructure Delivery Plan</p> <p>Details small district centre uses.</p> | |
| Draft Policy P 4 Chipping Ongar | <p>In accordance with Draft Policy SP 2 the following sites are allocated for residential development:</p> <ul style="list-style-type: none"> i. SR-0067i – approximately 73 dwellings ii. SR-0102 – approximately 16 dwellings iii. SR-0120 – approximately 135 dwellings iv. SR-0184 – approximately 30 dwellings v. SR-0185 – approximately 124 dwellings vi. SR-0186 – approximately 12 dwellings vii. SR-0390 – approximately 175 dwellings viii. SR-0842 – approximately 10 dwellings ix. SR-0848 – approximately 24 dwellings <p>Infrastructure requirements must be delivered at a rate and scale to meet the needs that arise from the proposed development, in accordance with the Infrastructure Delivery Plan.</p> <p>Details small district centre uses.</p> | <p>No HRA implications.</p> <p>Due to the distance of these residential site allocations from internationally designated sites, there are no impact pathways present.</p> |
| Draft Policy P 5 Buckhurst Hill | <p>In accordance with Draft Policy SP 2 the following sites are allocated for residential development:</p> <ul style="list-style-type: none"> i. SR-0176 – approximately 30 dwellings ii. SR-0225 – approximately 44 dwellings iii. SR-0813 – approximately 11 dwellings <p>Infrastructure requirements must be delivered at a rate and scale to meet the needs that arise from the proposed development, in accordance with the Infrastructure Delivery Plan.</p> <p>Details small district centre uses.</p> | <p>Potential HRA implications.</p> <p>Sites identified in this policy have potential to result in in-combination impacts relating to recreational pressure upon Epping Forest SAC and impacts alone resulting from urbanisation, depending on location. See Table 6 for detail of individual sites.</p> |
| Draft Policy P 6 North Weald Bassett | <p>In accordance with Draft Policy SP 2 the following sites are allocated for residential development:</p> <ul style="list-style-type: none"> i. SR-0003 – approximately 276 dwellings ii. SR-0036 – approximately 288 dwellings (includes GRT-N-06) iii. SR-0072 – approximately 21 dwellings iv. SR-0119 – approximately 225 dwellings v. SR-0158A – approximately 590 dwellings vi. SR-0195B – approximately 91 dwellings | <p>No HRA implications.</p> <p>Due to the distance of these residential site allocations from internationally designated sites, there are no impact pathways present.</p> |

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| | <p>vii. SR-0417 – approximately 49 dwellings viii. SR-0455 – approximately 27 dwellings ix. SR-0512 – approximately 11 dwellings</p> <p>In accordance with Draft Policy SP 3 the following site is allocated for traveler accommodation: i) GRT-N-06* (land at Blumans Farm, west of Tylers Green) – 5 pitches</p> <p>Infrastructure requirements must be delivered at a rate and scale to meet the needs that arise from the proposed development, in accordance with the Infrastructure Delivery Plan.</p> | |
| <p>Draft Policy P 6 Chigwell</p> | <p>In accordance with Draft Policy SP 2 the following sites are allocated for residential development: i. SR-0433 – approximately 29 dwellings ii. SR-0478B – approximately 66 dwellings iii. SR-0557 – approximately 210 dwellings iv. SR-0588 – approximately 52 dwellings v. SR-0601 – approximately 30 dwellings vi. SR-0894 – approximately 12 dwellings vii. SR-0895 – approximately 6 dwellings viii. SR-0896 – approximately 10 dwellings ix. SR-0898 – approximately 9 dwellings</p> <p>Infrastructure requirements must be delivered at a rate and scale to meet the needs that arise from the proposed development, in accordance with the Infrastructure Delivery Plan.</p> | <p>Potential HRA implications. Sites identified in this policy have potential to result in alone and in-combination impacts relating to recreational pressure upon Epping Forest SAC. See Table 6 for detail of individual sites.</p> |
| <p>Draft Policy P 8 Theydon Bois</p> | <p>In accordance with Draft Policy SP 2 the following sites are allocated for residential development: i. SR-0026B – approximately 133 dwellings ii. SR-0026C – approximately 121 dwellings iii. SR-0070 – approximately 52 dwellings iv. SR-0228i – approximately 29 dwellings v. SR-0228ii – approximately 19 dwellings</p> <p>In accordance with Draft Policy SP 3 the following site is allocated for traveler accommodation: i) GRT-I-08 (Sons Nursery, Hamlet Hill) – 1 pitch</p> <p>Infrastructure requirements must be delivered at a rate and scale to meet the needs that arise from the proposed development, in accordance with the Infrastructure Delivery Plan.</p> | <p>Potential HRA implications. Sites identified in this policy have potential to result in in-combination impacts relating to recreational pressure upon Epping Forest SAC. See Table 6 for detail of individual sites.</p> |

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| Draft Policy P 9 Roydon | <p>In accordance with Draft Policy SP 2 the following sites are allocated for residential development:</p> <ul style="list-style-type: none"> i. SR-0035 – approximately 6 dwellings ii. SR-0169 – approximately 8 dwellings iii. SR-0197 – approximately 10 dwellings iv. SR-0890 – approximately 15 dwellings <p>In accordance with Draft Policy SP 3 the following site is allocated for traveler accommodation:</p> <ul style="list-style-type: none"> i) GRT-I-08 (Sons Nursery, Hamlet Hill) – 1 pitch <p>Infrastructure requirements must be delivered at a rate and scale to meet the needs that arise from the proposed development, in accordance with the Infrastructure Delivery Plan.</p> | <p>Potential HRA implications. In-combination recreational pressure impact pathway for Wormley-Hoddesdonwood Park SAC requires consideration</p> |
| Draft Policy P 10 Nazeing | <p>In accordance with Draft Policy SP 2 the following sites are allocated for residential development:</p> <ul style="list-style-type: none"> i. SR-0011 – approximately 64 dwellings ii. SR-0150 – approximately 33 dwellings iii. SR-0300 – approximately 88 dwellings iv. SR-0473 – approximately 33 dwellings <p>In accordance with Draft Policy SP 3 the following site is allocated for traveler accommodation:</p> <ul style="list-style-type: none"> i) GRT-E-07 (Stoneshot View) – 5 pitches <p>Infrastructure requirements must be delivered at a rate and scale to meet the needs that arise from the proposed development, in accordance with the Infrastructure Delivery Plan.</p> | <p>Potential HRA implications. In-combination recreational pressure impact pathway for Wormley-Hoddesdonwood Park SAC requires consideration</p> |
| Draft Policy P 11 Thornwood | <p>In accordance with Draft Policy SP 2 SR-0149 is allocated for residential development for approximately 124 dwellings.</p> <p>Infrastructure requirements must be delivered at a rate and scale to meet the needs that arise from the proposed development, in accordance with the Infrastructure Delivery Plan.</p> | <p>No HRA implications. Due to the distance of this residential site allocation from internationally designated sites, there are no impact pathways present.</p> |
| Draft Policy P 12 Coopersale, Fyfield, High Ongar, Lower Sheering, Moreton, Sewardstonebury, Sheering and Stapleford Abbotts | <p>In accordance with Draft Policy SP 2 the following sites are allocated for residential development:</p> <ul style="list-style-type: none"> i. Coopersale - SR-0404 for approximately 27 dwellings and SR-0405 for approximately 19 dwellings. ii. Fyfield – SR-0049 for approximately 85 dwellings. iii. High Ongar – SR-0181 for approximately 10 dwellings. | <p>No HRA implications. Due to the distance of these residential site allocations from internationally designated sites, there are no impact pathways present.</p> |

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| | <p>iv. Lower Sheering – SR-0032 for approximately 26 dwellings.</p> <p>v. Sheering - SR-0033 for approximately 16 dwellings, SR-0073 for approximately 89 dwellings and SR-0311 for approximately 12 dwellings.</p> <p>vi. Stapleford Abbots – SR-0873 for approximately 10 dwellings.</p> <p>In accordance with Draft Policy SP 3 the following site is allocated for travelling showpeople accommodation:</p> <p>i. GRT-I-09 (Lakeview, Moreton) – 1 yard</p> <p>Infrastructure requirements must be delivered at a rate and scale to meet the needs that arise from the proposed development, in accordance with the Infrastructure Delivery Plan.</p> | |
| Draft Policy D 1 Delivery of Infrastructure | <p>New development must be served and supported by appropriate on- and offsite infrastructure and services as identified through the Infrastructure Delivery Plan. Planning permission will only be granted for developments where the infrastructure and services required to meet the needs of the new development and/or mitigate the impact of the new development is either already in place or will be provided to an agreed timescale.</p> <p>This policy provides for securing the maintenance of infrastructure and services as a result of a development through planning obligations.</p> <p>Provides for the demonstration of appropriate provision and phasing of infrastructure.</p> | <p>No HRA implications.</p> <p>This is a development management policy relating to the delivery of infrastructure. This is a positive policy as it includes for appropriate phasing of infrastructure and services.</p> <p>There are no impact pathways present.</p> |
| Draft Policy D 2 Essential Facilities and Services | <p>Development proposals will only be permitted where they provide or improve essential facilities and services required to serve the scale of development proposed. Loss will only be permitted under certain circumstances.</p> <p>Proposals for new facilities will be supported where they will meet an identified local need. The Council will work positively with local communities and support proposals to retain, improve or re-use essential facilities and services.</p> | <p>No HRA implications.</p> <p>This is a development management policy relating to essential facilities and services.</p> <p>There are no impact pathways present.</p> |
| Draft Policy D 3 Utilities | <p>Development will only be granted for proposals where there is sufficient capacity within the utilities</p> | <p>No HRA implications.</p> <p>This is a positive development management policy</p> |

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| | <p>infrastructure to meet the needs of the development. Developers should consult with utilities providers to ensure this is the case, and may be required to undertake assessments to demonstrate sufficient capacity.</p> <p>Where there is a capacity problem and no improvements are programmed by the utility provider, the Council will require the developer to fund appropriate improvements which must be completed prior to occupation of the development.</p> <p>Large developments may need to be phased to ensure there is sufficient capacity, and that any required upgrades can take place prior to occupation.</p> | <p>relating to provision of utilities. It ensures that any required upgrades are in place prior to occupation. There are no impact pathways present.</p> |
| <p>Policy D 4 Community, Leisure and Cultural Facilities</p> | <p>Provides for the retention and improvement of existing facilities and contributions for new and improved facilities, either through on site provision (larger sites), or financial contributions (small sites), along with financial contributions for on-going maintenance. Phasing of provision will be required in line with development.</p> <p>Loss of community facilities will only be permitted if the facility is no longer needed, practical, desirable or viable, any proposed replacement will be equivalent or better with no overall reduction of facilities. The proposal will clearly provide sufficient community benefit to outweigh the loss of the existing facility, meeting evidence of a local need.</p> <p>Other than proposals which involve the comprehensive relocation of facilities, any development proposals that would result in the loss of community, leisure and cultural facilities must be accompanied by an assessment which demonstrates that the facility or land is surplus to requirements.</p> | <p>No HRA implications. This is a development management policy relating to community, leisure and cultural facilities. Loss of leisure facilities has potential to lead to an increase in recreational pressure upon a designated site, as such provides policy to prevent this loss, except in some circumstances as outlined. There are no impact pathways present.</p> |
| <p>Draft Policy D 5 Communications Infrastructure</p> | <p>The Council will promote enhanced connectivity of the District through supporting infrastructure for high speed broadband and telecommunications.</p> <p>Provides development management policy relating to provision of telecommunications development.</p> | <p>No HRA implications. This is a development management policy relating to communications infrastructure. It does not identify any location, or type of development. This is a positive policy: the provision of high speed internet and telecommunications has potential to reduce the need to travel, thus reducing atmospheric pollution. There are no impact pathways present.</p> |

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| Draft Policy D 6 Neighbourhood Planning | Shows the Council's support for Neighbourhood planning and outlines requirements for Neighbourhood Plans, including sustainable development. | No HRA implications. This is a development management policy relating to Neighbourhood Planning. There are no impact pathways present. |
| Draft Policy D 7 Monitoring | Provides for monitoring of the implementation of Local Plan policies and infrastructure provision and report the results on an annual basis. | No HRA implications. This is a development management policy providing for annual monitoring of implementation of Plan policies and infrastructure. There are no impact pathways present. |

