SD 006

Chelmsford City Council

Chelmsford Pre-Submission Local Plan Habitats Regulations Assessment

Information to support an assessment under Regulation 105 of the *Conservation of Habitats and Species Regulations 2017*

January 2018

Amec Foster Wheeler Environment
& Infrastructure UK Limited

Report for

Claire Stuckey
Principal Planning Officer (Policy)
Chelmsford City Council
Director of Sustainable Communities
Civic Centre
Duke Street
Chelmsford
Essex
CM1 1JE

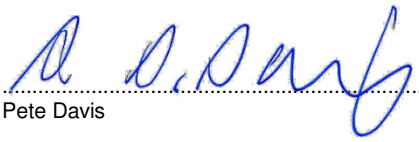
Main contributors

Mike Frost

Issued by

Mike Frost

Approved by



Pete Davis

Amec Foster Wheeler

Canon Court
Abbey Lawn
Abbey Foregate
Shrewsbury SY2 5DE
United Kingdom
Tel +44 (0) 1743 342 000

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Document revisions

No.	Details	Date
1	Draft HRA Report	19.12.17
2	HRA of Submission Draft	08.01.18

Contents

1. Introduction

1.1 Overview

Chelmsford City Council (the Council) is currently preparing a new Local Plan for its administrative area (for brevity, the term 'the City Area' is used throughout this document to describe the Council's administrative area). The new Local Plan will set out the vision, spatial principles, planning policies and site allocations that will guide development in the local authority area in the period up to 2036.

The first stage in the development of the Local Plan was the publication of the Chelmsford Local Plan Issues and Options Consultation Document (the Issues and Options Consultation Document) that was consulted on between 19th November 2015 and 21st January 2016. The Issues and Options Consultation Document set out, and sought views on, the planning issues that face Chelmsford over the next 15 years and options for the way they could be addressed in terms of the amount and broad location of future development in the City Area. Following consideration of the comments received as part of that consultation, ongoing engagement and further evidence base work, the Council selected its preferred options for the Local Plan in terms of the amount and location of growth to be delivered in the City Area up to 2036 and which formed the Chelmsford Draft Local Plan Preferred Options Consultation Document (the Preferred Options Consultation Document). The Preferred Options Consultation Document was published for consultation between 30th March and 11th May 2017 and included the draft Local Plan Strategic Priorities, Vision and Spatial Principles, development requirements and Spatial Strategy, proposed site allocations and plan policies.

The Preferred Options Consultation Document has since been revised to reflect representations received during consultation, new evidence and the recommendations of its accompanying assessments. The Chelmsford Local Plan: Pre-Submission Draft (hereafter referred to as the 'Pre-Submission Local Plan) is now being issued for consultation between 31st January 2018 and 14th March 2018 before it is considered by an independent planning inspector.

Amec Foster Wheeler Environment and Infrastructure UK Ltd (Amec Foster Wheeler, now Wood) has been commissioned by the Council to undertake the Habitats Regulations Assessment (HRA) of the new Local Plan including the Pre-Submission Draft. The HRA seeks to determine whether there will be any likely significant effects on European designated nature conservations sites as a result of the Local Plan's implementation.

1.2 The Chelmsford Local Plan – An Overview

Requirement to Prepare a Local Plan

The NPPF sets out (at paragraphs 150-157) that each local planning authority (LPA) should prepare a local plan for its area. Local plans should set out the strategic priorities and policies to deliver:

- the homes and jobs needed in the area;
- the provision of retail, leisure and other commercial development;
- the provision of infrastructure for transport, telecommunications, waste management, water supply, wastewater, flood risk and coastal change management, and the provision of minerals and energy (including heat);
- the provision of health, security, community and cultural infrastructure and other local facilities; and
- climate change mitigation and adaptation and conservation and enhancement of the natural and historic environment, including landscape.

The Planning Practice Guidance clarifies (at paragraph 002 'Local Plans') that local plans "*should make clear what is intended to happen in the area over the life of the plan, where and when this will occur and how it will be delivered*".

Scope of the Chelmsford Local Plan

The current Development Plan for Chelmsford for the period up to 2021 consists of various Development Plan Documents, alongside Supplementary Planning Documents (SPD). This is shown in **Box 1**.

Box 1: Development Plan Documents and SPD

Development Plan Documents
- Core Strategy and Development Control Policies Development Plan Document (DPD) – Adopted February 2008;
- Chelmsford Town Centre Area Action Plan – Adopted August 2008;
- North Chelmsford Area Action Plan – Adopted July 2011;
- Site Allocations Document – Adopted February 2012;
- Focused Review – Core Strategy and Development Control Policies - Adopted December 2013.

SPD including Community Infrastructure Levy (CIL)
- A Plan for South Woodham Ferrers SPD – Adopted June 2008;
- Making Places SPD (Urban Site Guidance) – Adopted June 2008;
- Sustainable Development SPD (Sustainable Design and Construction) - Adopted June 2008
- Public Realm Strategy – Adopted January 2011;
- Building for Tomorrow SPD – Adopted June 2013;
- Planning Obligations SPD – Adopted June 2014;
- Community Infrastructure Levy (CIL) Charging Schedule – Approved February 2014
- Village Design Statements (Adopted as SPD) - Various.

The Council is currently preparing a new Local Plan for Chelmsford that will, once adopted, replace the Development Plan Documents listed above. The new Local Plan will guide growth and development in Chelmsford City Council's administrative area (the City Area) for the period up to 2036 and beyond. It will be a single document that will provide the Council's vision, spatial principles and spatial strategy for the City Area and will also contain the Council's key planning policies, site specific land use allocations and a Local Plan policies map. Alongside the Waste and Minerals Local Plans and any Neighbourhood Plans that come forward, it will form the Development Plan for the local authority area.

Preparation of the Local Plan

The Council's Local Development Scheme (LDS) was published in October 2017[1]. The LDS sets out the timetable for production of the Local Plan in accordance with the requirements for plan production contained in The Town and Country Planning (Local Planning) (England) Regulations 2012). The key plan preparation milestones are detailed in **Table 1.1.**

Table 1.1 Local Plan preparation milestones

Stage	Date
Issues and Options Public and Stakeholder Consultation (Regulation 18)	Nov 2015 - Jan 2016 (completed)
Preferred Options Local Plan Public and Stakeholder Consultation (Regulation 18)	Mar - May 2017 (completed)
Draft Pre-Submission Local Plan Stakeholder and Public Consultation (Regulation 19)	Jan - Mar 2018 (current)
Submission for Independent Examination (Regulation 22)	June 2018
Examination in Public (Regulation 24)	Sep - Oct 2018
Adoption (Regulation 26)	Dec 2018

Adoption of the Local Plan is due to take place in late 2018. This will have been preceded by three principal periods of consultation during which the Local Plan will have been developed and refined taking into account (inter-alia) national planning policy and guidance, the Council's evidence base, the outcomes of consultation

[1] Chelmsford City Council (2017) *Chelmsford Local Plan Local Development Scheme 2017-2020.*

and the findings of social, economic and environmental assessments and appraisal including HRA. The three consultation periods are: Issues and Options; Preferred Options; and Pre-Submission.

Issues and Options

The first formal round of consultation in support of the development of the Local Plan was on the Issues and Options Consultation Document. As noted in **Section 1.1** above, this document set out, and sought views on, the planning issues that face Chelmsford over the next 15 years and options for the way they could be addressed. The specific matters put forward for consultation included:

- Spatial Principles (the high level objectives that guide the approach to the Local Plan);
- Housing Target Projections (options relating to how many houses should be built in the City Area up to 2036);
- Employment Target Projections (options relating to how many jobs should be supported in the City Area in the period up to 2036); and
- Spatial Options (options relating to where new development should be located in the City Area).

Consultation on the Issues and Options Consultation Document took place between 19th November 2015 and 21st January 2016.

Preferred Options

Following consideration of the comments received to the Issues and Options Consultation Document, ongoing engagement and further evidence base work, the Council selected its preferred options for the Local Plan in terms of the amount and location of growth to be delivered in the City Area up to 2036 and which formed the Preferred Options Consultation Document. The Preferred Options Consultation Document included (inter alia):

- the Local Plan Vision and Spatial Principles;
- the preferred Local Plan options in terms of the quantum of growth (development requirements) and distribution of growth (Spatial Strategy);
- proposed site allocations to deliver the preferred options across three Growth Areas; and
- plan policies including development requirements for proposed site allocations.

Consultation on the Preferred Options Consultation Document was undertaken between 30th March and 11th May 2017.

Pre-Submission

Taking into account representations received during consultation on the Preferred Options Consultation Document, new evidence and the recommendations of assessments, the Council has now prepared the Pre-Submission Local Plan. The Pre-Submission Local Plan is being issued for consultation before it is submitted to the Secretary of State for examination by an independent planning inspector. Further detail regarding the content of the Pre-Submission Local Plan is provided below.

The Pre-Submission Local Plan

The Pre-Submission Local Plan comprises of the following core components:

- the Local Plan Vision and Spatial Principles (which respond to the Strategic Priorities set out in Chapter 3 of the Pre-Submission Local Plan);
- the overarching Local Plan strategy in terms of the amount of new development to be accommodated in the City Area (development requirements) and how it will be accommodated (the Spatial Strategy);

- proposed site allocations to deliver the development requirements across three Growth Areas; and
- plan policies including development requirements for the proposed site allocations.

Local Plan Vision and Spatial Principles

The Vision for Chelmsford has been developed taking into account nine Strategic Priorities. The Vision contained Pre-Submission Local Plan is reproduced in **Box 2** below.

Box 2: Local Plan Vision

To continue the existing successes from the growth of Chelmsford City Council's area by embracing our role as England's newest City and the Capital of Essex. Chelmsford will be a sub-regional catalyst for change, providing new sustainable neighbourhoods and attracting inward investment for a wide range of businesses across our area. This also means maximising development opportunities within a compact and vibrant City Centre.

This positive change will optimise the opportunities for new and upgraded infrastructure including leisure and recreation facilities, shops, education and healthcare services and also provide even better housing and job opportunities to local residents making places where people want to live and work to further improve their quality of life and wellbeing. This will include improving the way people move around by public transport, by bike, on foot and in private vehicles and making the most of the area's assets and opportunities such as its river valleys, and improving the built, natural and historic environment.

Strategic Policy S1 lists a total of 11 guiding Spatial Principles that together detail how the Strategic Priorities and Vision will be achieved. The Spatial Principles are:

- Maximise the use of suitable previously developed land for development;
- Continue the renewal of Chelmsford City Centre and Urban Area;
- Locate development at well-connected sustainable locations;
- Locate development to avoid or manage flood risk;
- Protect the Green Belt;
- Protect and enhance the character of valued landscapes, heritage and biodiversity;
- Respect the pattern and hierarchy of existing settlements;
- Ensure development is deliverable;
- Ensure new development is served by necessary infrastructure;
- Use development to secure new infrastructure; and
- Plan for the longer-term.

Development Requirements and Spatial Strategy

Strategic Policy S8 (Housing and Employment Requirements) of the Pre-Submission Local Plan sets out the amount of growth that is to be delivered over the plan period in terms of housing, provision for Gypsies, Travellers and Travelling Showpeople, employment and retail, as follows:

- **Housing**: In order to meet the full objectively assessed housing need for the City Area in the period 2013-2036, provision is made for a minimum of 18,515 net new homes at an average annual rate of 805 net new homes per-year. Housing completions and outstanding commitments total 11,408 new homes. To ensure flexibility in delivery and help significantly boost housing supply, the Local Plan provides for a total of 21,893 new homes, nearly 20% more homes than the total objectively assessed housing need. When considering existing housing completions (3,090 dwellings) and existing commitments with and without planning permission (8,318 dwellings), and a windfall allowance (1,400) the residual requirement for the period up to 2036 is 9,085 new homes.

- **Gypsies, Travellers and Travelling Showpeople**: In order to meet identified need, a total of nine permanent pitches for Gypsies and Travellers and a total of 24 permanent plots for Travelling Showpeople will be provided in the period 2013-2036.
- **Employment**: To positively and proactively encourage sustainable and diverse economic growth across Chelmsford, a minimum of 55,000 square metres (sqm) of employment floorspace is to be delivered to meet the need for an average of 725 new jobs per year in the period to 2036.
- **Retail**: To meet the need for additional convenience retail floorspace, 13,400 sqm of floorspace is to be provided.

Strategic Policy S9 (The Spatial Strategy) seeks to distribute this growth in accordance with a Settlement Hierarchy, focusing new development across three Growth Areas in the higher order settlements of Chelmsford and South Woodham Ferrers (on brownfield sites and through sustainable urban extensions) and at Key Service Settlements outside of the Green Belt.

To support growth, the Key Diagram within the Spatial Strategy proposes key transportation infrastructure improvements including a Chelmsford North East Bypass, new Radial Distributor Roads in North East Chelmsford, improvements to the Army and Navy Junction, A12, A132 and Essex Regiment Way, two park and ride schemes (one located to the south west of Chelmsford around the A414 and the other located to the north east of Chelmsford around the A12 and A138).

The distribution of development proposed in the Pre-Submission Local Plan is set out in **Table 1.2** and represented graphically in the key diagram shown in **Figure 1.1**.

Table 1.2 Preferred Spatial Strategy: Development locations and allocations

Development Locations (2021-2036)		**New Homes**	**Traveller Pitches**	**Travelling Showpeople Plots**	**Net New Employment Floorspace**
Growth Area 1 - Central and Urban Chelmsford					
Status	*Existing Commitments*				
With Planning Permission	Peninsula site, Wharf Road	421			
Without Planning Permission	Lockside, Navigation Rd Waterhouse Lane, Writtle Telephone Exchange, Galleywood Reservoir	188			
Sub Total		**609**			
Location / Site	**New Local Plan Allocations**				
1	Previously developed sites in Chelmsford Urban Area	2,205			4,000sqm Office, 11,500sqm Food Retail
2	West Chelmsford	800		5	
3a	East Chelmsford – Manor Farm	250			
3b	East Chelmsford – Land North of Maldon Road				5,000sqm Office / Business Park
3c	East Chelmsford – Land North of Maldon Road	100			

Development Locations (2021-2036)		New Homes	Traveller Pitches	Travelling Showpeople Plots	Net New Employment Floorspace
3d	East Chelmsford – Land North of Maldon Road	50			
Sub total		**3,405**		**5**	9,000sqm Office / Business, 11,500sqm Food Retail
AREA TOTAL		**4,014**		**5**	9,000sqm Office / Business, 11,500sqm Food Retail
Growth Area 2 – North Chelmsford					
Status	*Existing Commitments*				
With Planning Permission	North East Chelmsford Beaulieu and Channels Post-2022 delivery, Land East of Main Road Gt Leighs and Land East of Plantation Road Boreham	2,669			40,000sqm Office / Business
Sub Total		**2,669**			**40,000sqm Office / Business**
Location / Site	**New Local Plan Allocations**				
4	North East Chelmsford	3,000		9	45,000sqm Office / Business Park
5a	Great Leighs – Land at Moulsham Hall	750		5	
5b	Great Leighs – Land East of London Road	250			
5c	Great Leighs – Land North and South of Banters Lane	100			
6	North of Broomfield	450			
GTI	Drakes Lane, Little Waltham		10		
Sub Total		**4,550**	**10**	**14**	**45,000sqm Office / Business Park**
AREA TOTAL		**7,219**	**10**	**14**	**85,000sqm Office / Business Park**
Growth Area 3 – South and East Chelmsford					
Status	**Existing Commitments**				
Existing Commitments without Planning	St Giles, Bicknacre	32			

Development Locations (2021-2036)		New Homes	Traveller Pitches	Travelling Showpeople Plots	Net New Employment Floorspace
Permission (re-allocation					
Sub total		**32**			
Location / Site	**New Local Plan Allocations**				
7	North of South Woodham Ferrers	1,000		5	1,000sqm Flexible Business Space, 1,900sqm Food Retail
8	South of Bicknacre	30			
9	Danbury	100			
Sub Total		**1,130**		**5**	**1,000sqm Flexible Business Space, 1,900sqm Food Retail**
AREA TOTAL		**1,162**		**5**	**1,000sqm Flexible Business Space, 1,900sqm Food Retail**
Windfall allowance 2021-2036		**1,400**			
NEW LOCAL PLAN ALLOCATIONS		**9,085**	**10**	**24**	**55,000 Office / Flexible Business Space, 13,400sqm Food Retail**
TOTAL		**10,485**	**10**	**24**	**55,000 Office / Flexible Business Space, 13,400sqm Food Retail**

Figure 1.1 Pre-Submission Local Plan Key Diagram

Growth Areas and Associated Proposed Site Allocations

To implement the Spatial Strategy, new development will be directed to sustainable locations within the following three Growth Areas (reflecting the distribution shown in **Table 1.2** and **Figure 1.1)**:

- **Growth Area 1:** Central and Urban Chelmsford;
- **Growth Area 2:** North Chelmsford; and
- **Growth Area 3:** South and East Chelmsford.

A total of 43 proposed site allocations are identified in the Pre-Submission Local Plan across these three Growth Areas. The site allocations include: Strategic Growth Sites; Growth Sites; Opportunity Sites; and Existing Commitments, in addition to Special Policy Areas relating to particular existing establishments in the countryside (the Special Policy Areas are Chelmsford City Racecourse, Broomfield Hospital, Hanningfield Reservoir Treatment Works, RHS Hyde Hall Gardens, Sandford Mill and Writtle University College).

Local Plan Policies

To support the overall strategy for development, the Pre-Submission Local Plan includes 97 policies across the following chapters:

- Our Vision and Spatial Principles (1 policy);
- Creating Sustainable Development (6 policies);
- How will Future Growth be Accommodated? (8 policies);
- Where will Development Growth be Focused? (50 policies);
- Protecting and Securing Important Assets (23 policies);
- Making High Quality Places (9 policies).

1.3 Habitats Regulations Assessment

Regulation 105 of the *Conservation of Habitats and Species Regulations 2017* (the 'Habitats Regulations') states that if a land-use plan is "*(a) is likely to have a significant effect on a European site*[2] *or a European offshore marine site*[3] *(either alone or in combination with other plans or projects); and (b) is not directly connected with or necessary to the management of the site*" then the plan-making authority must "…*make an appropriate assessment of the implications for the site in view of that site's conservation objectives*" before the plan is given effect.

The process by which Regulation 105 is met is known as Habitats Regulations Assessment (HRA)[4]. An HRA determines whether there will be any 'likely significant effects' (LSE) on any European site as a result of a plan's implementation (either on its own or 'in combination' with other plans or projects) and, if so, whether these effects will result in any adverse effects on the site's integrity. The Council has a statutory duty to prepare the Local Plan and is therefore the Competent Authority for an HRA.

[2] Strictly, 'European sites' are: any Special Area of Conservation (SAC) from the point at which the European Commission and the UK Government agree the site as a 'Site of Community Importance' (SCI); any classified Special Protection Area (SPA); any candidate SAC (cSAC); and (exceptionally) any other site or area that the Commission believes should be considered as an SAC but which has not been identified by the Government. However, the term is also commonly used when referring to potential SPAs (pSPAs), to which the provisions of Article 4(4) of Directive 2009/147/EC (the 'new wild birds directive') apply; and to possible SACs (pSACs) and listed Ramsar Sites, to which the provisions of the Habitats Regulations are applied a matter of Government policy (NPPF para. 118) when considering development proposals that may affect them. "European site" is therefore used in this report in its broadest sense, as an umbrella term for all of the above designated sites. Additional information on European site designations is provided in Appendix A.

[3] 'European offshore marine sites' are defined by Regulation 15 of *The Offshore Marine Conservation (Natural Habitats, &c.) Regulations 2007* (as amended); these regulations cover waters (and hence sites) over 12 nautical miles from the coast.

[4] The term 'Appropriate Assessment' has been historically used to describe the process of assessment; however, the process is now more accurately termed 'Habitats Regulations Assessment' (HRA), with the term 'Appropriate Assessment' limited to the specific stage within the process.

Regulation 105 essentially provides a test that the final plan must pass; there is no statutory requirement for HRA to be undertaken on draft plans or similar developmental stages (e.g. issues and options; preferred options). However, as with Sustainability Appraisal (SA), it is accepted best-practice for the HRA of strategic planning documents to be run as an iterative process alongside plan development, with the emerging policies or options continually assessed for their possible effects on European sites and modified or abandoned (as necessary) to ensure that the subsequently adopted plan is not likely to result in significant effects on any European sites, either alone or 'in combination' with other plans. This is undertaken in consultation with Natural England (NE) and other appropriate consultees.

1.4 Purpose of this Report

The HRA has been undertaken iteratively alongside the plan's development, with emerging policies and proposals assessed and reviewed, and recommendations made to ensure that the final plan is not likely to result in any significant effects on any European sites, alone or in combination with other plans or projects. Additional assessment, appropriate to the strategic nature of the plan and the anticipated outcomes, has been undertaken for those plan aspects where the possibility of 'significant' effects on European sites could not be clearly or self-evidently excluded during the plan development and review process.

This report summarises the iterative HRA process that has been undertaken to support the Local Plan's development to-date and ensure that it meets the requirements of Regulation 105. The report includes the following aspects:

- Details of the approach to the HRA of the Local Plan (**Section 2**).
- A summary of the baseline condition of the European sites and features that are potentially vulnerable (exposed and sensitive) to the likely effects of the Local Plan, and the impact pathways (**Section 3**).
- A summary of the initial screening assessments undertaken as part of the HRA of the emerging policies and proposals of the Local Plan, identifying those European sites and features that will not be affected by plan proposals, and those plan aspects (policies or allocations) which will not significantly affect any European sites (**Section 4**); this section includes a summary of mitigation measures proposed for inclusion in the Local Plan during the iterative assessment process.
- Additional technical assessments of the effects of the plan on those European sites and features that are vulnerable to aspects of the Local Plan, taking account of mitigation measures included in the Pre-Submission Draft (**Sections 5 – 7**).
- A summary of the proposed conclusion for the HRA of the Local Plan (**Section 8**).

The assessment will be reviewed following any amendments that are made to the final plan post-examination. A formal assessment conclusion against the requirements of Regulation 105 will be made at that point, although this report sets out the proposed conclusion for the final assessment.

1.5 How to Comment on this Report

This report has been issued for consultation alongside the Pre-Submission Local Plan from 31st January – 14th March 2014. Details of how to respond to the consultation are provided below.

This Consultation: How to Give Us Your Views

We would welcome your views on any aspect of this report. In particular, we would like to hear your views as to whether the effects which are predicted are likely and whether there are any potential significant effects which have not been considered.

Please provide your comments by 4.45pm on 14 March 2018. The Council encourages people to submit comments via its consultation portal at:
www.chelmsford.gov.uk/planningpolicyconsult

Alternatively, comments can be sent to:

- **By email – planning.policy@chelmsford.gov.uk**
- **By post - Planning and Housing Policy, Chelmsford City Council, Civic Centre, Duke Street, Chelmsford, CM1 1XP**
- **By hand – During normal opening hours to Chelmsford City Council Customer Service Centre (Duke Street, Chelmsford)**

A specially designed response form is available online at www.chelmsford.gov.uk/pre-submission or on request by telephoning (01245) 606330.

2. Approach to the HRA of the Local Plan

2.1 Overview

An HRA involves determining whether there will be any LSEs on any European sites as a result of a plan's implementation (either on its own or 'in combination' with other plans or projects) and, if so, whether it can be concluded that these effects will not have an adverse effect on the sites' integrity. European Commission guidance[5] suggests a four-stage process for HRA, although not all stages will always be required (see **Box 3**).

Box 3 – Stages of Habitats Regulations Assessment

Stage 1 – Screening:
This stage identifies the likely impacts upon a European site of a project or plan, either alone or 'in combination' with other projects or plans, and considers whether these impacts are likely to be significant.

Stage 2 – Appropriate Assessment:
Where there are likely significant effects, or where this is uncertain, this stage considers the effects of the plan or project on the integrity of the relevant European Sites, either alone or 'in combination' with other projects or plans, with respect to the sites' structure and function and their conservation objectives. Where it cannot be concluded that there will be no adverse effects on sites' integrity, it is necessary to consider potential mitigation for these effects.

Stage 3 – Assessment of Alternative Solutions:
Where adverse effects remain after the inclusion of mitigation, this stage examines alternative ways of achieving the objectives of the project or plan that avoid adverse impacts on the integrity of European sites.

Stage 4 – Assessment Where No Alternative Solutions Exist and Where Adverse Impacts Remain:
This stage assesses compensatory measures where it is deemed that the project or plan should proceed for imperative reasons of overriding public interest (IROPI). The EC guidance does not deal with the assessment of IROPI.

The 'screening' test or 'test of significance' is a low bar: a plan should be considered 'likely' to have an effect if the competent authority (in this case the Council) is unable (on the basis of objective information) to exclude the possibility that the plan could have significant effects on any European site, either alone or in combination with other plans or projects; an effect will be 'significant' if it could undermine the site's conservation objectives.

An 'appropriate assessment' stage provides a more detailed examination of the plan (or its components) where the effects are significant or uncertain[6], to determine whether there will be any 'adverse effects on integrity' of any sites as a result of the plan. The scope of any 'appropriate assessment' stage is not set, however, and such assessments need not be extremely detailed: they must simply be 'appropriate' to the effects and proposal being considered, and sufficient to ensure that there is no reasonable doubt that adverse effects on site integrity will not occur.

The approach summarised in **Box 3** works well at the project-level where the scheme design is usually established and possible effects on European sites can be assessed (usually quantitatively) using a linear stepwise process. In contrast, land-use plans and similar strategies present a number of distinct challenges for HRA and rigid application of the 'staged' approach to assessment suggested by **Box 3** is not always appropriate. In particular, it is preferable for sustainable policies to be developed from the beginning of the plan-making process rather than HRA being a purely retrospective assessment exercise towards the end. Therefore, it is important to recognise that the *process* of strategic HRA is as much about guiding the development of the plan (and demonstrating that effects on European sites have been considered appropriately) as it is about (ultimately) assessing its effects.

[5] *Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC* (EC 2002).

[6] i.e. 'likely significant effects', where the possibility of significant effects cannot be excluded.

2.2 Guidance

The following guidance has been used during the review and assessment of the Pre-Submission Local Plan:

- DTA Publications (2016) *The Habitats Regulation Handbook* [online]. Available at: http://www.dtapublications.co.uk/handbook/. Accessed 02.02.16;
- SNH (2017) *Habitats Regulations Appraisal of Plans: Guidance for plan-making bodies in Scotland*. Scottish Natural Heritage;
- DCLG (2006). *Planning for the Protection of European Sites: Appropriate Assessment. Guidance for Regional Spatial Strategies and Local Development Documents. Department for Communities and Local Government*, HMSO, London;
- English Nature, (1997-2001). *Habitats Regulations Guidance Notes 1-9*, Natural England, Peterborough;
- European Commission, (2002). *Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC*. European Commission, Brussels;
- European Commission, (2001). *Assessment of plans and projects significantly affecting Natura 2000 sites. European Commission*, Brussels;
- European Communities, (2007). *Managing Natura 2000 sites: The provisions of Article 6 of the Habitats Directive 92/433/EEC*. European Commission, Brussels.

2.3 Summary of Approach

Screening and Appropriate Assessment

The principles of 'screening'[7] are applied to the emerging Local Plan or its components (i.e. policies and site allocations) to allow the assessment stage to focus on those aspects that are most likely to have potentially significant or adverse effects on European sites, as well as shape the emerging strategy. Screening aims to determine whether the Local Plan will have any LSEs on any European site as a result of its implementation. It is intended to be a coarse filter for identifying effects (positive and negative) that may occur, to allow the assessment stage to focus on the most important aspects.

Screening can be used to 'screen-out' European sites and plan components from further assessment, if it is possible to determine that significant effects are unlikely (e.g. if sites or interest features are clearly not vulnerable (i.e. both exposed and sensitive) to the outcomes of a plan due to the absence of any reasonable impact pathways). The screening process has been applied to the Local Plan 'as a whole', on the European sites themselves and on the key components of the plan (the policies and allocations). The screening takes account of measures included in the plan to avoid significant effects.

The 'appropriate assessment' stage provides a more detailed examination of policies or allocations where the effects are likely to be significant, or (commonly) where they are uncertain. Note that undertaking a more detailed assessment of policies or sites does not necessarily imply a conclusion of 'significant effects' for those sites or aspects that are 'screened in' since controls within the Local Plan (i.e. policy measures) will also operate to minimise these effects and in many cases, the assessment is completed due to a residual uncertainty which the assessment is intended to resolve. The 'appropriate assessment' stage may therefore conclude that the proposals are likely to have an adverse effect on the integrity of a site (in which case they should be abandoned or modified); or that the effects will be significant but not adverse (i.e. an effect pathway exists, but those effects will not undermine site integrity); or that the effects will, if re-screened (taking into account the additional assessment or perhaps additional measures proposed for inclusion in the final plan), be 'not significant'.

[7] Note, from a strict procedural perspective, the 'screening' and 'appropriate assessment' stages can only be formally applied to the finalised plan, and not to its various phases or iterations; therefore the term 'screening' is used advisedly within this document.

'In Combination' Assessment

Article 6(3) of the Habitats Directive requires that the potential effects of the Local Plan on European sites must also be considered 'in combination with other plans or projects'. The 'in combination' assessment must also consider within-plan effects (i.e. between policies or allocations). Consideration of 'in combination' effects is not a separate assessment, but is integral to the screening and appropriate assessment stages of HRA and the development of avoidance/ mitigation measures. There is limited guidance available on the scope of the 'in combination' element, particularly with regard to which plans should be considered. However, the assessment should not necessarily be limited to plans at the same level in the planning hierarchy and there is consequently a wide range of plans that could have potential 'in combination' effects with the Local Plan. There is also limited guidance on the mitigation that may be appropriate if a European site is already being significantly affected by other plans; this is possible, since some plans will pre-date the requirement for HRA of plans, and therefore cannot be relied on to have no significant effect in their own right.

The plans identified by the SA have provided the basis for the assessment of 'in combination' effects; these plans have been reviewed to identify any potential effects and then considered (as necessary) within the assessment. The assessment has not generally included national strategies, national policy or legislation since the Local Plan must be compliant with these. It is considered that in combination effects are most likely in respect of other regional and sub-regional development plans and strategies. The plans considered 'in combination', and the results of the screening, are summarised in **Appendix D**. Completion of the 'in combination' assessment is directly related to the policy wording, and it will often be possible to remove any risk of 'in combination' effects through careful construction of the policy (i.e. inclusion of 'avoidance measures' during policy development).

Mitigation and Avoidance

The development of avoidance or mitigation measures is key to the HRA and plan development process. Avoidance measures are those that are incorporated into the plan during its development to prevent significant effects on European sites occurring; mitigation measures are used where significant effects are identified in order to prevent adverse effects on a site's integrity.

Avoidance or mitigation measures should aim to reduce the probability or magnitude of impacts on a European site until 'no likely significant effects' or 'no adverse effects on integrity' are anticipated, and will generally involve the development and adoption of (for example) wording changes or additional policies. Measures must be specific and targeted, and likely to work; it is not appropriate to re-state existing legislation or policy, such as by adding "*and must have no significant effect on any European site"* (or similar) to every policy. The avoidance or mitigation should also account for the limited influence that the Council can exert on non-planning issues, and should not generally exceed requirements set by national planning policy or guidance.

Uncertainty and 'Down the Line' Assessment

For most policies, even at the strategic level, it will be clear if adverse effects are likely at an early stage, and in these instances the policy should not be included within the plan since plans should not include proposals which would be likely to fail the Habitats Regulations tests at the project application stage. For other options, however, the effects may be uncertain and it is therefore important that this uncertainty is addressed either through additional investigation or (if this is not possible) appropriate mitigation measures.

It is usually possible to incorporate caveats or 'avoidance measures' within policy text that are sufficient to ensure that significant adverse effects will not occur. However, for other policies this may not be possible because there is insufficient available information about the nature of the development that is being proposed through the policy to enable a robust conclusion to be reached about whether there will be any LSEs. In these instances, current guidance indicates that it may be appropriate and acceptable for assessment to be undertaken 'down-the-line' at a lower tier in the planning hierarchy. For this to be acceptable, the following conditions must be met[8]:

[8] SNH (2017) *Habitats Regulations Appraisal of Plans: Guidance for plan-making bodies in Scotland*. Scottish Natural Heritage

- The higher tier plan appraisal cannot reasonably predict the effects on a European site in a meaningful way; whereas;
- The lower tier plan, which will identify more precisely the nature, scale or location of development, and thus its potential effects, retains enough flexibility within the terms of the higher tier plan over the exact location, scale or nature of the proposal to enable an adverse effect on site integrity to be avoided; and
- HRA of the plan at the lower tier is required as a matter of law or Government policy.

3. Scope of Assessment and Baseline Summary

3.1 Study Area

An HRA should include any European sites with interest features that may be vulnerable (i.e. potentially exposed and sensitive) to the outcomes of the plan or project. The potential for an interest feature to be exposed is based on the likely environmental outcomes of the plan or project, and hence its 'zone of influence'; European sites within the 'zone of influence', or with interest features that may rely on habitats within that area, should therefore be considered.

The zone of influence of the Local Plan will vary according to the aspect being considered (for example, noise effects would rarely extend more than a few hundred metres from the source), and so it is not usually appropriate to employ 'arbitrary' spatial buffers to determine those European sites that should be considered within an HRA. However, as distance is a strong determinant of the scale and likelihood of most effects, the considered use of a suitably precautionary search area as a starting point for the screening (based on a thorough understanding of both the plan outcomes and European site interest features) has some important advantages. Using buffers allows the systematic identification of European sites using GIS, so minimising the risk of sites or features being overlooked, and also ensures that sites where there are no reasonable impact pathways can be quickly and transparently excluded from any further screening or assessment. It also has the significant advantage of providing a consistent point of reference for consultees following the assessment process, allowing the 'screening' to focus on the potential effects, rather than on explaining why certain sites may or may not have been considered in relation to a particular aspect of the plan.

The screening stage therefore considers potential effects on:

- all European sites within 15km of the Council's Administrative Area;
- any additional sites that may be hydrologically linked to the Local Plan's zone of influence; and
- any additional sites identified by Natural England during scoping consultations.

This is considered to be a suitably precautionary starting point for the assessment of the Local Plan. The sites listed in **Table 3.1** are therefore included in the initial screening assessment (see also **Figure 3.1**; note: for clarity, the Outer Thames Estuary SPA is not illustrated on Figure 3.1).

Table 3.1 European sites within study area

Site	Approximate location relative to the Chelmsford City Council (CCC) Administrative Area
Essex Estuaries SAC	Includes all of the principal estuaries within Essex; within the CCC area along the River Crouch and its tributaries near South Woodham Ferrers.
Crouch and Roach Estuaries (Mid-Essex Coast Phase 3) SPA*	Within the CCC area along the River Crouch and its tributaries near South Woodham Ferrers.
Crouch and Roach Estuaries (Mid-Essex Coast Phase 3) Ramsar*	Within the CCC area along the River Crouch and its tributaries near South Woodham Ferrers.
Blackwater Estuary (Mid-Essex Coast Phase 4) SPA	Closest point of this site (near Maldon) is approximately 5.3km from the CCC boundary; hydrologically connected via the River Chelmer.
Blackwater Estuary (Mid-Essex Coast Phase 4) Ramsar	Closest point of this site (near Maldon) is approximately 5.3km from the CCC boundary; hydrologically connected via the River Chelmer.
Benfleet and Southend Marshes SPA	Closest point of this site (near Canvey Island) is approximately 8.4km from the CCC boundary; no hydrological connectivity.
Benfleet and Southend Marshes Ramsar	Closest point of this site (near Canvey Island) is approximately 8.4km from the CCC boundary; no hydrological connectivity.

Site	Approximate location relative to the Chelmsford City Council (CCC) Administrative Area
Foulness (Mid-Essex Coast Phase 5) SPA	Approximately 13.6km from CCC boundary; no hydrological connectivity.
Foulness (Mid-Essex Coast Phase 5) Ramsar	Approximately 13.6km from CCC boundary; no hydrological connectivity.
Thames Estuary and Marshes SPA	Approximately 13.5km from CCC boundary; no hydrological connectivity.
Thames Estuary and Marshes Ramsar	Approximately 13.5km from CCC boundary; no hydrological connectivity.
Abberton Reservoir SPA	Closest point of this site is approximately 16.6km from the CCC boundary; site included due to the reliance of the Essex Water Resource Zone (which covers Chelmsford) on this source.
Abberton Reservoir Ramsar	Closest point of this site is approximately 16.6km from the CCC boundary; site included due to the reliance of the Essex Water Resource Zone (which covers Chelmsford) on this source.
Dengie (Mid-Essex Coast Phase 1) SPA	Closest point of this site is approximately 20.0km from the CCC boundary; no hydrological connectivity. Site is included following scoping response from NE, principally due to the potential for visitor pressure effects.
Dengie (Mid-Essex Coast Phase 1) Ramsar	Closest point of this site is approximately 20.0km from the CCC boundary; no hydrological connectivity. Site is included following scoping response from NE, principally due to the potential for visitor pressure effects
Outer Thames Estuary SPA	This SPA was extended in December 2017 to include (*inter alia*) areas of the Crouch and Roach Estuaries that provide foraging habitat for common terns associated with the Foulness SPA. Closest point of site is approximately 2.7km from the CCC boundary.

* Note, Defra is currently (2 November 2017 – 2 March 2018) consulting on minor extensions to the Crouch and Roach Estuaries (Mid-Essex Coast Phase 3) SPA and Ramsar sites; these extension areas (near Brandy Hole and on Wallsea Island) are currently pSPAs / pRamsar sites, but are treated as part of the Crouch and Roach Estuaries (Mid-Essex Coast Phase 3) SPA and Ramsar sites for the purposes of this assessment. The assessment does not therefore separate the pSPA and SPA.

In addition, NE (in its response to the Preferred Options Consultation Document) indicated that the HRA should also consider potential effects on **Epping Forest SAC** (approximately 17km west of the Chelmsford City Council Administrative Area boundary) due to air quality changes.

Data on the European site interest features, their distribution, and their sensitivity to potential effects associated with the Local Plan were obtained from various sources and reports, including the Joint Nature Conservation Committee (JNCC) and NE websites (citations; boundaries; Site Improvement Plans (SIPs); etc.); site condition was based on the NE condition assessments for corresponding Sites of Special Scientific Interest (SSSI) units. Additional information on particular sites or features was obtained from other sources where available, including the Wetland Bird Survey (WeBS).

3.2 European Site Features and Condition

The interest features of the European sites within the study area, and the current factors affecting them, are summarised in **Table 3.2**. A summary of the conservation objectives is provided below. The percentage of a site in favourable or unfavourable condition was estimated using the NE condition assessments for the corresponding SSSI units, although it must be noted that the boundaries of the component SSSI units (to which the condition assessments relate) do not always match the European site boundaries exactly (i.e. the SSSIs are usually larger) and it is not always possible to split SSSI units to determine the precise area of the European site (or interest feature) that is in each condition category[9]. The current pressures on, and threats to, the sites are also identified, based on the SIPs[10].

There are many factors currently affecting the European sites over which the Local Plan will have no or little influence: analysis of the available European site data and the SSSI condition assessments indicates that

[9] This is evident in Table 3.1, where the proportion of the site area in each condition category does not always total 100%.
[10] Available at: http://publications.naturalengland.org.uk/category/5458594975711232

the most common reasons for an 'unfavourable' condition assessment of the component SSSI units are due to geomorphological processes (particularly erosion of saltmarshes, which is known to be an issue for the Essex Estuaries) and inappropriate management of some form (e.g. over- or undergrazing, scrub control, water-level management etc.). The potential mechanisms by which the Local Plan could affect these sites are discussed in **Section 3.3**.

Table 3.2 European sites and interest features within 15km of the Chelmsford City Council Administrative Area or otherwise included in assessment scope

Site and interest features	Condition (%)**		Summary of current threats and potential vulnerabilities to outcomes of Chelmsford Local Plan
Essex Estuaries SAC			
Annex I Features: ▸ Estuaries ▸ Mudflats and sandflats not covered by seawater at low tide ▸ *Salicornia* and other annuals colonizing mud and sand ▸ *Spartina* swards (*Spartinion maritimae*) ▸ Atlantic salt meadows (*Glauco-Puccinellietalia* maritimae) ▸ Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*) ▸ Sandbanks which are slightly covered by sea water all the time (Q)	F UR U UD PD NS	22.8 22.0 0.0 0.1 0.0 55.0	The Essex Estuaries SAC covers the major estuaries of the rivers Colne, Blackwater, Crouch and Roach and the associated intertidal and subtidal habitats. The dominant habitat components are therefore the estuaries themselves; extensive intertidal mud and sandflats with a range of sediments and biotopes; and a range of saltmarsh habitats at various successional stages, for which it is considered one of the best sites in the UK. The saltmarsh at the site is known to be generally eroding, due to sea level rise, and so realignment and habitat creation schemes associated with the Shoreline Management Plan and Regional Habitat Creation Programme are an important component of the drive to achieve favourable condition. The majority of the site is in 'favourable' or 'unfavourable recovering' condition, with the latter generally being areas of saltmarsh that are under pressure from erosion. There are some isolated units in 'unfavourable declining' condition, typically due to inappropriate management of saltmarsh habitats (e.g. insufficient grazing). The SIP indicates that the main pressures on the SAC features are coastal squeeze; general development; fisheries; invasive species; and air pollution (particularly nitrogen deposition).
Crouch and Roach Estuaries (Mid-Essex Coast Phase 3) SPA			
Article 4.1 qualification: ▸ Hen harrier *Circus cyaneus* (W-) Article 4.2 qualification: ▸ Dark-bellied brent goose *Branta bernicla bernicla* (W) ▸ Waterbird assemblage (W)	F UR U UD PD NS	23.1 76.2 0.7 0.0 0.0 0.0	The Crouch and Roach Estuaries SPA covers a complex of salt marsh, grazing marsh and intertidal habitats that provide important feeding and roosting sites for large numbers of waders and waterfowl in winter, particularly Dark-bellied brent geese. Unlike the other local estuaries, the intertidal zones of the Crouch and Roach estuaries are relatively narrow and constrained by the sea walls, at least in their upper reaches. These intertidal areas remain important for the site interest features, however, and Dark-bellied brent geese also make extensive use of the adjacent saltmarsh and grazing marsh habitats; the areas of permanent, ley and rotational grassland included within the SPA are therefore essential for the conservation of this species' population. The site therefore includes a number of terrestrial areas used for roosting and foraging, including grassland within the Blue House Farm nature reserve (east of North Fambridge) and around Marsh Farm Country Park (south of South Woodham Ferrers). Hen harrier were included on the original citation but recommended for removal under the SPA review. The majority of the site is in 'favourable' or 'unfavourable recovering' condition, with the latter generally being areas of saltmarsh that are under pressure from erosion. There are four small areas of grazing marsh in 'unfavourable no change' condition due to inappropriate management (e.g. insufficient grazing). The SIP indicates that the main pressures on the SPA features are coastal squeeze; general development; public disturbance; fisheries (particularly bait digging); and invasive species. Defra is currently (2 November 2017 – 2 March 2018) consulting on minor extensions to the Crouch and Roach Estuaries (Mid-Essex Coast Phase 3) SPA and Ramsar sites at two locations where managed realignment of the sea defences has been used to create new areas of intertidal mudflat and saltmarsh to compensate for losses of these habitats elsewhere. A relatively small realignment near Brandy Hole was created in 2002 and a much larger one at Allfleet's Marsh, on the north shore of Wallasea Island, in 2006. Both these sites now support SPA and Ramsar site waterbirds and other interest features. The extension

Site and interest features	Condition (%)**		Summary of current threats and potential vulnerabilities to outcomes of Chelmsford Local Plan
			areas are currently pSPAs / pRamsar sites, but are treated as part of the Crouch and Roach Estuaries (Mid-Essex Coast Phase 3) SPA and Ramsar sites for the purposes of this assessment.
Crouch and Roach Estuaries (Mid-Essex Coast Phase 3) Ramsar			
▸ Criterion 2: supports vulnerable, endangered, or critically endangered species or threatened ecological communities (plant and invertebrate assemblages). ▸ Criterion 5: regularly supports 20,000 or more waterbirds. ▸ Criterion 6: regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds (Dark-bellied brent goose).	F UR U UD PD NS	23.1 76.2 0.7 0.0 0.0 0.0	This site is largely coincident with the Crouch and Roach Estuaries SPA. The bird interest features of this site (Criteria 5 and 6) are essentially the same as for the Crouch and Roach Estuaries SPA (see above). The Criterion 2 features are the rare, vulnerable or endangered species of plant and invertebrates, which are predominantly associated with the supra-tidal and terrestrial habitats. The main pressures on the Ramsar interest features will be the same as for the Essex Estuaries SAC and the Crouch and Roach Estuaries SPA.
Blackwater Estuary (Mid-Essex Coast Phase 4) SPA			
Article 4.1 qualification: ▸ Little tern *Sterna albifrons* (B); ▸ Hen harrier *Circus cyaneus* (W-); ▸ Avocet *Recurvirostra avosetta* (W+); ▸ Golden Plover *Pluvialis apricaria* (W+); ▸ Ruff *Philomachus pugnax* (W+); Article 4.2 qualification: ▸ Pochard *Aythya farina* (B-) ▸ Ringed plover *Charadrius hiaticula* (B-,W, P+); ▸ Black-tailed godwit *Limosa limosa islandica* (W); ▸ Grey plover *Pluvialis squatarola* (W); ▸ Dunlin *Calidris alpina alpina* (W); ▸ Dark-bellied brent goose *Branta bernicla bernicla* (W); ▸ Redshank *Tringa tetanus* (W+*);* ▸ Shelduck *Tadorna tadorna* (W+); ▸ Wintering Assemblage.	F UR U UD PD NS	23.5 74.9 0.0 1.5 0.0 0.0	The Blackwater Estuary is the largest of the Essex Estuaries. The SPA includes extensive intertidal mudflats and the largest area of saltmarsh in Essex, as well as surrounding terrestrial habitats including grazing marsh, associated fleets and ditches, and semi-improved grassland. Shingle and shell banks and offshore islands are also a feature of the tidal flats. These areas provide a range of habitats for the site interest features. Much of the Blackwater saltmarsh is suffering erosion although in a number of locations managed realignment of the sea-defences is taking place, creating new estuarine habitat. The main breeding species (Little tern and Ringed plover) are associated with the shingle and shell banks and offshore islands, particularly (for Little tern) Mersea Island. The wintering species use all of the habitats at the site, particularly the saltmarsh (for roosting) and intertidal areas, although the associated grasslands are important foraging areas for Dark-bellied Brent geese. There is also some functional connectivity with other sites: Cormorants from the colony at Abberton Reservoir SPA take a large proportion of their food from here. The Golden plover population (recommended for inclusion as a feature by the SPA Review) is also thought to have functional connections with Abberton Reservoir SPA. The majority of the site is in 'favourable' or 'unfavourable recovering' condition, with the latter generally being areas of saltmarsh that are under pressure from erosion. There are areas of grassland on Osea Island intended to provide foraging opportunities for Brent geese that are in 'unfavourable declining' condition due to inappropriate management (e.g. insufficient grazing). The SIP indicates that the main pressures on the SPA features are coastal squeeze; general development; public disturbance; fisheries (particularly bait digging); and invasive species.

Site and interest features	Condition (%)**		Summary of current threats and potential vulnerabilities to outcomes of Chelmsford Local Plan
Blackwater Estuary (Mid-Essex Coast Phase 4) Ramsar			
▸ Criterion 1: sites containing representative, rare or unique wetland types (saltmarsh communities). ▸ Criterion 2: supports vulnerable, endangered, or critically endangered species or threatened ecological communities (invertebrate assemblage). ▸ Criterion 3: supports populations of plant/animal species important for maintaining regional biodiversity (saltmarsh communities). ▸ Criterion 5: regularly supports 20,000 or more waterbirds. ▸ Criterion 6: regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds (Black-tailed godwit; Grey plover; Dunlin; Dark-bellied brent goose).	F UR U UD PD NS	23.5 74.9 0.0 1.5 0.0 0.0	This site is coincident with the Blackwater Estuary SPA. The bird interest features of this site (Criteria 5 and 6) are essentially the same as for the Crouch and Roach Estuaries SPA (see above). The site meets Criteria 1 and 3 primarily due to the extensive saltmarsh communities that are present. The Criterion 2 features are the invertebrate fauna, primarily associated with the supra-tidal and terrestrial habitats (ditches and grazing marshes). The main pressures on the Ramsar interest features will be the same as for the Essex Estuaries SAC and the Blackwater Estuary SPA.
Benfleet and Southend Marshes SPA			
Article 4.2 qualification: ▸ Knot *Calidris canutus* (W); ▸ Dark-bellied brent goose *Branta bernicla bernicla* (W); ▸ Grey plover *Pluvialis squatarola* (W); ▸ Dunlin *Calidris alpina alpina* (W-); ▸ Ringed plover *Charadrius hiaticula* (P); ▸ Wintering Assemblage.	F UR U UD PD NS	0.0 100.0 0.0 0.0 0.0 0.0	This site is located on the north shore of the outer Thames Estuary, and covers an extensive area of saltmarsh, intertidal mudflats and shell banks, with associated supra-tidal grassland. The SPA features are primarily associated with the mudflats and saltmarsh, although areas of grassland are used for foraging (particularly by Brent geese) and high-tide roosting. The majority of the site is in 'favourable' or 'unfavourable recovering' condition, with the latter generally being areas of saltmarsh that are under pressure from erosion. There are areas of saltmarsh near Canvey Island that are in 'unfavourable no change' condition due to coastal squeeze. The SIP indicates that the main pressures on the SPA features are coastal squeeze; general development; public disturbance; fisheries (particularly bait digging); and invasive species.
Benfleet and Southend Marshes Ramsar			
▸ Criterion 5: regularly supports 20,000 or more waterbirds. ▸ Criterion 6: regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds (Knot; Dark-bellied brent goose; Grey plover).	F UR U UD PD NS	0.0 100.0 0.0 0.0 0.0 0.0	This site is coincident with the Benfleet and Southend Marshes SPA, and the bird interest features of this site (Criteria 5 and 6) are essentially the same as for the SPA (see above). The main pressures on the Ramsar interest features will be the same as for the Benfleet and Southend Marshes SPA.

