Habitat Regulations Assessment:  
Breckland Council Submission  
Core Strategy and Development Control Policies  
Document  

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Summary

This document records the results of a Habitat Regulations Assessment (HRA) of Breckland District Council’s Core Strategy. The Breckland District lies in an area of considerable importance for nature conservation with a number of European Sites located within and just outside the District. The range of sites, habitats and designations is complex. Taking an area of search of 20km around the District boundary as an initial screening for relevant protected sites the assessment identified five different SPAs, ten different SACs and eight different Ramsar sites.

Following on from this initial screening the assessment identifies the following potential adverse effects which are addressed within the appropriate assessment:

- Reduction in the density of Breckland SPA Annex I bird species (stone curlew, nightjar, woodlark) near to new housing.
- Increased levels of recreational activity resulting in increased disturbance to Breckland SPA Annex I bird species (stone curlew, nightjar, woodlark).
- Increased levels of people on and around the heaths, resulting in an increase in urban effects such as increased fire risk, fly-tipping, trampling.
- Increased levels of recreation to the Norfolk Coast (including the Wash), potentially resulting in disturbance to interest features and other recreational impacts.
- Increased water abstraction requirements to meet the additional water supply needs.
- Increased water discharges to meet the additional waste water treatment needs.
- Increased levels of traffic generated air pollution affecting sensitive features of SAC habitats.
- Potential reduction in the density of Habitats Directive Annex I bird species associated with the SPA, due to avoidance of areas close to new roads.

As a result of the assessment, a detailed package of mitigation measures has been identified, amendments to the Core Strategy are recommended and additional action is highlighted where further clarification is needed. The direct effect of built development and road improvements, the indirect effect of disturbance to Annex 1 birds, the effects of urbanisation and recreational pressure on the north Norfolk coast, can all be mitigated for with the application of the avoidance/mitigation measures proposed. With recommendations for zones of restricted development to protect Annex 1 species, Breckland District Council were able to confirm that and road infrastructure requirements of development proposed within the Core Strategy would need to be focused upon the A11 only, thus enabling it to also be ascertained that the Core Strategy would not result in any adverse effects arising from air pollution as a result road improvements within 200m of the Breckland SAC. Further clarification and categorisation is required in order for it to be ascertained that the impact of water demand, water treatment and discharge requirements, and the inadequacy of sewer systems to cope with flood events, will not result in adverse effects upon a number of European sites with water sensitivities. It is anticipated that Breckland District Council will be able obtain the necessary clarification, in order to be able to categorise housing numbers into those that can be taken forward and those that must be reviewed again in light of further information at the next plan review.
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1. Introduction

1.1. Overview of process to date

1.1.1. In 2007 Breckland District Council published its Core Strategy Preferred Options for public consultation. The Core Strategy Preferred Options was produced in accordance with the East of England Regional Spatial Strategy (EERSS), which at the publication of the Preferred Options was not yet finalised. The EERSS has since been published in its final form by the East of England Government Office, incorporating the Secretary of State’s Proposed Changes.

1.1.2. In order to ensure that the Core Strategy is compliant with the requirements of the Conservation (Natural Habitats &c.) Regulations 1994, Breckland District Council embarked upon an assessment of the strategy’s implications for European wildlife sites, i.e. a Habitats Regulations Assessment of the plan. Initial work clearly indicated that elements of the plan were likely to have significant effects upon European wildlife sites. At this point the assessment work was put on hold whilst a number of important research projects were commissioned, in order to further understand the potential effects upon European sites.

1.1.3. The commissioned research work is now drawing to a close, and Breckland District Council therefore appointed Footprint Ecology, in association with David Tyldesley and Associates, to take the Habitats Regulations assessment forward again, with full consideration of the research findings. This report sets out the Habitats Regulations Assessment process from this point forward, but opens with a review and summary of work undertaken thus far.

1.2. Background to the Habitats Regulations Assessment

1.2.1. The Conservation (Natural Habitats &c.) Regulations 1994, normally referred to as the ‘Habitats Regulations,’ transpose the requirements of the European Habitats Directive 1992 into UK law. The EC Habitats Directive and UK Habitats Regulations afford protection to plants, animals and habitats that are rare or vulnerable in a European context.

1.2.2. Earlier European legislation, known as the Birds Directive 1979, protects rare and vulnerable birds and their habitats and includes the requirement for all Member States to classify ‘Special Protection Areas’ (SPA) for birds. This involves each State identifying the most suitable areas of land, water and sea for the protection of rare and vulnerable species listed in the Directive, and areas which are important for migratory species, such as large assemblages of waterfowl.

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1.2.3. The Habitats Directive increased the protection afforded to plants, habitats and animals other than birds, through stricter protection of species and by the creation of ‘Special Areas of Conservation’ (SAC). This required each State, working in bio-geographical regions, to designate the best areas for habitats and species listed in annexes to the Directive. Article 6(1) and (2) of the Habitats Directive impose duties on Member States to establish ecological conservation management measures for these areas, to avoid deterioration of their natural habitats and the habitats of species, and to avoid significant disturbance of the species in the areas.

1.2.4. Importantly, by virtue of Article 7 of the Habitats Directive, the procedures relating to the protection of SAC equally apply to SPA. Article 7 of the Habitats Directive supersedes the previous requirements of the first sentence of Article 4(4) of the Birds Directive.

1.2.5. It should be noted that SPAs and SACs include European Marine Sites, which are designated sites below Highest Astronomical Tide. In addition, European Offshore Marine Sites (EOMS) are also part of the suite of internationally protected sites. Although outside the direct jurisdiction of local planning authorities, there is the potential for indirect effects upon European Offshore Marine Sites as a result of plans or projects under local planning authority control.

1.2.6. The UK is also a contracting party to the Ramsar Convention. This is a global convention to protect wetlands of international importance, especially those wetlands utilised as waterfowl habitat. In order to ensure compliance with the requirements of the Convention, the UK Government expects all competent authorities to treat listed Ramsar sites as if they are part of the suite of designated European sites, as a matter of policy. Most Ramsar sites are also a SPA or SAC, but the Ramsar features and boundary lines may vary from those for which the site is designated as a SPA or SAC. Collectively proposed and classified SPA, SAC and EOMS are referred to in this assessment as European sites. Article 6(3) and (4) of the Habitats Directive, and Regulations 48 and 85A - 85E of the Habitats Regulations, impose duties on all public bodies to follow strict regulatory procedures in order to protect the European sites from the effects of plans or projects.

1.2.7. Until recently, the assessment of the potential effects of a spatial or land use plan upon European sites was not considered a requirement of the Habitats Directive. A judgment of the European Court of Justice.

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3 Convention on wetlands of international importance especially as waterfowl habitat, Ramsar, Iran, 2/2/71 as amended by the Paris protocol of 3/12/92 and the Regina amendments adopted at the extraordinary conference of contracting parties at Regina, Saskatchewan, Canada 28/5 – 3/6/87, most commonly referred to as the ‘Ramsar Convention.’  
5 ECJ case C-6/04, Commission of the European Communities v United Kingdom of Great Britain and Northern Ireland, 20th October 2005.
required the UK to extend the requirements of Article 6(3) and (4) of the Directive to include the assessment of the potential effects of spatial and land use plans on European sites. The Habitats Regulations have been amended accordingly.

1.3. Outline of the Habitats Regulations Assessment process

1.3.1. The Habitats Regulations Assessment procedure is outlined in Figure 1 below, which illustrates the method of assessment in accordance with Regulation 85B. The site(s) affected could be in or outside the relevant plan area. Depending on the outcome of the Habitats Regulations Assessment, the LPA may need to amend the plan to eliminate or reduce potentially damaging effects on the European site. If adverse effects on the integrity of sites cannot be ruled out, the plan can only be adopted in accordance with Regulations 85C to 85E, where there are no alternative solutions that would have a lesser effect and there are imperative reasons of overriding public interest sufficient to justify adopting the plan despite its effects on the European site(s).

1.3.2. The Government is likely to expect that a plan will only need to proceed by way of these later tests in the most exceptional circumstances because a LPA should, where necessary, adapt the plan as a result of the Habitats Regulations Assessment, to ensure that it will not adversely affect the integrity of any European site. The considerations of Regulations 85C to 85E are not applicable in this case.

1.3.3. It will be seen that the key stages are screening, scoping, the ‘Appropriate Assessment’, introducing mitigation measures, consultation and recording the assessment.


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6 The addition of Part IVA (Regulations 85A-85E) to the Habitats Regulations in 2007, under the title “Appropriate Assessments for Land Use Plans in England and Wales”. 
FIGURE 1
OUTLINE OF THE PROCEDURE FOR HABITATS REGULATIONS ASSESSMENT

PROCEDURAL STAGE

SCREENING: ASSESSING LIKELY SIGNIFICANT EFFECTS

- 1. Identify all international sites in and around the plan area.
- 2. Acquire, examine and understand conservation objectives of each interest feature of each international site potentially affected.
- 3. Consider the policies and proposals in the plan and the changes that they may cause that may be relevant to the European sites. Introduce measures to avoid likelihood of significant effects on European sites.

APPROPRIATE ASSESSMENT SCOPING

- 4. Apply Reg 85B, acknowledging the plan is not necessary for site management, would any elements of the plan be likely to have a significant effect on any interest feature, alone or in combination with other projects or plans?
- 5. No significant effects are likely to occur as a result of implementing the plan.

APPROPRIATE ASSESSMENT

- 6. Significant effects are likely, or it is uncertain whether there would be significant effects
- 8. Undertake an appropriate assessment of the implications for each affected site in light of its conservation objectives, using the best information, science and technical know-how available.

APPROPRIATE ASSESSMENT ADDING MITIGATION

- 9. Consider whether any possible adverse effect on integrity of any site could be avoided by changes to the plan, such as modifying a policy or proposal whilst still achieving the plan’s aims and objectives.

FORMAL CONSULTATION

- 10. Draft a Record of the Habitats Regulations Assessment and consult Natural England and if necessary the public.

RECORDING THE ASSESSMENT

- 11. Taking account of Natural England and public representations, can it be ascertained that the LDD will not adversely affect the integrity of any international site?
- 12. No, because effects on integrity are adverse or uncertain
- Yes

13. LDD may be adopted without further reference to Habitats Regulations
2. European Sites Potentially Affected by the Core Strategy

2.1.1. The Breckland District lies in an area of considerable importance for nature conservation with a number of European sites located within and just outside the District. The range of sites, habitats and designations is complex. Some of the European Sites include a large number of component SSSIs scattered over a broad area (such as the Norfolk Valley Fens SAC), others such as the Breckland SPA cover a large area and are virtually contiguous. In some areas both SPA, SAC and Ramsar designations apply, while other parts of sites or areas are simply covered by one designation.

2.1.2. Whilst taking the Habitats Regulations Assessment forward from the original work undertaken by Breckland District Council\(^7\), it was deemed necessary to revisit a site screening exercise to consider which sites may or may not be affected by the Core Strategy. This exercise was revisited to ensure that all sites, and all site interest features that are likely to be significantly affected by the Core Strategy have suitable avoidance measures applied, or are taken forward to the more detailed Appropriate Assessment. With specialist knowledge of the impacts of both hydrological changes and recreational pressure on European sites held by the assessment team, it was considered possible that some sites and interest features should be added to the original screening work.

2.1.3. For our initial re-screening we looked at European sites both outside and within the District, because impacts such as water abstraction, waste water discharge and increased recreation could have effects well beyond the District boundary. Work in Dorset and Hampshire (Liley et al., 2008, Sharp et al., 2008b) has shown that coastal sites or large tracts of semi-natural habitat (such as the New Forest) will attract a relatively high proportion of residents from up to 20km away from the site, so we have used a 20km buffer as our initial area of search. This buffer is shown in Figure 1 and all European Sites that fall entirely or in part within it are summarised in Table 1.

Table 1: European Sites in and around Breckland District, entirely or partly within 20km of the District Boundary. Sites in italics were included in the initial (“state of play”) Appropriate Assessment produced by Breckland District Council. Sites in brackets are ones which we discount at this stage as not being relevant to this assessment (see text below). Sites in normal font are those newly added to the screening as a result of using the 20km buffer.

<table>
<thead>
<tr>
<th>SPA</th>
<th>SAC</th>
<th>Ramsar</th>
</tr>
</thead>
<tbody>
<tr>
<td>Broadland</td>
<td>Breckland</td>
<td>Broadland</td>
</tr>
<tr>
<td>Breckland</td>
<td>(Fenland)</td>
<td>(Chippenham Fen)</td>
</tr>
<tr>
<td>North Norfolk Coast</td>
<td>Norfolk Valley Fens</td>
<td>(Dersingham Bog)</td>
</tr>
<tr>
<td>The Wash</td>
<td>North Norfolk Coast</td>
<td>North Norfolk Coast</td>
</tr>
<tr>
<td>Ouse Washes</td>
<td>Ouse Washes</td>
<td>Ouse Washes</td>
</tr>
<tr>
<td></td>
<td>(Rex Graham Reserve)</td>
<td>Redgrave &amp; South Lopham Fens</td>
</tr>
<tr>
<td></td>
<td>River Wensum</td>
<td>(Roydon Common)</td>
</tr>
</tbody>
</table>

2.1.4. From the list in Table 1 we have screened out the following sites due to their character, habitat type, size or location. It is considered unlikely that any significant effects will occur on:

- **Fenland** (Fenland SAC, Chippenham Fen Ramsar): Chippenham Fen just clips the 20km buffer and the rest of the SAC is well beyond 20km from the District boundary. The site is an NNR, will not attract visitors, is poorly known, and has limited access. Water abstraction for the developments within Breckland District is not believed to affect this site.

- **Rex Graham Reserve** (Rex Graham Reserve SAC): this reserve is outside the district and is a chalk pit, designated as an SAC for the presence of the Annex I habitat semi-natural dry grasslands and scrubland chalk faces (important orchid sites). The 2.67ha site supports the largest population of military orchid *Orchis militaris* in the UK. The site is fenced and wardened and the flowers protected and would not be affected by water abstraction.

- **Roydon Common and Dersingham Bog** (Roydon Common and Dersingham Bog SAC, Dersingham Bog Ramsar, Roydon Common Ramsar): these two sites are well beyond the District boundary. Given the opportunities for recreational access within the District (Thetford Forest) and beyond (North Norfolk Coast) these sites would not be expected to attract significant numbers of people. Both sites are managed for nature conservation (both are National Nature Reserves, Dersingham Bog is managed by Natural England and Roydon Common by the Norfolk Wildlife Trust). Neither site is likely to suffer from water abstraction taking place within Breckland District.
Figure 1: European Sites within and surrounding Breckland District. We have not included Ramsar sites on the map for simplification, as no areas are designated as Ramsar that are not SPA / SAC. Designated sites boundaries provided by Natural England (downloaded from their website\(^8\)).

\(^8\) [http://www.naturalengland.org.uk](http://www.naturalengland.org.uk) accessed 1/9/08
3. Baseline Conditions Affecting the European and International Sites

3.1.1. As a result of revisiting the site screening exercise, there are a number of additional European Sites that were not included in the original “state of play” assessment, but which must now be considered within the Habitats Regulations Assessment of the Core Strategy, and may need to be taken forward to the more detailed Appropriate Assessment. These additional sites are one that, although outside the Breckland District, could be affected by the Core Strategy either because of a direct hydrological link with the District (i.e. water abstraction or pollution) or because the sites are open to the public and could draw a significant proportion of residents from the Breckland District for recreation.

3.1.2. Once sites have been screened into the HRA, it is necessary to gather further information on each site to understand its interest features and site sensitivities in order to ascertain whether effects are likely, and then whether those effects are likely to have adverse effects upon the integrity of the European site. The original assessment does give a comprehensive overview of the sites within the District, and we do not consider it necessary to repeat that material here as that original work will remain as part of the Core Strategy supporting documents. Instead we attempt to summarise the sites that we consider relevant to the next stage of the assessment, which is a combination of those originally screened in by the previous HRA work, and those now included as a result of our revisit of the screening exercise. Table 2 below lists all sites and relevant component SSSIs, providing context and highlighting issues that might be relevant in the next stage of the assessment process.
Table 2: European sites relevant to this assessment. Sites are drawn from table 1 above (see associated text to explain omissions). For each site the relevant threats, vulnerabilities and key issues are highlighted, along with a summary of the reasons for site designation. Data are drawn from SSSI condition assessments\(^9\), the UK SPA Review site accounts\(^{10}\), SAC/SCI summary details\(^{11}\), Ramsar site accounts\(^{12}\) and the Breckland Water Cycle Study undertaken by Scott Wilson (2008). The table includes component SSSIs for each European Site.

<table>
<thead>
<tr>
<th>Site</th>
<th>Reason for designation, trends in key species (where known)</th>
<th>Condition</th>
<th>Threats and Reasons for adverse condition</th>
<th>Notes / other issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breckland SPA</td>
<td>Stone curlew, nightjar and woodlarks. Increasing stone curlew populations (on arable but not heathland), recent declines in nightjars and woodlarks</td>
<td></td>
<td>Agricultural operations; disturbance to Annex I birds; high nitrogen loads causing undesirable habitat change; development pressures and infrastructure; egg collecting.</td>
<td>Thet Chalk aquifer is in hydraulic continuity with Breckland SAC/SPA</td>
</tr>
<tr>
<td>Relevant component SSSIs (within Breckland District)</td>
<td>Breckland Farmland SSSI</td>
<td>Stone curlew population (increasing)</td>
<td>100% favourable; Nutrient deposition, run-off, scrub invasion and inappropriate recreation.</td>
<td>See below.</td>
</tr>
<tr>
<td>Breckland Forest SSSI</td>
<td>Breeding woodlark and nightjar (recent declines), rare plants and invertebrates, geology</td>
<td>100% favourable</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Heathland sites (various individual SSSIs)</td>
<td>Stone curlew (population declining), nightjar and woodlark. Grassland and heath habitats (see Breckland SAC details)</td>
<td>Various (see below)</td>
<td>Nutrient deposition, run-off, scrub invasion and inappropriate recreation.</td>
<td></td>
</tr>
<tr>
<td>Breckland SAC</td>
<td>Inland dunes, natural eutrophic lakes, dry heaths, dry grasslands, alluvial forests and great crested newt</td>
<td>Nutrient deposition and agricultural run-off. Woodland and scrub invasion of open grassland and heaths and uncontrolled and inappropriate recreational activities</td>
<td>Thet Chalk aquifer is in hydraulic continuity with Breckland SAC/SPA</td>
<td></td>
</tr>
<tr>
<td>Constituent SSSIs (within Breckland District)</td>
<td>Barnham Cross</td>
<td>Calcareous and acidic grass heath</td>
<td>100% unfavourable recovering</td>
<td>Designation of this open space mentions frequent fires</td>
</tr>
</tbody>
</table>

\(^9\) [http://www.english-nature.org.uk/Special/sssi/search.cfm](http://www.english-nature.org.uk/Special/sssi/search.cfm) accessed 1/9/08
\(^{10}\) [http://www.jncc.gov.uk/page-1417](http://www.jncc.gov.uk/page-1417)
\(^{11}\) [http://www.jncc.gov.uk/page-1456](http://www.jncc.gov.uk/page-1456)
\(^{12}\) [http://www.jncc.gov.uk/page-1390](http://www.jncc.gov.uk/page-1390)
<table>
<thead>
<tr>
<th>Site</th>
<th>Reason for designation, trends in key species (where known)</th>
<th>Condition</th>
<th>Threats and Reasons for adverse condition</th>
<th>Notes / other issues</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bridgham &amp; Brettenham Heaths</td>
<td>Breckland heather and grass heath</td>
<td>13.0% favourable; 87% unfavourable recovering;</td>
<td>Part owned by Norfolk Wildlife Trust</td>
<td></td>
</tr>
<tr>
<td>Cranberry Rough</td>
<td>Basin mire with swamp woodland</td>
<td>21.6% favourable; 78.4% unfavourable recovering;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cranwich Camp</td>
<td>Breckland grassland</td>
<td>100% favourable;</td>
<td>Norfolk Wildlife Trust reserve</td>
<td></td>
</tr>
<tr>
<td>East Wretham Heath</td>
<td>Breckland meres with grassland</td>
<td>41.6% favourable; 58.4% unfavourable recovering;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Field Barn Heaths</td>
<td>Calcareous and mixed grassland</td>
<td>100% unfavourable recovering;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gooderstone Warren</td>
<td>Calcareous to acid grassland</td>
<td>57.6% favourable; 42.4% unfavourable recovering;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grime’s Graves</td>
<td>Heather and grassland Breckland heath</td>
<td>26.8% favourable; 73.2% unfavourable recovering;</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Old Bodney Camp</td>
<td>Grass and lichen/moss heath</td>
<td>100% unfavourable recovering;</td>
<td>Military training area</td>
<td></td>
</tr>
<tr>
<td>Stanford Training Area</td>
<td>Extensive grassland and heath, with fluctuating meres, wetlands, streams and woodland. Stone curlews breed</td>
<td>41.8% favourable; 37.4% unfavourable recovering; 20.8% unfavourable no change;</td>
<td>In various compartments, lack of bracken/scrub control, heather management. Needs mowing/grazing, open up pingos</td>
<td></td>
</tr>
<tr>
<td>Thetford Golf Course and Marsh</td>
<td>Grass/lichen/heather heath with fenland and wet valley woodland</td>
<td>3.1% favourable; 77.6 Unfavourable recovering;</td>
<td>Lack of any management</td>
<td></td>
</tr>
<tr>
<td>Weeting Heath</td>
<td>Rabbit grazed Breckland grass heath. Up to nine pairs of stone curlew</td>
<td>79.1% favourable; 20.9%</td>
<td>Inappropriate weed control (ragwort)</td>
<td>Mostly NNR, owned by Norfolk Wildlife Trust</td>
</tr>
<tr>
<td>Site</td>
<td>Reason for designation, trends in key species (where known)</td>
<td>Condition</td>
<td>Threats and Reasons for adverse condition</td>
<td>Notes / other issues</td>
</tr>
<tr>
<td>-------------------------------------------</td>
<td>-----------------------------------------------------------------------------------------------------------------------------</td>
<td>-----------------------------------------------------</td>
<td>------------------------------------------------------------------------------------------------------------</td>
<td>---------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Ouse Washes SPA/SAC/RAMSAR/SSSI</td>
<td>Declines most species breeding waders (except redshank) and wildfowl. Increasing wintering wildfowl and wader numbers to 2005/6. Spined loach populations.</td>
<td>12.9% favourable; 87.1% unfavourable no change</td>
<td>Neutral grassland-Inappropriate summer water levels &amp; water pollution. Watercourses-fail to meet total 0.1mg/l phosphorus target. Vegetation change from changing hydrological regime and high nutrient status of receiving water causing eutrophication. Increases in spring and summer flooding and depth of winter flooding. Saline intrusions, turbidity and sediment levels. Increased phosphates from new discharges</td>
<td>Long term tidal strategy - regular problems summer flooding-severe siltation of Great Ouse River. Discharges to River Thet could drain into Great Ouse River and to Ouse Washes SAC/SPA. Large land holdings by RSPB, Cambridgeshire Wildlife Trust and Wetlands and Wildfowl Trust</td>
</tr>
<tr>
<td>The Wash SPA/SSSI</td>
<td>Wintering waterbirds (increases for period 2001/02-2005/6); common tern (numbers are stable), little tern (numbers increasing), breeding waders (trends not known).</td>
<td>62.2% favourable; 37.3% unfavourable recovering; 0.5% unfavourable declining</td>
<td>Sustainable shellfish management policies now developed (hence recovering condition). Nutrient enrichment and unsustainable fishing practices on two areas of littoral sediment-One area of saltmarsh overgrazed. The estuary is fed by four rivers which could be affected by water abstraction and effluent discharges</td>
<td>Discharges to Rivers Wissey and Little Ouse could drain into Wash SAC/SPA The most important site for wintering wildfowl and waders in the UK with just under 400,000 birds at peak in 2005/6</td>
</tr>
<tr>
<td>North Norfolk Coast SPA/RAMSAR/SSSI</td>
<td>Steady increase in the numbers of wintering waders and wildfowl. Population of breeding sandwich tern stable, common and little terns, slight increase 2000 to 2006. Trends in breeding wader numbers not known,</td>
<td>96.6% favourable; 2.8% unfavourable recovering; 0.6% Unfavourable no change</td>
<td>Unfavourable no change on shingle ridge due to sea defence work with bulldozing each winter. Groundwater abstraction could affect freshwater flows onto grazing marshes. The site is visited by a large number of tourists especially in summer.</td>
<td>Latest five year mean for wintering wildfowl makes this the third most important site in UK.</td>
</tr>
<tr>
<td>The Wash &amp; North Norfolk Coast SAC</td>
<td>Sandbanks, intertidal mud and sand flats, coastal lagoons, inlet and bays,</td>
<td>Internationally important seal populations are vulnerable to</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site</td>
<td>Reason for designation, trends in key species (where known)</td>
<td>Condition</td>
<td>Threats and Reasons for adverse condition</td>
<td>Notes / other issues</td>
</tr>
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<td>-------------------------------</td>
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<td>-------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Norfolk Valley Fens SAC</td>
<td>Alkaline fens with two rare species of snail</td>
<td>100%</td>
<td>reductions in water table and water abstraction, spread of scrub and woodland as sites have dried out</td>
<td>Upper Wissey, Thet Chalk and Blackwater/Wending Beck aquifers are in hydraulic continuity with Norfolk Valley Fens (the former, specifically with Great Cressingham Fen and Thomson Water Carr &amp; Common)</td>
</tr>
<tr>
<td></td>
<td>reeves, colonising saltmarsh and Atlantic salt meadows, halophilous scrub, otter, seals</td>
<td>unfavourable declining</td>
<td>disturbance</td>
<td></td>
</tr>
<tr>
<td>Badley Moor</td>
<td>Spring fed valley fen</td>
<td>100%</td>
<td>Water abstraction, under-grazing</td>
<td></td>
</tr>
<tr>
<td>Swangey Fen</td>
<td>Spring fed fen</td>
<td>47.6% favourable; 38.7% Unfavourable recovering; 13.7% unfavourable no change;</td>
<td>Scrub removal and lack of grazing Atteborough WWTW drains into a watercourse that connects to Swangey Fen.</td>
<td>Breeding snipe</td>
</tr>
<tr>
<td>Foulden Common</td>
<td>Open water and rich fen with acid grassland and woodland</td>
<td>24.7% favourable; 26.6% unfavourable recovering; 48.7% unfavourable no change;</td>
<td>Scrub removal, fencing and grazing-further assessment necessary</td>
<td>Part owned by Otter Trust</td>
</tr>
<tr>
<td>Great Cressingham Fen</td>
<td>Calcareous spring-fed valley fen</td>
<td>100%</td>
<td>Site well managed and grazed but changes in plant communities unexplained and could be due to water abstraction</td>
<td></td>
</tr>
<tr>
<td>Potter and Scarning Fens</td>
<td>Calcareous valley fen on shallow peat</td>
<td>100%</td>
<td>Water abstraction; scrub clearance and grazing (rather than mowing) needed</td>
<td>Part owned by Norfolk Wildlife Trust</td>
</tr>
<tr>
<td>Site</td>
<td>Reason for designation, trends in key species (where known)</td>
<td>Condition</td>
<td>Threats and Reasons for adverse condition</td>
<td>Notes / other issues</td>
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</tr>
<tr>
<td>Thompson Water, Carr and Common</td>
<td>Open water and wet grassland, woodland and scrub. Nationally important invertebrate communities. Breeding and wintering wildfowl</td>
<td>38.1% favourable; 49.5% unfavourable recovering; 12.4% unfavourable no change; 12.4% unfavourable</td>
<td>Inappropriate scrub control and cutting/mowing</td>
<td>Norfolk Wildlife Trust reserve</td>
</tr>
<tr>
<td>Booton Common</td>
<td>Wet calcareous fen grassland, and acid heath</td>
<td>100% unfavourable declining;</td>
<td>Water abstraction</td>
<td>Norfolk Wildlife Trust reserve. Breeding snipe</td>
</tr>
<tr>
<td>Buxton Heath</td>
<td>Heath with fen</td>
<td>100% unfavourable declining;</td>
<td>Water abstraction</td>
<td></td>
</tr>
<tr>
<td>Coston Fen</td>
<td>Spring line fen with calcareous mire</td>
<td>100% unfavourable no change;</td>
<td>Scrub encroachment, extend grazing, eutrophication of surface water</td>
<td></td>
</tr>
<tr>
<td>East Walton and Adcock’s Common</td>
<td>Species rich grassland and basin mires</td>
<td>100% unfavourable declining;</td>
<td>Water abstraction</td>
<td>Breeding snipe</td>
</tr>
<tr>
<td>Flordon Common</td>
<td>Spring fed calcareous fen and unimproved grassland</td>
<td>20% favourable; 80% unfavourable no change;</td>
<td>Water abstraction</td>
<td></td>
</tr>
<tr>
<td>Holt Lowes</td>
<td>Dry heathland with alkaline valley mire</td>
<td>100% unfavourable declining</td>
<td>Scrub encroachment</td>
<td></td>
</tr>
<tr>
<td>River Wensum SAC / SSSI</td>
<td>Designated for plant, invertebrate and fish communities</td>
<td>41.2% favourable; 26.8% unfavourable recovering; 1.8% unfavourable no change; 30.2% unfavourable</td>
<td>Reasons for decline unclear but believed to be linked to scrub encroachment, lack of grazing and possible threat from alien signal crayfish. Development on the floodplain might alter flow regimes, which could also be</td>
<td>Dereham WWTW drains into watercourse which drain into the River Wensum</td>
</tr>
<tr>
<td>Constituent SSSIs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>River Wensum SSSI</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Site</td>
<td>Reason for designation, trends in key species (where known)</td>
<td>Condition</td>
<td>Threats and Reasons for adverse condition</td>
<td>Notes / other issues</td>
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</tr>
<tr>
<td>Dillington Carr SSSI</td>
<td>Carr woodland and open water on a tributary of the river Wensum</td>
<td>58.4% favourable; 41.6% unfavourable recovering;</td>
<td>Eutrophication from discharges</td>
<td>Refer to Scott-Wilson (2008) report, p124</td>
</tr>
<tr>
<td>Dereham Rush meadows SSSI</td>
<td>Carr woodland and open water on a tributary of the river Wensum</td>
<td>10.0% favourable; 74.6% unfavourable recovering; 15.3% unfavourable declining;</td>
<td>Eutrophication from discharges Woodland management and deer grazing</td>
<td>Refer to Scott-Wilson (2008) report, p124</td>
</tr>
<tr>
<td>The Broads/Broadlands SAC/SPA/RAMSAR</td>
<td>Hard oligo-mesotrophic waters with Charophytes, natural eutrophic lakes, transition mires and quaking bogs, calcareous and alkaline fens and alluvial forests. Rare snail, otter and fen orchid. Breeding bitterns and marsh harriers (both increasing), wintering hen harrier, Bewick’s and whooper swan (no trends available) and wigeon (stable) shoveler (declining) and gadwall (stable).</td>
<td>Management neglect and succession, water abstraction, sea level rise and saline incursions. Sewage discharges and agricultural runoff. Tourism and recreation</td>
<td>Blackwater/Wending Beck aquifer has hydraulic links to Broadlands SAC/SPA/RAMSAR and specifically to the Bure and Broad Marshes SSSI.</td>
<td></td>
</tr>
<tr>
<td>Relevant component SSSIs</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bure Marshes and broads SSSI</td>
<td>Un-reclaimed marshland on fenland peats with swamp alder carr, and open fen. Rare invertebrates</td>
<td>12.5% favourable; 6.6% unfavourable recovering; 80.9% unfavourable no change</td>
<td>Water abstraction, pollution, agricultural run-off and discharge</td>
<td>Nutrient enrichment of the River Bure has caused virtual elimination of water plants</td>
</tr>
<tr>
<td>Waveney and Little Ouse Valley Fens SAC/SSSI</td>
<td>Molinea meadows, calcareous fen. A rare snail</td>
<td></td>
<td></td>
<td>Declines in management, water abstraction, land drainage, scrub encroachment.</td>
</tr>
<tr>
<td>Site</td>
<td>Reason for designation, trends in key species (where known)</td>
<td>Condition</td>
<td>Threats and Reasons for adverse condition</td>
<td>Notes / other issues</td>
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<td>---------------------------------------</td>
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</tr>
<tr>
<td>Redgrave and Lopham Fens RAMSAR/SSSI</td>
<td>Spring fed base-rich valley fen with Molinia grasslands, sedge and reed dominated fen. Many rare and scarce invertebrates including a rare spider.</td>
<td>100% unfavourable recovering</td>
<td>Eutrophication, dredging, pollution with agricultural fertilisers and pollution from pesticides and agricultural run-off</td>
<td>Owned by Suffolk Wildlife Trust</td>
</tr>
</tbody>
</table>
4. **Consideration of the East of England Regional Spatial Strategy**