Table 6: Initial sift of Strategic Site Allocations (including Traveller Site Allocations) Where the 'HRA Implications' column is highlighted in green, this site allocation has been screened out alone and is not considered further. Where the 'HRA Implications' column is highlighted in orange, this site allocation contains potential impact pathways that could be linked to an internationally designated site and require further consideration later in this document. The reasons for screening out recreational pressure from sites located more than 5km from Epping Forest SAC are discussed in Chapter 6, below.

| Site ID on Figure A2 (Appendix A) | Site Ref | Number of dwellings (taken from original assessment – some sites have changed in size) | Settlement | Parish | Distance from Internationally Designated Sites | Pathways of Impact Requiring Investigation |
|-------------------------------------|-----------|--|----------------|--------------|---|--|
| Residential Site Allocations | | | | | | |
| 1 | SR-0026 B | 133 | Theydon Bois | Theydon Bois | 0.8km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 2 | SR-0011 | 64 | Lower Nazeing | Nazeing | More than 6km from Epping Forest SAC; 4.3km from Wormley-Hoddesdonpark Woods SAC; 2.8km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination recreational pressure impact pathway for Wormley-Hoddesdonpark Woods SAC and the Lee Valley SPA and Ramsar site. |
| 3 | SR-0032 | 26 | Lower Sheering | Sheering | More than 14km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | No HRA implications. Due to the distances involved, there are no impact pathways present. |
| 4 | SR-0033 | 16 | Sheering | Sheering | More than 14km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | No HRA implications. Due to the distances involved, there are no impact pathways present. |
| 5 | SR-0035 | 6 | Roydon | Roydon | More than 10km from Epping Forest SAC; 5.2km from Wormley-Hoddesdonpark Woods SAC; 1.5km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination recreational pressure impact pathway for Wormley-Hoddesdonpark Woods SAC and the Lee Valley SPA and Ramsar site. |

| Site ID on Figure A2 (Appendix A) | Site Ref | Number of dwellings (taken from original assessment – some sites have changed in size) | Settlement | Parish | Distance from Internationally Designated Sites | Pathways of Impact Requiring Investigation |
|-----------------------------------|-----------|--|---------------------|---------------------|---|---|
| 6 | SR-0067i | 73 | Chipping Ongar | Ongar | More than 10km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | No HRA implications. Due to the distances involved, there are no impact pathways present. |
| 7 | SR-0071 | 115 | Epping | Epping | 1.6km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 7km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 8 | SR-0072 | 21 | North Weald Bassett | North Weald Bassett | More than 6km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | No HRA implications. Due to the distances involved, there are no impact pathways present. |
| 9 | SR-0073 | 89 | Sheering | Sheering | More than 13km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | No HRA implications. Due to the distances involved, there are no impact pathways present. |
| 10 | SR-0099 | 463 | Waltham Abbey | Waltham Abbey | 2.7km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; within 1.1km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC, and the Lee Valley SPA and Ramsar site. However, due to the large size of this site, it may have potential to provide SANGC. |
| 11 | SR-0102 | 16 | Chipping Ongar | Ongar | More than 10km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | No HRA implications. Due to the distances involved, there are no impact pathways present. |
| 12 | SR-0104 | 132 | Waltham Abbey | Waltham Abbey | 2.5km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; within 1.5km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC, and the Lee Valley SPA and Ramsar site. |
| 13 | SR-0113 B | 244 | Epping | Epping | 1.0km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. However, due to the large size of this site, it may have potential to provide SANGC. |
| 14 | SR- | 135 | Chipping | Ongar | More than 10km from Epping Forest SAC; more | No HRA implications. |

| Site ID on Figure A2 (Appendix A) | Site Ref | Number of dwellings (taken from original assessment – some sites have changed in size) | Settlement | Parish | Distance from Internationally Designated Sites | Pathways of Impact Requiring Investigation |
|-----------------------------------|----------|--|----------------|----------------|---|---|
| | 0120 | | Ongar | | than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Due to the distances involved, there are no impact pathways present. |
| 15 | SR-0169 | 8 | Roydon | Roydon | More than 9km from Epping Forest SAC; 5.4km from Wormley-Hoddesdonpark Woods SAC; 1.7km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination recreational pressure impact pathway for Wormley-Hoddesdonpark Woods SAC, and the Lee Valley SPA and Ramsar site. |
| 16 | SR-0176 | 30 | Buckhurst Hill | Buckhurst Hill | Within 400m of Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 6km from Lee Valley SPA/ Ramsar site. | HRA implications. In-combination effect of recreational pressure upon Epping Forest SAC; moreover, due to its close proximity to Epping Forest SAC, additional impact pathways present include: <ul style="list-style-type: none"> Urbanisation |
| 17 | SR-0181 | 10 | High Ongar | High Ongar | More than 11km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | No HRA implications. Due to the distances involved, there are no impact pathways present. |
| 18 | SR-0208 | 66 | Epping | Epping | 0.8km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 7km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 19 | SR-0219 | 44 | Waltham Abbey | Waltham Abbey | 2.7km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; within 1.4km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC, and the Lee Valley SPA and Ramsar site. |
| 20 | SR-0225 | 44 | Buckhurst Hill | Buckhurst Hill | Less than 100m from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 6km from Lee Valley SPA/ Ramsar site. | HRA implications. In-combination effect of recreational pressure upon Epping Forest SAC; moreover, due to its close proximity to Epping Forest SAC, additional impact pathways present include: <ul style="list-style-type: none"> Urbanisation |
| 21 | SR-0228i | 29 | Theydon Bois | Theydon Bois | 0.6km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |

| Site ID on Figure A2 (Appendix A) | Site Ref | Number of dwellings (taken from original assessment – some sites have changed in size) | Settlement | Parish | Distance from Internationally Designated Sites | Pathways of Impact Requiring Investigation |
|-----------------------------------|------------|--|------------|----------|---|---|
| | | | | | site. | |
| 22 | SR-0229 | 89 | Epping | Epping | 1.2km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 7km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 24 | SR-0311 | 12 | Sheering | Sheering | More than 14km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | No HRA implications. Due to the distances involved, there are no impact pathways present. |
| 25 | SR-0445 | 23 | Epping | Epping | Within 400m of Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 7km from Lee Valley SPA/ Ramsar site. | HRA implications. In-combination effect of recreational pressure upon Epping Forest SAC; moreover, due to its close proximity to Epping Forest SAC, additional impact pathways present include: <ul style="list-style-type: none"> Urbanisation |
| 26 | SR-0333 Bi | 24 | Epping | Epping | 0.5km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 7km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 27 | SR-0347 | 44 | Epping | Epping | 1.2km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 7km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 28 | SR-0404 | 27 | Coopersale | Epping | 3.1km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 29 | SR-0555 | 181 | Epping | Epping | 2.5km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 7km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 30 | SR-0556 | 42 | Epping | Epping | 1.8km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 7km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 31 | SR-0433 | 29 | Chigwell | Chigwell | 2.7km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; | Potential HRA implications. In-combination impacts relating to recreational |

| Site ID on Figure A2 (Appendix A) | Site Ref | Number of dwellings (taken from original assessment – some sites have changed in size) | Settlement | Parish | Distance from Internationally Designated Sites | Pathways of Impact Requiring Investigation |
|-----------------------------------|-----------|--|--------------|--------------|---|---|
| | | | | | more than 10km from Lee Valley SPA/ Ramsar site. | pressure upon Epping Forest SAC. |
| 32 | SR-0358 | 53 | Debden | Loughton | 1.5km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. From review of freely available aerial mapping, this site comprises existing open amenity green space. The presence of this space may act to divert some recreational activity away from the SAC. Loss of this space could act to increase recreational pressure upon the SAC, further compounded by additional new dwellings. It is therefore assumed that development of this site would need to ensure no net loss of open space in line with Policy DM6. |
| 33 | SR-0527 | 14 | Loughton | Loughton | Within 400m of Epping Forest SAC (less than 100m); more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | HRA implications. In-combination effect of recreational pressure upon Epping Forest SAC; moreover, due to its close proximity to Epping Forest SAC, additional impact pathways present include: <ul style="list-style-type: none"> Urbanisation |
| 34 | SR-0526 | 30 | Loughton | Loughton | 1.3km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 35 | SR-0565 | 44 | Loughton | Loughton | Within 400m of Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | HRA implications. In-combination effect of recreational pressure upon Epping Forest SAC; moreover, due to its close proximity to Epping Forest SAC, additional impact pathways present include: <ul style="list-style-type: none"> Urbanisation |
| 36 | SR-0026 C | 121 | Theydon Bois | Theydon Bois | 0.7km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |

| Site ID on Figure A2 (Appendix A) | Site Ref | Number of dwellings (taken from original assessment – some sites have changed in size) | Settlement | Parish | Distance from Internationally Designated Sites | Pathways of Impact Requiring Investigation |
|-----------------------------------|-----------|--|---------------------|---------------------|---|---|
| 37 | SR-0417 | 49 | North Weald Bassett | North Weald Bassett | More than 5km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | No HRA implications. Due to the distances involved, there are no impact pathways present. |
| 38 | SR-0455 | 27 | North Weald Bassett | North Weald Bassett | More than 6km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | No HRA implications. Due to the distances involved, there are no impact pathways present. |
| 39 | SR-0195 B | 91 | North Weald Bassett | North Weald Bassett | More than 6km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | No HRA implications. Due to the distances involved, there are no impact pathways present. |
| 40 | SR-0512 | 11 | North Weald Bassett | North Weald Bassett | More than 6km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | No HRA implications. Due to the distances involved, there are no impact pathways present. |
| 41 | SR-0390 | 175 | Chipping Ongar | Ongar | More than 9km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | No HRA implications. Due to the distances involved, there are no impact pathways present. |
| 42 | SR-0473 | 33 | Lower Nazeing | Nazeing | More than 6km from Epping Forest SAC; 4.4km from Wormley-Hoddesdonpark Woods SAC; 2.2-3km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination recreational pressure impact pathway for Wormley-Hoddesdonpark Woods SAC, and the Lee Valley SPA and Ramsar site. |
| 43 | SR-0049 | 85 | Fyfield | Fyfield | More than 12km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | No HRA implications. Due to the distances involved, there are no impact pathways present. |
| 44 | SR-0228ii | 19 | Theydon Bois | Theydon Bois | 0.7km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 45 | SR-0587 | 22 | Epping | Epping | 1.3km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 7km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |

| Site ID on Figure A2 (Appendix A) | Site Ref | Number of dwellings (taken from original assessment – some sites have changed in size) | Settlement | Parish | Distance from Internationally Designated Sites | Pathways of Impact Requiring Investigation |
|-----------------------------------|----------|--|-------------------|-------------------|--|---|
| 46 | SR-0588 | 52 | Chigwell | Chigwell | 1.7km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 47 | SR-0601 | 30 | Chigwell | Chigwell | 2.6km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 48 | SR-0873 | 10 | Stapleford Abbots | Stapleford Abbots | More than 9km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | No HRA implications. Due to the distances involved, there are no impact pathways present. |
| 49 | SR-0878 | 12 | Loughton | Loughton | 0.7km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 50 | SR-0895 | 6 | Chigwell | Chigwell | 2.9km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 51 | SR-0896 | 10 | Chigwell | Chigwell | 2.8km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 52 | SR-0813 | 11 | Buckhurst Hill | Buckhurst Hill | Within 400m of Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 6km from Lee Valley SPA/ Ramsar site. | HRA implications. In-combination effect of recreational pressure upon Epping Forest SAC; moreover, due to its close proximity to Epping Forest SAC, additional impact pathways present include: <ul style="list-style-type: none"> Urbanisation |
| 53 | SR-0834 | 30 | Loughton | Loughton | Within 400m of Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | HRA implications. In-combination effect of recreational pressure upon Epping Forest SAC; moreover, due to its close proximity to Epping Forest SAC, additional impact |