Site and interest features	Condition (%)**		Summary of current threats and potential vulnerabilities to outcomes of Chelmsford Local Plan
Foulness (Mid-Essex Coast Phase 5) SPA			
Article 4.1 qualification: ▸ Avocet *Recurvirostra avosetta* (B,W); ▸ Common tern *Sterna hirundo* (B); ▸ Little tern *Sterna albifrons* (B); ▸ Sandwich tern *Sterna sandvicensis* (B); ▸ Hen harrier *Circus cyaneus* (W); ▸ Bar-tailed godwit *Limosa lapponica* (W); ▸ Golden Plover *Pluvialis apricaria* (W+). Article 4.2 qualification: ▸ Ringed plover *Charadrius hiaticula* (B); ▸ Dark-bellied brent goose *Branta bernicla bernicla* (W); ▸ Knot *Calidris canutus* (W); ▸ Oystercatcher *Haematopus ostralegus* (W); ▸ Grey plover *Pluvialis squatarola* (W); ▸ Redshank *Tringa tetanus* (W-,P+); ▸ Wintering Assemblage.	F UR U UD PD NS	72.6 24.7 0.0 2.7 0.0 0.0	Foulness SPA covers a complex and extensive area of intertidal sand-silt flats, saltmarsh, shell banks, grazing marshes, grassland, islands and creeks. The flats are particularly important for wintering birds with the network of islands, creeks and grazing land providing sheltered feeding and roosting sites. Several of the breeding species (Little tern, Common tern, Sandwich tern, Ringed plover) are associated with the shingle and shell banks, particularly around Foulness Point and Maplin Sands, with Avocet also using the complex matrix of intertidal and supra-tidal habitats. These areas are also important high-tide roosts for birds from this SPA and from the Crouch, Roach and Thames estuaries. The site is owned by the Ministry of Defence and so access is partly restricted, which further increases its relative value in the area. The majority of the site is in 'favourable' or 'unfavourable recovering' condition, with the latter generally being areas of saltmarsh that are under pressure from erosion. There is an area of grazing marsh that is in 'unfavourable declining' due to the cessation of grazing for H&S reasons. The SIP indicates that the main pressures on the SPA features of the Essex Estuaries are coastal squeeze; general development; public disturbance; fisheries (particularly bait digging); and invasive species, although public disturbance and bait digging activities are less significant here due to Ministry of Defence (MOD) controls (although disturbance from military activities still occurs).
Foulness (Mid-Essex Coast Phase 5) Ramsar			
▸ Criterion 1: sites containing representative, rare or unique wetland types (saltmarsh communities). ▸ Criterion 2: supports vulnerable, endangered, or critically endangered species or threatened ecological communities (invertebrate assemblage). ▸ Criterion 3: supports populations of plant/animal species important for maintaining regional biodiversity (saltmarsh communities). ▸ Criterion 5: regularly supports 20,000 or more waterbirds. ▸ Criterion 6: regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds (Dark-bellied brent goose; Knot; Oystercatcher; Grey plover; Redshank; Bar-tailed godwit)	F UR U UD PD NS	72.6 24.7 0.0 2.7 0.0 0.0	This site is coincident with the Foulness SPA. The bird interest features of this site (Criteria 5 and 6) are essentially the same as for the Foulness SPA (see above). The site meets Criteria 1 and 3 primarily due to the extensive saltmarsh communities that are present. The Criterion 2 features are the invertebrate fauna, primarily associated with the supra-tidal and terrestrial habitats (ditches and grazing marshes). The main pressures on the Ramsar interest features will be the same as for the Essex Estuaries SAC and the Foulness SPA.

Site and interest features	Condition (%)**		Summary of current threats and potential vulnerabilities to outcomes of Chelmsford Local Plan
Thames Estuary and Marshes SPA			
Article 4.1 qualification: ▸ Avocet *Recurvirostra avosetta* (W); ▸ Hen harrier *Circus cyaneus* (W); Article 4.2 qualification: ▸ Dunlin *Calidris alpina alpina* (W-); ▸ Knot *Calidris canutus* (W-); ▸ Black-tailed godwit *Limosa limosa islandica* (W-); ▸ Grey plover *Pluvialis squatarola* (W-); ▸ Ringed plover *Charadrius hiaticula* (P, W+); ▸ Redshank *Tringa tetanus* (W-); ▸ Wintering Assemblage.	F UR U UD PD NS	96.7 1.3 0.0 2.0 0.0 0.0	The majority of the Thames Estuary and Marshes SPA is located on the southern side of the Thames estuary. The site is dominated by extensive intertidal mudflats with fringing saltmarsh, with associated terrestrial habitats including grazing marsh; complex channels, fleets and ditches; and semi-improved grassland. A series of disused quarry pits have been transformed to create an extensive series of ponds and lakes at Cliffe Pools. These areas provide a variety of habitat types, which are important feeding and roosting sites for the large populations of bird species that use this site, including those during the spring and autumn migration periods. The majority of the site is in 'favourable' or 'unfavourable recovering' condition, although there are a few isolated areas of saltmarsh or grazing marsh that are in 'unfavourable declining', principally due to local management issues. As with the Essex Estuaries SIP, the main pressures on the SPA features are coastal squeeze; general development; public disturbance; fisheries (particularly bait digging); and invasive species.
Thames Estuary and Marshes Ramsar			
▸ Criterion 2: supports vulnerable, endangered, or critically endangered species or threatened ecological communities (plant and invertebrate assemblages). ▸ Criterion 5: regularly supports 20,000 or more waterbirds. ▸ Criterion 6: regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds (Ringed plover; Black-tailed godwit; Grey plover; Dunlin; Knot; Redshank).	F UR U UD PD NS	96.7 1.3 0.0 2.0 0.0 0.0	This site is largely coincident with the Thames Estuary and Marshes SPA. The bird interest features of this site (Criteria 5 and 6) are essentially the same as for the Thames Estuary and Marshes SPA (see above). The site meets Criterion 2 principally though the rarer plants and invertebrates that are primarily associated with the supra-tidal and terrestrial habitats (ditches and grazing marshes). The main pressures on the Ramsar interest features will be the same as for the Thames Estuary and Marshes SPA.
Abberton Reservoir SPA			
Article 4.1 qualification: ▸ Golden Plover *Pluvialis apricaria* (W+) Article 4.2 qualification: ▸ Wigeon *Anas penelope* (W-); ▸ Pochard *Aythya ferina* (W-); ▸ Teal *Anas crecca* (W); ▸ Goldeneye *Bucephala clangula* (W-); ▸ Mute swan *Cygnus olor* (W-); ▸ Great crested grebe *Podiceps cristatus* (W-); ▸ Gadwall *Anas strepera* (W); ▸ Tufted duck *Aythya fuligula* (W-); ▸ Cormorant *Phalacrocorax carbo* (B); ▸ Shoveler *Anas clypeata* (W-); ▸ Coot *Fulica atra* (W-); ▸ Wintering Assemblage.	F UR U UD PD NS	100.0 0.0 0.0 0.0 0.0 0.0	Abberton Reservoir is a 500 ha. storage reservoir approximately four miles south of Colchester. It is the largest freshwater body in Essex. Around 40,000 birds visit the reservoir annually and it is particularly important as a moulting and roosting site for wildfowl and waders, partly due to its proximity to the Essex Estuaries. It is also important as a staging point for birds on passage. The margins of parts of the reservoir have well-developed plant communities that provide important opportunities for feeding, nesting and shelter. In addition, there is a notable breeding population of cormorant, which also use the nearby estuaries for feeding. Water levels (etc.) in the reservoir are controlled according to an agreed operating plan; as part of a recent scheme to increase capacity, the original concrete banks have been removed and the shoreline re-profiled, creating extensive new areas of shallow wetland habitat for the site's waterfowl. The reservoir is therefore in favourable condition. Based on the SIP, the main pressures on the SPA features are siltation (although this is equally a problem for the reservoir as a storage resource, and so is managed accordingly); and disturbance, primarily from aircraft (although the site receives large numbers of visitors the disturbing effect is limited due to management and the nature of the site).

Site and interest features	Condition (%)**		Summary of current threats and potential vulnerabilities to outcomes of Chelmsford Local Plan
Abberton Reservoir Ramsar			
▸ Criterion 5: regularly supports 20,000 or more waterbirds. ▸ Criterion 6: regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds (Gadwall, Shoveler, Wigeon).	F UR U UD PD NS	100.0 0.0 0.0 0.0 0.0 0.0	This site is coincident with Abberton Reservoir SPA and the bird interest features (Criteria 5 and 6) are essentially the same as for the SPA (see above). The main pressures on the Ramsar interest features will be the same as for the Abberton Reservoir SPA.
Dengie (Mid-Essex Coast Phase 1) SPA			
Article 4.1 qualification: ▸ Hen harrier *Circus cyaneus* (W); ▸ Bar-tailed Godwit *Limosa lapponica* (W+) Article 4.2 qualification: ▸ Dark-bellied brent goose *Branta bernicla bernicla* (W-); ▸ Knot *Calidris canutus* (W); ▸ Grey plover *Pluvialis squatarola* (W); ▸ Wintering Assemblage.	F UR U UD PD NS	62.7 37.3 0.0 0.0 0.0 0.0	Dengie SPA is a large and unusually (for Essex) remote area of tidal mudflat and saltmarsh at the eastern end of the Dengie peninsula, between the Blackwater and Crouch Estuaries. It covers extensive intertidal flats and the largest continuous area of saltmarsh in Essex, and provides substantial and important feeding and roosting habitats for wintering populations of wildfowl and waders. The majority of the site is in 'favourable' or 'unfavourable recovering' condition, with the latter generally being areas of saltmarsh that are under pressure from erosion. The SIP indicates that the main pressures on the SPA features of the Essex Estuaries are coastal squeeze; general development; public disturbance; fisheries (particularly bait digging); and invasive species, although public disturbance is thought to be less significant here due to the site's relative isolation compared to the other estuarine areas.
Dengie (Mid-Essex Coast Phase 1) Ramsar			
▸ Criterion 1: sites containing representative, rare or unique wetland types (saltmarsh communities). ▸ Criterion 2: supports vulnerable, endangered, or critically endangered species or threatened ecological communities (coastal and saltmarsh plants and invertebrate assemblages). ▸ Criterion 3: supports populations of plant/animal species important for maintaining regional biodiversity (saltmarsh communities). ▸ Criterion 5: regularly supports 20,000 or more waterbirds. ▸ Criterion 6: regularly supports 1% of the individuals in a population of one species/subspecies of waterbirds (Dark-bellied brent goose; Knot; Oystercatcher; Grey plover; Redshank; Bar-tailed godwit)	F UR U UD PD NS	62.7 37.3 0.0 0.0 0.0 0.0	This site is largely coincident with the Dengie SPA, and the bird interest features of this site (Criteria 5 and 6) are essentially the same as for the SPA (see above). The site meets Criteria 1 and 3 primarily due to the extensive saltmarsh communities that are present, with Criterion 2 being met by the assemblage of rare coastal flora. The main pressures on the Ramsar interest features will be the same as for the Essex Estuaries SAC and the Dengie SPA.

Site and interest features	Condition (%)**	Summary of current threats and potential vulnerabilities to outcomes of Chelmsford Local Plan
Outer Thames Estuary SPA		
▸ Common tern *Sterna hirundo* (B); ▸ Little tern *Sterna albifrons* (B); ▸ Red-throated diver (W).	n/a	The Outer Thames Estuary SPA was initially designated for its wintering population of red-throated diver, but has recently been extended (December 2017) to include foraging areas used by breeding tern species associated with SPAs on the Norfolk and Essex coasts. These extensions include areas that may be affected by the CCC plan, specifically sections of the Crouch and Roach estuaries that are used for foraging by common terns from Foulness SPA. The Outer Thames Estuary SPA now covers all of the Roach estuary and the Crouch downstream of North Fambridge. The SIP for the site has not been updated to reflect the amendment (as of January 2018) but the pressures on the Crouch and Roach sections of the SPA are likely to be similar to the pressures on the Crouch and Roach Estuaries SPA (i.e. coastal squeeze; general development; public disturbance; fisheries; and invasive species) although the tern interest features of the Outer Thames Estuary SPA will be less sensitive to some of these when foraging within the site compared to the interest features of the Crouch and Roach Estuaries SPA.
Epping Forest SAC		
<u>Annex I Features:</u> ▸ Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae* or *Ilici-Fagenion*) ▸ Northern Atlantic wet heaths with *Erica tetralix* (Q) ▸ European dry heaths (Q) <u>Annex II species</u> ▸ Stag beetle *Lucanus cervus*	F 62.7 UR 37.3 U 0.0 UD 0.0 PD 0.0 NS 0.0	Epping Forest is one of the few remaining large-scale examples of ancient wood-pasture in lowland Britain, and has retained habitats of high nature conservation value including ancient semi-natural woodland, old grassland plains and scattered wetland. The SAC covers a series of semi-natural woodland and grassland blocks between Wanstead in London (near the A12) and the M25 at Epping. The key pressures currently affecting the site (based on the SIP) are air pollution, management (undergrazing), and visitor pressure. All of the SSSI units where air pollution is identified as a key issue in an 'unfavourable' condition assessment are in the southern area of the Forest, between Chingford and Wanstead, rather than those areas near the M25.

Key

*	Interest features (habitats or species) that are a primary reason for designation; all other habitats and species are qualifying features
W	Wintering species
P	Breeding species
-	Species included on original SPA citation but proposed for removal following the SPA Review
+	Species not included on the original SPA citation but added following the SPA Review
Annex I / II	Habitats or species listed on Annex I or II (respectively) of Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora (the 'Habitats Directive')
Article 4.1 / 4.2	Bird species qualifying under Article 4.1 or 4.2 of Directive 2009/147/EC on the Conservation of Wild Birds (the 'new Wild Birds Directive')
Criterion 1, 2, etc.	Ramsar criteria; there are nine criteria used as a basis for selecting Ramsar sites; see Appendix B
**	Based on the condition assessments of the SSSI units that correspond to the relevant European sites; note, for the Marine Site (Outer Thames Estuary SPA) there are no corresponding SSSI units.
F	Favourable
UR	Unfavourable recovering
U	Unfavourable no change
UD	Unfavourable declining
PD	Partially destroyed
NS	Not stated (e.g. offshore areas where site is not underpinned by an SSSI).

Conservation Objectives

The conservation objectives for all of the sites listed in **Table 3.2** have been revised by NE in recent years to increase consistency of assessment and reporting. As a result, the high-level conservation objectives for all sites are effectively the same:

For SACs:

- 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 [as applicable to each site];
  - The extent and distribution of the qualifying natural habitats;
  - The extent and distribution of the habitats of qualifying species;
  - The structure and function (including typical species) of the qualifying natural habitats;
  - The structure and function of the habitats of qualifying species;
  - The supporting processes on which the qualifying natural habitats rely;
  - The supporting processes on which the habitats of qualifying species rely;
  - The populations of qualifying species; and,
  - The distribution of qualifying species within the site.

For SPAs:

- With regard to the SPA and the individual species and/or assemblage of species for which the site has been classified (the 'Qualifying Features'...), and subject to natural change; ensure that the integrity of the site is maintained or restored as appropriate, and ensure that the site contributes to achieving the aims of the Wild Birds Directive, by maintaining or restoring:
  - The extent and distribution of the habitats of the qualifying features;
  - The structure and function of the habitats of the qualifying features;
  - The supporting processes on which the habitats of the qualifying features rely;
  - The population of each of the qualifying features; and
  - The distribution of the qualifying features within the site.

The conservation objectives for Ramsar sites are taken to be the same as for the corresponding SACs / SPAs (where sites overlap). The conservation objectives are considered when assessing the potential effects of plans and policies on the sites; information on the sensitivities of the interest features also informs the assessment.

3.3 Outcomes of Local Plan and Impact Pathways

Analysis of the available European site data and the SSSI condition assessments indicates that the most common reasons for an 'unfavourable' condition assessment of the component SSSI units are due to geomorphological processes (particularly erosion of saltmarshes, which is known to be an issue for the Essex Estuaries) and inappropriate management of some form (e.g. over- or undergrazing, scrub control, water-level management etc.). These are aspects over which the Local Plan will have no or little influence, although it is important to understand the pressures currently experienced (particularly when considering 'in combination' effects).

The main mechanisms by which the Local Plan could affect these sites are through spatial allocations that have direct or indirect effects on European sites; or through policies that direct development (or do not control development) such that significant effects are likely. The main environmental aspects, and the pathways by which the Local Plan could potentially affect European sites, are summarised in the following sub-sections together with any available baseline data on those aspects to inform the assessment. European sites that are particularly vulnerable to a specific aspect (i.e. sensitive and likely to be exposed due to the Local Plan) are identified.

Recreational Pressure

Many European sites will be vulnerable to some degree of impact as a result of recreational pressure, although the effects of recreational pressure are complex and very much dependent on the specific conditions and interest features at each site. For example: some bird species are more sensitive to disturbance associated with walkers or dogs than others; some habitats will be more sensitive to trampling or mechanical disturbance than others; some sites will be more accessible than others.

The most typical mechanisms for recreational effects are through direct damage of habitats, or disturbance of certain species. Damage will most often be accidental or incidental, but many sites are particularly sensitive to soil or habitat erosion caused by recreational activities and require careful management to minimise any effects (for example, through provision and maintenance of 'hard paths' (boardwalks, stone slabs etc.) and signage to minimise soil erosion along path margins).

Disturbance[11] of species due to recreational activities can also be a significant problem at some sites, although the relationship (again) is highly variable and depends on a range of factors including the species, the time of year and the scale, type and predictability of disturbance. Most studies have focused on the effects on birds, either when breeding or foraging. For example, a long-term monitoring project by NE on the Thanet Coast has found that turnstones (a shoreline-feeding waterbird) are particularly vulnerable to disturbance from dogs, which interrupts their feeding behaviour and can prevent them from gaining sufficient body fat for overwintering or migration. Finney *et al*. (2005), meanwhile, noted that re-surfacing the Pennine Way significantly reduced the impact of recreational disturbance on the distribution of breeding Golden plover, by encouraging walkers to remain on the footpath. In contrast, some species are largely unaffected by human disturbance (or even benefit from it) which can result in local or regional changes in the composition of the fauna. The scale, type and predictability of disturbance is also important; species can become habituated to some disturbance (e.g. noise), particularly if it is regular or continuous. Unpredictable disturbance is most problematic.

Most recreational activities with the potential to affect European sites are 'casual' and pursued opportunistically (e.g. walking, walking dogs, riding) rather than structured (e.g. organised group activities or trips to specific discrete attractions), which means that it can be difficult to quantify or predict either the uptake or the impacts of these activities on European sites and (ultimately) harder to control or manage effects. It also means that it is difficult to explore in detail all of the potential aspects of visitor pressure at the strategic level. However, it is possible for plans and strategies to influence recreational use of European sites through the planning process, for example by increasing the amount of green space required within or near developments if potentially vulnerable European sites are located nearby.

With regard to European sites within the study area, all will be sensitive to recreational pressure to some extent although the bird interest features of the mid Essex Estuaries SPA and Ramsar sites and, to a lesser extent, the habitats of the Essex Estuaries SAC are likely to be most sensitive to disturbance or damage due to recreational pressures. However, the extent to which these sites and features are exposed to the Local Plan is not easily established.

Attempts to predict the effects of increased recreation on European sites that may be associated with development or allocations derived from strategic plans typically aim to identify the distance within which a certain percentage of visits originate. Site-specific questionnaire surveys can be undertaken to identify visitor origin and to characterise the typical use of a site; these are then used to identify the 'buffer zones' or 'zones of influence' within which new development would be considered likely to have significant effects on a site, unless appropriately mitigated. Probably the most common metric used for 'buffer zones' or 'zones of

[11] In this case, literal disturbance by human activity; in ecology, 'disturbance' is a more complex concept used in models of ecosystem equilibrium.

influence' is the distance within which approximately 70 - 75% of visitors live. Some examples are summarised in **Table 3.3**. It should be noted that these are necessarily selective as not all studies considering visitor pressure have necessarily reported percentiles; however, they provide some good examples for European sites that have similarities to sites near the City Area, including the presence of nearby urban areas.

Table 3.3 Travel distances for ~70 – 75% of visitors recorded by previous studies

Study	European sites and key issues	Summary of findings
Solent Disturbance and Mitigation Project (Fearnley *et al.* 2010)	Solent Maritime SAC Chichester and Langstone Harbours SPA Pagham Harbour SPA Chichester and Langstone Harbours Ramsar Pagham Harbour Ramsar (Coastal sites; major urban areas; disturbance of birds)	Half of all visitors arriving on foot lived within 0.7km; half of all visitors arriving by car lived more than 4km away. Average travel distance (excluding holidaymakers): 5.04km. 75% of visits from postcodes within 5.6km.
Thames Basin Heaths (Liley *et al.* 2005)	Thames Basin Heaths SPA (Heathland sites; urban areas; disturbance of birds)	70% of visitors travel 5km or less to access sites.
Whitehall and Bordon Ecotown (EPR 2012)	Wealden Heaths SPA Shortheath Common SAC Woolmer Forest SAC Thursley, Ash, Pirbright and Chobham SAC Thursley and Ockley Bogs Ramsar site (Heathland and woodland sites; urban areas; disturbance of birds; damage to heath)	Average travel distance: 6.7km. 70% of visitors travel 4.3km or less to access sites. 70% distance values for following component sites: - Frensham Common: 10.7km - Kingsley Common: 7.4km - Bramshott Common: 4.5km - Woolmer Forest: 3.4km - Longmoor Enclosure: 3.2km - Ludshott Common: 2.9km - Broxhead Common: 2.1km - Hogmoor Inclosure: 0.9km - Shortheath Common: 0.6km - Bordon Enclosure: 0.5km
Ashdown Forest (UE / University of Brighton 2009)	Ashdown Forest SPA (Heathland sites; urban areas; disturbance of birds)	76% of visitors travel 5km or less to access sites.
Thanet Coast and Sandwich Bay (Fearnley *et al.* 2014)	Thanet Coast and Sandwich Bay SPA / Ramsar; Thanet Coast SAC (coastal sites, disturbance of birds)	75% of 'regular visitors' live within 4.9km; 75% of all visitors live within 9.8km.
Dorset Heaths (English Nature 2006)	Dorset Heaths SAC (plus other sites; heathland sites; urban areas; disturbance of birds)	75% of visitors coming to a site on foot come from within a straight-line distance of 500m. 75% of visitors by car live within 5.3km of the site.

Study	European sites and key issues	Summary of findings
South-East Devon European Site Mitigation Strategy (Liley *et al.* 2014)	Exe Estuary SPA (coastal sites, disturbance of birds); Dawlish Warren SAC (sand dunes, visitor damage); East Devon Pebblebed Heaths SAC / SPA (heathland, visitor damage, disturbance of birds)	75% of visitors to Exe Estuary, Dawlish Warren, and East Devon Pebblebed Heaths live within 7.8km, 14.4km and 6.9km of the site boundary respectively (based on household survey); 75% of visitors to Exe Estuary and Dawlish Warren live within 14.3km and 14.7km the site boundary respectively (based on on-site visitor surveys). Other metrics for determining 75% distances also used.
Deben Visitor Survey (Lake *et al.* 2014 for the Deben Estuary Partnership)	Deben Estuary SPA / Ramsar	75% of visitors on a day trip / from home live within 13.2km.

Typically, the distance within which 75% of visitors live is less than 6 – 7km, although in practice this distance is as likely to reflect the local settlement and population distributions, and journey times (which are not generally examined in detail), as much as the attractiveness of the European site. However, it is important to note that there is no standard method for defining the 'zone of influence' and a range of approaches have been adopted for different sites. For example, in a study for Canterbury City Council, Fearnley *et al*. (2014) suggested several possible options for a 'zone of influence' around the Thanet Coast SAC, on which mitigation proposals could be based; these ranged from 4.9km (the distance within which 75% of all 'regular visitors'[12] live) to 7.2km (the distance within which 90% of all 'regular visitors' live), to 9.8km (the distance within which 75% of all visitors live). Indeed, Fearnley *et al*. (2014) note that "*The identification of a 'zone of influence' is really an exercise in identifying a boundary which seems pragmatic, representative of visitor patterns to the site, the physical features of the site, infrastructure, current housing distribution and the nature of the surrounding area*". The South-East Devon European Site Mitigation Strategy (Liley *et al*. 2014) identifies several alternative approaches for determining the a 'zone of influence' around the Exe Estuary SPA (and hence the appropriate area for seeking developer contributions towards mitigation); these ranged from 7.8km from the SPA boundary to 14.3km, with a distance of 10km ultimately selected for the purposes of seeking developer contributions.

A difficulty with using solely travel distance is that it treats all visitors as 'equal users', whereas in reality a relatively small number of visitors will be responsible for most visits to a site (and hence most disturbance risk). NE, as part of its input to the County Durham Plan, has noted that it adopts a '75% rule' to determine significance, whereby recreational buffers are based on the distance within which 75% of visits, as opposed to visitors, originate (i.e. taking account of frequency of visits as well as distance travelled); for the Durham Coast SAC, Northumbria Coast SPA / Ramsar and Teesmouth and Cleveland Coast SPA / Ramsar this distance was 6km. For the Thanet Coast study (Fearnley *et al*. 2014), 75% of all 'regular visitors' lived within 4.9km. Furthermore, it is likely that journey time plays a role in choice of visit location and frequency, although this aspect is not substantially explored in much of the literature reviewed as part of this report.

Visitor behaviour is complex and generalised statistics can hide important variations in the use of a site, particularly for larger coastal and estuarine sites such as the Essex Estuaries SAC (for example, the 75% distance is likely to vary depending on the access point surveyed and the activity being undertaken by the visitor). Any derived buffers must therefore be applied cautiously as the precise distance will depend on the site: for example, a remote upland European site favoured by recreational walkers will probably have a substantially larger 75% distance for visits than, for example, the Blackwater Estuary SPA which is near Colchester and Maldon. Similarly, Abberton Reservoir is likely to have a larger 75% distance due to its position as a regional attraction.

Secondary buffers are also sometimes identified to reflect the variation in visitor behaviour, particularly for those that live in close proximity to a site. For example, the studies supporting the County Durham Plan adopted a 400m buffer also, since 59% of respondents living within the 0 – 400 metre buffer were high risk users, i.e. visit the coast between one and three times a day (see also 'Urbanisation' below). This distance

[12] People visiting at least once a week.

has also been used as a threshold for seeking contributions towards mitigation for the Thames Basin Heaths SAC.

Visitor survey data for the Essex estuary sites is limited; it is understood that there has been only one set of surveys aiming to characterise visitor behaviour in relation to European sites in the region, which was undertaken between 2010 and 2013 by Colchester Borough Council, Tendring District Council and Braintree District Council as part of the monitoring of their Core Strategies. This study (CBC (2012) *Habitat Regulations Assessment Survey and Monitoring; Year 3 Interim Report*) focused on those European sites within the Colchester and Tendring local authority areas (i.e. Abberton Reservoir SPA / Ramsar, Blackwater Estuary SPA / Ramsar, the Essex Estuaries SAC, the Colne Estuary SPA / Ramsar, the Stour and Orwell Estuaries SPA / Ramsar, and Hamford Water SPA / Ramsar / SAC); of these, those associated with Abberton Reservoir and the Blackwater Estuary are within the study area for the Chelmsford Local Plan.

Visitor surveys were undertaken at two locations within the estuary sites (Blackwater, Colne and Stour Estuaries; Hamford Water) and at one location (the visitor centre) at Abberton Reservoir. Unfortunately, the nature of the surveys and data means that it is difficult to draw meaningful conclusions on the use of these sites, particularly in relation to visitors from the Chelmsford area[13]. Although approximate travel distances were obtained for visitor groups many of the observations are influenced by sample size and a range of site-specific factors that cannot be scaled to provide reliable site-wide interpretation. However, based on the 2012 report it is worth noting the following:

- Dog walking and walking were the two main reasons for visits at all of the sites with the exception of Abberton Reservoir and Old Hall Marshes (principally bird-watching sites).
- Approximately 29% of visitors walked to the sites, with around 69% driving.
- The distance that 75% of visitors travelled (note, not the distance within which 75% of visits originate) varied according to the survey location and type of site, but was almost always less than 10 miles (16km) and most commonly less than five miles.
- Visitors from Chelmsford formed an extremely small cohort; of 326 visitor groups questioned in 2012 only four were identified from Chelmsford, all around the Colne estuary. None were recorded in the sites closest to Chelmsford.
- It is clear that the inherent variabilities of the European sites themselves, including accessibility by car and attractiveness of different areas for particular activities, are as important (probably more so) than distance in determining local visitor numbers and pressures, and so management of 'hotspots' (and the role that these might play in diverting visitors from areas where behaviours are more difficult to manage) is an important factor that the Chelmsford Local Plan may have limited influence over. Some areas of the European sites (particularly more remote areas) will inevitably have larger apparent 'catchments' if the travel distance for 75% of visitors is used, although the actual visitor pressure in these areas will be low.

In the absence of specific data for the sites nearest the Chelmsford City Council administrative area, the data from other studies has been used as a proxy for identifying areas or allocations where significant effects may occur, and therefore as the basis for mitigation proposals. In this context, a precautionary 'zone of influence' of 10km from the European site boundaries has been used to identify those proposed Local Plan allocations that may result in significant increases in visitor pressure on the designated sites, with allocations within 500m of an access point being considered as potentially high-risk. In addition, GIS modelling of drive times has been undertaken for the allocations. This indicates that most parts of most European sites in the study area are at least 25 – 30 minutes' drive from the proposed Local Plan allocations, and frequently more, which itself will limit the frequency with which residents from Chelmsford access the European sites (and hence their contribution to overall visitor pressure). It should be noted that interim advice from NE (November 2017)[14] regarding the forthcoming Essex Recreational Disturbance Avoidance and Mitigation

[13] The surveys did not cover sites or areas of the sites closest to Chelmsford (and hence those most likely to be used by Chelmsford residents – for example, the Blackwater around Maldon).

[14] Letter from NE to the LPAs within Essex, dated 16 November 2017 (Ref. 231488: "*Essex Recreational disturbance Avoidance and Mitigation Strategy (RAMS) – Interim advice to ensure new residential development and any associated recreational disturbance impacts on European designated sites are compliant with the Habitats Regulations*").

Strategy (RAMS) has suggested 'zones of influence' for the Blackwater Estuary SPA and Crouch and Roach Estuaries SPA of 8km and 10km respectively[15].

Urbanisation

Urbanisation is generally used as a collective term covering a suite of often disparate risks and impacts that occur due to increases in human populations near protected sites. Typically, this would include aspects such as fly-tipping or vandalism, although the effects of these aspects again depend on the interest features of the sites: for example, predation of some species by cats is known to be sizeable (Woods *et al*. 2003) and can be potentially significant for some European sites. Recreational pressure is arguably one type of effect associated with urbanisation, although this is usually considered separately as it is less closely associated with proximity: as a broad guide, urbanisation effects are more likely when developments (etc.) are within a few hundred metres of a designated site, whereas people will typically travel further for recreation.

Where sensitive sites are involved, development buffers of around 400m are typically used to minimise the effects of urbanisation: for example, NE has identified a 400m zone around the Chichester and Langstone Harbours SPA within which housing development should not be located due to the potential effects of urbanisation (particularly, the risk of chick predation by cats, which cannot be mitigated). Similarly, LPAs around the Thames Basin Heaths SPA have adopted a 400m zone around the SPA boundary where there is a presumption against new residential development as the impact on the SPA is considered likely to be adverse.

It should be noted that none of the condition assessments for European sites within the study area identify urbanisation as a particular issue and in reality there is sufficient distance between most sites and the nearest settlement boundaries for this to not be a significant threat. Having said that, allocating development sites within existing settlements where urbanisation has already occurred and where effects are likely to be more manageable, even if near a European site, is arguably a preferable course of action.

Atmospheric Pollution

A number of pollutants have a negative effect on air quality; however, the most significant and relevant to habitats and species (particularly plant species) are the primary pollutants sulphur dioxide (SO_2, typically from combustion of coal and heavy fuel oils), nitrogen oxides (NOx, mainly from vehicles) and ammonia (NH_3, typically from agriculture), which (together with secondary aerosol pollutants[16]) are deposited as wet or dry deposits. These pollutants affect habitats and species mainly through acidification and eutrophication. Acidification increases the acidity of soils, which can directly affect some organisms but which also promotes leaching of some important base chemicals (e.g. calcium), and mobilisation and uptake by plants of toxins (especially metals such as aluminium). Air pollution contributes to eutrophication within ecosystems by increasing the amounts of available nitrogen (N)[17]. This is a particular problem in low-nutrient habitats, where available nitrogen is frequently the limiting factor on plant growth, and results in slow-growing low-nutrient species being out-competed by faster growing species that can take advantage of the increased amounts of available N.

[15] The interim guidance also notes a zone of influence for the Essex Estuaries SAC of 24km, which appears to be based on data from the Colne estuary (i.e. from the CBC surveys undertake between 2010 and 2013 (e.g. see CBC 2012). It is not clear whether this 24km 'zone of influence' should be applied to the entirety of the Essex Estuaries SAC for mitigation purposes (since the coincident SPAs, other than the Colne Estuary SPA, all have substantially smaller 'zones of influence' identified) and the inclusion of specific values for the other SPAs suggests that these are the primary metrics to be used.

[16] Secondary pollutants are not emitted, but are formed following further reactions in the atmosphere; for example, SO_2 and NO_x are oxidised to form SO_4^{2-} and NO_2^- compounds; ozone is formed by the reaction of other pollutants (e.g. NOx or volatile organic compounds) with UV light; ammonia reacts with SO_4^{2-} and NO_2^- to form ammonium (NH_4^+).

[17] Nitrogen that is in a form that can be absorbed and used by plants.

Table 3.4 Main air pollutants, pathways and effects

Pollutant	Pathway	Summary of Effects
Ammonia (NH_3)	Primarily from agriculture through decomposition of animal manure and slurry.	Emissions contribute to acidification and (particularly) eutrophication.
Nitrogen oxides (NO_x)	All combustion processes produce oxides of nitrogen (NO_x) in air; road transport is the main source, followed by the electricity supply industry. NO_x emissions have decreased with increased fuel efficiency and catalytic converters	Emissions contribute to acidification and eutrophication; contribute to formation of secondary particles and ground level ozone.
Sulphur Dioxide (SO_2)	Sulphur dioxide (SO_2) is released when fuels containing sulphur are burnt, especially coal and heavy fuel oils. The energy industry has traditionally been the primary source, although this has decreased as use of coal has decreased.	SO_2 dissolves readily in water to form an acid which contributes to acidification of soils and water.

Overall in the UK, there has been a significant decline in SOx and NOx emissions in recent years and a consequent decrease in acid deposition; in England, SO_x and NO_x have declined by 90% and 65% respectively since 1990 (NAEI, 2014), the result of a switch from coal to gas and nuclear for energy generation, and increased efficiency and emissions standards for cars. These emissions are generally expected to decline further in future years. In contrast, emissions of ammonia have remained largely unchanged: they have declined by 20% in England since 1990 (NAEI, 2014), but have remained largely stable since 2008 (1% decrease from 2008 – 2011; 2.8% increase from 2011 – 2012).

The effect of SO_x and NO_x decreases on ecosystems has been marked, particularly in respect of acidification; the key contributor to acidification is now thought to be deposited nitrogen, for which the major source (ammonia emissions) has not decreased significantly. Indeed, although it is estimated that the proportion of UK semi-natural ecosystems that exceed the critical loads for eutrophication will decline from 40% to 32% by 2010 (NEGTAP, 2001), eutrophication from N-deposition (again, primarily from ammonia) is now considered the most significant air quality issue for many habitats.

The UK Air Pollution Information System (APIS) has been interrogated to identify those European sites and features in the study area where critical loads[18] for nutrient-N deposition and acidification are met or exceeded. APIS provides a comprehensive source of information on air pollution and the effects on habitats and species and although there are limitations to the data (see SNIFFER, 2007), particularly related to the scale at which data can be modelled, this provides the best basis for assessing the impacts of air emissions associated with the Local Plan in the absence of site-by-site monitoring data.

Table 3.5 summarises the APIS data for SACs with features that are directly sensitive to air quality in the study area. It should be noted that critical load values are generally provided for habitats rather than species, and that watercourses are not included as eutrophication of most watercourses due to air emissions is negligible compared to run-off from agricultural land.

[18] 'Critical Loads' are the threshold level for the deposition of a pollutant above which harmful indirect effects can be shown on a habitat or species, according to current knowledge (APIS, 2009).

Table 3.5 Summary of APIS interrogation

Site	Air quality sensitive features	Over CL?	
		Acid	***N***
Essex Estuaries SAC	Estuaries	n/a	-
	Mudflats and sandflats not covered by seawater at low tide	n/a	+
	Salicornia and other annuals colonizing mud and sand	n/a	-
	Spartina swards (*Spartinion maritimae*)	n/a	-
	Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	n/a	-
	Mediterranean and thermo-Atlantic halophilous scrubs	n/a	-
	Sandbanks which are slightly covered by sea water all the time	n/a	n/a
Epping Forest SAC	Northern Atlantic wet heaths with *Erica tetralix*	+	++
	European dry heaths	+	++
	Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae* or *Ilici-Fagenion*)	++	++

Table Notes:

CL	Critical load
Acid	Acidification
N	Eutrophication
n/a	Critical load not set for feature / feature not sensitive
-	below minimum CL for that habitat
+	minimum CL for that habitat is exceeded
++	maximum CL for that habitat is exceeded

The proposals within the Local Plan may indirectly contribute to local air pollution and wider diffuse pollution, but quantifying these effects is difficult. In practice, the principal source of air pollution associated with the Local Plan will be related to changing patterns of vehicle use due to the promotion of new development (since the Local Plan does not provide for any new significant point-sources). The Department of Transport's *Transport Analysis Guidance*[19] states that "*beyond 200m, the contribution of vehicle emissions from the roadside to local pollution levels is not significant*" and therefore this distance is used to determine the potential significance of any local effects associated with the Local Plan. Environment Agency (EA) guidance (EA, 2007) also states that "*Where the concentration within the emission footprint in any part of the European site(s) is less than 1% of the relevant long-term benchmark (EAL, Critical Level or Critical Load), the emission is not likely to have a significant effect alone or in combination irrespective of the background levels*".

More broadly, Local Plan proposals may indirectly contribute to wider diffuse pollution within and beyond the Council's Administrative Area, in combination with other developments, plans and programmes. There is little guidance on the assessment of diffuse pollution, although NE have previously indicated to Runnymede Borough Council that the HRA of its local plan "*can only be concerned with locally emitted and short range locally acting pollutants*" as wider diffuse pollution is beyond the control or remit of the authority. This is arguably correct, since trans-boundary air pollution can only be realistically addressed by national legislation or higher-tier plans, policies or strategies. As a result, any assessment must focus on the development of suitable mitigating policy that will minimise the contribution of plan-supported development to overall diffuse pollution.

Water Resources and Flow Regulation

The exploitation and management of water resources is connected to a range of activities, most of which are not directly controlled or influenced by the Local Plan; for example, agriculture, flood defence, recreation, power generation, fisheries and nature conservation. Much of the water supply to water-resource sensitive European sites is managed through specific consenting regimes that are independent of the Local Plan.

[19] See http://www.dft.gov.uk/webtag/documents/expert/unit3.3.3.php#013; accessed 15/06/14.

It is clear that development promoted or supported by the Local Plan is likely to increase demand for water, which could indirectly affect some European sites in the study area. When assessing the potential effects of increased water demand it is important to understand how the public water supply (PWS) system operates and how it is regulated with other water resource consents.

Essex and Suffolk Water (ESW) is responsible for supply to the Chelmsford City Area, which is within its Essex Water Resource Zone (WRZ). The supply network in this area is complex and highly integrated, which provides flexibility for the movement of raw and potable water around the WRZ as it is required (for both public water supply and augmentation of rivers during dry periods). In broad summary, most water for the Essex WRZ (around 77%) is derived from surface water abstractions within the WRZ (water from the rivers Chelmer, Blackwater and Stour, and the Roman River is passed to the storage reservoirs at Hanningfield and Abberton, or treated directly at local treatment works for supply), with a small percentage (~3%) derived from groundwater via chalk well and adit sources in the south and south west of the zone. The remaining 20% is provided as bulk supply from Thames Water's Lea Valley Reservoirs and by the Ely Ouse Essex Transfer Scheme (EOETS), which is owned and operated by the EA and transfers water from the Ely Ouse in Norfolk to Essex to augment flows in the rivers Stour and Blackwater in dry years. The complexity of the supply system means that direct and specific supply relationships cannot necessarily be made.

The Water Industry Act 1991, as amended by the Water Act 2003 and Water Act 2014, requires that all water companies must publish a Water Resources Management Plan (WRMP) that sets out their strategy for managing water resources across their supply area over the next 25 years and beyond. WRMPs use calculations of Deployable Output (DO) to establish supply/demand balances; this enables them to identify those WRZs with potential supply deficits over the planning period[20]. The calculations account for any reductions in abstraction that are required to safeguard European sites[21] and so the WRMP process (with other regulations) helps ensure (as far as is achievable) that future changes in demand will not affect any European sites[22].

ESW has accounted for the growth predicted by the Council and other LPAs in its forecasting for the 2014 WRMP. In essence, a predicted supply-demand deficit identified in the 2010 WRMP has been resolved by increasing the capacity of Abberton Reservoir, and through licence variations, such that the Essex WRZ (as of the 2014 WRMP) is predicted to be in surplus for the planning period. The WRMP has been subject to HRA, which has concluded that it will have no significant effect on any European sites, including those water-resource sensitive sites within the study area (e.g. Abberton Reservoir SPA / Ramsar). The WRMP provides the best estimate of future water resource demand, and therefore it is reasonable to assume that the growth predicted within the Local Plan can be accommodated without significant effects on any European sites due to PWS abstractions. Furthermore, since the WRMP explicitly accounts for the growth predicted by the Council and other LPAs, 'in combination' effects between the Local Plan and the WRMP are unlikely to occur. Having said that, the Local Plan can obviously help manage demand and promote water efficiency measures through its policy controls. It should also be noted that the ESW WRMP is currently being reviewed ahead of publication in 2019, so future review of this aspect may be appropriate.

Water Quality

Most waterbodies and watercourses in the Chelmsford City Area are affected to some extent by point or diffuse sources of pollutants, notably nitrates and phosphates. Point sources are usually discrete discharge

[20] Forecasts are completed in accordance with the Water Resources Planning Guidelines (published by the Environment Agency) and take into account (inter alia) economic factors (economic growth, metering, pricing), behavioural factors (patterns of water use), demographic factors (population growth, inward and outward migration, changes in occupancy rate), planning policy (LPA land use plans), company policies (e.g. on leakage control and water efficiency measures) and environmental factors, including climate change. The WRMP therefore accounts for these demand forecasts based on historical trends, an established growth forecast model and through review of local and regional planning documents.

[21] For example, sustainability reductions required by the Review of Consents (RoC) or the Environment Agency's Restoring Sustainable Abstractions (RSA) programme. It should be noted that, under the WRMP process, the RoC changes (and non- changes to licences) are considered to be valid over the planning period. This means that the WRMP (and its underlying assumptions regarding the availability of water and sustainability of existing consents) is compliant with the RoC and so the WRMP can only affect European sites through any new resource and production-side options it advocates to resolves deficits, and not through the existing permissions regime.

[22] Calculations of DO include for Target Headroom (precautionary 'over-capacity' in available water) to buffer any unforeseen variation in predicted future demand; the WRMP is also reviewed on a five-yearly cycle to ensure it is performing as expected and to account for any variations between predicted and actual demand.

points, such as wastewater treatment works (WwTW) outfalls, which are generally managed through specific consenting regimes that are independent of the Local Plan. Diffuse pollution is derived from a range of sources (e.g. agricultural run-off; road run-off) that cannot always be easily traced or quantified.

Development promoted or supported by the Local Plan is likely to increase demand on wastewater treatment works, and potentially increase run-off which could indirectly affect some European sites. The Anglian River Basin Management Plan (RBMP; EA 2016) identifies a number of water quality issues in the 'Combined Essex' RBMP unit, with the management issues being physical modifications to watercourses, point source and diffuse pollution leading to elevated phosphate levels and changes to the natural water flows and levels. With regard to effects on European sites, it should be noted that the EA's Review of Consents determined that there was no adverse effect on the integrity of any European sites from nutrient enrichment due to EA consents (i.e. associated with sewerage treatment). The role of the Local Plan should therefore be to ensure, through policy controls, that infrastructure provision is planned and delivered ahead of developments being completed.

Run-off from impermeable surfaces can have considerable effects on waterbodies and watercourses, and is a notable issue in both urban and rural areas. Development has traditionally sought to capture and divert rain and run-off to the nearest watercourse or treatment facility as quickly as possible, and extensive drainage networks have been developed to facilitate this. However, as developed areas have increased so have the total volumes and flow rates of run-off. This has two principal effects: firstly, impermeable surfaces provide very little resistance to the mobilisation and transport of pollutants within run-off; and secondly, flow rates and volumes often exceed the capacity of the receiving drains or watercourses, causing localised flooding or the operation of combined sewer overflows (CSOs)[23]. The effect of run-off from developed areas can be mitigated or reduced by the use of Sustainable Drainage Systems (SuDS) and by increasing the area of permeable surfaces (both natural and artificial) within developed areas. These measures offer effective attenuation by reducing the volumes of surface run-off. They also increase the retention of pollutants and, in the case of some SuDS, can allow for treatment of pollutants.

With regard to European sites in the study area, those most vulnerable to water quality impacts due to run-off will be the 'downstream receptors' – i.e. the sites associated with the Blackwater and Crouch estuaries. There is no risk of other water quality sensitive sites in the study area being affected (e.g. Abberton Reservoir or Benfleet and Southend Marshes) due to the absence of impact pathways. Since the water quality effects of the Local Plan are ultimately either controlled by existing consents regimes (which must undergo HRA) or have diffuse 'in combination' effects that are difficult to quantify, any assessment must focus on the development of suitable mitigating policy that will minimise the impacts of plan-supported development on water quality.

Flooding and Water Level Management

The implementation of the European Floods Directive (Directive 2007/60/EC) in England and Wales is being co-ordinated with the Water Framework Directive. Catchment Flood Management Plans (prepared by the EA), Shoreline Management Plans (prepared by coastal local authorities and the EA), River Basin District Flood Risk Management Plans (prepared by the EA) and Local Flood Risk Management Strategies (prepared by ECC) set out long term policies for flood risk management. The delivery of the policies from these long term plans will help to achieve the objectives of these plans and the RBMPs. Much of the Council's Administrative Area is at a low to moderate flood risk (based on EA flood maps) with the exception of areas of Chelmsford (which are vulnerable to fluvial flooding) and the lower-lying coastal areas around South Woodham Ferrers. Development supported by the Local Plan is unlikely to significantly alter regional flood risk levels, but may exacerbate the effects of local flooding. Run-off from impermeable surfaces can have considerable effects on waterbodies and watercourses, meaning that flow rates and volumes often exceed the capacity of the receiving drains or watercourses. This can lead to local water quality impacts on European sites. The effect of run-off from developed areas can be mitigated or reduced by the use of SuDS and by increasing the area of permeable surfaces (both natural and artificial) within developed areas.

[23] All sewerage pipes have a certain capacity, determined by the size of the pipe and the receiving water treatment works. At times of high rainfall, this capacity can be exceeded, with the risk of uncontrolled bursts. CSOs provide a mechanism to prevent this, by allowing untreated sewerage to mix with surface water run-off when certain volumes are exceeded. This is then discharged to the nearest watercourse.

Effects on Functional Habitats Outside of European Sites

The provisions of the Habitats Regulations ensure that 'direct' (encroachment) effects on European sites as a result of land use change (i.e. the partial or complete destruction of a European site) are extremely unlikely under normal circumstances, and this will not occur as a result of the Local Plan. However, many European interest features (particularly more mobile animal species) may use or be reliant on non-designated habitats outside of a European site during their life-cycle. Developments some distance from a European site can therefore have an effect on the site if its interest features are reliant on the habitats being affected by the development. All of the above aspects (recreation, water resources, etc.) can therefore also affect European site integrity indirectly through effects on functional habitats outside of the designated site boundary. With regard to the European sites within the study area, this is primarily considered a potential issue for the Crouch and Roach Estuaries SPA and Crouch and Roach Estuaries Ramsar, specifically in relation to wintering Dark-bellied brent geese which are known to forage in agricultural fields at low and high tide. Indeed, Ward (2004) suggests that the majority of geese associated with the Crouch and Roach now forage inland on fields near the estuary, although aggregations on the Crouch are still recorded around Brandy Hole (south of the estuary) and Bridgemarsh Island. The species' use of farmland appears variable according to cropping patterns and is not well-recorded by the standard Wetland Bird Survey (WeBS) monitoring techniques.