4.1. With a full appreciation of relevant European site issues now in place, the evidence gathering for the Breckland Core Strategy HRA now turns to the relevant higher tier planning document which guides the content of the Breckland Core Strategy. As a local level plan, the Breckland Core Strategy should be developed in accordance with the higher tier regional plan. In undertaking a HRA, a local level plan will therefore need to consider the findings of the higher tier plan’s HRA when taking forward relevant elements of the regional plan at the local level.

4.2. The East of England Plan came into force in May 2008, published by the Secretary of State for Communities and Local Government. This plan provides the Regional Spatial Strategy for the East of England, and the framework to inform the preparation of local development documents. The East of England RSS was assessed under the provisions of the Habitats Regulations, and a HRA record was produced. The RSS was the first regional plan to be subjected to a HRA, and was therefore very much a forerunner in the HRA process. The consultants undertaking the HRA, the Regional Assembly, Government Office, and also to some extent Natural England as statutory consultee, were all very new to the process of assessing regional plans under the requirements of the Habitats Regulations.

4.3. The progression of the HRA was particularly difficult because the RSS was well advanced at the time of the amendments to the Habitats Regulations, which made HRA of plans a legal requirement in domestic legislation.

4.4. Natural England formally objected to the HRA, and a number of concerns in relation to the robustness of measures proposed to protect the European sites from harm, and in relation to some elements of the plan, a lack of measures actually put forward. The HRA process was reviewed by a separate consultancy as a consequence of Natural England’s concerns. This report concluded that there were considerable shortfalls in relation to process, the absence of a precautionary approach, over reliance upon RSS policy ENV3 as a means of protecting the European sites from adverse effects, and consequently the potential for challenge as a result of the inadequacy of assessment and therefore failure to fully meet the requirements of the Habitats Regulations.

4.5. In November 2007 a further consultancy was commissioned to deal with a number of specific aspects relating to outstanding HRA concerns with regard to the emerging East of England RSS. This work went some way to rectifying outstanding issues prior to the East of England RSS being published.

4.6. Since the HRA was undertaken for the East of England RSS, a greater understanding of HRA requirements, and some examples of good
practice have now developed. However, there is still uncertainty ahead in terms of the HRA process.

4.7. Because of the strategic nature of a regional plan, it is accepted that more detailed HRA at the lower level will be required to clarify details such as location and exact nature of development and any necessary mitigation, but with the certainty from the higher tier assessment that it is possible for the development projects to be implemented.

4.8. Where elements of the higher tier plan are taken forward without certainty, a number of measures can be applied to ensure that the plan is published in accordance with the Habitats Regulations. The higher tier plan may specifically state and make clear that those elements are only to be taken forward where lower tier assessment can demonstrate with certainty that adverse effects will be prevented. If the implementation of such elements was critical to the plan, it would be expected that the RSS would present alternative viable options, to be taken forward if lower tier assessment shows that the plan may adversely affect European sites. Alternatively, if such elements were not critical to the plan, it can indicate that the uncertain elements would only be taken forward subject to them meeting the tests of the Habitats Regulations.

4.9. If elements of the RSS are included that do not meet these criteria and it has not been demonstrated that they meet the requirements of the Habitats Regulations, the RSS would need to either remove such elements, or set out a timetable for their review, following more detailed HRA. If subsequent assessment renders elements of the RSS unable to be implemented, those elements should be reviewed and alternative options sought in a revised and republished RSS. Whilst meeting the requirements of the Habitats Regulations, this option is not ideal, as it leaves uncertainty about delivering some aspects of the RSS.

4.10. The range of possibilities set out above were not fully pursued in relation to a number of elements of the published East of England RSS. As a result, each planning authority within the region needs to give added consideration to their HRA work.

4.11. With considerable growth being set out within the RSS for the Breckland District, and the extent of European Wildlife sites both within and close to the District, it has been necessary to allocate significant time and resource to ensuring that Breckland’s local development framework documents meet the requirements of the Habitats Regulations, whilst endeavouring to remain fully in accordance with the RSS.

4.12. Breckland’s local development framework documents must pay particular attention to RSS Policy TH1, which sets out policy requirements in relation to Thetford as a key centre for development and change. RSS Policy TH1 proposes an increase of dwellings on the edge of Thetford by 6,000, in the RSS plan period up to 2021, along with improved transport choices and the growth of a diversified employment base. Whilst this policy sets out the need to protect designated European sites, and raises
the possibility of the use of green infrastructure to protect those sites from increased recreational pressure, the HRA for the Breckland District must start from the position that this option has not been fully assessed at the regional level. Measures to protect the European sites have been applied to this regional policy, but without certainty that the policy can be fully implemented without any such adverse effects. It is from this position that Breckland District Council must now take forward its HRA of its Core Strategy and other LDF documents.
5. **Review of Background Documents**

5.1. The HRA process requires the assessors to draw upon a range of background material in order to fully understand the potential effects of the plan. The HRA of Breckland’s Core Strategy benefits from a range of background material that has been provided for the assessment team by Breckland Council. It is important to list the material used within the assessment in order to provide an accurate record, and to clearly indicate what material has and has not been included, should any further sources of information come to light at a later date.

5.2. The background documents that will be used for the HRA, provided by Breckland District Council are summarised in Table 3. Data was also requested on home postcodes of visitors, car-park capacity and recent nightjar distributions. These data were not held by Breckland District Council and could not be made available.

5.3. As the assessment progresses, any additional material, as relevant, will be sourced during the assessment process and listed within the HRA record. It is important to also note that the assessment team has a considerable library of research material, and we will therefore also draw on our own knowledge and this reference material as needed.

5.4. Should the assessment reach a point where in-combination assessments are necessary, the assessment team will also seek background information and planning documents from neighbouring local authorities at that point.
<table>
<thead>
<tr>
<th>Document</th>
<th>Description</th>
<th>Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thetford Growth Point A11 Energy Study, stage 1 draft report</td>
<td>Details the likely increases in energy use, potential constraints and sets out strategic solutions. Produced by IT Power Ltd.</td>
<td>July 2008</td>
</tr>
<tr>
<td>Breckland Water Cycle Study, Draft Interim Report</td>
<td>Assesses the impact of proposed growth targets for Breckland District, undertaken for the four main development areas in the Breckland District (excluding Thetford). By Scott Wilson</td>
<td>July 2008</td>
</tr>
<tr>
<td>Site Specific Policies and Proposals: Issues and Options Consultation</td>
<td>Consultation document seeking public and stakeholder views on possible sites for development</td>
<td>July 2008</td>
</tr>
<tr>
<td>Thetford Area Action Plan June 2008 – Issues and Options Consultation</td>
<td>Consultation document with questions about the action plan and background information</td>
<td>June 2008</td>
</tr>
<tr>
<td>Thetford Green Infrastructure Study</td>
<td>Assessment of existing green infrastructure, and proposed strategy including recommendations for networks and site management. Prepared by Land Use Consultants.</td>
<td>Sept. 2007</td>
</tr>
<tr>
<td>Local Service Centre Analysis</td>
<td>Analysis of larger villages in Breckland which have the potential to accommodate sustainable growth.</td>
<td>Sept. 2007</td>
</tr>
<tr>
<td>Strategic Housing Market Assessment</td>
<td>Assessment of housing market, addressing migration, incomes etc.</td>
<td>June 2007</td>
</tr>
<tr>
<td>Breckland District Landscape Character Assessment</td>
<td>Considers the rural landscapes within the District. Prepared by Land Use Consultants.</td>
<td>May 2007</td>
</tr>
<tr>
<td>Updated retail and town centre study</td>
<td>Update of 2004 retail capacity assessment based on latest population, expenditure and turnover levels.</td>
<td>Feb. 2007</td>
</tr>
<tr>
<td>Affordable Housing Thresholds, Site Viability Study</td>
<td>Financial appraisals of notional housing sites in the District. Prepared by Fordham Research Ltd.</td>
<td>Jan. 2007</td>
</tr>
<tr>
<td>Open Space Parish Schedule 2007</td>
<td>Accompanies open space assessment and gives breakdown and maps for each parish within the District</td>
<td>2007</td>
</tr>
<tr>
<td>Sustainability Appraisal 2007 incorporating Strategic Environmental Assessment</td>
<td>Context for preferred policies and proposals and considers the potential effects on the economic, social and environmental conditions of Breckland</td>
<td>2007</td>
</tr>
<tr>
<td>Urban Capacity Study 2007</td>
<td>Estimates housing capacity (1759 dwellings) that can be accommodated within existing settlements</td>
<td>2007</td>
</tr>
<tr>
<td>Open Space Assessment 2007</td>
<td>Audit of all green space within District</td>
<td>2007</td>
</tr>
<tr>
<td>Retail and Town Centre Study October 2004</td>
<td>Assessment of five main retail centres within the District. Produced by Nathaniel Lichfield &amp; Partners.</td>
<td>Oct. 2004</td>
</tr>
</tbody>
</table>
6. **Review of the ‘Check for Likely Significant Effects’ undertaken by Breckland District Council**

6.1. Breckland District Council had already undertaken the check for the likelihood of significant effects. As with the site screening exercise however, it was considered important for the robustness of the assessment to review the work undertaken by the Council.

6.2. Breckland District Council gave priority to the consideration of the potential effects of development supported within the Core Strategy upon the European sites within and surrounding the District. Breckland District Council reached the preferred options stage of the Core Strategy with what was termed as a “state of play” report, which was prepared in consultation with Natural England from late 2006 onwards. The check for likely significant effects had been completed and it was concluded that considerable research work was necessary in order to take the HRA forward to a more detailed Appropriate Assessment.

6.3. A Habitats Regulations Assessment must consider the effects of each element of the plan that could potentially affect each interest feature for which each European site is designated and also whether each element of the plan is likely to affect the achievement of each site’s conservation objectives. The initial work by Breckland District Council is thorough and methodical in its approach.

6.4. From consideration of the European sites that might be affected, in terms of their interest features and achievement of conservation objectives, key areas of concern where highlighted in terms of the potential for loss of supporting habitat, habitat fragmentation and the close proximity of urban settlement, that could, if expanded, add to disturbance impacts upon the European sites. Further areas of concern included hydrological impacts, particularly to ground water supply and the input of surface run off to watercourses.

6.5. These key impact areas were then assessed against each policy within the Core Strategy, followed by a policy by policy assessment of specific site impacts. Analysis in greater detail was then provided for the key Core Strategy Policies where it was determined that there would be a likelihood of a significant effect. Essentially, all policies that are proposed for inclusion within the Appropriate Assessment are checked against each site interest feature, thus providing important information for the formulation of the more detailed Appropriate Assessment (Preferred Options Policies CP1, CP3, CP4, DC8, DC11,DC12).

6.6. Thus there was a thorough check for the likelihood of significant effects. Following from this first stage, the initial work proceeded to construct a large table (Table 5.4) of information that serves two purposes. Firstly, it sets out recommendations for plan amendment, for all areas where the check for likely significant effects highlighted a potential effect, and where those effects can be immediately avoided by policy amendment. The policy wording additions or amendments proposed are suitable
measures to avoid adverse effects, and should be taken forward to the submission draft of the Core Strategy. The final HRA check of the submission draft should ensure that these avoidance measures have been fully incorporated.

6.7. The second element of the table relates to where avoidance measures cannot be applied. It summarises the requirements for Appropriate Assessment for those particular elements of the plan. It is at this point that omissions occur in relation to the range of sites and interest features highlighted as requiring further assessment within the Appropriate Assessment. Interest features previously flagged as potentially suffering from the effects of policies CP1, CP3, CP4, DC8, DC11 and DC12 are reduced in the Appropriate Assessment table. Those interest features have now been reinstated by this review.

6.8. The following table now provides the full suite of sites and their interest features that need to be considered as part of the HRA of the Core Strategy Preferred Options. The table also includes sites and their interest features that have been added as part of the revisit of the site screening exercise, using an initial 20km buffer to include all sites and then screening out those not relevant (as detailed in Section 2).

6.9. The range of sites and interest features set out within Table 4 has therefore increased from the original “state of play” report. It will be necessary to consider whether avoidance measures can be applied to reduce the areas of concern and prevent the likelihood of significant effects prior to the commencement of the detailed Appropriate Assessment. Where suitable avoidance measures can be sought, these will be recommended and the interest feature can then screened out from further inclusion within the Appropriate Assessment.

6.10. It should be noted that in addition to the policies listed, other policies may be revisited as part of the AA for the consideration of possible mitigation measures, or alternative solutions if necessary. For example, whilst it does not serve as mitigation measure on its own, further strengthening of the natural environment policy may be recommended as part of a suite of recommendations.
### Table 4: Policies and European Sites to include within the Appropriate Assessment

<table>
<thead>
<tr>
<th>Policy number</th>
<th>Interest features originally proposed to be taken forward to AA</th>
<th>Additional interest features to include within the AA, as highlighted as likely to be significantly affected</th>
</tr>
</thead>
</table>
| CP1 Housing Provision | All interest features of Breckland SPA | Breckland SAC – 2230 inland dunes, 3150 Natural eutrophic lakes, 4030 european dry heaths, 6210 semi natural dry grasslands, 91EO alluvial forests  
Norfolk Valley Fens – 7230 alkaline fens, 6410 Molinia meadows, 7210 Calcareous fens, 91EO Alluvial forests, 1016 Desmoulin’s whorl snail  
Waveney/Little Ouse Valley Fens SAC – Valley Fen, invertebrate assemblage, 6410 Molinia meadows, 7210 Calcareous fens, 1016 Desmoulin’s whorl snail.  
All interests of River Wensum SAC.  
All interest features of Broadland SPA.  
All interest features of North Norfolk Coast SPA.  
All interest features of the Wash SPA.  
All interest features of the Ouse Washes SPA.  
North Norfolk Coast SAC – 2110 Embryonic shifting dunes, 2120 Shifting dunes along the shoreline.  
All interest features of the Ouse Washes SAC.  
All interest features of the Broads SAC.  
The Wash and North Norfolk Coast SAC: 1365 Common Seal. |
| CP3 Employment | All interest features of Breckland SPA | Breckland SAC – 2230 inland dunes, 3150 Natural eutrophic lakes, 4030 european dry heaths, 6210 semi natural dry grasslands, 91EO alluvial forests  
Norfolk Valley Fens – 7230 alkaline fens, 6410 Molinia meadows, 7210 Calcareous fens, 91EO Alluvial forests  
All interest features of the Ouse Washes SPA.  
Waveney/Little Ouse Valley Fens SAC – Valley Fen, invertebrate assemblage, 6410 Molinia meadows, 7210 Calcareous fens, 1016 Desmoulin’s whorl snail. |
<table>
<thead>
<tr>
<th>Title</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>CP4 Infrastructure</td>
<td>All interest features of Breckland SPA</td>
</tr>
<tr>
<td></td>
<td>Breckland SAC – 2230 inland dunes, 3150 Natural eutrophic lakes, 4030 European dry heaths, 6210 semi natural dry grasslands, 91EO alluvial forests</td>
</tr>
<tr>
<td></td>
<td>Norfolk Valley Fens – 7230 alkaline fens, 6410 Molinia meadows, 7210 Calcareous fens, 91EO Alluvial forests</td>
</tr>
<tr>
<td></td>
<td>Waveney/Little Ouse Valley Fens SAC – Valley Fen, invertebrate assemblage, 6410 Molinia meadows, 7210 Calcareous fens, 1016 Desmoulin’s whorl snail.</td>
</tr>
<tr>
<td>DC8 Tourism related development</td>
<td>All interest features of Breckland SPA</td>
</tr>
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<td>Breckland SAC – 4030 European dry heaths, 6210 semi natural dry grasslands</td>
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<td>All interest features of North Norfolk Coast SPA/SAC/Ramsar.</td>
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<td>DC11 Green Infrastructure</td>
<td>All interest features of Breckland SPA</td>
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<td>All interest features of Breckland SAC</td>
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<td>Breckland SAC – 4030 European dry heaths, 6210 semi natural dry grasslands</td>
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<td>No effects on other interest features of the SAC highlighted in the LSE check.</td>
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<tr>
<td>DC12 Existing open space, sport and recreational facilities</td>
<td>Potential element of the plan flagged for possible amendment to prevent adverse effect upon all interest features of Breckland SPA, as part of a mitigation package?</td>
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<td>To be revisited as part of the AA</td>
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7. Review of Commissioned Research

7.1. Following the initial “state of play” analysis undertaken by Breckland District Council, a range of research commissions was taken forward. This further work is intended to provide the material necessary to undertake a detailed Appropriate Assessment of policies CP1, CP3, CP4, DC8, DC11 and DC12. This research will form the foundations of the Appropriate Assessment, and detailed consideration is therefore given to this work within the subsequent Appropriate Assessment stage. At this stage we simply outline the work conducted and key findings in order to complete the evidence gathering and review of previous HRA work, thus setting the stage for the assessment work to be taken forward.

7.2. Recreational access to Thetford Forest and surrounding heaths is clearly a key issue, and an understanding of visitor flow rate and recreational modelling was the first recommendation in the “state of play” analysis. Visitor work was commissioned by Breckland District Council and took place between August and October 2007 (see Dolman et al., 2008). This work involved counts and interviews with visitors using the path network in Breckland. A total of 739 groups of people were recorded, with most groups visiting to walk their dog, and other activities included walking, cycling and horse riding. National Trails and paths within Country Parks were the most visited. Two-thirds of visitors had driven to the start point of their route and most visitors were local: forty three percent of visitors had traveled less than 5km to the survey location and 20% had traveled between 5 and 10km to the survey location. These data were used to build a predictive model of visitor rates as a result of further development in Thetford.

7.3. These predictions of visitor rates were used to explore the potential disturbance impacts on nesting stone curlews, following the methodology (“SCARE”) developed by Taylor et al. (2007).

7.4. The impact of housing and roads on the spatial distribution of stone curlews were explored in a single piece of work (Sharp et al., 2008a), using nest data from the period 1988 – 2006. This work found significant avoidance of both housing and roads, and a significant effect of road traffic volumes, highlighting a clear effect of development on the species. The avoidance of housing was detectable at distances over 2km and similar distances were detected for main (trunk) roads.

7.5. Factors driving declines in woodlark and nightjar are still not fully understood, and may not be primarily driven by recreational disturbance. Work is on-going on woodlark and nightjars. Nest
cameras and nest monitoring were conducted over the 2008 breeding season. These data are not available at the time of writing.

7.6. A table of all documents used to inform the HRA will be incorporated into the final Record, once complete.
8. Scope of the Appropriate Assessment

8.1. Regulation 85B of the Habitats Regulations requires plan making authorities to determine whether a land use plan is likely to have a significant effect upon any European site. In considering the implications of the Breckland Core Strategy for European sites, this initial stage in the Habitats Regulations process has now been undertaken. For a number of policies within the Core Strategy, it was considered either that significant effects would be likely, or that a precautionary approach would need to be taken as it could not be determined that those particular plan policies would not be likely to have a significant effect upon any European site.

8.2. Where it is not possible to apply avoidance measures to completely remove the likelihood of significant effects, including where the effects are not fully understood, the relevant aspects of the plan must be subject to an ‘Appropriate Assessment’ in accordance with Regulation 85B. Application of the Habitats Regulations incorporates the precautionary principle at every stage. The European Court of Justice has set clear parameters in determining the question of adverse effects on the integrity of a European site and established that there should be no reasonable scientific doubt as to the absence of such effects13.

8.3. The Core Strategy for Breckland District should therefore be subject to Appropriate Assessment at this stage, in relation to the following policies:
- CP1 Housing provision
- CP3 Employment
- CP4 Infrastructure
- DC8 Tourism related development
- DC11 Green infrastructure
- DC12 Existing open space, sport and recreational facilities

8.4. Whilst the Habitats Directive and Regulations do not provide detailed guidance on the scope of an Appropriate Assessment, its requirements are clear from the title, in that it should be an assessment that is ‘appropriate.’ It should be detailed enough to meet the requirements of the Habitats Regulations in that plans or projects should only proceed where it can be ascertained that there will not be an adverse effect on the integrity of any European site (unless the further specific tests in relation to Regulation 85C are met, which are

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13 European Court of Justice Ruling Case C-127/02, 2004, Landelijke Vereniging tot Behoud van de Waddenzee, Netherlandse Vereniging tot Bescherming van Vogels vs. Staatssecretaris van Landbouw, Natuurbeheer en Visserij. Most commonly referred to as the ‘Waddenzee Ruling.’
not considered at this current stage in the stepwise process of Habitats Regulations Assessment).

8.5. Each policy considered likely to have a significant effect upon one or more European sites is considered in turn within the following appropriate assessment, where the implications for the European sites lying within, surrounding or in the vicinity of the Breckland District is considered in detail.

8.6. At the current stage the locations of the housing and employment development areas are being progressed within an emerging submission draft of the Core Strategy. The assessment team are continuing to assess the most up to date versions of the emerging document as it is prepared for submission.
9. Appropriate Assessment of Residential, Employment and Tourism Related Development Proposals (Policies CP1, CP3 and DC8)

9.1. Housing Provision

9.1.1. The Core Strategy at Policy CP1 outlines plans for over 19,000 new homes within the District by 2026. Thetford will be a focal point for this growth (with at least 6000 homes). The Area Action Plan for Thetford sets out the release of land to 2021 necessary to meet RSS requirements. Broad locations for sustainable extensions at Thetford are proposed to the north of the town and to the east of the town. Attleborough is also identified for substantial growth; the preferred option here is for the strategic release of a sustainable Greenfield extension to the south of the town for up to 4,000 new homes by 2026. Breckland District Council consider that windfall housing may amount to a further 2,000 to 3,000 houses.

9.1.2. This volume of new houses will result in a change in the distribution of accommodation, an increase in local residents in some areas of the District and possibly a change in the types of people living in different areas.

9.1.3. It is considered that there are likely to be the following significant effects as a result of Policy CP1:

- Potential reduction in the density of Habitats Directive Annex I bird species for which a negative relationship has been shown to exist with housing density (stone curlews, nightjars, woodlarks), i.e. decreased densities in close proximity to housing.
- Potential reduction in the density of stone curlews from their avoidance of roads
- Increased levels of recreational activity resulting in increased disturbance to Annex I ground nesting bird species sensitive to disturbance (stone curlew, nightjar, woodlark), in Thetford Forest and in other parts of the Breckland SPA
- Increased levels of people on and around the heaths, resulting in an increase in urban effects such as increased fire risk, fly-tipping, trampling etc (see Liley et al., 2006b and Underhill-Day, 2005 for reviews).
- Increased levels of recreation to the Norfolk Coast (including the Wash), potentially resulting in disturbance and other recreational impacts to important species and habitats in the coastal strip.
- Increased water abstraction requirements to meet the additional water supply needs
- Increased water discharges to meet the additional waste water treatment needs
9.2. **Employment Provision**

9.2.1. The Core Strategy proposes the delivery of at least 6,000 jobs over the plan period. However, the actual figure is closer to 9,000, because Policy CP3 explains that, on top of the 6,000 additional employment opportunities for the district, a further 3,000 jobs will need to be created in the Thetford area to secure economic containment in line with the large numbers of housing proposed for the Thetford urban extensions. In total, the Thetford area is proposed to secure an additional 5,000 jobs.

9.2.2. This large number of additional jobs cannot be accommodated purely by promotion of existing employment land opportunities or the intensification of use on those existing sites. Policy CP3 sets out proposals for strategic employment land allocations to accommodate this additional need.

9.2.3. The key locations are:
- 30-40ha adjoining the A11 on the outskirts of Thetford
- 30ha at Snetterton
- 5-10ha at Attleborough, in a location that relates to the A11

9.2.4. During assessment of the Core Strategy preferred options, further amendments to the provision of employment land were emerging. It was proposed that the Core Strategy submission stage document should be amended to reflect the following:
- A reduction in allocation at Snetterton to 20ha
- Additional allocation of 5-10 ha at Dereham, on sites well related to the A47
- 5ha at Swaffham, on sites well related to the A47

9.2.5. Whilst research has linked the impact of housing to significant effects upon Annex 1 bird species, current research has not specifically considered the impact of other types of built development. However, taking a logical, and most importantly a precautionary approach, in the absence of evidence to the contrary it is assumed that similar effects are likely as a result of other types of built development. This appropriate assessment therefore considers the effects of the new employment provision Policy CP3 alongside the effects of the new housing set out in Policy CP1 in terms of the likely significant effects and the potential for adverse effects upon ecological integrity.

9.2.6. It is considered that there are likely to be the following significant effects as a result of Policy CP3:
- Potential reduction in the density of Habitats Directive Annex I bird species, taking a precautionary approach following the negative relationship that has been shown to exist with housing density.
(stone curlews, nightjars, woodlarks), i.e. decreased densities in close proximity to built development.