| Site ID on Figure A2 (Appendix A) | Site Ref | Number of dwellings (taken from original assessment – some sites have changed in size) | Settlement | Parish | Distance from Internationally Designated Sites | Pathways of Impact Requiring Investigation |
|-----------------------------------|------------|--|---------------------|---------------------|---|---|
| | | | | | | pathways present include: • Urbanisation |
| 54 | SR-0835 | 158 | Loughton | Loughton | 1.5km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 55 | SR-0842 | 10 | Chipping Ongar | Ongar | More than 10km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | No HRA implications. Due to the distances involved, there are no impact pathways present. |
| 56 | SR-0848 | 24 | Chipping Ongar | Ongar | More than 10km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | No HRA implications. Due to the distances involved, there are no impact pathways present. |
| 57 | SR-0069/33 | 255 | Epping | Epping | 0.5km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. However, due to the large size of this site, it may have potential to provide SANGC. |
| 58 | SR-0197 | 10 | Roydon | Roydon | More than 9km from Epping Forest SAC; 5.3km from Wormley-Hoddesdonpark Woods SAC; 1.6km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination recreational pressure impact pathway for Wormley-Hoddesdonpark Woods SAC, and the Lee Valley SPA and Ramsar site. |
| 59 | SR-0158 A | 590 | North Weald Bassett | North Weald Bassett | More than 5km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | No HRA implications. Due to the distances involved, there are no impact pathways present. However, due to the large size of this site, it may have potential to provide ANG. |
| 60 | SR-0003 | 276 | North Weald Bassett | North Weald Bassett | More than 5km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | No HRA implications. Due to the distances involved, there are no impact pathways present. However, due to the large size of this site, it may have potential to provide ANG. |
| 61 | SR-0036 | 288 | North Weald Bassett | North Weald Bassett | More than 6km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods | No HRA implications. Due to the distances involved, there are no impact |

| Site ID on Figure A2 (Appendix A) | Site Ref | Number of dwellings (taken from original assessment – some sites have changed in size) | Settlement | Parish | Distance from Internationally Designated Sites | Pathways of Impact Requiring Investigation |
|-----------------------------------|----------|--|----------------|---------------------|---|---|
| | | | | | SAC; more than 10km from Lee Valley SPA/ Ramsar site. | pathways present. However, due to the large size of this site, it may have potential to provide ANG. |
| 62 | SR-0069 | 79 | Epping | Epping | 0.7km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 63 | SR-0070 | 52 | Theydon Bois | Theydon Bois | 0.7km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 64 | SR-0149 | 124 | Thornwood | North Weald Bassett | 4.4km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 9.5km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 65 | SR-0150 | 33 | Lower Nazeing | Nazeing | More than 7km from Epping Forest SAC; 3.9km from Wormley-Hoddesdonpark Woods SAC; 2.6km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination recreational pressure impact pathway for Wormley-Hoddesdonpark Woods SAC, and the Lee Valley SPA and Ramsar site. |
| 66 | SR-0153 | 305 | Epping | Epping | 1.5km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 7km from Lee Valley SPA/ Ramsar site. | Potential HRA implications relating to in-combination effect of recreational pressure upon Epping Forest SAC. However, due to the large size of this site, it may have potential to provide SANGC. |
| 67 | SR-0184 | 30 | Chipping Ongar | Ongar | More than 11km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | No HRA implications. Due to the distances involved, there are no impact pathways present. |
| 68 | SR-0185 | 124 | Chipping Ongar | Ongar | More than 10km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | No HRA implications. Due to the distances involved, there are no impact pathways present. |
| 69 | SR-0186 | 12 | Chipping Ongar | Ongar | More than 10km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ | No HRA implications. Due to the distances involved, there are no impact pathways present. |

| Site ID on Figure A2 (Appendix A) | Site Ref | Number of dwellings (taken from original assessment – some sites have changed in size) | Settlement | Parish | Distance from Internationally Designated Sites | Pathways of Impact Requiring Investigation |
|-----------------------------------|----------|--|------------|----------|--|--|
| | | | | | Ramsar site. | |
| 70 | SR-0226 | 114 | Loughton | Loughton | 0.8km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 71 | SR-0227 | 193 | Debden | Loughton | 2.1km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 72 | SR-0289 | 10 | Loughton | Loughton | 1.9km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 73 | SR-0356 | 304 | Loughton | Loughton | 1.7km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Potential HRA implications, From review of freely available aerial mapping, this site comprises existing open amenity green space that appears to contain well used pathways. The presence of this space acts to divert some recreational activity away from the SAC. Loss of this space could act to increase recreational pressure upon the SAC, further compounded by additional new dwellings. It is therefore assumed that development of this site would need to ensure no net loss of open space in line with Policy DM6. |
| 74 | SR-0361 | 195 | Loughton | Loughton | 1.2km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Potential HRA implications, From review of freely available aerial mapping, this site comprises existing open amenity green space of Jessel Green. The presence of this space acts to divert some recreational activity away from the SAC. Loss of this space could act to increase recreational pressure upon the SAC, further compounded by additional new dwellings. It is therefore assumed that development of this site would need to ensure no net loss of open space in line with Policy DM6. |

| Site ID on Figure A2 (Appendix A) | Site Ref | Number of dwellings (taken from original assessment – some sites have changed in size) | Settlement | Parish | Distance from Internationally Designated Sites | Pathways of Impact Requiring Investigation |
|-----------------------------------|------------|--|---------------|---------------|--|---|
| 75 | SR-0405 | 19 | Coopersale | Epping | 3.3km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 76 | SR-0548 | 35 | Loughton | Loughton | 2.1km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 77 | SR-0541 | 53 | Waltham Abbey | Waltham Abbey | 2.9km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; within 1.1km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC, and the Lee Valley SPA and Ramsar site. |
| 78 | SR-0890 | 15 | Roydon | Roydon | More than 8km from Epping Forest SAC; 5.3km from Wormley-Hoddesdonpark Woods SAC; 1.7km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination recreational pressure impact pathway for Wormley-Hoddesdonpark Woods SAC, and the Lee Valley SPA and Ramsar site. |
| 79 | SR-0894 | 12 | Chigwell | Chigwell | 2.9km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 80 | SR-0898 | 9 | Chigwell | Chigwell | 2.4km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 81 | SR-0478 B | 66 | Chigwell | Chigwell | 1.8km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 82 | SR-0132 Ci | 49 | Epping | Epping | 0.6km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 7km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC. |
| 83 | SR-0903 | 27 | Waltham Abbey | Waltham Abbey | 2.3km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; within 1.9km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC, and the Lee Valley SPA and Ramsar site. |
| 84 | SR-0385 | 60 | Waltham Abbey | Waltham Abbey | 1.7km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; within 2.3km from Lee Valley SPA/ Ramsar site. | Potential HRA implications In-combination impacts relating to recreational pressure upon Epping Forest SAC, and the Lee Valley SPA and Ramsar site. |

| Site ID on Figure A2 (Appendix A) | Site Ref | Number of dwellings (taken from original assessment – some sites have changed in size) | Settlement | Parish | Distance from Internationally Designated Sites | Pathways of Impact Requiring Investigation |
|-----------------------------------|----------|--|---------------------|----------|--|---|
| | | | | | | Further from review of freely available aerial mapping, this site comprises existing open amenity green space. The presence of this space acts to divert some recreational activity away from the SAC. Loss of this space could act to increase recreational pressure upon the SAC, further compounded by additional new dwellings. It is therefore assumed that development of this site would need to ensure no net loss of open space in line with Policy DM6. |
| 85/86 | SR-0300 | 88 | Lower Nazeing | Nazeing | More than 5km from Epping Forest SAC; at its closest 4.7km from Wormley-Hoddesdonpark Woods SAC; 2.2-3km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination recreational pressure impact pathway for Wormley-Hoddesdonpark Woods SAC, and the Lee Valley SPA and Ramsar site. |
| 87 | SR-0557 | 210 | Chigwell | Chigwell | 2.9km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | Potential HRA implications, From review of freely available aerial mapping, this site comprises existing open amenity green space. The presence of this space acts to divert some recreational activity away from the SAC. Loss of this space could act to increase recreational pressure upon the SAC, further compounded by additional new dwellings. It is therefore assumed that development of this site would need to ensure no net loss of open space in line with Policy DM6. |
| - | SR-0348 | 54 | Epping | | 1.6km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 8km from Lee Valley SPA/ Ramsar site. | Potential HRA implications relating to in-combination effect of recreational pressure upon Epping Forest SAC. |
| - | SR-0349 | 41 | Epping | | 1.6km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 8km from Lee Valley SPA/ Ramsar site. | Potential HRA implications relating to in-combination effect of recreational pressure upon Epping Forest SAC. |
| - | SR-0381 | 17 | Waltham Abbey | | 3km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; 1km from Lee Valley SPA/ Ramsar site. | Potential HRA implications relating to in-combination effect of recreational pressure upon Epping Forest SAC, and Lee Valley SPA and Ramsar site. |
| - | SR-0119 | 225 | North Weald Bassett | | 4.4km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more | Potential HRA implications. In-combination impacts relating to recreational |

| Site ID on Figure A2 (Appendix A) | Site Ref | Number of dwellings (taken from original assessment – some sites have changed in size) | Settlement | Parish | Distance from Internationally Designated Sites | Pathways of Impact Requiring Investigation |
|-----------------------------------|------------------------|--|---------------------|--------|--|---|
| | | | | | than 10km from Lee Valley SPA/ Ramsar site. | pressure upon Epping Forest SAC. Potential HRA implications. However, due to the large size of this site, it may have potential to provide ANG. |
| - | SP 3.1 | Approximately 1,050 homes (1,000 Latton Priory and 50 Riddings Lane) | Harlow | | 4.8km from Epping Forest SAC; more than 9km from Wormley-Hoddesdonpark Woods SAC; more than 6km from Lee Valley SPA/ Ramsar site. | Potential HRA implications relating to in-combination effect of recreational pressure upon Epping Forest SAC. |
| - | SP 3.2 | Approximately 1,000 homes | Harlow | | 5.9km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; 3.9km from Lee Valley SPA/ Ramsar site. | Potential HRA implications relating to in-combination effect of recreational pressure upon Lee Valley SPA/ Ramsar site. |
| - | SP 3.3 | Approximately 1,100 homes | Harlow | | 4.3km from Epping Forest SAC; 6.3km from Wormley-Hoddesdonpark Woods SAC; 3.1km from Lee Valley SPA/ Ramsar site. | Potential HRA implications relating to in-combination effect of recreational pressure upon Epping Forest SAC, Wormley-Hoddesdonpark Woods SAC, and Lee Valley SPA/ Ramsar site. |
| - | SP 3.4 | Approximately 750 homes and the potential relocation of Princess Alexandra Hospital | Harlow | | More than 9km from Epping Forest SAC; More than 12km from Wormley-Hoddesdonpark Woods SAC; More than 8km from Lee Valley SPA/ Ramsar site. | No HRA implications. Due to the distances involved, there are no impact pathways present. |
| Traveller Site Allocations | | | | | | |
| - | GRT_N_07 | 5 pitches | Waltham Abbey | | 3.2km from Epping Forest SAC; 6.9km from Wormley-Hoddesdonpark Woods SAC; within 1.1km of Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination impacts relating to recreational pressure upon Epping Forest SAC, and the Lee Valley SPA and Ramsar site. |
| - | GRT_N_06 | 5 pitches | North Weald Bassett | | More than 6km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | No HRA implications. Due to the distances involved, there are no impact pathways present. |
| - | GRT-I-08 ⁴⁴ | 1 pitch | Roydon | | More than 7km from Epping Forest SAC; 5.2km from Wormley-Hoddesdonpark Woods SAC; within 4.7km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination recreational pressure impact pathway for Wormley-Hoddesdonpark Woods SAC, and the Lee Valley SPA and Ramsar site. |

⁴⁴ Also referred to as GRT_1_08

| Site ID on Figure A2 (Appendix A) | Site Ref | Number of dwellings (taken from original assessment – some sites have changed in size) | Settlement | Parish | Distance from Internationally Designated Sites | Pathways of Impact Requiring Investigation |
|-----------------------------------|----------|--|------------|--------|---|---|
| - | GRT_E_07 | 5 pitches | Nazing | | More than 6km from Epping Forest SAC; 5.2km from Wormley-Hoddesdonpark Woods SAC; within 4.6km from Lee Valley SPA/ Ramsar site. | Potential HRA implications. In-combination recreational pressure impact pathway for Wormley-Hoddesdonpark Woods SAC, and the Lee Valley SPA and Ramsar site. |
| - | GRT-I-09 | 1 yard | Moreton | | More than 10km from Epping Forest SAC; more than 7km from Wormley-Hoddesdonpark Woods SAC; more than 10km from Lee Valley SPA/ Ramsar site. | No HRA implications. Due to the distances involved, there are no impact pathways present. |

4.1.2 It has not been possible to dismiss any impact at this point, without further analysis, particularly due to the potential for in combination effects. Having completed the initial sift of policies and allocations, impact pathways are now discussed in more detail in the following chapters.

5 Urbanisation

- 5.1.1 The nearest allocation to Lee Valley SPA/Ramsar site is 1km distant. Therefore urbanisation can be scoped out as an impact pathway for that European site. As previously noted Wormley – Hoddesdonpark Woods SAC is located 2.2km from the District boundary. As such, urbanisation resulting from the Plan is not a realistic impact pathway and so is also scoped out.