In addition, NE has suggested that Golden plover can use functionally-linked land up to 20km from a SPA and that potential effects on Golden plover associated with Abberton Reservoir SPA / Ramsar and the Blackwater Estuary SPA / Ramsar should be considered. Several studies suggest that some areas of lowland farmland may be as important for this species as the habitats of the coastal and wetland SPAs typically associated with wintering waders (e.g. Mason & MacDonald 1999; Gillings 2003), and perhaps even more so. Broadly, it appears that Golden plover retain an association with wetland or coastal sites, typically remaining within a few kilometres of these (except where significant regional movements of flocks occur in response to, for example, changing weather conditions), but will often spend several tidal cycles (or more) foraging and roosting in farmland, both during the day and night. This behaviour is known to be under-recorded by the standard Wetland Bird Survey (WeBS) monitoring technique, with the result that increasing attention is being paid to the use of agricultural areas by overwintering Golden plover. The 2016 SPA Review (JNCC, 2016) includes Golden plover in a broad group of species that are known to be reliant on cropped habitats, which are under-represented in the SPA network (although the SPA Review suggests that this should be addressed outside the SPA Review process through "*wider countryside measures to preserve and promote permanent pasture as feeding and roosting habitat for the species*"). However, distributions vary annually and only a fraction of the potentially available fields will be used in a given year; this variability in use means that identifying potentially critical functional land, especially at large distances from the designated sites (i.e. 10km or more) is difficult at the plan-level.

Abberton Reservoir

Blackwater Estuary

Essex Estuaries

Outer Thames Estuary

Dengie

Crouch and Roach Estuaries

Essex Estuaries

Foulness

Benfleet and Southend Marshes

Essex Estuaries

Thames Estuary and Marshes

Outer Thames Estuary

Key

Chelmsford City Administrative Area

15km buffer

Ramsar

SPA

SAC

0 5 10 km

Scale at A3: 1:250,000

Client

Chelmsford City Council

Chelmsford City Council
Local Plan
Habitats Regulations Assessment

amec foster wheeler

Figure 3.1
European sites within 15km of Chelmsford

4. Initial Screening Assessment

4.1 Initial Screening of European Sites

All European sites within 15km of the Council's Administrative Area have been included in the scope of the HRA. Often, however, sites or interest features within a study area can be excluded from further assessment at an early stage ('screened out') because the plan or project will self-evidently have either 'no effect' or 'no significant effect' on these sites (i.e. the interest features are not sensitive to the likely effects of a plan or project; or are not likely to be exposed to those effects due to the absence of any reasonable impact pathways).

The following sections provide a brief summary of the screening of the European sites and their interest features based on the baseline data summarised in **Section 3** and the emerging policies and proposals of the Local Plan. It should be noted that this aspect of the screening process is a 'low bar', with sites, aspects or features only 'screened out' if they will self-evidently be unaffected by the Local Plan (i.e. it is aiming to identify those aspects that will clearly have 'no effect' or 'no significant effect' (alone or in combination) due to an absence of impact pathways). It does not necessarily imply a conclusion of 'significant effects' for those sites that are 'screened in' since controls within the Local Plan (i.e. policy measures) will also operate to minimise these effects (these are considered in **Sections 5 to 7**); rather, it allows for the policy development to focus on those effects that are potentially important, and which may require bespoke policy measures to prevent significant effects in addition to the general protective policies of the Local Plan.

The screening of the sites and interest features takes account of those general protective policies that are proposed within the Local Plan. In addition, it is appropriate to assume that all relevant lower tier consents and permissions (etc.) will be correctly assessed and controlled, and that any activities directly or indirectly supported by the Local Plan will adhere to the relevant legislative requirements and all normal best-practice (e.g. it would be inappropriate to assume that normal controls on, for example, the installation of a new discharge to a watercourse, would not be correctly followed).

Essex Estuaries SAC (Including Coincident Ramsar Features)

The Essex Estuaries SAC covers the major estuaries of the rivers Colne, Blackwater, Crouch and Roach and the associated intertidal and subtidal habitats. The saltmarsh at the site is known to be generally eroding, due to sea level rise, and so realignment and habitat creation schemes associated with the Shoreline Management Plan and Regional Habitat Creation Programme are an important component of the drive to achieve favourable condition. The majority of the site is in 'favourable' or 'unfavourable recovering' condition, with the latter generally being areas of saltmarsh that are under pressure from erosion. Where appropriate, specific estuaries within the complex (e.g. the Blackwater) are identified, since not all areas of this SAC are likely to be equally exposed to the outcomes of the Local Plan.

Table 4.1 Summary of site screening based on impact pathways

Aspect	Screening summary	Consider further?
Recreational pressure	The SAC is within the Chelmsford City Council (CCC) Administrative Area along the Crouch estuary at South Woodham Ferrers, and other estuary habitats may be affected by this aspect. Component estuaries within 8km of the CCC area are considered further.	Yes
Urbanisation	Effects possible only in relation to the Crouch and Roach components of the SAC and development around South Woodham Ferrers.	Yes (Crouch Estuary only)
Atmospheric pollution	The habitat features of the SAC are not particularly sensitive to atmospheric pollutants and the major road routes in and through the Chelmsford area are not within 200m of the site. The possible exception to this is the area around South Woodham Ferrers, where the A132 is approximately 230m from the European site at its closest point; this road may experience increases in traffic volumes associated with growth around South Woodham Ferrers.	Yes

Aspect	Screening summary	Consider further?
Water resources	The site features are water resource sensitive, and potentially vulnerable to increased abstraction (although this is not currently affecting the site). The ESW WRMP will have no significant effects on this site, based on its HRA, and therefore growth within Chelmsford can be accommodated based on the available data. However, the Local Plan policies should allow for the early identification of infrastructure requirements and it may be appropriate to review this conclusion following completion of the 2019 WRMP (in preparation).	No, although ensure policies reflect need to plan for water resource provision.
Water quality	The features of this site are sensitive to water quality changes, particularly if this results in eutrophication or smothering, although the tidal processes will attenuate local effects to some extent. Impacts from WwTW discharges are unlikely based on current and predicted capacity data (see **Section 3.3**) and so effects are most likely from diffuse pollution or local point sources such as CSOs or unconsented discharges. These will largely be controlled by the EA although the Local Plan policies should aim to ensure that run-off is managed appropriately.	Yes
Flooding / water management	Most of this site will have limited sensitivity to flooding or water management effects, comprising sub-tidal or intertidal habitats, or localised areas of grazing marsh (management of water levels usually controlled). Effects on the SAC due to the Local Plan only have the potential to occur around South Woodham Ferrers, where development could conceivably encroach on wetter areas associated with the site, but this is likely to be localised.	Consider with regard to specific allocations only.
Effects on mobile species away from site	Site does not support any mobile interest features.	No

Crouch and Roach Estuaries SPA (Including Coincident Ramsar Features)

The Crouch and Roach Estuaries SPA covers a complex of salt marsh, grazing marsh and intertidal habitats that provide important feeding and roosting sites for large numbers of waders and waterfowl in winter, particularly Dark-bellied brent geese. The site is within the Council's Administrative Area at South Woodham Ferrers.

Table 4.2 Summary of site screening based on impact pathways

Aspect	Screening summary	Consider further?
Recreational pressure	The SPA is within the CCC area along the Crouch estuary at South Woodham Ferrers; features sensitive and potentially exposed to increased recreational pressure.	Yes
Urbanisation	The SPA is within the CCC area along the Crouch estuary at South Woodham Ferrers; features sensitive and potentially exposed to increased urbanisation pressure	Yes
Atmospheric pollution	The habitat features of the SPA are not particularly sensitive to atmospheric pollutants and the major road routes in and through the Chelmsford area are not within 200m of the site. The possible exception to this is the area around South Woodham Ferrers, where the A132 is approximately 230m from the European site at its closest point; this road may experience increases in traffic volumes associated with growth around South Woodham Ferrers.	Yes
Water resources	The site features are water resource sensitive, and potentially vulnerable to increased abstraction (although this is not currently affecting the site). The ESW WRMP will have no significant effects on this site, based on its HRA, and therefore growth within Chelmsford can be accommodated based on the available data. However, the policies of the Local Plan should allow for the early identification of infrastructure requirements and it may be appropriate to review this conclusion following completion of the 2019 WRMP (in preparation).	No, although ensure policies reflect need to plan for water resource provision.
Water quality	The features of this site are sensitive to water quality changes, particularly if this results in eutrophication or smothering, although the tidal processes will attenuate local effects to some extent. Impacts from WwTW discharges are unlikely based on current and predicted capacity data (see **Section 3.3**) and so effects are most likely from diffuse pollution or local point sources such as CSOs or unconsented discharges. These will largely be controlled by the EA although the Local Plan policies should aim to ensure that run-off is managed appropriately.	Yes

Aspect	Screening summary	Consider further?
Flooding / water management	Areas of grazing marsh associated with this site will be sensitive to changes in flooding or water management, although these areas will generally be managed locally in this regard in any case and will not be affected by the plan proposals unless within close proximity to the site.	Consider with regard to specific allocations only.
Effects on mobile species away from site	The bird interest features are mobile and Dark-bellied brent geese are known to use agricultural land outside the SPA boundary for feeding, and so may be exposed to urbanisation or proximity effects associated with the proposed Local Plan allocations.	Yes (with recreational pressure)

Blackwater Estuary SPA (Including Coincident Ramsar Features)

This site is approximately 5km from the Council's Administrative Area at its closest point. The majority of the site is in 'favourable' or 'unfavourable recovering' condition, with the latter generally being areas of saltmarsh that are under pressure from erosion. The features of the SAC are vulnerable to a range of potential impacts including: direct encroachment; coastal squeeze or developments (etc.) that alter natural geomorphological processes; visitor pressure; management; air quality changes; and local water quality / quantity changes (note, current abstraction and discharge consents are not having an adverse effect on the site, based on Review of Consents data).

Table 4.3 Summary of site screening based on impact pathways

Aspect	Screening summary	Consider further?
Recreational pressure	The SPA is outside the CCC area but within 8km of the boundary. The SPA interest features (in particular) are thought to be potentially vulnerable to increased visitor pressure, and this aspect may operate in combination with other plans and programmes.	Yes
Urbanisation	No proposed site allocations are within 500m of the site and therefore the Local Plan will have no effect via this pathway.	No
Atmospheric pollution	Some supporting habitats are vulnerable to diffuse atmospheric pollution and eutrophication, although eutrophication via agricultural run-off and flood water is overwhelmingly more significant than air pollution. The distance of the site from the CCC area ensures that significant air quality changes as a result of the Local Plan proposals are unlikely to occur.	No
Water resources	The site features are water resource sensitive, and potentially vulnerable to increased abstraction (although this is not currently affecting the site). The ESW WRMP will have no significant effects on this site, based on its HRA, and therefore growth within the CCC area can be accommodated based on the available data. However, the Local Plan policies should allow for the early identification of infrastructure requirements and it may be appropriate to review this conclusion following completion of the 2019 WRMP (in preparation).	No, although ensure policies reflect need to plan for water resource provision.
Water quality	The features of this site are sensitive to water quality changes, particularly if this results in eutrophication or smothering, although the tidal processes will attenuate local effects to some extent. Impacts from WwTW discharges are unlikely based on current and predicted capacity data (see **Section 3.3**) and so effects are most likely from diffuse pollution or local point sources such as CSOs or unconsented discharges. These will largely be controlled by the EA although the Local Plan policies should aim to ensure that run-off is managed appropriately.	No, although ensure policies reflect need to manage run-off and plan for sewerage provision.
Flooding / water management	Areas of grazing marsh associated with this site will be sensitive to changes in flooding or water management, although these areas will generally be managed locally in this regard in any case and will not be affected by the Local Plan proposals unless within close proximity to the site.	No
Effects on mobile species away from site	The bird interest features are mobile and Dark-bellied brent geese are known to use agricultural land outside the SPA boundary for feeding. However, it is unlikely that geese associated with this site will make significant use of land within the CCC area due to the distance and so are unlikely to be affected via this pathway. With regard to Golden plover, which may forage further from the estuary than the geese, all of the proposed major Local Plan allocations are at least 8 km from Blackwater although NE has indicated that this aspect should be considered in detail.	Yes (Golden plover only)

Benfleet and Southend Marshes SPA (Including Coincident Ramsar Features)

This site is approximately 8.4km from the Council's Administrative Area, and is not hydrologically connected. The majority of the site is in 'favourable' or 'unfavourable recovering' condition, with the latter generally being areas of saltmarsh that are under pressure from erosion.

Table 4.4 Summary of site screening based on impact pathways

Aspect	Screening summary	Consider further?
Recreational pressure	The SPA is outside the CCC area and over 8km from the site boundary; it is therefore unlikely that allocations or developments within the CCC area will contribute significantly to the number of visits to this site, although there may be weak in combination effects.	Yes (in combination)
Urbanisation	No site allocations are within 500m of the site and therefore the Local Plan will have no effect via this pathway.	No
Atmospheric pollution	Some supporting habitats are vulnerable to diffuse atmospheric pollution and eutrophication, although eutrophication via agricultural run-off and flood water is overwhelmingly more significant than air pollution. The distance of the site from the CCC area ensures that significant air quality changes as a result of the Local Plan proposals are unlikely to occur.	No
Water resources	The site features are water resource sensitive, and potentially vulnerable to increased abstraction (although this is not currently affecting the site). The ESW WRMP will have no significant effects on this site, based on its HRA, and therefore growth within the CCC area can be accommodated based on the available data. However, the Local Plan policies should allow for the early identification of infrastructure requirements and it may be appropriate to review this conclusion following completion of the 2019 WRMP (in preparation).	No, although ensure policies reflect need to plan for water resource provision.
Water quality	This site is not hydrologically connected to the CCC area and so no effects will occur.	No
Flooding / water management	Areas of grazing marsh associated with this site will be sensitive to changes in flooding or water management, although these areas will generally be managed locally in this regard in any case and will not be affected by the Local Plan proposals unless within close proximity to the site.	No
Effects on mobile species away from site	The bird interest features are mobile and Dark-bellied brent geese are known to use agricultural land outside the SPA boundary for feeding. However, it is unlikely that birds associated with this site will make significant use of land within the CCC area and so are unlikely to be affected via this pathway.	No

Foulness SPA (Including Coincident Ramsar Features)

This site is approximately 14km from the Council's Administrative Area, and is not hydrologically connected. The majority of the site is in 'favourable' or 'unfavourable recovering' condition, with the latter generally being areas of saltmarsh that are under pressure from erosion. The site is owned by the Ministry of Defence (MoD) and so access is partly restricted.

Table 4.5 Summary of site screening based on impact pathways

Aspect	Screening summary	Consider further?
Recreational pressure	The SPA is outside the CCC area and over 8km from the CCC boundary; it is therefore unlikely that allocations or developments within the CCC area associated with the Local Plan will contribute significantly to the number of visits to this site, particularly as access is partly restricted by the MoD in any case, although there may be weak in combination effects.	Yes (in combination)
Urbanisation	No proposed site allocations are within 500m of the site and therefore the Local Plan will have no effect via this pathway.	No

Aspect	Screening summary	Consider further?
Atmospheric pollution	Some supporting habitats are vulnerable to diffuse atmospheric pollution and eutrophication, although eutrophication via agricultural run-off and flood water is overwhelmingly more significant than air pollution. The distance of the site from the CCC area ensures that significant air quality changes as a result of the Local Plan proposals are unlikely to occur.	No
Water resources	The site features are water resource sensitive, and potentially vulnerable to increased abstraction (although this is not currently affecting the site). The ESW WRMP will have no significant effects on this site, based on its HRA, and therefore growth within the CCC area can be accommodated based on the available data. However, the Local Plan policies should allow for the early identification of infrastructure requirements and it may be appropriate to review this conclusion following completion of the 2019 WRMP (in preparation).	No, although ensure policies reflect need to plan for water resource provision.
Water quality	The features of this site are sensitive to water quality changes, particularly if this results in eutrophication or smothering, although the tidal processes will attenuate local effects to some extent. Impacts from WwTW discharges are unlikely based on current and predicted capacity data (see **Section 3.3**) and so effects are most likely from diffuse pollution or local point sources such as CSOs or unconsented discharges. These will be negligible due to the location of the site relative to the Chelmsford area. These will also largely be controlled by the EA although the Local Plan policies should aim to ensure that run-off is managed appropriately.	No, although ensure policies reflect need to manage run-off and plan for sewerage provision.
Flooding / water management	Areas of grazing marsh associated with this site will be sensitive to changes in flooding or water management, although these areas will generally be managed locally in this regard in any case and will not be affected by the Local Pla proposals unless within close proximity to the site.	No
Effects on mobile species away from site	The bird interest features are mobile and Dark-bellied brent geese are known to use agricultural land outside the SPA boundary for feeding. However, it is unlikely that birds associated with this site will make significant use of land within the CCC area and so are unlikely to be affected via this pathway.	No

Thames Estuary and Marshes SPA (Including Coincident Ramsar Features)

The vast majority of this site is located on the southern side of the Thames estuary, although a small area (Mucking Flats) is located on the northern side of the estuary approximately 13km from the Council's Administrative Area. The majority of the site is in 'favourable' or 'unfavourable recovering' condition, with the latter generally being areas of saltmarsh that are under pressure from erosion. The Mucking Flats area is all in favourable' or 'unfavourable recovering' condition.

Table 4.6 Summary of site screening based on impact pathways

Aspect	Screening summary	Consider further?
Recreational pressure	The SPA is outside the CCC area and over 8km from the CCC boundary; it is therefore unlikely that allocations or developments associated with the Local Plan within the CCC area will contribute significantly to the number of visits to this site, although there may be weak in combination effects.	Yes (in combination)
Urbanisation	No proposed site allocations are within 500m of the site and therefore the Local Plan will have no effect via this pathway.	No
Atmospheric pollution	Some supporting habitats are vulnerable to diffuse atmospheric pollution and eutrophication, although eutrophication via agricultural run-off and flood water is overwhelmingly more significant than air pollution. The distance of the site from the CCC area ensures that significant air quality changes as a result of the Local Plan proposals are unlikely to occur.	No

Aspect	Screening summary	Consider further?
Water resources	The site features are water resource sensitive, and potentially vulnerable to increased abstraction (although this is not currently affecting the site). The ESW WRMP will have no significant effects on this site, based on its HRA, and therefore growth within the CCC area can be accommodated based on the available data. However, the Local Plan policies should allow for the early identification of infrastructure requirements and it may be appropriate to review this conclusion following completion of the 2019 WRMP (in preparation).	No, although ensure policies reflect need to plan for water resource provision.
Water quality	This site is not hydrologically connected to the CCC area and so no effects will occur.	No
Flooding / water management	Areas of grazing marsh associated with this site will be sensitive to changes in flooding or water management, although these areas will generally be managed locally in this regard in any case and will not be affected by the Local Plan proposals unless within close proximity to the site.	No
Effects on mobile species away from site	The bird interest features are mobile and some are known to use agricultural land outside the SPA boundary for feeding or roosting. However, it is unlikely that birds associated with this site will make significant use of land within the CCC area and so are unlikely to be affected via this pathway.	No

Abberton Reservoir SPA (Including Coincident Ramsar Features)

This reservoir is located approximately 17km from the Council's Administrative Area, and is not hydrologically connected other than via its role as a storage reservoir for the ESW Essex WRZ. The site is therefore closely managed and controlled, and so opportunities for effects as a result of the Local Plan are more limited than with other sites. The site is 'favourable' condition.

Table 4.7 Summary of site screening based on impact pathways

Aspect	Screening summary	Consider further?
Recreational pressure	Public access to the reservoir is limited and controlled by ESW, and access is designed to minimise effects on the interest features of the site. Effects as a result of the Local Plan are therefore very unlikely given the control over access (and hence exposure) that can be ensured at this site.	No
Urbanisation	No proposed site allocations are within 500m of the site and therefore the Local Plan will have no effect via this pathway.	No
Atmospheric pollution	Some supporting habitats are vulnerable to diffuse atmospheric pollution and eutrophication, although eutrophication via agricultural run-off and flood water is overwhelmingly more significant than air pollution. The distance of the site from the CCC area ensures that significant air quality changes as a result of the Local Plan plan proposals are unlikely to occur.	No
Water resources	The site features are water resource sensitive, and potentially vulnerable to increased abstraction (although this is not currently affecting the site, which is in favourable condition). The ESW WRMP will have no significant effects on this site, based on its HRA, and therefore growth within the CCC area can be accommodated based on the available data. However, the Local Plan policies should allow for the early identification of infrastructure requirements and it may be appropriate to review this conclusion following completion of the 2019 WRMP (in preparation).	No, although ensure policies reflect need to plan for water resource provision.
Water quality	This site is not hydrologically connected to the CCC area and so no effects will occur.	No
Flooding / water management	Areas of grazing marsh associated with this site will be sensitive to changes in flooding or water management, although these areas will generally be managed locally in this regard in any case and will not be affected by the Local Plan proposals.	No
Effects on mobile species away from site	The bird interest features are mobile and will make use of the nearby estuaries for feeding; this is particularly true of the Cormorant population. The features of the site may therefore be exposed to increased visitor pressure on the nearby estuarine sites. This effect is likely to be relatively weak, and can obviously be avoided if effects on the estuarine sites are avoided, and therefore this is considered in this context.	No (although address risks in association with recreational pressure in combination).

Aspect	Screening summary	Consider further?
	With regard to Golden plover, which may forage away from the estuary, the closest proposed Local Plan site allocation is 19.7km from Abberton, and there is no evidence to suggest that the proposed allocation sites coincide with critical areas of functional land (in reality, this could only be determined with long-term site specific surveys to determine whether any allocations are consistently used by potentially significant numbers of plover). Furthermore, the proposed site allocations occupy only a small fraction of the available land within 20km of the reservoir, and any potential effects could clearly be mitigated at the project-stage though provision of compensatory habitat in the vicinity. Significant effects that cannot be be avoided or mitigated using scheme-level measures will not occur, and so this aspect is not considered further.	

Dengie SPA (Including Coincident Ramsar Features)

This site is a large and remote area of tidal mudflat and saltmarsh at the eastern end of the Dengie peninsula, between the Blackwater and Crouch Estuaries, located approximately 20km from the Council's Administrative Area. It is not hydrologically connected to Chelmsford except at the mouths of the adjacent estuaries. The majority of the site is in 'favourable' or 'unfavourable recovering' condition, with the latter generally being areas of saltmarsh that are under pressure from erosion.

Table 4.8 Summary of site screening based on impact pathways

Aspect	Screening summary	Consider further?
Recreational pressure	Dengie is particularly remote in an Essex context and visitor numbers are known to be relatively low. Most of the site is over 20km from the Chelmsford area and even the closest town within the CCC area (South Woodham Ferrers) is approximately 30 minutes drive away. It is therefore considered unlikely that the CCC area contributes significantly to the current recreational pressure at the site, and growth associated with the Local Plan is unlikely to increase this. Furthermore, the measures that would be employed to reduce recreational pressure on the closer sites (e.g. Crouch and Roach Estuaries SPA) will arguably be effective in moderating pressure on this site.	No
Urbanisation	No proposed site allocations are within 500m of the site and therefore the Local Plan will have no effect via this pathway.	No
Atmospheric pollution	Some supporting habitats are vulnerable to diffuse atmospheric pollution and eutrophication, although eutrophication via agricultural run-off and flood water is overwhelmingly more significant than air pollution. The distance of the site from the CCC area ensures that significant air quality changes as a result of the Local Plan proposals are unlikely to occur.	No
Water resources	The site features are water resource sensitive, and potentially vulnerable to increased abstraction (although this is not currently affecting the site, which is in favourable condition). The ESW WRMP will have no significant effects on this site, based on its HRA, and therefore growth within the CCC area can be accommodated based on the available data. However, the Local Plan policies should allow for the early identification of infrastructure requirements and it may be appropriate to review this conclusion following completion of the 2019 WRMP (in preparation).	No, although ensure policies reflect need to plan for water resource provision.
Water quality	This site is not hydrologically connected to the CCC area and so no effects will occur.	No
Flooding / water management	Areas of grazing marsh associated with this site will be sensitive to changes in flooding or water management, although these areas will generally be managed locally in this regard in any case and will not be affected by the Local Plan proposals.	No
Effects on mobile species away from site	The bird interest features are mobile and some are known to use agricultural land outside the SPA boundary for feeding or roosting. However, it is unlikely that birds associated with this site will make significant use of land within the CCC area and so are unlikely to be affected via this pathway.	No

Outer Thames Estuary SPA

The vast majority of this predominately offshore site is a substantial distance from the CCC boundary and will not be exposed to any of the potential outcomes of the CCC Local Plan. However, the extension to the SPA covers the sub- and intertidal areas of the Crouch estuary downstream of North Fambridge, and the Roach estuary, and so the habitats and species of the SPA are likely to have a similar exposure to the plan outcomes as the Crouch and Roach Estuaries SPA. However, it is worth noting that the interest features (specifically common tern for the Crouch and Roach estuaries section of the Outer Thames Estuary SPA) will be generally less sensitive to some impact pathways due to their typical behavioural characteristics.

Table 4.9 Summary of site screening based on impact pathways

Aspect	Screening summary	Consider further?
Recreational pressure	The SPA is within 2.5km of the CCC area along the Crouch estuary; features sensitive and potentially exposed to increased recreational pressure.	Yes (with the Crouch and Roach Estuaries SPA).
Urbanisation	No proposed site allocations are within 500m of the site and therefore the Local Plan will have no effect via this pathway.	No
Atmospheric pollution	The habitat and bird interest features of the SPA are not particularly sensitive to atmospheric pollutants, and the major road routes in and through the Chelmsford area are not within 200m of the site.	No
Water resources	The site habitats are arguably water resource sensitive, and potentially vulnerable to increased abstraction, although tern species are not considered sensitive to this impact pathway due to their foraging behaviours.	No
Water quality	The habitat features of this site are sensitive to water quality changes, particularly if this results in eutrophication or smothering, although the tidal processes will attenuate local effects to some extent. Impacts from WwTW discharges are unlikely based on current and predicted capacity data (see **Section 3.3**) and so effects are most likely from diffuse pollution or local point sources such as CSOs or unconsented discharges. These will largely be controlled by the EA although the Local Plan policies should aim to ensure that run-off is managed appropriately. However, tern species are not considered particularly sensitive to this impact pathway due to their foraging preferences and behaviours.	Yes (with the Crouch and Roach Estuaries SPA).
Flooding / water management	Site not exposed / sensitive to this impact pathway.	No
Effects on mobile species away from site	The bird interest features are mobile but their terrestrial habitats are predominantly associated with Foulness SPA (i.e. common tern roost and breed around Foulness, and feed in marine areas including the Roach and the lower reaches of the Crouch); as a result these will not be exposed to the effects of the CCC plan (see also Foulness SPA, above).	No

In addition to the European sites and impact pathways identified above, the potential for the Local Plan to have air quality effects on **Epping Forest SAC** is considered.

4.2 Initial Screening of Local Plan Components: Policies and Allocations

Overview

It is preferable for HRA to inform the development and refinement of sustainable policies from the outset of the plan-making process rather than it being a purely retrospective assessment exercise towards the end. The principles of HRA have therefore been applied to the emerging Local Plan and its core components (i.e. the policies and proposed site allocations) as part of an iterative process, to ensure that:

- any technical assessments required can focus on those aspects of the Local Plan where potentially significant effects on European sites cannot be obviously excluded; and

- the policies of the adopted Local Plan are drafted to ensure 'no likely significant effect', or that appropriate mitigation is identified to ensure no adverse effect on integrity.

In this context, the emerging Local Plan policies and proposed site allocations contained in the Preferred Options Consultation Document were informally 'screened' and the findings presented in the HRA Report that accompanied the document; the results of this initial screening exercise are presented in **Appendix B** and summarised in this section.

It should be noted that the outcomes of the initial screening have been taken into account by the Council in developing the Pre-Submission Local Plan and as part of the iterative HRA process, the policies and proposed site allocations contained in the Pre-Submission Local Plan have subsequently been reviewed as part of the preparation of this report. This review is presented in **Appendix E** and discussed further in **Section 8**.

Review of Draft Local Plan Policies

Approach

The screening process has considered the European sites potentially vulnerable to the Local Plan and the likely outcomes of the policies as drafted. Policies may have effects in their own right, or they may be used to control potential effects or prevent them from occurring. A policy should be considered 'likely' to have an effect if the competent authority is unable (on the basis of objective information) to exclude the possibility that the plan could have significant effects on any European site, either alone or in combination with other plans or projects; an effect will be 'significant' if it could undermine the site's conservation objectives. However, it is important that the policy assessment focuses on effects that are objectively possible, rather than just imaginable; furthermore, it is not appropriate for policies to simply re-state existing legislation in place of appropriate mitigating measures.

When considering the likely effects of a policy, it is recognised that some policy 'types' cannot result in impacts on any European sites. Different guidance documents suggest various classification and referencing systems to help identify those policies that can be safely screened out; the general characteristics of these policy types are summarised in **Table 4.9**.

Table 4.10 Policy 'types' that can usually be screened out

Broad Policy Type	Notes
General statements of policy / aspiration	The European Commission recognises* that plans or plan components that are general statements of policy or political aspirations cannot have significant effects; for example, general commitments to sustainable development.
General design / guidance criteria or policies that cannot lead to or trigger development	A general 'criteria based' policy expresses the tests or expectations of the plan-making body when it comes to considering proposals, or relates to design or other qualitative criteria which do not themselves lead to development (e.g. controls on building design); however, policies with criteria relating to specific proposals or allocations should not be screened out.
External plans / projects	Plans or projects that are proposed by other plans and are referred to in the plan being assessed for completeness (for example, Highways England road schemes; specific waste development proposals promoted by a County Minerals and Waste Plan).
Environmental protection policies	Policies designed to protect the natural or built environment will not usually have signifcant or adverse effects (although they may often require modification if relied on to provide sufficient safeguards for other policies).
Policies which make provision for change but which could have no conceivable effect	Policies or proposals which cannot affect a European site (no impact pathways and hence no effect; for example, proposals for a new cycle path several kilometres from the nearest European site) or which cannot undermine the conservation objectives, either alone or in combination, if impact pathways exist (no significant effect).

* EC, 2000, Managing Natura 2000 sites: the provisions of Article 6 of the 'Habitats' Directive 92/43/EEC April 2000 at 4.3.2

It should be noted that it is inappropriate to apply a policy classification tool uncritically to all policies of a certain type; there will obviously be some occasions when a policy or similar may have potentially significant effects, despite being of a 'type' that would normally be screened out. The criteria in **Table 4.9** have therefore been applied critically to the screening of the Local Plan policies to identify the following policy groups:

- '**No effect**' policies: policies that will have 'no effect' (i.e. policies that, if included as drafted, self-evidently would not have any effect on a European site due to the type of policy or its operation; for example, a policy controlling town centre shop signage; a policy setting out sustainable development criteria that developments must meet). Note that 'no effect' policies cannot have in-combination effects.
- '**No likely significant effect**' policies: policies where impact pathways exist but the effects will not be significant (alone or in-combination).
- '**Uncertain effect**' policies: policies where the precise effects on European sites (either alone or in combination) are uncertain, and hence additional investigation (appropriate assessment) or policy modification is required. Note that further investigation will often demonstrate that there is no significant effect or allow suitable mitigation or avoidance measures to be identified to ensure this.
- '**Likely significant effect**' policies: policies which are likely to have a significant effect (either alone or in-combination) and hence require additional investigation (appropriate assessment) or policy modification. Note that 'likely significant effect' policies are more likely to require that the policy be amended, abandoned or re-worked to avoid significant effects.

Reflecting these policy groups, a colour coding system (see **Table 4.10**) has been used for the purposes of screening the Local Plan policies in **Appendix B** and **Appendix E**.

Table 4.11 Colour coding for screening of Local Plan policies

	No LSE – policy will not or cannot affect any European sites and can therefore be screened out (subject to brief review of final policy).
	No LSE, but amendments recommended; policies that will not affect any European sites but which could be enhanced or strengthened.
	Policy requires changes to avoid significant effects (e.g. minor re-wording; referencing mitigating policies), or effects are uncertain.
	Significant effects likely; policy should be abandoned or re-worked to include specific mitigation (may apply to groups of policies).

It should be noted that the inclusion of a policy in the 'red' or 'yellow' categories does not mean that significant effects are inevitable since in many instances the assessments reflect uncertainties that need to be explored through further assessment (and it would be possible to undertake an appropriate assessment stage and still conclude (following a further screening) that there will be no significant effects). It should also be noted that the screening of the proposed Local Plan policies accounts for overarching or cross-cutting protective policies that may potentially be relied on to ensure that other policies, particularly those that promote or support development but which do not specify the scale or location of that development, do not have significant effects. However, these policies will not automatically be sufficient to prevent significant effects in all cases, and some policies may require bespoke measures to ensure that significant effects do not occur.

Screening Outcomes

The vast majority of the draft Local Plan policies contained in the Preferred Options Consultation Document were categorised as 'no effect' or 'no significant effect' policies. However, three policies (Policies S8, S9 and GS8) were identified as having possible LSE and were therefore subject to more detailed assessment with resulting measures to avoid significant effects subsequently identified. As highlighted above, this review was undertaken during the policy development phase to assist the Council with the drafting of the policies and

any appropriate mitigation or avoidance measures; suggestions for policy changes or amendments were not intended to be prescriptive and a number of approaches for ensuring 'no significant effects' would be acceptable (for example, a policy with a potential significant effect could have been abandoned; or modified; or cross-referenced to an over-riding protective policy).

As set out above, all of the policies of the Pre-Submission Local Plan have been reviewed as part of this report. This is to ensure that the conclusions of the initial screening remain valid, and any recommended mitigation has been appropriately incorporated or reflected in the Local Plan.

4.3 Review and Screening of Site Allocations

The proposed site allocations contained in the Preferred Options Consultation Document (and the associated policies set out in Chapter 7) were reviewed to identify those which (if developed) could result in significant effects on a European site. The review largely focused on the identification of specific effects that might be associated with specific allocations (and which may therefore require the inclusion of allocation-specific mitigation within the associated policies) rather than the broader 'quantum of development' effects[24]. The risk of effects is obviously strongly dependent on how a particular development is implemented at the project stage and in most cases, potential effects can be avoided using best-practice and standard scheme-level avoidance measures which do not necessarily need to be specified for each allocation (for example, scheduling construction works near the Crouch and Roach SPA for the summer period to avoid potential disturbance of over-wintering birds). However, in some instances there may not be sufficient flexibility or safeguards provided to ensure that a particular allocation could be delivered without significant effects, if brought forward.

The review of the proposed allocations concluded that most would not, if developed, have any significant effects **on their own** that could not be avoided or mitigated using standard measures, and that the Local Plan provided sufficient flexibility (and protective policies) to ensure this. The majority of the preferred site allocations were located in or around Chelmsford Urban Area and at Great Leighs – most notably the large 'North East Chelmsford' allocation (Strategic Growth Site 4) and the 'Moulsham Hall and North Great Leighs' allocation (Strategic Growth Sites 5a to 5c). As a result, all of the allocations were at least 10km from the nearest European site (typically the Blackwater Estuary SPA / Ramsar). GIS modelling of driving times from the allocation sites to the roads nearest to the European sites indicated that most allocations (particularly those around Chelmsford City) were almost 30 minutes away from nearest access points to the European sites.

The principal exception to this was Strategic Growth Site 7[25] ('North of South Woodham Ferrers'), which is within 500m of the Crouch estuary and hence the Crouch and Roach Estuaries SPA / Ramsar and the Essex Estuaries SAC. It was therefore considered that further examination of Strategic Growth Site 7 and Chelmsford's contribution to regional in-combination recreational effects was appropriate.

4.4 Summary of Initial Screening

The emerging Local Plan has been drafted iteratively, taking into account reviews of early policy drafts and of the preferred options; this has also included a review of the proposed allocations, and the European sites potentially exposed and sensitive to the likely outcomes of the plan. The initial screening undertaken in respect of the Preferred Options Consultation Document concluded the following:

- All of the European sites are potentially vulnerable to regional 'in-combination' effects due to visitor pressure, to which the Chelmsford Local Plan will contribute (although this contribution is likely to be relatively limited for most sites), and therefore this aspect would benefit from further consideration to ensure that effects as a result of the Local Plan do not occur.
- None of the proposed site allocations are likely to result in significant effects alone, with the possible exception of Strategic Growth Site 7 (North of South Woodham Ferrers), which is within 500m of the Crouch estuary.

[24] Effects due to the overall quantum of development are essentially a within-plan 'in combination' effect.
[25] Formerly Policy SGS8.

- Other potential pathways for sites to be affected (e.g. through water resource permissions) are unlikely to be realised. The scale of any effects will depend on separate consenting (etc.) regimes that the Local Plan must complement and support through appropriate policy controls, but it is considered that policy controls within the Local Plan can adequately mitigate the risk of effects. The exceptions to this are water quality issues and 'in combination' air quality effects, which would benefit from further consideration to ensure that effects as a result of the Local Plan do not occur.
- The vast majority of proposed Local Plan policies will have no effect on any European sites, typically because they are policy types that do not make provision for changes. In some instances, recommendations were made to improve the performance of the policies with respect to European sites, and the inclusion of these amendments (or similar) has helped to ensure that the Local Plan (as a whole) ultimately has no significant effects on any European sites.

Based on the findings of the initial screening exercise and responses received from NE, three principal aspects have been taken forward for further consideration and detailed assessment as part of this report in order to ensure that effects of the Local Plan do not occur, specifically: recreational pressure; air quality; and water quality. These aspects have been explored in more detail in **Sections 5 to 7** respectively.

5. Assessment of Effects: Recreational Pressure

5.1 Issues and Potential Threats Associated with the Local Plan

Damage of habitats or disturbance of species due to recreational activities can be a significant problem at some sites, although the relationship is highly variable and depends on a range of factors including the habitats, the species, the time of year and the scale, type and predictability of disturbance. With regard to the European sites associated with the Essex estuaries, the main concerns are associated with the bird interest features of the SPA and Ramsar sites, and therefore this section focuses on these receptors; however, the mitigation required for these features is likely to be suitable to minimise impacts on the SAC features also. Human activity can affect birds either directly (e.g. through causing them to flee) or indirectly (e.g. through damaging their habitat). However, birds will also display a range of subtle behavioural responses that can have an energetic cost, through reduced food intake and / or increased energy expenditure. Broadly, disturbance can therefore result in reduced breeding success or increased mortality. At the population scale, this can be significant.

The initial screening of the Preferred Options Consultation Document and, subsequently, the Pre-Submission Local Plan identified two principal aspects of the Local Plan where there are residual uncertainties regarding effects on European sites due to recreational pressure, specifically:

- potential effects from the likely development of the proposed allocation Strategic Growth Site 7 (North of South Woodham Ferrers) **alone** on the Crouch and Roach SPA / Ramsar, and the Crouch component of the Essex Estuaries SAC; and
- the contribution of **all allocations** in the Local Plan to **regional** '**in-combination**' effects with other plans due to visitor pressure.

Strategic Growth Site 7 (North of South Woodham Ferrers)

Strategic Growth Site 7 (SGS7) is an approximately 110 ha greenfield allocation located across the northern edge of South Woodham Ferrers, between the junction of the A132 and B1012, and the Chelmsford City Council Administrative Area boundary east of Bushy Hill. This allocation is covered by a specific policy in the Pre-Submission Local Plan (Strategic Growth Site 7 – North of South Woodham Ferrers) and is expected to comprise:

- ~1,000 new homes including affordable housing;
- a 5-plot Travelling Showpersons' site;
- 1,000sqm of flexible business space;
- 1,900sqm of food retail floorspace;
- a potential new primary school and early years and childcare nursery.

Consequently, the allocation is a relatively large development that is likely to increase the population of South Woodham Ferrers by around 14%[26].

The SGS7 allocation is close to the Crouch estuary and hence the **Crouch and Roach Estuaries SPA**; the **Crouch and Roach Estuaries Ramsar**; and the **Essex Estuaries SAC**. The western side of the allocation is approximately 280m from these sites at Fenn Creek, to the west of South Woodham Ferrers (the allocation also includes a small tributary of Fenn Creek); the eastern edge is approximately 250m from the creek at Saltcoats Park, which are included within the SPA and Ramsar sites. As a result, there is scope for this

[26] The 2011 Census population data are reported by 'Lower Super Output Area' (LSOAs), geographical areas that were introduced in 2004 to improve the reporting of small area statistics. The LSOAs for South Woodham Ferrers indicate that the population was around 16,690 in 2011); the approximate population equivalent of the SGS7 allocation, based on an average occupancy of 2.3 people per home, would be 2,300.

allocation to significantly affect these sites through recreational pressure and urbanisation affecting habitats and species, including functional habitats outside European site boundaries.

Regional 'In Combination' Effects

All of the European sites within the study area are vulnerable to 'in combination' visitor pressure effects from the broader quantum of growth regionally, associated with LPAs near to the designated sites. In strict additive terms, any visit by a Chelmsford resident to any European site is contributing to 'in combination' visitor pressure, although distance and journey time obviously has a very strong influence on the number of visitors from Chelmsford and frequency of visits. As a result, the assessment focuses on those sites most accessible to residents from new developments associated with the proposed Local Plan allocations (particularly the Crouch estuary sites and the Blackwater estuary sites) and growth within the boundaries of Rochford District Council, Maldon District Council, Castle Point Borough Council, Southend-on-Sea Borough Council, Basildon Council, Braintree District Council and Colchester Borough Council.

5.2 Crouch Estuary Sites (Crouch and Roach Estuaries SPA / Ramsar; Essex Estuaries SAC; Outer Thames Estuary SPA)

Baseline Summary

Crouch and Roach SPA / Ramsar

The Crouch and Roach Estuaries SPA covers a complex of salt marsh, grazing marsh and intertidal habitats that provide important feeding and roosting sites for large numbers of waders and waterfowl in winter, particularly Dark-bellied brent geese. The Ramsar site is largely coincident with the SPA, and is essentially designated for the same wintering bird features (although the site also meets Ramsar Criterion 2 for the rare, vulnerable or endangered species of plant and invertebrates that are predominantly associated with the supra-tidal and terrestrial habitats of the grazing marshes). The majority of the site is in 'favourable' or 'unfavourable recovering' condition, with the latter generally being areas of saltmarsh that are under pressure from erosion. There are four small areas of grazing marsh in 'unfavourable no change' condition due to inappropriate management (e.g. insufficient grazing) although these are not near to the allocation SGS7. The SIP indicates that the main pressures on the SPA features are: coastal squeeze; general development; public disturbance; fisheries (particularly bait digging); and invasive species.

The principal interest features of these sites are the wintering population of Dark-bellied grent geese, and the Waterbird Assemblage. Low tide WeBS count data from 2010/11 indicate that the majority of records of Dark-bellied brent geese are associated with the more remote areas of the SPA / Ramsar, notably: the creeks between the Roach and Foulness; the mouth of the Crouch; and the Crouch around Bridgemarsh Island, which is a known foraging and roosting area. Previous WeBS surveys (1995/1996) found large aggregations around Brandy Hole (south of the estuary), although this area did not appear to be used in 2004/5 and 2010/11, possibly due to displacement associated with amendments to the sea wall here. It should be noted that the SPA / Ramsar site is proposed for extension around Brandy Hole and Wallsea Island (south of the Crouch estuary), to cover areas of managed re-alignment that are used by the interest features of the SPA. The WeBS Core Count data for the Upper Crouch Estuary sector (the area closest to the SGS7 allocation) are summarised in **Table 5.1**.

Table 5.1 Annual peak numbers for 2009/10 to 2013/14 within WeBS Core Count sector 25432 (Upper Crouch Estuary)

SPA Feature	2009/10	2010/11	2011/12	2012/13	2013/14	Mean Peak
Waterbird Assemblage	8867	5848	9557	6993	4573	7168
Dark-bellied brent goose	2500	600	850	950	460	1317

Data from: Holt *et al* (2015). Waterbirds in the UK 2013/14: The Wetland Bird Survey. BTO/RSPB/JNCC. Thetford

Dark-bellied brent geese are known to make significant use of agricultural areas adjacent or in close proximity to their estuarine roosts, many of which are not covered by the SPA / Ramsar designation. This behaviour is known to be under-recorded by the standard WeBS monitoring techniques (Low Tide and Core Counts), with the result that increasing attention is being paid to the use of agricultural areas by overwintering geese. Indeed, the 2016 SPA Review (JNCC, 2016) includes Dark-bellied brent geese in a broad group of species that are known to be reliant on cropped habitats, which are under-represented in the SPA network (although the SPA Review suggests that this should be addressed outside the SPA Review process through "*wider countryside measures to preserve and promote permanent pasture as feeding and roosting habitat for the species*"). Ward (2004) suggests that the majority of birds associated with the Crouch and Roach now forage inland on fields near or adjacent to the estuary. The 2016 SPA review notes that Brent geese show a high degree of site fidelity, returning to the same sections of coast within a site each year, and it is likely that this fidelity extends to their agricultural habitats (notwithstanding variations in cropping patterns). Dark-bellied brent geese are known to use improved managed grasslands within the Marsh Farm Country Park (near South Woodham Ferrers), particularly the peninsula south of Clementsgreen Creek, and significant aggregations occur in the Blue House Farm Nature Reserve, east of North Fambridge. However, there is no evidence that the fields proposed for allocation SGS7 are used by Dark-bellied brent geese, and the general characteristics of this area (fields enclosed by hedges, undulating topography) would not generally be attractive to this species.

Essex Estuaries SAC

The Essex Estuaries SAC covers the major estuaries of the rivers Colne, Blackwater, Crouch and Roach and the associated intertidal and subtidal habitats, although this assessment focuses on the features associated with the Crouch estuary. The main interest features of Crouch estuary component of the SAC are:

- Estuaries;
- Mudflats and sandflats not covered by seawater at low tide;
- Salicornia and other annuals colonizing mud and sand;
- Spartina swards (*Spartinion maritimae*);
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*).

Unlike the other local estuaries, the intertidal zones of the Crouch estuary are relatively narrow and constrained by the sea walls, particularly in its upper reaches, and the SAC around South Woodham Ferrers essentially comprises a series of tidal creeks. These areas are all in 'unfavourable recovering' condition, primarily due to salt-marsh erosion which is being addressed through regional habitat creation programmes. The SIP indicates that the main pressures on the SAC features are: coastal squeeze; general development; fisheries; invasive species; and air pollution (particularly nitrogen deposition).

Outer Thames Estuary SPA

The Outer Thames Estuary SPA was primarily an offshore site, initially designated for its wintering population of Red-throated diver, but has recently been extended (December 2017) to include foraging areas used by breeding tern species associated with SPAs on the Norfolk and Essex coasts. The Outer Thames Estuary SPA therefore now covers the subtidal and intertidal areas of the Roach estuary and of the Crouch estuary downstream of North Fambridge. The interest features of the SPA are Red-throated diver (in winter), Common tern and Little tern although the Crouch and Roach sections of the SPA have been primarily included as they are used by Common terns breeding on Foulness and so this feature is the focus of the assessment. The SIP for the site has not been updated to reflect the amendment (as of January 2018) but the pressures on the Crouch and Roach sections of the SPA are likely to be similar to the pressures on the Crouch and Roach Estuaries SPA (i.e. coastal squeeze; general development; public disturbance; fisheries; and invasive species).

Assessment of Effects (SGS7)

Context

Outside of the main settlements (South Woodham Ferrers, North Fambridge and Burnham-on Crouch on the northern bank; and Hullbridge on the southern bank) there are perhaps only five or six minor roads that provide direct access to the estuary, which are generally quite isolated. This means that there are comparatively few access points and much of the estuary requires a reasonably significant effort to access (e.g. walking several kilometres). It is therefore likely that most visitor pressure will be found around these minor roads and that the roads on the north bank will generally be favoured by residents associated with allocation SGS7.

It should also be recognised that the developed areas (i.e. South Woodham Ferrers, Burnham-on Crouch and Hullbridge in particular) are already reasonably substantial and that interest features using the SPA and Ramsar will be habituated to disturbance, particularly in the vicinity of these towns. Much of the SPA and Ramsar around South Woodham Ferrers is included within the Marsh Farm Country Park, an area of grazing marsh managed by Essex County Council (ECC) which provides "*ideal dog-walking and wildlife-spotting opportunities, as well as a chance to explore many scenic riverside paths*"[27] and which effectively provides a circular walking route around the town. This park allows some control of visitor pressure locally by facilitating recreation in a more closely managed area of the SPA / Ramsar, and residents from the SGS7 allocation are most likely to use this area due to its accessibility on foot and parking provision.

In addition, the principal areas used by Dark-bellied brent geese within the SPA / Ramsar near to South Woodham Ferrers (Brandy Hole (south of the estuary); Bridgemarsh Island; Blue House Farm Nature Reserve) are not easily accessed from the town and have little public access in any case; this further reduces the potential for significant disturbance, although geese do regularly use the Marsh Farm Country Park. It should also be noted that HRAs of the Rochford Core Strategy (2014) and Maldon Local Plan (2017) did not identify substantial measures to reduce the impacts of visitor pressure due to allocations around Hullbridge or Burnham-on-Crouch (although these allocations were smaller than that proposed for South Woodham Ferrers).