- Potential reduction in the density of stone curlews due to their avoidance of roads and the impact of increased road traffic
- Increased levels of recreational activity resulting in increased disturbance to Annex I ground nesting bird species sensitive to disturbance (stone curlew, nightjar, woodlark), in Thetford Forest and in other parts of the Breckland SPA
- Increased water abstraction requirements to meet the additional water supply needs
- Increased water discharges to meet the additional waste water treatment needs

9.3. **Promotion of Tourism Related Development**

9.3.1. The Core Strategy states that there is scope for further growth of the tourism sector, which is an important contributor to the economy of the Breckland District. It is recognised that it is in fact the wealth of biodiversity within and around the district that contributes to this aspect of the economy, drawing tourists to the area to enjoy the natural environment. Policy DC8 and its supporting text within the Core Strategy gives support to a range of tourist related development, where a need for such development can be demonstrated. The policy does not set out specific areas or allocations for tourism related development, and the policy is therefore not considered to give rise to any direct effects. However, the indirect effect of a net increase in tourists in the district, as promoted by Policy DC8 needs to be considered, and has been raised as likely to have a significant effect upon the Breckland SPA. To some extent, the increased numbers of tourists attracted the Breckland area could also increase the numbers of visitors to the North Norfolk Coast designated sites.

9.3.2. It is considered that there are likely to be the following significant effects as a result of Policy DC8:

- Increased levels of recreational activity resulting in increased disturbance to Annex I ground nesting bird species sensitive to disturbance (stone curlew, nightjar, woodlark), in Thetford Forest and in other parts of the Breckland SPA
- Increased levels of people on and around the heaths, resulting in an increase in urban effects such as increased fire risk and trampling etc (see Liley et al., 2006b and, Underhill-Day, 2005 for reviews).
- Increased levels of recreation to the Norfolk Coast (including the Wash), potentially resulting in disturbance and other recreational impacts to important species and habitats in the coastal stip.
- Increased water abstraction requirements to meet the additional water supply needs
• Increased water discharges to meet the additional waste water treatment needs

9.4. **Direct impacts of built development on Breckland SPA Annex 1 bird species**

9.4.1. Correlative studies of stone curlews (Sharp et al., 2008a), nightjars (Clarke et al., 2008, Liley and Clarke, 2003, Liley and Clarke, 2002, Liley et al., 2006a) and woodlarks (Mallord, 2005) have found lower densities of these Annex I species in areas close to housing or surrounded by high densities of housing. The reasons for this avoidance are difficult to pin-point and could be due to a range of factors. Urban sites have higher levels of recreational access (e.g. Liley et al., 2006b) and therefore visitor pressure and disturbance may be an underlying cause. Nightjars and woodlarks have both been shown to avoid areas of high human disturbance (Liley et al., 2006a, Mallord et al., 2006, Mallord et al., 2007b), for nightjars there is evidence that disturbance may impact on breeding success (Langston et al., 2007b, Murison, 2002) and for stone curlews disturbance has been shown to have an effect on incubation behaviour (Taylor et al., 2007). Urban heaths are subject to a range of other urban pressures (see Haskins, 2000, Liley et al., 2006b, Underhill-Day, 2005 for reviews), that include increased fire occurrence (Kirby and Tantrum, 1999) and high densities of predators such as cats (e.g. Sims et al., 2008) and foxes (Harris and Rayner, 1986).

9.4.2. These factors, such as increased access levels and fire incidence are all indirect effects that occur as a result of the housing, rather than being a direct effect of the presence of the houses. Such urban effects are difficult to tease apart, and are discussed in more detail in later sections. It is however also possible that the reduced densities are directly related to the built environment. The avoidance of housing by stone curlews has been clearly demonstrated using data relating to arable land (Sharp et al., 2008a), where there is limited public access. The large distances over which the housing has been shown to have an effect (for both stone curlew and nightjar) are such that access, increased predator density and fire occurrence would seem implausible as explanations in their own right. It may therefore be that these species simply show a behavioural response to avoiding the built environment. It may be that housing and other built development has some negative effect we do not understand, perhaps relating to fragmentation, loss of off-site foraging habitats or similar. It is possible that birds may simply perceive areas close to housing and other built development as poorer quality.

9.4.3. A potential problem with relating the avoidance of housing to an adverse effect on the integrity of the site is that the avoidance of
housing is simply a behavioural mechanism, and does not necessarily relate to a population effect. With respect to stone curlews, the population size is relatively low (246 nests were found in Breckland 2006), the species is rare and occurs over a large area at a low density. There is a reasonable amount of habitat choice when populations are at low numbers, and there is likely to be little competition for territories. We cannot predict whether the avoidance would still be present when the population increases and there becomes competition for territories. If there is in fact no cost (such as increased disturbance or predation) from nesting close to housing, then the avoidance pattern may disappear. Given that it is impossible to predict the pattern of settlement at higher population sizes, we have to assume that there is an adverse effect from development, and that those adverse effects apply for all three Annex 1 species.

9.4.4. It is difficult to place an exact boundary on the scale at which, or distance at which, housing has an effect on the bird species. For all three species the density of birds is much lower close to housing, but some individuals will still settle in areas close to housing. The pattern of avoidance may also change over time. In fact the proportion of stone curlew nests (within a given year) which are close to settlements has steadily increased over the past two decades, indicating that the avoidance of housing, while always remaining highly significant, has decreased in more recent years (Sharp et al., 2008a). Similarly with nightjars, the reduced density on more urban heaths in Dorset, found using the data from the 1992 national survey (Liley and Clarke, 2003) was still present in 2004, when the population had markedly increased, however the avoidance did appear to be weaker (Liley et al., 2006a).

9.4.5. The pattern of avoidance (taken from Sharp et al., 2008a), for stone curlews on arable land, across all years combined, is reproduced in Figure 2. It shows that, up to 2.5 km away from settlements, the average density of stone curlew nests per year on arable land of suitable soil type increases with distance from any settlements. This would therefore suggest that stone curlew show avoidance of towns and villages, up to 2.5 km away. The area of suitable habitat type in each distance class decreases with distance, such that there is only about 10 km² which is 2.5 – 4.0 km away from any settlement, compared to 84 km² which is within 500m of the nearest settlement (Figure 2). Within every single year from 1988 to 2006, the stone curlew nest density (per ha of suitable arable land) was significantly lower on land within 0-500m of the nearest settlement than in successive distance bands. Annual nest densities on arable land 500-1000m from settlements were also lower than densities at subsequent distance bands in 14 of the 18 years over the period 1988-2006. In the predictive models developed as part of the same piece of work, housing values were weighted (using a half-normal curve) such that
nearby housing were assumed to have a greater impact than houses further away. Different weightings were tested and the best fit was found using a curve based on a standard deviation of 1000m (see Figure 3 in Sharp et al., 2008a). This weighting gives housing at 1000m half as much ‘weight’ as housing at zero metres, and the impact declines such that at 2500m the effect is negligible.

Figure 2: Average density of stone curlew nests on arable land (1988-2006) and the area of arable land available at different distance bands away from towns and villages.

9.4.6. For nightjars, significant effects of housing surrounding sites have been detected where that housing occurs within 5km of sites (Liley et al., 2006a). The problem is that sites that have lots of housing close by also tend to have lots of houses further away, and it is therefore virtually impossible to state the distance to which housing has an effect. In the Liley et al. study, we calculated the correlation between nightjar density on a heathland patch (based on the 2004 nightjar survey) and the housing density within a range of distances from the edge of each patch, separately for the Dorset and Thames Basin
Heaths (TBH) patches and then for the two SPA datasets combined. The correlations were calculated for nightjar density based on the whole patch area and also based on the ‘heathland’ area only. These simple negative correlations of whole patch nightjar density with housing density for Dorset were similar (-0.373 to -0.417) and statistically significant (all \( p < 0.01 \)) for each distance range up to the assessed maximum of 5km; although correlations marginally peaked at distance limits of between 800 and 2000m. For the Thames Basin Heaths, the negative correlations for whole patch nightjar density with housing density were slightly stronger (-0.425 to -0.481) than those for Dorset for housing distance limits up to 800m. However, because there are fewer sites in the Thames Basin Heaths, the statistical degrees of freedom were much less and the correlations were therefore statistically significant only for distances up to 800m; correlations thereafter decreased in strength with distance. Using nightjar data extracted only for heathland habitats (i.e. calculating density per ha of heathland rather than per ha of the total site), patterns were similar.

9.4.7. For both stone curlew and nightjar there is therefore evidence of an avoidance of housing. This effect trails off with distance away from housing, but this trailing off is gradual and it is therefore difficult to draw a definitive distance, beyond which no effect occurs. There is clearly evidence for taking at least a 1000m distance for stone curlews, and potentially further to somewhere between 1000m and 2500m. Based on the evidence from the Thames Basin Heaths and Dorset, similar distances would potentially be applicable for nightjar too.

9.4.8. The distance at which it is determined that any built development would no longer have an adverse effect upon stone curlews will be based upon the best available information and scientific opinion, whilst also applying the required precautionary approach. Evidence presented here indicates that at a distance of 1000m there is likely to still be an adverse effect, given that the weighting at this distance is still half that at zero metres, but that the effect becomes negligible once the built development is 2500m away. At some distance between those points therefore, the effects of the development will no longer be such that an adverse effect upon the ecological integrity of the SPA occurs. At any distance from that point up to 2500m, effect upon the interest features of the European site are at a scale that those effects are no longer considered to be an adverse effect upon the ecological integrity of the site. Those remaining effects however, would need to be considered in combination with any other effects arising as a result of the Core Strategy, where it has similarly been determined that adverse effects upon site integrity alone have been ruled out, but those effects have not been completely avoided. Two or more of these lower level effects
combined could lead to an adverse effect upon site integrity when considered in-combination.

9.4.9. We have plotted the distribution of key areas for Annex I birds in Figure 3. We have plotted the Breckland SPA boundary, and also mapped the forestry blocks and suitable arable land for stone curlews. We have combined these respective habitats and plotted a range of buffers up to a distance of 2.5km. It can be seen that all of Thetford and some of Swaffham and Watton are within the 1Km and 1.5km buffers.

9.4.10. The appropriate assessment of the impact of built development upon the Annex 1 species for Breckland SPA concludes that adverse effects upon the ecological integrity of the site, in relation to the three Annex 1 bird species cannot be ruled out. Greater evidence exists in relation to the impacts of housing, but a precautionary approach is taken with regard to the impacts of employment development. The point at which the effects are no longer adverse (i.e. at a distance somewhere between 1000m and 2500m) now requires further consideration. It is concluded that as it is the built development itself that causes the effect, it is difficult to determine what possible mitigation measures could be implemented. It is therefore suggested that, based upon the evidence and taking a precautionary approach a distance must be set that prevents built development occurring within a zone whereby it is considered that adverse effects would occur. The evidence presented here within the appropriate assessment report should enable Natural England, and possibly other key stakeholders or relevant specialist bodies, to set the most appropriate distance on a precautionary basis.
Figure 3: Important areas for Annex I bird species and buffers at successive distances (to 2.5km) beyond these. The arable land data is that used by Sharp et al. (2008a). The forestry block data were provided by the Forestry Commission. Buffers are drawn around the combined area of the arable land, the forestry and the Breckland SPA.
9.5. **Indirect effects of residents from additional housing, and incoming tourists, in terms of disturbance Breckland SPA Annex 1 bird species (Policies CP1 and DC8)**

9.5.1. There is a strong evidence base on the impacts of recreational disturbance on stone curlews, nightjars and woodlarks. Although national populations of all three species have generally increased in recent years, prospects for further recovery, for nightjar and woodlark at least, may be limited by factors including the effects of recreational disturbance (Langston et al., 2007c).

9.5.2. In work on Salisbury Plain, Taylor (2007) looked at the behavioural response of incubating stone curlews to potential disturbance events in the vicinity of the nest. Stone curlews responded to disturbance by becoming alert and then temporarily leaving the nest, and Taylor recorded the distance (between the source of the disturbance and the nest) at which these responses occurred. Her results showed that stone curlews leave the nest in response to disturbance at considerable distances and that the closer a potential source of disturbance, the greater likelihood that the birds would respond by leaving the nest. Even at long distances (> 300 m) the probability of the stone curlew running or flying was elevated, relative to that when the disturbance was further away or absent. The probability of response per unit distance also varied with the type of disturbance. For example, after allowing for the effect of distance, birds were more likely to respond by running or flying from a walker with a dog than a walker without a dog, or than a motor vehicle. While these results do not show any population impact of disturbance, the behavioural response shows that the species is particularly sensitive to the presence of people. Repeated flushing has the potential for consequences on the health of the adult in terms of energy use and leaves the nest vulnerable to predation.

9.5.3. Studies of nightjars have shown that breeding success is lower on sites with higher levels of access, and for nests close to footpaths (Murison, 2002). Predation of eggs seems to be a principal cause of nightjar nest failure. Dogs have been filmed (using nest cameras) flushing incubating nightjars from the nest. Recreational disturbance, particularly from dogs, causes adults to be flushed from the nest, potentially betraying the presence of the nest to predators such as crows (Langston et al., 2007a, Langston et al., 2007b, Murison, 2002, Woodfield and Langston, 2004). In both conifer plantations and heathland sites nightjar territories tend to occur where levels of human disturbance are lowest (Liley et al., 2006a), suggesting that the birds are able to select areas where access levels are lower, and sites with high levels of recreational access tend to hold fewer nightjars (Clarke et al., 2008).
Woodlarks have been intensively studied in conifer plantations and heathland habitats in the Dorset Heaths (see Mallord, 2005). Mallord’s work has shown that otherwise suitable habitat with high levels of recreational access holds lower densities of woodlarks, but that breeding success in such areas is actually better, due to reduced competition between woodlarks (Mallord et al., 2007a, Mallord et al., 2006). The increase in breeding success is, however, not sufficient to compensate for the impact of disturbance and the net effect is a negative population impact (Mallord et al., 2006).

Patterns of recreational use of Thetford Forest and surrounding countryside are described by Dolman et al. (2008). In their visitor survey, based on a sample of path sections, a total of 739 groups (1507 people) were recorded during 3551 hours of visitor surveys. This gives an approximate hourly visitor rate of 0.4 people per hour.

The visitor survey documents a pattern of diffuse access across a large area. Most people arrived by car (68% interviewees), particularly in Thetford Forest (when compared to surrounding countryside). Half (50%) of drivers used car-parks, with the remainder using lay-bys (17%), gateways (22%), verges or nearby housing (<10%). The proportion using gateways was higher in the Forest – with nearly one-third (29%) of visitors using these to park. Country Parks had highest visitor rates (0.89 groups per hour). Tarmac roads and National Trails were also busy, followed by byways and designated routes. Fire routes within the forest and gateways were also used but there was little evidence of use on private tracks.

Of the 739 groups, 340 (46% of groups) were dog walkers. Walking and cycling were also frequently recorded activities. Weekends were busiest, but week-day use was still relatively high: virtually three-quarters (74%) of interviewees visited at least once per week. Over half (56%) of dog walkers visited daily. More than half (54%) respondents walked the same footpath at least once per week.

The distance between people’s home postcode and the point at which they were interviewed (interview points were often well inside the forest and therefore well away from the starting point of people’s routes) shows that most visitors are relatively local – 43% were interviewed within 5km of their home postcode and a further 20% between 5 and 10km.

The visitor modelling by Dolman et al derived predictions of visitor use under different housing scenarios and these were used by the RSPB to explore the potential for increased flushing of stone curlews (using

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14 Early draft report provided by R. Langston, RSPB, on 21/9/08
their SCARE model, developed by Taylor et al. (2007) as a result of an increase in access levels resulting from new housing.

9.5.10. The RSPB initially took all nest locations in the Thetford area for 2002-2007 (a 6 year period), giving a sample of 1365 nest locations. Of these, 499 were within 400 m of a track (locations further than this from tracks were considered almost certainly not affected by walkers). The 499 points were within 384 grid squares. For grid squares with more than one nest the nearest nest to a track was used, giving a sample of 384 nests. Of these 90 were on semi-natural habitat and 294 were on other habitats (mostly farmland). A random sample of 60 from the 90 semi-natural nests and 30 from the 294 other nests were then used in the SCARE model.

9.5.11. The RSPB then applied the SCARE model to each of the 90 selected nest sites. Using the estimated number of potential disturbance events (PDEs) per hour (average for March-October, walkers and walkers with dogs only) on each track within 400 m of the nest site, provided from the UEA visitor survey (Dolman et al., 2008). The SCARE model estimated the number of responses per hour expected from the estimated number of PDEs per hour. Having done this separately for each track, the response rates across all tracks within 400 m of the nest were then summed for each grid square. A fitted relationship between the probability of occupancy of an otherwise suitable site and expected active response rate (from Taylor et al., 2007) was then used to estimate the probability of occupancy by breeding stone curlews of each site.

9.5.12. The visitor models only predicted changes in access levels as a result of new housing development in Thetford, and therefore changes in visitor access levels were predicted only in the area adjacent to Thetford. The SCARE models suggested that probabilities of occupancy would remain unchanged for most stone curlew locations, as many were well away from Thetford, but for those locations close to Thetford the modelling provides evidence that some areas would be less likely to be used by stone curlews. Unfortunately, in the time available, the RSPB work was unable to estimate the total number of displaced birds and therefore the full implications for stone curlews cannot be determined. It can only be concluded that in some areas an unquantified number of stone curlews would be displaced.

9.5.13. The predictions of visitor numbers (for both current housing levels and future scenarios), as described by Dolman et al. (2008) were provided on a 3km x 3km grid, providing a coarse overview of the visitor totals for the SPA and adjacent land. The predictions were hourly rates, for the period 06.30-18.30, averaged across weekends and weekdays.
and averaged across all paths within each grid cell. We summarise these data in Figure 4.
Figure 4: Current and future predictions of visitor numbers, based on a 3x3km grid, as provided by UEA. Data are the mean number of potential disturbance events per hour per track section, averaged over weekdays and weekends, for daylight hours 06.30 – 18.30. See Dolman et al. for more details.
9.5.14. In summary:
- There were 119 grid cells.
- The length of path within each 3km cell ranged from 19m to 66.16km, with a mean, per cell of 15013m.
- The mean baseline (i.e. current) number of disturbance events per hour (averaged across all path sections within each cell) ranged from 0.04-1.10 (mean value per cell = 0.25, median = 0.22 events per hour).
- The mean number of disturbance events per hour per scenario (i.e. average across all scenario predictions across all path sections within the cell) ranged from 0.06 – 1.80 (mean value per cell = 0.27, median = 0.23).
- The scenarios simply focused on new development within Thetford, and therefore, not surprisingly, they show an increase for only 52 of the 119 grid cells (i.e. 44% of grid cells). The largest increase in visitor numbers was 0.70 events per hour, for the grid cell adjacent to Thetford.

9.5.15. Whilst the stone curlew population within Breckland is quite unique, other heathland sites elsewhere in the UK are recognised for their populations of the two other Annex 1 species: woodlark and nightjar. As a means of determining the likely scale of impacts of recreation on these two species, we attempt to make comparisons with other SPAs that support nightjars and woodlarks (Table 5). Such a comparison is useful because detailed work on the impacts of disturbance has been conducted in other SPAs (particularly the Dorset Heaths), we also know the visitor rates at these other sites and mitigation measures have been established to minimise the effects of future increases in visitor rates. Such broad brush comparisons allow us to determine at least if visitor rates are broadly comparable, whether the volume of housing is similar and potentially provide a ‘model’ for mitigation measures.
Table 5: Comparison of Dorset Heaths, Thames Basin Heaths and Breckland SPAs. Details of how the different figures are derived are given beneath the table.

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<tr>
<th></th>
<th>Dorset Heaths</th>
<th>Thames Basin Heaths</th>
<th>Breckland</th>
</tr>
</thead>
<tbody>
<tr>
<td>Size of designated area (ha)¹</td>
<td>8,169</td>
<td>8,294</td>
<td>39,280</td>
</tr>
<tr>
<td>Total area with access and inc</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>forestry² (ha)</td>
<td>10,718</td>
<td>7,348</td>
<td>18,058</td>
</tr>
<tr>
<td>Relevant European designations</td>
<td>SPA, SAC,</td>
<td>SPA, SAC,</td>
<td>SPA, SAC</td>
</tr>
<tr>
<td>Mean group size</td>
<td>1.5</td>
<td>1.8</td>
<td>2.0</td>
</tr>
<tr>
<td>Number of visitors per hour³</td>
<td>0.16</td>
<td>0.63</td>
<td>0.50</td>
</tr>
<tr>
<td>Total number car-park spaces</td>
<td>5,215</td>
<td>1,998</td>
<td></td>
</tr>
<tr>
<td>% of single person groups</td>
<td>64</td>
<td>52</td>
<td>50</td>
</tr>
<tr>
<td>% of visitor groups visiting daily</td>
<td>9</td>
<td>52</td>
<td>40</td>
</tr>
<tr>
<td>% visitors whose main purpose is dog-walking</td>
<td>80</td>
<td>59</td>
<td>60⁴</td>
</tr>
<tr>
<td>No. Nightjars⁵</td>
<td>791</td>
<td>370</td>
<td>350</td>
</tr>
<tr>
<td>No. Woodlarks⁶</td>
<td>153</td>
<td>219</td>
<td>405</td>
</tr>
<tr>
<td>No. Houses within 500m⁷</td>
<td>42,522</td>
<td>38,579</td>
<td>11,687</td>
</tr>
<tr>
<td>No. Houses within 5km</td>
<td>238,957</td>
<td>302,792</td>
<td>51,722</td>
</tr>
</tbody>
</table>

¹These areas are the total area designated – the Dorset Heaths SPA, the Thames Basin Heaths SPA and Breckland SPA.

²This row is the approximate area of land with access and associated with the SPA / SAC. For the Dorset Heaths we include the forestry blocks (such as Wareham Forest) that are largely outside the SPA but support large numbers of woodlark and nightjar. The area given for Breckland is the area of Breckland Forest SSSI.

³These figures are impossible to make directly comparable and we therefore suggest that they are used simply to provide a very crude comparison. The Breckland figure is calculated from the UEA data, using the mean number of disturbance events per cell (0.25) and then multiplying this by the mean group size (2.0) to give total people. For Dorset and Thames Basin these figures are the average from the two different models for each site, using the median value per 50mx50m cell (see Table 9 in Liley et al., 2006a), and then divided by 16 to give the hourly rate. The crucial difference is that the Breckland data is solely for paths, whereas the values for the other sites are for the entire area (i.e. off paths and on-paths).

⁴This figure of 60% is based on the percentage of groups, rather than actual visitors.

⁵These figures from Conway et al. (2007), from the 2004 national survey.

⁶These figures from actual territory centres, GIS data provided by Natural England from the 2006 national survey.

⁷The data on the number of houses are from postcode data and are the number of residential properties for all postcodes that fall within the given distance of the SPA boundary.
9.5.16. The comparison reveals that the Breckland SPA (and we focus on the forest and heath elements) represent a much larger parcel of land with public access than either Dorset or the Thames Basin Heaths. There are far fewer houses adjacent to Breckland SPA and the visitor rates (as might be expected given the larger area of land and few number of houses) appear approximately similar. It is potentially difficult to draw direct comparisons with the visitor data as these data are from surveys conducted in a different manner and the Breckland data was only made available at a relatively coarse scale. The predictions for the Dorset and Thames Basin Heaths are made for the entire site area: visitors in the models are spread out over the area of the site regardless of path networks. In reality people will mostly use paths and therefore we would expect in Dorset and Thames Basin Heaths these figures to be much higher if it were possible to generate estimates solely for paths, as was done for Breckland.

9.5.17. The coarse nature of the Breckland grid will result in visitor totals being ‘flattened’: access levels will peak around car-parks, visitor centres and access points and decrease with distance ‘into’ the forest. A relatively small proportion of people are likely to penetrate 3km from the start of their route, and therefore the average for a given 3km grid cell will include quiet sections of paths and busier sections. The maximum value for any track section in Breckland was 3.35 disturbance events per hour and three 3km cells had maximum values above 2 disturbance events per hour. Even these maxima are very low compared to visitor numbers on the Dorset and Thames Basin Heaths.

9.5.18. As a consequence of these comparisons we suggest that access levels are currently relatively low in Breckland SPA and the level of increase in visitors, as a result of new housing, will still not bring the area into the same general level of visitor pressure as currently experienced on the Dorset and Thames Basin Heaths. Many of the grass heaths have CRoW access restrictions put in place each year due to the presence of stone curlews and this will minimise disturbance effects on those sites.

9.5.19. Bird distributions will change over time, particularly those of nightjar and woodlark in relation to forestry management. Locally visitor numbers may be high (we have insufficient information to pin point these locations), and, with potential growth in Thetford and Weeting, increased access levels and localised disturbance to some areas that have the potential to support (or currently do support woodlarks and nightjars) is likely.

9.5.20. In considering the likelihood of adverse effects arising from the indirect effects of additional housing, it is important to note that whilst
comparisons with other SPAs are useful, the differences in visitor patterns and levels should not automatically lead to the conclusion that significantly lower visitor use of the Breckland SPA will not result in an adverse effect upon site integrity. There is no evidence to dispute the possibility that small increases in visitor use in less frequently used sites could have an impact upon the Annex 1 interest features.

9.5.21. Whilst the scale of impact may be less than that seen at other heathland SPAs, it is concluded, taking a very precautionary approach and in the absence of evidence to the contrary, that the relatively low level increase in visitors to the Breckland SPA could potentially result in adverse effects. The analysis of potential visitor increases and likely effects upon the Annex 1 species undertaken in this assessment will inform the level and types of mitigation necessary to prevent any visitor increases, albeit on a relatively low level, adversely affecting the ecological integrity of the annex 1 species.

9.6. Other urban effects (All policies taken to appropriate assessment, particularly CP1 and CP3, and to some extent DC8 and DC12)

9.6.1. Disturbance to birds has been discussed in an earlier section. Other ‘urban effects’ include a wide range of impacts including; deliberate and accidental fires, litter, predation from people and pets, eutrophication and dumping / fly tipping. Attention was formally drawn to these issues in a report on the Dorset heaths to the Council of Europe in 1998 (De Molinaar, 1998), which prompted the UK Government to commission a study of heathland fires in the county (Kirby and Tantrum, 1999). Various authors have since reviewed and summarised the various impacts (see Haskins, 2000, Liley et al., 2006b, Underhill-Day, 2005); we provide a summary in Table 6 and further discussion below. We view these urban effects as potentially operating synergistically to influence the conservation interest of sites surrounded by high densities of housing.
Table 6: Summary of key negative impacts (besides disturbance to birds) of development close to European heathland sites. Table is adapted from Liley et al. (2006b)

<table>
<thead>
<tr>
<th>Effect</th>
<th>Description and Impact</th>
<th>Examples of species / species group affected</th>
<th>Key references</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fragmentation</td>
<td>Loss of supporting habitats</td>
<td>Nectar feeding invertebrates; nightjar, woodlark. Invertebrates, plants, reptiles, birds and mammals</td>
<td>Alexander &amp; Cresswell (1990)</td>
</tr>
<tr>
<td></td>
<td>Lack of connectivity between sites preventing movement / genetic exchange between sites</td>
<td>Invertebrates and plants</td>
<td>Webb (1989); Webb &amp; Vermaat (1990); Webb (1990); Webb &amp; Thomas (1994)</td>
</tr>
<tr>
<td></td>
<td>Smaller site size increases edge effects from non-heathland species</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Predation and increased</td>
<td>Access by pet cats, some of which feed on the heath</td>
<td>Birds, invertebrates, reptiles and amphibians</td>
<td>Woods et al. (2003); Sims et al. (2008)</td>
</tr>
<tr>
<td>mortalities</td>
<td>Different densities of mammalian predators such as foxes present on more urban heaths</td>
<td>Birds, reptiles, mammals.</td>
<td>Taylor (2002)</td>
</tr>
<tr>
<td>Roads</td>
<td>Increase in crows and magpies on sites with greater human activity</td>
<td>Birds, invertebrates, reptiles and amphibians</td>
<td>Marzluff &amp; Neatherlin (2006)</td>
</tr>
<tr>
<td>Roads</td>
<td>Road kills from traffic</td>
<td>Birds, invertebrates, reptiles and amphibians</td>
<td>Erritzoe (2002)</td>
</tr>
<tr>
<td>Roads</td>
<td>Increased levels of noise and light pollution</td>
<td>Birds, Invertebrates</td>
<td>Reijnen et al. (1997)</td>
</tr>
<tr>
<td>Pollution / Hydrology</td>
<td>Ground and surface water pollution from roads and hard surfaces, spills and dumping.</td>
<td>Vegetation communities, macroinvertebrates in watercourses</td>
<td>Armitage et al. (1994)</td>
</tr>
<tr>
<td>Trampling</td>
<td>Soil erosion from walkers, cyclists and horse riders</td>
<td>Plant communities and species, some invertebrates benefit</td>
<td></td>
</tr>
<tr>
<td>Vandalism</td>
<td>Damage to signs, fences, gates</td>
<td>Invertebrates and reptiles</td>
<td></td>
</tr>
<tr>
<td>Eutrophication</td>
<td>Enrichment of soils from dog excrement.</td>
<td>Plant communities and species, invertebrates</td>
<td>Bonner &amp; Agnew (1983); Taylor et al. (Taylor et al., 2005); Liley (2004)</td>
</tr>
<tr>
<td></td>
<td>breeding and foraging habitat</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restrictions on</td>
<td>Stock grazing, gates left open, dogs</td>
<td>Vegetation communities</td>
<td>Bullock &amp; Webb (1994)</td>
</tr>
<tr>
<td>management</td>
<td>chasing animals, injury to stock</td>
<td></td>
<td></td>
</tr>
<tr>
<td>--------------</td>
<td>----------------------------------</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Objections to management eg.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>tree clearance</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Increased costs of wardening</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Woods (2002)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Negative public perception</th>
<th>Disregard of access and activity restrictions, hence trampling, dog fouling, fire lighting, illegal motorcycling etc</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Vegetation communities, birds, invertebrates, reptiles and amphibians</td>
</tr>
</tbody>
</table>

9.6.2. Controlled fires have been part of beneficial heathland management for many years, however, wild (i.e. unmanaged) fires can be a serious issue. Kirkby & Tantrum (1999) analysed 3333 fire incidents in Dorset during 1990-1998. There was a clear peak during April-August, the period when potential damage to heathland fauna and flora is at its greatest. The authors found a clear link between fire frequency and urban areas, with heaths surrounded by more houses tending to be those with the most fires. Kirkby & Tantrum’s survey of the causes of fires revealed 59% were arson, 17% were camp fires, 8% from management fires getting out of control, and 7% from spreading bonfires.