5.2 Epping Forest SAC

- 5.2.1 The following policies and site allocations could not be dismissed in the initial sift from potentially posing likely significant effects upon Epping Forest SAC as a result of urbanisation impacts (as distinct from recreational pressure) due to providing development within 400m of the SAC. These are therefore discussed further in this chapter:

Policies

- Draft Policy P 1 Epping
- Draft Policy P 2 Loughton
- Draft Policy P 5 Buckhurst Hill

Site Allocations

- 5.2.2 Draft Policies P 1 (Epping), P 2 (Loughton), and P 5 (Buckhurst Hill) identified in the above bullet points provide for the following site allocations that are located within 400m of the SAC. Distances from internationally designated sites and the quantum of development to be delivered are identified in Table 6:

- SR0176
- SR0225
- SR0445
- SR0527
- SR0565
- SR0813
- SR0834

- 5.2.3 The closest of these is SR0225, which lies 80m from the SAC. Although Epping Forest SAC is potentially vulnerable to incidences such as fly-tipping, introduction of non-native species, vandalism and arson that can arise as a result of proximity to urban areas, neither the Site Improvement Plan⁴⁵ nor the Citation for the SAC⁴⁶ suggest that these are occurring to an extent that causes concern over the condition of the SAC and its associated Conservation Objectives.

- 5.2.4 The pre-amble to Draft Policy DM 3 (Epping Forest SAC and the Lee Valley SPA) does potentially provide a mechanism whereby the plan can ensure that no likely significant effects occur as it

⁴⁵ Natural England (2015). Site Improvement Plan. Epping Forest.

⁴⁶ JNCC (2015) Natura 200 – Standard Form Epping Forest SAC.

provides for HRA of projects or plans that are 'likely to give rise to significant impact on the integrity of the sites'.

- 5.2.5 Furthermore, Draft Policy DM 11 (Waste Recycling Facilities on New Development) is a development management policy relating to waste recycling storage facilities on new development sites. This is a positive policy as it is likely to reduce any occurrences of fly tipping within an internationally designated site as a result of new development.

In combination

- 5.2.6 Whilst the neighbouring authority of Waltham Forest provides for strategic site allocations within 400m of the SAC, its Core Strategy contains suitable policy to avoid impacts relating to urbanisation effects. Waltham Forest Site Specific Allocations Preferred Options HRA identifies that CS Policy 7 (Promoting Sustainable Waste Management and Recycling) contains measures that support best practice in waste management and therefore mitigates against the possibility of unauthorised disposal occurring. Redbridge is in the process of preparing its new Local Plan and site allocations.

Recommendation

- 5.2.7 The pre-amble to Draft Policy DM 3 (Epping Forest SAC and the Lee Valley SPA) provides for HRA of projects or plans that are 'likely to give rise to significant impact on the integrity of the sites'. **However, it should be noted that for accuracy and to ensure that the text contains accurate reference to terminology in the Conservation of Habitats and Species Regulations (2010), the phrase 'significant impact on the integrity of ...' should be replaced by 'likely significant effect on ...'**
- 5.2.8 Given the existing heavily urban context of the boundary between the SAC and its surroundings within the district, and the fact that urbanisation is not currently considered a significant problem, it is considered that additional development will not materially increase the risk posed to the site and certainly should not be an obstacle to allocation. **However, it is considered appropriate that a safeguard is put in place for each allocation within 400m of the SAC. This safeguard should require a project-level HRA to be undertaken, which will set out how the developer proposes to ensure that urbanisation effects (fly tipping, introduction of non-native plant species, incidental arson etc.) will not arise.**

6 Recreational Pressure

6.1.1 The following policies and site allocations could not be dismissed in the initial sift from potentially posing likely significant effects upon the Lee Valley SPA/ Ramsar site, Wormley-Hoddesdonpark Woods SAC and Epping Forest SAC internationally designated sites as a result of increased recreational pressure. These are therefore discussed further in this chapter:

Policies

- Draft Policy SP 2: Spatial Development Strategy 2011-2033
- Draft Policy SP 3 Strategic Allocations around Harlow
- Draft Policy P 2 Loughton
- Draft Policy P 3 Waltham Abbey
- Draft Policy P 6 Chigwell

Site Allocations

6.1.2 In general residential site allocations will not result in an impact alone upon internationally designated sites. The sites identified below are site allocations that will potentially result in loss of existing amenity space that may currently help divert recreational pressure away from internationally designated sites. Thus, any loss of these publically accessible green spaces could result in an increase in recreational pressure upon internationally designated sites. Distances from internationally designated sites and the quantum of development to be delivered are identified in Table 6.

- SR-0358
- SR-0356
- SR-0361
- SR-0385
- SR-0557

6.1.3 The following policies within the Plan do provide a positive contribution that could result in a reduction in recreational pressure:

- The pre-amble to Draft Policy DM 3 (Epping Forest SAC and the Lee Valley SPA) provides a positive contribution to the plan ensuring that no likely significant effects occur as a result of the Plan. It provides for HRA of projects or plans that are 'likely to give rise to significant impact on the integrity of the sites'.
- Draft Policy SP 5 (The Natural Environment, Landscape Character and Green Infrastructure) is a positive policy that provides for the retention and extension of green infrastructure which has potential to divert recreational pressure away from internationally designated sites. This policy includes the requirement for CIL/S106 agreements where appropriate green infrastructure cannot be provided on site.
- Draft Policy DM 3 (Epping Forest SAC and the Lee Valley SPA) is a positive policy as it expects all relevant development to assist in the conservation and enhancement of the biodiversity of Epping Forest SAC and Lee Valley SPA.

The second part of Draft Policy DM 3 provides for enhanced green links between the SAC and SPA and other green spaces within the District and to provide easy access opportunities providing a green corridor for wildlife and people. The preamble to this policy states that by improving links to these designated sites via other green spaces/ links, will act to divert recreational pressure away from the sensitive designated sites and spreading the impacts of recreational pressure over a larger area. However, care should be made to ensure that these increased links do not increase recreational pressure upon the designated sites.

- Draft Policy DM 4 (Suitable Accessible Natural Green Space and Corridors) is a positive policy as it explicitly provides for the Council to deliver Suitable Accessible Natural Green Spaces and Corridors (SANGSC). This space seeks to divert any new recreational activity away from internationally designated sites.
- Draft Policy DM 5 (Green Infrastructure Design of Development) is a positive policy that provides for green infrastructure for recreational use which can potential divert recreational pressure away from the designated sites.
- Draft Policy DM 6 (Designated and Undesignated Open Spaces) is a positive policy as it provides for open spaces that can detract recreational pressure away from internationally designated sites and requires no net loss of open space.
- Draft Policy DM 7 (Heritage Assets) is a development management policy relating to heritage assets including Registered Parks and Gardens. These spaces can act to divert recreational pressure away from internationally designated sites and this policy requires no net loss.
- Draft Policy DM 10 (Housing Design and Quality) is a positive policy as it encourages the inclusion of amenity/ garden space, green infrastructure and open space. These have potential to divert recreational pressure away from internationally designated sites.

6.1.4 Within the context of these policies, recreational pressure on each European site is discussed below.

6.2 Lee Valley SPA/Ramsar site

6.2.1 The following SSSI's are components of the SPA/ Ramsar site:

- Turnford & Cheshunt Pits SSSI straddles the boundary between Epping Forest District and Broxbourne and lies 300m from the settlement of Waltham Abbey. Most of the site is owned by the Lee Valley regional Park Authority and is managed as a Country Park (River Lee Country Park).
- Rye Meads SSSI is located approximately 70 metres north of Epping Forest District and 2.6km from the nearest significant village within that district (Lower Nazeing, with a population c. 4,500). The site is a Nature Reserve and is owned by Thames Water and the RSPB who manage the site with Herts and Middlesex Wildlife Trust.
- Amwell Quarry SSSI is located 2.5km north west of the District boundary. The site is a National Nature Reserve. It is owned and managed by Herts and Middlesex Wildlife Trust.

6.2.2 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.

6.2.3 It is also noted that the HRA of the Lee Valley Park Development Framework (UE Associates, 2009) was able to conclude that there would be no likely significant effect of the numerous measures and policies intended to increase public accessibility to the Regional Park (including those areas of

international importance) due to the Regional Park authorities overriding commitment to managing the Regional Park and their past experience of delivering increased access while avoiding disturbance and their ongoing commitment to visitor access management in the more sensitive parts of the Park. If proposals to improve accessibility in the Park can be concluded as being unlikely to lead to a significant effect, then logically, changes in the number of residents within the visitor catchment of the Park can be scoped out.

6.2.4 Recreational activity is therefore not considered further as an impact pathway with regard to this site.

6.2.5 However, to maximise confidence that the SPA/Ramsar site is adequately protected, it is recommended that all new development deliver greenspace in-line with the Natural England ANG standard to ensure that it is self-sufficient.

6.3 Wormley-Hoddesdonpark Woods SAC

6.3.1 The site 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 (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 Forest⁴⁷ and Epping Forest. These indicate 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 some small villages in the north-west of Epping Forest District (such as Nazeing, Lower Nazeing and Bumbles Green), but none of the larger settlements.

6.3.2 Natural England's Site Improvement Plan (SIP)⁴⁸ 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.

6.3.3 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.

6.3.4 The Local Plan does not propose to allocate any new housing sites at all within 3.8km of the SAC. The Local Plan proposes to allocate nine housing sites (1357 dwellings) and two traveller sites within 4-7km of the SAC as identified below:

- SR-0011 in Lower Nazeing– 64 dwellings
- SR-0035 in Roydon – 6 dwellings
- SR-0169 in Roydon - 8 dwellings
- SR-0300 in Lower Nazeing - 88 dwellings
- SR-0473 in Lower Nazeing – 33 dwellings
- SR-0197 in Roydon – 10 dwellings

⁴⁷ 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

⁴⁸ <http://publications.naturalengland.org.uk/file/6541134543192064> [accessed 12/08/16]

- SR-0150 in Lower Nazeing – 33 dwellings
- SR-0890 in Roydon – 15 dwellings
- GRT-I-08 in Roydon – 1 pitch
- GRT-E-07 in Nazing – 5 pitches
- SP3.3 near Harlow - Approximately 1,100 homes

6.3.5 Based on the issues identified in the Site Improvement Plan 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. Nonetheless, **to maximise confidence that the SAC is adequately protected, it is recommended that all new development deliver greenspace in-line with the Natural England ANG standard to ensure that it is self-sufficient.**

In combination

6.3.6 The Local Plan includes both new allocations (i.e. sites that do not currently have planning permission) and sites that have already received planning permission but which have not yet been delivered. The total amount of housing planned for Epping Forest District over the Local Plan period (considering new allocations and already permitted development) is 11,400 new homes (2011-2033).

6.3.7 The HRA of the Broxbourne Local Plan is not yet publically available. However, the Sustainability Appraisal does discuss impacts on Wormley-Hoddesdonpark Woods SAC from development in Broxbourne and concludes that effects will not be significant. Some parts of East Herts District do lie within the likely recreational catchment of the SAC (Assumed as a worst case 7km), but the HRA of the East Herts District Plan identifies that the District Plan does not propose to allocate any new housing sites at all within 3km of the SAC and the nearest large housing site is 5km distant, to the east of Ware. It concludes that these will not be significant even in combination. 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.