Population Change

As noted above, allocation SGS7 is likely to increase the population of South Woodham Ferrers by around 14%. Visitor survey data is not available for the Crouch sites and therefore it is necessary to use reasonable proxies to estimate the potential increase in visitor pressure on the site as a result of the population increases predicted by the Local Plan. To provide some context, the current population distribution near the Crouch estuary, and the potential future distribution as a result of the Local Plan, was estimated using the 2011 Census data and the assumed housing levels for the allocations (see **Appendix C**). This is inevitably a coarse approximation, constrained by the resolution of the Census data, but is nevertheless useful when considering the possible magnitude of any increases in recreational pressure. **Table 5.2** summarises these data for the Crouch and Roach Estuaries SPA / Ramsar.

Table 5.2 Anticipated population change near the Crouch and Roach Estuaries SPA / Ramsar associated with Local Plan allocation proposals

	~Current Population*	**Predicted increase**	
		Popn.	*%*
Within 500m	18,994	267	1.41
Within 2.5km	67,308	2204	3.27
Within 5km	267,567	2251	0.84
Within 7.5km	401,044	2463	0.61

[27] Essex Country Parks website; http://www.visitparks.co.uk/places/marsh-farm-country-park/

	~Current Population*	Predicted increase	
		Popn.	*%*
Within 10km	501,355	2667	0.53
Within 15km	775,885	11465	1.48

*Estimated, based on LSOA data.

It should be noted that this analysis overestimates the relative contribution of the Local Plan as it does not account for allocations to be delivered by other authorities through their respective local plans.

Assessment – Crouch and Roach Estuaries SPA / Ramsar

The principal interest feature of these sites is the wintering population of Dark-bellied brent geese, and the assessment focuses on this species as it is typically one of the more exposed and disturbance-sensitive species in the waterbird assemblage.

Most waders and waterfowl are sensitive to disturbance or displacement due to sudden movements or noises. Disturbance will typically cause changes in behaviour such as the cessation of feeding and the adoption of a 'heads up' alert posture, with increasing disturbance resulting in short flights or walks away from the affected area; displacement generally refers to longer term or larger scale movements away from areas that would normally be used. Disturbance or displacement can affect bird species by:

- increasing energy expenditure (e.g. due to a flight response, or by reducing the time spent at roosts); and / or by
- reducing energy intake (e.g. by reducing feeding time due to increased vigilance, or by reducing foraging efficiency due to increased competition or unfamiliarity with new foraging areas that birds may be displaced to).

The net effects of disturbance or displacement can be quite variable and will depend on a number of factors, including: the type of disturbance; its duration and frequency; the availability, location and quality of alternative habitat; and the bird species involved. Some species are likely to be more exposed than others due to their habitat preferences or behavioural characteristics (for example, Redshanks tend to be more strongly associated with incised tidal creeks than other waders). Other species may be more sensitive; for example, larger species such as brent geese typically have larger 'flush distances' (i.e. the distances at which birds typically move when approached). Laursen *et al*. (2005) determined that the mean flush distance for Brent geese was 319m, in contrast to 70m for Dunlin (a much smaller species). Single large disturbance events, or events that are predictable or regular, often have less effect than frequent but irregular disturbance events. Furthermore, bird species may modify their response to disturbance depending on where they are foraging and the type of disturbance experienced; habituation to some noise and visual impact is common, and birds regularly forage in areas that would appear to have a high risk of disturbance, such as industrial sites; indeed, Dark-bellied brent geese will sometimes use recreational areas (e.g. golf courses) as 'overflow' areas for foraging (JNCC, 2016) although areas of higher disturbance risk are generally avoided by this species. However, visual stimuli are thought to be particularly important: Cutts *et al*. (2013) observe that noise stimuli rarely appear to cause waterbird disturbance before associated visual stimuli have an effect. The effects of visual stimuli are strongly dependent on the proximity and type of visual impact (a dog will often elicit a more significant response than moving or stationary machinery, and activities on the foreshore will be more disturbing than activities on the land).

Population increases associated with allocation SGS7 will increase recreational pressure on the SPA as more people are likely to make use of the coastline for leisure and work; however, most recreational activities are 'casual' and pursued opportunistically (e.g. walking, walking dogs, bike riding) rather than structured (e.g. organised group activities or trips to specific discrete attractions), which means that it can be difficult to quantify the impacts of these activities on European sites and (ultimately) harder to control or manage. With regard to the prediction of effects, it is not possible to accurately model the likely increase in the number of visits to the site without substantial investigations into the current behaviour of residents around the estuaries

(including those that do not regularly visit the sites). However, it is reasonable to assume that new residents are likely to behave (on average) in a similar manner to existing residents, and therefore the population increase can be used as a proxy for the likely increase in visitor pressure due to SGS7[28]. As noted, most attempts to predict the significance of increased recreation on European sites generally aim to identify the distance within which a certain percentage of visits originate (i.e. taking account of frequency of visits as well as distance travelled), typically 75%. The analysis of the literature suggests that, for most European sites studied, this distance is usually around 5 – 7km from the site boundary and so the development of SGS7 is almost certain to significantly increase the number of visits to the European site; based on the growth of South Woodham Ferrers, a 14% increase (at least) in the number of visitors to the SPA would be logical (based on the increase in the town population due to the SGS7 allocation alone), and more when considered 'in combination' (see below).

Notwithstanding the above, it should be recognised that most sections of the SPA have relatively limited access from South Woodham Ferrers; outside of the town itself there are few access points and much of the estuary requires a reasonably significant effort to access (e.g. walking several kilometres). It is therefore likely that most of the increased visitor pressure associated with SGS7 will be near to South Woodham Ferrers. In addition, the estuary around the town is relatively narrow and constrained by the sea walls, and essentially comprises a series of tidal creeks; disturbance levels in these areas are already high and so any interest features choosing to use these areas are likely to be relatively habituated to this.

Additional visits can be controlled and managed; for example, Guillemain *et al*. (2007) investigated the effects of ecotourism in the Camargue and found that waterbodies with more tourists did not support fewer birds in the medium-term; and that in the long term, wildfowl numbers were not related to the number of visitors. Obviously, there will always be site-specific variations, but it is known that management can minimise disturbance, provided sufficient funds are available. It is therefore important that the Local Plan provides control mechanisms for monitoring, managing and mitigating any potential effects.

In this context, other local plans have adopted a range of measures in similar situations, most commonly involving developer contributions to site management alongside the provision of well-designed green infrastructure that integrates with the developments and allows easy walking access to local greenspace and the wider countryside (i.e. attractive local areas that are more convenient than protected areas). These measures can be scaled to address the housing provision associated with the Local Plan (this is consistent with NE's position on other strategic mitigation schemes (for example, in relation to the Thames Basin Heaths SPA, or the SPAs associated with the Solent and nearby harbours)). However, it is noted that the Rochford Core Strategy (2014) and Maldon Local Plan (2017) did not identify substantial measures to reduce the impacts of visitor pressure due to allocations around Hullbridge, Maldon or Burnham-on-Crouch.

Generally, the activity with the greatest potential to disturb wintering waterbirds is dog-walking (mainly as this, along with walking, is typically the most common activity undertaken by visitors to these sites; and birds tend to be more alert to walkers with dogs than walkers alone, particularly if the dog is off its lead). Studies have repeatedly shown that the most important factors influencing dog owners' choice of recreational area are: the ability to take their dog off its lead; the proximity to home; and it being traffic-free. Measures that reduce the attractiveness of areas of the estuary in this regard and increase the accessibility and value of local greenspace are likely to be successful in mitigating some potential increases in recreational pressure. Given the known flush distances of brent geese, there would be an argument for targeting measures at areas within 300 – 500m of areas that are known to regularly support large aggregations of roosting or foraging birds; for example, around Bridgemarsh Island or in the Blue House Farm Nature Reserve.

Overall, it is considered that the SGS7 allocation has the potential to significantly affect the SPA / Ramsar through increased visitor pressure, but that this can be moderated or avoided through appropriate mitigation measures incorporated into the Local Plan.

In terms of functional land, there is no evidence that the fields proposed for allocation SGS7 are used by Dark-bellied brent geese, and the general characteristics of this area (fields enclosed by hedges, undulating topography) would not generally be attractive to this species, although this might vary with cropping patterns. On this basis, significant effects would not occur, and any potential effects that might be evident at the

[28] Although it is possible that visits will increase disproportionately in the short-term as new residents explore the surrounding areas.

scheme level can be clearly avoided or mitigated using standard measures available at the project stage (e.g. alternative habitat provision).

Assessment – Essex Estuaries SAC

The habitat features of the Essex Estuaries SAC are also sensitive to visitor pressure, principally through direct damage (trampling, erosion etc.) and localised eutrophication (e.g. associated with dog faeces); other pressures, for example bait digging, may also increase as a result of the SGS7 allocation. Many of the SAC habitats will have limited exposure to casual recreation (in general, few people will directly affect the intertidal mudflats and sandflats feature for example, other than bait diggers) although the SAC includes most of the sea walls along the Crouch estuary. However, the features are generally fairly resilient to direct disturbance (since coastal habitats are typically exposed naturally to a range of environmental perturbations) and so the measures designed to safeguard the Crouch and Roach Estuaries SPA / Ramsar are likely to be largely effective for the SAC also (as far as effects can be related to the SGS7 allocation).

Assessment – Outer Thames Estuary SPA

The assessment of effects for the Outer Thames Estuary SPA (as it relates to the Crouch and Roach estuaries) is largely as for the Crouch and Roach Estuaries SPA, i.e. it is possible that increased recreational use of the Crouch and Roach estuaries associated with SGS7 will increase disturbance and displacement of foraging terns using the estuaries, but that this can be moderated or avoided through appropriate mitigation measures incorporated into the Local Plan. However, it is worth noting that Common terns are generally less sensitive to recreational disturbance when foraging than most wintering water birds[29], and can more easily avoid exposure to disturbing activities, due to their behavioural characteristics and foraging preferences.

Assessment of Effects (In Combination)

Context

The Crouch estuary sites are vulnerable to 'in combination' visitor pressure effects from the broader quantum of growth in the region, particularly in terms of the LPAs bordering the estuary (Chelmsford, Rochford District Council, Maldon District Council) but also nearby LPAs (e.g. Castle Point Borough Council, ~4.1km from the Crouch estuary; Southend-on-Sea Borough Council, ~1.8km from the Roach estuary; Basildon Council, ~1.4km from the Crouch estuary) and other LPAs within Essex. A precautionary 10km 'zone of influence' has been used for the European sites although the proximity of some large settlements to the Crouch estuary sites would arguably ensure most visitors travel less than this (e.g. Southend-on-Sea, ~8km from the Crouch estuary and 2km from the Roach; Wickford, ~4km from the Crouch estuary; Basildon, ~8km from the Crouch estuary).

The broader context for the assessment of in combination effects on the Crouch estuary sites is as set out in relation to allocation SGS7, i.e.:

- Outside of the main settlements (South Woodham Ferrers, North Fambridge and Burnham-on Crouch on the northern bank; and Hullbridge on the southern bank) there are perhaps only six or seven minor roads that provide direct access to the estuaries, which are generally quite isolated. This means that there are comparatively few access points and much of the estuary requires a reasonably significant effort to access (e.g. walking several kilometres). It is therefore likely that most visitor pressure will be found around the principal access points.
- Interest features using the SPA and Ramsar near to the principal access points (i.e. South Woodham Ferrers, Burnham-on Crouch and Hullbridge in particular) are likely to be habituated to disturbance, particularly in the vicinity of these towns.
- The principal areas used by Dark-bellied brent geese within the SPA / Ramsar (e.g. Brandy Hole (south of the estuary); Bridgemarsh Island; Blue House Farm Nature Reserve; Wallasea

[29] Note, the principal nesting sites are on Foulness and so significant disturbance of these as a consequence of the CCC plan would not be expected.

Island; and (although outside the Crouch and Roach SPA / Ramsar), Potton Island and Foulness) are not easily accessed; this further reduces the potential for significant disturbance, although geese do regularly use the Marsh Farm Country Park.

Population Change

Table 5.2 above summarises the current population distribution near the Crouch estuary, and the potential future distribution as a result of the Local Plan, based on 2011 Census data and the housing levels for the proposed allocations (see also **Appendix C**). In summary, the Local Plan allocations are likely to result in a 0.53% increase in population within 10km of this site, based on the 2011 baseline (in reality it will be proportionally less due to housing growth since 2011). This obviously does not account for the growth or allocations within the local plans of neighbouring authorities; this analysis has been attempted (see **Appendix C**) to provide an estimate of the total quantum of housing predicted within 10km of the SPA / Ramsar over the planning period, but data gaps/inconsistencies (e.g. the absence of some plans; the age of other plans; because plans are still in preparation; uncertainty over precise delivery of housing to date; absence of 'windfall' housing from the numbers; etc.) means that this analysis is partial and perhaps of limited value, although the figures are accurate based on allocation data provided by other LPAs and analysis of their local plans (where published). **Table 5.3** provides a summary of this analysis. Note, some allocations straddle distance bands (e.g. only a small part of SGS7 is within 500m of the Crouch estuary) and so the closest point of the allocation has been used for simplicity except where allocations are within 500m, in which cases numbers are provided pro-rata to the area within 500m.

Table 5.3 Predicted housing growth near the Crouch estuary sites based on local plan allocations

LPA	Within 500m	0.5 - 2.5km	2.5 - 5km	5 - 7.5km	7.5 - 10km	10 - 15km
Chelmsford	39*	861*	30	32	400	6137
Rochford	41**	2539**	656			
Maldon		450		1000	559	1484
Basildon	-	Not available	Not available	Not available	Not available	Not available
Southend-on-Sea	-	Not available	Not available	Not available	Not available	Not available
Castle Point	-	-	Not available	Not available	Not available	Not available
Total	80	3850	686	1032	959	7621

* Note, these figures relate to SGS7 but most of this allocation (and hence housing) is over 500m from the SPA boundary; in this instance, housing numbers are pro-rata for clarity.
** These figures include allocations at Hullbridge which are mostly over 500m from the SPA; in this instance, housing numbers are calculated pro-rata for clarity.

It should be noted that all of the proposed Chelmsford Local Plan allocations are over 10km from the Crouch estuary sites with the exception of SGS7 (discussed above) as well as the small (and arguably inconsequential) allocations of GS8 and EC5 (62 dwellings in total) and the southern tip of SGS3c (100 dwellings).

Assessment – Crouch and Roach Estuaries SPA / Ramsar

The majority of the proposed Local Plan allocations, particularly the larger allocations north and west of the Chelmsford Urban Area, will have a limited influence on visitor pressure at the Crouch and Roach Estuaries SPA / Ramsar sites due to their distance from these sites, and the relative inaccessibility of most parts of the sites. However, there is likely to be a potentially significant increase in population within 10km of the site (principally around the western end of the estuary, where several towns are relatively close), and the nearest Local Plan allocations (principally SGS7 but including other allocations also) will contribute to this increase. This will increase the number of visits and visitors to the estuary, which may increase the risk of disturbance events having a significant effect on wintering waterbird populations. Although the Local Plan's contribution (other than SGS7) is likely to be relatively small (both in numbers of visitors and frequency of visits), in pure

additive terms it is clear that the Local Plan, with other plans locally, has the potential to significantly affect the SPA / Ramsar through increased visitor pressure. However, it is likely that this effect can be moderated (to ensure effects are not adverse) or avoided through appropriate mitigation measures incorporated into the Local Plan.

Assessment – Essex Estuaries SAC

The habitat features of the Essex Estuaries SAC are also sensitive to visitor pressure, principally through direct damage (trampling, erosion etc.) and localised eutrophication (e.g. associated with dog faeces); other pressures, for example bait digging, may also increase as a result of population growth locally. Many of the SAC habitats will have limited exposure to casual recreation (in general, few people will directly affect the intertidal mudflats and sandflats feature for example, other than bait diggers) although the SAC includes most of the sea walls along the Crouch estuary. However, the features are generally fairly resilient to direct disturbance (since coastal habitats are typically exposed naturally to a range of environmental perturbations) and so the measures designed to safeguard the Crouch and Roach Estuaries SPA / Ramsar are likely to be largely effective for the SAC also.

Assessment – Outer Thames Estuary SPA

The assessment for this site is effectively the same as for the Crouch and Roach Estuaries SPA; i.e. it is possible that increased recreational use of the Crouch and Roach estuaries associated with the 'in combination' quantum of development will increase disturbance and displacement of foraging terns using the estuaries, but that this can be moderated or avoided through appropriate mitigation measures incorporated into the Local Plan.

Incorporated Measures

As noted above, one of the most common approaches to mitigation for recreational impacts involves developer contributions, usually linked to catchment areas and development size. NE has indicated to the Council that a cross-authority 'Recreation and Avoidance Mitigation Strategy' (RAMS) would be an appropriate mechanism to ensure that adverse effects in this regard do not occur. The Council has committed to this approach through the policies contained in the Pre-Submission Local Plan and the supporting justifications. In particular:

- **Strategic Policy S6**: Sets out requirements for protection of sites, with the supporting text explicitly committing to the RAMS approach ("*Following consultation with Natural England, an Essex-wide RAMS is being prepared to cover the Essex Estuaries SAC and Crouch together with the Roach Estuaries SPA and the Colne and Blackwater Estuaries SPAs and Ramsar sites, with a view to their subsequent adoption as a Supplementary Planning Document (SPD). Any residential development that is likely to affect the integrity of European Sites, will be required to either contribute towards mitigation measures identified in the RAMS or, in exceptional circumstances, identify and implement bespoke mitigation measures to ensure compliance with the Habitat Regulations.*")
- **Strategic Policy S11**: Requires that new development "*…provide or contribute towards ensuring a range of green and natural infrastructure and public realm improvements*…[including]… *Contributions towards recreation disturbance avoidance and mitigation measures for European designated sites*". The supporting text states that "*Measures required to mitigate the impacts of recreational disturbance on European Protected sites will be delivered as detailed in the Essex coastal Recreational Disturbance Avoidance and Mitigation Strategy (RAMS). Any residential development that is likely to affect the integrity of European Sites, will be required to either contribute towards mitigation measures identified in the RAMS (or subsequent Supplementary Planning Document) or, in exceptional circumstances, identify and implement bespoke mitigation measures to ensure compliance with the Habitat Regulations.*"
- **Policy NE1**: Requires that "*Developments that are likely to have an adverse impact (either individually or in combination with other developments) on European Designated Sites must satisfy the requirements of the Habitats Regulations, determining site specific impacts and*

avoiding or mitigating against impacts where identified". The supporting text states that "*A Mitigation Strategy document is being produced through the Essex Recreational Disturbance Avoidance and Mitigation Strategy (RAMS) project, with a view to its subsequent adoption as a Supplementary Planning Document, to support the Local Plan. Development proposals will need to take account of this Mitigation Strategy. Where necessary, this will include new residential development contributing towards implementation of this Mitigation Strategy. The Mitigation Strategy is being led by Essex County Council and is expected to be completed in 2018*".

- **Strategic Growth Policy SGS7** (for the South Woodham Ferrers allocation) includes specific requirements for:
  - the provision of "…*high quality circular routes or connections to the wider Public Rights of Way network located away from the Crouch estuary*";
  - networks of green infrastructure to "*Mitigate potential effects due to recreational pressure on nearby designated European sites*"; and
  - "*Provision of and/or financial contributions towards, recreation disturbance avoidance and mitigation measures for European designated sites including the Crouch Estuary*".

  In addition, the supporting text states that "…*measures that increase the recreation choice for residents away from the estuary, or which help mitigate impacts where the estuary is used for recreation, must form an integral part of the development proposals*".
- **Strategic Growth Site, and Growth Site Policies SGS3a, SGS3c, SGS3d, GS8, SGS9**: Relate to proposed allocations within 10km of the Crouch and Roach Estuaries SPA / Ramsar and note that "*Where appropriate, contributions will be collected towards recreation disturbance avoidance and mitigation measures for European designated sites*", with the supporting text of each policy stating that "*At this stage, it is considered that this development allocation will be required to pay for the implementation of mitigation measures to protect the Crouch and Roach Estuaries Special Protection Area, Ramsar site and Site of Special Scientific Interest, and potentially the Essex Estuaries Special Area of Conservation. The appropriate mechanisms will be identified in the RAMS.*"

The policies referred to above clearly establish the Council's commitment to a RAMS, which will be agreed with NE and delivered in 2018, and the requirement for developers to contribute to the delivery of this RAMS. In addition, the Council's commitment to the provision of green infrastructure is woven throughout the policy provisions of the Pre-Submission Local Plan. The precise requirements of the RAMS will be agreed with NE, but it is likely to include measures that have been successfully employed at other sites, such as:

- requirements for green-space provision within and near developments to attract casual recreational use away from European sites, including good connections to Public Rights of Way and countryside areas away from the estuary;
- localised access-management measures (rationalisation of access points and car park locations; provision of interpretation; re-routing of footpaths in particularly sensitive areas; fencing; etc.);
- habitat management, safeguarding (e.g. through the purchase of non-designated functional land) or creation within and near the European sites.
- seasonal wardening services between October and April, providing an on-site presence throughout at key locations within the SPA when wintering birds are present;
- educational measures to support longer-term compliance;
- regular monitoring of birds and visitors.

These measures will be funded by a developer contribution, likely to be based on the number of new dwellings, which will cover annual mitigation costs (e.g. seasonal wardening, coordination, monitoring, etc.) and any capital investment required (e.g. signage etc.). Project-level HRA will also be required in order to

confirm any site-specific details that may trigger a requirement for additional measures, notwithstanding the requirements of the RAMS.

Conclusion

Some proposed Local Plan allocations have the potential to significantly affect the interest features of the Crouch and Roach Estuaries SPA / Ramsar, the Outer Thames Estuary SPA, and the associated areas of the Essex Estuaries SAC by increasing recreational pressure, either alone (allocation SGS7 (South Woodham Ferrers)), or 'in combination' with the population growth supported by the Chelmsford Local Plan and other local plans (particularly the plans of Rochford, Maldon, Basildon, Southend-on-Sea and Castle Point). The wide-scale and regional nature of these pressures means that significant effects cannot be excluded based on either the available data for the European sites, or through use of allocation-specific avoidance or mitigation measures (e.g. greenspace provision). Consequently, the Council has committed to the adoption of a RAMS, which is currently being led by ECC in collaboration with the relevant LPAs and NE. The RAMS will be adopted as a SPD and development proposals will be required to account for this. The Local Plan policies clearly set out this commitment, which will be agreed with NE and delivered in 2018, and the requirement for developers to contribute to the delivery of this strategy.

Whilst the precise requirements of the RAMS have not yet been finalised, it will include measures that have been successfully employed for other European sites (e.g. Thames Basin Heaths SPA; Thanet Coast and Sandwich Bay SPA / Ramsar), supported by developer contributions. As a result, this plan-level mitigation measure is considered to be available, achievable and likely to be effective and so can be relied on to ensure that proposals coming forward under the Local Plan either avoid affecting the designated sites (no significant effect) or, where significant effects cannot be avoided, that effects will not adversely affect site integrity. In consequence, it is considered that delivery of the Local Plan will have no adverse effects on the integrity of the Crouch estuary sites, alone or in combination with other plans.

5.3 Blackwater Estuary Sites (Essex Estuaries SAC; Blackwater Estuary SPA / Ramsar)

Baseline Summary

Blackwater Estuary SPA / Ramsar

The Blackwater Estuary is the largest of the Essex Estuaries and includes extensive intertidal mudflats, the largest area of saltmarsh in Essex and surrounding terrestrial habitats including grazing marsh, associated fleets and ditches, and semi-improved grassland. Shingle and shell banks and offshore islands are also a feature of the tidal flats.

The site currently has eight interest feature species: Little tern (breeding); Pochard (breeding); Hen harrier (wintering); Ringed plover (breeding); Black-tailed godwit (wintering); Grey plover (wintering); Dunlin (wintering); and Dark-bellied brent goose (wintering), although additional wintering species have been proposed for inclusion following the SPA Review (Avocet, Golden plover, Ruff, Redshank, Shelduck)[30]. Almost all of the site is used by large numbers of birds, although key areas appear to be the central sections of the northern shore and the channels around Old Hall Marshes. The broad distribution and characteristics of these species are summarised in **Table 5.4**.

Table 5.4 Broad distribution and characteristics of Blackwater Estuary SPA interest features

Feature	Distribution / favoured habitats
Little tern	Small numbers at the site and declining. Principally associated with the shingle and shell banks and offshore islands, particularly Mersea Quarters off Mersea Island and nearby sites in the Colne Estuary SPA. Largely protected from land-based disturbance as recent nesting attempts have been on islands in the Mersea Quarters, not on Mersea Island.

[30] Note, the SPA Review also recommended the removal of some species.

Feature	Distribution / favoured habitats
Hen harrier	Principally associated with the grasslands, reedbeds and saltmarshes fringing the site, notably Old Hall Marshes and Tollesbury Wick.
Pochard	Breed within freshwater habitats associated with the margins of the site, e.g. Old Hall Marshes and Tollesbury Wick. Recent records (Essex Bird Reports) suggest most currently breed at Old Hall Marshes, with regular nesting in smaller numbers at other locations.
Ringed plover	Principally associated with the shingle and shell banks and offshore islands, particularly Mersea Island and nearby sites on the Colne Estuary SPA. Particularly sensitive to disturbance as nesting season largely coincides with the summer holiday period and their sand/shingle nesting habitat is very popular for seaside recreation.
Black-tailed godwit	Present throughout the intertidal areas of the estuary in winter, particularly the intertidal areas of the inner estuary around Northey Island, Osea Island and Lawling Creek. Will use terrestrial areas for roosting at high-tide. Gill *et al.* (2001) found no "…*detectable response to human presence by this species*" during surveys at sites in Essex, including the Blackwater.
Grey plover	Present throughout the estuary in winter, particularly the intertidal areas around Northey Island and Osea Island. Will use terrestrial areas for roosting at high-tide. Not thought to be particularly sensitive to disturbance, although recent declines at the site do not mirror regional or national trends suggesting site-specific factors are responsible.
Dunlin	Present throughout the estuary in winter. Will use terrestrial areas for roosting at high-tide.
Dark-bellied brent goose	Widely distributed throughout the estuary in both intertidal and terrestrial habitats, but areas around the Northey Island, Coopers Creek, Old Hall Marshes and Tollesbury Wick are important. Other areas of non-designated agricultural land are also used. Sensitivity to disturbance is generally high, although geese will sometimes use recreational areas (e.g. golf courses) as 'overflow' areas for foraging (JNCC 2016) – see **Section 5.2** above)
Redshank	Widely distributed throughout the estuary intertidal areas. Will use terrestrial areas for roosting at high-tide. Often found in narrow creeks and areas of relatively high disturbance.
Avocet	Small numbers, tending to be concentrated around Old Hall Marshes and Mersea Island.
Golden plover	Widely distributed throughout the estuary in both intertidal and terrestrial habitats; other areas of non-designated agricultural land are also used.
Ruff	Small numbers, principally near Salcott Channel.
Shelduck	Present throughout the intertidal areas of the estuary in winter, particularly the intertidal areas of the inner estuary around Northey Island. Will use terrestrial areas for roosting at high-tide.
Waterbird Assemblage	Almost all of the site is used by large numbers of birds, although key areas appear to be the central sections of the northern shore and the channels around Old Hall Marshes. Most species widespread although duck species (e.g. Wigeon, Teal and Pintail) typically more localised.

Many of the interest features will feed mainly or exclusively on exposed intertidal sediments and saltmarsh at low tide, gathering at suitable roost sites (typically areas with low or little vegetation, such as saltmarsh or shingle) at high-tide. The high-tide roosts are therefore particularly sensitive to disturbance due to their relatively limited distribution (compared to the intertidal areas) and the consequently greater distances that birds may be flushed if disturbed. Disturbance may also force birds to roost further from their preferred feeding areas. Important roost sites are known on the Blackwater at Cooper's Creek (near Mundon Stone Point and Lawling Creek), at Highfields near St Lawrence Creek on the south shore, and around Tollesbury Wick, Old Hall Marshes and on West Mersea. Other roost sites are distributed throughout the estuary.

In addition, some species (notably Dark-bellied brent geese and Golden plover) are known to make use of agricultural areas adjacent or in close proximity to their estuarine roosts, many of which are not covered by the SPA / Ramsar designation (see also **Section 5.2** above). The Golden plover population (recommended for inclusion as a feature by the SPA Review) is thought to have functional connections with Abberton Reservoir SPA, with the population using agricultural areas around and between these sites for foraging. Cormorants from the colony at Abberton Reservoir SPA also take a large proportion of their food from the Blackwater although this species will not be particularly sensitive to the principal disturbance pressures associated with recreation at this site.

The majority of the site is in 'favourable' or 'unfavourable recovering' condition, with the latter generally being areas of saltmarsh that are under pressure from erosion. There are areas of grassland on Osea Island intended to provide foraging opportunities for Brent geese that are in 'unfavourable declining' condition due to inappropriate management (e.g. insufficient grazing). The SIP indicates that the main pressures on the SPA features are coastal squeeze; general development; public disturbance; fisheries (particularly bait digging); and invasive species.

Essex Estuaries SAC

The main interest features of Blackwater estuary component of the SAC are:

- Estuaries;
- Mudflats and sandflats not covered by seawater at low tide;
- Salicornia and other annuals colonizing mud and sand;
- Spartina swards (*Spartinion maritimae*);
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*).

Small areas of the Mediterranean and thermo-Atlantic halophilous scrubs (Sarcocornetea fruticosi) feature occur on Osea Island, although the principal areas of this habitat are outside the Blackwater estuary. As noted above, the majority of the site is in 'favourable' or 'unfavourable recovering' condition, with the latter generally being areas of saltmarsh that are under pressure from erosion.

Assessment of Effects (In combination)

Context

The Blackwater estuary sites are vulnerable to 'in combination' visitor pressure effects from the broader quantum of growth in the region, particularly in the LPA areas bordering the estuary (Maldon District Council, Colchester Borough Council) but also nearby LPAs (e.g. Chelmsford City Council, Tendring District Council, Braintree District Council). However, it should be noted that the size and geography of the SPA / Ramsar will ensure that some in combination effects are more likely to be experienced across the estuary 'as a whole' rather than at specific points where theoretical 'zones of influence' might overlap.

As with the Crouch and Roach Estuaries SPA / Ramsar, outside of the main settlements (Maldon, Goldhanger, Tollesbury, Salcott, West Mersea on the north bank; Maylandsea, St. Lawrence and Bradwell Waterside on the south bank) there are very few roads that provide direct access to the estuary. This means that there are comparatively few access points and much of the estuary requires a reasonably significant effort to access (e.g. walking several kilometres). It is therefore likely that most visitor pressure will be found around the principal access points associated with these towns and villages. However, it is arguable that many of the interest features using the SPA and Ramsar near to the principal access points (especially around Maldon and West Mersea) are likely to be habituated to disturbance, particularly in the vicinity of these towns. In this context, the HRA of the Maldon Local Plan (2017) suggests that "*With regard to Maldon town, the Blackwater SPA/Ramsar boundary extends to the edge of the town, and due to high levels of disturbance from recreation and traffic is it considered unlikely that any key roosting sites are present in this area*".

Population Change

Table 5.5 summarises the current and predicted population distribution near the Blackwater estuary based on 2011 Census data and the housing levels associated with the proposed Local Plan allocations (see also **Appendix C**). With regard to the Blackwater Estuary SPA / Ramsar, the Chelmsford Local Plan will (if all allocations are delivered) on its own result in a ~0.8% increase in the population within 10km of this site. This obviously does not account for the growth or allocations within the local plans of neighbouring authorities; this analysis has been attempted to provide an estimate of the total quantum of housing predicted within 10km of the SPA / Ramsar over the planning period, but data gaps (e.g. the absence of some plans; the age of other plans; or because plans are still in preparation) means that this analysis is

partial and perhaps of limited value. **Table 5.6** provides a summary of this analysis. In short, and as would be expected, much of the population increase within 10km is associated with allocations in Maldon and Braintree (Witham); it is suggested that the key area (as far as in combination effects for the Chelmsford Local Plan are concerned) will be around Maldon where the zone of influences of several allocations in neighbouring authorities are likely to overlap, and easy accessibility by car increases the risk of increased visitor pressure.

Table 5.5 Anticipated population change near the Blackwater Estuary SPA / Ramsar associated with Local Plan allocation proposals

	~Current Population*	Predicted increase	
		Popn.	***%***
Within 500m	2,229	0	0
Within 2.5km	45,201	0	0
Within 5km	62,180	0	0
Within 7.5km	128,532	37	0.03
Within 10km	263,389	2187	0.83
Within 15km	561,350	13860	2.47

*Estimated, based on LSOA data.

Table 5.6 Predicted housing growth near the Blackwater estuary sites based on local plan allocations

LPA	Within 500m	0.5 - 2.5km	2.5 - 5km	5 - 7.5km	7.5 - 10km	10 - 15km
Chelmsford					1062	5514
Rochford					60	3176
Maldon	131	2912		450		
Colchester*		100	105	370	2428	1501
Braintree*				518	1441	959
Tendring*	-	-	-	GIS not available		*
Garden Communities*						5000*
Basildon	-	-	-	-	-	Not available
Southend-on-Sea	-	-	-	-	-	Not available
Castle Point	-	-	-	-	-	Not available
Total	131	3012	105	1338	4991	11150

* The housing numbers for Colchester and Braintree (GIS data for Tendring was not provided at the time of reporting) do not include the three proposed 'Garden Communities' that will be located in these districts. The precise boundaries of these communities have not yet been determined, but two of these communities (Braintree / Colchester Borders and Colchester / Tendring Borders) will be within 15km of the Blackwater Estuary SPA (with a small proportion of each potentially just within 10km, depending on the final community boundaries). These communities will provide approximately 2500 homes each, and so are identified as a separate line in the table.

Assessment – Blackwater Estuary SPA / Ramsar

The assessment for the Blackwater Estuary SPA / Ramsar is largely the same as that for the Crouch and Roach Estuaries SPA / Ramsar. In summary:

- There is likely to be a potentially significant increase in population within 10km of the site (principally associated with: Maldon, where over 3,000 homes are proposed within 2km of the estuary[31]; within (Braintree), where several allocations are 7 – 10km from the site boundary; and allocation SGS7 in the Local Plan, ~8km from the site). Three proposed Local Plan allocations are within 10km of the Blackwater: SGS7 (North of South Woodham Ferrers); GS8 (Bicknacre); and EC5 (St Giles, Moor Hall Lane, Bicknacre).
- The proposed Local Plan allocations will increase the number of visits and visitors to the estuary, which may increase the risk of disturbance events having a significant effect on wintering waterbird populations.
- The Local Plan's contribution is likely to be relatively small (both in numbers of visitors and frequency of visits), although in pure additive terms it is clear that the Local Plan, with other plans locally, has the potential to significantly affect the SPA / Ramsar through increased visitor pressure. However, it is likely that this can be moderated (to ensure effects are not adverse) or avoided through appropriate mitigation measures incorporated into the Local Plan.

Assessment – Essex Estuaries SAC

The assessment for the Blackwater estuary component of the Essex Estuaries SAC is largely the same as that for the Crouch estuary. In summary:

- The habitat features of the Essex Estuaries SAC are also sensitive to visitor pressure, principally through direct damage (trampling, erosion etc.) and localised eutrophication (e.g. associated with dog faeces); other pressures, for example bait digging, may also increase as a result of population growth locally.
- Many of the SAC habitats will have limited exposure to casual recreation.
- The features are generally fairly resilient to direct disturbance (since coastal habitats are typically exposed naturally to a range of environmental perturbations) and so the measures designed to safeguard the SPA / Ramsar are likely to be largely effective for the SAC also.

Incorporated Measures

The incorporated measures for the Blackwater estuary sites are the same as for the Crouch estuary sites (see **Section 5.2**). In summary, the Council is committed through policy set out in the Pre-Submission Local Plan to the delivery and implementation of a cross-authority RAMS, which is being prepared in collaboration with NE. RAMS supported by developer contributions are one of the most common approaches to mitigation for recreational impacts, and NE has indicated to the Council that this would be an appropriate mechanism to ensure that adverse effects in this regard do not occur. The commitment to the RAMS (and complementary policies such as requirements for green infrastructure provision) are woven through the proposed Local Plan policies, notably Strategic Policy S6, Strategic Policy S11, Policy NE1, and Strategic Growth Site Policies SGS3a, SGS3c, SGS3d, SGS7, GS8, SGS9.

Conclusion

As with the Crouch estuary sites (see **Section 5.2,**) some proposed Local Plan allocations have the potential to significantly affect the interest features of the Blackwater Estuary SPA / Ramsar, and the associated areas of the Essex Estuaries SAC, by increasing recreational pressure 'in combination' with the population growth supported by other local plans (particularly the local plans of Maldon and Braintree). The Council is committed to the adoption of a RAMS to avoid and mitigate the potential effects of these increases. The RAMS will include measures that have been successfully employed for other European sites, supported by developer contributions, and can be relied on to ensure that proposals coming forward under the Local Plan either avoid affecting the designated sites (no significant effect) or, where significant effects cannot be

[31] It should be noted that the HRA of the Maldon Local Plan (adopted in mid-2017) concluded that "…*the Maldon LDP is not likely to have a significant effect on any interest features of the international sites detailed above, either alone or in-combination*"; this was based on the location of the allocations on the outskirts of Maldon town, the existing levels of disturbance around Maldon and Heybridge, and policy requirements for the provision of green-space. The proposed RAMS is not noted in the adopted plan.

avoided, that effects will not adversely affect site integrity. Therefore it is considered that delivery of the Local Plan will have no adverse effects on the integrity of the Blackwater estuary sites, alone or in combination with other plans.

5.4 Other Essex Estuary sites

The other European sites within the study area (Benfleet and Southend Marshes SPA / Ramsar; Foulness (Mid-Essex Coast Phase 5) SPA / Ramsar; Thames Estuary and Marshes SPA / Ramsar; Dengie (Mid-Essex Coast Phase 1) SPA / Ramsar; and the associated areas of Essex Estuaries SAC) are also vulnerable to increases in visitor pressure that may occur 'in combination' with the Local Plan.

Due to the location and accessibility of the sites relative to the proposed allocations, it is likely that only a very small proportion of any increase in the number of visitors or visits to these sites will be related to the CCC Local Plan[32], although in purely additive terms any Local Plan-related visitors will be contributing to 'in combination' visitor pressure at these sites. The RAMS being developed by ECC (which is supported by the Council including through policies contained in the Pre-Submission Local Plan) will cover the sites associated with the Essex estuaries, and is an appropriate mechanism for ensuring that the Local Plan's contribution to 'in combination' effects on more distant sites is appropriately managed. On this basis, it is considered that delivery of the Local Plan will have no adverse effects on the integrity of these estuary sites, alone or in combination with other plans.

[32] For example, it is self-evident that visitors to the Benfleet and Southend Marshes SPA will be overwhelmingly from Southend-on-Sea, South Benfleet and Canvey Island.

6. Assessment of Effects: Air Quality

6.1 Issues and Potential Threats Associated with the Local Plan

The principal source of air pollution related to the implementation of the Local Plan will be associated with changing patterns of vehicle use due to the promotion of new development (since the Local Plan does not provide for any new significant point-sources). The Department of Transport's *Transport Analysis Guidance*[33] states that "*beyond 200m, the contribution of vehicle emissions from the roadside to local pollution levels is not significant*" and therefore this distance is used to determine the potential significance of any local effects associated with the Local Plan.

The sites considered potentially vulnerable to air quality changes associated with the Local Plan are those with features that are potentially sensitive to this aspect, i.e.:

- Epping Forest SAC (reflecting NE's response to the Preferred Options Consultation Document);
- the sites associated with the Crouch and Roach Estuaries (principally with regard to allocation SGS7); and
- the sites associated with the Blackwater Estuary.

It should be noted that recent case law[34] has altered the established approach to air quality assessments for European sites, particularly regarding the application of metrics relating predicted changes in traffic flows to potentially significant air quality impacts. The case concerned the importance of taking into consideration the in-combination effect of proposed developments when assessing the air quality impacts. Prior to the High Court judgement, the Design Manual for Roads and Bridges (DMRB) threshold of an increase of over 1,000 vehicles / day in annual average daily traffic (AADT) volumes was used to scope out air quality assessments (i.e. if predicted AADT increases were less than 1,000 then no air quality assessment was required, alone or in combination). This case concerned the cumulative impact of local plans produced by multiple councils impacting Ashdown Forest SAC. In this instance, the Joint Core Strategy (JCS) prepared by Lewes District Council and South Downs National Park Authority scoped out an air quality assessment as the AADT for the JCS was below 1,000. However, the Judge decided that whilst the DMRB threshold was relevant to determine potential air quality impacts, the land allocations included in the JCS would impact the Ashdown Forest SAC and when considered in combination with the allocations in the Wealden District Council (WDC) Core Strategy, the threshold would be breached.

As a consequence of this decision, it is important that local authorities thoroughly consider the cumulative effect of traffic associated with multiple developments. This is a developing area, so there are currently no guidelines as to the catchment for inclusion into the air quality assessment, nor on the extent to which thresholds can still be applied (particularly where plan contributions to traffic flows are negligible).

6.2 Epping Forest SAC

Baseline Summary

Epping Forest is one of the few remaining large-scale examples of ancient wood-pasture in lowland Britain, and has retained habitats of high nature conservation value including ancient semi-natural woodland, old grassland plains and scattered wetland. The SAC covers a series of semi-natural woodland and grassland blocks between Wanstead in London (near the A12) and the M25 at Epping. The key pressures currently affecting the site (based on the SIP) are air pollution, management (undergrazing), visitor pressure and invasive species.

The SAC is approximately 17km from the Chelmsford City Council Administrative Area boundary at its closest point, and ~24km from the nearest proposed allocations. Consequently, the Local Plan will only

[33] See http://www.dft.gov.uk/webtag/documents/expert/unit3.3.3.php#013; accessed 15/06/14
[34] http://www.bailii.org/ew/cases/EWHC/Admin/2017/351.html

affect the site indirectly through any additional vehicle trips that occur within 200m of the SAC as a result of development within the Local Plan area.

The features of the SAC considered sensitive to air quality impacts (specifically, based on the SIP, atmospheric nitrogen deposition) are:

- Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae* or *Ilici-Fagenion*)
- Northern Atlantic wet heaths with *Erica tetralix*; and
- European dry heaths.

The critical loads for N-deposition for these features, and the current N-deposition (based on APIS) are summarised in **Table 6.1**.

Table 6.1 Summary of N-deposition and critical loads for Epping Forest SAC, based on APIS

Feature	Critical Loads (kg N/ha/yr)	Current N-deposition (kg N/ha/yr)		
		Max	***Min***	***Average***
Atlantic acidophilous beech forests	10 – 20	52.5	25.6	29.2
Northern Atlantic wet heaths with *Erica tetralix*	10 – 20	28.8	14.7	16.6
European dry heaths	10 – 20	28.8	14.7	16.6

The variation in Current N-deposition for the features is related to their locations within the SAC; as noted, the SAC is a series of semi-natural woodland and grassland blocks between Wanstead in London (near the A12) and the M25 at Epping, covering approximately 14.5km. All of the SSSI units where air pollution is identified as a key issue in an 'unfavourable' condition assessment are in the southern area of the Forest, between Chingford and Wanstead (and hence near the North Circular and the A12), rather than those areas near the M25.

Assessment of Effects

Context

Air quality has been shown to have negatively affected the epiphytic lichen communities[35] of the Epping Forest SAC near the roads that cross the site. The principal source of air pollution related to the Local Plan will be that associated with changing patterns of vehicle use due to the promotion of new development and housing sites. As noted above, the Department of Transport's *Transport Analysis Guidance*[36] states that "*beyond 200m, the contribution of vehicle emissions from the roadside to local pollution levels is not significant*" and therefore this distance is used to determine the potential significance of any local effects associated with the Local Plan.

Many roads are within 200m of the SAC, although most (particularly towards the southern end) are relatively minor residential streets which will not see any potentially significant increases in traffic volumes as result of the Local Plan. The assessment of the effects of the Local Plan therefore focuses on those routes most likely to be used by traffic from the Chelmsford City Area when entering or going around London (see **Annexed Report 1**), specifically:

- the M25 near Epping;
- the A12 near Wanstead;

[35] Epiphyte richness is a key factor in defining hyper-Atlantic forms of the Atlantic acidophilous beech forests Annex I type.
[36] See http://www.dft.gov.uk/webtag/documents/expert/unit3.3.3.php#013; accessed 15/06/14

- the A406 North Circular near Woodford;
- A104 Epping New Road west of Theydon Bois; and
- the A112 near Chingford.

Feature Distributions and Condition

The interest features are present across the SAC and are all likely to occur, to some extent, within 200m of the above roads. The condition of the SSSI units in these areas is generally 'unfavourable recovering' (on the basis of agreed management proposals, although units near the A12 (Unit 136) and North Circular (Unit 134) are classified as 'unfavourable no change' due to ongoing air quality impacts). However, air quality is cited as an issue in the condition assessments for all SSSI units.

Traffic Volumes

A high-level traffic assessment has been undertaken as part of this HRA to predict the Local Plan's contribution to future traffic growth and hence N-deposition at the above locations (see **Annexed Report 1**). This analysis has aimed to determine whether the proposed allocations will result in an increase of over 1,000 vehicles / day in AADT volumes on the principal roads within 200m of Epping Forest, either on their own or in combination; and whether the increase will result in a consequential rise of 1% on the critical load/level for NOx (methodologies are detailed in **Annexed Report 1**). The results of the AADT assessment are summarised in **Table 6.2**.

Table 6.2 Predicted changes in AADT at roads within 200m of Epping Forest SAC

Road	2016 Existing AADT	2036 AADT without Local Plan Allocations		2036 AADT with Local Plan Allocations		Local Plan AADT Contribution	
		Total	*Change*	*Total*	*Change*	*Total*	*% of 2036*
M25 Average	142,688	164,367	21,679	164,432	21,744	65	0.30
A104 Average	19,952	22,840	2,888	22,848	2,896	8	0.28
A112 Average	15,621	19,547	3,926	19,559	3,938	12	0.30
A406 Average	109,963	137,493	27,530	137,581	27,618	88	0.32
A12 Average	75,521	94,460	18,939	94,503	18,982	43	0.23

This analysis demonstrates that the anticipated increase in AADT volumes by 2036 is substantially over the nominal 1,000 AADT increase threshold for 'significant' effects to be possible. This is irrespective of the Local Plan contribution with most of the increase being associated with growth in the LPA areas immediately around the SAC. It is also clear that the Local Plan contribution under all scenarios is very limited.

Notwithstanding the findings of the high-level traffic assessment, air quality modelling has been undertaken to determine the likely effect of the increase in AADT volumes (see **Annexed Report 1**). This demonstrates the following:

- The greatest change in annual mean NOx concentrations between the 'without Local Plan' and 'with Local Plan' scenarios for 2031 is 0.02 μgm^{-3} at Epping Forest New Road north and North Circular; this is an inconsequential amount.
- Nitrogen deposition has been calculated using the predicted annual mean concentration of NOx, and the contribution of the Local Plan is substantially less than the accepted threshold for

'significant effects' to be possible alone (>1% of the minimum critical load); in this instance, this would be less than 0.01 kg/ha/yr[37].

- Nitrogen deposition is likely to remain over the minimum critical load for the site habitats to 2036 irrespective of the Local Plan contribution, which will be inconsequential; however, it is expected that emission factors will decrease in future years.

Assessment

N-deposition is currently affecting the interest features of the Epping Forest SAC, and this is predicted to continue over the plan period as traffic increases. However, the Local Plan's contribution to traffic growth and emissions near Epping Forest SAC will be inconsequential at all locations modelled, and the critical loads for N-deposition at the SAC will be exceeded irrespective of the proposals in the plan. The Local Plan will therefore have no significant effects alone, and it is considered that the plan will also have no significant 'in combination' effects (except if the most literal interpretation is applied) as the contribution of the proposed allocations and associated traffic volumes is so small.

Incorporated Mitigation

The local authorities immediately around Epping Forest SAC, plus ECC, Hertfordshire County Council, Highways England, NE and the Corporation of London, have agreed to work collaboratively to reduce air quality impacts on the SAC, putting in place a memorandum of understanding to support this. Given the *de minimis* contribution of the Local Plan to predicted changes in traffic volumes and air quality around Epping Forest, specific mitigation measures for potential effects associated with out-of-district travel are not considered essential to ensure 'no significant effects'. Whilst the Local Plan's ability to influence out-of-district travel will be limited, sustainable travel principles (including support for public transport, cycle and pedestrian routes, car clubs, etc.) are woven throughout the proposed Local Plan policies, particularly with regards to the strategic allocations.

Conclusion

Based on the traffic and air quality analyses, it is considered that the Local Plan will have no significant effects on the air-quality sensitive interest features of the Epping Forest SAC, alone or in combination.

