Eastleigh Borough Council

Issues and Options Eastleigh Borough Local Plan

Habitat Regulations Assessment Screening Report

November 2015

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1 Introduction

1.1 Legislation

1.1.1 The need for Appropriate Assessment is set out within Article 6 of the EC Habitats Directive 1992, and implemented into British law by the Conservation (Natural Habitats, &c) Regulations 1994 (as amended). The 1994 Regulations have been replaced by the Conservation of Habitats and Species Regulations 2010 (as amended). Under these Regulations, land use plans must be subject to Appropriate Assessment if they are likely to have a significant effect on a Natura 2000 site (Special Areas of Conservation, SAC and Special Protection Areas, SPA). It is Government policy for sites designated under the Convention on Wetlands of International Importance (Ramsar sites) to be treated as having equivalent status to Natura 2000 sites. As such, Appropriate Assessments should also cover these sites.

1.1.2 The Habitats Directive applies a precautionary approach to protected areas; plans and projects can only be permitted having ascertained that there will be no adverse effect on the integrity of the site(s) in question. In the case of the Habitats Directive, plans and projects may still be permitted if there are no alternatives to them and there are Imperative Reasons of Overriding Public Interest (IROPI) as to why they should go ahead. In such cases, compensation would be necessary to ensure the overall integrity of the site network.

1.1.3 In recent years the term Habitat Regulations Assessment (HRA) has been coined to describe the entire assessment process required to comply with the Regulations, including the specific Appropriate Assessment stage. In order to ascertain whether or not site integrity will be affected, an HRA should therefore be undertaken of the plan or project in question.

Habitats Directive 1992

Article 6 (3) states that:

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

Conservation of Habitats and Species Regulations 2010 (as amended)

The Regulations state that:

"*A competent authority, before deciding to … give any consent for a plan or project which is likely to have a significant effect on a European site … shall make an appropriate assessment of the implications for the site in view of that sites conservation objectives*".

1.2 This Report

1.2.1 The purpose of this report is to document an initial Habitat Regulations Assessment Screening (Likely Significant Effects) exercise for the issues and options Eastleigh Borough Local Plan. There is no requirement in law to undertake an HRA on a plan at issues and options stage. However, it has been judged to be useful for plan development to have an analysis of the implications for internationally important wildlife sites of each of the spatial options under consideration. Since this is an issues and options assessment it

is intentionally high-level since locations have not been fixed and policies and quanta of development remain to be drafted.

2 Methodology

2.1 Introduction

2.1.1 This section sets out our approach and methodology for undertaking the HRA.

2.2 A Proportionate Assessment

2.2.1 Project-related HRA often requires bespoke survey work and novel data generation in order to accurately determine the significance of adverse effects; in other words, to look beyond the risk of an effect to a justified prediction of the actual likely effect and to the development of avoidance or mitigation measures.

2.2.2 However, the draft CLG guidance[1] makes it clear that when implementing HRA of land-use plans, the AA should be undertaken at a level of detail that is appropriate and proportional to the level of detail provided within the plan itself:

2.2.3 "*The comprehensiveness of the [Appropriate] assessment work undertaken should be proportionate to the geographical scope of the option and the nature and extent of any effects identified. An AA need not be done in any more detail, or using more resources, than is useful for its purpose. It would be inappropriate and impracticable to assess the effects [of a strategic land use plan] in the degree of detail that would normally be required for the Environmental Impact Assessment (EIA) of a project*."

2.2.4 In other words, there is a tacit acceptance that appropriate assessment can be tiered and that all impacts are not necessarily appropriate for consideration to the same degree of detail at all tiers (**Figure 1**). This HRA was therefore undertaken using existing data and without undertaking bespoke surveys or detailed modelling.

2.2.5 The most robust and defensible approach to Plan-level HRA is to make use of a precautionary approach in assessing the policies of the Local Plan. In other words, the plan is never given the benefit of the doubt; it must be assumed that an objective/policy is likely to have an impact leading to a significant adverse effect upon a European site unless it can be clearly established otherwise.