Recommendation

6.3.8 **Nonetheless, in order to maximise confidence that the SAC is adequately protected, it is recommended that all new development deliver greenspace in-line with the Natural England ANG standard to ensure that it is self-sufficient.**

6.4 Epping Forest SAC

6.4.1 Epping Forest SAC receives a great many visits per year (estimated at over 4 million) and discussions with the Corporation of London 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 in recent years. A 2011 visitor survey report⁴⁹ identified that those living within 2km of the edge of the Forest comprise at least 95% of all visitors. However, further analysis of these data was undertaken by Footprint Ecology in September 2016⁵⁰. This further analysis identified that, although the scale of the data was substantial (in 2014 alone almost 900 questionnaires were returned) the catchment appeared to be larger than suggested by previous reports. Based on 2014 data it appeared that 89% of survey respondents originating from within 5km of the SAC and 76% originating from within 4km. . Some uncertainties with the data were identified as follows:

- It is not clear to what extent the postcodes reflect a random sample of visitors due to the nature of the survey method, which enabled completion online as well as collection of data

⁴⁹ Alison Millward Associates. 2011. Epping Forest Visitor Survey 2011: Results Summary

⁵⁰ Footprint Ecology (2016). Initial review of current visitor data for Epping Forest

from people who attended the visitor centres, rather than based on encounters with people on footpaths and at car parks across the site. Therefore, although the scale of response is good, respondents are a self-selecting group to some extent. However, in order to try and address this staff and volunteers targeted visitors from the harder to reach groups such as under 16s, ethnic minorities, the elderly and disabled, at the busier locations with the hard copy version to be completed by themselves or with help from staff and volunteers; and

- The data show an uneven distribution of postcodes from which visitors originated. It showed that the southern portion of Epping Forest SAC (427ha of the total area of 2476ha), receives more than half of visitors, who focus on a few key honeypot sites (Wanstead Flats, Bush Wood, Wanstead Park, Hollow Ponds, Connaught Water and High Beach), with the northern portion of the SAC receiving a smaller proportion of visitors. This is not really surprising given that far more people live within 5km of the southern part of the SAC than the northern part. However, it does mean that, while the data indicate that 89% of 2014 survey respondents live within 5km this may over-estimate the catchment for the northern part of the SAC within Epping Forest district.

6.4.2 It should be noted that the distances mentioned above are distances measured from the SAC boundary because interview location wasn't always known and in many cases questionnaires were completed online or at visitor centres rather than out on site. This survey therefore applied a slightly different method to those for other European sites, where visitor origin data has been typically been presented as the distance between the interview location (which is usually an entry point such as a car park) and home postcode. This doesn't change the distribution of respondents' post-codes around Epping Forest SAC, but means that the catchment information from the Epping Forest visitor surveys is not directly comparable to data collected on other European sites by other methods.

6.4.3 However, the distribution of postcodes revealed by the analysis seems logical and intuitive as a 5km zone would cover all the larger settlements surrounding the SAC. There is therefore no reason to assume that the core catchment is either much larger or much smaller. Nonetheless, it is anticipated that to inform a formal Mitigation Strategy 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 between the HMA authorities and Essex County Council, Hertfordshire County Council, Natural England and the Corporation of London. Such a survey could refine the catchment further but would also, by exclusively targeting visitors to the SAC (as opposed to local residents more broadly) in a thorough manner using a random sample of visitors, would enable further details of recreational activities undertaken in particular locations to be collected. This would in turn provide possible support for use of the SANGC concept and enable targeted use of access management contributions collected from new residential developments.

6.4.4 Based on the existing analysis and settlement patterns around the SAC it is reasonable to expect that most regular (i.e. at least weekly) visitors to the SAC are likely to derive from the London Boroughs of Waltham Forest, Enfield, and Redbridge and the following main settlements in Epping Forest District: Chigwell, Buckhurst Hill, Loughton, Theydon Bois, Epping and Waltham Abbey. These settlements all lie partially or wholly within 5km of the SAC.

6.4.5 Residential site allocations located wholly or in part within 5km of Epping Forest SAC are as follows:

| | | |
|-----------|------------|-----------|
| SR-0026B | SR-0565 | SR-0361 |
| SR-0071 | SR-0026C | SR-0405 |
| SR-0099 | SR-0228ii | SR-0548 |
| SR-0104 | SR-0587 | SR-0541 |
| SR-0113B | SR-0588 | SR-0894 |
| SR-0176 | SR-0601 | SR-0898 |
| SR-0208 | SR-0878 | SR-0478B |
| SR-0219 | SR-0895 | SR-0132Ci |
| SR-0225 | SR-0896 | SR-0903 |
| SR-0228i | SR-0813 | SR-0385 |
| SR-0229 | SR-0834 | SR-0557 |
| SR-0445 | SR-0835 | SR-0348 |
| SR-0333Bi | SR-0069/33 | SR-0381 |
| SR-0347 | SR-0069 | SR-0119 |
| SR-0555 | SR-0070 | SP3.3 |
| SR-0556 | SR-0149 | SP3.1 |

| | | |
|---------|---------|----------|
| SR-0433 | SR-0226 | GRT_N_07 |
| SR-0358 | SR-0227 | |
| SR-0527 | SR-0289 | |
| SR-0526 | SR-0356 | |

- 6.4.6 Since Epping Forest is already known to be under pressure from high levels of recreation, additional recreational activity resulting from new residential development located within 5km of the SAC would result in a likely significant effect without mitigation.
- 6.4.7 It is appropriate that Epping Forest District shares in delivering the HMA-wide commitment set out in the Epping Forest SAC Memorandum of Understanding to undertake additional visitor survey of Epping Forest SAC if required to further refine the catchment and do devise strategic mitigation solutions (such as access management contributions and, for the largest sites, provision of on-site alternative recreational natural greenspace). This is already facilitated by Draft Policies SP 6, DM 3 and DM 4, but a full strategic mitigation strategy remains to be devised. Since the commitment regarding recreational pressure is already provided in the Epping Forest SAC Memorandum of Understanding, which is a formal agreement, it does not need to be specifically referenced in the Epping Forest Local Plan.
- 6.4.8 It is considered that the Epping Forest SAC Memorandum of Understanding, once signed by all parties, will (coupled with Draft Policies SP 6, DM 3 and DM 4) provide an appropriate framework to ensure that Epping Forest SAC is protected from the adverse effects of new development and thus ensure no likely significant effect on the SAC would materialise in practice, either alone or in combination with other plans and projects.

Loss of existing green space

- 6.4.9 It should be noted that the following site allocations could result in the loss of areas of existing green infrastructure that are used for recreational activities. The presence of these green areas is likely to divert a level of recreational activity away from the SAC, as such the loss of these green areas, could result in an increase in recreational pressure upon the SAC, which is then compounded by the provision of an increase in net new dwellings. The sites are as follows:
- SR-0358 which from review of aerial mapping appears to comprise existing open amenity green space;
 - SR-0356 which from review of aerial mapping appears to comprise existing open amenity green space with well-worn paths;
 - SR-0361 which from review of aerial mapping appears to comprise existing open amenity green space (Jessel Green);
 - SR-0385 which from review of aerial mapping appears to comprise existing open amenity green space; and,
 - SR-0557 which from review of aerial mapping appears to comprise existing open amenity green space.

Recommendation

- 6.4.10 **As an interim measure, it is recommended that Epping Forest District Council should, in line with Draft Policies DM 3 and DM 4, require:**
- **All outline or (if outline permission has already been obtained) detailed housing applications (that have not already received a Resolution to Grant permission) for more than 400 dwellings⁵¹ in Loughton, Epping, Waltham Abbey, Theydon Bois and Chigwell to deliver their own on-site accessible natural greenspace (typically at a rate of 8ha per 1000 population, although this can be judged against quality and**

⁵¹ Site allocations within 5km of Epping Forest SAC that are to provide 400 dwellings or more are: SR0099: (463 dwellings)

accessibility on a case by case basis) and make a financial contribution towards access management of the SAC; and

- **All other outline or detailed residential applications (that have not already received a Resolution to Grant permission) in the same settlements to make a financial contribution to access management of the SAC.**

6.4.11 The size of the tariff remains to be determined but should be confirmed prior to submission of the Local Plan to the Secretary of State. This will be an interim tariff until such time as the visitor survey and analysis is completed and the need for any additional mitigation is identified.

7 Air Quality

7.1.1 The following policies and site allocations could not be dismissed in the initial sift from potentially posing likely significant effects upon the Lee Valley SPA/ Ramsar site and Epping Forest SAC, as a result of increased air pollution. Therefore further discussion is contained in this Chapter:

Policies

- Draft Policy SP 2 (Spatial Development Strategy 2011-2033). Provides for 11,400 new homes and 10,000 new jobs within Epping District during the Plan period.
- Draft Policy E 1 (Employment Sites). Provides for new employment sites as well as improvements to existing sites, however no quantum of development is identified.

Site Allocations

- All residential and employment sites in combination

7.1.2 Policies within the Plan that provide a positive contribution to atmospheric improvements are as follows:

- The pre-amble to Draft Policy DM 3 (Epping Forest SAC and the Lee Valley SPA) provides a positive contribution to the plan ensuring that no likely significant effects occur as a result of the Plan. It provides for HRA of projects or plans that are 'likely to give rise to significant impact on the integrity of the sites'.
- Draft Policy T 1 (Sustainable Transport Choices). By definition sustainable transport would not result in likely significant effects upon internationally designated sites. Further, this policy does not identify any location, type or scale of development. This policy does not identify any scale or location of any transport schemes. It contains positive text to encourage modal shift away towards cycling, walking and use of public transport and electric cars which all have potential to reduce atmospheric pollution.
- Draft Policy DM 21 (Local Environmental Impacts, Pollution and Land Contamination). This is a positive development management policy relating to environmental impact, pollution and land contamination. It is a positive policy as it provides for preventing detrimental impacts as a result of environmental conditions resulting from new development such as air quality, and provides for the reuse and recycling of building materials and the use of local products, thus reducing atmospheric pollutants further, and the use of water resources during the manufacturing process.
- Draft Policy D 5 (Communications Infrastructure). This is a development management policy relating to communications infrastructure. It does not identify any location, or type of development. It is a positive policy: the provision of high speed internet and telecommunications has potential to reduce the need to travel, thus reducing atmospheric pollution.

7.1.3 Within the context of these policies, recreational pressure on each European site is discussed below

7.2 Lee Valley SPA/Ramsar site

7.2.1 Parts of the Lee Valley SPA and Ramsar site are sensitive to deterioration in air quality, as the supporting habitat consists of terrestrial features that can be degraded by excessive deposition of pollutants. The Ramsar site is partly designated for its aquatic plant life, specifically the whorled

water milfoil, which is dependent on calcareous water (and thus susceptible to acidification of the aquatic environment).

- 7.2.2 All forms of development within the Plan that would be likely to lead to increases in vehicle emissions within 200m of Lee Valley SPA and Ramsar could have potential to reduce air quality. The delivery of 16,390 new dwellings, including in specified areas in close proximity to the SPA/Ramsar, coupled with other employment and infrastructure development, is likely to lead to increased road traffic on routes within 200m of the designated site.
- 7.2.3 The only portion of the SPA/Ramsar site that is located within 200m of a major road is Rye Meads SSSI located within 200m of the A414.
- 7.2.4 Traffic modelling and air quality impact assessment was undertaken to support the assessment of the different HMA Options. Option C resulted in the worst case change of traffic flows on the A414, with a total increase in AADT of 1750.

Table 7: HMA Transport Flow Data Summary

| Link | Baseline (2014) AADT | 2033 Do Minimum AADT | Option A AADT | Option B AADT | Option C AADT | Option D AADT | Option E AADT |
|--------------|----------------------|----------------------|---------------|---------------|---------------|---------------|---------------|
| A414 two way | 20001 | 22798 | 23325 | 24520 | 24547 | 22299 | 21994 |

Table 8: Changes to traffic flows as a result of the five SMA Options

| | | Change in two-way AADT compared to DM. Positive numerals mean an increase, negative numerals mean a decrease | | | | | |
|------|------------------------|--|----------|----------|----------|----------|----------|
| Link | 2033 Minimum way flows | Do two | Option A | Option B | Option C | Option D | Option E |
| A414 | 22798 | | 527 | 1723 | 1750 | -499 | -803 |

- 7.2.5 Table 7 summarises the transport data for the HMA. Table 8 identifies the changes in traffic flows on the A414 as a result of the HMA Options. The Design Manual for Roads and Bridges⁵² states that if the change in flows between the Do Minimum and Do Something Scenarios is less than 1,000 AADT the air quality effect can be considered neutral and no further assessment is necessary. As can be seen in Table 8, the different SMA Options result in a variety of changes in AADT at each of the links, although in no case is there predicted to be an increase of more than 1,750 AADT for any HMA option. For the purpose of this assessment, the worst case change in traffic flows (Option E), even though this may not represent the final chosen option. This was subject to detailed air quality modelling, the results of which are provided in Appendix C.
- 7.2.6 At its closest, the SPA/Ramsar site is located 25m from the A414 behind a thick belt of trees, which will play some part in intercepting pollution from the road. The modelled annual mean NO_x concentrations at this road link indicate that the change in NO_x concentrations due to HMA traffic is not more than 1% of the Critical Load (i.e. 0.3µg^m⁻³). It is determined that at this level or below, the contribution of nitrogen deposition to a sensitive feature/ supporting habitat would not be significant and this is demonstrated by the nitrogen deposition calculations that have been undertaken. The most sensitive feature to changes in air quality is breeding bittern since it relies upon the fen, marsh and swamp habitats. The Critical Load for nitrogen deposition is 15kg/N/ha/yr (so 1% of this Critical Load is 0.15Kg/N/ha/yr). At its highest, Option E would contribute an increase in nitrogen deposition of 0.02Kg/N/ha/yr, which is much less than 1% of the Critical Load. As such it can be concluded that the level of development provided within the worst case Option (Option E) of the SMA would result in an imperceptible change in atmospheric pollution that would not lead to a likely significant effect upon Rye Meads SSSI (and thus the SPA/Ramsar site) either alone or in combination with other projects or plans.