6.3 Crouch Estuary Sites (Essex Estuaries SAC; Crouch and Roach Estuaries SPA / Ramsar)

Baseline Summary

The habitat features of the estuary sites are not highly sensitive to air pollution from vehicles (estuary systems are typically eutrophic, and atmospheric N-deposition is typically dwarfed by inputs from aquatic systems), although the SIP indicates that the following features of the Crouch estuary sites are broadly sensitive to atmospheric nitrogen deposition:

- SAC features:
  - Salicornia and other annuals colonizing mud and sand;
  - Estuaries;
  - Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*);
  - Spartina swards (*Spartinion maritimae*); and
  - Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*).

[37] The air quality assessment models NOx and then converts it into rates of N-deposition using tools released by Defra, although these only calculate to two decimal places; in this instance the change in concentration is too small to be picked up by these tools and so the change in concentration is given as <0.01 kgN/ha/yr.

- SPA features:
  - Dark-bellied brent geese (via effects on the saltmarsh communities).

The critical loads for N-deposition for these features, and the current N-deposition (based on APIS) are summarised in **Table 6.3**.

Table 6.3 Summary of N-deposition and critical loads for the Essex Estuaries SAC and Crouch and Roach Estuaries SPA / Ramsar, based on APIS

Feature	Critical Loads (kg N/ha/yr)	Current N-deposition (kg N/ha/yr)		
		Max	***Min***	***Average***
Salicornia and other annuals colonizing mud and sand	20 – 30	17.2	11.6	14.3
Estuaries	20 – 30	17.2	11.6	14.3
Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*)	20 – 30	17.2	11.6	14.3
Spartina swards (*Spartinion maritimae*)	20 – 30	17.2	11.6	14.3
Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	20 – 30	17.2	11.6	14.3
Dark-bellied brent geese (Pioneer, low-mid, mid-upper saltmarshes)	20 – 30	17.2	11.6	14.3

It is worth noting, however, that the action plan within the SIP covering these sites primarily focuses on tern species associated with the Blackwater Estuary SPA, the Colne Estuary SPA, and Foulness SPA (noting that "*Atmospheric nitrogen deposition exceeds the relevant critical loads for coastal dune habitats used by breeding terns and hence there is a risk of harmful effects. However, on the Essex estuaries declines in the numbers of breeding terns appear to be due mainly to erosion of a man-made cockle-shingle bank (at Foulness) and to disturbance (elsewhere), rather than to over-vegetation of breeding areas caused by nitrogen deposition*"). Tern species are not associated with the Crouch and Roach Estuaries SPA.

Assessment of Effects

Context

The principal source of air pollution related to the implementation of the Local Plan will be that associated with changing patterns of vehicle use due to the promotion of new development and housing sites. As noted above, the Department of Transport's *Transport Analysis Guidance*[38] states that "*beyond 200m, the contribution of vehicle emissions from the roadside to local pollution levels is not significant*" and therefore this distance is used to determine the potential significance of any local effects associated with the Local Plan.

Considering the Crouch estuary sites, very few roads are within 200m of the European site boundaries; the majority are unclassified minor roads linked to small settlements or villages which will not see any potentially significant increases in traffic volumes as a result of the Local Plan[39]. The possible exceptions to this are roads near to the proposed SGS7 allocation:

[38] See http://www.dft.gov.uk/webtag/documents/expert/unit3.3.3.php#013; accessed 15/06/14

[39] i.e. increases that could affect the European sites; it is self-evident that the minor roads within 200m of the Crouch and Roach will not see substantial increases in traffic due to the Local Plan given their location and (in most cases) the absence of through routes. Whilst there are likely to be some changes in the number of vehicles using minor roads in the region associated with broader population growth, these will be too small to meaningfully model or detect using the industry standard approaches to traffic modelling that can be applied at the strategy-level (i.e. without substantial additional data collection including field monitoring).

- the A132 east of South Woodham Ferrers, which is likely to see an increase in commuter traffic (although it should be noted that this road is over 235m from the SAC / SPA / Ramsar at its closest point near Woodham Fen, and typically much further away, and so significant effects would not be expected); and
- short sections of local roads around South Woodham Ferrers (principally Ferrers Road, Inchbonnie Road, Marsh Farm Road, and Creekview), which may see increases in local traffic due to the SGS7 allocation, particularly if vehicles access the car parks adjacent to the estuary, (e.g. at Marsh Farm Country Park).

Feature Distributions and Condition

The Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*) feature is not present within the Crouch estuary component of the Essex Estuaries SAC, and so is not considered further in this section. The remaining air quality sensitive habitat features (Salicornia and other annuals colonizing mud and sand; Estuaries; Spartina swards (*Spartinion maritimae*); and Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) are present within 200m of the above roads. Dark-bellied brent geese are known to use improved managed grasslands within the Marsh Farm Country Park (which are over 200m from the nearest roads) but are less likely to use the creek saltmarshes that are within 200m of the above roads due to behavioural preferences. The condition of the SSSI units in these areas is either unfavourable recovering (areas of eroding saltmarsh) or favourable (areas of improved grassland within and near Marsh Farm Country Park that are used by Brent geese). Air quality is not identified as an aspect currently affecting these units, and the units in this area used by Brent geese would not be sensitive to the effects of N-deposition in any case (improved grassland and pasture).

Traffic Volumes

The Council is completing a detailed Air Quality Impact Assessment to predict the Local Plan's contribution to future traffic growth in and around South Woodham Ferrer; this is not currently available for analysis (January 2018) although initial indications are that the minor roads within South Woodham Ferrers (and hence within 200m of the nearest European sites) will not see potentially significant (in HRA terms) increases in traffic volumes. This report will be reviewed, and the HRA updated if necessary, prior to Examination.

In the absence of the detailed model, Wood has undertaken a separate, high-level analysis of the potential effects of SGS7 on the A132 near South Woodham Ferrers (although it must be noted that all of this road is over 200m from the SAC boundary); this suggests that the proposed allocations will result in an increase of over 1,000 vehicles / day in AADT volumes on the A132 (see **Table 6.4**).

Table 6.4 Predicted changes in AADT at main roads within 200m of Essex Estuaries SAC and Crouch and Roach Estuaries SPA / Ramsar at South Woodham Ferrers

Road	2016 Existing AADT	2036 AADT without Local Plan Allocations		2036 AADT with Local Plan Allocations		Local Plan AADT Contribution	
		Total	*Change*	*Total*	*Change*	*Total*	*% of 2036*
A132	29,823	35,587	5,764	37,484	7,661	1,897	5.3%

It must be noted that this assessment is a relatively coarse high-level model only, and will be superseded by more detailed analysis within the Air Quality Impact Assessment report. However, it does provide some useful guidance on the level of impacts expected since the A132 will be the busiest road locally by some margin, since it is the principal route in and out of the town.

Assessment

There is no evidence that N-deposition associated with current traffic volumes is significantly affecting the habitat interest features of the SAC / Ramsar site around South Woodham Ferrers. The accepted threshold for 'significant effects' to be possible is an increase of >1% of the minimum critical load; in this instance, this

would be approximately 0.2 kg/ha/yr. Although it is not simple to apply 'rule of thumb' estimates to relationships between traffic volumes and N-deposition (as this is influenced by a number of factors), it is worth noting that the DMRB guidance regarding air quality thresholds is based on the assumption that 1,000 extra vehicles is equivalent to ~0.01 kg N/ha/yr (this is obviously a coarse figure and there are other factors that come into play such as the emissions factors used for opening year/ wind direction etc./ number of HGVs / speed etc.). Recent air quality modelling by Wood of a new link road elsewhere in the UK found that an increase of ~7,000 AADT increased nitrogen deposition by 0.21 kg N/ha/yr at the worst receptor point (at the immediate kerbside), and that by 25m from the road the increase in N-deposition was zero.

In terms of exposure, no part of the A132 is within 200m of the Crouch estuary designated sites' boundaries (the closest point is ~220m away), and so any effects would be extremely marginal based on established protocols. As noted, the Department of Transport's *Transport Analysis Guidance*[40] states that "*beyond 200m, the contribution of vehicle emissions from the roadside to local pollution levels is not significant*" since vehicle exhausts are situated very close to the ground the emissions only have a local effect, and beyond 200m emissions will have dispersed sufficiently that atmospheric concentrations are essentially background levels. As a result, the designated sites in the area nearest to the A132 (around Woodham Fen) will not be exposed to potentially significant effects as a result of N-deposition associated with the Local Plan, alone or in combination.

With regard to the other sections of the designated sites within 200m of roads within South Woodham Ferrers, detailed Air Quality Impact Assessment models have been developed to assess the likely effects of allocation SGS7 (alone and in combination) on traffic and air quality around the town. As noted, this is not currently available for analysis (January 2018) although initial indications are that the minor roads within South Woodham Ferrers (and hence within 200m of the nearest European sites) will not see potentially significant (in HRA terms) increases in traffic volumes. This report will be reviewed, and the HRA updated if necessary, prior to Examination. It should be noted that the minor roads are screened from the European sites by housing and gardens for much of their length (which will reduce potential deposition).

On this basis, the predicted increases in traffic volumes around South Woodham Ferrers as a result of the proposed Local Plan allocations are extremely unlikely (regardless of any moderating factors) to increase N-deposition by over 1% of the critical load (alone or in combination). Irrespective of this, the area of the designated sites within 200m of these minor roads is less than 13.7 ha, principally composing upper saltmarshes and grasslands associated with the tidal creeks, and the intertidal mudflats of the Crouch estuary. Whilst marine and inter-tidal systems are generally N-limited, in most cases nitrogen inputs from the atmosphere are likely to be inconsequential compared to inputs from marine and riverine sources. Indeed, APIS notes that airborne N-deposition "…*is likely to be of low importance for these systems as the inputs are probably significantly below the large nutrient loadings from river and tidal inputs*." Furthermore, marine and inter-tidal systems will be subject to tidal flushing which will remove a large proportion of any nitrogen that does deposit from atmosphere, thus preventing it from accumulating to the same extent as in terrestrial habitats.

As a result, it is considered that the Local Plan will have no significant effects on the air-quality sensitive features of the European sites associated with the Crouch estuary (Essex Estuaries SAC; Crouch and Roach Estuaries SPA / Ramsar), alone or in combination.

Incorporated Mitigation

Policy SGS7 (as contained in the Pre-Submission Local Plan) includes a number of development requirements (alongside wider policy provisions) that will minimise local car use associated with this allocation and hence the potential for effects on the sites of the Crouch estuary; these include (inter alia):

- Maximising opportunities for sustainable travel.
- Providing a well-connected internal road layout which allows good accessibility for bus services and bus priority measures.
- Providing new public transport routes/services.

[40] See http://www.dft.gov.uk/webtag/documents/expert/unit3.3.3.php#013; accessed 15/06/14

- Providing additional pedestrian and cycle connections to the town centre.
- Providing a dedicated car club for residents and businesses on site and available to the rest of South Woodham Ferrers.
- Improvements to the local and strategic road network as required by the Local Highway Authority.

Conclusion

Based on the traffic and air quality analyses, and taking into account the location, characteristics and condition of the air-quality sensitive interest features and their site-relevant critical loads, the Local Plan (particularly with regard to the proposed allocation SGS7) will have no significant effects on the interest features of the European sites associated with the Crouch estuary (Essex Estuaries SAC; Crouch and Roach Estuaries SPA / Ramsar), alone or in combination.

6.4 Blackwater Estuary Sites (Essex Estuaries SAC; Blackwater Estuary SPA / Ramsar)

Baseline Summary

The habitat features of the estuary sites are not highly sensitive to air pollution from vehicles (estuary systems are typically eutrophic, and atmospheric N-deposition is typically dwarfed by inputs from aquatic systems), although the SIP indicates that the following features of the Blackwater estuary sites are broadly sensitive to atmospheric nitrogen deposition:

- SAC features:
  - Salicornia and other annuals colonizing mud and sand;
  - Estuaries;
  - Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*);
  - Spartina swards (*Spartinion maritimae*);
  - Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)/
- SPA features:
  - Dark-bellied brent geese (via effects on the saltmarsh communities);
  - Little tern (via effects on sand dune habitats, although it should be noted that these habitats are very localised in the Blackwater).

The critical loads for N-deposition for these features, and the current N-deposition (based on APIS) are summarised in **Table 6.5**.

Table 6.5 Summary of N-deposition and critical loads for the Essex Estuaries SAC and Blackwater Estuary SPA / Ramsar, based on APIS

Feature	Critical Loads (kg N/ha/yr)	Current N-deposition (kg N/ha/yr)		
		Max	***Min***	***Average***
Salicornia and other annuals colonizing mud and sand	20 – 30	17.2	11.6	14.3
Estuaries	20 – 30	17.2	11.6	14.3
Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*)	20 – 30	17.2	11.6	14.3

Feature	Critical Loads (kg N/ha/yr)	Current N-deposition (kg N/ha/yr)		
		Max	*Min*	*Average*
Spartina swards (*Spartinion maritimae*)	20 – 30	17.2	11.6	14.3
Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)	20 – 30	17.2	11.6	14.3
Dark-bellied brent geese (Pioneer, low-mid, mid-upper saltmarshes)	20 – 30	17.2	11.6	14.3
Little tern (Shifting coastal dunes)	10 – 20	15.1	10.6	12.4
Little tern (Coastal stable dune grasslands - acid type)	8 – 10	15.1	10.6	12.4
Little tern (Coastal stable dune grasslands - calcareous type)	10 – 15	15.1	10.6	12.4

It is worth noting, however, that the areas supporting Little tern in the Blackwater are not sand dunes or dune grasslands, but typically areas of shingle or shell banks associated with islands (e.g. Pewet Island, Bradwell; Bradwell Shell Banks; Cobmarsh Island), all of which are over 200m from the nearest road.

Assessment of Effects

Context

As with the Crouch estuary, few roads are within 200m of the European site boundaries; the majority are unclassified minor roads linked to small settlements or villages which will not see any potentially significant increases in traffic volumes as result of the Local Plan, with the possible exception of roads around Maldon (notably the B1026 Goldhanger Road, east of Heybridge). Minor roads within Maldon that are within 200m of the SAC are not explicitly considered as significant increases in traffic on these roads is not anticipated (based on the Maldon Local Plan) and because these cannot be reliably modelled using the industry standard approaches to traffic modelling that can be applied at the strategy-level (i.e. without substantial additional data collection including field monitoring). Other roads within 200m (e.g. the B1025 to Mersea Island) are not considered due to the distance to the nearest proposed Local Plan allocations (>30km straight-line distance, and substantially further by road) and the very low likelihood of any substantial increases in traffic volumes at these distances (see assessment for Epping Forest SAC, above), and for these locations.

Feature Distributions and Condition

The Mediterranean and thermo-Atlantic halophilous scrubs (*Sarcocornetea fruticosi*) feature is not present within the Blackwater estuary component of the Essex Estuaries SAC, and so is not considered further in this section. The remaining air quality sensitive habitat features (Salicornia and other annuals colonizing mud and sand; Estuaries; Spartina swards (*Spartinion maritimae*); and Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*) are present within 200m of the above road. Dark-bellied brent geese are known to use pasture and arable land adjacent to the estuary, as well as the estuary itself, although the main non-designated areas of usage are not near the B1026. The condition of the SSSI units in these areas is either 'unfavourable recovering' (areas of eroding saltmarsh) or 'favourable'. Air quality is not identified as an aspect currently affecting these units, and agricultural fields in this area that may be used by Brent geese would not be sensitive to the effects of N-deposition in any case. The most sensitive features identified by APIS (dunes and dune grasslands associated with breeding Little tern) are not present in this section of the estuary (and the areas supporting Little tern in the Blackwater are in any case typically areas of shingle or shell banks associated with islands (e.g. Pewet Island, Bradwell; Bradwell Shell Banks; Cobmarsh Island), all of which are over 200m from the nearest road), and so these features (and by extension Little tern) are not considered further.

Traffic Volumes

A high-level traffic assessment has been undertaken as part of this HRA to predict the Local Plan's contribution to future traffic growth and hence N-deposition at the B1026 near Heybridge (see **Annexed Report 1**). This analysis has aimed to determine whether the proposed Local Plan allocations will result in an increase of over 1,000 vehicles / day in AADT volumes, either on their own or in combination. The results of the AADT assessment are summarised in **Table 6.6**.

Table 6.6 Predicted changes in AADT at roads within 200m of Essex Estuaries SAC and Blackwater Estuary SPA / Ramsar near Maldon

Road	2016 Existing AADT	2036 AADT without Local Plan Allocations		2036 AADT with Local Plan Allocations		Local Plan AADT Contribution	
		Total	*Change*	*Total*	*Change*	*Total*	*% of 2036*
B1026	18,427	21,376	2,949	21,489	3,062	113	0.5%

Assessment

The assessment of effects is as for the Crouch estuary sites; in summary:

- There is no evidence that N-deposition associated with current traffic volumes is significantly affecting the habitat interest features of the SAC / Ramsar site around the western end of the Blackwater.
- The predicted increases in traffic volumes on the B1026 near Maldon as a result of the proposed Local Plan allocations are extremely unlikely (regardless of any moderating factors) to increase N-deposition by over 0.2 kg/ha/yr (1% of the minimum critical load for features in this area), alone or in combination.
- The area of the designated sites within 200m of the B1026 composes saltmarshes and intertidal mudflats, which will be less sensitive to airborne deposition than the critical loads would suggest due to the dominance of N-inputs from marine and riverine sources, and the tidal flushing which minimises accumulation compared to terrestrial habitats.

As a result, it is considered that the Local Plan will have no significant effects on the air-quality sensitive features of the European sites associated with the Blackwater estuary (Essex Estuaries SAC; Crouch and Roach Estuaries SPA / Ramsar), alone or in combination.

Incorporated Mitigation

As with Epping Forest SAC, specific mitigating measures for potential effects associated with out-of-district travel are not considered essential to ensure 'no significant effects' due to the *de minimis* nature of any air quality impacts. Whilst the Local Plan's ability to influence out-of-district travel will be limited, sustainable travel (including support for public transport, cycle and pedestrian routes, car clubs, etc.) are woven throughout the policies of the Pre-Submission Local Plan, particularly in regards to the strategic allocations. Furthermore, Appendix D of the Pre-Submission Local Plan carries forward provisions from the North Chelmsford Area Action Plan (NCAAP) related to the North East Chelmsford allocations, which include for provision of a new railway station.

Conclusion

Based on the traffic and air quality analyses, and taking into account the location, characteristics and condition of the air-quality sensitive interest features and their site-relevant critical loads, the Local Plan will have no significant effects on the interest features of the European sites associated with the Blackwater estuary (Essex Estuaries SAC; Crouch and Roach Estuaries SPA / Ramsar), alone or in combination.

7. Assessment of Effects: Water Quality

7.1 Issues and Potential Threats Associated with the Local Plan

The Chelmsford City Area is served by approximately 11 principal waste water treatment works (WwTWs), of which seven are within the Council's Administrative Area. ECC and Southend-on-Sea Borough Council produced a WwTW Needs Assessment in 2014 (URS, 2014), which identified treatment works in the region that were at or near capacity (and which would therefore require upgrading to support additional development). In summary, two WwTWs serving the City Area were considered to be at or near volumetric capacity: Ingatestone, the catchment of which includes the village of Stock, to the southwest of Chelmsford; and Billericay, the catchment of which overlaps very slightly (and inconsequentially[41]) with the Council's Administrative Area.

The Council subsequently commissioned a more detailed Water Cycle Study (Aecom, 2017)[42] which specifically considers the growth associated with the Local Plan. This study concludes that two treatment works within the Council's Administrative Area, at Great Leighs and South Woodham Ferrers, do not currently have sufficient capacity to accommodate all of the development proposed within their catchments over the plan period. The ultimate downstream receptors for discharges from these WwTWs are the Blackwater Estuary (Great Leighs WwTW, discharges to the River Ter and hence the River Chelmer; Blackwater Estuary is approximately 22.5km downstream) and the Crouch Estuary (South Woodham Ferrers WwTW, adjacent to the Crouch Estuary). As a result, the sites associated with these estuaries **(Essex Estuaries SAC; Blackwater Estuary (Mid-Essex Coast Phase 4) SPA / Ramsar; Crouch and Roach Estuaries (Mid-Essex Coast Phase 3) SPA / Ramsar**) are potentially exposed to significant effects due to water quality changes associated with housing growth and allocations proposed by the Local Plan (no Local Plan allocations are proposed for the catchment of Ingatestone WwTW, and so the plan will have no substantive effect on discharges from this WwTW[43]).

More broadly, the run-off from impermeable surfaces can affect waterbodies and watercourses and this is a notable issue in both urban and rural areas associated with new development. Those European sites most vulnerable to water quality impacts due to run-off will be the 'downstream receptors', i.e. the sites associated with the Blackwater and Crouch estuaries; there is no risk of other water quality sensitive sites in the study area being affected (e.g. Abberton Reservoir or Benfleet and Southend Marshes) due to the absence of impact pathways. However, as the water quality effects of the Local Plan are ultimately either controlled by existing consents regimes (which must undergo HRA) or have diffuse 'in combination' effects that are difficult to quantify, any assessment should focus on the mitigating policies that will minimise the impacts of plan-supported development on water quality.

7.2 Crouch and Blackwater Estuary Sites (Essex Estuaries SAC; Blackwater Estuary (Mid-Essex Coast Phase 4) SPA / Ramsar; Crouch and Roach Estuaries (Mid-Essex Coast Phase 3) SPA / Ramsar; Outer Thames Estuary SPA)

Assessment of Effects

The habitats of these designated sites are sensitive to eutrophication from point and diffuse sources, particularly by dissolved inorganic nitrogen (DIN). An increase of DIN has potential to cause phytoplankton and opportunistic macroalgae blooms, which can lead to reduced dissolved oxygen availability in estuarine conditions and eutrophication, potentially resulting in reduced oxygen and death of flora and fauna. This can have consequent effects on mobile interest features associated with the habitats (i.e. SPA birds), although

[41] Based on mapping available in URS (2014), the catchment of Billericay WwTW extends into the CCC area by around 400m, to include a school and farm buildings only.
[42] Note, this Water Cycle Study is draft only at the time of reporting.
[43] Minor developments within the catchment may be built over the planning period, but these cannot be predicted at this point and would not substantially affect the WwTW operation.

this is complex in reality. However, estuaries are typically eutrophic environments in any case (with species correspondingly adapted to these conditions) and the hydrodynamic characteristics (e.g. water conditions are essentially cold and relatively turbid with high levels of water movement and wave action and with tidal flushing ensuring dilution and dispersal) ensures that interest features are less vulnerable (i.e. both exposed and sensitive) than for some other habitats.

Waste Water Treatment

The assessment of effects is based on the detailed WCS undertaken by AECOM (2017). In summary:

- **Great Leighs WwTW**: Great Leighs WwTW is likely to service the allocations around Great Leighs (SGS5a, SGS5b and SGS5c), which cumulatively provide for an additional 1,100 dwellings. The WCS has demonstrated that Great Leighs WwTW currently has sufficient flow headroom in its existing discharge permit for the development of approximately 280 dwellings; based on a linear housing trajectory, the existing discharge permit will be exceeded in 2024.
- **South Woodham Ferrers WwTW**: South Woodham Ferrers WwTW will service the allocations around South Woodham Ferrers (SGS7). The WCS headroom assessment has demonstrated that South Woodham Ferrers WwTW currently has sufficient flow headroom in its existing discharge permit for the development of approximately 870 dwellings, after which the discharge permit will be exceeded. Based on a linear housing trajectory, the existing discharge permit will be exceeded in 2026.

Despite the findings of the WCS outlined above, the study specifically notes that "*improvements to Great Leighs and South Woodham Ferrers WRCs are possible using wastewater treatment technologies currently available, demonstrating that an engineering solution is feasible and hence treatment capacity should not be seen as a barrier to growth*". Therefore, provided that the planning process allows for the timely identification and delivery of any additional treatment capacity that may be required, then new developments can be accommodated without significant effects on receiving European sites, 'alone' or 'in combination'. In this context, the Local Plan period (to 2036) is predominantly covered by the water company Asset Management Plans (AMP) periods AMP7 (2020 – 2025); AMP8 (2025 – 2030); and AMP9 (2030 – 2035). Anglian Water (AWS) is currently preparing for AMP7 which will outline its investment programme from April 2020 to 2025. AWS's approach to wastewater treatment asset management requires that sufficient certainty is given that the quantum of development proposed will come forward during the plan period before improvements to WRC assets can be justified and funding sought. This certainty is provided, in part, by the Local Plan and therefore the adoption of the plan will ensure that provision of additional capacity is planned and development is not delayed. Once funding has been confirmed, there will be a lead-in time for the necessary upgrades to be completed. It is considered there is sufficient time before development comes forward within the WwTW catchments for AWS to plan their investment and to deliver the necessary upgrades. The exact technical specification of the upgrades required will be determined by AWS and the EA for the AMP7 (2020 – 2025) and AMP 8 (2025-2030) asset planning periods, in line with revised quality conditions. As a result, significant effects 'alone' would not occur. With regard to 'in combination' effects with other plans, the waste water planning process operates at a regional level, taking account of development within all plan areas, and so the same safeguards will ensure no significant 'in combination' effects as a result of developments regionally.

Other Discharges

Other discharges or run-off that may be associated with development arising from the Local Plan will all take place some distance from the designated sites, with the exception of discharges associated with development around South Woodham Ferrers. As a result, any such discharges will be largely attenuated before reaching the designated sites and significant effects 'alone' would not occur. There are theoretical 'in combination' risks associated with diffuse pollution, to which run-off will contribute, although the effect of run-off from developed areas can be mitigated or reduced by the use of SuDS and by increasing the area of permeable surfaces (both natural and artificial) within developed areas. These measures offer effective attenuation by reducing the volumes of surface run-off. They also increase the retention of pollutants and, in the case of some SuDS, can allow for treatment of pollutants. These measures can be employed to ensure that developments supported by the Local Plan do not contribute significantly to wider diffuse pollution and manage those aspects within their control.

Incorporated Measures

The provision of waste water treatment capacity is a statutory obligation on AWS, and it is required to comply with all relevant discharge consents. The Local Plan contributes to the waste water treatment planning process by providing certainty for AWS (through the allocations process) but does not (and cannot) directly influence or control AWS's plans for service delivery. The Local Plan therefore adopts a policy-led mitigation approach to this aspect, to ensure that this potential issue is appropriately considered at the site level when developments are bought forward; in particular:

- **Strategic Policy S11** (Infrastructure Requirements) requires that, inter alia, "*new development must be supported by the provision of infrastructure, services and facilities that are identified as necessary to serve its needs*" and that "*Infrastructure necessary to support new development must include appropriate utility infrastructure*". The supporting text, and that "*The Council will work with local landowners and partners to bring forward the infrastructure required to facilitate the development set out within the Local Plan*".

These requirements will, in conjunction with the established waste water planning process and statutory requirements, ensure that sufficient waste water provision is in place to safeguard European sites potentially exposed to changes WwTW discharges due to housing growth.

With regard to diffuse pollution associated with run-off from developments:

- **Strategic Policy S6** (Conserving and Enhancing the Natural Environment) states that "*The Council will ensure that new development does not contribute to water pollution and, where possible, enhances water quality*"; the supporting text states that "*New development in particular will be expected to incorporate multifunctional greenspaces which provide for biodiversity, recreation and sustainable travel, whilst helping to reduce pollution through the use of sustainable drainage systems (SuDS)*".
- All of the policies relating to strategic allocations in Chapter 5 of the Pre-Submission Local Plan require delivery of suitable SuDS.

Conclusion

The Local Plan will have no significant effect, alone or in combination, on those interest features of the Essex Estuaries SAC, the Blackwater Estuary (Mid-Essex Coast Phase 4) SPA / Ramsar; the Crouch and Roach Estuaries (Mid-Essex Coast Phase 3) SPA / Ramsar; or the Outer Thames Estuary SPA that are sensitive to changes in water quality. This is because:

- The WwTW improvements required to support the housing growth associated with the Local Plan are:
  - possible using wastewater treatment technologies currently available; and
  - achievable before the capacity limitations expose European sites to potential effects.
- The Local Plan includes policies requiring the timely provision of infrastructure to support new development (including utilities provision and SuDS), which will (in conjunction with the existing waste water planning and consents regime) safeguard European sites.

8. Assessment of Effects: Functional Land (Golden plover)

8.1 Issues and Potential Threats Associated with the Local Plan

Many European interest features (particularly more mobile animal species) may use or be reliant on non-designated habitats outside of a European site during their life-cycle. Developments some distance from a European site can therefore have an effect on the site if its interest features are reliant on the habitats being affected by the development.

With regard to the European sites within the study area, this is primarily considered a potential issue for the Crouch and Roach Estuaries SPA and Crouch and Roach Estuaries Ramsar, specifically in relation to allocation SGS7 and wintering Dark-bellied brent geese, which are known to forage in agricultural fields near the SPA at low and high tide; this issue is addressed in Section 5.2.

NE has also suggested that Golden plover can use functionally-linked land up to 20km from a SPA and that potential effects on Golden plover associated with Abberton Reservoir SPA / Ramsar and the Blackwater Estuary SPA / Ramsar due to allocations in the CCC area should therefore be considered. As noted in the initial screening, Abberton Reservoir is ~19.7km from the closest CCC allocation and so effects on this site through this mechanism are not considered further.

Blackwater Estuary SPA

Baseline Summary

Golden plover are not currently cited as a qualifying species for the SPA except as part of the Waterbird Assemblage, although they were identified for inclusion as a qualifying species by the second SPA Review. As noted in Section 5.3, almost all of the SPA is used by large numbers of birds, although key areas appear to be the central sections of the northern shore and the channels around Old Hall Marshes. Golden plover are widely distributed around the estuary.

However, there is very little information available on aggregations of wintering Golden plover away from the estuary, particularly at substantial distances (e.g. >10km), and there are no existing survey or desk-study data for the proposed allocation sites that would support a detailed analysis of their use by Golden plover. Desk-study records of individuals cannot be reliably extrapolated to the SPA population, and there is little merit in undertaking field surveys at the plan level (particularly where sites are some distance from the SPA) due to the annual variability in use of fields by this species (see below). As a result, reasonable proxies, existing literature and accepted behavioural preferences must be used to determine whether any allocation areas are likely to coincide with functionally-significant non-designated land and to complete an appropriate plan-level assessment.

Assessment of Effects

Broadly, existing studies (e.g. Mason & MacDonald 1999; Gillings 2003), suggest that Golden plover retain an association with wetland or coastal sites, typically remaining within a few kilometres of these (except where significant regional movements of flocks occur in response to, for example, changing weather conditions), but will often spend several tidal cycles (or more) foraging and roosting in farmland, both during the day and night. However, whilst there is evidence of regional site fidelity (i.e. birds associated with Abberton Reservoir and the Blackwater Estuary will predominantly use available habitats within a few kilometres of the sites), the species' use of farmland appears variable according to cropping patterns and rotations, with limited field fidelity from year to year (Mason & MacDonald 1999) except where favoured habitats are consistently or intentionally maintained. There is evidence that certain crops may be preferred,

and larger fields are favoured over smaller ones[44], but distributions will usually be variable from year to year. Gillings et al. (2007) found that flocks occupied only a fraction of the available fields in a given area, concentrating mostly in large fields with open boundaries and where manure had been applied. This variability in use means that identifying potentially critical functional land, especially at large distances from the designated sites (i.e. 10km or more) is not easily achievable even with site-specific surveys; and any surveys undertaken to inform the plan are likely to be out of date by the point of development.

Recent HRAs in the Essex area have used 15km as a 'zone of influence' for potential effects on Golden plover. Thirty-two of the CCC allocation sites are within 15km of the Blackwater Estuary SPA, although all of these are over 8km from the site, and all but three over 10km; of these 32 allocations, the vast majority (26) are substantially less than 5 ha, and are within or on the edge of existing urban areas; these are considered unsuitable as functionally-significant non-designated land for Golden plover for these reasons. The remaining allocations were assessed using mapping and aerial photography to determine their potential to provide functionally-significant habitat areas for Golden plover associated with the SPA (on a qualitative 'low' / 'moderate' / 'high' scale, as far as achievable for a plan-level assessment), based on the size of the fields comprising the allocation; the types of field boundaries; the wider habitat; their apparent agricultural use; their distance from the SPA; and any additional moderating factors such as proximity to settlements or nearby footpaths. This analysis is summarised in **Table 8.1**.

Table 8.1 Suitability of allocations as functionally-significant non-designated land

Allocation	Distance from SPA	Size	Suitability	Rationale
SGS4	11.0 km	373.1 ha	Low	Allocation comprises cultivated agricultural land and quarry areas, some of which have been restored to arable. Most fields will not be particularly attractive to this species (size, boundary features, footpaths etc) although some of the restored quarry areas are large (but adjacent to existing workings). However, the distance of the allocation from the SPA reduces the likelihood that the site is used by plover or that it is functionally-significant to the SPA.
SGS7	8.1 km	121.4 ha	Low	This allocation is the closest to the Blackwater and is near to the Crouch and Roach SPA, so is arguably more likely to provide functional land than more distant inland sites, particularly if birds move between estuaries in response to local conditions. However, the fields themselves are not large and the site is unlikely to be favoured by this species due to various factors influencing sight-lines and hence predation risk (undulating topography; nearby hedges, woodland and treelines; etc).
SGS1c	14.6 km	6.5 ha	Negligible	Playing field surrounded entirely by housing within Chelmsford City.
SGS3a	11.2 km	27.4473	Negligible	Cultivated fields adjacent to Great Baddow between the A12 and the A1114; most individual fields are ~5 – 8 ha. and bordered by hedges and tree lines; several footpaths run along the allocation margins and across some fields.
SGS3b	10.7 km	13.5888	Negligible	As for SGS3a
SGS3c	11.2 km	7.23723	Negligible	As for SGS3a

When considering thresholds for significance, 1% of the relevant population is typically used; so, for Golden plover, the threshold for designation as an international site is 4,000 birds, based on the currently estimated UK population of Golden plover of 400,000 (Stroud *et al.* 2016). This 1% value is often used for HRAs of projects also – so a project likely to affect 1% of an SPA's population of a species could potentially have a significant effect (in HRA terms). Although the population of Golden plover associated with the Blackwater SPA is less certain than for other species due to their use of wider areas away from the estuary, the current WeBS 5 year peak mean (8,863 birds) would suggest that aggregations of ~89 birds (i.e. 1% of the 5 year peak mean) might be considered potentially notable, such that significant effects could potentially occur.

[44] Mason & MacDonald (1999) found that fields over 15 ha. were favoured by golden plover, with fields of less than 10 ha. being used less often than their proportion in the study area and fields greater than 15 ha used more often; this may suggest that targeting allocations at fields less than 10 ha. in size might help minimise impacts although these would not necessarily be well located in respect of other environmental impacts, and would increase impacts on biodiversity features associated with smaller fields (e.g. greater density of boundary features such as hedges and ditches).

However, it is reasonable to assume that a site would need to be regularly used by these numbers of birds to be considered as potentially significant 'functional land', and any assessment of affects would need to take into account the wider availability of similar habitat resources locally or within similar range of the SPA.

It is evident that most of the fields in most allocations will not be favoured by Golden plover based on their behavioural preferences. Furthermore, wide-ranging bird species inevitably have a very wide range of potential foraging (etc.) sites to choose from; as a very rough guide, analysis of the CORINE land use dataset from 2012 (CEH 2016) indicates that over 97 000 ha. of land within 15km of the Blackwater Estuary are classified as 'pasture' or 'arable', which may be available to golden plover for roosting and foraging depending on annual cropping patterns and field characteristics. The allocations (even in combination with allocations from other LPAs) will obviously occupy an extremely small proportion of the potentially available land. SPAs typically support higher value and more unique habitats where concentrations of (usually dependent) species are found; agricultural land is more ubiquitous and so pressure on, say, an individual field would not typically carry the same degree of risk to site integrity as pressure on an equivalent area of an SPA. In addition, potential impacts can be managed relatively easily at the scheme-level through the provision and management of alternative sites.

Incorporated Mitigation

The 2016 SPA Review (JNCC, 2016) includes Golden plover in a broad group of species that are known to be reliant on cropped habitats, which are under-represented in the SPA network. However, the SPA Review suggests that this should be addressed outside the SPA Review process through "*wider countryside measures to preserve and promote permanent pasture as feeding and roosting habitat for the species*", rather than through the identification and protection of specific additional sites. This reflects the variability in the use of agricultural areas by this species. Plan-level HRA should identify and resolve large-scale issues that cannot be conceivably or reasonably addressed by scheme-level measures (particularly broader quantum of development effects). Based on the available information, the proposed allocations are unlikely to coincide with any functionally-significant non-designated areas of land that are likely to be critical to the integrity of the SPA, and in practice this risk can be accurately quantified and appropriately mitigated at a lower planning tier (e.g. masterplanning). As a result, specific policy directives relating to this aspect are not considered essential to ensure that significant effects do not occur.

Conclusion

It is unlikely that any of the allocation sites coincide with functionally-significant non-designated areas of land that are likely to be critical to the integrity of the SPA. The sites generally have features that are likely to deter Golden plover (e.g. field size, high disturbance, etc) and are all (with the exception of three sites) at least 10km from the closest point of the SPA. The sites do not appear particularly unique or otherwise notable in a regional context, and the habitats present are widely available within a similar distance of the SPA (so reducing the likelihood that any one site (or collection of sites) is critical to the functional integrity of the SPA). It is considered that any risk can be accurately quantified and appropriately mitigated at a lower planning tier (e.g. site masterplanning). Significant effects that cannot be be avoided or mitigated using scheme-level measures will not occur, and so specific policy directives relating to this aspect are not considered essential to ensure that significant effects do not occur.

9. Review of the Pre-Submission Local Plan and Conclusions

9.1 Pre-Submission Local Plan Review

As detailed in **Section 4**, all of the policies of the Pre-Submission Local Plan have been reviewed to ensure that the conclusions of the HRA of the Preferred Options Consultation Document (see **Section 4.2**) remain valid, and that any recommended mitigation has been appropriately incorporated or reflected in the Local Plan. This review is contained at **Appendix E** to this report and demonstrates that the issues identified at the Preferred Options stage have been appropriately addressed in the policies that comprise the Pre-Submission Local Plan to ensure that European sites are safeguarded. The overall summary and conclusions of the HRA of the Pre-Submission Local Plan are set out below.

9.2 HRA Summary and Conclusions

The Council is currently preparing a new Local Plan for its administrative area. The new Local Plan will set out the vision, spatial principles, planning policies and site allocations that will guide development in the local authority area in the period up to 2036. The Local Plan has been developed iteratively since 2015 and has involved consultation on issues and options (November 2015 to January 2016) and then preferred options (March – May 2017). The Council is currently consulting on the Pre-Submission Local Plan before it is considered by an independent planning inspector.

Regulation 105 of the Habitats Regulations states that if a land-use plan is "*(a) is likely to have a significant effect on a European site or a European offshore marine site (either alone or in combination with other plans or projects); and (b) is not directly connected with or necessary to the management of the site*" then the plan-making authority must "*…make an appropriate assessment of the implications for the site in view of that site's conservation objectives*" before the plan is given effect. The process by which Regulation 105 is met is known as HRA. An HRA determines whether there will be any 'likely significant effects' (LSE) on any European site as a result of a plan's implementation (either on its own or 'in combination' with other plans or projects) and, if so, whether these effects will result in any adverse effects on the site's integrity. The Council has a statutory duty to prepare the Local Plan and is therefore the Competent Authority for an HRA.

Regulation 105 essentially provides a test that the final plan must pass; there is no statutory requirement for HRA to be undertaken on draft plans or similar developmental stages. However, it is accepted best-practice for the HRA of strategic planning documents to be run as an iterative process alongside plan development, with the emerging policies or options continually assessed for their possible effects on European sites and modified or abandoned (as necessary) to ensure that the subsequently adopted plan is not likely to result in significant effects on any European sites, either alone or 'in combination' with other plans.

In this context, the HRA of the new Local Plan has been undertaken iteratively alongside the plan's development, with emerging policies and proposals assessed and reviewed, and recommendations made to ensure that the final plan is not likely to result in any significant effects on any European sites, alone or in combination with other plans or projects. Additional assessment, appropriate to the strategic nature of the plan and the anticipated outcomes, has also been undertaken of those plan aspects where the possibility of 'significant' effects on European sites could not be clearly or self-evidently excluded during the plan development and review process.

The HRA process has demonstrated that the vast majority of the Local Plan policies and proposals will have 'no effect' on any European sites, typically because they are policy types that do not make provision for changes. In some instances, recommendations have been made to improve the performance of the emerging policies with respect to European sites in order to help ensure that the Local Plan (as a whole) has no significant effects on any European sites. In this regard, the iterative assessment process has identified the following principal issues:

- All of the European sites within the study area adopted for the HRA that are associated with the Mid-Essex coast estuaries (i.e. Crouch and Roach Estuaries SPA / Ramsar; Blackwater Estuary SPA / Ramsar; Foulness SPA / Ramsar; Dengie SPA / Ramsar; and the associated areas of the Essex Estuaries SAC) plus the Thames Estuary and Marshes SPA / Ramsar and Benfleet and Southend Marshes SPA / Ramsar are potentially vulnerable to regional 'in combination' effects due to visitor pressure, to which the Local Plan will contribute (although this contribution is likely to be relatively limited for most of these sites).
- None of the proposed allocations are likely to result in significant effects alone, with the possible exception (in the absence of mitigation) of Strategic Growth Site 7 (North of South Woodham Ferrers), which is within 500m of the Crouch estuary and so may affect the site by increasing recreational pressure and, potentially, through urbanisation effects.
- The growth supported by the Local Plan has the potential to contribute to 'in combination' air quality effects on sensitive sites (principally Epping Forest SAC).
- The growth supported by the Local Plan has the potential to affect water quality due to current limitations in waste water treatment capacity at some treatment works.
- Other potential pathways for sites to be affected, notably through changes in water resource permissions, are unlikely to be realised.

These aspects have been subject to more detailed assessment and appropriate policy-based mitigation measures have been identified where the possibility of significant effects could not be objectively excluded. This is to ensure that proposals coming forward under the Local Plan either avoid affecting designated sites entirely (no significant effect) or will not adversely affect site integrity where potential effect pathways remain.

In summary:

- **Recreational Pressures**: The wide-scale and regional nature of recreational pressures means that the possibility of associated significant effects cannot be excluded based on either the available data for the European sites, or through the use of allocation-specific avoidance or mitigation measures (e.g. greenspace provision). In the Pre-Submission Local Plan, the Council has therefore committed to the adoption of a RAMS, which is currently being developed by ECC in collaboration with other relevant LPAs and NE. The RAMS will be adopted as a SPD and development proposals will be required to account for this. The RAMS will include measures that have been successfully employed for other European sites, and this plan-level mitigation measure is therefore considered to be both achievable and likely to be effective and so can be relied on to ensure that proposals coming forward under the Local Plan either avoid affecting the designated sites entirely (no significant effect) or will not adversely affect site integrity where potential effect pathways remain. Additional provisions and masterplanning requirements are also included in the policy for allocation SGS7 (alongside other, more general policy provisions), with allocation-specific measures (e.g. the provision of greenspace and walking routes away from the estuary) that will be required to minimise effects on the Crouch and Roach Estuaries SPA / Ramsar.
- **Air Quality**: The assessment of potential air quality impacts is driven in part by recent case law that has altered the interpretation of historically accepted metrics regarding 'in combination' effects. The assessment presented in this report (**Section 6**) has considered potential effects on air quality sensitive sites that may arise due to future traffic growth associated with the Local Plan's implementation. This has focused on sections of Epping Forest SAC and the mid-Essex estuaries sites that are within 200m of a road that might see a potentially significant increase in traffic (>1,000 AADT) and to which the Local Plan might reasonably contribute. This analysis has determined that:
  - The Local Plan's contribution to traffic growth and air quality changes around Epping Forest SAC will be inconsequential, and that air quality and associated traffic thresholds for the features of the SAC will be substantially exceeded over plan period irrespective of the Local Plan's contribution to traffic volumes near this site. The 'in combination' contribution of the Local Plan is therefore considered to be too small to be 'significant'.

- There will be traffic growth associated with allocation SGS7 on roads within 200m of the Crouch estuary European sites, but these changes will not exceed the accepted thresholds for significance, alone or 'in combination'. Furthermore, the features of these estuarine sites are not highly sensitive to air quality changes due to the physiochemical characteristics of the sites. The same conclusion has been reached for roads near the Blackwater estuary around Maldon.

- **Water quality**: A detailed WCS has been undertaken by AECOM (2017) which has concluded that the treatment capacity of two waste water treatment works in the region could be exceeded due to the growth supported by the Local Plan and which could affect the European sites of the mid-Essex estuaries. However, the improvements required to support the housing growth envisaged by the plan are possible using wastewater treatment technologies currently available and are achievable before the capacity limitations expose European sites to potential effects. In this context, the Local Plan includes policies that require the provision of the infrastructure necessary to support new development (including utilities provision and SuDS), which will (in conjunction with the existing waste water planning and consents regime) ensure no significant effects on European sites alone or in combination due to changes in water quality.

- **Functional land**: A review of the allocation sites has concluded that it is unlikely that any of the sites coincide with functionally-significant non-designated areas of land that are likely to be critical to the integrity of any European sites (particularly with reference to Golden plover and Dark-bellied brent geese). Most are a substantial distance from the nearest European sites and do not appear particularly unique or otherwise notable in a regional context. It is considered that any risk can be accurately quantified and appropriately mitigated at a lower planning tier (e.g. site masterplanning) and that specific policy directives relating to this aspect are not considered essential to ensure that significant effects do not occur.

The assessment of the Pre-Submission Local Plan has therefore concluded that most aspects of the plan will have no significant effects on any European sites, alone or in combination. Where residual effect pathways remain, appropriate policy-based mitigation measures have been incorporated into the plan policies to ensure that proposals coming forward under the Local Plan either avoid affecting European sites entirely (no significant effect) or will have no adverse affect on site integrity. It will be necessary to review any changes that are made to the Pre-Submission Local Plan prior to adoption in order to ensure that the HRA conclusions remain applicable. A formal assessment conclusion against the requirements of Regulation 105 will be made at that point.

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Appendix A
European Site Terminology

Table A.1 European site terminology

Name	Abbreviation	Notes
Special Area of Conservation	SAC	Designated under the EU *Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora*, and implemented in the UK through the *Conservation of Habitats and Species Regulations 2010* (as amended), and the *Conservation (Natural Habitats, & c.) Regulations (Northern Ireland) 1995* (as amended).
Sites of Community Importance	SCI	Sites of Community Importance (SCIs) are sites that have been adopted by the European Commission but not yet formally designated by the government of each country. Although not formally designated they are nevertheless fully protected by *Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora*, the *Conservation of Habitats and Species Regulations 2010* (as amended), and the *Conservation (Natural Habitats, & c.) Regulations (Northern Ireland) 1995* (as amended).
Candidate SAC	cSAC	Candidate SACs (cSACs) are sites that have been submitted to the European Commission, but not yet formally adopted as SCIs. Although these sites are still undergoing designation and adoption they are still fully protected by *Council Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora*, the *Conservation of Habitats and Species Regulations 2010* (as amended) and the *Conservation (Natural Habitats, & c.) Regulations (Northern Ireland) 1995* (as amended).
Possible SACs	pSAC	Sites that have been formally advised to UK Government, but not yet submitted to the European Commission. As a matter of policy the Governments in England, Scotland and Wales extend the same protection to these sites in respect of new development as that afforded to SACs.
Draft SACs	dSAC	Areas that have been formally advised to UK government as suitable for selection as SACs, but have not been formally approved by government as sites for public consultation. These are not protected (unless covered by some other designation) and it is likely that their existence will not be established through desk study except through direct contact with the relevant statutory authority; however, the statutory authority is likely to take into account the proposed reasons for designation when considering potential impacts on them.
Special Protection Area	SPA	Designated under *EU Council Directive 79/409/EEC on the Conservation of Wild Birds* (the 'old Wild Birds Directive') and *Directive 2009/147/EC on the Conservation of Wild Birds* (the 'new Wild Birds Directive, which repeals the 'old Wild Birds Directive'), and protected by Article 6 of *Directive 92/43/EEC on the Conservation of natural habitats and of wild fauna and flora.* These directives are implemented in the UK through the *Wildlife & Countryside Act 1981* (as amended), the *Conservation of Habitats and Species Regulations 2010* (as amended), the *Wildlife (Northern Ireland) Order 1985*, the *Nature Conservation and Amenity Lands (Northern Ireland) Order 1985* and *The Conservation (Natural Habitats, &C.) (Northern Ireland) Regulations 1995* (as amended) and the *Offshore Marine Conservation (Natural Habitats & c.) Regulations 2007*.
Potential SPA	pSPA	These are sites that are still undergoing designation and have not been designated by the Secretary of State; however, ECJ case law indicates that these sites are protected under Article 4(4) of *Directive 2009/147/EC* (which in theory provides a higher level of protection than the Habitats Directive, which does not apply until the sites are designated as SPAs), and as a matter of policy the Governments in England, Scotland and Wales extend the same protection to these sites in respect of new development as that afforded to SPAs, and they may be protected by some other designation (e.g. SSSI).
Ramsar		The *Convention on Wetlands of International Importance especially as Waterfowl Habitat* (Ramsar Convention or Wetlands Convention) was adopted in Ramsar, Iran in February 1971. The UK ratified the Convention in 1976. In the UK Ramsar sites are generally underpinned by notification of these areas as Sites of Special Scientific Interest (SSSIs) (or Areas of Special Scientific Interest (ASSIs) in Northern Ireland). Ramsar sites therefore receive statutory protection under the *Wildlife & Countryside Act 1981* (as amended), and the *Nature Conservation and Amenity Lands (Northern Ireland) Order 1985*. However, as a matter of policy the Governments in England, Scotland and Wales extend the same protection to listed Ramsar sites in respect of new development as that afforded to SPAs and SACs.