9.6.3. Fire has a serious impact on ecological integrity. The effect of individual fires depends on date, fire temperature and duration, and the type of habitat burnt. Fire destroys vegetation, which, depending on substrate and fire characteristics, can take 4-20 years to re-establish, most areas going through successional grassland stages, and some on better soils ending up in woodland rather than heathland. Particularly hot, slow-moving fires can destroy seedbanks and even the peat layer, thus extending the time taken for heathland vegetation to re-establish. Invertebrates, reptiles, birds and other species will re-colonise once the vegetation has recovered.

9.6.4. There are estimates that cats account for one third of the mortality occurring in some bird populations (Churcher and Lawton, 1987) and in a five month period it has been estimated that Britain’s c. 9 million cats bring home in the order of 92 million prey items (Woods et al., 2003). These prey items include birds, mammals, herptiles and invertebrates. Underhill-Day (2005) presents records of cats from 15 Dorset heathlands – and evidence suggests that they roam up to 1500m (particularly at night), so many heaths are well within territory ranges of urban cats. While evidence for the population consequences of cat predation are mixed (e.g. Sims et al., 2008), the presence of an increased number of cats on breckland heaths clearly has the potential for negative impacts to a range of interest features. The proximity of some heaths to urban areas may also result in an increase in the densities of other urban predators, such as foxes (Harris and Rayner, 1986, Taylor, 2002). On heaths with human activity, there is evidence of higher densities of avian predators such as crows and magpies (Marzluff & Neatherlin, 2006; Taylor, 2002.).

9.6.5. Trampling may occur as a result of horses, cycles, motorcycles or feet and can result in soil compaction, changes to soil hydrology or chemistry, changes to the soil invertebrate community (and an overall reduction in invertebrate numbers), changes in plant communities and—with heavy use—soil erosion and creation of bare ground. The degree of damage depends on several factors: soil type, slope, drainage and hydrology; the composition of the initial vegetation; and the scale, frequency and seasonality of its wear (see Lowen et al., 2008 for reviews). The Breckland heaths are characterised by a high cover of lichen species, including several of conservation concern, and trampling may be a particular issue. The finest terricolous lichen communities in Breckland are limited to two
trackways where it is thought that pressure from the human foot is beneficial as it compresses the substrate, but there is concern about other types of use, especially in the winter when heavy episodic use can churn the ground up (Gilbert, 2002).

9.6.6. Many visitors are accompanied by dogs (46% of the groups recorded by Dolman et al., 2008). The majority (85% in the Dolman et al study) of visitors let their dogs off the lead. In addition to disturbance to birds and direct predation, dogs may chase livestock, disturb aquatic wildlife, cause physical damage to water body structure, and possibly chemical pollution and enrich soil through fouling. The inevitably local enrichment (eutrophication) effects—caused by inputs of nitrogen, phosphates and potassium—may last up to three years in grassland communities, and may have a similar duration of effect in heathlands; the enrichment effect on nutrient-poor soils such as heaths is significant.

9.6.7. For most of these urban effects, their occurrence and scale of impact is likely to be related to the amount of housing surrounding sites. Much of the work on urban effects to heathlands has come from the Dorset Heaths, where some heaths lie in the middle of the Poole / Bournemouth conurbation. In order to determine the extent to which the Breckland heaths compare with the Dorset Heaths in the degree of urbanisation surrounding them, we used postcode data (number of residential properties) within a GIS to determine how many houses surround component parts of the respective SACs. We extracted the number of houses at distance bands of 500m, 1000m, 2500m and 5000m, and these data are summarised in Figure 5. It is clear that the Breckland heaths are, largely, much more rural in feel than the Dorset sites. For example the median number of residential properties within 2500m of the Breckland sites is 747 properties and for the Dorset Heaths the median is 6351 properties.
Despite this general trend, there are a smaller number of Breckland SSSIs with relatively high numbers of surrounding properties. Those with more than 4000 within 2500m of the SSSI boundary are Barnhamcross Common (10,124 properties within 2500m, Thetford Golf Course & Marsh (8094 properties within 2500m) and Thetford Heath (4851 houses within 2500m). These sites are all very close to Thetford. It is therefore assumed that it is likely to be these more urban heaths in the vicinity of Thetford where the urban effects described above could be an issue.

Barnham Cross Common is very urban in feel and largely surrounded by housing. It is close to Thetford town centre. At the time of writing the site is classified as in unfavourable recovering condition\textsuperscript{15}, however this assessment is several years old and the presence of a management plan can influence assessment criteria. A reconsideration of assessment condition is needed as it is considered that condition may have declined further rather than improved. A management agreement is in place and recent management has included scrub removal and mowing of the grassland. The assessment team visited briefly on the 18th August and found evidence of at least eight recent fires (all relatively small), most of which were on the eastern edge of the site, relatively close to housing.

\textsuperscript{15} Condition assessment data from the Natural England website, last updated August 1\textsuperscript{st} 2008, assessment dated 2003
There was evidence of bike ruts and off road vehicle use. Many dog walkers were seen and dog fouling was clearly an issue at the site. Tall patches of nettle *Urtica dioica* and rosebay willowherb *Chamerion angustifolium* were evidence of nutrient enrichment.

9.6.10. The other Thetford sites are less easily accessible from Thetford town. Thetford Golf Course and Marsh lies separated from the town by the A11. It is currently\(^\text{16}\) largely in unfavourable recovering condition (due to annual management that includes conifer clearance). One unit (unit 3) is assessed as unfavourable with no change. This assessment is for a marshy area and lack of appropriate management is the reason for the poor condition. Thetford Heath lies to the south-west of Thetford (the other side of Barnhamcross Common) and much of this heath has no public access. The SSSI units are currently in favourable or unfavourable recovering condition\(^\text{17}\), with grazing / management being undertaken by the Norfolk Wildlife Trust.

9.6.11. Following the appropriate assessment work on urban effects, it would therefore appear that urban effects are currently not a major issue for most Breckland sites, with the exception of Barnhamcross Common. Current levels of housing are such that most heaths have a rural feel and urban effects are not currently a cause for unfavourable condition. Future development in the District may however result in an increase in these effects, and development in Thetford and Weeting would be particular cause for concern. Development that would add to the existing urban effects of Barnhamcross Common is proposed within the Core Strategy, with the Thetford urban extension.

9.6.12. It is concluded that mitigation measures need to be sought to prevent further adverse effects arising at Barnhamcross Common. It is concluded that there is the potential for urbanisation effects to occur with increasing housing at Thetford and Weeting. Taking a precautionary approach, mitigation measures should also be sought for Thetford Golf Course & Marsh and Thetford Heath, to prevent the occurrence of urban effects.

\(^{16}\) Units last assessed between 2000 and 2002

\(^{17}\) Assessments dated 2003 and 2004
9.7. Indirect Effects of Increased Recreational Pressure the SPAs, SACs and Ramsar sites at the North Norfolk Coast (Policies CP1 and DC8)

9.7.1. Norfolk’s dynamic, north- and west facing coastline is of international importance for its wildlife and also attracts large number of visitors. International designations for nature conservation are summarised in Table 7

Table 7: International designations applying to the North Norfolk Coast

<table>
<thead>
<tr>
<th>Designation</th>
<th>Geographical Area</th>
<th>Summary of Interest Feature</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biosphere Reserve</td>
<td>Blakeney Point, Cley, Salthouse, Holkham, Scolt</td>
<td>Coastal habitats; various plants, lichens and invertebrates; breeding terns; wintering and passage waterfowl;</td>
</tr>
<tr>
<td>North Norfolk Coast Ramsar</td>
<td>All of N. Norfolk Coast SSSI</td>
<td>Breeding waders, terns, Mediterranean gull, bittern, marsh harrier; passage and wintering waterfowl; wintering bittern and hen harrier</td>
</tr>
<tr>
<td>North Norfolk SPA</td>
<td>All of N. Norfolk Coast SSSI</td>
<td>Breeding waders, terns, Mediterranean gull, bittern, marsh harrier; passage and wintering waterfowl; wintering bittern and hen harrier</td>
</tr>
<tr>
<td>North Norfolk Coast and Gibraltar Point SAC</td>
<td>N. Norfolk Coast SSSI above HWM and excluding the grazing marshes</td>
<td>Dune grassland (priority); Lagoons (priority); Mediterranean saltmarsh scrub; Shifting dunes; Shifting dunes with marram grass; Humid dune slacks; Coastal shingle vegetation outside the reach of waves</td>
</tr>
<tr>
<td>Wash and Norfolk Coast SAC</td>
<td>North Norfolk Coast SSSI below HWM and also adjacent marine area including the Wash</td>
<td>Subtidal sandbanks; Glasswort and other annuals colonising mud and sand; Atlantic salt meadows; Mediterranean salt meadows; Mediterranean saltmarsh scrub; Intertidal mudflats and sandflats; Shallow inlets and bays; Common Seal</td>
</tr>
<tr>
<td>The Wash Ramsar</td>
<td>As The Wash SPA</td>
<td>Estuarine habitats; wintering and passage waterfowl.</td>
</tr>
<tr>
<td>The Wash SPA</td>
<td>The entirety of the Wash (over 62,000 ha)</td>
<td>Breeding marsh harrier, common tern and little tern; Passage and wintering waterfowl</td>
</tr>
</tbody>
</table>

9.7.2. In their review of the impacts of recreation to European marine sites, Saunders et al. (2000) split effects into those relating to water-borne activities and those relating to land based recreation. They identify the following impacts:

**Water born activities**

- Engine emissions
- Sound emissions
- Antifouling paint leaching
- Sewage and other waste discharges
- Disturbance to wildlife
- Erosion and turbidity

**Land based recreation**

- Soil compaction and erosion
- Littering and marine pollution
- Disturbance to wildlife
- Fire
9.7.3. To this list we can add the additional resources (staff time, visitor infrastructure etc) that might be associated with increased visitor pressure or managing visitors. The scale of the different effects will relate to the types of access, intensity and timing as well as the locations and types of habitat involved. There may also be cumulative impacts.

9.7.4. For more detailed reviews of the implications of coastal access, impacts of access and management measures we refer the reader to other sources (e.g. Kirby et al., 2004, Lowen et al., 2008, McKenna et al., 2000, Penny Anderson Associates, 2001, Penny Anderson Associates, 2006, Saunders et al., 2000, Scottish Natural Heritage, 2007, Taylor et al., 2006). We highlight the following interest features where access impacts may be particularly important.

9.7.5. For some coastal habitats, the volume of visitor pressure, in terms of footfall, can be an issue. For example in sand dunes, experimental work has demonstrated that light levels of trampling can increase plant diversity, but moderate to high trampling can lead to increased bare ground, soil compaction, loss of plant species diversity and changes in vegetation height. Differences exist between different dune habitats. Work in Norfolk by Coombes (2007) has explored the relationship between the amount of passes (footfalls) and reduction in vegetation cover in different habitats. For most habitats (yellow dunes, grey dunes and saltmarsh) the relationship appears to be linear, suggesting that the impact is proportional to the amount of access. Her monitoring of visitor routes at sites such as Holkham clearly shows a range of routes and people fanning out across a wide area of beach and dune habitats, utilising an informal network of paths.

9.7.6. The effect of access and human disturbance to seals is reviewed by Lowen et al. (2008). Clear population impacts have been shown for some species, but there have been relatively few studies within the UK. In Norfolk, monitoring results highlight the recent increase in numbers of grey seals along the East Anglian coastline and the scarcity of harbour seals (Skeate and Perrow, 2008), which are a designated interest feature of the Norfolk Coast SAC. The authors suggest that disease has also precipitated a decline from which harbour seals seem unable to recover; harbour seals now seem unable to breed on the mainland, “presumably because of the pressure of humans and their dogs”. Harbour seals’ breeding and moulting season lasts from June to August coinciding with the ‘peak’ tourist and recreational season. Disturbance is therefore of particular concern. Seals can occur along the entire coast, but principal areas include Blakeney and the Wash.

9.7.7. There is a large body of work addressing the impacts of disturbance to coastal birds. On the North Norfolk coast work has shown clear impacts of disturbance for ringed plovers nesting at Snettisham, on the edge of the Wash (Liley, 1999, Liley and Sutherland, 2007). There are no studies of breeding terns and disturbance in the UK, but in Portugal low breeding success of Little Terns has shown to be associated with human activities (Calado, 1996). Detailed nest monitoring has evaluated the influence of
human disturbance on breeding success of little terns and the interaction with the seasonal variation in the birds’ breeding biology (Medeirosa et al., 2007). The percentage of nests producing hatched chicks varied between 26.7% and 66.4% in different years and habitats. The main causes of hatching failure varied between years and habitats, but predation, flooding and human activities were very common causes. Critically, the presence/absence of protective measures (warning signs and wardening) was the most important predictor of nesting success, with birds being up to 34 times more likely to succeed with protective measures. Nests were also more likely to succeed earlier in the season.

9.7.8. There have been a wide range of different studies addressing the impacts of disturbance to geese (e.g. Percival et al., 1997, Keller, 1990, Madsen, 1985, Stock and Hofeditz, 1997, Riddington, 1996, Gill, 1996, Owens, 1977). These address a range of species, types of disturbance and show a range of impacts. Much work has been undertaken within the Norfolk Coast SPA. Riddington et al. (1996) studied disturbance factors that caused Brent Geese along a stretch of the north Norfolk coast to take flight. The most frequent source of disturbance was pedestrians. Those disturbances resulting in greatest energy expenditure were also of human origin, but tended to be ‘mechanised’ (e.g. aircraft, gunfire). The authors suggested that disturbance may be one of the primary factors influencing local distribution of Brent Geese. Gill (1996) studied the Pink-footed Geese roosting at Scolt Head Island. For most of the winter the geese fed predominantly upon the harvested remains of sugar beet. Beet fields closest to the roost site were used first and the geese fed further from the roost as the beet remains in these fields was depleted. Small fields were avoided by the geese and fields closer to roads were used significantly less.

9.7.9. Shorebirds are often considered highly susceptible to disturbance because of their very obvious flight responses to humans and because they use areas that are generally subject to high levels of human recreational use. Many species may appear to avoid human presence (e.g. Ravenscroft et al., 2008) but this may not reduce the number of animals supported in an area. Using their individual-based model on the Wash estuary, West et al. (2007) explored the over winter survival of a range of species (black-tailed godwit Limosa limosa, bar-tailed godwit Limosa lapponica, Eurasian curlew Numenius arquata, Eurasian oystercatcher Haematopus ostralagus, red knot Calidris canutus, redshank Tringa totanus, dunlin Calidris alba and ringed plover Charadrius hiaticula) in relation to disturbance, habitat loss and changes in prey abundance. The model allowed predictions of the prey densities at which birds would start to starve. The system as a whole was predicted to be relatively insensitive to habitat loss. Black-tailed godwits were the most sensitive species, but their survival was not affected until 40% of the feeding grounds were removed. The survival of all species in the model remained high at fewer than 20 disturbances/hour. Although actual disturbance rates on the Wash were not measured during this study it is unlikely that present-day rates of disturbance represent a threat to the survival of the bird species modelled (West et al., 2002).
9.7.10. The North Norfolk coast attracts some 7.7 million day and 5.5 million night visits per year, (Rayment et al., 2000). These estimates were derived from work by the RSPB in 1999 (see Rayment et al., 2000 for full details), which involved interviews with visitors to six locations (beach car-parks / visitor centres at Halkham, Snettisham, Titchwell, Cley, Morston Quay and Blakeney). Across all sites just 4% of visitors were local residents, 28% were day-trippers from home, 22% were classed as holiday day-trippers and 46% were on holiday and staying in the study area. Taking the 7.7 million estimate of total day visitors, and assuming that the sample of interviews is representative, then the Norfolk Coast perhaps receives in the region of 2.2 million visits that are day trippers traveling from their homes, reflecting the attractiveness of the coast and its draw on the local population. An increase in housing levels across a broad area will potentially result in an increase in these day trippers.

9.7.11. People are attracted to the area for a wide range of reasons (for examples and more details see Scott Wilson Ltd, 2006, Liley, 1999), which include traditional coastal trips, wildlife watching, dog walks and sports & activities (such as kite flying, surfing, sailing etc).

9.7.12. There are some details on recent total visitor numbers for certain sites, which although often estimates give a guide for the scale of visitor numbers to particular attractions. These data are summarised in Table 8, which includes a variety of sites within the SPA / SAC. One of the sites, Titchwell RSPB reserve, is actually the most visited of all RSPB reserves in the country18.

Table 8: Visitor totals to selected North Norfolk sites in 2005. Taken from national tourism agency website19 (given as source “NTA” in the table) and from Rayment et al. (2000). Data for all sites apart from the railway are “estimates”. The tourism agency totals are all from 2005. Those in Rayment are older but not for specific years.

<table>
<thead>
<tr>
<th>Site</th>
<th>Total Visitor Numbers for 2005</th>
<th>Source and year</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norfolk Lavender</td>
<td>155,000</td>
<td>NTA</td>
<td>3% drop in visitors from 04-05</td>
</tr>
<tr>
<td>Sheringham Park</td>
<td>180,000</td>
<td>NTA</td>
<td>No change in visitors from 04-05</td>
</tr>
<tr>
<td>North Norfolk Coast Railway</td>
<td>119,485</td>
<td>NTA</td>
<td>1% drop in visitors from 04-05</td>
</tr>
<tr>
<td>Titchwell RSPB Reserve</td>
<td>89,210</td>
<td>NTA</td>
<td>11% drop in visitors from 04-05</td>
</tr>
<tr>
<td>Cley NWT Reserve</td>
<td>100,000</td>
<td>(Rayment et al., 2000)</td>
<td>30,000 through visitor centre each year</td>
</tr>
<tr>
<td>Lady Anne’s Drive, Holkham</td>
<td>110,000</td>
<td>(Rayment et al., 2000)</td>
<td>30,000 cars in the busiest 7 months of the year</td>
</tr>
<tr>
<td>Blakeney Quay</td>
<td>140,000</td>
<td>(Rayment et al., 2000)</td>
<td>40,000 cars April - November</td>
</tr>
<tr>
<td>Morston Quay</td>
<td>140,000</td>
<td>(Rayment et al., 2000)</td>
<td>40,000 cars April - November</td>
</tr>
<tr>
<td>Snettisham</td>
<td>41,000</td>
<td>(Rayment et al., 2000)</td>
<td>13,000 cars.</td>
</tr>
</tbody>
</table>

18 http://naturesvoice.co.uk/reserves/factfile.asp
9.7.13. Visitor questionnaire work at the Cley Reserve has been conducted in an attempt to determine the recreational value of the reserve (Klein and Bateman, 1998). Some of the interviews from this piece of work highlight the attractiveness of the coast and the loyalty with which some people visit. One respondent had visited the reserve 500 times in the past year and another respondent had twice travelled about 700 km for day trips to the reserve. The mean (and standard deviation) distance travelled by respondents to reach the reserve was 96 miles (+ 91 miles). While Cley is likely to attract visitors from a considerable distance (it is famous for birds), this distance reflects the extent to which people will travel to reach the coast.

9.7.14. The assessment team is not aware of studies which have specifically addressed where people come from (i.e. home postcodes or addresses) for multiple sites on the Norfolk Coast. Data on visitor flows at specific locations may well be available through car-park totals / tickets or similar, but these are often not comparable between sites. We have little understanding of how visitor numbers have changed over time, and which groups, if any, have increased. Activities such as kite surfing have clearly increased in recent years (Liley, 2008). Climate change has been predicted to result in an increase in visitor rates to the Norfolk coast, due to the increase in favourable weather conditions (Coombes, 2007).

9.7.15. Access and visitor pressure is rarely cited as an issue in the relevant SSSI condition tables\(^{20}\). The North Norfolk Coast SSSI is largely in favourable or unfavourable recovering condition (96%), with inappropriate coastal defence the reason for the small area remaining in unfavourable condition. For the Wash SSSI, 95% of the area is in favourable condition or is unfavourable recovering. The main reasons for unfavourable condition are inappropriate management, usually relating to grazing levels. For some SSSI units that are currently in favourable condition (e.g. units 21 and 22) access is cited as a potential threat, and for unit 22 the notes state that the unit is “subject to a high level of human activity throughout the year. Essentially the environmental damage to this part of the SSSI has been done and is now likely to have reached a threshold level.”

9.7.16. Given the paucity of visitor data for the Norfolk Coast it is difficult to determine what impact housing future development in Breckland may have. An increase in housing is likely to result in an increase in people, and it is to be expected that some of these will visit the coast. While the actual distance to the coast is not too far from Breckland District’s boundary, the journey by car is not fast (Table 9) and public transport options are limited. Thetford, being right in the south of Breckland District is, of course, particularly far from the coast and journey time by car from Thetford is well over an hour to most locations (Table 9). Therefore the proposed greatest increase in housing, as set out within the Core Strategy, will be furthest from the coastal sites.

\(^{20}\) Viewed on the web, 14/9/08; http://www.english-nature.org.uk/Special/sssi/search.cfm
Table 9: Travel distance (by road) and drive time from various locations to a selection of coastal sites that provide access to the European Sites. Distances and times are taken from the AA route finder website21.

<table>
<thead>
<tr>
<th>Location</th>
<th>Snettisham</th>
<th>Holkham</th>
<th>Brancaster</th>
<th>Blakeney</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thetford</td>
<td>65 km (64 mins)</td>
<td>72 km (75 mins)</td>
<td>78 km (83 mins)</td>
<td>80 km (76 mins)</td>
</tr>
<tr>
<td>Dereham</td>
<td>60 km (62 mins)</td>
<td>37 km (60 mins)</td>
<td>44 km (68 mins)</td>
<td>40 km (57 mins)</td>
</tr>
<tr>
<td>Attleborough22</td>
<td>83 km (86 mins)</td>
<td>93 km (94 mins)</td>
<td>99 km (101 mins)</td>
<td>81 km (83 mins)</td>
</tr>
<tr>
<td>Swaffham</td>
<td>41 km (44 mins)</td>
<td>42 km (48 mins)</td>
<td>48 km (56 mins)</td>
<td>50 km (49 mins)</td>
</tr>
</tbody>
</table>

9.7.17. The journey times illustrated in Table 3 may well deter people from making regular trips. Visits are therefore likely to be occasional and be day trips. Given the large volume of existing visitors, and the infrastructure in place along much of the coast (there are a string of nature reserves along the northern coast and much of the Wash is currently relatively difficult to access and less scenically attractive), it is perhaps to be anticipated that visitors from Breckland District will account for a relatively small proportion of visitors and be visiting sites where access management measures are in place. However, given the attractiveness of the coastline to visitors, the range of species present and the potential complexities of climate change (resulting in an increase in coastal access levels), even with the predicted small proportion of visitors to the coast from the Breckland District it is impossible to be confident that visitors originating from the Breckland District, and the likely increase in visitors with the volumes of new housing proposed, will not contribute to an adverse effect on integrity.

9.7.18. It is concluded that an adverse effect upon site integrity cannot be ruled out, when effects are considered in-combination with all other emerging spatial plans promoting new housing and tourism in the 20km arc from the international designations at the North Norfolk Coast. This in-combination effect is highlighted specifically in relation to Policies CP1 promoting levels of new housing and to some extent DC8 promoting the tourism economy of the district. Mitigation measures need to be sought, in partnership with all other plan making authorities within a 20km arc of the international designations at the North Norfolk Coast, to prevent combined adverse effects.

21 http://www.theaa.com/travelwatch/planner_main.jsp

22 Attleborough travel times were checked against an alternative route via Mundford, but times did not reduce via this alternative route.
10. The Appropriate Assessment of Potential Effects on Water Cycles (Impacts Arising as a Result of Policies CP1, CP3 and DC8)

10.1. Overview of Issues and Sources of Information Available

10.1.1. The check of the Breckland Core Strategy for the likelihood of significant effects highlighted the potential for the implementation of a number of policies (Policies CP1, CP3, CP4 and DC8) to lead to significant effects upon water resources and cycles, which in turn would be likely to significantly affect a number of European sites reliant upon those water resources and important water cycles. Without further research and information gathering, possible measures to prevent adverse effects in terms of impacts on water were not obvious, and it was therefore determined that a more detailed level of assessment was necessary, in order to conclude whether the policies promoted within the Core Strategy Preferred Options can be taken forward.

10.1.2. The information for the following appropriate assessment of the impacts of the Breckland Core Strategy upon water resources and hydrological functioning is derived largely from the two following reports, in addition to knowledge held by the assessment team:


10.1.4. The Breckland Water Cycle Study, Outline Study (BWCS) produced by Scott Wilson for Breckland District Council dated July 2008 and described as a draft interim report. At the time of undertaking this appropriate assessment, there were no Figures in the report and Appendices A-F and H were not included. Subsequent receipt of these appendices will assist in future stages of this HRA and should inform any necessary mitigation measures.

10.1.5. TWCS is concerned with water cycle issues in Thetford, and BWCS in Attleborough, Dereham, Swaffham and Watton (the four towns).

10.1.6. The sourcing, use and disposal of water can have a number of effects on the European sites within the region:

- Ground abstraction can lower water tables and affect spring lines, seepages and standing water
- Surface abstraction can reduce river flows, particularly during dry summer weather
- Increased abstraction can reduce soil moisture and therefore invertebrate food availability
- Discharges can increase nutrient levels, increase BOD and lower dissolved oxygen levels in rivers and other watercourses
- Discharges can increase velocities and levels and increase water temperatures below discharge points
10.1.7. Development proposed and supported by the Core Strategy is likely to impact upon water systems in a number of ways. It is considered that there is likely to be a significant effect upon water cycles arising from Policies CP1, CP3, CP4 and DC8 in relation to:

- Increased flood risk
- Waste water discharges reaching European sites sensitive to poor water quality
- Water abstractions

10.1.8. Each area of concern is considered in greater detail below. In considering the effects of the development proposed, impacts can occur as a result of water abstractions that have the effect of reducing water volume, water discharges that increase water volume and add nutrients to the water systems, or alter hydrological pathways to result in changes to water volume and movement.

10.2. **Flood Risk Identification**

10.2.1. Within the Water Cycles Studies an assessment is made of various sources of flood risk. These include potential sources of flooding from tidal flood sources, overland flow, fluvial floods and sewer and surface water drainage flooding. In most cases, flooding does not constitute a risk to the European wetland sites, some of which are at risk from drying out. However flooding with surface water, particularly where it could contain untreated sewage, could constitute a risk. Section 4 in both TWCS and BWCS are specifically concerned with flood risk to new development sites, but note that burst sewers are already a problem in Thetford and in all four towns, with the latter quoting a report on Dereham which describes this as a county ‘hotspot’ for sewer flooding.

10.2.2. The two WCS examine the effect of flooding, including overland flows and sewer bursts on the potential development sites. The summary in TWCS suggests that there are no serious constraints to any of the development areas from flooding and the BWCS summary suggests that flooding risk could be lessened by clearing ditches to lessen risks to development sites. However, as the latter report points out in 4.1, floods have a source-pathway-receptor, and if flooding from a sewer source is diverted down the pathway of ditch systems, this begs the question of where the polluted water will find a receptor and whether this could be one of the rivers which either supplies, runs through or discharges into a European site, or in the case of the Wensum, is itself a European site. The Wendling Beck and River Tud into which most drainage from Swaffham discharges, are both headwaters of the Wensum.