7.3 Epping Forest SAC

- 7.3.1 As discussed in the methodology section, air quality in Epping Forest SAC was, like air quality along the A414 past the Lee Valley SPA/Ramsar site, subject to detailed analysis at the HMA level as part

⁵² Volume 11, Section 3, Part 1 (HA207/07)

- of the process of selecting an HMA-wide growth option. That analysis is provided in detail in Appendix D. However, it is summarised below.
- 7.3.2 There was relatively little difference between any of the Options. This is probably because all the Options have the same broad distribution for new housing i.e. clustered around Harlow, even though they vary in quantum and detailed distribution.
- 7.3.3 For all Options and all roads other than Theydon Road, there would be an increase in NOx concentration up to 10-20m from the roadside (depending on link modelled) that would be greater than 1% of the Critical Level. This varies from $0.4 \mu\text{g m}^{-3}$ (1.3% of the Critical Level) at the furthest distance, up to a maximum of $1.5 \mu\text{g m}^{-3}$ (5% of the Critical Level) immediately adjacent to the A104 under Option C. DMRB Interim Advice Note 174/12⁵³ 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). However, since it is over 1% of the Critical Level the contribution of the Options cannot be dismissed as imperceptible. It is therefore necessary to consider the implications of the elevated NOx. This is done by examining the resultant nitrogen and acid deposition, since these are the two primary pathways for NOx to affect vegetation (whether ground-based or epiphytic).
- 7.3.4 The calculations indicate that no modelled Option results in a change in nitrogen or acid deposition rate equivalent to (or even close to) 1% of the Critical Load on any road link. Therefore, it is possible to conclude in line with DMRB and AQTAG guidelines that all Options would make an imperceptible or inconsequential contribution to local nitrogen and acid deposition within Epping Forest SAC. Due to the ability to reach this conclusion it is not necessary to undertake an assessment of nitrogen deposition or acid deposition 'in combination' with other projects and plans because, as per DMRB and AQTAG, a contribution of less than 1% is so small that it is considered never to have a likely significant effect even in combination with other projects and plans. Not all NOx is deposited near the roadside; much is converted to other chemicals and/or dispersed more widely before being deposited. Therefore, the degree of change in nitrogen and acid deposition at a given distance from the roadside is always much smaller than the accompanying change in NOx concentrations.
- 7.3.5 The change in NOx concentrations at the roadside on several road links is predicted to be greater than 1% of the critical level (in the worst case, up to 5% of the critical level). Therefore, these cannot be described as imperceptible and require consideration 'in combination'. This is essentially achieved by examining the total Do Something NOx concentrations, as the Do Something scenario incorporates all expected future development including currently unimplemented planning permissions, plus background traffic growth. As per footnote 68, the Critical Level for NOx is set at $30 \mu\text{g m}^{-3}$ to capture the role of NOx in nitrogen deposition and particularly in growth effects. If nitrogen deposition due to a scheme can be dismissed as imperceptible even in combination, then whether the expected total NOx concentration is over $30 \mu\text{g m}^{-3}$ or not ceases to be particularly important and attention should be paid to other effects of NOx that may arise other than through its role as a source of nitrogen. These may include biochemical effects e.g. enzyme activity, chlorophyll content and physiological effects e.g. CO₂ 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. Based on those studies, the physiological and biochemical effects of NOx do not appear to occur until much higher annual concentrations are reached. 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*⁵⁴. Reference to the data provided within the WHO report suggests that exposure to annual average concentrations below $100 \mu\text{g m}^{-3}$ are unlikely to cause direct biochemical or physiological effects based on the available studies and it may be that concentrations considerably above $100 \mu\text{g m}^{-3}$ would be required in the field before an effect was observed. From the tables above, the highest 'in combination' (Do Something) 2033 NOx concentration predicted on the modelled links from these Options is $56.5 \mu\text{g m}^{-3}$ 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 NOx concentration at which other effects, unrelated to growth stimulation and nitrogen deposition, are likely to occur.

⁵³ The Design Manual for Roads and Bridges (Interim Advice Note 174/12 Updated advice for evaluating significant local air quality effects for users of DMRB Volume 11, Section 3, Part 1 'Air Quality (HA207/07))

⁵⁴ WHO Regional Office for Europe, Copenhagen, Denmark, 2000. Air Quality Guidelines – Second Edition. Chapter 11

- 7.3.6 In summary therefore, based on the traffic flow data for the modelled links and using the criteria set by AQTAG, it can be concluded that there will be no adverse effect on the integrity of Epping Forest SAC from either option, either alone or in combination with other plans and projects.
- 7.3.7 However, even allowing for some improvement in background air quality to 2033 from improved emissions technology, the total nitrogen deposition rates adjacent to all modelled links will reach, or exceed, the lowest point of the currently used critical load range for Epping Forest SAC. As such, while the modelling indicates that none of the HMA Options can be 'blamed' for making a significant contribution to the future elevated nitrogen deposition rates, when all traffic is taken together there clearly will remain potential for a continued negative effect on the SAC by 2033. Therefore, while it may not be required as 'mitigation' for Local Plan development specifically, it is considered appropriate that the HMA authorities pursue the Memorandum of Understanding and use it as a basis to work cooperatively with The Corporation of London, Natural England and other partners to achieve material improvements in air quality and nitrogen inputs to Epping Forest SAC by 2033, such as through delivery of the Forest Transport Plan and Forest Nitrogen Action Plan. This would also be appropriate since it is recognised that transport modelling is predictive and it is impossible to know how accurate it will be until 2033, and it is recognised that some pollutants that have been identified of being of concern for the SAC (such as ammonia) cannot be accurately modelled and that there are currently difficulties modelling queuing traffic at Wake Arms Roundabout. Since the commitment to this work is set out in the Epping Forest SAC Memorandum of Understanding and this MoU is a formal document, the commitment does not need reproducing in the District Plan.

Recommendation

- 7.3.8 **It is considered appropriate that approach outlined in the Epping Forest Memorandum of Understanding is used as a basis to work cooperatively with The Corporation of London, Natural England and other partners to achieve material improvements in air quality and nitrogen inputs to Epping Forest SAC by 2033. This approach should be reflected in the Plan document to establish a net improvement in air quality along Essex roadsides in Epping Forest SAC by 2033. This should include:**
- **Monitoring air quality along key roads within Essex that lie within 200m of Epping Forest, in conjunction with the Epping Forest Conservators;**
 - **Working with the Epping Forest Conservators and Essex County Council to deliver the Site Nitrogen Plan and Transport Management Strategy for Epping Forest, in addition to any further measures that are identified as an outcome of the monitoring described in the above point; and**
 - **Maximising promotion of sustainable transport throughout the local authority area.**
- 7.3.9 Provided this provision is included within the Plan, it can be considered that this impact pathway upon the SAC can be screened out.

8 Water Abstraction

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

Policies

- Draft Policy SP 2: Spatial Development Strategy 2011-2033
- Draft Policy E 1 (Employment Sites). Provides for new employment sites as well as improvements to existing sites, however no quantum of development is identified.

Site Allocations

- All residential and employment sites in combination

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

- The pre-amble to Draft Policy DM 3 (Epping Forest SAC and the Lee Valley SPA) provides a positive contribution to the plan ensuring that no likely significant effects occur as a result of the Plan. It provides for HRA of projects or plans that are 'likely to give rise to significant impact on the integrity of the sites'.
- Draft Policy DM 19 (Sustainable Water Use). This is a positive development management policy that provides for enhanced water use efficiency, thus reducing the need for water abstraction.

8.2 Lee Valley SPA/Ramsar site

8.2.1 Almost all settlements within Epping Forest receive their potable water supply through Affinity Water. Within its catchment Affinity Water abstracts water from tributaries of Lee Valley SPA/Ramsar site.

8.2.2 The Lee Valley SPA/Ramsar site 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. 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. However, the quarries could theoretically be adversely affected if groundwater abstraction for public water supply was sufficiently great to cause drawdown of water levels.

8.2.3 The current Affinity Water Water Resource Management Plan 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 East Herts District Plan will not result in adverse effects on Lee Valley SPA/Ramsar site through excessive water drawdown, either alone or in combination with other plans and projects.

9 Water Quality

9.1.1 The following site allocations and policies could not be dismissed in the initial sift from potentially posing likely significant effects upon the Lee Valley SPA/ 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

- Draft Policy SP 2 (Spatial Development Strategy 2011-2033)
- Draft Policy E 1 (Employment Sites). Provides for new employment sites as well as improvements to existing sites, however no quantum of development is identified.

Site Allocations

- All residential and employment sites in combination

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

- The pre-amble to Draft Policy DM 3 (Epping Forest SAC and the Lee Valley SPA) provides a positive contribution to the plan ensuring that no likely significant effects occur as a result of the Plan. It provides for HRA of projects or plans that are 'likely to give rise to significant impact on the integrity of the sites'.
- Draft policy DM 16 (Sustainable Drainage Systems). By definition, sustainable drainage systems would not result in likely significant effects upon internationally designated sites. This is a positive policy as it aims to result in a net improvement in water quality discharge to a sewer, improve water quality and reduce runoff.
- Draft Policy DM 18 (On Site Management of Waste Water and Water Supply). This is a positive development management policy as it ensures that the public sewerage network has sufficient capacity to serve existing and new development, thus preventing a reduction in water quality.

9.2 Lee Valley SPA/Ramsar site

9.2.1 Change in water quality is the main pathway through which the Lee Valley SPA/Ramsar site could be adversely affected. Two parts of the Lee Valley SPA/Ramsar site lie within East Herts: Amwell Quarry and Rye Meads. The nearest proposed development site to a part of Lee Valley SPA/Ramsar site is 760m distant, so direct surface water runoff effects on water quality will not arise. However, Rye Meads consists of non-operational land at and around the Rye Meads Wastewater Treatment Works (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.

9.2.2 '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 controlled⁵⁵. 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 Sewage Treatment Works (STW) 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.
- 9.2.3 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/Ramsar site, and if so, to amend the consent in order to avoid such an effect. 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/Ramsar site is unlikely to occur from this pathway.
- 9.2.4 However, once the WwTW ceases to have capacity within its existing discharge consent for effluent from additional dwellings, 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). Water quality is therefore an important pathway to investigate with regard to future development within the Rye Meads WwTW catchment.
- 9.2.5 With regard to Epping Forest, as identified in Table 4, the settlements of Roydon, Lower Sheering and Harlow are located within the catchment of Rye Meads WwTW, likely to provide approximately 3,970 new dwellings between them. The bulk of wastewater volumes treated by the WwTW come from Stevenage, Welwyn Garden City and Harlow but settlements in East Herts also make a significant contribution.
- 9.2.6 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. The current predictions show that Rye Meads STW can relatively comfortably deal with known growth up to 2036. In the period from 2036 to 2041 the site becomes more stressed but not necessarily to an extent that would trigger an upgrade to the site.
- 9.2.7 Since 2036 to 2041 is beyond the Local Plan period, it is therefore possible to conclude that the District Plan will not result in a water quality effect on Lee Valley SPA/Ramsar site either alone or in combination with other projects and plans.

⁵⁵ '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>

10 Summary of Recommendations and Conclusions

10.1.1 Provided that the recommendations made in this document are incorporated into the District Plan, it would be possible to conclude that the Epping Forest District Plan will not result in a likely significant effect, either alone or in combination, upon any European sites. This conclusion is contingent upon the signature, adoption and implementation of the Epping Forest SAC Memorandum of Understanding between the HMA authorities, Hertfordshire County Council, Essex County Council, Natural England and the Corporation of London. This will ensure that any issues that may arise regarding air quality or recreational pressure on Epping Forest SAC can be identified and addressed before they result in a likely significant effect.

10.1.2 The recommendations are as follows:

10.2 General

10.2.1 The pre-ambles to Draft Policy DM 3 (Epping Forest SAC and the Lee Valley SPA) should be reworded for accuracy and to ensure that the text contains accurate reference to terminology in the Conservation of Habitats and Species Regulations (2010). The phrase 'significant impact on the integrity of ...' should be replaced by 'likely significant effect on ...'