Appendix B
Initial Policy Screening

Summary

The strategic and non-strategic policies contained in the Preferred Options Consultation Document were reviewed and 'screened' using the principles set out in **Section 4.2**. This screening is presented in **Table B1**. The review accounted for the key mitigating policies at that point, notably:

- Strategic Policy S6 (Conserving and Enhancing the Natural Environment) – sets general requirements and commitments to the protection of natural features, including European sites.
- Policy NE1 (Ecology and Biodiversity) – sets out requirements and expectations regarding effects on designated sites.
- Policy NE3 (Flooding/SuDS) – requires the use of SuDS in larger developments.
- Allocation-specific policies that require the provision / enhancement of green space and infrastructure in developments (Chapter 7).

The review also included an assessment of 'in-combination' effects between policies.

This initial screening found that the vast majority of the policies contained in the Preferred Options Consultation Document were categorised as 'no effect' or 'no significant effect' policies. Please note that the policy numbers/titles have changed for the Pre-Submission version of the Local Plan.

Table B.1 Preferred Option Policy Review

Policy	Title	LSE	Notes / Rationale
Strategic Policy S1	Spatial Principles	No	General statement of policy / aspiration - general principles are consistent with safeguarding of European sites
Strategic Policy S2	Securing Sustainable Development	No	General statement of policy / aspiration - small risk of conflict with European sites dues to presumption in favour of sustainable development but this aspect is is moderated by references to other policies and requirements that will safeguard.
Strategic Policy S3	Addressing Climate Change and Flood Risk	No	Protective policy likely to reduce the risk of effects on European sites.
Strategic Policy S4	Promoting Community Inclusion	No	General statement of policy / aspiration
Strategic Policy S5	Conserving and Enhancing the Historic Environment	No	Environmental protection policy
Strategic Policy S6	Conserving and Enhancing the Natural Environment	No - Amend	Environmental protection policy. General principles are sound although there may be some benefit in highlighting the importance of utilities provision, for example "The Council will ensure that any new development does not contribute to water pollution and, where possible, enhances water quality. This can be achieved through the use of Sustainable Drainage Systems, which when well designed, may also contribute to enhancing biodiversity and amenity in Chelmsford. ***Developers should also ensure that there is adequate sewerage capacity and provision to support their proposals***".
Strategic Policy S7	Protecting and Enhancing Community Assets	No	General statement of policy / aspiration

Policy	Title	LSE	Notes / Rationale
Strategic Policy S8	Development Requirements	Uncertain - Amend	This policy underpins the growth intentions for the CCC area and therefore is linked to the consideration of possible in combination effects due to recreational pressure
Strategic Policy S9	The Spatial Strategy	Uncertain - Amend	This policy underpins the spatial distribution of growth; the principle aspect of potential conflict is the inclusion of South Woodham Ferrers in the top tier hierarchy, although this is arguably reasonable given that it is the main settlement area outside Chelmsford. This aspect is explored further.
Strategic Policy S10	Delivering Housing Growth	No	General statement of policy / aspiration regarding provision of market and affordable housing
Strategic Policy S11	Delivering Economic Growth	No	General statement of policy / aspiration regarding support for employment sites
Strategic Policy S12	Infrastructure Requirements	No	General design / guidance criteria
Strategic Policy S13	Securing Infrastructure	No	General design / guidance criteria
Strategic Policy S14	The Role of the Countryside	No	Policy provides some safeguarding for rural areas
Strategic Policy S15	The Role of City, Town and Neighbourhood Centres	No	General statement of policy / aspiration
Policy GR1	Growth in Chelmsford Urban Area	No	General design / guidance criteria for housing in Chelmsford
Strategic Growth Site 1a	Chelmer Waterside	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Chelmer Waterside Site CW1a	Former Gas Works, Wharf Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Chelmer Waterside Site CW1b	Peninsula, Wharf Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Chelmer Waterside Site CW1c	Lockside, Navigation Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Chelmer Waterside Site CW1d	Baddow Road Car Park and Land to the East	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Chelmer Waterside Site CW1e	Travis Perkins, Navigation Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Chelmer Waterside Site CW1f	Navigation Road Sites	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Strategic Growth Site 1b	Essex Police HQ and Sports Ground, New Court Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Strategic Growth Site 1c	Meteor Way including Car park and Adjoining Land	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)

Policy	Title	LSE	Notes / Rationale
Strategic Growth Site 1d	Former St Peter's College, Fox Crescent	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Strategic Growth Site 1e	North of Gloucester Avenue (John Shennan)	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Strategic Growth Site 1f	Civic Centre Land, Fairfield Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Strategic Growth Site 1g	Riverside Ice and Leisure, Victoria Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Growth Site 1h	Chelmsford Social Club and Private Car Park, 55 Springfield Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Growth Site 1i	Garage Site and Land, Medway Close	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Growth Site 1j	Former Chelmsford Electrical and Car Wash, Brook Street	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Growth Site 1k	Waterhouse Lane Depot and Nursery	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Growth Site 1l	Eastwood House Car Park, Glebe Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Growth Site 1m	Church Hall Site, Woodhall Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Growth Site 1n	10 - 30 Coval Lane, Chelmsford	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Growth Site 1o	British Legion, New London Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Growth Site 1p	Garage Site, St Nazaire Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Growth Site 1q	Car Park r/o Bellamy Court, Broomfield Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Growth Site 1r	Ashby House Car Parks, New Street	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Growth Site 1s	BT Telephone Exchange, Cottage Place	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Opportunity Site OS1a	Former Royal Mail Premises, Victoria Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Opportunity Site OS1b	Rivermead, Bishop Hall Lane	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Opportunity Site OS1c	Railway Sidings, Brook Street	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Strategic Growth Site 2	West Chelmsford	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)

Policy	Title	LSE	Notes / Rationale
Strategic Growth Site 3a	Land East of Chelmsford/North of Great Baddow - Manor Farm	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Strategic Growth Site 3b	Land East of Chelmsford/North of Great Baddow - Land North of Maldon Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Strategic Growth Site 3c	Land East of Chelmsford/North of Great Baddow - Land South of Maldon Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Existing Commitment EC1	Land North of Galleywood Reservoir	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Existing Commitment EC2	Land Surrounding Telephone Exchange, Ongar Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Strategic Growth Site 4	North East Chelmsford	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Strategic Growth Site 5	Moulsham Hall and North of Great Leighs	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Strategic Growth Site 6	North of Broomfield	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Strategic Growth Site 7	East of Boreham	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Travellers Site TS1	Drakes Lane Gypsy and Traveller Site	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Existing Commitment EC3	Land to the South and West of Broomfield Place and Broomfield Primary School	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Strategic Growth Site 8	North of South Woodham Ferrers	Uncertain - Amend	Allocation is within 500m of Crouch estuary sites so risk of effects by various pathways; modifications suggested following more detailed assessment.
Growth Site 9	South of Bicknacre	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Growth Site 10	Danbury	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Existing Commitment EC4	St Giles, Moor Hall Lane, Bicknacre	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues)
Policy SPA1	Broomfield Hospital Special Policy Area	No	General statement of policy / aspiration; site is not linked to European sites
Policy SPA2	Chelmsford City Racecourse Special Policy Area	No	General statement of policy / aspiration; site is not linked to European sites
Policy SPA3	Hanningfield Reservoir Special Policy Area	No	General statement of policy / aspiration; reservoir is used by species that also use nearby European sites but the policy is safeguarding in this respect.

Policy	Title	LSE	Notes / Rationale
Policy SPA4	RHS Hyde Hall Special Policy Area	No	General statement of policy / aspiration; site is not linked to European sites
Policy SPA5	Sandford Mill Special Policy Area	No	General statement of policy / aspiration; site is not linked to European sites
Policy SPA6	Writtle University College Special Policy Area	No	General statement of policy / aspiration; site is not linked to European sites
Policy HO1	Size and Type of Housing	No	General design / guidance criteria re. size and type of housing
Policy HO2	Affordable Housing and Rural Exception Sites	No	Statement of policy re. affordable housing requirements and exception sites
Policy HO3	Gypsy, Traveller and Travelling Showpeople Sites	No	General design / guidance criteria
Policy EM1	Employment Areas	No	Statement of policy re. development in employment areas
Policy EM2	Primary And Secondary Frontages in Chelmsford City Centre & South Woodham Ferrers, Neighbourhood Centres and Upper Floors	No	General design / guidance criteria re. frontages in towns
Policy CO1	Green Belt, Green Wedges, Green Corridors and Rural Areas	No	Protective policy likely to reduce the risk of effects on European sites.
Policy CO2	New Buildings and Structures In The Green Belt	No	General design / guidance criteria for buildings in the green belt
Policy CO3	New Buildings and Structures in Green Wedges and Green Corridors	No	General design / guidance criteria for buildings in the green wedges etc.
Policy CO4	New Buildings and Structures in the Rural Area	No	General design / guidance criteria for buildings in rural areas
Policy CO5	Infilling in the Green Belt, Green Wedges, Green Corridors and Rural Area	No	General design / guidance criteria for infilling
Policy CO6	Change of Use (Land And Buildings) and Engineering Operations	No	General design / guidance criteria for change of use, including in rural areas
Policy CO7	Extensions to Existing Buildings Within the Green Belt, Green Wedges, Green Corridors and Rural Area	No	General design / guidance criteria for building extensions
Policy CO8	Rural and Agricultural/Forestry Workers Dwellings	No	General design / guidance criteria

Policy	Title	LSE	Notes / Rationale
Policy HE1	Designated Heritage Assets	No	Protection of listed etc buildings
Policy HE2	Non-Designated Heritage Assets	No	Protection of non-designated heritage assets
Policy HE3	Archaeology	No	Guidance for developments affecting archaeological resources.
Policy NE1	Ecology and Biodiversity	No - Amend	Environmental protection policy. General principles are sound but it is recommended that the text be amended slightly to more accurately reflect existing legislative requirements, and ensure that features are safeguarded rather than simply the sites themselves, for example: "Planning permission will not be granted where the development would ~~result in harm to~~ ***adversely affect the interest features or ecological functioning of*** designated sites of international, national and local importance, and any other site where protected species are likely or known to be present, unless it can be clearly demonstrated that any harm resulting from the development can be avoided or adequately mitigated. The weight given to the protection of such sites will be dependent on the level of designation. Where development proposals do not comply with the above, they will only be permitted if it has been clearly demonstrated that there exists an overriding public interest ***and (for European protected sites) that there is no alternative and that appropriate compensatory measures can be delivered***".
Policy NE2	Trees, Woodland and Landscape Features	No	Protection for ecological and landscape features
Policy NE3	Flooding/SuDS	No	Requirements for the use of SuDS; likely to provide incidental safeguards for European sites
Policy NE4	Renewable Energy and Low Carbon Energy	No	General design / guidance criteria for renewable energy schemes
Policy CA1	Delivering Community Assets	No	Support for community assets with criteria
Policy CA2	Protecting Community Assets	No	Safeguarding of community assets
Policy MP1	Design and Place Shaping Principles	No	General requirements for development design
Policy MP2	High Quality Design	No	General requirements for development design
Policy MP3	Sustainable Buildings	No	General requirements for development design
Policy MP4	Design Specification for New Dwellings and Houses in Multiple Occupation	No	General requirements for development design
Policy MP5	Parking Standards	No	General requirements for development design
Policy MP6	Tall Buildings	No	General requirements for development design
Policy MP7	Provision of Broadband	No	General requirements for development design
Policy PA1	Protecting Amenity	No	General requirements for development design
Policy PA2	Contamination and Pollution	No	General requirements for hazardous sites and air quality zones.

Table B.2 provides a summary of the policy assessment including key recommendations.

Table B.2 Summary of review of Local Plan policies and recommendations

Policy Status	Policies / Policy Groups		Notes and recommendations
No LSE, but enhancements recommended	S6	Conserving and Enhancing the Natural Environment	Environmental protection policy. General principles are sound although there may be some benefit in highlighting the importance of utilities provision, for example "*The Council will ensure that any new development does not contribute to water pollution and, where possible, enhances water quality. This can be achieved through the use of Sustainable Drainage Systems, which when well designed, may also contribute to enhancing biodiversity and amenity in Chelmsford.* ***Developers should also ensure that there is adequate sewerage capacity and provision to support their proposals***".
	NE1	Ecology and Biodiversity	Environmental protection policy. General principles are sound but it is recommended that the text be amended slightly to more accurately reflect existing legislative requirements, and ensure that features are safeguarded rather than simply the sites themselves, for example: "Planning permission will not be granted where the development would ~~result in harm to~~ ***adversely affect the interest features or ecological functioning of*** designated sites of international, national and local importance, and any other site where protected species are likely or known to be present, unless it can be clearly demonstrated that any harm resulting from the development can be avoided or adequately mitigated. The weight given to the protection of such sites will be dependent on the level of designation. Where development proposals do not comply with the above, they will only be permitted if it has been clearly demonstrated that there exists an overriding public interest ***and (for European protected sites) that there is no alternative and that appropriate compensatory measures can be delivered***".
LSE possible	S8	Development Requirements	This policy sets out the growth intentions for the Local Plan area and therefore is linked to the consideration of possible in combination effects due to recreational pressure.
	S9	The Spatial Strategy	This policy sets out the proposed spatial distribution of growth; the principle aspect of potential conflict is the inclusion of South Woodham Ferrers in the top tier hierarchy, although this is arguably reasonable given that it is the main settlement area outside Chelmsford. This aspect is explored further.
	SGS8	North of South Woodham Ferrers	Allocation is within 500m of Crouch estuary sites so risk of effects by various pathways; modifications suggested following more detailed assessment.
'No effect' or 'no significant effect'	All other policies		All other policies, as drafted, as considered unlikely to result in significant effects on any European sites or their interest features (alone or in combination), primarily due to the nature of the policy; most, in this regard, are 'no effect' policies.
Significant effects likely	No policies		None of the policies are likely to result in significant adverse effects based on the incorporated mitigation measures.

Note, the recommendations in **Table B2** provide guidance only; the incorporation of these amendments, or similar, is assumed within the assessment of the likely effects of the preferred options, although this obviously can only be confirmed during the final stages of the Local Plan's development.

Appendix C
Approximate Population Changes

Table C1 provides an estimate of the approximate population changes within certain distances of the European sites that are predicted due to the Local Plan. This estimate is based on the LSOA data for the areas surrounding the European sites (with populations assumed to be evenly distributed within these, although obviously this will be a slight simplification) and the predicted population addition associated with the proposed Local Plan allocations (based on a population equivalent of 2.2 x the number of dwellings in the allocation). These figures should be used mindfully, but do demonstrate that the proposed allocations will, in themselves (with the exception of the allocations around the Crouch estuary), result in relatively small increases in population sizes near to the sites. Population increases are invariably less than 1% of the current population, except:

- around the Crouch (in association with the 'North of South Woodham Ferrers' allocation); and
- if allocations over 15km from the designated sites are considered.

Table C.1 Approximate population changes around European sites associated with Chelmsford allocations

European site	Current Population					
	Within 500m	Within 2.5km	Within 5km	Within 7.5km	Within 10km	Within 15km
Essex Estuaries SAC	52,522	182,396	439,846	666,457	844,763	1,177,061
Abberton Reservoir SPA / Ramsar	1,313	11,754	75,632	159,128	204,882	299,625
Benfleet and Southend Marshes SPA / Ramsar	42,311	212,224	296,399	401,117	521,272	716,260
Blackwater Estuary (Mid-Essex Coast Phase 4) SPA / Ramsar	2,229	45,201	62,180	128,532	263,389	561,350
Crouch and Roach Estuaries (Mid-Essex Coast Phase 3) SPA / Ramsar	18,994	67,308	267,567	401,044	501,355	775,885
Dengie (Mid-Essex Coast Phase 1) SPA / Ramsar	1,323	3,684	14,527	27,293	46,916	239,011
Foulness (Mid-Essex Coast Phase 5) SPA / Ramsar	6,136	35,807	83,452	160,612	254,965	426,819
Thames Estuary and Marshes SPA / Ramsar	8,582	64,230	238,532	557,457	913,907	1,364,551

European site	Predicted population addition associated with Chelmsford Local Plan					
	Within 500m	Within 2.5km	Within 5km	Within 7.5km	Within 10km	Within 15km
Essex Estuaries SAC	207	2204	2251	2463	2857	15741
Abberton Reservoir SPA / Ramsar	0	0	0	0	0	0
Benfleet and Southend Marshes SPA / Ramsar	0	0	0	0	0	2218
Blackwater Estuary (Mid-Essex Coast Phase 4) SPA / Ramsar	0	0	0	37	2187	13860
Crouch and Roach Estuaries (Mid-Essex Coast Phase 3) SPA / Ramsar	267	2204	2251	2463	2667	11465
Dengie (Mid-Essex Coast Phase 1) SPA / Ramsar	0	0	0	0	0	0
Foulness (Mid-Essex Coast Phase 5) SPA / Ramsar	0	0	0	0	0	473
Thames Estuary and Marshes SPA / Ramsar	0	0	0	0	0	0

European site	% population increase associated with Chelmsford Local Plan (blanks = zero values)					
	Within 500m	Within 2.5km	Within 5km	Within 7.5km	Within 10km	Within 15km
Essex Estuaries SAC	0.39	1.21	0.51	0.37	0.34	1.34
Abberton Reservoir SPA / Ramsar						
Benfleet and Southend Marshes SPA / Ramsar						0.31
Blackwater Estuary (Mid-Essex Coast Phase 4) SPA / Ramsar				0.03	0.83	2.47
Crouch and Roach Estuaries (Mid-Essex Coast Phase 3) SPA / Ramsar	1.41	3.27	0.84	0.61	0.53	1.48
Dengie (Mid-Essex Coast Phase 1) SPA / Ramsar						
Foulness (Mid-Essex Coast Phase 5) SPA / Ramsar						0.11

Thames Estuary and Marshes SPA / Ramsar

Appendix D
Review of Plans for 'In Combination' Effects

Table D1 presents the review of plans for in-combination effects with the Local Plan.

Table D.1 Review of plans for 'in combination' effects

Plan	Summary	Likely net effect of plan on European sites (based on plan HRAs)	LSE with the Local Plan (with incorporated measures)?	Notes
Essex and Suffolk Water (2014) Final Water Resources Management Plan	Water companies in England and Wales are required to produce a Water Resources Management Plan that sets out how they aim to maintain water supplies over a 25-year period. The current Water Resources Management Plan was published in 2014. The Essex and Suffolk Water WRMP demonstrates how in the medium to long new resources intend to be developed, leakage tackled and sensible water use promoted through metering and water efficiency campaigns. The long term strategy is to increase the robustness of the water resources network to climate change and reduce unsustainable abstractions.	No significant effect.	No	ESW's WRMP for the next 25 years explicitly accounts for any reductions in abstraction that are required to safeguard European sites (see **Section 3**) and for the growth predicted by the Local Plan and other LPA local plans in its forecasting. Therefore, the future water resource requirements of Chelmsford are factored into the abstraction regime, such that they will not affect European sites (i.e. the growth provided for by the Local Plan is in line with predictions and will not increase water resources pressure on any European sites, alone or in combination).
River Basin Management Plan Anglian River Basin District	The River Basin Management Plan contains the following objectives/targets for the Anglian River Basin District: ▶ By 2015, 16 per cent of surface waters (rivers, lakes, estuaries and coastal waters) in this river basin district are going to improve for at least one biological, chemical or physical element, measured as part of an assessment of good status according to the Water Framework Directive. This includes an improvement of 1,700 km of the river network in relation to fish, phosphate, specific pollutants and other elements. ▶ By 2015 19 per cent of surface waters will be at good ecological status/potential and 45 per cent of groundwater bodies will be at good status. In combination 20 per cent of all water bodies will be at good status by 2015.	No significant effect	No	The plans will be complementary and the policies within both plans do not create a scenario where there is insufficient flexibility at the project stage to allow significant effects to be avoided.
Environment Agency (2010) Essex and South Suffolk Shoreline Management Plan 2	Shoreline Management Plan provides a large-scale assessment of the risks associated with coastal evolution and presents a policy framework to address these risks to people and the developed, historic and natural environment in a sustainable manner. With regard to Chelmsford, the principal proposals are for a 'hold the line' approach around south Woodham Ferrers.	No adverse effect on sites also exposed to effects of Local Plan.	No	None of the sites exposed to potentially significant changes as a result of the SMP will be directly affected by the Local Plan proposals / allocations so in combination risks are limited.

Plan	Summary	Likely net effect of plan on European sites (based on plan HRAs)	LSE with the Local Plan (with incorporated measures)?	Notes
Essex Waste Local Plan (2001)	The objectives of the Waste Local Plan are: ▶ minimising waste by recycling/composting and other means; ▶ making adequate provision of necessary waste management facilities; and ▶ safeguarding the environment of Essex, and the quality of life of its residents.	No significant effect	No	The Local Plan is complementary and the policies within both plans do not create a scenario where specific developments cannot be delivered due to the risk of significant effects.
Joint Municipal Waste Management Strategy for Essex (2007-2032) (2008)	This Strategy sets out Essex's approach to dealing with municipal waste up to 2032. It sets out a waste hierarchy which follows reduce, re-use, recycle, recover and dispose.	No significant effect	No	The Local Plan is complementary and the policies within both plans do not create a scenario where specific developments cannot be delivered due to the risk of significant effects.
Essex Minerals Local Plan (2014)	▶ The Local Plan will need to consider the 'preferred sites' identified within the Minerals Plan and the associated implications as part of the Plan preparation. ▶ The SA Framework should include objectives/guide questions which ensure the vision/objectives of the Minerals Plan are included and in physical terms the locations of the 'preferred sites' are taken into account as part of the assessment process.	No significant effect	No	The Local Plan is complementary and the policies within both plans do not create a scenario where specific developments cannot be delivered due to the risk of significant effects.
Essex Local Flood Risk Management Strategy (2013)	The LFRMS sets out how flood risk will be managed in Essex. The Strategy sets out nine guiding principles to manage flood risk which are: ▶ Focus on reducing disruption from flooding as well as the causes. ▶ Effective flood risk management could reduce the long-term damage caused to properties and impacts on human health and well-being. ▶ Decisions should be based on a sound evidence base and made against clear criteria. ▶ Increase the flood risk knowledge base across all stakeholders. ▶ Public organisations have a duty to inform households of their susceptibility to flooding and advise on what steps they can take to make their property more resilient. ▶ Co-operation among relevant public agencies is essential for long-term comprehensive flood risk management. ▶ New developments should ensure there is no increase in flood risk and seek to reduce the flood risk which already exists. ▶ Emerging local plans should direct new development away from areas of flood risk where possible. ▶ Cumulative impact of small developments on flood risk is as significant	No significant effect	No	The Local Plan is complementary and the policies within both plans do not create a scenario where specific developments cannot be delivered due to the risk of significant effects The Local Plan contains appropriate controls to direct new development away from areas at risk of flooding and seek to reduce the risk of flooding overall.

Plan	Summary	Likely net effect of plan on European sites (based on plan HRAs)	LSE with the Local Plan (with incorporated measures)?	Notes
Essex Transport Strategy; The Local Transport Plan for Essex (2011)	This is the third Local Transport Plan and has been produced to respond to the needs of the communities in Essex. The vision of the Plan is "for a transport strategy that supports sustainable economic growth and helps deliver the best quality of life for the residents of Essex". The Plan sets five outcomes which comprise: ▶ Provide connectivity for Essex communities and international gateways to support sustainable economic growth and regeneration. ▶ Reduce carbon dioxide emissions and improve air quality through lifestyle changes, innovation and technology. ▶ Improve safety on the transport network and enhance and promote a safe travelling environment. ▶ Secure and maintain all transport assets to an appropriate standard and ensure that the network is available for use. ▶ Provide sustainable access and travel choice for Essex residents to help create sustainable communities".	No significant effect	No	The Local Plan is complementary and the policies within both plans do not create a scenario where specific developments cannot be delivered due to the risk of significant effects.
North Essex Catchment Flood Management Plan Summary Report (2009)	The aim of the CFMP is to "understand the scale and extent of flooding now and in the future, and set policies for managing flood risk within the catchment". The CFMP "should be used to inform planning and decision-making by key stakeholders" such as the Environment Agency, regional/local authorities, internal drainage boards, transportation planners, land owners/managers, the public and local businesses. The CFMP identifies the following objectives: ▶ Where possible, flood risk should be managed by storing water on the floodplain upstream of Chelmsford. ▶ Redevelopment of floodplain areas is an opportunity to increase their flood resilience. ▶ Flood awareness plans will be used to manage the consequences of flooding.	No adverse effect on sites also exposed to effects of Local Plan.	No	None of the sites exposed to potentially significant effects as a result of the Local Plan will be significantly affected by the CFMP so in combination risks are limited.
Braintree District Council Site Allocations and Development Management Plan (2014)	The pre submission site allocations plan shows the location of smaller non-strategic site allocations needed to meet the Council's Core Strategy required level of housing development up to 2026. The ADMP has reviewed existing employment sites in accordance with the NPPF requirements and identifies which employment sites in current or recent use, should be protected for employment uses, and which should instead be allocated for housing, retail or other purposes.	No significant effect	No	Potential 'quantum of development' effects through recreational pressure and air quality impacts associated with traffic movements on some sites; see **Section 5**.

Plan	Summary	Likely net effect of plan on European sites (based on plan HRAs)	LSE with the Local Plan (with incorporated measures)?	Notes
Braintree District Council Core Strategy (2011)	The Core Strategy sets out strategic growth locations and the level of provision that should be made for future housing in each of the towns, key service villages and other villages in the District. The Core Strategy sets out the overall target for job provision in the District between 2001 and 2026, as well as identifying strategic employment allocations. The Core Strategy identifies broad areas of growth for town centre retailing and regeneration.	No significant effect	No	Potential 'quantum of development' effects through recreational pressure and air quality impacts associated with traffic movements on some sites; see **Section 5**.
Maldon District Council Local Development Plan 2014-2019 (2014)	The LDP covers the whole of the Maldon District Council authority area. This equates to an area of 36,000 hectares which includes 70 miles of coastline. The settlements of Maldon, Heybridge and Burnham-on-Crouch are important drivers to the local economy. They collectively contribute approximately 18,000 jobs, which amounts to approximately two-thirds of all jobs in the District. Historically, Maldon's economy was based on agricultural production, coastal trade and manufacturing. However, in recent decades there has been a shift towards a mixed economy with an increased service sector. The District has strong spatial connections with a number of important growth areas including, the Haven Gateway, the Thames Gateway, London, Chelmsford and the M11 corridor. The District's natural landscape is dominated by the two estuaries and the extensive flat and gently undulating alluvial plain along the Rivers Blackwater and Crouch.	No significant effect	No	Potential 'quantum of development' effects through recreational pressure and air quality impacts associated with traffic movements on some sites; see **Section 5**.

Plan	Summary	Likely net effect of plan on European sites (based on plan HRAs)	LSE with the Local Plan (with incorporated measures)?	Notes
Rochford District Council Core Strategy (2011)	The District of Rochford is situated within a peninsula between the Rivers Thames and Crouch, and is bounded to the east by the North Sea. The District has land boundaries with Basildon and Castle Point District and Southend–on–Sea Borough Councils. It also has marine boundaries with Maldon and Chelmsford Districts. The District has linkages to the M25 via the A127 and has a direct rail link to London. The District is predominantly rural, which is reflected in the fact that 12,763 hectares are designated as Metropolitan Green Belt. Large areas of the District are of ecological importance, with Sites of Special Scientific Interest totalling 12,986 hectares. The strength of the spheres of influence of the large neighbouring centres of Southend, Basildon and Chelmsford means that traffic is drawn through Rochford District's own centres to them. This not only has an impact on traffic congestion ingeneral, but also engenders concern with regards to air quality within the District's town centres. Particular locations where this is a concern include east of Rayleigh, where commuters to Basildon and Chelmsford are drawn through the centre of Rayleigh; west of Hockley, where those commuting by car to Southend or Chelmsford/Basildon are drawn through the centre of Hockley or Rayleigh, respectively; and east of Rochford, where vehicular movements would inevitably be directed through Rochford's historic centre.	No significant effect	No	Potential 'quantum of development' effects through recreational pressure and air quality impacts associated with traffic movements on some sites; see **Section 5**.
Rochford District Council Allocations Plan (2014)	The Core Strategy is the overarching planning policy document of the LDF, which sets out our main issues for the future and the policies which will shape the future development of the District. The Allocations Document sits below the Core Strategy in the LDF. The Allocations document provides a structure for clear, visible, consistent decision making by ensuring that land allocations for different uses are clearly set out. The Allocations Document does not just identify land for residential, educational, and employment development, sites across the District are also set out in this document for protection, including the Green Belt, Local Wildlife Sites, open spaces and the Upper Roach Valley.	No significant effect	No	Potential 'quantum of development' effects through recreational pressure and air quality impacts associated with traffic movements on some sites; see **Section 5**.

Plan	Summary	Likely net effect of plan on European sites (based on plan HRAs)	LSE with the Local Plan (with incorporated measures)?	Notes
Basildon 2031 - Local Plan Core Strategy (emerging)	The Core Strategy Revised Preferred Options Report is a draft planning blueprint being prepared by Basildon Borough Council as the Local Planning Authority for next twenty years to establish a framework for the Borough's future growth until 2031.	TBC	No	Potential 'quantum of development' effects through recreational pressure and air quality impacts associated with traffic movements on some sites; see **Section 5**..
Colchester Adopted Local Plan 2001 – 2021	The Council currently has a set of adopted Development Plan Documents which are intended to plan for the future of the borough up to 2021. These comprise the following documents: Core Strategy (adopted 2008, amended 2014), the Site Allocations DPD (adopted 2010), Development Policies DPD (adopted 2010, amended 2014), Proposals Maps (adopted 2010) and the Tiptree Jam Factory DPD (adopted 2013)	No significant effect	No	Potential 'quantum of development' effects through recreational pressure; see **Section 5**.
Colchester Emerging Local Plan 2017-2033	Local plan submitted and EIP expected in January 2018. No allocations etc likely to interact with the CCC Local Plan except through broader 'quantum of development' effects through recreational pressure on some sites, notably the Blackwater estuary.	No significant effect	No	Potential 'quantum of development' effects through recreational pressure; see **Section 5**.
Braintree Emerging Local Plan 2017-2033	Local plan submitted and EIP expected in 2018. No allocations etc likely to interact with the CCC Local Plan except through broader 'quantum of development' effects through recreational pressure on some sites, notably the Blackwater estuary.	No significant effect	No	Potential 'quantum of development' effects through recreational pressure; see **Section 5**.
North Essex LPAs Joint Issues and Options – Garden Communities	Joint Issues and Options report for potential garden communities (large-scale new developments) in Colchester, Braintree and Tendring. No allocations etc likely to interact with the Local Plan except through broader 'quantum of development' effects through recreational pressure on some sites, notably the Blackwater estuary.	TBC	No	Potential 'quantum of development' effects through recreational pressure; see **Section 5**.

Appendix E
Review of Submission Draft Policies

Policy	Title	LSE Alone / In combination	Notes/Rationale
Strategic Policy S1	Spatial Principles	No	General statement of policy / aspiration - general principles are consistent with safeguarding of European sites.
Strategic Policy S2	Securing Sustainable Development	No	General statement of policy / aspiration - small risk of conflict with European sites due to presumption in favour of sustainable development but this aspect is moderated by references to other policies and requirements that will safeguard.
Strategic Policy S3	Addressing Climate Change and Flood Risk	No	Protective policy likely to reduce the risk of effects on European sites.
Strategic Policy S4	Promoting Community inclusion and Neighbourhood Planning	No	General statement of policy / aspiration.
Strategic Policy S5	Conserving and Enhancing the Historic Environment	No	Environmental protection policy.
Strategic Policy S6	Conserving and Enhancing the Natural Environment	No	Environmental protection policy. Need for utilities provision addressed.
Strategic Policy S7	Protecting and Enhancing Community Assets	No	General statement of policy / aspiration.
Strategic Policy S8	Housing and Employment Requirements	No	This policy underpins the growth intentions for the CCC area and therefore is linked to the consideration of possible in combination effects due to recreational pressure; the potential effects of this are mitigated by the commitment to the RAMS.
Strategic Policy S9	The Spatial Strategy	No	This policy underpins the spatial distribution of growth; the principle aspect of potential conflict is the inclusion of South Woodham Ferrers in the top tier hierarchy, although this is arguably reasonable given that it is the main settlement area outside Chelmsford; the potential effects of this are mitigated by the commitment to the RAMS.
Strategic Policy S10	Delivering Economic Growth	No	General statement of policy / aspiration regarding provision of market and affordable housing.
Strategic Policy S11	Infrastructure Requirements	No	General statement of policy / aspiration regarding support for employment sites.
Strategic Policy S12	Securing infrastructure and Impact Mitigation	No	General design / guidance criteria.
Strategic Policy S13	The Role of the Countryside	No	General design / guidance criteria.

Policy	Title	LSE Alone / In combination	Notes/Rationale
Strategic Policy S14	Role of City, Town and Neighbourhood Centres	No	Policy provides some safeguarding for rural areas.
Strategic Policy S15	Monitoring and Review	No	General statement of policy / aspiration.
Strategic Growth Site 1A	Chelmer Waterside	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Strategic Growth Site 1B	Essex Police Headquarters and Sports Ground, New Court Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Strategic Growth Site 1C	North of Gloucester Avenue (John Shennan)	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Strategic Growth Site 1D	Former St Peter's College, Fox Crescent	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Strategic Growth Site 1E	Former Royal Mail Premises, Victoria Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Strategic Growth Site 1F	Riverside Ice and Leisure Land, Victoria Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Strategic Growth Site 1G	Civic Centre Land, Fairfield Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Strategic Growth Site 1H	Eastwood House Car Park, Glebe Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Policy GR1	Growth Sites in Chelmsford Urban Area	No	General design / guidance criteria for housing in Chelmsford.
Growth Site 1I	Chelmsford Social Club and Private Car Park, 55 Springfield Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Growth Site 1J	Ashby House Car Parks, New Street	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Growth Site 1K	Rectory Lane Car Park West	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Growth Site 1L	Car Park to the West of County Hotel, Rainsford Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Growth Site 1M	Former Chelmsford Electrical and Car Wash, Brook Street	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Growth Site 1N	BT Telephone Exchange, Cottage Place	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).

Policy	Title	LSE Alone / In combination	Notes/Rationale
Growth Site 1O	Rectory Lane Car Park East	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Growth Site 1P	Waterhouse Lane Depot and Nursery	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Growth Site 1Q	Church Hall Site, Woodhall Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Growth Site 1R	British Legion, New London Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Growth Site 1S	Rear of 17 to 37 Beach's Drive	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Growth Site 1T	Garage Site, St Nazaire Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Growth Site 1U	Garage Site and Land, Medway Close	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Growth Site 1V	Car Park R/O Bellamy Court, Broomfield Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Opportunity Site OS1A	Rivermead, Bishop Hall Lane	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Opportunity Site OS1B	Railway Sidings, Brook Street	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Strategic Growth Site 2	West Chelmsford	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Strategic Growth Site 3A	East Chelmsford (Manor Farm)	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues) but within 10km of Crouch and Roach; mitigation measures (RAMS) incorporated into plan policies.
Strategic Growth Site 3B	East Chelmsford Land North of Maldon Road (Employment)	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Strategic Growth Site 3C	East Chelmsford Land South of Maldon Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues) but within 10km of Crouch and Roach; mitigation measures (RAMS) incorporated into plan policies.
Growth Site 3D	East Chelmsford Land North of Maldon Road (Residential)	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues) but within 10km of Crouch and Roach; mitigation measures (RAMS) incorporated into plan policies.
Existing Commitment EC1	Land North of Galleywood Reservoir	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).

Policy	Title	LSE Alone / In combination	Notes/Rationale
Existing Commitment EC2	Land Surrounding Telephone Exchange, Ongar Road, Writtle	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Strategic Growth Site 4	North East Chelmsford	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Strategic Growth Site 5A	Great Leighs Land At Moulsham Hall	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Strategic Growth Site 5B	Great Leighs Land East of London Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Strategic Growth Site 5C	Great Leighs Land North and South of Banters Lane	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Strategic Growth Site 6	North of Broomfield	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Travellers Site GT1	Drakes Lane Gypsy and Traveller Site	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Existing Commitment EC3	Great Leighs Land East of Main Road	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Existing Commitment EC4	East of Boreham	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Strategic Growth Site 7	North of South Woodham Ferrers	No	Allocation is within 500m of Crouch estuary sites so risk of effects by various pathways; policy has been amended to include site-specific mitigation requirements and effects will be mitigated as part of the RAMS also.
Growth Site 8	South of Bicknacre	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues) but within 10km of Crouch and Roach; mitigation measures (RAMS) incorporated into plan policies.
Strategic Growth Site 9	Danbury	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues) but within 10km of Crouch and Roach; mitigation measures (RAMS) incorporated into plan policies.
Existing Commitment EC5	St Giles, Moor Hall Lane, Bicknacre	No	General design / guidance criteria for allocation plot; low risk of 'in combination' effects (regional visitor pressure issues).
Policy SPA1	Broomfield Hospital Special Policy Area	No	General statement of policy / aspiration; site is not linked to European sites.
Policy SPA2	Chelmsford City Racecourse Special Policy Area	No	General statement of policy / aspiration; site is not linked to European sites.
Policy SPA3	Hanningfield Reservoir Special Policy Area	No	General statement of policy / aspiration; reservoir is used by species that also use nearby European sites but the policy is safeguarding in this respect.

Policy	Title	LSE Alone / In combination	Notes/Rationale
Policy SPA4	RHS Hyde Hall Gardens Special Policy Area	No	General statement of policy / aspiration; site is not linked to European sites.
Policy SPA5	Sandford Mill Special Policy Area	No	General statement of policy / aspiration; site is not linked to European sites.
Policy SPA6	Writtle University College Special Policy Area	No	General statement of policy / aspiration; site is not linked to European sites.
Policy HO1	Size and Type of Housing	No	General design / guidance criteria re. size and type of housing.
Policy HO2	Affordable Housing and Rural Exception Sites	No	Statement of policy re. affordable housing requirements and exception sites.
Policy HO3	Gypsy, Traveller and Travelling Showpeople Sites	No	General design / guidance criteria.
Policy EM1	Employment Areas and Rural Employment Areas	No	Statement of policy re. development in employment areas.
Policy EM2	Primary and Secondary Frontages in Chelmsford City Centre & South Woodham Ferrers, Neighbourhood Centres and Upper Floors	No	General design / guidance criteria re. frontages in towns.
Policy CO1	Green Belt, Green Wedges, Green Corridors and Rural Areas	No	Protective policy likely to reduce the risk of effects on European sites.
Policy CO2	New Buildings and Structures in the Green Belt	No	General design / guidance criteria for buildings in the Green Belt.
Policy CO3	New Buildings and Structures in Green Wedges and Green Corridors	No	General design / guidance criteria for buildings in the green wedges etc.
Policy CO4	New Buildings and Structures in the Rural Area	No	General design / guidance criteria for buildings in rural areas.
Policy CO5	Infilling in the Green Belt, Green Wedge, Green Corridor and Rural Area	No	General design / guidance criteria for infilling.
Policy CO6	Change of Use (Land and Buildings) and Engineering Operations	No	General design / guidance criteria for change of use, including in rural areas.
Policy CO7	Extensions to Existing Buildings Within the Green Belt, Green Wedges, Green	No	General design / guidance criteria for building extensions.

Policy	Title	LSE Alone / In combination	Notes/Rationale
	Corridors and Rural Area		
Policy CO8	Rural and Agricultural/Forestry Workers' Dwellings	No	General design / guidance criteria.
Policy HE1	Designated Heritage Assets	No	Protection of listed etc buildings.
Policy HE2	Non Designated Heritage Assets	No	Protection of non-designated heritage assets.
Policy HE3	Archaeology	No	Guidance for developments affecting archaeological resources.
Policy NE1	Ecology and Biodiversity	No	Environmental protection policy. Policy enhanced following preferred option review.
Policy NE2	Trees, Woodland and Landscape Features	No	Protection for ecological and landscape features.
Policy NE3	Flooding/SuDS	No	Requirements for the use of SuDS; likely to provide incidental safeguards for European sites.
Policy NE4	Renewable and Low Carbon Energy	No	General design / guidance criteria for renewable energy schemes.
Policy CF1	Delivering Community Facilities	No	Support for community assets with criteria.
Policy CF2	Protecting Community Facilities	No	Safeguarding of community assets.
Policy CF3	Education Establishments	No	General requirements for development design.
Policy MP1	High Quality Design	No	General requirements for development design.
Policy MP2	Design and Place Shaping Principles in Major Developments	No	General requirements for development design.
Policy MP3	Sustainable Buildings	No	General requirements for development design.
Policy MP4	Design Specification For Dwellings and Houses in Multiple Occupation	No	General requirements for development design.
Policy MP5	Parking Standards	No	General requirements for development design.
Policy MP6	Tall Buildings	No	General requirements for development design.
Policy MP7	Provision of Broadband	No	General requirements for development design.
Policy PA1	Protecting Amenity	No	General requirements for hazardous sites and air quality zones.
Policy PA2	Contamination and Pollution	No	Protective policy.

ANNEXED REPORT 1
Traffic and Air Quality Assessment

Technical note:
Traffic and Air Quality Impacts of the Proposed Chelmsford Local Plan Allocations on Epping Forest Special Area of Conservation

1. Introduction

1.1 Background

This Technical Note has been prepared to evaluate the traffic and air quality impacts of the proposed Chelmsford Local Plan: Pre-Submission Draft (the Pre-Submission Local Plan) allocations on Epping Forest Special Area of Conservation (SAC); this assessment is intended to inform the Habitats Regulations Assessment (HRA) of the Local Plan. The proposed allocations (43 in total) form nine development locations across the following three Growth Areas:

- Growth Area 1: Central and Urban Chelmsford;
- Growth Area 2: North Chelmsford; and
- Growth Area 3: South and East Chelmsford.

The Technical Note sets out the approach taken to the assessment and findings in terms of the traffic impacts of the proposed allocations on the existing highway network that passes through and within 200m of Epping Forest SAC. Based on the findings of the assessment, **Appendix B** presents a high level analysis of the air quality impacts of the Local Plan on the SAC.

1.2 Context

As noted above, this Technical Note has been produced to inform the HRA of the Local Plan. Specifically, it has been prepared in response to representations received from Natural England to the HRA of the Chelmsford Draft Local Plan Preferred Options Consultation Document (the Preferred Options Consultation Document). Within this response, dated 11 May 2017, the following comments were made:

> *"Natural England recognises that at both the screening (for likely significant effects) and appropriate assessment stages of a HRA, the likely effects of a plan or project need to be considered individually and in combination with other relevant plans or projects. This is a legal requirement of the Habitats Regulations 2010 (as amended) which aims to ensure that European sites are not inadvertently damaged by the additive effects of multiple plans or projects.*
>
> *Natural England's guidance is that where evidence is available, such as increases in traffic from other plans that will affect the same roads being assessed, the 1, 000 Annual Average Daily Traffic (AADT) or 1% threshold should also be applied to the combined values to screen for in-combination effects. This is particularly the case for air pollution impacts on Epping Forest SAC. We advise that neighbouring authorities have signed up to a Memorandum of Understanding to address the impacts of local plans on Epping Forest with respect to air pollution. This is an aspect that should be*

considered by Chelmsford City Council's Memorandum of Understanding. We will provide more detailed advice on this in our follow-up advice letter."

A follow up letter dated 26 June 2017 stated:

"In our part 1 advice we advised on the need to consider the likely effects of plans or projects individually and in combination with other relevant plans or projects. We now provide further advice on the following issues.

Scope of HRA. A High Court judgment was handed down on 20 March 2017 in Wealden District Council v Secretary of State for Communities and Local Government, Lewes District Council and South Downs National Park Authority [2017] EWHC 351. Wealden District Council brought a challenge against a Joint Core Strategy produced by two of its neighbouring authorities. Natural England provided advice to Lewes District Council and the South Downs National Park Authority on the assessment of air quality impact on Ashdown Forest SAC. This advice was based on nationally developed guidance agreed with other UK statutory nature conservation bodies.

The court found that Natural England's advice on the in-combination assessment of air quality impacts in this case was flawed. We are considering the details of this decision and the implications for our advice. Competent authorities should seek their own legal advice on any implications of this recent judgment for their decisions. The judgment highlights that where a competent authority is aware of plans or projects that are likely to affect the same road, then these should be considered in-combination (e.g. added up) before applying a screening threshold (1,000 AADT change in traffic or 1% of critical load/level) for ruling out likely significant effect.

We previously advised on 29 January 2016 (our ref: 171880) that effects on local roads and impacts on vulnerable sites from air quality effects "can be assessed using traffic projections and the 200m distance criterion followed by local Air Quality modelling where required". Given that neighbouring authorities have signed up to a Memorandum of Understanding to address the impacts of Local Plans on Epping Forest SAC with respect to air pollution, and advice to your Council to seek a legal opinion in the light of the Wealden Judgement, we now revise our previous advice. We advise that Epping Forest SAC should be screened in to the HRA process. This would allow the Council, as competent authority, to demonstrate how potential air pollution impacts on Epping Forest SAC that may result from likely increased traffic as a result of the Local Plan have been considered in combination with other plans and projects."

In response to these comments, a methodology was developed to establish the traffic and air quality impacts of the Local Plan on Epping Forest SAC. This methodology was submitted to Natural England for their comment.

1.3 Methodology

The assessment of the proposed Local Plan allocations is based on the nine development locations. The proposed methodology to undertake the required analysis is as follows:

a) To calculate whether the proposed development locations on their own will result in an increase in vehicles within Epping Forest of greater than 1,000 cars per day:
   - Calculate the vehicle trip generation for the development locations included within the Plan using industry standard software TRICS;
   - Calculate the percentage of these trips travelling through Epping Forest on the M25, A112, North Circular, A104 and A112 using:
     - Journey to work data to determine the quantity of vehicles travelling in that direction; and
     - Google journey planning to determine their preferred route.

b) To calculate whether the proposed Local Plan allocations (in terms of the nine development locations) plus land use allocations associated with the local plans of surrounding local planning authorities will result in an increase in vehicles within Epping Forest of greater than 1,000 cars per day:

- Establish base traffic volumes on the roads listed above using data from the Department for Transport (DfT);
- Establish traffic growth on these roads using industry standard software TEMPro for 2016 to 2036; and
- Calculate the increase in traffic volumes as a result of traffic growth and add to the proposed Chelmsford Local Plan traffic (above).

c) To calculate whether the proposed allocations (in terms of the nine development locations) on their own will result in an increase of 1% on the critical load/level for nitrogen oxides (NoX):

- Use the traffic flows generated to calculate the 2016 level and load of NoX on the roads listed above based on existing conditions; and
- Use the traffic flows generated to calculate the anticipated future level and load of NoX on the roads listed above with and without the proposed allocations.

1.4 Structure of this Technical Note

The remainder of this Technical Note is structured as follows:

- **Section 2** presents the data used in the assessment such as trip rates and journey to work data; and
- **Section 3** provides analysis and conclusions.

2. Data

2.1 Introduction

In order to establish the impacts of the proposed Local Plan allocations in and around Epping Forest, the following data sources were interrogated:

- The proposed allocations in terms of their location, size and activity mix;
- Generic trips rates from TRICS for those allocations;
- Journey to Work data from the 2011 Census;
- Route choice using Google Journey Planning Data;
- DfT traffic counts on the highways of interest; and
- Traffic growth forecasts using TEMPro.

The data used from these sources is explained in more detail below.

2.2 Proposed Development Locations Allocations

A strategic overview of the developments expected to take place in the Chelmsford City Area by 2036 are shown in **Table 2.1**. As highlighted above, a total of 44 allocations are proposed in the Pre-Submission Local Plan that make up nine development locations across three Growth Areas: Central and Urban Chelmsford; North Chelmsford; and South and East Chelmsford. **Table 2.1** presents the location, the number of new homes proposed and the quantity and mix of employment floorspace to be delivered at each development location.

It is noted, that in addition to the locations identified in **Table 2.1** the proposed Local Plan includes a quantum of development classified as “existing commitments” or “with planning permission”. In transport terms, as these sites are known and accepted, it is assumed that they are inherent within any background traffic growth forecasts and inclusion within this assessment would represent double counting. The Local

Plan also includes a number of windfall dwellings which by their nature cannot be quantified in terms of individual development size or location and so have been excluded from this assessment.