10.2.3. It is recommended that the risks of polluted surface water from overland sources including burst sewers render it impossible to conclude that European sites will not be adversely affected. Measures will be necessary to prevent the risk of burst sewer flooding.
10.3. **Wastewater Discharges and Treatment Works Capacity**

10.3.1. Wastewater from the Thetford Waste Water Treatment Works (WWTW) discharges directly into the Little Ouse River downstream of the town and thence into the Great Ouse River down to the Wash Ramsar/SAC/SPA site. There are two smaller WWTWs at Croxton, and the discharge from these is pumped into the Little Ouse River.

10.3.2. Attleborough WWTW discharges into the River Thet, which drains via the Little Ouse River running through the Breckland SAC/SPA to the Great Ouse River and then down to the Wash Ramsar/SAC/SPA site.

10.3.3. Dereham WWTW discharges into the Wendling Beck, which drains into the River Wensum SAC, which then drains into the Yare at Norwich and thence through Breydon Water SPA/ Ramsar site to the sea.

10.3.4. Swaffham WWTW discharges into the River Wissey, as does the Watton WWTW through the Watton Brook, and the river drains into the Little Ouse and through the Breckland SAC/SPA to the Great Ouse and via the Wash Ramsar/SAC/SPA to the sea.

10.3.5. The relevant designated features on European Sites which could be affected by discharges include:

- Sandbanks which are slightly covered by seawater all the time (Wash and North Norfolk Coast SAC)
- Mudflats and sandflats not covered by seawater at low tide (Wash and North Norfolk Coast SAC)
- Large shallow inlets and bays (Wash and North Norfolk Coast SAC)
- Reefs (Wash and North Norfolk Coast SAC)
- Salicornia and other annuals colonising mud and sand (Wash and North Norfolk Coast SAC)
- Atlantic salt meadows (Wash and North Norfolk Coast SAC)
- Mediterranean and thermo-Atlantic halophilous scrub (Wash and North Norfolk Coast SAC)
- Otter Lutra lutra (Wash and North Norfolk Coast SAC)
- Breeding little tern Sterna albifrons, common tern Sterna hirundo, wintering Bewick’s swan Cygnus columbianus bewickii, bar-tailed godwit Limosa laponica, pintail Anas acuta, wigeon A. penelope, gadwall A. strepera, pink-footed goose Anser brachyrhynchus, turnstone Arenaria interpres, brent goose Branta bernicula bernicula, goldeneye Bucephala clangula, dunlin Calidris alpina alpine, Knot Calidris canuta, oystercatcher Haematopus ostralegus, black-tailed godwit Limosa limosa islandica, common scoter Melanitta nigra, curlew Numenius arquata, grey plover Pluvialis squatarola, shelduck Tadorna Tadorna and redshank Tringa totanus. (Wash and North Norfolk Coast SPA)
- An internationally important assemblage of birds (Wash and North Norfolk Coast SPA, The Wash Ramsar)
- Eurasian oystercatcher Haematopus ostralegus, grey plover Pluvialis squatarola, knot Calidris canutus islandica, sanderling Calidris alba, Eurasian curlew Numenius arquata arquata, Common redshank Tringa totanus totanus, ruddy turnstone Arenaria interpres interpres,
pink-footed goose \textit{Anser brachyrhynchus}, dark-bellied brent goose \textit{Branta bernicla bernicla}, common shelduck \textit{Tadorna tadorna}, northern pintail \textit{Anas acuta}, dunlin \textit{Calidris alpina alpina}, bar-tailed godwit \textit{Limosa lapponica lapponica} (The Wash Ramsar)
\begin{itemize}
  \item Breeding common tern \textit{Sterno hirundo}, wintering Bewick’s swan \textit{Cygnus columbianus bewickii}, golden plover \textit{Pluvialis apricaria}, avocet \textit{Recurvirostra avosetta} and passage ruff \textit{Philomachus pugnax} (Breydon Water SPA)
  \item Assemblages of international importance (Breydon Water SPA/Ramsar)
  \item Wintering Bewick’s swan \textit{Cygnus columbianus bewickii}, lapwing \textit{Vanellus vanellus}, (Breydon Water Ramsar)
\end{itemize}

10.3.6. An assessment has been made within the Water Cycles Studies of the baseline and capacity for each of the identified WWTWs at Thetford Attleborough, Dereham, Swaffham and Watton:
\begin{itemize}
  \item The size, location and discharge consent details
  \item Consent compliance
  \item Dry weather flow, flow to full treatment, and flow calculations
  \item Location of sewer incidents
  \item Information on existing capacities and consents.
\end{itemize}

10.3.7. A number of assumptions were made in the assessment for Thetford, notably:
\begin{itemize}
  \item New developments on Greenfield sites will be required to provide sustainable drainage measures such that run off rates from developed sites do not exceed the pre-existing Greenfield rates
  \item Per capita consumption for the domestic population is 0.146 m$^3$ per head per day (G)
  \item The total domestic population (P) of Thetford served by the WWTW is 22,257 people, and including trade effluent, the total population equivalent (PE) is 29886 people
  \item Average house occupancy is 2.1.
  \item The infiltration rate (I) has been calculated as PG X 0.25 (where PG is G X PE) and has been calculated as 1032 m$^3$/day
  \item Trade flow from industry is 1405 m$^3$/day and it is assumes this will increase by 15%
  \item It was assumed that the surface water and foul water systems were separate
  \item No increase in holiday consumption
\end{itemize}

10.3.8. As no information was available on the amount of flow that Thetford WWTW can treat to the standard required in the discharge consents, the volumetric treatment capacity (headroom capacity) of the WWTW has been calculated from the difference between the dry weather flow (DWF) calculated for the existing population and the consented maximum dry weather flow permitted under the discharge consent

10.3.9. There are three WWTW serving Thetford and the surrounding area, but two of these are small and discharge below the town. The assessment was
therefore confined to the Thetford WWTW. However, sewage sludge from elsewhere is transferred to the Thetford WWTW for treatment and this could increase the process capacity but is unlikely to materially affect the volumetric headroom calculations.

10.3.10. Assumptions were also made for the four towns, namely:
- New developments on Greenfield sites will be required to provide sustainable drainage measures such that run off rates from developed sites do not exceed the pre-existing Greenfield rates.
- The domestic population (Pd) and holiday population (Ph) represent the current population being served by the WWTWs at June 2008.
- Per capita consumption for the domestic population is 0.144 m³ per head per day (Gd), for the holiday population, 0.055 m³/h/d (Gh) and for commercial jobs (Gc) 0.028 m³/h/d.
- The infiltration rate (I) (water entering the system from other sources such as unaccounted drains, illegal connections etc) will be calculated as PG=Pd X Gd + Ph X Gh and I is calculated as 0.25 of PG.
- Dry weather flow is calculated as PG + I + E (where E is the trade flow).
- The occupancy rate is taken as 2.1 people per dwelling and it has been assumed there will be no increase in holiday consumption.

10.3.11. As no information was available on the amount of flow that each WWTW can treat to the standard required in the discharge consents, the volumetric treatment capacity (headroom capacity) of each WWTW has been calculated from the difference between the dry weather flow (DWF) calculated for the existing population and the consented maximum dry weather flow permitted under discharge consents.

10.3.12. It was assumed that the surface water and foul water systems were separate in all four cases, but it is known that there are some combined or partially separated sections of sewers in the systems at Attleborough, Dereham and Watton.

10.3.13. The calculated headroom capacities for Thetford and the four towns is shown in Table 10.

Table 10: Headroom capacities (m³/day) of the WWTW for Thetford and the four towns

<table>
<thead>
<tr>
<th>WWTW</th>
<th>Thetford</th>
<th>Attleborough</th>
<th>Dereham</th>
<th>Swaffham</th>
<th>Watton</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consented DWF</td>
<td>8810</td>
<td>2500</td>
<td>3769</td>
<td>997</td>
<td>2650</td>
</tr>
<tr>
<td>Calculated DWF</td>
<td>6565</td>
<td>2015</td>
<td>3851</td>
<td>1245</td>
<td>1938</td>
</tr>
<tr>
<td>Headroom</td>
<td>2245</td>
<td>485</td>
<td>-82</td>
<td>-248</td>
<td>712</td>
</tr>
</tbody>
</table>

10.3.14. It was concluded within the Water Cycles Studies that:
- The WWTW at Thetford could accommodate 7,320 new houses.
However the timing of new development in Thetford is dependent on which of a number of development scenarios is chosen and

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23 This table may need to be amended at subsequent stages of assessment in light of the most recent revised Environment Agency consents.
calculations of infiltration rates which rise in line with these scenarios. Based on a series of calculations it has been assessed that the volumetric capacity of the existing STW under existing consent will accommodate 5307 new houses before an upgrade or replacement WWTW is required.

- The WWTW capacity at Attleborough could accommodate 1,283 new houses, and thus further development at anticipated annual rates up to 2013, but that post 2013 further development would be dependent on new infrastructure.
- The WWTW at Dereham has sufficient volumetric capacity to treat the proposed 926 houses and 1800 jobs between 2008 and 2026.
- The WWTW at Swaffham has sufficient volumetric capacity to treat a further 944 houses and 200 jobs to 2023, but will require an upgrade or new WWTW to accommodate growth above this level.
- The WWTW at Watton has the capacity to treat the wastewater flows for the anticipated levels of new development up to 2026.

10.4. River Discharges and Current Water Quality

10.4.1. The WWTW at Attleborough discharges into the River Thet which joins the River Little Ouse at Thetford where the Thetford WWTW discharges into the river. Both WWTW at Swaffham and Watton discharge into the River Wissey. The River Little Ouse and Wissey drain into the River great Ouse which eventually flows into the Wash.

10.4.2. An examination of the river quality for the River Thet and River Little Ouse above and below Thetford during 2003-2006 shows that Nitrate levels were high in all stretches in all years, with phosphate levels moderate in the River Thet upstream of Thetford in all years and in the River Little Ouse upstream in 2003-2004 but high in 2005-2006. Downstream of Thetford (the stretch into which the Thetford WWTW discharges, phosphates were high in all years. Phosphate stripping was installed in the Thetford WWTW in 2004. The chemical and biological quality of the both rivers is good or very good fro 2003-2006. The current performance of the Thetford WWTYW is described as good. Calculations of additional flow due to proposed development showed this to be insignificant.

10.4.3. An examination of the river water quality into which the WWTWs for the four towns discharge, shows that downstream of the discharge points in all cases, nitrate and phosphate levels were high or very high for the years 2003-2006. Upstream of the discharge points to the River Thet at Attleborough WWTW, there were high levels of nitrates 2004-2006 (moderate 2003-2005) and moderately low levels of phosphates 2003-2006, on the Wissey, there were high or very high levels above the discharge point 2003-2006, and on the Watton Brook the levels above the discharge point were moderate for both nitrates and phosphates 2003-2006. There were no figures for the Wendling Beck above the discharge point at Dereham for comparison. In addition, the River Thet significantly failed the River Quality Objectives (RQO) during 2003-2006 below the discharge point of the Attleborough WWTW (it passed above the discharge point during the same period). Wendling Beck also failed to
meet the RQO 2003-2004 and only marginally passed during 2005-2006. A
deterioration in the chemical quality of the water in The River Thet
downstream of the WWTW at Attleborough, below the WWTW on the
Wissey at Dereham and below the discharge point on the Watton Brook.
In all cases this was due to deterioration in Biological Oxygen Demand or
dissolved oxygen or both. In all four rivers, calculations of additional flows
due to proposed development showed these to be insignificant.

10.4.4. The BWCS concludes that, at all five locations, there is likely to be a
requirement to limit average P concentrations such that treated effluent
concentrations are no higher than current discharged concentrations
(2mg/l of P), but that the in-river P concentrations are likely to increase
and that although no current statutory driver exists to limit P, future
legislation under the Water Framework directive is likely to require further
investment in P reduction.

10.4.5. It also concludes that in all the rivers accepting WWTW discharges, there is
adequate hydraulic capacity to accept the additional wastewater flow
without increasing downstream flood levels or affecting ecologically
sensitive areas.

10.4.6. At Thetford the TWCS concludes that:
• The existing water quality of the Little Ouse is good, complying with its river
  quality objectives. Developments up to 2003 should ensure this remains
  the case
• Both of the WWTW at Croxton are too small to be expanded, too far
  away to take pumped waste water from the main works at Thetford, and
  are up river from the town. They have therefore not been considered in
  the TWCS

10.4.7. At Attleborough the BWCS concludes:
• That the River Thet is failing to achieve DO water quality standards
  and that additional discharges will exacerbate this effect, so there is
  no spare capacity in the receiving watercourse using existing
  treatment standards at Attleborough WWTW
• That if the WWTW were to be expanded, the additional discharges
  over the existing DWF consent are likely to require a tightening of the
  current WWTW BOD and ammonia consent criteria

10.4.8. At Dereham the BWCS concludes:
• Wendling beck is failing to achieve required DO standards below the
  WWTW discharge point
• The additional load generated by the proposed development will not
  result in the river the current statutory target for BOD, but the
  ammonia consent needs tightening to meet the current statutory
  target

10.4.9. At Swaffham the BWCS concludes:
• That the additional load generated by the proposed development is
  likely to require a tightening of the current WWTW BOD and ammonia
  consent
10.4.10. At Watton the BWCS concludes:

- The additional load generated by the proposed development will not result in the river failing current statutory targets for BOD and ammonia if discharges are treated to current consented quality.

10.4.11. The results suggest that while there are existing sources of phosphates and nitrates from diffuse inputs into the rivers (particularly the Wissey), that discharges from WWTWs are compounding this, particularly phosphate discharges in to the River Thet and both phosphates and nitrates from discharges at Watton into the Watton Brook (there are no figures above the WWTW discharge point at Dereham WWTW). Despite phosphate stripping at the Thetford WWTW, phosphate levels remained high below the discharge point during 2003-2006.

10.4.12. There is concern that the existing levels of nitrates and phosphates could be limiting. While it is accepted that phosphates are likely to be a more significant limiting factor in freshwater aquatic systems than nitrates, where phosphate levels are reduced, nitrates, previously masked by high phosphate levels, can also have effects.

10.4.13. The calculations of existing discharge capacity and future calculated flows is of considerable importance as the eventual discharges may impact the river systems flowing into or through European Sites. If capacities are exceeded this may result in eutrophication or pollution of river water if discharges are not compliant with quality. Further, the calculations of headroom upon which the above conclusions are based, is dependant on a number of assumptions and the figures used in the calculations, particularly per capita consumption, estimates of infiltration rate and total population.

10.4.14. There are a number of queries concerning the assumptions and calculations used some of which might be answered by the inclusion of Appendix D. These queries are as follows:

- The figure used for the population of Thetford is derived from the Anglian water services but is undated.

- Figures have been used in the calculations in Tables, 5.7, 5.13, 5.19 and 5.25 for existing population levels in each of the four towns but their derivation and dates are not given. The total figure for Breckland DC given in the introduction is based on the 2001 census and is now out of date. In its Sustainability Assessment, Breckland Council give an estimated figure for 2006 of 128,250. The assumption in 3.1.1.1 takes the built houses as having been included in the baseline figures, as these houses are already built and being served by the wastewater network and WWTW. It is assumed that these houses have been included in the figures given in Tables 5.7, 5.13, 5.19 and 5.25 but it would be helpful if this could be confirmed.

- Similarly it is not clear where the holiday population and trade flow figures are derived.
• The assumption is made that in 5.1.2 that housing occupancy rate is 2.1 whereas the figure given by the Council for the whole district is 2.35
• It is noted that the consumption per head per day is given as 0.146 for Thetford and 0.144 elsewhere
• While the method used in the calculation of headroom figures is a creditable attempt to provide a clear picture of the current situation based on the assumptions, it would clearly be far more satisfactory to use the actual figures for process capacity (as noted in the reports) for each WWTW and these should be supplied
• It is unclear what future is planned for the WWTWs at Croxton and whether their capacity will be absorbed into an enlarged WWTW at Thetford and the smaller works closed down.
• The report rightly notes the need to investigate further and include provision in the calculations for combined sewers
• There is a concern also noted in the report that there could be a mismatch between the timing of new development and the AMP approved expenditure. It seems probable that the development of new houses since 2001 has contributed to the two WWTWs which are above capacity now. Water Companies are currently writing their business plans for submission to OFFWAT and approval for the period 2010-2015. The Council is still some time from completing their Local Development Framework, without which, the Water Company will be unable to finalise proposals for the relevant works. Two of the existing WWTWs at Swaffham and Dereham are already above capacity, and a review of the calculations in relation to Attleborough may suggest that this WWTW will reach capacity during the course of the next AMP. In order to avoid adverse effects to the European sites, adequate treatment capacity must be in place before new developments are occupied

10.4.15. Overall the conclusions of the reports are:
• That the Thetford WWTW has sufficient capacity for new developments until 2021, but will require an upgrade or replacement between 2021 and 2031.
• That an upgrade or new WWTW will be required at Attleborough and Swaffham, but that the WWTW at Watton and Dereham has sufficient capacity to treat the increased demand up to 2026.
• That there is insufficient water quality capacity in the River Thet at Attleborough, the Wendling Beck at Dereham to permit further discharges without a change in treatment standards.
• Further investment might be required to treat the additional flow from the projected increase in population up to 2026 such that the River Thet, Wendling Beck and River Wissey continue to reach their statutory river quality and ecology targets.
• New trunk sewers will be required at Attleborough, Dereham and Swaffham, depending on the location of new development.

10.4.16. It is clear from the above appropriate assessment work in relation to water discharges and altered flows that further information is required to carry out the necessary detailed assessment of the effect of new development
on the sewage infrastructure; that additional treatment capacity will be required but as yet this is unquantified; that there are already concerns about existing WWTW operating above their consented capacities; that water quality in the receiving watercourses is not reaching the required standards; and that the information available suggests existing discharges are contributing to this failure. It is not clear that maximum figures have been used in all calculations as would be required under a precautionary approach.

10.4.17. It therefore cannot be concluded that the wastewater discharges from the proposed developments, and resultant flow alterations will not have an adverse effect on the affected European sites without putting in place mitigation measures which are adequate in terms of capacity, level of treatment and timing. The analysis, carried out by Scott Wilson, indicates that this should be possible, but insufficient details are available to complete a final assessment.

10.4.18. Given the lack of information it has not been possible to make a full assessment of the effects of increased discharges or water abstraction for new development in Breckland District. It seems probable that the requirements of the legislation and particularly the forthcoming enforcement of the Water Framework Directive through the Environment Agency will provide a robust and effective way of achieving future development without adverse effect on the European sites. At this stage therefore, this assessment is confined to commenting on the available information and the way it has been used to investigate the issues by the very full reports by Scott Wilson.

10.4.19. In addition, the discharges noted here will be part of a larger volume of discharges from other sources on the river, for example Norwich in to the River Yare and thence into Breydon Water SAP/Ramsar and Kings Lynn in to The Wash SAC/SPA/ Ramsar. Unless all effects from discharges at Thetford and the four towns can be fully mitigated an in-combination assessment will be necessary for The Wash and Breydon Water European sites.

10.4.20. In considering the impacts of water discharges on European sites, it is concluded that it cannot currently be demonstrated that there would not be an adverse effect upon European sites as a result of the proposed development within Policies CP1, CP3, CP4 and DC8. WWTW upgrades and new trunk sewers are required at Attleborough, Dereham and Swaffham, and no further discharges can currently be permitted in the River Thet at Attleborough, the Wendling Beck at Dereham. Further investment commitments are also likely to be required for the River Thet, Wendling Beck and River Wissey to ensure that adverse effects upon European site interest features do not occur.

10.4.21. Measures must now be considered to determine whether these requirements can be met prior to the potentially damaging new development.
10.5.1. **Water Resources and Water Supply**

Water supply is the responsibility of Anglian Water Services (AWS) who, at the time of writing the TWCS and BWCS were still drafting their Water Resource Management Plan. Currently some 60% of the water used comes from river abstraction and 40% from groundwater.

10.5.2. The relevant designated features on European Sites which could be affected by water abstraction include*:

- Water courses with *Ranunculus fluitantis* and Calitricho-Batrachion vegetation (River Wensum SAC)
- White-clawed crayfish *Austropotamobius pallipes* (River Wensum SAC)
- Desmoulin’s whorl snail *Vertigo mouliniana*, brook lamprey, *Lampetra planeri*, bullhead, *Cottus gobio* (River Wensum SAC)
- Alkaline fens (Norfolk Valley Fens SAC)
- Molinea meadows, calcareous fens, alluvial forests (Norfolk Valley Fens SAC)
- Hard oligo-mesotrophic waters with *Chara* ssp (Broads SAC)
- Natural eutrophic lakes with Magnopotamion or Hydrocharition-type vegetation (Broads SAC, Breckland SAC)
- Transition mires and quaking bogs (Broads SAC)
- Calcareous fens with *Cladium mariscus* and species of *Caricion davallianae* (Broads SAC, Broadland Ramsar, Waveney and Little Ouse Valley Fens SAC)
- Alkaline fens (Broads SAC, Broadland Ramsar)
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (Broads SAC, Broadland Ramsar, Breckland SAC)
- Desmoulin’s whorl snail *Vertigo mouliniana*, Fen orchid *Liparis loeselii*, Otter *Lutra lutra* (Broads SAC, Broadland Ramsar)
- Wintering Bewick’s swan *Cygnus columbianus bewickii*, Eurasian wigeon *Anas penelope*, Gadwall *Anas strepera strepera* and northern shoveler *Anas clypeata* (Broadland Ramsar)
- Breeding bittern *Botaurus stellaris*, marsh harrier *Circus aeruginosus*, wintering Hen harrier *Circus cyaneus*, Bewick’s swan *Cygnus columbianus bewickii* and Whooper swan *Cygnus cygnus* (Broadland SPA)
- Molinea meadows on calcareous, peaty or clayey-silt-laden soils (Waveney and Little Ouse Valley Fens SAC)
- Desmoulin’s whorl snail *Vertigo mouliniana* (Waveney and Little Ouse Valley Fens SAC)
- Spring fed lowland base-rich valley (Redgrave and South Lopham Fens Ramsar)
- Rare and scarce invertebrates including fen raft spider *Dolomedes plantarius* (Redgrave and South Lopham Fens Ramsar)
- Great crested newt *Triturus cristatus* (Breckland SAC)
- Stone curlew *Burhinus oedicnemus*

10.5.3. The availability of water in rivers are classified by the Environment Agency (EA) as:

- **Water Available (WA):** Water is likely to be available at all flows including low flows. Restrictions may apply.
• No Water Available (NWA): No water is available for further licensing at low flows. Water may be available at higher flows with appropriate restrictions.
• Over Licensed (O-L): Current actual abstraction is such that no water is available at low flows. If existing licences were used to their full allocation they could cause unacceptable environmental damage at low flows. Water may be available at high flows, with appropriate restrictions.
• Over Abstracted (O-A): Existing abstraction is causing unacceptable damage to the environment at low flows. Water may still be available at high flows, with appropriate restrictions.

10.5.4. The classification for each of the rivers and groundwater areas affected by development in Thetford and the four towns is shown in Table 11.

Table 11: River water availability as classified by the Environment Agency

<table>
<thead>
<tr>
<th>River</th>
<th>Surface water</th>
<th>Groundwater</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Little Ouse</td>
<td>O-L</td>
<td>NWA</td>
</tr>
<tr>
<td>Upper Little Ouse</td>
<td>O-L</td>
<td>NWA</td>
</tr>
<tr>
<td>That</td>
<td>O-L</td>
<td>O-L</td>
</tr>
<tr>
<td>Sapiston Brook</td>
<td>NWA</td>
<td>NWA</td>
</tr>
<tr>
<td>Ely Ouse (South level)</td>
<td>O-L</td>
<td>N/A</td>
</tr>
<tr>
<td>Attleborough River Thet</td>
<td>O-L</td>
<td>O-L</td>
</tr>
<tr>
<td>Dereham River Tud (to Wensum)</td>
<td>NWA/O-L</td>
<td>NWA</td>
</tr>
<tr>
<td>Swaffham (to Wissey)</td>
<td>O-L</td>
<td>NWA</td>
</tr>
<tr>
<td>Watton (to Wissey)</td>
<td>O-L</td>
<td>NWA</td>
</tr>
</tbody>
</table>

10.5.5. All of Thetford’s water supply currently comes from groundwater sources, and around the four towns groundwater supplies also dominate. Some water is also supplied from groundwater sources to Cambridge Water Company by agreement with AWS.

10.5.6. A calculation of water resources would be expected to look at current abstraction rates, compare this with licensed levels and then ascertain whether there was a surplus for use in supplying new developments. AWS is licensed to abstract 4000ML from groundwater sources per annum, but no figures were available as to the percentage of this which is utilised. Similarly, no information was available from AWS on the current water balance for the abstraction of groundwater for the three towns.

10.5.7. There is some information from the draft Water Resources Management Plan (WRMP) prepared by AWS which suggests that the existing resources together with development of small scale and local sources will supply sufficient capacity to supply the majority of target growth up to 2031. For the four towns, the same source suggests that there is a current deficit in capacity but that this will ease slightly when some additional groundwater resources are brought on line at the end of the AMP 4 period. There is no information on whether any spare water might be available from the amount currently transferred to Cambridge.
10.5.8. Allowing for headroom (an allowance of 30% for climate change and other uncertainties) AWS calculate that existing demand for Thetford is 10 ML/d rising by 3ML/d by 2031. This is in line with the TWCS calculations of a worst case scenario of 2.99ML/d. AWS indicate that there will be enough water available for Thetford during dry years to meet demand until 2029 after which development of new resources will be required.

10.5.9. The draft WRMP also contains some predictions for the four towns which show that Attleborough, Swaffham and Dereham are all predicted to have deficits by 2035/6. Current demand is estimated at 37 ML/d with predicted demand at 44 ML/d by 2026/7 and 46 ML/d by 2035/36. This compares with calculations in the BWCS of 4.9 ML/d including headroom, probably up to 2021, but this is not clear. A number of options are available to AWS in relation to the use of alternative boreholes for meeting some of this demand, but no information is available at present on the likely proportion of future supplies which might come from these sources.

10.5.10. Information on the aquifers relevant to groundwater abstraction are available from EA for the four towns. Attleborough is located over the Thet Chalk aquifer, which is already over licensed according to the Catchment Abstraction Management Strategy (CAMS). This aquifer is hydraulically linked to elements of the Norfolk Valley Fens SAC and to the Breckland SAC and the Brecks SPA.

10.5.11. Dereham is located over the Blackwater/Wendling Beck aquifer which according to the CAMS is already over licensed.

10.5.12. The aquifer is hydraulically linked to The Broads SAC and The Broadland SPA/RAMSAR site. A number of the constituent SSSIs of the Norfolk Valley Fens SAC are close to Dereham and both these and and the River Wensum SAC are also hydraulically linked to the aquifer.

10.5.13. Watton and Swaffham are both located on the Upper Wissey Chalk aquifer which according to the CAMS has no water available. The aquifer is linked to elements of the Norfolk Valley Fens SAC and the Breckland SAC.

10.5.14. The TWCS considers that water abstraction at Thetford could affect the Thetford Golf Course and Marsh SSSI, part of the Breckland SAC and Brecks SPA via the groundwater abstraction point at Two Mile Bottom. However it is possible, depending on the extent of the aquifer that other sites could be affected, notably other sites in the Breckland SAC, and Redgrave and Lopham Fens SSSI, part of the Waveney and Little Ouse Valley Fens SAC.