10.3 Urbanisation

Epping Forest

10.3.1 It is considered appropriate that a safeguard is put in place for each allocation within 400m of the SAC. This safeguard should require a project-level HRA to be undertaken, which will set out how the developer proposes to ensure that urbanisation effects (fly tipping, introduction of non-native plant species, incidental arson etc.) will not arise.

10.4 Recreational Pressure

Wormley-Hoddesdonpark Woods SAC and Lee Valley SPA/Ramsar site

10.4.1 To maximise confidence that these sites are adequately protected, it is recommended that all new development deliver greenspace in-line with the Natural England ANG standard to ensure that it is self-sufficient

Epping Forest SAC

10.4.2 As an interim measure, it is recommended that Epping Forest District Council should, in line with Draft Policies DM 3 and DM 4, require:

- All outline or (if outline permission has already been obtained) detailed housing applications (that have not already received a Resolution to Grant permission) for more than 400 dwellings⁵⁶ in Loughton, Epping, Waltham Abbey, Theydon Bois and Chigwell to deliver their own on-site accessible natural greenspace (typically at a rate of 8ha per 1000 population, although this can be judged against quality and accessibility on a case by case basis) and make a financial contribution towards access management of the SAC; and
- All other outline or detailed residential applications (that have not already received a Resolution to Grant permission) in the same settlements to make a financial contribution to access management of the SAC.

⁵⁶ Site allocations within 5km of Epping Forest SAC that are to provide 400 dwellings or more are: SR0099: (463 dwellings)

- 10.4.3 The size of the tariff remains to be determined but should be confirmed prior to submission of the Local Plan to the Secretary of State. This will be an interim tariff until such time as the visitor survey and analysis is completed and the need for any additional mitigation is identified.

10.5 Air Quality

Epping Forest SAC

- 10.5.1 It is considered appropriate that approach outlined in the Epping Forest Memorandum of Understanding is used as a basis to work cooperatively with The Corporation of London, Natural England and other partners to achieve material improvements in air quality and nitrogen inputs to Epping Forest SAC by 2033. This approach should be reflected in the Plan document to establish a net improvement in air quality along Essex roadsides in Epping Forest SAC by 2033. This should include:
- Monitoring air quality along key roads within Essex that lie within 200m of Epping Forest, in conjunction with the Epping Forest Conservators;
 - Working with the Epping Forest Conservators and Essex County Council to deliver the Site Nitrogen Plan and Transport Management Strategy for Epping Forest, in addition to any further measures that are identified as an outcome of the monitoring described in the above point; and,
 - Maximising promotion of sustainable transport throughout the local authority area.
- 10.5.2 Provided the above recommendations are incorporated into the Local Plan, it can be screened out from resulting in likely significant effect upon internationally designated sites.

Appendix A. Figures

Figure A1: Locations of Internationally Designated Sites

Figure A2: Location of Site Allocations

Appendix B. Background to Internationally Designated Sites

B.1 Epping Forest SAC

B.1.1 Introduction

Epping Forest SAC is located approximately 10km south of East Herts district. 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 supports a nationally outstanding assemblage of invertebrates, a major amphibian interest and an exceptional breeding bird community.

B.1.2 Reasons for Designation⁵⁷

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.

B.1.3 Current Pressures and Threats⁵⁸

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

B.1.4 Conservation Objectives

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

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

⁵⁷ JNCC (2015) Natura 200 Standard Data Form: Epping Forest SAC

⁵⁸ Natural England (2015). Site Improvement Plan: Epping Forest SAC

B.2 Lee Valley SPA and Ramsar Site

B.2.1 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/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.

B.2.2 Reasons for Designation

The Lee Valley site is designated as an SPA⁵⁹ for its Birds Directive Annex I and Ramsar site under criterion 6⁶⁰ 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 2⁶¹, by supporting the nationally scarce plant species whorled water-milfoil *Myriophyllum verticillatum* and the rare or vulnerable invertebrate *Micronecta minutissima* (a water-boatman).

B.2.3 Current Pressures and Threats⁶²

- Water pollution
- Hydrological changes
- Public disturbance
- Inappropriate scrub control
- Fishing
- Air pollution
- Inappropriate cutting and mowing
- Invasive species

B.2.4 Conservation Objectives⁶³

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,

⁵⁹ <http://jncc.defra.gov.uk/page-2047-theme=default> [accessed 12/08/2016]

⁶⁰ <http://jncc.defra.gov.uk/pdf/RIS/UK11034.pdf> [accessed 12/08/2016]

⁶¹ Ibid

⁶² <http://publications.naturalengland.org.uk/file/5788502547496960> [accessed 12/08/2016]

⁶³ <http://publications.naturalengland.org.uk/file/5168095937167360> [accessed 12/08/2016]

- The distribution of the qualifying features within the site.

B.3 Wormley-Hoddesdonpark Woods SAC

B.3.1 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.

B.3.2 Reasons for Designation⁶⁴

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.

B.3.3 Current Pressures and Threats⁶⁵

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

B.3.4 Conservation Objectives⁶⁶

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

⁶⁴ <http://jncc.defra.gov.uk/protectedsites/sacselection/sac.asp?EUCode=UK0013696> [accessed 12/08/2016]

⁶⁵ <http://publications.naturalengland.org.uk/file/6541134543192064> [accessed 12/08/2016]

⁶⁶ <http://publications.naturalengland.org.uk/file/6475250191564800> [accessed 12/08/2016]

Appendix C. Air Quality Impact Assessment: Lee Valley SPA/Ramsar site

Option A

| A414 | | | | | | | | | | | | |
|--------------|-------------------------------|------|------|--------|-------------------------------|-------|-------|--------|-------------------------------|------|------|--------|
| Distance (m) | Annual Mean NOx Conc. (ug/m3) | | | | Annual Mean N Dep (k N/ha/yr) | | | | Annual Mean A Dep (keq/ha/yr) | | | |
| | BL | DM | DS | Change | BL | DM | DS | Change | BL | DM | DS | Change |
| 25 | 31.7 | 21.7 | 21.8 | 0.1 | 15.30 | 11.64 | 11.65 | 0.01 | 1.24 | 1.21 | 1.21 | 0.00 |
| 50 | 28.2 | 19.9 | 20.0 | 0.1 | 15.12 | 11.55 | 11.56 | 0.00 | 1.22 | 1.20 | 1.20 | 0.00 |
| 100 | 25.8 | 18.7 | 18.8 | 0.0 | 15.00 | 11.49 | 11.49 | 0.00 | 1.21 | 1.20 | 1.20 | 0.00 |
| 150 | 24.9 | 18.2 | 18.3 | 0.0 | 14.95 | 11.47 | 11.47 | 0.00 | 1.20 | 1.20 | 1.20 | 0.00 |
| 200 | 24.4 | 18.0 | 18.0 | 0.0 | 14.92 | 11.45 | 11.46 | 0.00 | 1.20 | 1.19 | 1.19 | 0.00 |

Option B

| A414 | | | | | | | | | | | | |
|--------------|-------------------------------|------|------|--------|-------------------------------|-------|-------|--------|-------------------------------|------|------|--------|
| Distance (m) | Annual Mean NOx Conc. (ug/m3) | | | | Annual Mean N Dep (k N/ha/yr) | | | | Annual Mean A Dep (keq/ha/yr) | | | |
| | BL | DM | DS | Change | BL | DM | DS | Change | BL | DM | DS | Change |
| 25 | 31.7 | 21.7 | 22.0 | 0.3 | 15.30 | 11.64 | 11.66 | 0.02 | 1.24 | 1.21 | 1.22 | 0.00 |
| 50 | 28.2 | 19.9 | 20.1 | 0.2 | 15.12 | 11.55 | 11.56 | 0.01 | 1.22 | 1.20 | 1.21 | 0.00 |
| 100 | 25.8 | 18.7 | 18.8 | 0.1 | 15.00 | 11.49 | 11.50 | 0.01 | 1.21 | 1.20 | 1.20 | 0.00 |
| 150 | 24.9 | 18.2 | 18.3 | 0.1 | 14.95 | 11.47 | 11.47 | 0.01 | 1.20 | 1.20 | 1.20 | 0.00 |
| 200 | 24.4 | 18.0 | 18.1 | 0.1 | 14.92 | 11.45 | 11.46 | 0.00 | 1.20 | 1.19 | 1.19 | 0.00 |

Option C

| A414 | | | | | | | | | | | | |
|--------------|-------------------------------|------|------|--------|-------------------------------|-------|-------|--------|-------------------------------|------|------|--------|
| Distance (m) | Annual Mean NOx Conc. (ug/m3) | | | | Annual Mean N Dep (k N/ha/yr) | | | | Annual Mean A Dep (keq/ha/yr) | | | |
| | BL | DM | DS | Change | BL | DM | DS | Change | BL | DM | DS | Change |
| 25 | 31.7 | 21.7 | 22.0 | 0.3 | 15.30 | 11.64 | 11.66 | 0.02 | 1.24 | 1.21 | 1.22 | 0.00 |
| 50 | 28.2 | 19.9 | 20.1 | 0.2 | 15.12 | 11.55 | 11.56 | 0.01 | 1.22 | 1.20 | 1.21 | 0.00 |
| 100 | 25.8 | 18.7 | 18.8 | 0.1 | 15.00 | 11.49 | 11.50 | 0.01 | 1.21 | 1.20 | 1.20 | 0.00 |
| 150 | 24.9 | 18.2 | 18.3 | 0.1 | 14.95 | 11.47 | 11.47 | 0.01 | 1.20 | 1.20 | 1.20 | 0.00 |
| 200 | 24.4 | 18.0 | 18.1 | 0.1 | 14.92 | 11.45 | 11.46 | 0.00 | 1.20 | 1.19 | 1.19 | 0.00 |

Option D

| A414 | | | | | | | | | | | | |
|--------------|-------------------------------|------|------|--------|-------------------------------|-------|-------|--------|-------------------------------|------|------|--------|
| Distance (m) | Annual Mean NOx Conc. (ug/m3) | | | | Annual Mean N Dep (k N/ha/yr) | | | | Annual Mean A Dep (keq/ha/yr) | | | |
| | BL | DM | DS | Change | BL | DM | DS | Change | BL | DM | DS | Change |
| 25 | 31.7 | 21.7 | 21.6 | -0.1 | 15.30 | 11.64 | 11.64 | 0.00 | 1.24 | 1.21 | 1.21 | 0.00 |
| 50 | 28.2 | 19.9 | 19.9 | -0.1 | 15.12 | 11.55 | 11.55 | 0.00 | 1.22 | 1.20 | 1.20 | 0.00 |
| 100 | 25.8 | 18.7 | 18.7 | 0.0 | 15.00 | 11.49 | 11.49 | 0.00 | 1.21 | 1.20 | 1.20 | 0.00 |
| 150 | 24.9 | 18.2 | 18.2 | 0.0 | 14.95 | 11.47 | 11.47 | 0.00 | 1.20 | 1.20 | 1.20 | 0.00 |
| 200 | 24.4 | 18.0 | 18.0 | 0.0 | 14.92 | 11.45 | 11.45 | 0.00 | 1.20 | 1.19 | 1.19 | 0.00 |

Option E

| A414 | | | | | | | | | | | | |
|--------------|--|------|------|--------|-------------------------------|-------|-------|--------|-------------------------------|------|------|--------|
| Distance (m) | Annual Mean NO _x Conc. (ug/m ³) | | | | Annual Mean N Dep (k N/ha/yr) | | | | Annual Mean A Dep (keq/ha/yr) | | | |
| | BL | DM | DS | Change | BL | DM | DS | Change | BL | DM | DS | Change |
| 25 | 31.7 | 21.7 | 21.6 | -0.1 | 15.30 | 11.64 | 11.64 | -0.01 | 1.24 | 1.21 | 1.21 | 0.00 |
| 50 | 28.2 | 19.9 | 19.8 | -0.1 | 15.12 | 11.55 | 11.55 | 0.00 | 1.22 | 1.20 | 1.20 | 0.00 |
| 100 | 25.8 | 18.7 | 18.7 | -0.1 | 15.00 | 11.49 | 11.49 | 0.00 | 1.21 | 1.20 | 1.20 | 0.00 |
| 150 | 24.9 | 18.2 | 18.2 | 0.0 | 14.95 | 11.47 | 11.47 | 0.00 | 1.20 | 1.20 | 1.20 | 0.00 |
| 200 | 24.4 | 18.0 | 18.0 | 0.0 | 14.92 | 11.45 | 11.45 | 0.00 | 1.20 | 1.19 | 1.19 | 0.00 |

Appendix D. Air Quality Impact Assessment: Epping Forest SAC

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 involve 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. These data are summarised below. According to the Design Manual for Roads and Bridges guidance for assessing air quality impact of traffic, a two-way increase in flows of less than 1,000 AADT (assuming the percentage HDV and average vehicle speeds remain the same) means that *'the impact of the scheme can be considered to be neutral in terms of local air quality and no further work is needed'*. Nonetheless, in this exercise all changes in flows were subject to air quality calculation.

| Link | 2033 Minimum way flows | Do two | Change in two-way AADT compared to DM. Positive numerals mean an increase, negative numerals mean a decrease | | | | |
|--|------------------------------|-----------|--|----------|----------|----------|----------|
| | | | 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; 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.