Table 2.1 Proposed Development Locations

Development Locations (2021-2036)		Net New Homes	Net New Traveller Pitches	Travelling Show people	Net New Employment Floorspace
Location	**Growth Area 1 - Central and Urban Chelmsford**				
1.	Previously developed sites in Chelmsford Urban Area	2,205			Office 4,000sqm,Food Retail 11,500sqm
2.	West Chelmsford	800		5	
3a	East Chelmsford – Manor Farm	250			
3b	East Chelmsford – Land North of Maldon Road				5,000sqm Office / Business Park
3c	East Chelmsford – Land South of Maldon Road	100			
3d	East Chelmsford – Land North of Maldon Road	50			
Location	**Growth Area 2 - North Chelmsford**				
4.	North East Chelmsford	3,000		9	Office/High Tech Business Parks 45,000sqm
5a	Great Leighs – Land at Moulsham Hall	750		5	
5b	Great Leighs – Land East of London Road	250			
5c	Great Leighs – Land North and South of Banters Lane	100			
6	North of Broomfield	450			
GTI	Drakes Lane, Little Waltham		10		
Location	**Growth Area 3 – South and East Chelmsford**				
7.	North of South Woodham Ferrers	1,000		5	Office 1,000sqm, Food Retail 1,900sqm
8.	South of Bicknacre	30			
9.	Danbury	100			

Figure 2.1 shows the nine development locations mapped out by the number of their location as well as proposed highway improvements within the existing network.

Figure 2.1 Location of the Proposed Developments

2.3 Development Traffic - Trip Rates

To understand the potential trip generating characteristics of the proposed Local Plan allocations (in terms of the nine development locations), trip rates have been developed using the industry standard approach of TRICS.

The trip rates for both the residential and various employment components are based upon TRICS studies which are presented in **Appendix A**. The locations used within the TRICS studies were kept broad in order to gauge a more accurate average from a large dataset and specific land development types were selected to match each proposed activity. These land development types included:

- Housing developments – using the TRICS category "Houses privately owned";
- Food retail – using the TRICS category "Retail park including food";
- Offices – using the TRICS category "Office"; and
- Business Parks – using the TRICS category "Business Park".

Table 2.2 sets out the trip rates from TRICS and the corresponding total vehicle trips for the day.

Table 2.2 Trip Rates – Total Vehicles -Daily

Development Type			Daily			
			Rate (Vehicles)		Trips	
	Number	Unit	Arrive	Depart	Arrive	Depart
Location 5						
Residential	1,100	Dwelling	2.01	2.14	2,207	2,353
Locations 1, 2, 3, 4, 6						
Residential	7,145	Dwelling	2.01	2.14	14,333	15,283
Employment ***(Offices)***	4,000	Sqm	7.26	7.28	290	291
Employment ***(Offices)***	50,000	Sqm	4.65	4.51	2,325	2,254
Employment ***(Food retail)***	11,500	Sqm	28.53	28.61	3,281	3,290
Locations 7, 8, 9						
Residential	1,130	Dwelling	2.01	2.14	2,267	2,417
Employment ***(Office)***	1,000	Sqm	7.26	7.28	73	73
Employment ***(Food retail)***	1,900	Sqm	28.53	28.61	542	544
Total Trips					25,318	26,505

The information contained within **Table 2.2** shows that the proposed development quantum as set out in the Pre-Submission Local Plan would generate some 51,823 vehicle trips during the day.

It has been assumed in this study, due to the distance between the Chelmsford City Area and Epping Forest (some 50km), that typically only journey to work trips will be present in or around Epping Forest. As such, it is considered possible that those living within Chelmsford will typically leave their dwelling for work during a

morning peak period of between 7-9am and return from work during an evening peak period of between 5-7pm. Conversely, those working in Chelmsford will arrive at their destination workplace during the morning peak period and depart during the evening peak period.

Table 2.3 sets out the combined peak periods trip rates and the resultant generated trips dependent on the development type.

Table 2.3 Trip Rate Calculation – Residential and Employment

Development Type	Number	Unit	AM Departure (7-9) + PM Arrival (5-7)		AM Arrival (7-9) + PM Departure (5-7)	
			Trip Rate	Trips	Trip Rate	Trips
Location 5						
Residential	1,100	Dwelling	1.142	1,256		
Locations 1, 2, 3, 4, 6						
Residential	7,145	Dwelling	1.142	8,160		
Employment ***(Offices)***	4,000	Sqm			4.795	192
Employment ***(Office/high tech Business parks)***	50,000	Sqm			3.723	1,862
Employment ***(Food retail)***	11,500	Sqm			5.833	671
Locations 7, 8, 9						
Residential	1,130	Dwelling	1.142	1,290		
Employment ***(Office)***	1,000	Sqm			4.795	48
Employment ***(Food retail)***	1,900	Sqm			5.833	111
Total Trips				10,706		2,884

The information contained within **Table 2.3** shows that the proposed development quantum as set out in the Local Plan would generate some 13,590 Journey to Work trips during the morning and evening peak periods.

2.4 Trip Distribution

To understand the distribution of the trips generated by the proposed allocations, Journey to Work data from the 2011 UK Census has been interrogated. To represent journeys taken from Chelmsford into Epping Forest District and the London Boroughs (of interest), the data selected was from the Chelmsford 001 and 016 Middle Super Output Area zones. Journey to Work data also from the 2011 UK Census has been introduced to analyse those trips made into workplaces in Chelmsford from Epping Forest District and the London Boroughs (of interest), this data selected was for the Chelmsford 002 and 019 and 020 Middle Super Output Area zones. **Figure 2.2** shows the location of each London Borough of interest.

The data used filtered out all other modes of transport with the exception of cars and vans. The other modes were discounted as the subject of interest is vehicles that would use the highways through Epping Forest SAC to get to and from Chelmsford.

Table 2.4 below sets out the proportion of people travelling between Chelmsford and each London Borough (of interest) by car as a percentage of the total people travelling to work who live or work in Chelmsford.

Table 2.4 Trip Distribution- Driving Car

Location	Location 5	Locations 1,2,3,4,6 Residential	Locations 1,2,3,4,6 Employment	Locations 7,8,9 Residential	Locations 7,8,9 Employment
Hackney	0.26%	0.18%	0.09%	0.12%	0.00%
Tower Hamlets	0.58%	0.69%	0.07%	0.61%	0.38%
Barnet	0.16%	0.11%	0.08%	0.12%	0.00%
Brent	0.05%	0.05%	0.05%	0.04%	0.00%
Camden	0.05%	0.16%	0.02%	0.20%	0.08%
Ealing	0.16%	0.08%	0.01%	0.04%	0.00%
Hammersmith and Fulham	0.00%	0.05%	0.01%	0.16%	0.00%
Haringey	0.11%	0.12%	0.06%	0.12%	0.04%
Hounslow	0.00%	0.08%	0.02%	0.00%	0.00%
Islington	0.16%	0.18%	0.02%	0.08%	0.12%
Kensington and Chelsea	0.00%	0.03%	0.00%	0.00%	0.00%
Richmond upon Thames	0.05%	0.02%	0.01%	0.00%	0.00%
Waltham Forest	0.32%	0.35%	0.19%	0.37%	0.15%
Westminster	0.84%	0.67%	0.01%	N/A	N/A
Hillingdon	0.00%	0.10%	0.02%	0.08%	0.08%
Enfield	0.53%	0.33%	0.15%	0.29%	0.08%
Harrow	0.11%	0.04%	0.03%	0.16%	0.00%
Epping Forest District	0.34%	0.33%	0.01%	0.16%	0.08%

The information contained within **Table 2.4** shows the forecast percentage of people who commute to and from each area of Chelmsford: North, Central and South. The data shows commuting trips from Chelmsford to Epping Forest District and the London Boroughs and the return journey derived from the 2011 Journey to Work Census data. Without exception, all the percentages are lower than 1% which suggests that very few vehicles trips exist between Chelmsford and Epping Forest District or the London Boroughs (of interest) via Epping Forest SAC.

2.5 Trip Assignment

To identify the roads within 200m of Epping Forest SAC that would be likely to see an increased volume of users as a result of the proposed Chelmsford Local Plan, the Google journey planner was interrogated. Five main roads were noted as possible routes either as a principal route or as a rat run:

- M25;
- A12;
- North Circular;
- Epping New Road; and
- A112.

Table 2.5 shows the different routes that can be taken to travel between Epping Forest District, each London Borough (of interest) and Chelmsford via Epping Forest SAC. Three separate places were selected; Great Leighs for the Location 5, the centre of the City for Locations 1,2,3,4,6 and South Woodham Ferrers for Locations 7,8,9. Each London Borough was chosen as a separate destination and the time frame used was a generic Wednesday morning at 8am. The journey planner then calculated the quickest routes and possible alternatives between the selected origin and destination and percentages were devised based on this.

Table 2.5 Trip Assignment for the Proposed Allocation Traffic

Location	Chelmsford Location	M25	A12	North Circular	Epping New Road	A112
Hackney	*Location 5*		70%	10%		
	Locations 1,2,3,4,6		50%	10%		
	Locations 7,8,9		30%	10%		
Tower Hamlets	*Location 5*		10%			
	Locations 1,2,3,4,6		10%			
	Locations 7,8,9		20%			
Barnet	*Location 5*	50%		30%		
	Locations 1,2,3,4,6	50%		30%		
	Locations 7,8,9	50%		30%		
Brent	*Location 5*	40%		40%		
	Locations 1,2,3,4,6	30%		50%		
	Locations 7,8,9	30%		50%		
Camden	*Location 5*	20%		50%		
	Locations 1,2,3,4,6	20%		50%		
	Locations 7,8,9	20%		50%		
Ealing	*Location 5*	40%		40%		
	Locations 1,2,3,4,6	40%		40%		
	Locations 7,8,9	40%		40%		

Location	Chelmsford Location	M25	A12	North Circular	Epping New Road	A112
Hammersmith and Fulham	*Location 5*	20%		20%		
	Locations 1,2,3,4,6	10%		20%		
	Locations 7,8,9	10%		20%		
Haringey	*Location 5*	10%		70%		
	Locations 1,2,3,4,6	20%		50%		
	Locations 7,8,9	10%		70%		
Hounslow	*Location 5*	50%		10%		
	Locations 1,2,3,4,6	50%		10%		
	Locations 7,8,9	50%		10%		
Islington	*Location 5*	10%		70%		
	Locations 1,2,3,4,6	50%		10%		
	Locations 7,8,9		20%	60%		
Kensington and Chelsea	*Location 5*			10%		
	Locations 1,2,3,4,6			10%		
	Locations 7,8,9			10%		
Richmond upon Thames	*Location 5*	60%		20%		
	Locations 1,2,3,4,6	60%		20%		
	Locations 7,8,9			10%		
Waltham Forest	*Location 5*		20%	50%	10%	10%
	Locations 1,2,3,4,6		20%	50%	10%	10%
	Locations 7,8,9		20%	50%	10%	10%
Westminster	*Location 5*		10%	10%		
	Locations 1,2,3,4,6		10%	10%		
	Locations 7,8,9	N/A	N/A	N/A	N/A	N/A
Hillingdon	*Location 5*	50%		10%		
	Locations 1,2,3,4,6	50%		10%		
	Locations 7,8,9	50%		10%		
Enfield	*Location 5*	50%		20%		10%
	Locations 1,2,3,4,6	50%		30%		10%
	Locations 7,8,9	50%		20%		10%

Location	Chelmsford Location	M25	A12	North Circular	Epping New Road	A112
Epping Forest District	*Location 5*	40%		40%	10%	10%
	Locations 1,2,3,4,6	30%		30%	10%	10%
	Locations 7,8,9	40%		40%	10%	10%

The information displayed in **Table 2.5** shows the percentage routings between the three locations in Chelmsford and Epping Forest District and each London Borough of interest depending on how likely each road is to be used on a trip. This was gathered from the journey planner tool on Google maps.

2.6 Overall Highway Impact

Using the number of vehicle trips set out in **Table 2.3**, the estimated proportion of people travelling via Epping Forest SAC shown in **Table 2.4** and the vehicle routing presented in **Table 2.5**, the number of additional vehicle trips can be calculated.

Table 2.6 displays a summary of each highway that will be affected by the proposed Local Plan allocations and the number of vehicle trips they are determined to be impacted by per day.

Table 2.6 Summary- Impact of Vehicles on each Highway

Location	M25	A12	North Circular	Epping New Road	A112	Total
Location 5 *Residential*	8	5	11	1	1	**27**
Locations 1, 2, 3, 4, 6 *Residential*	45	31	61	5	8	**151**
Locations 1, 2, 3, 4, 6 *Employment*	5	3	7	1	1	**17**
Locations 7, 8, 9 *Residential*	6	3	9	1	1	**20**
Locations 7, 8, 9 *Employment*	0	0	0	0	0	**1**
Total	**65**	**43**	**88**	**8**	**12**	**215**

Table 2.6 shows that in total, 215 vehicles are anticipated to travel between the development locations and Epping Forest District or the London Boroughs of interest each day. The North Circular Road is anticipated to be the most impacted road with an additional 88 vehicles using it whilst Epping New Road and the A112 appear to be least impacted roads with 8 and 12 additional vehicles using them respectively.

2.7 Existing Traffic Conditions

It is important to understand the existing traffic conditions within the area of Epping Forest. This data is shown in **Table 2.7** and has been gathered from the DfT website. The table displays national traffic counts data from the highways (M25, Epping New Road, A112, North Circular and A12) within Epping Forest SAC that are likely to be affected by the proposed Local Plan allocations due to commuting traffic between selected London Boroughs and Chelmsford.

Table 2.7 Existing Traffic Counts within Epping Forest Traffic Network

Road name	Count point ID	All motor vehicles	All HGVs
M25	28,049	135,453	19,308
M25	17,957	140,169	19,051
M25	7,904	144,456	23,299
M25	27,883	150,674	20,956
M25 Average		**142,688**	**20,654**
A104 (Epping New Road)	6,198	13,729	236
A104 (Epping New Road)	36,199	15,703	159
A104 (Epping New Road)	78,368	17,431	177
A104 (Epping New Road)	73,902	32,946	648
A104 Average		**19,952**	**305**
A112	6,642	18,015	423
A112	73,487	16,685	715
A112	36,674	18,645	613
A112	16,626	11,442	171
A112	56,667	16,133	131
A112	26,658	15,101	362
A112	6,643	17,214	215
A112	36,675	11,735	241
A112 Average		**15,621**	**359**
A406 North Circular	73,480	99,751	5,122
A406 North Circular	7,058	120,941	8,491
A406 North Circular	37,116	122,664	8,092
A406 North Circular	73,903	143,319	8,047
A406 North Circular	58,232	67,250	5,827
A406 North Circular	18,527	94,876	3,388

Road name	Count point ID	All motor vehicles	All HGVs
A406 North Circular	56,029	137,512	7,714
A406 North Circular	48,611	93,392	6,400
A406 Average		**109,963**	**6,635**
A12	70,049	87,228	4,602
A12	73,906	72,941	2,819
A12	38,683	85,244	4,459
A12	16,197	33,956	1,457
A12	36,213	57,862	1,711
A12	74,530	83,860	2,992
A12	74,529	107,556	5,027
A12 Average		**75,521**	**3,295**

2.8 Traffic Growth

To understand the traffic impact in the future year of assessment, 2036, when the Local Plan period would end, background traffic growth needs to be calculated. Levels of background traffic growth are variable, dependent upon the predicted increase in economic activity within the area. Background traffic growth has been estimated using the industry standard DfT Trip End Model Presentation Program (TEMPro) 7.2 for the Epping Forest and Waltham Forest areas.

The daily background traffic growth expected between 2016 and 2036 has been calculated for light vehicles (LVs) and HGVs using the following methodology:

- Light Vehicles - the National Trip End Motel (NTEM) growth rates extracted from TEMPro software for the respective Council District/Borough that each highway is found in. These District/Boroughs include Epping Forest for the M25 and A104 (Epping New Road) and Waltham Forest for the A112, A406 North Circular and the A12; and
- Heavy Vehicles – National Transport Model (NTM) data extracted from TEMPro for the respective District/Borough that each highway is found in (see above).

Table 2.8 presents the daily vehicle TEMPro growth rates for both LV and HGV that have been devised for each highway based on the corresponding District/Borough.

Table 2.8 Daily Vehicle TEMPro Growth Rate

Road	Area	LV	HGV
M25	Epping Forest	1.1439	1.1994
A104 (Epping New Road)	Epping Forest	1.1439	1.1994
A112	Waltham Forest	1.2519	1.2263
A406 North Circular	Waltham Forest	1.2519	1.2263
A12	Waltham Forest	1.2519	1.2263

2.9 Committed Developments

It has been assumed that there are no other committed developments in the area that would not be accounted for within the TEMPro background traffic growth.

3. Analysis and Conclusions

Based on Natural England's response to the Preferred Options Consultation Document and HRA, the following two questions have been identified:

(1) Whether the proposed Local Plan allocations with or without land use allocations from surrounding authorities will result in an increase in vehicles within Epping Forest of greater than 1,000 cars per day.

(2) Whether the proposed allocations on their own will result in an increase of 1% on the critical load/level for NoX.

Based on, and using the data presented in, **Section 2**, questions one and two above can be answered as follows.

3.1 Question 1

The data presented in **Table 2.6** clearly shows that the forecast traffic flows on each highway through Epping Forest as a result of the proposed Local Plan allocations are significantly lower than 1,000 vehicles per day. In fact, the total number of vehicle trips anticipated on all the roads through Epping Forest combined are well below the 1,000 vehicles per day threshold.

To address whether the proposed Local Plan allocation in combination with other developments in other areas will trigger the 1,000 vehicles per day threshold, the TEMPro growth factors have been applied to existing traffic count data. **Table 3.1** presents:

- The existing traffic flow data on each road of interest (taken from **Table 2.7**);
- The forecast future traffic flows in 2036 (derived by multiplying the existing traffic count data by the relevant growth factors);
- The effect of the Chelmsford Local Plan traffic (taken from **Table 2.6**); and
- The net change in traffic flow (between 2016 and 2036).

Table 3.1 Existing Traffic Counts within Epping Forest Traffic Network

Road name	2016 AADT	2036 AADT	Chelmsford Local Plan AADT	2036 AADT + Chelmsford AADT	Net Change from 2016
M25 Average	142,688	164,367	65	164,432	21,744
A104 Epping New Rd Average	19,952	22,840	8	22,848	2,896
A112 Average	15,621	19,547	12	19,559	3,938
A406 North Circular Average	109,963	137,493	88	137,581	27,618
A12 Average	75,521	94,460	43	94,503	18,982

The data presented in **Table 3.1** clearly shows that the forecast traffic flows on each highway through Epping Forest as a result of the proposed Local Plan allocations in combination with other forecasted developments in other areas are significantly over 1,000 vehicles per day.

Caveat

The data presented throughout this document looks at those journeys between Chelmsford and Epping Forest District or the London Boroughs. However, as the M25 has been identified as being within 200m of the Epping Forest SAC, it could be considered that journey to work trips further afield may result in additional vehicles at this location. As such, further analysis of the journey to work data has been undertaken and this shows that some 3% of all journey to work trips to and from Chelmsford might use the M25 to access areas beyond Epping Forest District and the London Boroughs.

This 3% of all journey to work trips may equate to some 424 additional vehicles per day on the M25 resulting from the proposed Local Plan allocations. However, strategic commuter journeys of this nature are highly specific and not considered to necessarily be indicative of any particular transport trends. Their inclusion or exclusion from any analysis should be treated with caution. Nevertheless, should those 424 trips be included within this assessment then the traffic impact on the M25 would be 489 vehicles per day which remains well below the 1,000 vehicle threshold.

3.2 Question 2

Traffic data similar to that presented in **Table 3.1** has been used to undertake an analysis and respond to Question 2 regarding NoX. It should be noted that since the air quality assessment was undertaken, the traffic data was revised and this resulted in:

- An additional 18 vehicles per day on the M25;
- An additional 19 vehicles per day on the A12;
- An additional 15 vehicles per day on the North Circular;
- An additional 2 vehicles per day on Epping New Road; and
- An additional 3 vehicles per day on the A112.

As the change in traffic flows listed above (over a 24 hours period) are negligible, it is considered that the air quality assessment remains valid.

The details of the air quality assessment and the conclusions are presented in **Appendix B**. As a summary, the pertinent points are listed below:

- It is considered to be a conservative assessment due to the use of the 2017 background concentrations for future scenarios;
- Both the predicted annual and daily mean concentrations of NOx decrease along the transect with distance from the road;
- There were a number of exceedances of the Air Quality Objectives and Environmental Assessment Level criteria in all scenarios, both without and with the additional traffic associated with the proposed Local Plan allocations;
- The highest predicted concentrations tended to be at Epping Forest New Road north, which is likely due to the combined effect of this road, as well as the M25;
- The concentration increases as a result of the additional traffic is considered negligible overall with reference to the EPUK & IAQM significance criteria;
- Potential increases to nitrogen deposition was calculated. The Predicted Environmental Concentrations were calculated to be between 120 – 189% of the minimum critical load (MinCL) at all points along the 200m transect. However, the background deposition rate was shown to be significantly higher than the minimum critical load associated with the ecological features of the SAC;
- According to the Environment Agency insignificance threshold of 1% or less for the Calculation of Process Contributions in relation to the critical load, nitrogen deposition is predicted to be inconsequential at all points along the modelled transects; and
- For acid deposition, the process contribution is predicted to be <0.4% of the critical load function and causes no exceedances, so is therefore insignificant.

Author	Reviewer
Amy Evans	Helen Harding

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Management systems

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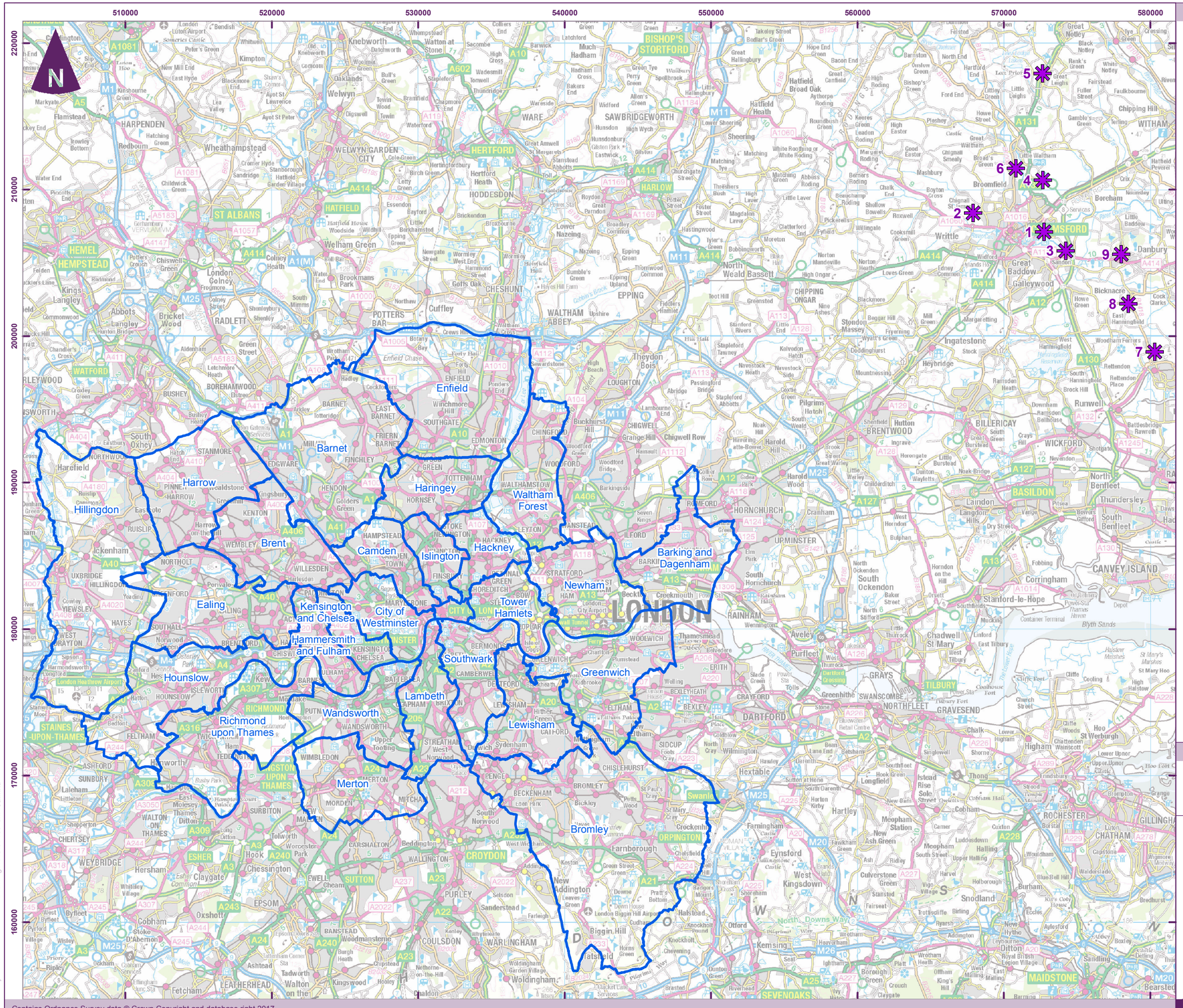
Figure



Key

- London Borough of interest
- Development locations

0 2 4 6 8 10 12 14 km

Scale at A3: 1:250,000

Client

Chelmsford City Council

Chelmsford City Council
Traffic impact of the proposed Chelmsford Local Plan allocations on Epping Forest SAC

amec foster wheeler

Figure 2.2
Locations of each London Borough of interest

file: H:\Projects\37180 Chelmsford\Drawings\GIS\37180-Shr49a.mxd

Appendix A
Trip Rates

Calculation Reference: AUDIT-206602-171120-1108

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 03 - RESIDENTIAL
Category : A - HOUSES PRIVATELY OWNED

MULTI-MODAL VEHICLES

Selected regions and areas:

02	**SOUTH EAST**		
	WS	WEST SUSSEX	2 days
03	**SOUTH WEST**		
	DV	DEVON	1 days
05	**EAST MIDLANDS**		
	NR	NORTHAMPTONSHIRE	1 days
07	**YORKSHIRE & NORTH LINCOLNSHIRE**		
	NE	NORTH EAST LINCOLNSHIRE	2 days
	NY	NORTH YORKSHIRE	1 days
09	**NORTH**		
	DH	DURHAM	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Secondary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter:	Number of dwellings
Actual Range:	102 to 805 (units:)
Range Selected by User:	100 to 3000 (units:)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/09 to 10/05/17

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	2 days
Tuesday	1 days
Thursday	2 days
Friday	2 days
Saturday	1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	8 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Edge of Town Centre	1
Suburban Area (PPS6 Out of Centre)	3
Edge of Town	3
Neighbourhood Centre (PPS6 Local Centre)	1

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Residential Zone	7
No Sub Category	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Secondary Filtering selection:

Use Class:

C3	8 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

1,001 to 5,000	3 days
5,001 to 10,000	1 days
10,001 to 15,000	3 days
20,001 to 25,000	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

5,001 to 25,000	4 days
50,001 to 75,000	1 days
75,001 to 100,000	2 days
125,001 to 250,000	1 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	2 days
1.1 to 1.5	6 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

Yes	2 days
No	6 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	8 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 **DH-03-A-02** **MIXED HOUSES** **DURHAM**
LEAZES LANE
ST HELEN AUCKLAND
BISHOP AUCKLAND
Neighbourhood Centre (PPS6 Local Centre)
Residential Zone
Total Number of dwellings: 125
Survey date: MONDAY *27/03/17* *Survey Type: MANUAL*

2 **DV-03-A-02** **HOUSES & BUNGALOWS** **DEVON**
MILLHEAD ROAD

HONITON
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 116
Survey date: FRIDAY *25/09/15* *Survey Type: MANUAL*

3 **NE-03-A-02** **SEMI DETACHED & DETACHED** **NORTH EAST LINCOLNSHIRE**
HANOVER WALK

SCUNTHORPE
Edge of Town
No Sub Category
Total Number of dwellings: 432
Survey date: MONDAY *12/05/14* *Survey Type: MANUAL*

4 **NE-03-A-03** **PRIVATE HOUSES** **NORTH EAST LINCOLNSHIRE**
STATION ROAD

SCUNTHORPE
Edge of Town Centre
Residential Zone
Total Number of dwellings: 180
Survey date: TUESDAY *20/05/14* *Survey Type: MANUAL*

5 **NR-03-A-01** **HOUSES** **NORTHAMPTONSHIRE**
BOUGHTON GREEN ROAD
KINGSTHORPE
NORTHAMPTON
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 102
Survey date: SATURDAY *22/09/12* *Survey Type: MANUAL*

6 **NY-03-A-06** **BUNGALOWS & SEMI DET.** **NORTH YORKSHIRE**
HORSEFAIR

BOROUGHBRIDGE
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Number of dwellings: 115
Survey date: FRIDAY *14/10/11* *Survey Type: MANUAL*

7 **WS-03-A-04** **MIXED HOUSES** **WEST SUSSEX**
HILLS FARM LANE
BROADBRIDGE HEATH
HORSHAM
Edge of Town
Residential Zone
Total Number of dwellings: 151
Survey date: THURSDAY *11/12/14* *Survey Type: MANUAL*

8 **WS-03-A-06** **MIXED HOUSES** **WEST SUSSEX**
ELLIS ROAD
S BROADBRIDGE HEATH
WEST HORSHAM
Edge of Town
Residential Zone
Total Number of dwellings: 805
Survey date: THURSDAY *02/03/17* *Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

MANUALLY DESELECTED SITES

Site Ref	Reason for Deselection
AG-03-A-01	NA
AN-03-A-06	NA
AN-03-A-07	NA
AN-03-A-08	NA

TRIP RATE for Land Use 03 - RESIDENTIAL/A - HOUSES PRIVATELY OWNED

MULTI-MODAL VEHICLES

Calculation factor: 1 DWELLS

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate	No. Days	Ave. DWELLS	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	8	253	0.062	8	253	0.250	8	253	0.312
08:00 - 09:00	8	253	0.118	**8**	**253**	**0.352**	**8**	**253**	**0.470**
09:00 - 10:00	8	253	0.143	8	253	0.148	8	253	0.291
10:00 - 11:00	8	253	0.122	8	253	0.151	8	253	0.273
11:00 - 12:00	8	253	0.126	8	253	0.142	8	253	0.268
12:00 - 13:00	8	253	0.138	8	253	0.149	8	253	0.287
13:00 - 14:00	8	253	0.141	8	253	0.140	8	253	0.281
14:00 - 15:00	8	253	0.137	8	253	0.171	8	253	0.308
15:00 - 16:00	8	253	0.243	8	253	0.166	8	253	0.409
16:00 - 17:00	8	253	0.236	8	253	0.151	8	253	0.387
17:00 - 18:00	**8**	**253**	**0.280**	8	253	0.157	8	253	0.437
18:00 - 19:00	8	253	0.260	8	253	0.162	8	253	0.422
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			2.006			2.139			4.145

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Calculation Reference: AUDIT-206602-171117-1120

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 02 - EMPLOYMENT
Category : A - OFFICE

MULTI-MODAL VEHICLES

Selected regions and areas:

02	**SOUTH EAST**		
	BD	BEDFORDSHIRE	1 days
	ES	EAST SUSSEX	1 days
	HF	HERTFORDSHIRE	1 days
	KC	KENT	4 days
	SC	SURREY	1 days
	SO	SLOUGH	1 days
04	**EAST ANGLIA**		
	NF	NORFOLK	1 days
	SF	SUFFOLK	2 days
07	**YORKSHIRE & NORTH LINCOLNSHIRE**		
	WY	WEST YORKSHIRE	2 days
08	**NORTH WEST**		
	GM	GREATER MANCHESTER	1 days
	LC	LANCASHIRE	1 days
09	**NORTH**		
	DH	DURHAM	2 days
	TW	TYNE & WEAR	2 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Secondary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Gross floor area
Actual Range: 1230 to 10293 (units: sqm)
Range Selected by User: 2000 to 5000 (units: sqm)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/09 to 23/05/17

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Monday	5 days
Tuesday	7 days
Wednesday	1 days
Thursday	5 days
Friday	2 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	20 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Edge of Town Centre	8
Suburban Area (PPS6 Out of Centre)	6
Edge of Town	6

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Industrial Zone	4
Commercial Zone	3
Residential Zone	5
Built-Up Zone	6
No Sub Category	2

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village,

Secondary Filtering selection:

Use Class:

A1	1 days
B1	19 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Population within 1 mile:

1,001 to 5,000	1 days
5,001 to 10,000	5 days
10,001 to 15,000	4 days
15,001 to 20,000	4 days
20,001 to 25,000	1 days
25,001 to 50,000	5 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

25,001 to 50,000	2 days
75,001 to 100,000	4 days
100,001 to 125,000	1 days
125,001 to 250,000	8 days
250,001 to 500,000	3 days
500,001 or More	2 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.5 or Less	1 days
0.6 to 1.0	8 days
1.1 to 1.5	10 days
1.6 to 2.0	1 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

Yes	9 days
No	11 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	20 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 **BD-02-A-03** **OFFICES** **BEDFORDSHIRE**
BROMHAM ROAD

BEDFORD
Edge of Town Centre
No Sub Category
Total Gross floor area: 1469 sqm
Survey date: MONDAY *14/10/13* *Survey Type: MANUAL*

2 **DH-02-A-01** **RPMI OFFICES** **DURHAM**
BRINKBURN ROAD

DARLINGTON
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Gross floor area: 3372 sqm
Survey date: FRIDAY *05/11/10* *Survey Type: MANUAL*

3 **DH-02-A-02** **CONSTRUCTION COMPANY** **DURHAM**
DURHAM ROAD
BOWBURN
NEAR DURHAM
Edge of Town
Industrial Zone
Total Gross floor area: 2000 sqm
Survey date: TUESDAY *27/11/12* *Survey Type: MANUAL*

4 **ES-02-A-12** **COUNCIL OFFICES** **EAST SUSSEX**
VICARAGE LANE

HAILSHAM
Edge of Town Centre
Built-Up Zone
Total Gross floor area: 3640 sqm
Survey date: THURSDAY *26/11/15* *Survey Type: MANUAL*

5 **GM-02-A-09** **LEASED OFFICES** **GREATER MANCHESTER**
NEW MOUNT STREET

MANCHESTER
Edge of Town Centre
Built-Up Zone
Total Gross floor area: 2500 sqm
Survey date: MONDAY *26/09/16* *Survey Type: MANUAL*

6 **HF-02-A-04** **OFFICES** **HERTFORDSHIRE**
STATION WAY

ST ALBANS
Edge of Town Centre
Residential Zone
Total Gross floor area: 5000 sqm
Survey date: THURSDAY *02/10/14* *Survey Type: MANUAL*

7 **KC-02-A-06** **LAND REGISTRY** **KENT**
FOREST ROAD
CAMDEN PARK
TUNBRIDGE WELLS
Edge of Town
Residential Zone
Total Gross floor area: 5677 sqm
Survey date: TUESDAY *01/12/09* *Survey Type: MANUAL*

8 **KC-02-A-07** **KCC HIGHWAYS REG.** **KENT**
KAVELIN WAY
HENWOOD IND. ESTATE
ASHFORD
Edge of Town
Commercial Zone
Total Gross floor area: 2525 sqm
Survey date: MONDAY *05/12/11* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

9 **KC-02-A-08** **KCC HIGHWAYS REG. OFFICE** **KENT**
ST MICHAEL'S CLOSE
CLAY WOOD
AYLESFORD
Edge of Town
Industrial Zone
Total Gross floor area: 3168 sqm
Survey date: MONDAY *28/11/11* *Survey Type: MANUAL*

10 **KC-02-A-10** **COUNCIL OFFICES** **KENT**
SANDLING ROAD

MAIDSTONE
Edge of Town Centre
Built-Up Zone
Total Gross floor area: 2900 sqm
Survey date: WEDNESDAY *19/10/11* *Survey Type: MANUAL*

11 **LC-02-A-09** **OFFICES** **LANCASHIRE**
FURTHERGATE

BLACKBURN
Suburban Area (PPS6 Out of Centre)
Built-Up Zone
Total Gross floor area: 2600 sqm
Survey date: TUESDAY *04/06/13* *Survey Type: MANUAL*

12 **NF-02-A-01** **COUNCIL OFFICE** **NORFOLK**
CHAPEL STREET

KING'S LYNN
Edge of Town Centre
Built-Up Zone
Total Gross floor area: 5500 sqm
Survey date: THURSDAY *30/09/10* *Survey Type: MANUAL*

13 **SC-02-A-17** **PHARMACEUTICALS** **SURREY**
ST GEORGE'S AVENUE
THE HEATH
WEYBRIDGE
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Gross floor area: 10293 sqm
Survey date: TUESDAY *18/10/11* *Survey Type: MANUAL*

14 **SF-02-A-01** **COUNCIL OFFICES** **SUFFOLK**
BEETONS WAY

BURY ST. EDMUNDS
Suburban Area (PPS6 Out of Centre)
Industrial Zone
Total Gross floor area: 8000 sqm
Survey date: MONDAY *27/09/10* *Survey Type: MANUAL*

15 **SF-02-A-02** **OFFICES** **SUFFOLK**
BATH STREET

IPSWICH
Edge of Town Centre
Commercial Zone
Total Gross floor area: 6505 sqm
Survey date: FRIDAY *19/07/13* *Survey Type: MANUAL*

LIST OF SITES relevant to selection parameters (Cont.)

16 **SO-02-A-02** **COUNCIL OFFICES** **SLOUGH**
BATH ROAD

SLOUGH
Edge of Town Centre
Built-Up Zone
Total Gross floor area: 5050 sqm
Survey date: THURSDAY *27/02/14* *Survey Type: MANUAL*

17 **TW-02-A-04** **HOUSING CO.** **TYNE & WEAR**
EARLSWAY
TEAM VALLEY TRAD. EST.
GATESHEAD
Edge of Town
Industrial Zone
Total Gross floor area: 2500 sqm
Survey date: TUESDAY *29/09/09* *Survey Type: MANUAL*

18 **TW-02-A-05** **TELEVISION CO.** **TYNE & WEAR**
DELTA BANK ROAD
METRO RIVERSIDE PARK
GATESHEAD
Suburban Area (PPS6 Out of Centre)
Commercial Zone
Total Gross floor area: 1500 sqm
Survey date: TUESDAY *29/09/09* *Survey Type: MANUAL*

19 **WY-02-A-03** **OFFICE** **WEST YORKSHIRE**
VICTORIA ROAD
HEADINGLEY
LEEDS
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Gross floor area: 2696 sqm
Survey date: THURSDAY *17/06/10* *Survey Type: MANUAL*

20 **WY-02-A-05** **OFFICES** **WEST YORKSHIRE**
PIONEER WAY
WHITWOOD
CASTLEFORD
Edge of Town
No Sub Category
Total Gross floor area: 1230 sqm
Survey date: TUESDAY *23/05/17* *Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

MANUALLY DESELECTED SITES

Site Ref	Reason for Deselection
DC-02-A-09	na
ES-02-A-11	na
HC-02-A-11	na
HF-02-A-03	na
KC-02-A-09	na
KC-02-A-11	na
SC-02-A-14	na
SC-02-A-15	na
SC-02-A-16	na
TW-02-A-06	na

TRIP RATE for Land Use 02 - EMPLOYMENT/A - OFFICE

MULTI-MODAL VEHICLES

Calculation factor: 100 sqm

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	20	3906	0.682	20	3906	0.086	20	3906	0.768
08:00 - 09:00	**20**	**3906**	**1.864**	20	3906	0.251	**20**	**3906**	**2.115**
09:00 - 10:00	20	3906	1.421	20	3906	0.415	20	3906	1.836
10:00 - 11:00	20	3906	0.497	20	3906	0.372	20	3906	0.869
11:00 - 12:00	20	3906	0.376	20	3906	0.385	20	3906	0.761
12:00 - 13:00	20	3906	0.506	20	3906	0.617	20	3906	1.123
13:00 - 14:00	20	3906	0.632	20	3906	0.500	20	3906	1.132
14:00 - 15:00	20	3906	0.402	20	3906	0.489	20	3906	0.891
15:00 - 16:00	20	3906	0.339	20	3906	0.599	20	3906	0.938
16:00 - 17:00	20	3906	0.298	20	3906	1.315	20	3906	1.613
17:00 - 18:00	20	3906	0.186	**20**	**3906**	**1.702**	20	3906	1.888
18:00 - 19:00	19	4047	0.052	19	4047	0.547	19	4047	0.599
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			7.255			7.278			14.533

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Calculation Reference: AUDIT-206602-171117-1136

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 02 - EMPLOYMENT
Category : B - BUSINESS PARK
MULTI-MODAL VEHICLES

Selected regions and areas:

02	**SOUTH EAST**		
	HC	HAMPSHIRE	1 days
	SC	SURREY	1 days
05	**EAST MIDLANDS**		
	LN	LINCOLNSHIRE	1 days
06	**WEST MIDLANDS**		
	SH	SHROPSHIRE	2 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Secondary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter: Gross floor area
Actual Range: 1300 to 55000 (units: sqm)
Range Selected by User: 4000 to 60000 (units: sqm)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/09 to 25/06/15

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Tuesday	2 days
Thursday	2 days
Friday	1 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	5 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Edge of Town Centre	2
Suburban Area (PPS6 Out of Centre)	2
Edge of Town	1

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Industrial Zone	1
Commercial Zone	1
No Sub Category	3

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Secondary Filtering selection:

Use Class:

B1	5 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Secondary Filtering selection (Cont.):

Population within 1 mile:

5,001 to 10,000	1 days
10,001 to 15,000	2 days
15,001 to 20,000	1 days
20,001 to 25,000	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

25,001 to 50,000	1 days
100,001 to 125,000	1 days
125,001 to 250,000	2 days
250,001 to 500,000	1 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	2 days
1.1 to 1.5	3 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Travel Plan:

Yes	1 days
No	4 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	5 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 **HC-02-B-02** **BUSINESS PARK** **HAMPSHIRE**
WESTERN ROAD

PORTSMOUTH
Suburban Area (PPS6 Out of Centre)
No Sub Category
Total Gross floor area: 55000 sqm
Survey date: FRIDAY *18/10/13* *Survey Type: MANUAL*

2 **LN-02-B-02** **BUSINESS PARK** **LINCOLNSHIRE**
CARDINAL CLOSE

LINCOLN
Edge of Town
Industrial Zone
Total Gross floor area: 5000 sqm
Survey date: THURSDAY *25/06/15* *Survey Type: MANUAL*

3 **SC-02-B-03** **BUSINESS PARK** **SURREY**
A331

FRIMLEY
Edge of Town Centre
No Sub Category
Total Gross floor area: 20160 sqm
Survey date: TUESDAY *27/11/12* *Survey Type: MANUAL*

4 **SH-02-B-03** **BUSINESS CENTRE** **SHROPSHIRE**
CASTLE STREET
HADLEY
TELFORD
Suburban Area (PPS6 Out of Centre)
No Sub Category
Total Gross floor area: 1300 sqm
Survey date: TUESDAY *16/06/09* *Survey Type: MANUAL*

5 **SH-02-B-04** **BUSINESS PARK** **SHROPSHIRE**
STAFFORD COURT

TELFORD
Edge of Town Centre
Commercial Zone
Total Gross floor area: 10175 sqm
Survey date: THURSDAY *24/10/13* *Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

TRIP RATE for Land Use 02 - EMPLOYMENT/B - BUSINESS PARK

MULTI-MODAL VEHICLES

Calculation factor: 100 sqm

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	5	18327	0.481	5	18327	0.061	5	18327	0.542
08:00 - 09:00	**5**	**18327**	**1.565**	5	18327	0.159	**5**	**18327**	**1.724**
09:00 - 10:00	5	18327	0.714	5	18327	0.238	5	18327	0.952
10:00 - 11:00	5	18327	0.270	5	18327	0.167	5	18327	0.437
11:00 - 12:00	5	18327	0.224	5	18327	0.236	5	18327	0.460
12:00 - 13:00	5	18327	0.295	5	18327	0.409	5	18327	0.704
13:00 - 14:00	5	18327	0.327	5	18327	0.352	5	18327	0.679
14:00 - 15:00	5	18327	0.285	5	18327	0.272	5	18327	0.557
15:00 - 16:00	5	18327	0.151	5	18327	0.378	5	18327	0.529
16:00 - 17:00	5	18327	0.171	5	18327	0.559	5	18327	0.730
17:00 - 18:00	5	18327	0.122	**5**	**18327**	**1.182**	5	18327	1.304
18:00 - 19:00	5	18327	0.044	5	18327	0.495	5	18327	0.539
19:00 - 20:00									
20:00 - 21:00									
21:00 - 22:00									
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			4.649			4.508			9.157

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Calculation Reference: AUDIT-206602-171107-1151

TRIP RATE CALCULATION SELECTION PARAMETERS:

Land Use : 01 - RETAIL
Category : J - RETAIL PARK - INCLUDING FOOD
MULTI-MODAL VEHICLES

Selected regions and areas:

02	**SOUTH EAST**		
	SC	SURREY	1 days
09	**NORTH**		
	CB	CUMBRIA	1 days
	TW	TYNE & WEAR	1 days

This section displays the number of survey days per TRICS® sub-region in the selected set

Secondary Filtering selection:

This data displays the chosen trip rate parameter and its selected range. Only sites that fall within the parameter range are included in the trip rate calculation.

Parameter:	Gross floor area
Actual Range:	7400 to 11311 (units: sqm)
Range Selected by User:	734 to 30175 (units: sqm)

Public Transport Provision:
Selection by: Include all surveys

Date Range: 01/01/09 to 06/05/17

This data displays the range of survey dates selected. Only surveys that were conducted within this date range are included in the trip rate calculation.

Selected survey days:

Saturday	3 days

This data displays the number of selected surveys by day of the week.

Selected survey types:

Manual count	3 days
Directional ATC Count	0 days

This data displays the number of manual classified surveys and the number of unclassified ATC surveys, the total adding up to the overall number of surveys in the selected set. Manual surveys are undertaken using staff, whilst ATC surveys are undertaking using machines.

Selected Locations:

Edge of Town Centre	1
Suburban Area (PPS6 Out of Centre)	2

This data displays the number of surveys per main location category within the selected set. The main location categories consist of Free Standing, Edge of Town, Suburban Area, Neighbourhood Centre, Edge of Town Centre, Town Centre and Not Known.

Selected Location Sub Categories:

Development Zone	1
Residential Zone	1
No Sub Category	1

This data displays the number of surveys per location sub-category within the selected set. The location sub-categories consist of Commercial Zone, Industrial Zone, Development Zone, Residential Zone, Retail Zone, Built-Up Zone, Village, Out of Town, High Street and No Sub Category.

Secondary Filtering selection:

Use Class:

A1	3 days

This data displays the number of surveys per Use Class classification within the selected set. The Use Classes Order 2005 has been used for this purpose, which can be found within the Library module of TRICS®.

Secondary Filtering selection (Cont.):

Population within 1 mile:

5,001 to 10,000	1 days
10,001 to 15,000	1 days
20,001 to 25,000	1 days

This data displays the number of selected surveys within stated 1-mile radii of population.

Population within 5 miles:

5,001 to 25,000	1 days
125,001 to 250,000	2 days

This data displays the number of selected surveys within stated 5-mile radii of population.

Car ownership within 5 miles:

0.6 to 1.0	1 days
1.1 to 1.5	2 days

This data displays the number of selected surveys within stated ranges of average cars owned per residential dwelling, within a radius of 5-miles of selected survey sites.

Petrol filling station:

Included in the survey count	0 days
Excluded from count or no filling station	3 days

This data displays the number of surveys within the selected set that include petrol filling station activity, and the number of surveys that do not.

Travel Plan:

No	3 days

This data displays the number of surveys within the selected set that were undertaken at sites with Travel Plans in place, and the number of surveys that were undertaken at sites without Travel Plans.

PTAL Rating:

No PTAL Present	3 days

This data displays the number of selected surveys with PTAL Ratings.

LIST OF SITES relevant to selection parameters

1 **CB-01-J-01** **RETAIL PARK** **CUMBRIA**
ULLSWATER ROAD

PENRITH
Edge of Town Centre
No Sub Category
Total Gross floor area: 7400 sqm
Survey date: SATURDAY *13/09/14* *Survey Type: MANUAL*

2 **SC-01-J-03** **RETAIL PARK** **SURREY**
ORIENTAL ROAD
MAYBURY
WOKING
Suburban Area (PPS6 Out of Centre)
Residential Zone
Total Gross floor area: 9285 sqm
Survey date: SATURDAY *04/10/14* *Survey Type: MANUAL*

3 **TW-01-J-02** **RETAIL PARK** **TYNE & WEAR**
TIMBER BEACH ROAD
CASTLETOWN
SUNDERLAND
Suburban Area (PPS6 Out of Centre)
Development Zone
Total Gross floor area: 11311 sqm
Survey date: SATURDAY *01/04/17* *Survey Type: MANUAL*

This section provides a list of all survey sites and days in the selected set. For each individual survey site, it displays a unique site reference code and site address, the selected trip rate calculation parameter and its value, the day of the week and date of each survey, and whether the survey was a manual classified count or an ATC count.