[1] CLG (2006) Planning for the Protection of European Sites, Consultation Paper

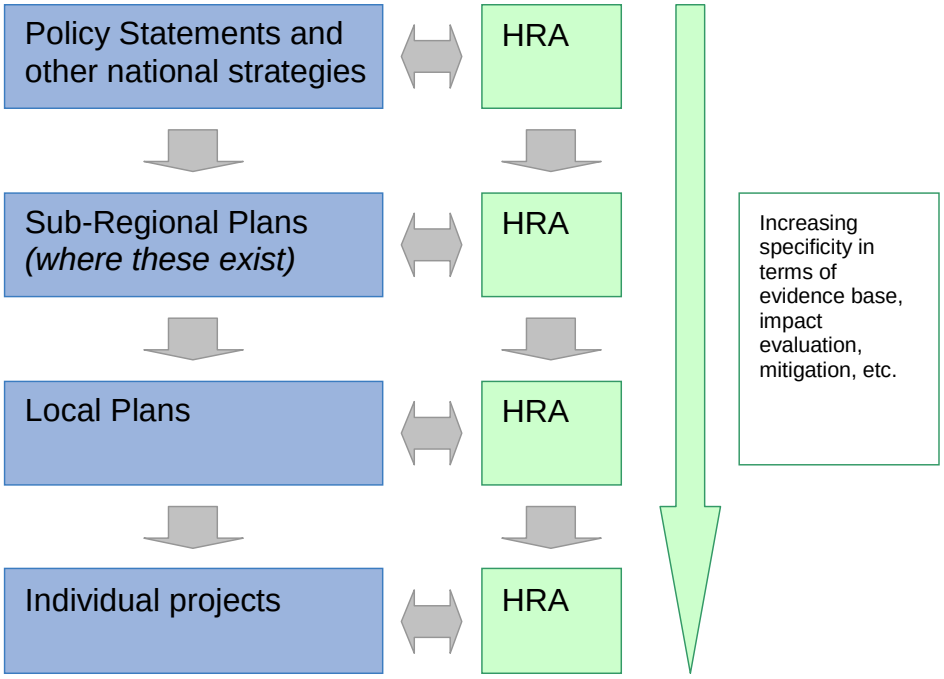


Figure 1: Tiers in HRA of Land Use Plans

2.3 The Process of HRA

2.3.1 The HRA has been carried out in the continuing absence of formal Government guidance. CLG released a consultation paper on AA of Plans in 2006. As yet, no further formal guidance has emerged.

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

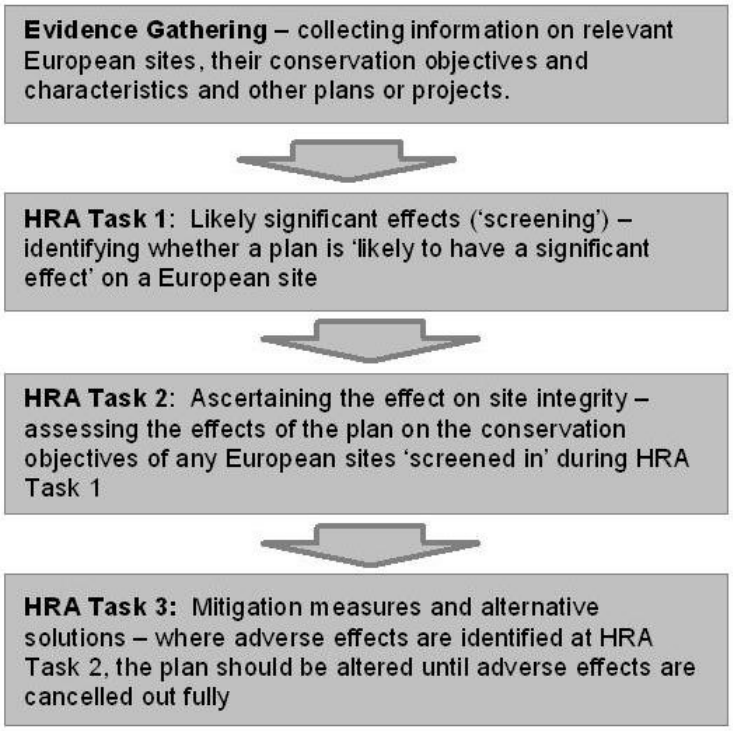


Figure 2: Four-Stage Approach to Habitat Regulations Assessment

2.3.3 In practice, this broad outline requires some amendment in order to feed into a developing land use plan such as a Local Plan.