10.5.15. A list of the European sites which it is considered could be affected by discharges or abstraction in Breckland District Council area is shown in Table 12.
Table 12: The European sites which could be affected by abstraction and discharges

<table>
<thead>
<tr>
<th>Location</th>
<th>Factors</th>
<th>European Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thetford</td>
<td>Ground water Abstraction</td>
<td>Breckland SAC-East Wretham Heath, Breckland SAC-Thetford Golf Course &amp; Marsh, Breckland SAC-Stanford Training Area, Waveney and Little Ouse Valley Fens, SAC/Ramsar-Redgrave and Lopham Fens</td>
</tr>
<tr>
<td>Dereham</td>
<td>Ground Water Abstraction</td>
<td>Norfolk Valley Fens-Badley Moor, Norfolk Valley Fens-Potter &amp; Scarning Fens, Norfolk Valley Fens-Buxton heath, River Wensum SAC, River Wensum SAC-Dillington Carr, River Wensum SAC-Dereham Rush meadows, The Broads SAC -Bure &amp; Broad Marshes, Broadland SPA/Ramsar- Bure &amp; Broad Marshes</td>
</tr>
<tr>
<td>Attleborough</td>
<td>Ground Water Abstraction</td>
<td>Norfolk Valley Fens-Swangey Fen, Breckland SAC-Stanford Training Area, Breckland SAC-East Wretham Heath</td>
</tr>
<tr>
<td>Swaffham</td>
<td>Ground Water Abstraction</td>
<td>Norfolk Valley Fens-Great Cressingham Fen, Norfolk Valley Fens-Thomson Water, Norfolk Valley Fens-Foulden Common, Breckland SAC-Cranberry Rough</td>
</tr>
<tr>
<td>Watton</td>
<td>Ground Water Abstraction</td>
<td>Norfolk Valley Fens-Thomson Water, Norfolk Valley Fens-Great Cressingham Fen, Breckland SAC-Stanford Training Area, Breckland SAC-Cranberry Rough</td>
</tr>
<tr>
<td>Thetford</td>
<td>WWTW discharges via R Little Ouse</td>
<td>The Wash Ramsar/SAC/SPA</td>
</tr>
<tr>
<td>Dereham</td>
<td>WWTW discharges-Wensum</td>
<td>River Wensum SAC, River Wensum SAC-Dillington Carr, River Wensum SAC-Dereham Rush meadows</td>
</tr>
<tr>
<td>Swaffham</td>
<td>WWTW discharges-via R Wissey</td>
<td>The Wash Ramsar/SAC/SPA</td>
</tr>
<tr>
<td>Watton</td>
<td>WWTW discharges via R Wissey</td>
<td>The Wash Ramsar/SAC/SPA</td>
</tr>
<tr>
<td>Attleborough</td>
<td>WWTW discharges via R Thet</td>
<td>The Wash Ramsar/SAC/SPA</td>
</tr>
</tbody>
</table>

10.5.16. In the Thetford area, all the surface water sources are over-licensed, except Sapiston brook which has no water available at low flows. Elsewhere, the rivers are also over-licensed except the River Tud which is borderline. This indicates that there is no water available for additional abstraction during summer, or in dry winters, and that there is little opportunity to secure future water supplies from existing sources.

10.5.17. It is clear from the available documents and the above appropriate assessment of the effects of water abstraction that full and up-to-date figures are not available to allow reliable predictions to be made of the
extent to which existing water resources will be sufficient to cater for increased demand, or the extent to which alternative sources might be brought into use. Until such figures are made available, no conclusions can be drawn on whether and to what extent groundwater sources, which in some areas are already in deficit if headroom is allowed for, can cope with new development and whether additional or alternative sources will need to be investigated. At present, it seems clear that in the short term existing sources are likely to be exploited up to the existing extraction licence limits at Thetford, and that water supply to three of the four towns is already in deficit. Given the existing situation and this degree of uncertainty it is essential that a precautionary approach is taken. It is therefore concluded that it is not possible to determine that there will be no adverse effect upon the integrity of European sites as a result of water abstraction.

10.5.18. The Environment Agency’s abstraction licensing system should serve to protect the European sites from the negative effects of over-abstraction. However it is apparent that some aquifers are already over licensed and in the Breckland district, one of the driest parts of the UK, the solution to providing for future water supply is likely to require some new and imaginative solutions. There are already existing concerns about water supplies to some of the European sites, particularly elements of the Norfolk Valley Fens SAC.

10.5.19. Measures must now be investigated to determine whether adverse effects can be prevented. It would be sensible for Breckland District Council to consider the encouragement or imposition of water saving measures in all new developments as a matter of course, but this does not guarantee the removal of adverse effects, and this issue must be rectified with guaranteed measures before the proposed development levels within the Core Strategy can be taken forward.

10.5.20. Furthermore, it appears that some of the aquifers are shared with other towns and may be affected by water abstraction outside Breckland District. If abstraction within the District might have an effect on the Broads SAC/SPA/Ramsar site, then extraction in the Norwich area could also have an effect. A fuller examination of the abstraction effects across the Region is now needed to consider the possible wide ranging in-combination effects.
11. Appropriate Assessment of New or Improved Infrastructure (Policy CP4, and also Road Improvement Requirements as a Result of Policies CP1 and CP3)

11.1. New or Improved Infrastructure Provision

11.1.1. Policy CP4 explains that the new development proposed in the district relies upon the securing of the required infrastructure to meet the demands of social and physical infrastructure, and as such, improvements will need to be made to existing infrastructure, and new social and physical infrastructure will be required.

11.1.2. The social infrastructure requirements (education, health and social facilities) are not taken forward to appropriate assessment, as it is considered that this aspect of Policy CP4 is not likely to have a significant effect upon any European site. There may be a need for project specific appropriate assessments where the provision of such facilities cannot demonstrate that there would not be a likely significant effect, for example where such a facility is proposed at project level to be in close proximity to a European site.

11.1.3. The remaining elements of Policy CP4 relate to physical infrastructure (water, power and transport infrastructure). The provision of energy infrastructure is not taken forward to appropriate assessment, as it is considered that this is not likely to have a significant effect upon any European site. As specific energy projects are not referred to within CP4 it is considered that this aspect of the policy is not likely to result in significant effects. There will however be a need for project specific appropriate assessments where the provision of such infrastructure cannot demonstrate that there would not be a likely significant effect. Such projects may include wind farms, for example. Due to the complexity and multitude of potential effects upon European sites relating to water infrastructure, these have been dealt with in a separate section of this appropriate assessment (see Section 10). Outstanding issues therefore remain in relation to the provision of adequate transport infrastructure.

11.1.4. Policy CP4 does not specify where new road infrastructure or road infrastructure improvements are required, but clearly refers to the need for such development in relation to the sustainable urban extensions and employment growth, i.e. as set out in Policies CP1 and CP3. It is suggested within Policy CP4 that infrastructure provision for these will be considered further in future Area Action Plans. In considering the Core Strategy, it is however essential that such road infrastructure requirements are considered for the Core Strategy, as the development creating the need for such improvements is set out within the Core Strategy. Once the lower tier plans are brought forward, the requirement for such infrastructure will already be set, and assessment will therefore become very difficult. With the network of European sites particularly in the south of the District that are intersected by existing roads (see Figure 4), there is
concern that improvements to these existing roads, and the likely focus of need for new roads around the urban extensions and employment allocations could lead to adverse effects upon the site interest features.

Figure 6: Breckland SSSIs (component sites within the Breckland SAC) in relation to the road network, showing close proximity of existing roads to SAC habitat
11.1.5. It is therefore considered that the requirements for new or improved road infrastructure provision, as set out in Policy CP4 are likely to result in the following significant effects:

11.1.6. Increased levels of air pollution affecting sensitive features of SAC habitats

11.1.7. Potential reduction in the density of Habitats Directive Annex I bird species associated with the SPA, due to avoidance of areas close to new roads.

11.2. The Impact of Air Pollution on SAC habitats

11.2.1. Heathland habitats are vulnerable to atmospheric pollution, and in particular the addition of nitrogen (Barker et al., 2004, Bobbink et al., 1998, Britton and Fisher, 2007, Power et al., 1998, Power et al., 1995, Terry et al., 2004). The severity of these impacts depends on abiotic conditions. The most important effects are the accumulation of nitrogenous compounds resulting in enhanced availability of nitrate or ammonium, soil-mediated effects of acidification and increased susceptibility to secondary stress factors. Long-term nitrogen enrichment results in increased availability of nitrogen leading to competitive exclusion of characteristic species by more nitrophilic plants.

11.2.2. Breckland heaths may be particularly sensitive. There have been dramatic and rapid contractions in the distribution and abundance of Breckland lichen species and one species Buellia asterella is now thought extinct (the first UK BAP priority species to go extinct). The cause of this decline is a result of the previously open grassland having closed up due to the spread of higher plants and bryophytes denying the lichens the calcareous mineral soil they require as a substrate. Increased aerial inputs of nitrogen are chiefly responsible for the sward closure (Gilbert, 2002).

11.2.3. The A11 goes through the SAC and numerous other roads are also close to or adjacent to Breckland SAC (Figure 6). The following component SSSIs fall within 200m of existing A roads:

<table>
<thead>
<tr>
<th>SSSIs within Breckland District and within 200m A11</th>
<th>SSSIs within Breckland District but within 200m of other A roads</th>
<th>SSSIs outside Breckland District but within 200m of A11</th>
<th>SSSIs outside Breckland District and within 200m of other A roads</th>
</tr>
</thead>
<tbody>
<tr>
<td>Thetford Golf Course &amp; Marsh</td>
<td>East Wretham Heath</td>
<td>Weather &amp; Horn Heaths; Eriswell</td>
<td>Cavenham-Icklingham Heath</td>
</tr>
<tr>
<td>Bridgham &amp; Brettenham Heaths</td>
<td>Barnhamcross Common</td>
<td></td>
<td>Deadman's Grave, Icklingham</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Foxhole Heath, Eriswell</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Lakenheath Warren</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>RAF Lakenheath</td>
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<td></td>
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<td></td>
<td>Thetford Heath</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Wangford Warren &amp; Carr</td>
</tr>
</tbody>
</table>

11.2.4. The scale of proposed development within Breckland District is such that there will be increases in traffic volumes, and possibly to the extent that road improvements and new road projects will be required. In their initial Thetford transport study (Mott MacDonald, 2008) suggest that “the growth framework will have significant impacts on the existing road network even after the introduction of measures to promote sustainable transportation
have been introduced.” New road projects potentially include additional dualling of the A11, a link road at Attleborough and a possible new link road to the east of Thetford (P. Mileham, pers. comm.).

11.2.5. If road improvements or new roads will be the likely consequence of development proposed within the Core Strategy, those likely consequences of development must also be considered in the HRA of the Core Strategy. Where any road improvements, including road widening or improvements for the purpose of increasing the traffic capacity of the road, would lie within 200m of the SAC, this is likely to result in an adverse effect. It is essential therefore that any possible measures to prevent adverse effects are considered at this stage. To leave consideration of road improvements until after the Core Strategy has been given effect would remove the possibility of applying mitigation measures in advance of the development and/or would remove the opportunity to consider alternative options. It therefore needs to be established whether road improvements will be the likely consequence of development proposed within the Core Strategy. If any will be likely, mitigation and potential alternative options must then be considered in light of the likely adverse effects of increased traffic and road infrastructure improvements.

11.3. The Avoidance of Roads by Stone Curlews

11.3.1. Stone curlews are summer migrants, associated with open, bare habitats, such as some heaths, downland and some arable. Within Breckland they occur on the grassy heaths (where densities tend to be highest) and also on arable land. The numbers of birds nesting on arable land have been increasing over time, and there have been some slight declines in the numbers nesting on grassland sites in recent years (Sharp et al., 2008a). A clear avoidance, by stone curlews, of otherwise suitable habitat adjacent to major roads has now been demonstrated in a number of studies (Day, 2003, Green et al., 2000, Sharp et al., 2008a).

11.3.2. The initial work by Green et al. (Green et al., 2000) found that stone curlews avoided nesting on arable land near major roads, but that there was no significant effect of secondary roads. The apparent avoidance was thought not to be the result of a scarcity of suitable fields near roads, since it the modeling approach taken by Green et al. had allowed for effects of nesting and foraging habitats. The authors cite work that shows that stone curlews are rarely killed on roads, and therefore they argue that the avoidance was a behavioural response, potentially as a result of noise or the movement of vehicles. They suggested that population density was diminished within 3km of roads.

11.3.3. Subsequent work, in an unpublished doctoral thesis (Day, 2003) further explored the avoidance and tired to establish the underlying mechanisms. Day found that nesting stone curlews significantly avoided motorways and trunk A roads in each year (1985 – 2000) apart from 1989. Non trunk A roads were significantly avoided in most years, and there was little avoidance of B roads. The avoidance of trunk A roads became stronger over time – in a period in which road traffic increased particularly
rapidly on trunk A roads. Day found no effect of roads on breeding success (such as nest success, chick growth rate, chick survival) or adult survival. He modeled noise and light levels in the vicinity of roads, and found that the density of stone curlew nests was more strongly related to modeled levels of light from vehicle headlamps than noise levels. He argues however that the underlying mechanisms for the avoidance remain to be confirmed and therefore the design and effectiveness of mitigation measures remain uncertain.

11.3.4. More recently Sharp et al. (Sharp et al., 2008a) found a significant avoidance of trunk roads by nesting stone curlews. Yearly data were grouped into four different periods (1988-92; 1993-96, 1997-2000, 2002-06) and for all four periods, the nest density on arable land within 500m of a trunk road was statistically lower than densities at greater distances. Over the first (1988-1992) and last (2002-2006) periods, there was also statistically significant differences between nest densities on land in the 500-1000m band relative to those at greater distances from trunk roads. With all years’ data combined, the total nest numbers involved were sufficient for effects to be detectable up to 1500m. A similar analysis of nest density in relation to distance from non-trunk A-roads was carried out and showed a negative impact of the presence of non-trunk A-roads on stone curlew nest density up to a distance of 500m.

11.3.5. Sharp et al. compared individual roads within the study area and found that, in the majority of cases the same positive relationship between stone curlew nest density and distance from a road was present. The A11, a trunk road, and the A1065, a non-trunk road, both have similar areas of habitat available within similar distance bands, and both are avoided by nesting stone curlews the road, but the densities are far greater around the A1065 than the A11, and the avoidance only is observed in the nearest 500m for the A1065 while it is observed up to 3 km for the A11. While there are a number of other factors which influence the choice of nest location by stone curlew, such as the surrounding habitat quality, settlements and field size, the A11, which is likely to have heavier traffic, appears to have a greater impact upon the spatial distribution of stone curlew nests than the A1065, which is likely to have lighter traffic.

11.3.6. In all time periods covered by the data, the nest density on arable land within 500m of a Trunk road was statistically lower than densities at greater distances. Over the first (1988-1992) and last (2002-2006) periods, there was also statistically significant differences between nest densities on land in the 500-1000m band relative to those at greater distances from trunk roads. With all years’ data combined, the total nest numbers involved are sufficient for effects to be detectable up to 1500m. This would suggest that there is a negative relationship and potential negative impact of trunk roads on stone curlew nest density up to a distance of at least 1000m, and maybe up to 1500m.

11.3.7. Using a grid of 500m cells over the Breckland area, Sharp et al. built predictive models to explore the effect of housing, roads and traffic on the density of stone curlew nests within each cell. The final model
included weighted terms for all three variables (housing, length of road and traffic levels), indicating that each of these is significant in combination with the others. Both nest density and housing were average values over the period 2002-2006 as this coincides with the period over which traffic levels were available. When the daily traffic variable was zero (77% of all 500m cells), average nest density declined consistent with increasing values of the housing variable. When the housing variable had low values, then average nest density decreased as the daily traffic variable increased. Nest density also declined consistently with increasing daily traffic amongst all cells housing variables values in the next higher class 3001-7000.

11.3.8. Sharp et al. suggest that there is a negative impact of trunk roads on stone curlew nest density on arable land up to a distance of at least 1000m, and maybe up to 2000m. For non trunk A roads there is also a negative impact up to a distance of 500m. Any new road infrastructure, if occurring close to suitable stone curlew habitat is therefore likely to result in an impact. Increases in road traffic volumes would also be of concern. Data provided by Norfolk County Council on projected road traffic increases along the A11 suggest traffic could increase by as much as 35% over the period to 2026; this figure of 35% was used by Sharp et al. in their modelling.

11.3.9. Road traffic increases are predicted for all routes around Thetford (Mott MacDonald, 2008) and there is the likelihood of new roads being required, particularly to the east of the town (see Mott MacDonald, 2008). Given the scale of avoidance of roads shown for stone curlews, and the likely increases in traffic volumes, it is apparent that adverse effects upon the stone curlew interest feature are likely.

11.3.10. If road improvements or new roads will be the likely consequence of development proposed within the Core Strategy, those likely consequences of development must also be considered in the HRA of the Core Strategy. Indirect effects on European site features are likely, and in some cases the potential options for road improvements could directly result in an adverse effect. It is essential therefore that any possibly measures to prevent adverse effects are considered at this stage. To leave consideration of road improvements until after the Core Strategy has been given effect would remove the possibility of applying mitigation measures in advance of the development and/or would remove the opportunity to consider alternative options. It now therefore needs to be established whether any new roads, or road improvements such as widening or other measures to increase the traffic capacity, will be the likely outcome of the development proposed and supported within the Core Strategy. Mitigation and potential alternative options would then need to be considered in light of the likely adverse effects of increased traffic and road infrastructure improvements.
12. Mitigation

12.1. Introduction

12.1.1. In accordance with Regulation 85B(1) of the Habitats Regulations, an appropriate assessment of the implications of the Breckland Core Strategy for European sites has been made. The appropriate assessment was undertaken on a number of policies within the Core Strategy where it was determined that those policies would be likely to have a significant effect upon a number of European sites. In light of the assessment made, and the requirements of Regulation 85B(4), Breckland District Council as the plan making body, should not give effect to the plan in its current form because the appropriate assessment concluded that it could not be demonstrated that adverse effects upon the integrity of a number of European sites would not occur.

12.1.2. It is therefore necessary to consider whether, in light of the assessment made, any mitigation measures could be applied to the plan in order to prevent any adverse effect upon the integrity of the European sites in question, and meet the requirements of Regulation 85B(4), to enable the plan to proceed to adoption. The following sections consider the mitigation options available for each potential adverse effect, and the validity and robustness of those mitigation options.

12.1.3. With regard to water issues, an updated (October 2008) version of the Water Cycle Study was considered very briefly as the assessment team was given sight of the document just as the HRA was being finalised.

12.2. Direct effects of built development

12.2.1. The appropriate assessment concluded that it could not be ascertained that adverse effects upon the three Annex 1 bird species; nightjar, woodlark and stone curlew, would not occur as a result of the Core Strategy in terms of the proposed new built development set out within the Core Strategy that would be located in close proximity to habitat used by the three species. The assessment determined that, based upon the best ecological information available, the point at which effects could no longer be considered to be adverse was at a distance of between 1000m and 2500m between the new development and the Annex 1 bird species habitat. The habitat may lie within the SPA or occur as supporting habitat outside the SPA boundary.

12.2.2. There is no evidence to show that screening (such as shelter belts or landscaping) might reduce the avoidance of built development by stone curlews and enable the distance at which the effects are considered to be adverse to be reduced. Many fields do have existing shelterbelts, and the avoidance of housing is still clear across suitable arable land, suggesting that screening will not work as mitigation.
12.2.3. The creation of new areas of supporting habitat, replacing supporting habitat outside the SPA, away from buildings and disturbance could provide potential nesting locations for displaced birds that utilise land outside the SPA boundary. Such mitigation measures could not be applied to those territories that lie within the SPA boundary however, as SPA land cannot normally be replaced with other non-SPA land in order to prevent an adverse effect upon site integrity. Furthermore, it is unlikely that suitable areas could actually be found for stone curlews as this species uses existing arable land in close proximity to the SPA.

12.2.4. In developing strategies to avoid the effects of housing on heathland birds, competent authorities in close proximity to the Thames Basin Heaths and Dorset Heathlands have considered research findings that cat predation can affect heathland bird populations. The Dorset and Thames Basin strategies took the distance of 400m as a no build zone around the edge of SPA heathland sites, this distance chosen to minimise additional cat predation on the adjacent heaths and also to reduce additional visitor pressure (with 400m being a typical distance that many people will travel on foot). Research in Dorset has indicated that cat predation is a particular problem for Dartford warbler populations (Murison, 2007), a species that does not occur in Breckland. Furthermore, the nesting patterns and densities of woodlark and nightjar within and around the Breckland SPA are quite different, with the range of habitat available and limited urbanisation around parts of the SPA utilised by these two Annex 1 species. Development proposals within 400m that occur close to nightjar or woodlark habitat will be few, and it is therefore proposed that the Core Strategy simply states that development within 400m of the SPA will need to undertake a project level HRA.

12.2.5. It is therefore concluded that the way to prevent adverse effects upon the three Annex 1 species is to ensure the Core Strategy is amended to make certain that:

- Built development promoted within the Core Strategy does not occur within 1500m of the SPA boundary for those parts of the SPA that are classified for stone curlews. Any housing proposal within this buffer should not be supported by the Core Strategy. However, locations within this buffer, where housing already screens the development location from the SPA boundary, could potentially be built on without adverse affect. Whilst at a plan level any development within the zone would not be supported, a project level assessment could be undertaken and in such circumstances may be able to demonstrate that the development would not result in an adverse effect upon the integrity of the SPA. At project level, assessment of development plans will be necessary to ensure no net loss of feeding habitat for stone curlews.

- For the any development within 400m of the SPA, a project level HRA will be required to demonstrate that the development will not have an adverse effect upon the integrity of the SPA. In the area around Thetford we consider the A11 to provide a suitable boundary to contain development and limit access pressure, cat predation etc in the nearby parts of the SPA.
• Areas outside the SPA that support stone curlews (we suggest 1km squares that have supported at least five nesting attempts since 1995) should also be buffered to 1500m in the Core Strategy. In these areas new development will need to be assessed at the project level and mitigation (such as new areas of suitable habitat for stone curlews) be provided.
• These zones will possibly need to change in the future, in response to new survey information and in recognition that supporting habitat may change over time. The different zones should therefore be reconsidered at plan review.

12.2.6. The zones described above are shown in Figure 7.
Figure 7: 1500m buffer around parts of the SPA that support stone curlews and around 1km grid cells (outside of the SPA) that have held 5+ nests in recent years. © Crown Copyright. All rights reserved. Licence Number DBRE004.
Avoidance and mitigation summary - Direct effects of built development

Core Strategy amendments
- Amend the Core Strategy to ensure that allocations and policies do not promote housing within the 1500m zone.
- Include the 1500m zone map in the Core Strategy, with explanatory text
- Ensure policy wording states that any housing within the zone will not normally be supported. In exceptional circumstances, such as where existing development completely masks the new proposal from Breckland SPA/supporting habitat, project level HRA must be able to demonstrate that adverse effects upon the Breckland SPA Stone Curlew interest feature will be prevented.
- Any development proposal that lies within 400m of Breckland SPA must also be able to demonstrate, through project level HRA, that the woodlark and nightjar interest features of the SPA will also not be adversely affected by the proposal.

Further action
With the measures applied above, no further action is required

12.3. Indirect effects: disturbance to Annex I birds associated with the SPA

12.3.1. The appropriate assessment took a precautionary approach in its consideration of the potential indirect effects of increased disturbance to Annex 1 species as a result of the proposals set out within the Core Strategy at preferred options stage. Whilst it was considered that increased access levels would be relatively low, it could not be ascertained that the predicted low level increases would not have an adverse effect.

12.3.2. It is considered that, in view of the low level of disturbance likely, a package of mitigation measures as outlined below would be sufficient to reduce, avoid and contain any disturbance impacts to the extent that adverse effects would be prevented. The different elements would need to be carefully developed and would involve partnership working with local landowners, agencies and conservation bodies, and therefore relies upon stakeholder consensus and the best available knowledge. The District Council would need to consider where it will be necessary to secure legal agreements to give certainty that the measures will be implemented.

12.3.3. All new tourism development such as new car-parks and the promotion of honeypot sites should only be taken forward in areas relatively unsuitable for annex I birds (such as deciduous woodland).

12.3.4. The provision of alternative sites for dog walking close to areas of new development. Such sites would need to be of a suitable size to
accommodate a range of different routes (including some of at least 2.5km), with car-parking facilities, varied countryside and safe environs for dogs to be off leads and no potential conflicts with other users (such as children, mountain bikers or horse riders).

12.3.5. Work with FC and other local landowners to develop a partnership approach to the protection and enhancement of European habitats. The following suggestions should be considered for implementation via a partnership approach:

- Seek ways to ensure access is focused away from open habitats, for example by promoting way-marked routes for dog walkers, cyclists etc. These routes would be flexible in that they were changed every few years in response to forestry management.
- The creation of permanent areas of open habitat, suitable for woodlark and nightjar, in areas with low levels of access (i.e. away from areas of disturbance).
- Mobile wardens or rangers on sites where birds are present. Wardens / rangers would promote responsible access (dogs on leads etc) and also be responsible for education initiatives, liaison with the public and liaison with access user groups.
- Maintenance and regular policing of access restrictions under CRoW for areas of open country supporting stone curlews
- Access restrictions under CRoW implemented to ensure stone curlews are not deterred from settling due to recreational disturbance levels.

12.3.6. It is recommended that a mitigation and monitoring strategy be committed to within the Core Strategy, and written and implemented within a set timescale. Such a strategy would involve regular monitoring of birds (including nest monitoring to check for disturbance effects) and access monitoring. Access monitoring data would provide spatial maps of visitor flows (at suitable resolution) in order to guide and target access management measures. Additional research could include work to explore the changes in numbers of key species in relation to habitat quality and disturbance.

12.3.7. Indications are that the low level of disturbance is not likely to have a significant effect, yet a lack of research to the contrary led to the precautionary conclusion that adverse effects could not be ruled out with the necessary certainty. With the application of the measures proposed, it is considered that the indirect effect of increased disturbance to Annex 1 birds will be completely avoided, and may even provide a net benefit in terms of more positive visitor management. With the avoidance of any adverse effect, it is considered that there will not be any remaining effects for consideration in-combination with any other plan or project.
Avoidance and mitigation summary - Indirect disturbance to Annex 1 birds

Core Strategy amendments
Include policy wording or supporting text to explain that the council is committed to ensuring sustainable levels of recreation in and around the Breckland SPA, and work with partners including Natural England, RSPB and Forestry Commission to develop a strategy that sets out an access management and monitoring programme that provides measures to prevent increasing visitor pressure, and suitable mitigation (should monitoring indicate that the Annex1 species are failing to meet conservation objectives due to recreational pressure).

Further action
With the measures applied above, no further action is required.

12.4. Other urban effects

12.4.1. The appropriate assessment concluded that urban effects, which include a wide range of impacts such as increased fires, litter and eutrophication, would be likely to operate synergistically to adversely affect the conservation interest of European sites that are located within areas of high density housing.

12.4.2. It is therefore recommended that the following measures should be applied for any SAC or SPA sites close to development, and in particular for those sites close to Thetford (Barnham Cross Common, Thetford Heath, Thetford Golf Club and Marsh) and its wider vicinity (such as East Wretham and Brettenham).

- Mobile wardens / ranger staff with a remit focused on access management and promoting responsible access. Duties would include issuing dog bags, ask people to keep dogs on leads, watching for fires and illegal activity (such as off-road bikes) and promoting the conservation of the sites through one-to-one contact with visitors and education programmes.

- Close work with local conservation staff and the local emergency services to ensure rapid response to fires and to any illegal activity (such as off-road motorcycles). Response to fires should involve familiarisation of emergency staff with the sites, clear labelling of gates and access points and an accurate means of rapidly conveying locations of fires and suitable access routes.

- Provision of dog bins at suitable locations around the Thetford sites

- The provision of suitable areas for dog walking and recreational use (walks etc) for communities living in Thetford (particularly near Barnham
Cross). Such sites should be large enough to provide a range of routes, have varied terrain/range of habitats, safe parking and be suitable for dog owners to let their dog off a lead.

- Control of parking availability and limiting parking away from official car-parks on designated sites.
- Access infrastructure as necessary to limit access by off-road vehicles to sensitive locations.
- Education programmes, promotion of nature conservation and responsible access with local communities. Potentially promotion of suitable areas for dog walking and other types of access.

12.4.3. Barnham Cross requires particular focus. An options appraisal and detailed management plan for the site is required. Such an appraisal should address habitat management and access management, ensuring favourable condition of this site can be maintained in the future. The appraisal would need to consider the potential for grazing the site (potentially requiring fencing of the common); effectiveness of mowing in maintaining vegetation communities; potential for turf stripping to reduce nutrient load; levels of scrub clearance necessary and access management measures needed to fit with these management measures. Any plan should include consideration of local people and integrate access management with habitat management, for example scrub management will reduce fire impacts (as fire will not impact grass heath habitats) and the presence of livestock on the site may cause dog walkers to avoid using the common. Certain areas of the site that support the important flora (such as the chalk habitats) will need to be the focus of management effort.

12.4.4. The above measures could be included within the mitigation and monitoring strategy recommended to avoid any indirect adverse effects occurring in relation to increased disturbance, or could be set out in a separate commitment within the Core Strategy. Given the level of detail required, it may be most appropriate to provide a separate strategy for Barnham Cross for example. It is concluded that, with the application of measures proposed, the synergistic effects of increased urbanisation, in close proximity to the European sites will be prevented.

12.4.5. Further consideration should also be given to the possibilities of new open spaces within and around Thetford, which could be paid for via developer contributions for development within certain distances of the more heavily used parts of the European sites.
Avoidance and mitigation summary – Urban effects

Core Strategy amendments
The council will need to commit to developing a framework of developer contributions, secured by legal agreement, for any new development where the heaths at Thetford (Barnham Cross Common, Thetford Heath, Thetford Golf Club and Marsh), East Wretham or Brettenham are likely to be used as local greenspace by the new residents or employees. Contributions will be used for the implementation of an urban heaths management plan (an individual management plan will be produced for Barnham Cross Common), with the primary purpose of achieving SPA/SAC conservation objectives.