MANUALLY DESELECTED SITES

Site Ref	Reason for Deselection
CF-01-J-03	NA
NW-01-J-01	NA
NW-01-J-02	NA

TRIP RATE for Land Use 01 - RETAIL/J - RETAIL PARK - INCLUDING FOOD

MULTI-MODAL VEHICLES

Calculation factor: 100 sqm

BOLD print indicates peak (busiest) period

	ARRIVALS			DEPARTURES			TOTALS		
Time Range	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate	No. Days	Ave. GFA	Trip Rate
00:00 - 01:00									
01:00 - 02:00									
02:00 - 03:00									
03:00 - 04:00									
04:00 - 05:00									
05:00 - 06:00									
06:00 - 07:00									
07:00 - 08:00	3	9332	0.314	3	9332	0.125	3	9332	0.439
08:00 - 09:00	3	9332	1.118	3	9332	0.675	3	9332	1.793
09:00 - 10:00	3	9332	1.850	3	9332	1.364	3	9332	3.214
10:00 - 11:00	3	9332	2.783	3	9332	2.261	3	9332	5.044
11:00 - 12:00	**3**	**9332**	**3.254**	3	9332	2.947	**3**	**9332**	**6.201**
12:00 - 13:00	3	9332	2.975	**3**	**9332**	**2.993**	3	9332	5.968
13:00 - 14:00	3	9332	3.100	3	9332	2.947	3	9332	6.047
14:00 - 15:00	3	9332	2.983	3	9332	2.986	3	9332	5.969
15:00 - 16:00	3	9332	2.815	3	9332	2.915	3	9332	5.730
16:00 - 17:00	3	9332	2.625	3	9332	2.979	3	9332	5.604
17:00 - 18:00	3	9332	2.025	3	9332	2.547	3	9332	4.572
18:00 - 19:00	3	9332	1.314	3	9332	1.854	3	9332	3.168
19:00 - 20:00	3	9332	0.800	3	9332	1.025	3	9332	1.825
20:00 - 21:00	3	9332	0.389	3	9332	0.682	3	9332	1.071
21:00 - 22:00	3	9332	0.186	3	9332	0.307	3	9332	0.493
22:00 - 23:00									
23:00 - 24:00									
Total Rates:			28.531			28.607			57.138

This section displays the trip rate results based on the selected set of surveys and the selected count type (shown just above the table). It is split by three main columns, representing arrivals trips, departures trips, and total trips (arrivals plus departures). Within each of these main columns are three sub-columns. These display the number of survey days where count data is included (per time period), the average value of the selected trip rate calculation parameter (per time period), and the trip rate result (per time period). Total trip rates (the sum of the column) are also displayed at the foot of the table.

*To obtain a trip rate, the average (mean) trip rate parameter value (TRP) is first calculated for all selected survey days that have count data available for the stated time period. The average (mean) number of arrivals, departures or totals (whichever applies) is also calculated (COUNT) for all selected survey days that have count data available for the stated time period. Then, the average count is divided by the average trip rate parameter value, and multiplied by the stated calculation factor (shown just above the table and abbreviated here as FACT). So, the method is: COUNT/TRP*FACT. Trip rates are then rounded to 3 decimal places.*

Appendix B
Air Quality Assessment and Conclusions

Technical note:
Air Quality Impacts of the Proposed Chelmsford Local Plan Allocations on Epping Forest Special Area of Conservation

1. Introduction

This Technical Note has been prepared to evaluate the air quality impacts of the proposed Chelmsford Local Plan: Pre-Submission Draft (the Pre-Submission Local Plan) allocations on Epping Forest Special Area of Conservation (SAC). This assessment is intended to inform the Habitats Regulations Assessment (HRA) of the Local Plan and has been prepared in response to representations received from Natural England to the HRA of the Chelmsford Draft Local Plan Preferred Options Consultation Document (the Preferred Options Consultation Document) in the context of the High Court judgement that was handed down on 20 March 2017 in Wealden District Council v Secretary of State for Communities and Local Government, Lewes District Council and South Downs National Park Authority [2017].

2. Policy, Legislative and Guidance Context

2.1 Relevant policy

Table 2.1 below sets out the relevant policies that have framed the approach to this assessment.

Table 2.1 Policies considered by this assessment

Policy Reference	Policy Issues
National Planning Policy Framework (NPPF)1	The National Planning Policy Framework (NPPF) sets out the Government's national planning policy. The NPPF states: "Planning policies should sustain compliance with and contribute towards EU limits values or national objectives for pollutants, taking into account the presence of Air Quality Management Areas and the cumulative impacts on air quality from individual sites in local areas. Planning decisions should ensure that any new development in Air Quality Management Areas is consistent with the local air quality action plan." In relation to conserving and enhancing the natural environment, it states: "The planning system should contribute to and enhance the natural and local environment by…preventing both new and existing development from contributing to or being put at unacceptable risk from, or being adversely affected by unacceptable levels of soil, air, water or noise pollution or land instability".
National Planning Practice Guidance (NPPG)2	The Government's online National Planning Practice Guidance (NPPG) states that air quality concerns are more likely to arise where development is proposed within an area of existing poor air quality, or where it would adversely impact upon the implementation of air quality strategies and / or action plans. It is stated in the NPPG that air quality is relevant to planning applications when the Development could: "Expose people to existing sources of air pollutants. This could be by building new homes, workplaces or other development in places with poor air quality."

2.2 Relevant legislation

The legislative framework for air quality consists of legally enforceable EU Limit Values that are transposed into UK legislation as Air Quality Standards (AQS) that must be at least as challenging as the EU Limit Values. Action in the UK is then driven by the UK's Air Quality Strategy[3] that sets the Air Quality Objectives (AQOs).

The EU Limit Values are set by the European directive on air quality and cleaner air for Europe (2008/50/EC)[4] and the European directive relating to arsenic, cadmium, mercury, nickel, and polycyclic aromatic hydrocarbons in ambient air (2004/107/EC)[5] as the principal instruments governing outdoor ambient air quality policy in the EU. The Limit Values are legally binding levels for concentrations of pollutants for outdoor air quality.

The two European directives, as well as the Council's decision on exchange of information, were transposed into UK Law via the Air Quality Standards Regulations 2010[6], which came into force in the UK on 11 June 2010, replacing the Air Quality Standards Regulations 2007[7]. Air Quality Standards are concentrations recorded over a given time period, which are considered to be acceptable in terms of what is scientifically known about the effects of each pollutant on health and on the environment. The Air Quality Strategy sets

[1] Department for Communities and local Government (DCLG), 2012. National Planning Policy Framework.
[2] Department for Communities and Local Government (DCLG), 2014. National Planning Practice guidance – Air Quality.
[3] Defra in partnership with the Scottish Executive, Welsh Assembly Government and Department of the Environment Northern Ireland (2007) The Air Quality Strategy for England, Scotland, Wales and Northern Ireland.
[4] Official Journal of the European Union, (2008) Directive 2008/50/EC of the European Parliament and of The Council of 21 May 2008 on ambient air quality and cleaner air in Europe.
[5] Official Journal of the European Union, (2004) Directive 2004/107/EC of the European Parliament and of The Council of 15 December 2004 relating to arsenic, cadmium, mercury, nickel and polycyclic aromatic hydrocarbons in ambient air.
[6] The Stationery Office Limited (2010) Statutory Instrument 2010 No. 1001 Environmental Protection – The Air Quality Standards Regulation 2010.
[7] The Stationery Office Limited (2007) Statutory Instrument 2010 No. 64 Environmental Protection – The Air Quality Standards Regulation 2007.

the AQOs, which give target dates and some interim target dates to help the UK move towards achievement of the EU Limit Values. The AQOs are a statement of policy intentions or policy targets and as such, there is no legal requirement to meet these objectives except in as far as they mirror any equivalent legally binding Limit Values in EU legislation. The most recent UK Air Quality Strategy for England, Scotland, Wales and Northern Ireland was published in July 2007.

Since Part IV of the Environment Act 1995[8] came into force, local authorities have been required to periodically review concentrations of the UK Air Quality Strategy pollutants within their areas and to identify areas where the AQOs may not be achieved by their relevant target dates. This process of Local Air Quality Management (LAQM) is an integral part of delivering the Government's AQOs detailed in the Strategy. When areas are identified where some or all of the AQOs might potentially be exceeded, and where there is relevant public exposure, i.e. where members of the public would regularly be exposed over the appropriate averaging period, the local authority has a duty to declare an Air Quality Management Area (AQMA) and to implement an Air Quality Action Plan (AQAP) to reduce air pollution levels towards the AQOs. The latest guidance on the LAQM process is given in Defra's 2016 Local Air Quality Management Technical Guidance (LAQM TG (16))[9].

In addition to the objectives for human health, a national objective relating to the protection of vegetation and ecosystems is prescribed for NO_X. This is not a threshold in the sense that damage to vegetation is likely to occur when this concentration is exceeded but that, above this concentration, there is an increased risk of damage.

Oxides of nitrogen (NO_x) associated with traffic emissions are considered in this assessment in relation to their impact on the Epping Forest SAC. NO_x effects to ecological receptors can include growth effects, physiological effects and biochemical effects. The AQO for ecological receptors represents the long-term critical level for NO_x and was established as this is the level likely to cause growth effects. **Section 3.1** sets out the AQOs that are relevant to this assessment, and the dates by which they are to be achieved.

2.3 Relevant guidance

H1 Assessment guidance

The Environment Agency's Horizontal Guidance Note H1[10] provides methods for quantifying the environmental impacts of emissions to all media. It should be noted that this methodology was withdrawn in February 2016; however, it is still widely used alongside other resources. Environment Agency webpages contain long and short-term Environmental Assessment Levels (EALs) and Environmental Quality Standards (EQS) for releases to air derived from a number of published UK and international sources. For the pollutants considered in this study, these EALs and EQS are equivalent to the AQS and AQOs set in force by the Air Quality Strategy for England, Scotland Wales and Northern Ireland.

Design manual for Roads and Bridges (DMRB)

The DMRB guidance[11] states that internationally designated biodiversity sites (Special Protection Areas, SACs and Ramsar sites) and Sites of Special Scientific Interest (SSSIs) within 200m of an affected route or corridor, where there is expected to be an increase in >1,000 daily vehicle movements, need to be considered within an assessment. It should be noted that critical loads are not statutory standards which are to be achieved, but are an indicator of when harmful effects can occur for different habitat types.

[8] HMSO (1995) Environment Act 1995.
[9] Defra (2016) Local Air Quality Management Technical Guidance LAQM.TG (16).
[10] Environment Agency (2011) Horizontal Guidance Note H1.
[11] Highways England (2007) Design manual for Roads and Bridges (Volume 11, Section 3).

Environmental Protection UK (EPUK) & Institute of Air Quality Management (IAQM) – Guidance on land-use planning and development control: Planning for air quality[12]

This guidance regards the assessment of air quality issues associated with planning applications, which includes a summary of relevant legislation and the assessment of significance. Using this guidance, the magnitude of change due to an increase/decrease in the annual mean concentration of pollutants due to a development is described using specified criteria. The overall significance of the development is then determined using professional judgement. Significance criteria can be seen in **Appendix C**.

Wealden District Council High Court Judgement[13]

This case concerned the importance of taking into consideration the in-combination effect of proposed developments when assessing air quality impacts on ecologically sensitive areas, specifically designated sites. Prior to the high court judgement, the DMRB threshold of an increase in more than 1,000 annual average daily traffic (AADT) was used to scope out air quality assessments.

This case concerned the cumulative impact of local plans produced by multiple councils impacting Ashdown Forest SAC. The Joint Core Strategy (JCS) prepared by Lewes District Council and South Downs National Park Authority scoped out an air quality assessment as the AADT for the JCS was below 1,000. However, the Judge decided that whilst the DMRB threshold was relevant to determine potential air quality impacts, the land allocations included in the JCS would impact the Ashdown Forest SAC and when considered in combination with the allocations in the Wealden District Council (WDC) Core Strategy, the threshold would be breached.

This case set a precedent whereby the cumulative impact of proposed development should be assessed when there is the possibility of effects on ecologically sensitive sites. This has been demonstrated through subsequent court cases whereby planning permission has not been granted or allowed by appeal. Consequently, in March 2017, a judge quashed Policies SP1 and SP2 in the JCS due to the potential for increased nitrogen deposition adversely impacting Ashdown Forest SAC. This reduced the number of proposed residences in the JCS by 1,177 homes[14].

As a consequence of this decision, it is important that local authorities thoroughly consider the cumulative effect of traffic associated with multiple developments. This is an on-going situation, so there are currently no guidelines as to the catchment for inclusion into the air quality assessment.

[12] EPUK & IAQM (2017) Guidance on land-use planning and development control: Planning for air quality.

[13] The Planning Inspectorate (2015) Appeal decision - Wealden District Council v Secretary of State for Communities and Local Government & Ors, Court of Appeal - Administrative Court, March 20, 2017, [2017] EWHC 351.

[14] http://www.bailii.org/ew/cases/EWHC/Admin/2017/351.html

3. Assessment Methodology

3.1 Assessment criteria

Table 3.1 shows the air quality standards, objectives and environmental assessment levels relevant to this assessment.

Table 3.1 Summary of relevant air quality standards and objectives

Pollutant	AQS/ AQO/ EAL	Objective (UK)	Averaging Period
NOx	AQS	30 µgm-3	Annual Mean
	EAL	75 µgm-3	Daily Mean

Additionally, the Environment Agency suggests that for nitrogen deposition, an increase of greater than 1% nitrogen deposition, as a result of a proposed development or plan, of the critical load is a significant impact.

3.2 Assessment methodology

Dispersion modelling

The ADMS-Roads dispersion model, developed by CERC[6], is a tool for investigating air pollution problems due to small networks of roads that may be in combination with industrial sites, for instance small towns or rural road networks. It calculates pollutant concentrations over specified domains at high spatial resolution (street scale) and in a format suitable for direct comparison with a wide variety of air quality standards for the UK and other countries. The latest version of the model, version 4.1, was used in this study.

ADMS-Roads is referred to as an advanced Gaussian or new generation dispersion model as it incorporates the latest understanding of the boundary layer structure. It differs from old generation models such as ISC, R91 and CALINE in two main respects:

- It characterises the boundary layer structure and stability using the boundary layer depth and Monin-Obukhov length to calculate height-dependent wind speed and turbulence, rather than using the simpler Pasquill-Gifford stability category approach; and
- It uses a skewed-Gaussian vertical concentration profile in convective meteorological conditions to represent the effect of thermally generated turbulence.

The road network

AADT flows were calculated in order to carry out dispersion modelling (as contained in the traffic assessment to which this Technical Note is an appendix). The following scenarios were modelled based on the traffic information provided:

- Baseline 2017;
- Future 2036 ‘without development’ scenario; and
- Future 2036 ‘with development’ scenario.

Flows can be seen in **Appendix A**. Emissions were calculated using the latest emission factors from Defra, Emissions Factor Toolkit v8.0[15], which is used to predict emissions that are imported into ADMS-Roads. For the future scenarios, the year 2030 was used as this is the most distant year available.

[15] Defra (2017) Emissions Factor Toolkit v8.0.

It should be noted that traffic flows include the cumulative impact of committed developments from the wider network, so also include flows from other local plans in the vicinity of Epping Forest.

Receptors

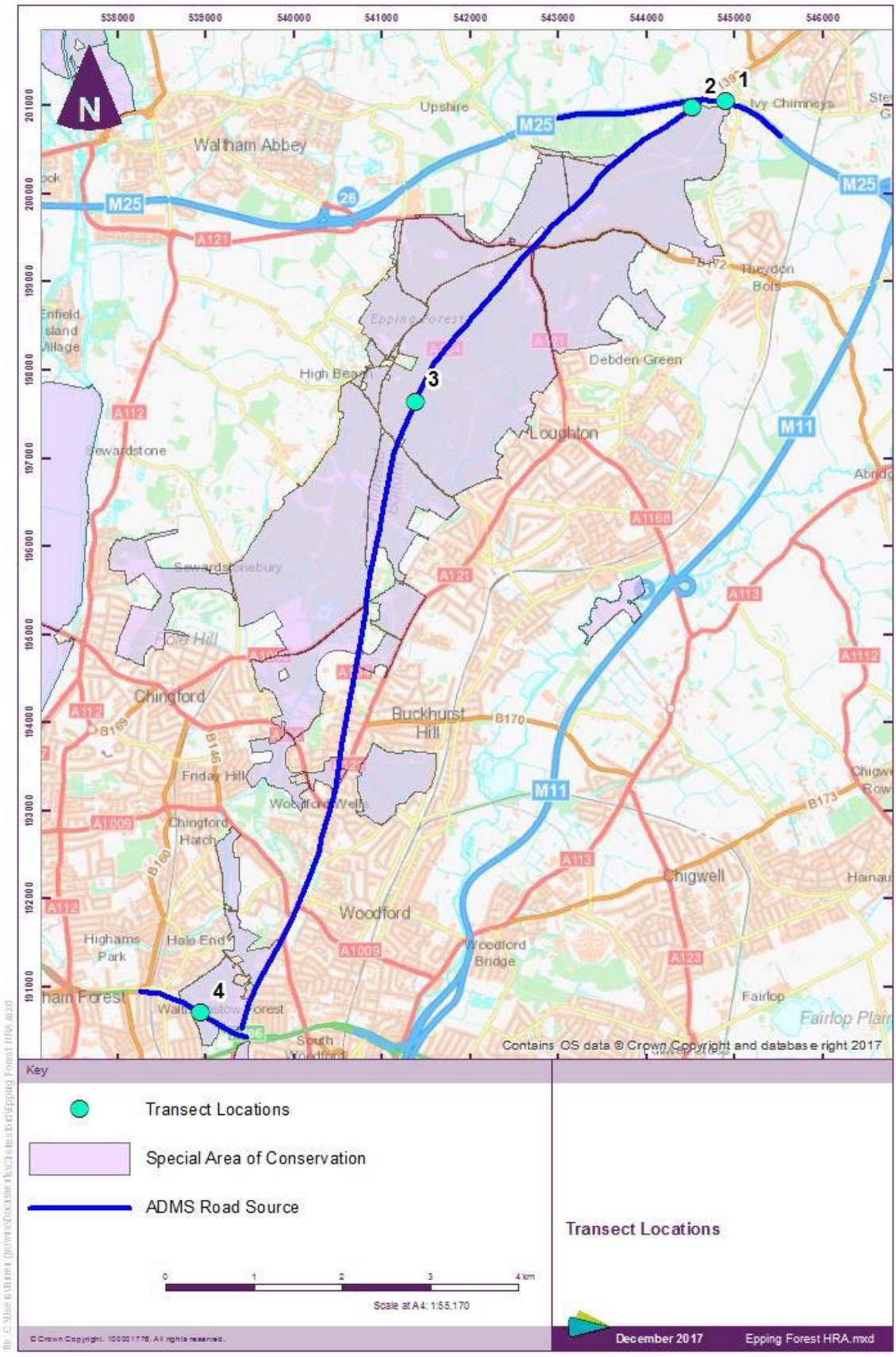
The focus of this air quality assessment is the potential impact of air quality on the Epping Forest SAC. As the guidance states that ecological receptors may be affected by traffic emissions up to a distance of 200 m from the road, a transect has been used to model concentrations across this area. This has been carried out on the M25, Epping Forest New Road north, Epping Forest Road south and North Circular at kerbside, 25 m, 50 m, 100 m, 150 m and 200 m from the road centreline, where possible. Receptor locations are shown in **Table 3.2** and on **Figure 3.1**.

Table 3.2 Transect locations

Receptor	Road	Distance from the road (m)	X (m)	Y (m)
1a	M25	64	544853	200988
1b	M25	100	544842	200952
1c	M25	150	544827	200904
1d	M25	200	544813	200856
2a	Epping Forest New Road (north)	Kerbside	544562	201011
2b	Epping Forest New Road (north)	25	544577	200996
2c	Epping Forest New Road (north)	50	544596	200979
2d	Epping Forest New Road (north)	100	544633	200944
2e	Epping Forest New Road (north)	150	544670	200909
2f	Epping Forest New Road (north)	200	544707	200875
3a	Epping Forest New Road (south)	Kerbside	541372	197639
3b	Epping Forest New Road (south)	25	541352	197646
3c	Epping Forest New Road (south)	50	541329	197655
3d	Epping Forest New Road (south)	100	541282	197673
3e	Epping Forest New Road (south)	150	541235	197691
3f	Epping Forest New Road (south)	200	541189	197708
4a	North Circular	25	538963	190720
4b	North Circular	50	538978	190740
4c	North Circular	100	539006	190782
4d	North Circular	150	539034	190823
4e	North Circular	200	539062	190865

Note: Receptor points are placed at the kerbside where the SAC extends to the road. Otherwise, the first receptor in the transect is placed at the SAC boundary.

Figure 3.1 Modelled transect points

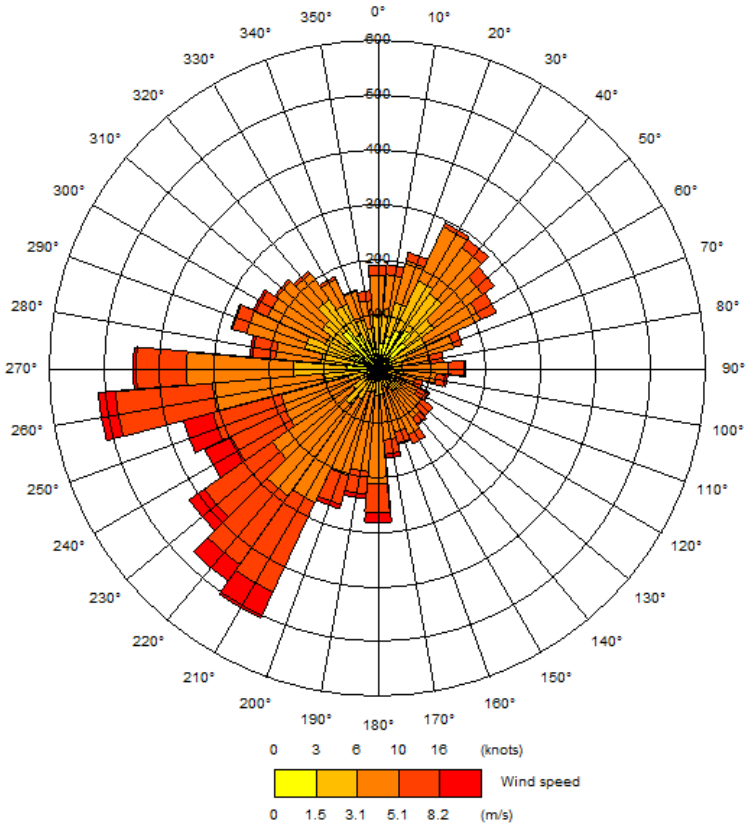


Meteorology

Hourly sequential meteorological data from a nearby, representative observing station is required for dispersion modelling. For this assessment, five years of meteorological data was obtained from the Heathrow weather station as this is considered to be representative of conditions at the transects.

Figure 3.2 shows the wind rose for Heathrow for the period 2016 showing the frequency and distribution of wind directions and wind speeds.

Figure 3.2 Heathrow wind rose for 2016



Surface characteristics

The surface roughness is a model parameter related to the height of features, such as buildings and trees. The value of 1.0 m was used within the model to represent the assessment areas as ADMS guidance states that this value would be appropriate for 'cities and woodlands'.

The concentrations of an emitted pollutant found in elevated, complex terrain differ from those found in simple level terrain. However, these effects are most pronounced when the terrain gradients exceed 1 in 10 i.e., a 100 m change in elevation per 1 km step in the horizontal plane. As there are no areas surrounding the site that meet this criterion, it was decided not to include terrain effects in the dispersion modelling. This is in line with the approach recommended in the LAQM.TG(16) Guidance.

Model verification

Model verification enables an estimation of uncertainty and systematic errors associated with the dispersion modelling components of the air quality assessment to be considered. There are many explanations for these errors, which may stem from uncertainty in the modelled number of vehicles, speeds and vehicle fleet composition. Defra has provided guidance in terms of preferred methods for undertaking dispersion model

verification[9]. Model verification involves the comparison of modelled concentrations and local monitoring data.

Full details of the model verification procedure are provided in **Appendix B**. Model verification was carried out for the year 2015 as appropriate monitoring data, traffic flow[16] and background concentrations were available. Model verification was carried out using local authority operated diffusion tubes located in residential areas as there were not any diffusion tubes with corresponding traffic data in areas representative of the Epping Forest SAC, therefore is considered to be a conservative approach. The verification process led to the use of a modelled Road-NO_X adjustment factor of 3.68.

Consideration of impacts

The assessment of nitrogen deposition from car emissions is set out as follows:

- Calculation of Process Contributions (PC);
- Estimation of Predicted Environmental Concentrations (PEC); and
- Conclusions of impact assessment for emissions to air.

Process contribution

The PC is the contribution added by additional traffic associated with a proposed development or plan.

Predicted environmental concentration

The PEC is calculated as the sum of the background of the substance in air and the process contribution:

$$\mathbf{PEC_{air} = PC_{air} + background\ concentration_{air}}$$

Critical loads

The Air Pollution Information System[17] (APIS) provides information on critical loads for specific designated areas, as well as for individual species. The Epping Forest SAC has been designated for the following interest features:

- H4010. Northern Atlantic wet heaths with *Erica tetralix;*
- H4030. European dry heaths;
- H9120. Atlantic acidophilous beech forests with Ilex and sometimes also Taxus in the shrublayer; and
- S1083. Lucanus cervus.

The interest features are listed in order of sensitivity to nitrogen deposition (most sensitive first), therefore the assessment has focused on these species. The critical loads for both habitats are shown in **Figure 3.3** below. All species present at the site have a minimum critical load of 10 kg N. $ha^{-1}.yr^{-1}$, which has been used for comparison in this assessment. This is considered a conservative approach. Critical loads are a tool for assessing the risk of air pollution affecting different ecosystems. An increment of 1% or less of the critical load is generally considered insignificant, based on Environment Agency permitting.

[16] Department for Transport (2017) Traffic Counts.
[17] http://www.apis.ac.uk/srcl/select-a-feature?site=UK0030284&SiteType=SAC&submit=Next

Figure 3.3 Critical load for most sensitive habitats to nitrogen deposition at Epping Forest

Acid deposition

Calculation of acid deposition rates represents the pollutants that deposit from atmosphere to soils, vegetation and freshwater environments. Sulphur and nitrogen compounds are taken into considereration and compared to critical loads of acid deposition for each interest feature using the critical load finction tool provided by APIS[18].

As this assessment considers traffic emissions, only deposited nitrogen process contribution will be taken into account.

[18] APIS (2017) Critical Load Function Tool.

4. Baseline Air Quality

4.1 Background deposition rates

Nitrogen deposition

The Air Pollution Information System[19] (APIS) provides information on deposition rates and critical loads for specific designated areas, as well as for individual species. The average deposition rate at Epping Forest SAC is 16.6 kg N/ha/year (Maximum: 28.8 kg N/ha/year / Minimum: 14.7 kg N/ha/year).

DMRB guidance states that background deposition rates are expected to decrease by 2% per year. However, due to disparity between predicted concentration decrease and actual concentration decrease, the baseline deposition rate has been used to calculate future rates of nitrogen deposition. This is considered to be a worst-case approach.

4.2 Estimated background concentrations

Defra has made estimates of background pollution concentrations on a 1km^2 grid for the UK for seven of the main pollutants, including NO_x. Base data from 2015 was used to make projections for the years 2011 to 2030[20]. **Table 4.1** below shows the predicted concentration for 2017 and 2030 at the areas of the SAC that may be affected by traffic associated with the proposed Local Plan allocations.

Table 4.1 Defra 2015 to 2017 predicted annual mean background concentrations (µgm^{-3}) at the transect locations

Pollutant	2017	2030
Transect 1 & 2 – 544500, 200500		
NOx	23.0	13.0
Transect 3 – 541500,197500		
NOx	19.8	12.6
Transect 4 – 538500, 190500		
NOx	44.4	22.9

All background concentrations and deposition rates used in this assessment to predict future concentrations are from 2017. This is considered to be a conservative estimate as it is expected that background levels will decrease year on year.

[19] http://www.apis.ac.uk/srcl/select-a-feature?site=UK0030284&SiteType=SAC&submit=Next
[20] http://uk-air.defra.gov.uk/data/laqm-background-maps?year=2011a.gov.uk/review-and-assessment/tools/background-maps.html

5. Assessment of Air Quality Effects

5.1 Assessment

This section sets out the results of the dispersion modelling and compares predicted concentrations against AQOs and EAL. The predicted concentrations resulting from the additional traffic flow (i.e. the PC) are presented along with background concentrations and the percentage contribution that the PECs would make towards the relevant standard, objective or guideline value.

Nitrogen oxides (NO_x)

Annual NO_x

Table 5.1 shows the predicted annual mean concentration of NO_x at the four transect locations: M25 (Receptor points 1a – d), Epping Forest New Road north (2 a – f), Epping Road New Road south (3 a – f) and North Circular (4 a – e).

Table 5.1 Predicted annual mean NO_x concentration at transect points

Area	Receptor	Distance from Road (m)	2017 Baseline (µgm-3)	2036 Without (µgm-3)	2036 With (µgm-3)	Difference (with – without) (µgm-3)	Significance
M25	1a	64	103.3	49.8	49.8	0.01	Negligible
	1b	100	75.3	40.4	40.4	0.00	Negligible
	1c	150	59.0	35.0	35.0	0.00	Negligible
	1d	200	50.7	32.2	32.2	0.00	Negligible
Epping Forest New Road north	2a	Kerbside	196.5	84.8	84.9	0.02	Negligible
	2b	25	119.9	56.2	56.2	0.01	Negligible
	2c	50	94.4	47.2	47.2	0.01	Negligible
	2d	100	71.2	39.2	39.2	0.00	Negligible
	2e	150	59.8	35.4	35.4	0.00	Negligible
	2f	200	53.0	33.0	33.0	0.00	Negligible
Epping Forest New Road south	3a	Kerbside	72.4	42.2	42.2	0.01	Negligible
	3b	25	35.7	27.9	27.9	0.00	Negligible
	3c	50	30.0	25.7	25.7	0.00	Negligible
	3d	100	26.9	24.5	24.5	0.00	Negligible
	3e	150	25.8	24.1	24.1	0.00	Negligible
	3f	200	25.2	23.8	23.8	0.00	Negligible
North Circular	4a	25	119.5	58.2	58.2	0.02	Negligible
	4b	50	69.7	40.0	40.0	0.01	Negligible
	4c	100	46.1	31.4	31.4	0.00	Negligible

Area	Receptor	Distance from Road (m)	2017 Baseline (µgm-3)	2036 Without (µgm-3)	2036 With (µgm-3)	Difference (with – without) (µgm-3)	Significance
	4d	150	38.3	28.6	28.6	0.00	Negligible
	4e	200	34.2	27.1	27.1	0.00	Negligible

Note: **Bold** denotes exceedance of the assessment criteria of 30 µgm^{-3}.

As expected, annual mean concentrations of NO_x are predicted to decrease with distance from the road. Also, the highest annual mean concentrations can be seen in the 2017 baseline scenario due to the assumption that emission factors will decrease in future years. There are a number of modelled receptor points at which the 30 µgm^{-3} AQS is exceeded across all scenarios. The highest concentrations are expected at transect 2 (Epping Forest New Road north), which is due to the combined impact of traffic travelling on the M25 and Epping Forest New Road.

The greatest change in concentration between the 'without' and 'with' scenarios for 2031 is 0.02 µgm^{-3} at Epping Forest New Road north and North Circular, which is considered a negligible change with reference to the EPUK & IAQM significance criteria in **Appendix C**. Therefore, the significance of impact at all transects is considered to be negligible.

Daily NO_x

Table 5.2 shows the predicted daily mean concentrations of NO_x at points along the 200 m transects.

Table 5.2 Predicted daily mean NO_x concentration at transect points

Area	Receptor	Distance from Road (m)	2017 Baseline (µgm-3)	2031 Without (µgm-3)	2031 With (µgm-3)	Difference (µgm-3)
M25	1a	64	313.1	120.4	120.4	0.0
	1b	100	214.6	87.0	87.1	0.0
	1c	150	157.3	67.9	68.0	0.0
	1d	200	127.7	58.0	58.0	0.0
Epping Forest New road north	2a	Kerbside	627.0	243.2	243.3	0.1
	2b	25	372.6	143.8	143.8	0.0
	2c	50	284.6	112.4	112.4	0.0
	2d	100	201.8	83.8	83.8	0.0
	2e	150	161.1	69.6	69.6	0.0
	2f	200	136.4	61.1	61.1	0.0
Epping Forest New Road south	3a	Kerbside	240.4	111.1	111.1	0.0
	3b	25	87.8	47.9	47.9	0.0
	3c	50	61.8	37.6	37.6	0.0
	3d	100	47.0	31.9	31.9	0.0
	3e	150	41.6	29.8	29.8	0.0
	3f	200	38.7	28.7	28.7	0.0

Area	Receptor	Distance from Road (m)	2017 Baseline (µgm-3)	2031 Without (µgm-3)	2031 With (µgm-3)	Difference (µgm-3)
North Circular	4a	25	366.4	150.5	150.6	0.1
	4b	50	195.6	86.1	86.2	0.0
	4c	100	109.5	54.4	54.4	0.0
	4d	150	79.6	43.5	43.5	0.0
	4e	200	64.2	37.9	37.9	0.0

Note: **Bold** denotes exceedance of assessment criteria of 75 µgm^{-3} EAL.

Predicted daily mean concentrations of NO_x are expected to exceed the 75 µgm^{-3} EAL beyond the 200 m transects 1 & 2, closest to the M25, in the baseline 2017 scenario. However, in the future scenarios without and with the traffic associated with the Local Plan, the EAL is exceeded up to a point between the 100 m and 150 m modelled points at the worst affected transects (1&2). The maximum contribution as a result of the development traffic is 0.1 µgm^{-3} at a kerbside location, so the contribution of the additional traffic is very small.

Nitrogen deposition

Nitrogen deposition has been calculated using the predicted annual mean concentration of NO_x and shown in **Table 5.3**.

Table 5.3 Critical load assessment of nitrogen deposition in 2036

Area	Receptor	Distance from Road (m)	Minimum Critical load (MinCL) (kg N ha-1 yr-1)	N dep 'without scenario' (kg N ha-1 yr-1)	N dep 'with scenario' (kg N ha-1 yr-1)	PEC 'with scenario' (kg N ha-1 yr-1)	increase in PC as a % of MinCL	% PEC of MinCL
M25	1a	64	10	1.89	1.89	18.49	0%	185%
	1b	100	10	1.76	1.76	18.36	0%	184%
	1c	150	10	1.69	1.69	18.29	0%	183%
	1d	200	10	1.65	1.65	18.25	0%	183%
Epping Forest New Road north	2a	Kerbside	10	2.33	2.33	18.93	0%	189%
	2b	25	10	1.97	1.97	18.57	0%	186%
	2c	50	10	1.85	1.85	18.45	0%	185%
	2d	100	10	1.75	1.75	18.35	0%	183%
	2e	150	10	1.70	1.70	18.30	0%	183%
	2f	200	10	1.67	1.67	18.27	0%	183%
Epping Forest New Road south	3a	Kerbside	10	1.63	1.63	18.23	0%	182%
	3b	25	10	1.43	1.43	18.03	0%	180%
	3c	50	10	1.40	1.40	18.00	0%	180%
	3d	100	10	1.39	1.39	17.99	0%	180%

Area	Receptor	Distance from Road (m)	Minimum Critical load (MinCL) (kg N ha-1 yr-1)	N dep 'without scenario' (kg N ha-1 yr-1)	N dep 'with scenario' (kg N ha-1 yr-1)	PEC 'with scenario' (kg N ha-1 yr-1)	increase in PC as a % of MinCL	% PEC of MinCL
	3e	150	10	1.38	1.38	17.98	0%	180%
	3f	200	10	1.38	1.38	17.98	0%	163%
North Circular	4a	25	10	3.00	3.00	19.60	0%	163%
	4b	50	10	2.78	2.78	19.38	0%	149%
	4c	100	10	2.67	2.67	19.27	0%	138%
	4d	150	10	2.64	2.64	19.24	0%	128%
	4e	200	10	2.62	2.62	19.22	0%	120%

The nitrogen deposition at the Epping Forest SAC is above the minimum critical load value at all modelled receptor points across the transect. However, it should be noted that the background deposition rate is 16.6 kg N ha^{-1} yr^{-1}, well above the 10 kg N ha^{-1} yr^{-1} minimum critical load before the process contribution associated with the additional traffic flow is considered.

Environment Agency guidance suggests that if the increase in PC (i.e. with – without scenarios) as a result of the additional traffic is 1% or less of the critical load, the change in nitrogen deposition will be insignificant. This is the case at the Epping Forest SAC.

It should be noted that this is considered to be a conservative estimate as the minimum critical load value was used.

Acid deposition

The impacts of the additional traffic on acid deposition have been assessed with reference to data obtained from the APIS website. **Table** 5.4 shows the nitrogen deposition in keq ha^{-1} y^{-1} at the ecological receptors.

The impact for the PC acid deposition at the receptor was calculated using the APIS Critical Load Function tool (APIS tool). **Table** 5.4 shows the input values used for the receptors and **Table 5.5** shows the outputs.

Table 5.4 Acidity critical load assessment, inputs to APIS critical load function tool in 2036

Area	Receptor	CLmaxS (keq ha−1 y−1)	CLminN – CLmaxN (keq ha−1 y−1)	PC deposition (keq ha−1 y−1)	S background (keq ha−1 y−1)	N background (keq ha−1 y−1)
M25	1a	1.66	0.892 - 2.374	<0.01	0.18	1.19
	1a	1.66	0.892 - 2.374	<0.01	0.18	1.19
	1b	1.66	0.892 - 2.374	<0.01	0.18	1.19
	1c	1.66	0.892 - 2.374	<0.01	0.18	1.19
	1d	1.66	0.892 - 2.374	<0.01	0.18	1.19
Epping Forest New Road north	2a	1.66	0.892 - 2.374	<0.01	0.18	1.19
	2b	1.66	0.892 - 2.374	<0.01	0.18	1.19
	2c	1.66	0.892 - 2.374	<0.01	0.18	1.19
	2d	1.66	0.892 - 2.374	<0.01	0.18	1.19

Area	Receptor	CLmaxS (keq ha−1 y−1)	CLminN – CLmaxN (keq ha−1 y−1)	PC deposition (keq ha−1 y−1)	S background (keq ha−1 y−1)	N background (keq ha−1 y−1)
	2e	1.66	0.892 - 2.374	<0.01	0.18	1.19
	2f	1.66	0.892 - 2.374	<0.01	0.18	1.19
Epping Forest New Road south	3a	1.66	0.892 - 2.374	<0.01	0.18	1.19
	3b	1.66	0.892 - 2.374	<0.01	0.18	1.19
	3c	1.66	0.892 - 2.374	<0.01	0.18	1.19
	3d	1.66	0.892 - 2.374	<0.01	0.18	1.19
	3e	1.66	0.892 - 2.374	<0.01	0.18	1.19
	3f	1.66	0.892 - 2.374	<0.01	0.18	1.19
North Circular	4a	1.66	0.892 - 2.374	<0.01	0.18	1.19
	4b	1.66	0.892 - 2.374	<0.01	0.18	1.19
	4c	1.66	0.892 - 2.374	<0.01	0.18	1.19
	4d	1.66	0.892 - 2.374	<0.01	0.18	1.19
	4e	1.66	0.892 - 2.374	<0.01	0.18	1.19

Table 5.5 Output of APIS critical load function tool

Receptor	Exceedance (keq ha−1 y−1)			% of critical load function*		
	PC	Background	PEC	PC	Background	PEC
1a	no exceedance of CL function	no exceedance of CL function	no exceedance of CL function	<0.4	57.7	58.1
1b	no exceedance of CL function	no exceedance of CL function	no exceedance of CL function	<0.4	57.7	58.1
1c	no exceedance of CL function	no exceedance of CL function	no exceedance of CL function	<0.4	57.7	58.1
1d	no exceedance of CL function	no exceedance of CL function	no exceedance of CL function	<0.4	57.7	58.1
2a	no exceedance of CL function	no exceedance of CL function	no exceedance of CL function	<0.4	57.7	58.1
2b	no exceedance of CL function	no exceedance of CL function	no exceedance of CL function	<0.4	57.7	58.1
2c	no exceedance of CL function	no exceedance of CL function	no exceedance of CL function	<0.4	57.7	58.1
2d	no exceedance of CL function	no exceedance of CL function	no exceedance of CL function	<0.4	57.7	58.1
2e	no exceedance of CL function	no exceedance of CL function	no exceedance of CL function	<0.4	57.7	58.1
2f	no exceedance of CL function	no exceedance of CL function	no exceedance of CL function	<0.4	57.7	58.1

Receptor	Exceedance (keq ha−1 y−1)			% of critical load function*		
	PC	Background	PEC	PC	Background	PEC
3a	no exceedance of CL function	no exceedance of CL function	no exceedance of CL function	<0.4	57.7	58.1
3b	no exceedance of CL function	no exceedance of CL function	no exceedance of CL function	<0.4	57.7	58.1
3c	no exceedance of CL function	no exceedance of CL function	no exceedance of CL function	<0.4	57.7	58.1
3d	no exceedance of CL function	no exceedance of CL function	no exceedance of CL function	<0.4	57.7	58.1
3e	no exceedance of CL function	no exceedance of CL function	no exceedance of CL function	<0.4	57.7	58.1
3f	no exceedance of CL function	no exceedance of CL function	no exceedance of CL function	<0.4	57.7	58.1
4a	no exceedance of CL function	no exceedance of CL function	no exceedance of CL function	<0.4	57.7	58.1
4b	no exceedance of CL function	no exceedance of CL function	no exceedance of CL function	<0.4	57.7	58.1
4c	no exceedance of CL function	no exceedance of CL function	no exceedance of CL function	<0.4	57.7	58.1
4d	no exceedance of CL function	no exceedance of CL function	no exceedance of CL function	<0.4	57.7	58.1
4e	no exceedance of CL function	no exceedance of CL function	no exceedance of CL function	<0.4	57.7	58.1

* % of CL function is calculated after the value of PEC relative to CLminN is taken into account. See detailed explanation for further information and justification[21].

Table 5.5 shows that the impact of the proposed additional traffic as a result of the Chelmsford Local Plan on acid deposition is small, a maximum PC of <0.4% of the critical load function.

Overall, acid deposition rates at ecological receptors resulting from emissions from the additional traffic are not expected to have a significant impact on the integrity of the designated ecological features of Epping Forest SAC.

[21] http://www.apis.ac.uk/clf-guidance

6. Conclusions

This Technical Note has presented an assessment of the impact to air quality and potential for nitrogen deposition at Epping Forest SAC as a result of additional traffic on the network due to allocations within the Chelmsford Local Plan. This is considered a conservative assessment due to the use of the 2017 background concentrations for future scenarios.

The cumulative impact of other committed developments and other councils' local plan allocations were taken into consideration by the traffic model used to predict future flows on the network. This is in line with the conclusions of the High Court Judgement concerning Ashdown Forest.

As expected, both the predicted annual and daily mean concentrations of NO_x decrease along the transect with distance from the road. There were a number of exceedances of the AQO and EAL assessment criteria in all scenarios, both without and with the additional traffic associated with the Local Plan allocations. The highest predicted concentrations tended to be at transect 2 (Epping Forest New Road north), which is likely due to the combined effect of this road, as well as the M25. The concentration increases as a result of the additional traffic is considered negligible overall with reference to the EPUK & IAQM significance criteria.

Potential increase to nitrogen deposition has also been calculated. The PEC was calculated to be between 120 – 189% of the minimum critical load (MinCL) at all points along the 200 m transect. However, the background deposition rate was shown to be significantly higher than the minimum critical load associated with the ecological features of the SAC. According to the Environment Agency insignificance threshold of 1% or less for the PC in relation to the critical load, nitrogen deposition is predicted to be inconsequential at all points along the modelled transects. Also, with regard to acid deposition, the process contribution is predicted to be <0.4% of the critical load function and causes no exceedances, so is therefore insignificant.

Author	Reviewer
Lauren Growns	Ben Warren

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Appendix A
Modelling Input

Traffic data

Annual average daily traffic (AADT) flows were provided by Amec Foster Wheeler Transport Consultants and are shown in Table A.1 below.

Table A.1 Traffic data

Link ID	2017 Baseline		2036 Without		2036 With	
	AADT	% HGV	AADT	% HGV	AADT	% HGV
M25 Average	142,688	15%	164,367	15%	164,414	15%
A104 Epping New Rd Average	19,952	2%	22,840	2%	22,846	2%
A112 Average	15,621	2%	19,547	2%	19,556	2%
A406 North Circular Average	109,963	6%	137,493	6%	137,566	6%
A12 Average	75,521	4%	94,460	4%	94,484	4%

Note: The above data includes the cumulative flows of committed developments associated with the Local Plan allocations. Additionally, A112 and A12 were scoped out of the assessment as the Epping Forest SAC boundary is greater than 200 m from the road, in line with DMRB guidance.

Appendix B
Model verification

The ADMS-Roads dispersion model has been widely validated for this type of assessment.

Model validation undertaken by the software developer (CERC) will not have included validation in the vicinity of the Proposed Development Site. It is therefore necessary to perform a comparison of modelled results with local monitoring data at relevant locations. This process of verification attempts to minimise modelling uncertainty and systematic error by correcting modelled results by an adjustment factor to gain greater confidence in the final results.

The predicted results from a dispersion model may differ from measured concentrations for a large number of reasons, including uncertainties associated with:

- Background concentration estimates;
- Meteorological data;
- Source activity data such as traffic flows and emissions factors;
- Model input parameters such as surface roughness length, minimum Monin-Obukhov length;
- Monitoring data, including locations; and
- Overall model limitations.

Model verification is the process by which these and other uncertainties are investigated and where possible minimised. In reality, the differences between modelled and monitored results are likely to be a combination of all of these aspects.

Model setup parameters and input data were checked prior to running the models in order to reduce these uncertainties. The following were checked to the extent possible to ensure accuracy:

- Traffic data;
- Road widths;
- Distance between sources and monitoring as represented in the model;
- Speed estimates on roads;
- Source types, such as elevated roads and street canyons;
- Selection of representative meteorological data;
- Background monitoring and background estimates; and
- Monitoring data.

NO_x/ NO_2

Suitable local monitoring data for the purpose of verification is available for annual mean NO_x/NO_2 concentrations as shown in Table B1 below. The diffusion tube 15 (Epping Forest District Council) and DT V (Redbridge Borough Council) was used for verification purposes as it has associated traffic data available from the Department for Transport. It is recommended in TG (16) that a mixture of automatic monitoring and passive monitoring data are used for model verification purposes, however this was not possible as the majority of monitoring stations did not have corresponding traffic data.

Table B1 Local monitoring data suitable for ADMS-roads model verification

Location	2015 Annual Mean NO_2 (μgm^{-3})	OS Grid Reference
15	27.0	537727, 196187
DT V	31.4	545030, 186919

Verification calculations

The verification of the modelling output was performed in accordance with the methodology provided in LAQM.TG (16) as far as possible. Table B2 shows that there was systematic under prediction of monitored concentrations at the diffusion tubes. It was therefore considered necessary to adjust modelled concentrations.

Table B2 Verification, modelled versus monitored

Site	2015 Modelled Annual Mean NO_2 (μgm^{-3})	2015 Monitored Annual Mean NO_2 (μgm^{-3})	% (Modelled-Monitored)/ Monitored
15	22.1	27.0	-18%
DT V	26.0	31.4	-17%

Table B3 shows the comparison of modelled road-NO_X, a direct output from the ADMS-Roads modelling, with the monitored road-NO_X, determined from the LAQM NO_X to NO_2 conversion tool. An adjustment factor, determined through regression, of 3.38 was used to adjust modelled results. Table B4 shows the adjusted modelled NO_2 concentration, compared to the monitored NO_2 concentration.

Table B3 Comparison of modelled and monitored road NO_x to determine adjustment factor

Site	2015 Modelled Annual Mean Road NO_X (μgm^{-3})	2015 Monitored Annual Mean Road NO_X (μgm^{-3})	Ratio
15	4.7	15.2	3.12
DT V	3.5	15.1	4.25

Table B4 Comparison of adjusted modelled NO_2 to monitored NO_2

Site	2015 Modelled Annual Mean Road NO_2 (μgm^{-3})	2015 Monitored Annual Mean Road NO_2 (μgm^{-3})	Modelled/Monitored (%)
15	28.3	27.0	-5%
DT V	30.5	31.4	4%

Appendix C
Significance Criteria

The significance criteria used to assess the predicted change in annual mean concentration of NO_x is shown in Table C1.

Table C.2 Impact descriptors for individual receptors

Long term average concentration at receptor in assessment year	% Change in concentration relative to Air Quality Assessment Level (AQAL)			
	< 1	2-5	6 - 10	>10
75 % or less of AQAL	Negligible	Negligible	Slight	Moderate
76-94 % of AQAL	Negligible	Slight	Moderate	Moderate
95 – 102% of AQAL	Slight	Moderate	Moderate	Substantial
103 – 109 % of AQAL	Moderate	Moderate	Substantial	Substantial
110% or more of AQAL	Moderate	Substantial	Substantial	Substantial

Table Notes: When defining the concentration as a percentage of the AQAL, the 'without scheme' concentration is used where there is a decrease in pollutant concentration, and the 'with scheme;' concentration for an increase. The total concentration categories reflect the degree of potential harm by reference to the AQAL value. At exposure less than 75% of this value, i.e. well below, the degree of harm is likely to be small. As the exposure approaches and exceeds the AQAL, the degree of harm increases. This change naturally becomes more important when the result is an exposure that is approximately equal to, or greater than the AQAL. It is unwise to ascribe too much accuracy to incremental changes or background concentrations, and this is especially important when total concentrations are close to the AQAL. For a given year in the future, it is impossible to define the new total concentration without recognising the inherent uncertainty, which is why there is a category that has a range around the AQAL, rather than being exactly equal to it.