When calculating Do Minimum NO_x 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.

Any process that involves the release of combustion products into atmosphere will contribute to atmospheric pollution, such that a plan or project that resulted in (for example) a single additional car journey on a given road through Epping Forest SAC will be contributing to pollution to some degree. With this principle in mind, the Air Quality Technical Advisory Group (AQTAG; consisting of Environment Agency, Natural England and Natural Resources Wales) has drawn a clear distinction between '*plans and projects considered to be inconsequential and never likely to have an in-combination effect (and so not included in any assessment of likely significant effect in-combination with a new plan or project) and those concluded to have 'no likely significant effect' (insignificant alone but which may need to be considered in the assessment of any other new plans or projects)*'⁶⁷. The threshold they use for deciding whether a plan or project (or in this case each HMA growth option) is inconsequential is '1% of the Critical Level' (for NO_x)⁶⁸ or '1% of the Critical Load'⁶⁹ for nitrogen and acid deposition. Design Manual for Roads and Bridges advises that where the concentration within the emission footprint [i.e. the Process Contribution (PC), the contribution of the scheme in question] in any part of the European site(s) is 1% of the relevant long-term benchmark (Critical Level or Critical Load) or less, the emission is 'imperceptible' and not likely to have a significant effect alone or in combination with other projects and plans irrespective of the background levels⁷⁰.

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. Where this is less than 1% of the Critical Level or Load it is shown as a green cell. Where it is above 1% of the Critical Level or Load it is shown as an orange cell. Note that where the number given in a cell is 0.00 it does not literally mean that there will be no deposition but rather that it will be less than 0.01 kgN/ha/yr or keq/ha/yr and thus below the rate that can be modelled.

⁶⁷ AQTAG position regarding In-combination guidance and assessment. Correspondence between AQTAG and PINS. March 2015 states that: '*AQTAG is confident that a process contribution [the difference between Do Minimum and Do Something Scenarios] < 1% of the relevant critical level or load (CL) can be considered inconsequential and does not need to be included in an in-combination assessment*'

⁶⁸ The Critical Level for NO_x is set for all vegetation at 30 µgm⁻³. Experiments have shown that the different effects of NO_x occur at different annual concentrations and some will not arise until concentrations of several hundred (or even thousand) micrograms per cubic metre are reached. However, the growth stimulation or inhibition nitrogen deposition effects arise at the lowest annual concentrations and 30 µgm⁻³ was chosen as the Critical Level on the basis that concentrations below this level are very unlikely to be accompanied by significant nitrogen deposition unless there are other sources of atmospheric nitrogen.

⁶⁹ The Air Pollution Information System (www.apis.ac.uk) gives 10 kgN/ha/yr as the lowest point in the Critical Load range for Epping Forest SAC.

⁷⁰ Design Manual for Roads and Bridges Interim Advice Note (IAN) 174/13 (2013) Updated advice for evaluating significant local air quality effects for users of DMRB Volume 11, Section 3, Part 1 Air Quality (HA207/07) states that '*Where the difference in concentrations [between the Do Minimum and Do Something Scenarios] are less than 1% of the air quality threshold then the change at these receptors is considered to be imperceptible and they can be scoped out of the judgement on significance*'.

Option A

| A121 between Wake Arms Roundabout and M25 | | | | | | | | | | | | |
|---|-------------------------------|------|------|--------|-------------------------------|-------|-------|--------|-------------------------------|------|------|--------|
| Distance (m) | Annual Mean Nox Conc. (ug/m3) | | | | Annual Mean N Dep (k N/ha/yr) | | | | Annual Mean A Dep (keq/ha/yr) | | | |
| | 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 | | | | | | | | | | | | |
| Distance (m) | Annual Mean Nox Conc. (ug/m3) | | | | Annual Mean N Dep (k N/ha/yr) | | | | Annual Mean A Dep (keq/ha/yr) | | | |
| | 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 | | | | | | | | | | | | |
| Distance (m) | Annual Mean Nox Conc. (ug/m3) | | | | Annual Mean N Dep (k N/ha/yr) | | | | Annual Mean A Dep (keq/ha/yr) | | | |
| | 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 | | | | | | | | | | | | |
|---|-------------------------------|------|------|--------|-------------------------------|-------|-------|--------|-------------------------------|------|------|--------|
| Distance (m) | Annual Mean Nox Conc. (ug/m3) | | | | Annual Mean N Dep (k N/ha/yr) | | | | Annual Mean A Dep (keq/ha/yr) | | | |
| | 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 | | | | | | | | | | | | |
| Distance (m) | Annual Mean Nox Conc. (ug/m3) | | | | Annual Mean N Dep (k N/ha/yr) | | | | Annual Mean A Dep (keq/ha/yr) | | | |
| | 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 | | | | | | | | | | | | |
| Distance (m) | Annual Mean Nox Conc. (ug/m3) | | | | Annual Mean N Dep (k N/ha/yr) | | | | Annual Mean A Dep (keq/ha/yr) | | | |
| | 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 | | | | | | | | | | | | |
|---|-------------------------------|------|------|--------|-------------------------------|-------|-------|--------|-------------------------------|------|------|--------|
| Distance (m) | Annual Mean Nox Conc. (ug/m3) | | | | Annual Mean N Dep (k N/ha/yr) | | | | Annual Mean A Dep (keq/ha/yr) | | | |
| | 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 | | | | | | | | | | | | |
| Distance (m) | Annual Mean Nox Conc. (ug/m3) | | | | Annual Mean N Dep (k N/ha/yr) | | | | Annual Mean A Dep (keq/ha/yr) | | | |
| | 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 | | | | | | | | | | | | |
|--------------|-------------------------------|------|------|--------|-------------------------------|-------|-------|--------|-------------------------------|------|------|--------|
| Distance (m) | Annual Mean Nox Conc. (ug/m3) | | | | Annual Mean N Dep (k N/ha/yr) | | | | Annual Mean A Dep (keq/ha/yr) | | | |
| | 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 | | | | | | | | | | | | |
| Distance (m) | Annual Mean Nox Conc. (ug/m3) | | | | Annual Mean N Dep (k N/ha/yr) | | | | Annual Mean A Dep (keq/ha/yr) | | | |
| | 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 | | | | | | | | | | | | |
|---|-------------------------------|------|------|--------|-------------------------------|-------|-------|--------|-------------------------------|------|------|--------|
| Distance (m) | Annual Mean Nox Conc. (ug/m3) | | | | Annual Mean N Dep (k N/ha/yr) | | | | Annual Mean A Dep (keq/ha/yr) | | | |
| | 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 | | | | | | | | | | | | |
| Distance (m) | Annual Mean Nox Conc. (ug/m3) | | | | Annual Mean N Dep (k N/ha/yr) | | | | Annual Mean A Dep (keq/ha/yr) | | | |
| | 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 | | | | | | | | | | | | |
| Distance (m) | Annual Mean Nox Conc. (ug/m3) | | | | Annual Mean N Dep (k N/ha/yr) | | | | Annual Mean A Dep (keq/ha/yr) | | | |
| | 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 |

Interpretation

The key interpretation of the preceding tables is as follows:

1. There is relatively little difference between any of the Options. This is probably because all the Options have the same broad distribution for new housing i.e. clustered around Harlow, even though they vary in quantum and detailed distribution.
2. For all Options and all roads other than Theydon Road, there would be an increase in NO_x concentration up to 10-20m from the roadside (depending on link modelled) that would be greater than 1% of the Critical Level. This varies from 0.4 µg_m⁻³ (1.3% of the Critical Level) at the furthest distance, up to a maximum of 1.5 µg_m⁻³ (5% of the Critical Level) immediately adjacent to the A104 under Option C. DMRB Interim Advice Note 174/12⁷¹ 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). However, since it is over 1% of the Critical Level the contribution of the Options cannot be dismissed as imperceptible. It is therefore necessary to consider the implications of the elevated NO_x. This is done by examining the resultant nitrogen and acid deposition, since these are the two primary pathways for NO_x to affect vegetation (whether ground-based or epiphytic).
3. The calculations reported in the tables above indicate that no modelled Option results in a change in nitrogen or acid deposition rate equivalent to (or even close to) 1% of the Critical Load on any road link. Therefore, it is possible to conclude in line with DMRB and AQTAG guidelines that all Options would make an imperceptible or inconsequential contribution to local nitrogen and acid deposition within Epping Forest SAC. Due to the ability to reach this conclusion it is not necessary to undertake an assessment of nitrogen deposition or acid deposition 'in combination' with other projects and plans because, as per DMRB and AQTAG, a contribution of less than 1% is so small that it is considered never to have a likely significant effect even in combination with other projects and plans. Not all NO_x is deposited near the roadside; much is converted to other chemicals and/or dispersed more widely before being deposited. Therefore, the degree of change in nitrogen and acid deposition at a given distance from the roadside is always much smaller than the accompanying change in NO_x concentrations.
4. The change in NO_x concentrations at the roadside on several road links is predicted to be greater than 1% of the critical level (in the worst case, up to 5% of the critical level). Therefore, these cannot be described as imperceptible and require consideration 'in combination'. This is essentially achieved by examining the total Do Something NO_x concentrations, as the Do Something scenario incorporates all expected future development including currently unimplemented planning permissions, plus background traffic growth. As per footnote 68, the Critical Level for NO_x is set at 30 µg_m⁻³ to capture the role of NO_x in nitrogen deposition and particularly in growth effects. If nitrogen deposition due to a scheme can be dismissed as imperceptible even in combination, then whether the expected total NO_x concentration is over 30 µg_m⁻³ or not ceases to be particularly important and attention should be paid to other effects of NO_x that may arise other than through its role as a source of nitrogen. These may include biochemical effects e.g. enzyme activity, chlorophyll content and physiological effects e.g. CO₂ assimilation or stomatal conductivity, although many of these changes

⁷¹ The Design Manual for Roads and Bridges (Interim Advice Note 174/12 Updated advice for evaluating significant local air quality effects for users of DMRB Volume 11, Section 3, Part 1 'Air Quality (HA207/07))

may still be due to increased nitrogen rather than other effects of the gas such as acidity. Based on those studies, the physiological and biochemical effects of NO_x do not appear to occur until much higher annual concentrations are reached. 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*'.⁷² Reference to the data provided within the WHO report suggests that exposure to annual average concentrations below 100 µg m⁻³ are unlikely to cause direct biochemical or physiological effects based on the available studies and it may be that concentrations considerably above 100 µg m⁻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 from these Options is 56.5 µg m⁻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.

In summary therefore, based on the traffic flow data for the modelled links and using the criteria set by AQTAG, it can be concluded that there will be no adverse effect on the integrity of Epping Forest SAC from either option, either alone or in combination with other plans and projects.

However, it can also be seen from these tables that, even allowing for some improvement in background air quality to 2033 from improved emissions technology, the total nitrogen deposition rates adjacent to all modelled links will reach, or exceed, the lowest point of the currently used critical load range for Epping Forest SAC. As such, while the modelling indicates that none of the HMA Options can be 'blamed' for making a significant contribution to the future elevated nitrogen deposition rates, when all traffic is taken together there clearly will remain potential for a continued negative effect on the SAC by 2033. Therefore, while it may not be required as 'mitigation' it is considered appropriate that the HMA authorities pursue the Memorandum of Understanding and use it as a basis to work cooperatively with The Corporation of London, Natural England and other partners to achieve material improvements in air quality and nitrogen inputs to Epping Forest SAC by 2033, such as through delivery of the Forest Transport Plan and Forest Nitrogen Action Plan.

⁷² WHO Regional Office for Europe, Copenhagen, Denmark, 2000. Air Quality Guidelines – Second Edition. Chapter 11

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