Further action
With the measures applied above, no further action is required

12.5. **Recreational Pressure to the North Norfolk Coast**

12.5.1. Without evidence to the contrary, it was concluded by the appropriate assessment that an adverse effect upon the suite of European sites at the north Norfolk coast could not be ruled out, when considered in-combination with all other emerging spatial plans promoting new housing and tourism in the area surrounding the coast, up to 20km away.

12.5.2. In light of the conclusions drawn it is advised that new research is necessary on visitor flows and the ‘catchment’ of north Norfolk coast to determine which areas attract day trippers from Breckland, and how many people currently visit. This could potentially involve joint working with North Norfolk Coast partnership and other local authorities (such as Norwich and King’s Lynn). The research would also quantify the extent of current nature conservation impacts arising from access and how much these relate to day trippers. Such a project would require a combination of questionnaires with visitors, discussion with local conservation staff and a collation of existing data on access impacts, distribution of key species etc.

12.5.3. Such a piece of work would identify whether mitigation was required, where and how it should be implemented. Much of the coastal strip is already under conservation management and there is considerable access provision and existing work to promote responsible access. It is therefore not certain that mitigation might be necessary, and if it were, it would need to fit alongside current initiatives.

12.5.4. Given the likely future changes in the coastal strip, as a result of sea level rise, coastal zone management and initiatives to enhance coastal access there is likely to be considerable change. Such change could provide opportunities for enhancing access provision, as appropriate. Mitigation measures (if required), would potentially enhance and modify access patterns in a way that is sensitive to nature conservation, and ideally be
co-ordinated within the coastal strip by local conservation staff / Norfolk Coast Partnership.

12.5.5. Potential measures that could provide mitigation, if required, through partnership with local conservation bodies might include:

- Redistribution of parking locations and number of spaces.
- Changes in car-parking fees to help redistribute people.
- Provision of additional board walks or way marked routes to direct people away from sensitive locations.
- Wardening / ranger staff present on sites to promote responsible access.
- Restrictions on where dogs are allowed.
- Zoning of activities and provision of exclosures to prevent access where there are important concentrations of ground nesting birds or seals.
- Changes to public transport to reduce dependency on the car and ensure access is to particular hubs where visitor flows can be monitored and easily controlled.
- Provision of publicity material promoting responsible access, places to visit etc.

12.5.6. In conclusion it is advised that the potential for an adverse effect upon the north Norfolk coast European sites is not certain, but is assumed at this stage, taking a precautionary approach. There is confidence however that, should adverse effects be determined by the research proposed, the application of a range of mitigation measures will prevent the occurrence of adverse effects.

12.5.7. It is therefore recommended that the Breckland District Core Strategy simply recognises the potential in-combination effects upon the north Norfolk Coast European sites, and commits to working in partnership with neighbouring authorities and other relevant partners, as it is impossible for Breckland District Council to undertake mitigation measures on its own. The Norfolk Coast Partnership is likely to be the most suitable lead partner and co-ordinator.

12.5.8. It is further suggested that the 20km arc from the coast should be mapped to determine which areas of the Breckland District might fall into this zone. This will indicate whether any Core Strategy allocations fall within 20km of the coast. Further consideration should then be given as to whether those allocations would be likely to add to effects upon the coastal sites.
Avoidance and mitigation summary – North Norfolk Coast recreational pressure

Core Strategy amendments
Supporting text should recognise that coastal competent authorities promoting visitor access will need to consider the necessary measures required to meet the requirements of the Habitats Regulations and protect the integrity of the coastal European sites, and that it is possible that additional housing within the Breckland District may contribute to that visitor pressure, in-combination with new housing in other districts. The text should therefore commit to working in partnership with neighbouring authorities and other relevant partners to prevent adverse effects when monitoring indicates it could occur.

Further action
With the measures applied above, no further action is required

12.6. Flood Risk
12.6.1. The appropriate assessment identified that there is a risk during flood events that water polluted with sewage from burst sewers could drain into watercourses that discharge to, or affect European designated sites. Although flood risk assessments have been carried out for the main settlements where most development is anticipated (Thetford, Dereham, Swaffham, Attleborough and Watton), these are concerned with the risk of flooding to new and existing development by surface water and not the risks to European sites from floodwaters containing contaminants, particularly raw sewage. A risk could arise from foul water drainage from new developments contributing to the overloading of existing sewer systems, or an increase in surface water drainage containing contaminants from hard surfaces contributing to surface water run-off and increased flood risk. Whilst a potential adverse effect as a result of flooding has been highlighted, information from existing sources is currently not comprehensive enough to fully assess these risks.

12.6.2. In the absence of information to the contrary and taking a precautionary approach, we highlight European sites that appear to be at risk from polluted water during flood events in Table 13.
Table 13: Potential pollution risks during flood events to European Sites

<table>
<thead>
<tr>
<th>Potential Source</th>
<th>Pathway</th>
<th>Receptor (SAC European Sites)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attleborough</td>
<td>River Thet</td>
<td>Norfolk Valley Fens-Swangey Fen SSSI</td>
</tr>
<tr>
<td>Attleborough</td>
<td>Rivers Thet/Little Ouse</td>
<td>Breckland SAC-Thetford Golf Course and Marsh</td>
</tr>
<tr>
<td>Thetford</td>
<td>River Little Ouse</td>
<td>Breckland SAC-Thetford Golf Course and Marsh</td>
</tr>
<tr>
<td>Dereham</td>
<td>River Tud</td>
<td>Norfolk Valley Fens-Badley Moor SSSI</td>
</tr>
<tr>
<td>Dereham</td>
<td>Wendling Beck/R. Wensum</td>
<td>River Wensum SAC</td>
</tr>
<tr>
<td>Dereham</td>
<td>Wendling Beck/R. Wensum</td>
<td>River Wensum SAC-Dillington Carr</td>
</tr>
<tr>
<td>Dereham</td>
<td>Wendling Beck/R. Wensum</td>
<td>River Wensum SAC-Dereham Rush meadows</td>
</tr>
<tr>
<td>Swaffham</td>
<td>River Wissey</td>
<td>Norfolk Valley Fens SAC-Great Cressingham Fen</td>
</tr>
</tbody>
</table>

12.6.3. Due to the distances involved and the effects of dilution from main rivers and side streams, the risks from polluted waters to the Wash SPA/SAC/Ramsar and Breydon Water SPA/SAC/Ramsar sites do not appear to be significant.

12.6.4. The risks are the responsibility of the Environment Agency as the consenting body to water discharges, and AWS as the water company. However, assurances must be sought from those bodies in relation to the following issues:

- Whether the existing capacity and available headroom in existing sewerage systems is adequate to absorb additional discharges from new development, taking account of any storm water links between sewers and surface water drains and take a worse case scenario in relation to a 100 year event
- That existing systems are adequate or alternative arrangements put in place before the development goes forward
- A further measure that can be directly applied to LDF documents is the requirement for all new developments to install infiltration and attenuation measures to dispose of surface water in accordance with recommended SUDS and that disposal to surface water drains is a last resort.
Avoidance and mitigation summary – Flood risk

Core Strategy amendments

- Require all new developments to install infiltration and attenuation measures to dispose of surface water in accordance with recommended SUDS.
- Require any inadequate waste water infrastructure serving new development to be upgraded as required and operational in time to meet the demands of development.

Further action

Seek confirmation from the Environment Agency and/or AWS that existing capacity and available headroom in existing sewage systems is adequate to absorb additional discharges from new development, or that upgraded infrastructure is planned and fully committed to within the Core Strategy period.

12.7. Water Quality and Waste Water Discharge

12.7.1. The appropriate assessment concluded that the WWTW serving Attleborough and Swaffham had limited capacity to accommodate new development part way through the plan period, but with Watton and Dereham predicted to be able to accommodate further capacity to the end of the plan period. Furthermore, the assessment concluded that for a number of receiving watercourses, the required water quality is currently not being achieved. Water quality is within the jurisdiction of the Environment Agency and waste water discharge under the control of the relevant Water Companies, via Environment Agency consents.

12.7.2. With these matters outside the jurisdiction of Breckland District Council, their responsibilities are confined to obtaining assurances that the level of new houses proposed can be accommodated by existing WWTWs, or in due course by replacement or upgraded WWTWs that can be undertaken within the plan period. Policies and development proposed within the Core Strategy should not be taken forward if there is not the required level of certainty of their implementation without adverse effects.

12.7.3. Currently the discharge capacity at the Thetford WWTW has some headroom capacity, although this is calculated on volumetric capacity rather than process capacity (the difference between consented and actual maximum dry weather flows rather than the amount of flow that can be treated to consented quality standards). Thetford WWTW also treats sludge from other WWTW which could affect process capacity. Existing calculations suggest that a further 5,300 new homes could be accommodated before an upgrade is required. This represents approximately three-quarters of the new houses proposed for Thetford during the plan period.

12.7.4. Based on the same calculations of volumetric capacity rather than process capacity, at Dereham the existing WWT has sufficient capacity
for proposed developments up to 2026. At both Attleborough and Dereham the receiving watercourse is however already exceeding its DO target. At Watton there is existing headroom to treat waste water from proposed new development up to 2026.

12.7.5. In conclusion it is recommended that before new development is permitted at Dereham and Attleborough the necessary steps will need to be taken to improve WWTW discharge quality. At Dereham the discharges to the Wendling Beck discharge into the Wensum SAC and poor water quality here has a greater potential to damage the international site than those WWTWs which discharge to the Little Ouse where the water is mixed with the larger Great Ouse and diluted by other inputs before arriving at the Wash SPA/SAC.

12.7.6. Prior to the Core Strategy being given effect, it will be necessary to engage with the Environment Agency and/or AWS, and the consultants commissioned to produce the Breckland Water Cycle Study, in order to undertake the following for inclusion within the Core Strategy:

12.7.7. Housing Figures Group 1: Divide each town’s housing allocation to give the number of houses that can be taken forward under existing discharge consents, and the number of houses that is above this threshold. The quantum of houses in this group can be supported within the Core Strategy.

12.7.8. Housing Figures Group 2: For each town’s proportion of housing that is above the existing consent threshold, divide the number into those that are to be achieved in the plan period with the implementation of WWTW replacements or upgrades, which can be put in place within the plan period, with the necessary resources, technology and capability available, and where the provision of such works has been guaranteed or committed to. The Core Strategy must require the necessary works to be in place and operational in time to meet the demands of development.

12.7.9. Housing Figures Group 3: The remaining quantum of housing is that which cannot be accommodated by existing WWTW capacity, and for which future WWTW upgrades or new works cannot be guaranteed as commitments are not in place. The Core Strategy should state that the inclusion of this higher quantum of housing is in accordance with the RSS, but cannot currently be supported by the Core Strategy due to a lack of certainty that adverse effects upon European sites can be prevented. To take this higher quantum of housing forward would not be in accordance with the Habitats Regulations. It is recommended that the Core Strategy should specifically state that, in light of current investigative work being undertaken by the Environment Agency and AWS, this higher quantum for each town will be reassessed under the provisions of the Habitats Regulations in light of up to date information at the first plan review. At this review it may be necessary to revise housing figures accordingly.
Avoidance and mitigation summary – Water quality and waste water discharge

Core Strategy amendments
- Amend the housing figures to be taken forward into three categories, i.e. those immediately provided for in the plan, those that can only be taken forward with the committed works in place and operational in time to meet the demands of development, and those that cannot be taken forward prior to plan review and the revisit of the HRA. In particular, ensure that each town with promoted growth is clearly divided into the categories within the Core Strategy based upon the evidence base. Any housing categorised into 1 or 2 must be linked to the evidence base, otherwise it is placed into category 3.

Further action
Seek the necessary information from the Environment Agency and/or AWS and the consultants commissioned to produce the Breckland Water Cycle Study to enable housing currently promoted to be taken forward under the three categories.

12.8. Water Supply
12.8.1. The appropriate assessment of the demands of increased water supply as a result of the development proposed within and supported by the Core Strategy concluded that the water demands would be likely to result in adverse effects upon European site integrity, given the current state of abstractions, with consents either up to capacity or already over exploited. There is a number of European wetland sites which rely on spring-fed water (Norfolk Valley Fens SAC, Waveney and Little Ouse Valley Fens SAC/Ramsar) or groundwater levels (Breckland SAC, Broadland SPA/Ramsar, Broads SAC) or chalk-fed stream water (River Wensum SAC). All these sites are vulnerable to water shortages resulting from abstraction of groundwater. The Thetford growth point is of particular concern in this respect.

12.8.2. Existing water supplies are provided by Anglian Water from river abstraction and groundwater supplies under abstraction licences granted by the Environment Agency. Public water supply currently uses 77% of abstracted water in the Anglian Region with 52% of this going for domestic use and 27% to industry. Currently between 40-45% of all customers of AWS take their water through metered supplies, and a higher proportion of domestic customers in the region are metered than anywhere else in England and Wales. Average per capita use of water in the region is 120/140 litres/person/day which compares with 150 litres/person/day nationally. Summer surface water availability is currently fully committed and no significant further resource is available, although in principle, further winter water could be available, subject to appraisal.

12.8.3. Existing abstraction of groundwater is not believed to be causing problems but no significant further resource is available. The Environment Agency is currently reviewing abstraction licences, which could provide
further information, but it is unlikely that this review will be completed prior
to the finalisation of the Core Strategy, and measures will therefore need
to be considered in the absence of this additional information. Although
Water Companies have a duty to promote the efficient use of water by
their customers, they tend to concentrate the supply side measures,
whereas there can be substantial saving by users, estimated to be
between 12-30% of usage in existing housing stock (Every and Foley,
2006). As stated in the appropriate assessment however, whilst very
environmentally positive, any initiatives that require a voluntary response
cannot guarantee the necessary water use reductions for the purposes of
the HRA.

12.8.4. In order to ascertain that the Core Strategy will not have adverse effects
in terms of water demand, it is now critical that an accurate and realistic
picture is established in terms of the guaranteed water supply for the plan
period. As for water quality issues, it is advised that it will be necessary to
engage with the Environment Agency and/or AWS, and the consultants
commissioned to produce the Breckland Water Cycle Study, in order to
set out clear phasing of development that ensures the provision of water
supply meets the pace of new development and that European sites
remain adequately protected.

12.8.5. It is recommended that the following is determined for inclusion within the
Core Strategy:

12.8.6. **Housing figures Group 1:** Divide each town’s housing allocation to give
the number of houses that can be taken forward under existing
abstraction consents, and the number of houses that is above this
threshold. The quantum of houses in this group can be supported within
the Core Strategy.

12.8.7. **Housing Figures Group 2:** For each town’s proportion of housing that is
above the existing consent threshold, divide the number into those that
are to be achieved in the plan period with the implementation works to
secure additional supply, which can be put in place within the plan
period, with the necessary resources, technology and capability
available, and where the provision of such works has been guaranteed or
committed to. The Core Strategy must require the necessary works to be
in place and operational in time to meet the demands of development.

12.8.8. **Housing Figures Group 3:** The remaining quantum of housing is that which
cannot be accommodated by existing supply and consents, and for
which additional supply cannot be guaranteed as commitments are not
in place. The Core Strategy should state that the inclusion of this higher
quantum of housing is in accordance with the RSS, but cannot currently
be supported by the Core Strategy due to a lack of certainty that adverse
effects upon European sites can be prevented. To take this higher
quantum of housing forward would not be in accordance with the
Habitats Regulations. It is recommended that the Core Strategy should
specifically state that, in light of current investigative work being
undertaken by the Environment Agency and AWS, this higher quantum for
each town will be reassessed under the provisions of the Habitats Regulations in light of up to date information at the first plan review. At this review it may be necessary to revise housing figures accordingly.

12.8.9. With the knowledge that future water supply will continue to be an important consideration, and in the interests of sustainable development, it would be prudent to revisit the Core Strategy and consider where water efficiencies can be required or encouraged. This is not a HRA requirement, but any reduction of existing demand will contribute to more favourable baseline conditions at the next plan review when the HRA work will be revisited. Some of the following suggestions promoted in the Water Cycle Study include:

- Low flow showers, dual flush toilets, water butts and water efficient appliances
- Developers should be given encouragement to develop additional water saving measures such as rainwater harvesting, composting toilets and grey water re-cycling
- Require the same excellent BREEAM standards for water use in both domestic and industrial and commercial buildings.
- Where appropriate, new development should strive to be ‘water neutral’ whereby the use of water in the district after the development should be the same or less than the total water use before the development.
- Water neutrality could also apply for retro-fitting to existing buildings where development permissions relate to restoration or change of use.

### Avoidance and mitigation summary – Water supply

**Core Strategy amendments**

- Amend the housing figures to be taken forward into three categories, i.e. those immediately provided for in the plan, those that can only be taken forward with the committed works in place and operational in time to meet the demands of development, and those that cannot be taken forward prior to plan review and the revisit of the HRA.

**Further action**

Seek the necessary information from the Environment Agency and/or AWS and the consultants commissioned to produce the Breckland Water Cycle Study to enable housing currently promoted to be taken forward under the three categories.

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12.9. **Air pollution from roads**

12.9.1. The appropriate assessment concludes that, given the development proposed within the Core Strategy at preferred options stage, increased volumes of traffic and road infrastructure improvements are likely in close proximity to the Breckland SAC. The development proposed within the
Core Strategy is likely to lead to a requirement for road infrastructure improvements, and must therefore be considered as part of the HRA of the Core Strategy.

12.9.2. Habitat management (such as mowing, grazing, turf cutting and burning) can potentially help reduce the impacts of increased nutrient levels (e.g. Fottner et al., 2007, Hardtle et al., 2006, Terry et al., 2004, Barker et al., 2004). High intensity management such as turf stripping is the most effective (Hardtle et al., 2006). Such measures cannot be repeated too much on a site and are likely to be required regardless of increases in road traffic, due to an increase in general levels of atmospheric pollutants. It is recommended therefore that habitat management should therefore not be relied on as mitigation.

12.9.3. There may be opportunities for planting and management of trees along roadsides. Trees can directly absorb some airborne pollutants and may therefore improve local air quality by increasing the uptake rates of gaseous, particulate and aerosol pollutants from the atmosphere (Freer-Smith et al., 1997). The role of woodlands in reducing particulate pollution is reviewed by Beckett et al. (1998) and a summary of more recent research is provided in Freer-smith et al. (2005). Conifers tend to be the most effective species for reducing air pollution (Beckett et al., 1998, Beckett et al., 2000), the height and thickness of vegetation cover is also important (Maning and Feder, 1980), as are local conditions such as wind speed (Belot et al., 1994).

12.9.4. Woodland strips will already be in place in some locations, and may not always be effective. Additional work may be required to determine where such planting might function as mitigation. Measures would need to be in place to ensure long term management, particularly to ensure no pine regeneration on the heaths themselves. With current information available, it is concluded that woodland strips cannot ensure the protection of the SAC with adequate certainty for reliance on such measures as mitigation.

12.9.5. Promotion and provision of public transport and the use of railways to transport freight may function to reduce road traffic volumes. Such promotion of alternative transport cannot guarantee a significant reduction in traffic volume, nor can it guarantee that road infrastructure improvements would not be necessary, and such measures cannot therefore be relied upon as adequate mitigation.

12.9.6. In conclusion it is advised that the potential road infrastructure improvements or even new roads that may arise as a result the development proposed within the Core Strategy, occurring within 200m of Breckland SAC, are likely to adversely affect site interest features, and this effect cannot be adequately mitigated for. It is therefore necessary to ensure that development promoted within the Core Strategy can proceed without resulting in road infrastructure improvements or new roads within 200m of Breckland SAC. Once this is ascertained, the
prevention of road infrastructure improvements or new roads within 200m of the SAC should be committed to within the Core Strategy.

12.9.7. The conclusions drawn in relation to the direct effect of built development upon European site interest features are likely to require amendments to the Core Strategy in terms of locations for new development, and possibly volumes of new development, particularly in the vicinity of Thetford. It is therefore suggested that the need to avoid road infrastructure improvements or new roads within 200m of the Breckland SAC is also considered alongside those likely amendments, to enable a Core Strategy to be taken forward that will not result in any such impacts within 200m of the SAC.

12.9.8. In response to the above recommendations, Breckland District Council have confirmed that the road improvements in relation to south easterly links around Thetford will now be ruled out by the 1500m zone of no built development necessary to protect the stone curlew interest feature of Breckland SPA. In light of this zone, and the locations for housing around Thetford that will be taken forward, the road improvements that are a likely consequence of the development proposed around Thetford will be focused upon the A11. The council have further confirmed that it is unlikely that any such improvements will occur within 200m of the SAC. In light of the conclusion that such works could not be mitigated for, the effects of any road infrastructure improvements or new roads within 200m of the SAC will need to be considered by the Highways Agency /DfT as competent authority for the A11 Trunck road. For other roads, improvements should not be taken forward and this should be incorporated within the plan.

### Avoidance and mitigation summary – Air pollution from roads

#### Core Strategy amendments
The prevention of road infrastructure improvements or new roads within 200m of the SAC should be committed to within the Core Strategy.

#### Further action
With the measures applied above, no further action is required

12.10. **Avoidance of roads by stone curlew**

12.10.1. The appropriate assessment considered the available scientific research with regard to the avoidance of roads by stone curlew, and concluded that it cannot be ascertained that stone curlews would not be adversely affected by increased traffic levels, new roads or road improvements that are likely to arise as a result of the proposed development promoted within the Core Strategy preferred options.
12.10.2. No new road infrastructure where stone curlews occur will be the only ways to ensure no additional avoidance of roads by stone curlew. As with the recommendations made with regard to road infrastructure impacts upon Breckland SAC interest features, it is advised that it is necessary to ensure that development promoted within the Core Strategy can proceed without resulting in increased traffic volumes, road infrastructure improvements or new roads within the vicinity of the SPA, or stone curlew supporting habitat outside the SPA.

12.10.3. Natural England and the RSPB have considered the research presented within the appropriate assessment in relation to the avoidance of roads by stone curlew and have taken a precautionary approach and determined that the distance at which it can be ascertained that stone curlews will not be affected by road infrastructure improvements or new roads is the same as that for buildings, being 1500m. It is now necessary to check any road infrastructure improvements or new roads that are likely to be necessary based upon the levels of growth promoted in the Core Strategy, and determine whether any such works would lie within 1500m of stone curlew habitat.

12.10.4. Again, as discussed previously, the assessment of the direct effects of built development may now require amendments to the Core Strategy in terms of locations for new development and possibly volumes of new development, particularly in the vicinity of Thetford, with the application of a 1500m buffer. It is therefore suggested that the need to avoid road infrastructure improvements or new roads within 1500m of stone curlew habitat is also considered alongside those likely amendments, to enable a Core Strategy to taken forward that will not result in any adverse effect upon Breckland SPA interest features.

12.10.5. In response to the above recommendations, Breckland District Council have confirmed that the road improvements in relation to south easterly links around Thetford will now be ruled out by the 1500m zone of no built development necessary to protect the stone curlew interest feature of Breckland SPA. In light of this zone, and the locations for housing around Thetford that will be taken forward, the road improvements that are a likely consequence of the development proposed around Thetford will be focused upon the A11. In light of the conclusion that such works could not be mitigated for, the commitment to ensuring that any road infrastructure improvements or new roads within 1500m of the SPA or stone curlew supporting habitat will not be taken forward should be incorporated within the plan.

Avoidance and mitigation summary – Stone curlew avoidance of roads

Core Strategy amendments
The prevention of road infrastructure improvements or new roads within 1500m of Breckland SPA/supporting habitat should be committed to within the Core Strategy.
12.11. Conclusions relating to mitigation

12.11.1. The findings of the appropriate assessment and consideration of potential mitigation measures can be summarised as follows:

- The direct effect of buildings and roads development, the indirect effect of disturbance to Annex 1 birds, the effects of urbanisation, and recreational pressure on the north Norfolk coast, can all be mitigated for with the application of the avoidance/mitigation measures proposed. It is further advised that the measures will remove the effects to a level at which they can be considered de minimis and no further assessment will therefore be necessary.

- Breckland District Council have confirmed that in relation to the road infrastructure requirements of development proposed within the Core Strategy for Thetford, any such requirements to improve the flow of increased traffic will need to be focussed upon the A11 only, because the 1500m zone will prevent any options for improvements or new roads to the south and east of the town. This has therefore enabled it to be ascertained that the effects of air pollution as a result road improvements within 200m of the Breckland SAC will also be avoided as a consequence.

- Further clarification and housing categorisation is required in order for it to be ascertained that the impact of water demand, water treatment and discharge requirements, and the inadequacy of sewer systems to cope with flood events will not result in adverse effects upon a number of European sites with water sensitivities. However, it is anticipated that Breckland District Council will be able to obtain the necessary information from the Environment Agency and/or AWS and the consultants commissioned to produce the Breckland Water Cycle Study, in order to be able to take forward the measures proposed with the categorisation of housing figures into those that can be taken forward and those that must be reviewed again in light of further information at the next plan review. With the application of the avoidance/mitigation measures proposed, it is anticipated that the measures will remove the effects to a level at which they can be considered de minimis and no further assessment will therefore be necessary.

12.12. Re-screening of final Core Strategy submission document

12.12.1. The HRA has tracked alongside the emerging submission draft of the Core Strategy, and the appropriate assessment and mitigation sections of the assessment were undertaken with consideration of the most up to date drafts of the emerging plan. However, in accordance with Regulation 85B(1) of the Habitats Regulations, the final Core Strategy, as presented for Examination should be rechecked to ensure that it can be ascertained that the plan in its final form is fully compliant, and that any potential adverse effects upon the integrity of any European site have been either
avoided or mitigated for. This recheck is set out within Appendix 1 and completes the HRA Record. Where policy numbers have changed as the plan progressed from preferred options to submission, the original policy numbers were referred to throughout the assessment to maintain continuity. However, as a final record of the submission document the table in Annex 1 provides the new policy numbers as submitted. Where those policies were originally deemed likely to have a significant effect, the previous numbers are also given. Assessment summaries refer to both the policy and its supporting text.
## Appendix 1: Recheck of the Core Strategy at final submission stage

<table>
<thead>
<tr>
<th>Core Strategy Submission Policy Number</th>
<th>Recheck and assessment summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Introduction</td>
<td>Introductory contextual information, no policies. No LSE</td>
</tr>
<tr>
<td>Spatial Strategy – Spatial Portrait, Issues and Challenges, Vision, Objectives</td>
<td>Overarching and strategic vision setting. Vision amended to include reference to international habitats and species. No LSE</td>
</tr>
<tr>
<td>Policy SS1 Spatial Strategy</td>
<td>Umbrella policy for the Core Strategy. Amended to include reference to 1500m buffers to ensure stone curlew not adversely affected. No LSE</td>
</tr>
<tr>
<td>Key diagram</td>
<td>Amended to include visual representation of 1500m buffers to ensure stone curlew not adversely affected. No LSE</td>
</tr>
<tr>
<td>Policy CP1 Housing</td>
<td>Amended to remove allocations to the south-east of Thetford, now promoting growth to the north-east only. Housing figures divided into those that can and cannot be taken forward with current water infrastructure capacity. Plan review required for those houses above this threshold. No LSE.</td>
</tr>
<tr>
<td>Policy CP2 The Travelling Community</td>
<td>General policy without location specificity. No LSE</td>
</tr>
<tr>
<td>Policy CP3 Employment</td>
<td>1500m zone applied to Core Strategy, which will be relevant to any employment development. No LSE.</td>
</tr>
<tr>
<td>Policy CP4 Infrastructure</td>
<td>Amended to state that any new road infrastructure required to serve strategic growth will not be supported within 200m of any SAC. No LSE</td>
</tr>
<tr>
<td>Policy CP5 Developer Obligations</td>
<td>Amended to include reference to developer contributions for habitat management. No LSE</td>
</tr>
<tr>
<td>Policy CP6 Green Infrastructure</td>
<td>No a general and strategic level policy without location specificity. Requires maintenance of biodiversity as one of its purposes. Management of urban heaths covered by management plan commitments at CP11. No LSE</td>
</tr>
<tr>
<td>Policy CP7 Town Centres</td>
<td>Directs development away from European sites. No LSE</td>
</tr>
<tr>
<td>Policy CP8 Natural Resources</td>
<td>Amended to include reference to flood risk and European site risks, and also specific reference to 1500m buffer and inclusion of map. No LSE</td>
</tr>
<tr>
<td>Policy CP9 Pollution and Waste</td>
<td>General policy without location specificity. No LSE</td>
</tr>
<tr>
<td>Core Strategy Submission Policy Number</td>
<td>Recheck and assessment summary</td>
</tr>
<tr>
<td>---------------------------------------</td>
<td>--------------------------------</td>
</tr>
<tr>
<td>Policy CP10 Natural Environment</td>
<td>Amended to include detailed reference to 1500m buffer for stone curlews, both in policy and supporting text. Reference also made to partnership working to protect coastal habitats. No LSE</td>
</tr>
<tr>
<td>Policy CP11 Protection and Enhancement of the Landscape</td>
<td>Amended to include supporting text referring to managing access to European sites. No LSE</td>
</tr>
<tr>
<td>Policy CP12 Energy</td>
<td>General policy without location specificity. No LSE</td>
</tr>
<tr>
<td>Policy CP13 Accessibility</td>
<td>General policy without location specificity. No LSE</td>
</tr>
<tr>
<td>Policy CP14 Sustainable Rural Communities</td>
<td>General policy without location specificity. No LSE</td>
</tr>
<tr>
<td>Policy DC1 Protection of Amenity</td>
<td>Not promoting development. No LSE</td>
</tr>
<tr>
<td>Policy DC2 Principles of New Housing</td>
<td>Design orientated. No LSE</td>
</tr>
<tr>
<td>Policy DC3 Replacement Dwellings and Extensions in the Countryside</td>
<td>General policy without location specificity. No LSE</td>
</tr>
<tr>
<td>Policy DC4 Affordable Housing Principles</td>
<td>Not promoting development. No LSE</td>
</tr>
<tr>
<td>Policy DC5 Affordable Housing on Exception Sites</td>
<td>Not promoting development. No LSE</td>
</tr>
<tr>
<td>Policy DC6 General Employment Areas</td>
<td>Refers to employment locations already checked for LSE. All allocations removed from south and east of Thetford. No LSE</td>
</tr>
<tr>
<td>Policy DC7 Employment Development</td>
<td>General policy without location specificity. No LSE</td>
</tr>
<tr>
<td>Policy DC8 Tourism Related Development</td>
<td>Amended to include specific reference to only promoting tourism that ensures the protection of European sites. No LSE</td>
</tr>
<tr>
<td>Original Policy DC8 taken forward to appropriate assessment</td>
<td></td>
</tr>
<tr>
<td>Policy DC9 Proposals for Town Centre Uses</td>
<td>Directs development away from European sites. No LSE</td>
</tr>
<tr>
<td>Policy DC10 Telecommunications</td>
<td>General policy without location specificity. No LSE</td>
</tr>
<tr>
<td>Policy DC11 Open Space</td>
<td>Amended to include supporting text that specifically requires open space provision to ensure no adverse effects upon European sites, including via lighting or disturbance. No LSE</td>
</tr>
<tr>
<td>Original Policy DC12 taken forward to appropriate assessment</td>
<td></td>
</tr>
<tr>
<td>Policy DC12 Trees and Landscape</td>
<td>Positive environmental policy and does not promote development. No LSE</td>
</tr>
<tr>
<td>Policy DC13 Flood Risk</td>
<td>Positive environmental policy and does not promote development. No LSE</td>
</tr>
<tr>
<td>Policy DC14 Energy Efficiency</td>
<td>Positive environmental policy and does not promote development. No LSE</td>
</tr>
<tr>
<td>Policy DC15 Renewable Energy</td>
<td>General policy without location specificity and refers to need to ensure any proposal does not have a detrimental effect upon nature conservation sites. No LSE</td>
</tr>
<tr>
<td>Policy DC16 Design</td>
<td>Design orientated. No LSE</td>
</tr>
<tr>
<td>Policy DC17 Historic Environment</td>
<td>Positive environmental policy and does not promote development. No LSE</td>
</tr>
<tr>
<td>Policy DC18 Conversion of Buildings of Particular Historic or Architectural Merit</td>
<td>General policy without location specificity. No LSE</td>
</tr>
<tr>
<td>Core Strategy Submission Policy Number</td>
<td>Recheck and assessment summary</td>
</tr>
<tr>
<td>----------------------------------------</td>
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</tr>
<tr>
<td>Policy DC19 Community Facilities</td>
<td>Directs development away from European sites. No LSE</td>
</tr>
<tr>
<td>Policy DC20 Highway Safety</td>
<td>Safety policy and does not promote development. No LSE</td>
</tr>
<tr>
<td>Policy DC21 Parking Provision</td>
<td>General policy without location specificity. No LSE</td>
</tr>
<tr>
<td>Policy DC22 Corridors of Movement</td>
<td>Safeguarding policy and does not promote development. No LSE</td>
</tr>
<tr>
<td>Policy DC23 Conversion of Buildings in the Countryside</td>
<td>General policy without location specificity. No LSE</td>
</tr>
<tr>
<td>Policy DC24 Farm Diversification</td>
<td>General policy without location specificity and refers to environmental protection. No LSE</td>
</tr>
</tbody>
</table>
Appendix 2: Record of Consultations and Subsequent Amendments to the HRA Record

As each stage of the HRA was completed in draft form it was sent out to consultation by Phil Mileham Senior Planning Policy Officer at Breckland District Council. The consultation group included other officers within Breckland District Council, the RSPB and Natural England. Each stage was then finalised following receipt of consultation comments. The record below indicates where suggested amendments were fully implemented with a ✓. Where suggestions are not fully implemented reasons are given in bold.

Stages 1 and 2

Comments from Phil Mileham (via email to Durwyn Liley, 12-9-08)

Page 8 para 1 - sentence 1 revisions – Breckland District lies in an area of considerable importance for nature conservation with a number of European sites located within and just outside the District. ✓
Page 8 para 3 – after water abstraction should include - , waste water discharge. ✓
Page 11 para 2 – Could this be revised to clarify more explicitly that Wild Frontiers work on site description and vulnerability will be retained? ✓
Page 11 table 2 – is there a gap here on condition of Breckland SPA that needs to be included? ✓ In threats section, does reference to ‘disturbance’ specifically relate to recreation or predation? Could this be clarified either way. Different effects, no need to clarify.
Page 14 table 2 – Swangey Fen – Notes other issues. Attleborough Waste Water Treatment Works drains into watercourse which flows into Swangey Fen. ✓
Page 21 – para 1 – spelling mistake – check for likelihood of significant effects ✓
Page 21 – para 2 – spelling mistake – Breckland ✓
Page 21 – para 2 – revision - The Council reached the Preferred Options stage of the Core Strategy with what was termed as a ‘state of play’ report, which was prepared in consultation with Natural England from late 2006 onwards. ✓
Page 21 – para 3 – spelling mistake – thorough ✓
Page 21 – para 5 – last sentence – should refer to Preferred options Policies CP1, etc. ✓

Section 7 – review of Commissioned Research – Could this be expressed in tabular format to aid clarity. A good idea, which could be taken forward to the final HRA record once complete.
Comments from Steve Jones, RSPB (via email to Phil Mileham, 16-9-08)

Section 1
Statement that the ‘research is now drawing to a close’ should be clarified. It is not yet clear why woodlarks and nightjars are declining in this SPA, and further work may well be required to provide the evidence needed to conclude the AA. Further work may be required to evaluate availability of open space, to establish what mechanisms cause stone curlews to avoid nearby roads and housing, etc. The AA should identify any such research needs, timescales and costs. It should also identify which other partners this information (such as other LPAs with the SPA partly within their planning area, or who’s plans may give rise to LSE). It is recognised that the commissioned research will not have all the answers, and part of the remit of the HRA will be to highlight the need for further work. Wording changed to ‘commissioned research is now drawing to a close’ to give clarity.

Section 2
We endorse the use of a 20km during the screening stage. This has highlighted a number of additional sites to take account of during screening. We suggest that the Broadland SPA should be considered as it is easily accessible via the A11/A47. The North Norfolk Coast is another key area to consider as it is likely to draw recreational users from this District which, in combination with the Norwich and other growth points, could give rise to a LSE. The Norfolk Coast is being considered within the HRA. It is considered that Broadland SPA is too far away, not promoted, and does not offer the recreational qualities of other sites, and is therefore not considered within the HRA.

Section 3
Table 2 - decline of stone curlew on grass heaths is a key issue as recreational pressure may increase even if sites are closed in summer. Further, some sites that should support stone curlews might not due to existing recreational pressure. Good points, all noted for the assessment.
It is essential to establish target population sizes for stone curlews for each part of the SPA before impacts can be assessed and robust mitigation defined. Agree, however this is NE’s remit. Inclusion within this record of comments should flag this point to NE.
Some sites, such as Brettenham Heath, support fewer pairs than they should, and this site is close to the SE extension. Important point, noted for the assessment.
Factors driving recent declines of woodlark and nightjar need to be diagnosed.
Can include possibilities based upon current knowledge, noted for the assessment.
- It is not clear why the Breckland farmland SSSI is 100% favourable. NE remit
- We doubt that the Breckland Forest SSSI is 100% favourable as woodlarks and nightjars are declining. NE remit
- the stated condition of the various component SSSIs needs to be reviewed as there are not yet agreed target levels for each site, and the condition assessments will have been done in their absence. NE remit
Also Table 2 - we’d like to see some separation between “Reasons for designation” and “trends in key species (where known)” as these are two different things and
we're not convinced that running them in together is helpful. These should be kept clearly distinct (even if grouped together - in this case by shading or a separate line). Simply put together to save space in a large table.

Section 4
We anticipate there will be a conflict between protecting the Brecks SPA and meeting the "at least 6000 houses" RSS target for Thetford. **Agreed.**
The RSS AA was inadequate and it cannot be assumed that the targets within RSS are deliverable and they have not been subject to proper AA. **Agreed.** This point has been made already in the stages 1 and 2 document.

Section 5
Final paragraph of section 5 (page 19): We're unhappy with the statement "should the assessment reach a point where in-combination assessments are necessary". The in-combination assessments should be conducted anyway - otherwise there is a risk that mitigation measures are taken into consideration to remove a direct adverse effect and the issue of in-combination effects may never actually be considered. In such a situation the mitigation need only be sufficient to reduce the effect and not remove all of it. **Agreed.**

If a plan or project is subject to appropriate assessment it is possible that there may still be residual effects of the plan that have not been entirely eliminated by counter-acting measures, even where it has been ascertained that there would not be an adverse effect on the integrity of a European site. It is also possible that these residual effects may have a significant effect on a European site when combined with other such residual effects, from plans or projects whether or not they have been subject to appropriate assessment. Until the HRA is further developed, it cannot be determined whether effects have been fully eliminated by measures proposed, or whether residual effects remain that need consideration. Hence the assessment states that in-combination effects will be considered if necessary.

**Stage 3 early draft**
This interim draft was not sent out to consultees, but rather was only seen by Breckland District Council

Comments from Phil Mileham as track changes, sent 29-9-08

Section 8
Change policy nos DC11 and DC12 to CP11 and DC 11. **Agreed.**

Aware that policy numbers have changed in an emerging submission draft, but not done as we need to keep all compliant with the preferred options version at this stage

Deletion of ‘preferred option’ ✓

Section 9
Spelling ‘additional’ ✓

Alterations to allocations as per emerging submission draft not done as we need to keep all compliant with the preferred options version at this stage

Spelling ‘Breckland’ ✓

Change SAC to SPA not done as original correct

Mistype – ‘4’ ✓
Table 4 – query re travel times checked by Durwyn Liley and an explanatory footnote added

Section 10
Note on sending of appendices – footnote added
Deletion of ‘preferred options’ ✓
Query over Swaffham – changed to Dereham ✓
Query whether Thetford WWTW needs adding ✓
21 change to 2.1 ✓
Table 5 needs to be rechecked re recent consents - footnote added
Mistype – ‘1’. ✓
Mistype – ‘2103’ alter to ‘2013’ ✓
Change AA to OA ✓
Add more in section 10.5 re Norfolk Valley Fens ✓
Spelling and spacing ‘Breckland’ ✓
Spelling ‘areas’ ✓

Section 11
Change SAC to SPA not done as original correct
Notes added on road infrastructure – noted and used, thank you
Stages 1, 2, 3 amalgamated version 3-10-08

Comments from Phil Mileham sent via email 29-9-08

Page 11 – Table 2: reference to Scott Wilson (2008) should refer to the Water Cycle Study for completeness. ✓
Page 11 – Table 2: Do the percentages for Weeting Heath tally? ✓
Page 11 – Table 2: The Wash SPA/SSSi – Notes Discharges into Wissey and Little Ouse. ✓
Page 19 – Section 5, Bullet points at para 3 need revising to reflect data supplied. ✓
Page 24 – table 4 – CP3 Employment – Is the Ouse Washes applicable here in light of effluent from businesses? ✓
Page 24 – table 4 – DC8 Tourism – Is there a potentially wider recreational impact as a result of this policy? ✓ North Norfolk Coast sites added
Page 25 – review of commissioned research – 3rd Para needs revising to reflect receipt of SCARE data. ✓
Page 28 – AA of resi, employment and tourism – 1st Paragraph may need to refer to total of 22,000 dwellings in light of likely windfall development. Note that planning guidance states that windfall cannot be accounted for within the policy. ✓ sentence added
Page 59 – Section 2 – Is likely to need revising to reflect recent revised consents from EA. Latest information from Water Cycle Study will be provided as soon as it arrives. Footnote already added.
Page 59 Paras 4 and 5 – lack of information noted. However, it is unclear what additional information you need to make a full assessment? The paragraph later goes on to mention very full report by Scott-Wilson? Do you need the stage 2 WCS? 2nd WCS would be useful.

General comment – Could the document be fully paragraph numbered in its entirety? This may well help us during the examination process. This will be done form the final report. To do this during draft changes causes a lot of extra work.

Comments from RSPB sent via email 9-10-08

Table 2 -The RSPB believes the list of European and International sites identified for assessment is complete. Noted

Section 5 - Final para of section 5 (page 19): The RSPB disagrees with the statement “should the assessment reach a point where in-combination assessments are necessary”. The in-combination assessments should be conducted anyway - otherwise there is a risk that mitigation measures are taken into consideration to remove a direct adverse effect and the issue of in-combination effects may never actually be considered. In such a situation the mitigation need only be sufficient to reduce the effect and not remove all of it. This might only give rise to problems in some rare circumstances, but we would still like it covered off, and it would not be an onerous requirement to address this concern. See earlier comments in relation to the same issue.

The implications of the cumulative/in-combination effects of house building on recreation and traffic flows could be mentioned. There is a need for adjacent LPAs
to communicate and share the evidence base, and perhaps collaborate over mitigation and monitoring. **Issues being considered within the mitigation section, and once mitigation is finalised there may or may not be remaining effects. Point will be added to this effect as advice to future HRAs in neighbouring authorities if effects remain.**

Section 6. - We agree with the outcome of this section. **Noted and welcomed, thank you.**

Section 7. - As we stated during the last round of comments on stages 1+2, although we suspect there will soon be sufficient research to complete an AA of the Core Strategy, there may well be a need for further research into the future, and this should be itemised as an output of the AA process. **Good point, will be part of final HRA doc.** On p26, it would be useful to flag that the factors driving declines in woodlark and nightjar have not been diagnosed and that, although this may not be driven primarily by recreation, the lack of understanding has implications for concluding the AA process. For example on-going nest camera etc work is needed to diagnose these declines. **Additional text added at section 7.**

Section 9
Section 9.1 - We think the bullet points on p28 are comprehensive. **Comment welcomed.**
Section 9.2 - The bullet points towards the bottom of p29 are comprehensive. **Comment welcomed.**
Section 9.3 - bullet points p30 comprehensive. **Comment welcomed.**
Last sentence p33 - We will give this question further consideration and discuss with NE. **Noted, and outcome of discussions awaited.**
Section 9.5 -1st para p35. woodlarks and nightjars have both declined in this SPA, not increased. **Paragraph refers to national populations and has not been changed.** p41, 3rd para. - Our understanding is that access is restricted on sites once stone curlews settle each year, but of course the SCARE research shows that disturbance can prevent birds settling in the first place, so restrictions may not be put in place if birds are made not to settle by excess disturbance in spring. Further, there are parts of some sites that should support stone curlews but don’t, and these may not have access restrictions. It should not be assumed that current restrictions are adequately enforced: in fact our understanding is that some sites with restrictions rarely get visits from wardens. A key requirement is resources to enable adequate wardening. ✓ **this is addressed in the mitigation section**
bottom p42 - Barnham Cross Common is very obviously declining in condition. **Additional text added.**
Section 9.7: We agree with this analysis. It highlights a flaw in the RSS AA, in that it failed to consider the cumulative effects of developments in nearby districts on these European and International sites. **Comment welcomed.**
p52 - add reduced soil moisture as result of abstraction combined with summer drought stress; this could reduce e.g. earthworm biomass and affect stone-curlew. **Additional text added.**

Section 11
p65 - re social infrastructure and Policy CP4. A community centre at the edge of Barnham Cross Common was proposed with the intention to draw people onto the
common using this social facility. We believe this would give rise to a likely significant effect and should be assessed. **This proposal is not included in the Core Strategy, and is not currently being taken forward in any LDF document.**

p65 third para - energy infrastructure in form of wind farms could give rise to a likely significant effect. **No project promotion within the Core Strategy, so no further measures required. Extra wording added on the need for project level assessment.**

Figure 6 - Why does Figure 6 exclude the Breckland SPA? What is its purpose? It is thought this a reference to figure 5? If so, the figure shows the road network in relation to SAC sites, to show close proximity of SAC habitat, which could be affected by air borne pollution. Further text added to the figure title to give clarity.

top p67, 1st bullet point should mention SPA rather than just SAC (although it mentions Annex 1 birds). Additional impacts are displacement from habitat (second bullet), not just loss of habitat - i.e. stone-curlew displaced from otherwise suitable habitat. **Bullet point amended.**

p69 - We agree with the conclusions of this section. **Comment welcomed.**

Other comments:
We believe that the Green Infrastructure policy must be screened for likely significant effect; **Already done**
but at some point consideration needs to be given to how to deal with the Green Infrastructure Study that underpins this policy (and the policies to be included in the AAP). Ideally the GI study should be subject to AA. **Policy CP11 was screened in as the improvement and expansion of green infrastructure may lead to more recreational pressure. Consideration of this policy is still outstanding and will be concluded in final HRA once mitigation for other urgent issues is resolved.**

It is essential that a monitoring and review framework is set out as an output of the Core Strategy AA process. **Agreed, the final HRA doc will include this, once mitigation measures are finalised and we then know what we need to monitor.**

There are numerous typos within the later stages of the document which should be tidied up before the document is finalised. **Noted and to be rectified.**

Comments from Natural England sent via email 10-10-08

1) This is a comprehensive report which is under-pinned by good research and data. **Comment welcomed**
2) The interest features of the River Wensum SAC should be included in Table 4. ✓ **amended.**
3) We have noted the comment in the final paragraph of page 33 and will consult with the RSPB over what constitutes a suitable distance. **Noted and outcome of discussions awaited**
4) We note from the findings of the Appropriate Assessment that it has not been possible to rule out adverse effects arising from any of the policies assessed. Obviously suitable measures will be necessary to avoid negative impacts to the interest features of any European site(s). We understand that Footprint Ecology are now working on appropriate mitigation measures which we would be pleased to discuss with you when finalised. **Comments noted and welcomed. As with earlier drafts and section by section work, NE will be consulted on the mitigation section of the report, before the whole HRA is finalised.**
Buffers / definition
Clarification needed as to whether the SPA referred to in section 12 (especially 12.1) is the Brecks Farmland SPA or the Brecks Forest SPA? they are both part of the same SPA

A definition will be required of any areas of supporting habitat beyond the SPA to which the buffer will be applied (subject to agreement with NE). It is recommended that this is mapped and included within the AA. map and description added

Will we need agreement from the group that the indirect effects identified (principally recreation/access) will have a “low level of disturbance”? Consensus was reached in the meeting (with RSPB and Natural England on 23/10/08).

Is there sufficient comfort from the FC Management Strategy (has this been subject to AA?) that the mitigation proposed is realistically deliverable? Do we need the Forestry Commission in attendance on Thursday – re: mitigation measures? FC design plans are not usually subject to Appropriate Assessment. Breckland Council will need to establish a package of mitigation that is likely to include FC and others.

12.2 – page 71 – recognise that this is submission version Core Strategy not Preferred Options. Wording amended to reflect the fact that the assessment evolved alongside and informed the submission version

Should AA Report give some indication as to the scale of development where contributions are required? It is assumed to be a single property, but could be developments of 5 or more units etc? Any net increased in dwellings, so for one individual dwelling upwards. There is no point in having differing thresholds, because this would lead to projects being split so that each planning application sits just below the threshold.

Clarification at 12.3 – all SACs and SPAs – including Dereham? Need to check as emphasis is on Barnham Cross and there are actions specifically for Thetford. Should this be clearly signposted in the Core Strategy to the AAP? Whilst focus on Barnham Cross is noted, the recommended mitigation should not compromise work done to date with NE and management committee to implement already developed management plan. This is likely to need rewording to avoid conflicts. However, NE will need to advise here. Wording amended.

12.4 – page 74 - Advice will be required at the meeting (especially from NE) on the way forward for a co-ordinated approach to mitigating recreational impact on North Norfolk coast. It is unclear at this stage as to what level of detail would suffice in the Core Strategy document and the ensuing EIP to pass AA? Issue discussed at meeting and wording amended.

12.4 - Pg 74 - Agree that research may be needed. However, as North Norfolk coast is at very margins of what the AA has screened in for consideration (20km), it is considered that this should be coordinated by either NE, another local authority or at County level rather than directed to Breckland. There should perhaps be some
reference to the GNDP, particularly in light of the scale of growth proposed in the Norwich Sub-Region. **Wording amended.**

12.8 – pg79 – Need to be clearer as to what is meant by road ‘improvements’. It is hoped this does not exclude highway improvements for safety reasons. Whilst capacity is perhaps what is meant more detail is needed here. **Wording amended.**

Is there an issue here regarding any other DC policies not screened in to AA that might allow for isolated houses permitted through DC process? Is this also an issue in relation of changes of use of agricultural to garden or domestic/commercial extensions etc? **The plan is assessed in terms of its policies and likelihood of significant effects, to ensure that the plan does not promote development that would be likely to fail the requirements of the Habitats Regulations at project level. Project level assessment is still required however, for any individual project proposals where a likelihood of significant effects cannot be ruled out.**

**Water issues**

Section 12.5 - WCS refers to hydraulic capacity of receiving water course re: flood risk. What further work is envisaged around risk of pollution from flooding? Is the cause more around climate change? It is unclear how burst sewers can be directly attributed to new growth (an AA matter) as opposed to existing developments that have no possibility for mitigation? This is particularly notable in respect of surface water drainage issues increasing run-off. This should also factor in changes to GDPO in respect of requirements for planning permission for impermeable surfaces. **New growth will increase pressure on existing sewage systems. Wording amended.**

Section 12.6 – Advise of latest EA consents at Dereham and Swaffham. Note – PM/DS to pass on email correspondence in relation to revised consents which should allow for growth levels proposed in Dereham and Swaffham in CP1 to be acceptable in terms of quality capacity. Is the report recommending the phasing of housing around water resources? There are implications for CP1 and CP4, but does CP4 not already pick up the issue of phasing and delivery of infrastructure? **Email correspondence received. Wording amended to clarify.**

12.6 – Pg 76 – 3rd Para – 5,300 homes is ¾ of growth required in Thetford. It is assumed this is what is meant but the language here may need revising to clarify. **Wording amended.**

12.6 – pg 76 – 1st Bullet – Breckland growth infrastructure study should be referenced in regard to new WWTWs. AWS management planning process will require certainty of an adopted Core Strategy. Policy CP4 and phasing elements of CP1 should provide sufficient certainty for the purposes of the AA. **Wording amended. Breckland growth infrastructure study has not been sourced.**

12.6 – pg 76 – 2nd bullet – Again, does CP4 give us sufficient comfort in this regard? **Paragraph reworded.**

12.7 – pg 77 - What is the actual effect of water supply/resources on European Habitats? This needs strengthening in this section. Is it just related to Thetford or
District-wide? Report needs to be clearer, perhaps providing additional cross references at para 1. **Additional text inserted.**

12.7 - The water efficiency measures in this section are very similar to those mooted by Anglian Water through WCS Stage 1. **Yes, but all now just described as a positive and sustainable approach to water efficiency, not a HRA measure.**

12.7 – page 77 - Bullet 1 – The Council is unlikely to commit to an SPD for water efficiency. Therefore, if this is not an essential measure to pass AA, this should be deleted. Furthermore, the Government Office is not particularly keen on LPAs committing to the production of other documents that could adversely impact upon the timely delivery of new housing allocations. Could water efficiency in Attleborough and Thetford be dealt with through policies in emerging Area Action Plans (that the Council has committed to) rather than SPD? It is also suggested that ‘encouraging water metering’ is beyond the scope of the LDF system. Furthermore, we are not comfortable with the suggestion that contributions can be ‘waived’ to compensate for water saving measures. This is likely to conflict with other sustainable development objectives. It again recommended that if not essential to pass AA, should be deleted. **All now just described as a positive and sustainable approach to water efficiency, not a HRA measure.**

Page 78 – Could we not suggest that water efficiency statements are required as part of local 1APP requirements? This is presuming we have suitable background evidence from the WCS and the AA. If not, how can we tell what water usage is now and what it would be after development? **Now just described as a positive and sustainable approach to water efficiency, not a HRA measure.**

12.7 – pg 77 - Water supply – This section needs to refer back to the Regional AA report. **Not aware of anything that would be helpful or relevant to include. We will need clarification as to what should be included if this is still required.**

12.7 – pg 78 – 2nd Bullet - Water neutrality – code level 6? Can the report clarify what “water neutrality” entails? **Now just described as a positive and sustainable approach to water efficiency, not a HRA measure.**

Section 12.9 – It is considered that again, we need a view from NE on avoidance of roads by Stone Curlew. Presumably 1,000m is the starting point in this case? **1,500m for both roads and buildings is now agreed between NE and RSPB, and reflected in the report.**

**General point:**
Where the Report states “further consideration” what is actually meant? Is it a case of further primary research? Is it a case of further interpretation of existing data? It is hoped that there is no vacuum of evidence highlighted at this late stage that would result in an inability to complete the assessment. **Further consideration refers to the fact that the issue is not currently resolved. This may need further discussion or further research.**
There is generally a need to be clearer about mitigation measures in the AA. Could this perhaps be set out in a table to aid clarity for the reader or more clearly set out in the conclusions? **Mitigation summaries now included**

It is recommended that paragraph numbering is used throughout to aid discussion and reference. The Council will need to reference the AA in responding to Inspectors questions prior to examination and this will be most useful. **Now added**

Comments received by email (to Durwyn Liley) from RSPB, 6-11-08

9.1 Housing Provision. Add bullet points on p 28: ‘decrease density in proximity to roads’; **text amended** also mention loss of SC pairs nesting on nonSPA arable; loss of non-SPA areas used for feeding SC; **noted but no amendment made**, these impacts are essentially captured in the first bullet. Mitigation section for built development amended to encompass loss of foraging habitat.

Last 3 bullet points p29: add road traffic flow and recreation impacts (both could result from employment provision). **Text ammended**

p41. para 3. there are CRoW restrictions but these are put in place once birds are confirmed, whereas spring time disturbance could prevent birds appearing in the first place. **Text amended and additional text put in mitigation section to address this issue.**

Section 11.1 deals with new/improved infrastructure.

- I still feel that Figure 6 is slightly misleading as it shows only roads as they relate to SAC sites, whereas a lot of the white on this figure is SPA too. I suggest therefore that shading is used to highlight the SPA (also SSSI). **Figure not amended as section specifically relates to the SAC habitats**

- 11.2 deals with pollution, 11.3 with avoidance of roads: an additional section is required to deal with physical habitat loss. If, for example, a south-east link road is needed, this can only pass through the N2K site, resulting in direct area/habitat loss. **South east link road is not included in the core strategy.**

12.2 deals with Annex 1 birds in the Brecks SPA only and should be labeled as such. I agree with the proposal to commit to developing a mitigation and monitoring strategy within a set timescale. Work towards this should probably start asap. **Heading for 12.2 amended and other comments welcomed.**

12.3 I agree with all of this, and it is probably best to have a separate plan for Barnham Cross given its particular community focus (i.e. there is an established community group that would wish to have close involvement in a plan for this site but perhaps not other areas). **Separate plan for Barnham Cross made clear in text and comment welcomed.**

12.4. I agree with this section. The Norwich AA has already cited the need for some of the work mentioned here and the council may wish to participate in joint working. The Norfolk Coast Partnership (Tim Venes) has already agreed to the need for a partnership and accepts that this body might be the lead. **comment welcomed**
12.7. This is concerning and appears to be the least certain part of the whole HRA. Comment noted. This text revised in later versions.

12.8. Early sward closure in clear-fell areas (driven by air pollution/warming?) may well be one factor driving the observed decline in woodlark. Seeking to make the scale of development planned 'traffic flow neutral' seems implausible! We know that traffic flows will increase anyway, even if no new Breckland resident drives a car, due to all the other regional development - thus in-combination effects cannot be prevented surely? In combination assessment of general traffic flows which are relevant locally, regionally and nationally are a national issue and cannot be addressed in a local HRA.

I can’t find anything in the 'mitigation' section dealing with physical habitat loss should any road schemes be required that cross through the N2K sites (section 12.9 comes closest but only deals with displacement). See comment above relating to south east link road.
References