2.4 Evidence gathering

2.4.1 Key sources of evidence that we have accessed for this Habitat Regulations Assessment are:

- The Joint Nature Conservation Committee website (www.jncc.gov.uk) and Natura 2000 data sheets;
- The websites www.natureonthemap.co.uk and www.magic.gov.uk both of which enable internationally important wildlife sites to be viewed in a spatial context;
- Habitat Regulations Assessments for adopted Core Strategies in surrounding authorities;
- Stillman, R. A., West, A. D., Clarke, R. T. & Liley, D. 2012. Solent Disturbance and Mitigation Project Phase II: Predicting the impact of human disturbance on overwintering birds in the Solent. Report to the Solent Forum;
- Postlethwaite B. February 2010. Noise Quality Assessment Eastleigh River Side Project. Unpublished report by Bureau Veritas on behalf of Eastleigh Borough Council;
- Chanin P., Ecology of the European Otter, Conserving Natura 2000 Rivers, Ecology series No 10, Published by Life in the Rivers;
- AEA Technology. April 2010. Eastleigh River Side Air quality Study. River Itchen Deposition research. Unpublished report by AEA technology on behalf of Eastleigh Borough Council;

- AEA Technology. 2010. Road transport emissions impacts on Nature Conservation Sites. Report to the Partnership for Urban South Hampshire;
- The UK Air Pollution Information System www.apis.ac.uk;
- Environment Agency Stage 3 and 4 Review of Consents Reports for the River Itchen and Solent Maritime SAC/Solent & Southampton Water SPA (2007);
- The River Itchen Sustainability Study;
- Environment Agency & Natural England. October 2015. Addressing the Needs of Housing Growth and Protecting the Marine Environment in the Solent Area;
- Hampshire & Isle of Wight Wildlife Trust. 2010. Solent Waders and Brent Goose Strategy;
- Whyte, P. 2011. Itchen Navigation Otter Survey 2010/2011. Report by Hampshire & Isle of Wight Wildlife Trust for the Itchen Navigation Heritage Trail Project Partnership;
- Mott Gifford and Hampshire County Council. October 2008. Contaminated Land and Hydrology Research Study for Eastleigh Borough Council Area Action Plan. Report No:227552HA/002, for Eastleigh County Council;
- Environment Agency. April 2010. Integrated Pollution Prevention and Control - Environmental Assessment and Appraisal of BAT. Horizontal Guidance Note IPPC H1, Annex F;
- Highways Agency. 2011. Design Manual for Roads & Bridges. Volume 11, Section 3, Part 1: Air Quality;
- EPR. 2011. Nutburn Road, North Baddesley: Visitor Questionnaire Survey of Emer Bog and Baddesley Common;
- R.H. Allen (The Environmental Project Consulting Group). 2003. Hydro-Ecological Appraisal of Emer Bog cSAC, North Baddesley, Hampshire, R.H. Allen (The Environmental Project Consulting Group), 2002 and Emer Bog cSAC: Review of Consents: Surface Water Quality and Hydro-Ecological Regime of Emer Bog cSAC;
- Davidson-Watts, I. & McKenzie, A. 2006. Habitat use and Ranging of Barbastelle Bats of the Mottisfont Estate, Hampshire. ID Wildlife Ltd; and
- Sharp, J., Lowen, J. & Liley, D. 2008. Changing patterns of visitor numbers within the New Forest National Park, with particular reference to the New Forest SPA. Unpublished report by Footprint Ecology for the New Forest National Park Authority.
- The HRA of the Submission Eastleigh Local Plan HRA 2011-2029 (now withdrawn).

Physical scope of the HRA

2.4.2 There are no standard criteria for determining the ultimate physical scope of an HRA. Rather, the source-pathway-receptor model should be used to determine whether there is any potential pathway connecting development to any European sites. In the case of Eastleigh it is clear that there are pathways connecting development to the River Itchen SAC and Solent Maritime SAC/Solent & Southampton Water SPA/Ramsar site since both European sites lie either within or immediately adjacent to the boundary of the Borough.

2.4.3 Examining sites outside the Borough it was determined that there were only conceivable pathways connecting to three other sites – The New Forest SAC/SPA/Ramsar site, Emer Bog SAC and Mottisfont Bats SAC. This therefore defined the scope of the HRA. It should be noted that the presence of a conceivable pathway linking the Borough to a European site does not mean that likely significant effects will occur. Figure 3, at the back of this

document, illustrates the broad proposed development locations considered in this document, within the context of European sites in Eastleigh Borough.

2.5 Task 1: Likely Significant Effects (Screening)

2.5.1 The first stage of any Habitat Regulations Assessment is a Likely Significant Effect (LSE) test - essentially a risk assessment to decide whether the full subsequent stage known as Appropriate Assessment is required. The essential question is:

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

2.5.3 The objective is to 'screen out' those plans and projects that can, without any detailed appraisal, be said to be unlikely to result in significant adverse effects upon European sites, usually because there is no mechanism for an adverse interaction with European sites. **The Likely Significant Effects stage is the purpose of the current document.**

Other plans and projects

2.5.4 It is neither practical nor necessary to assess the 'in combination' effects of the pre-submission Eastleigh Borough Local Plan 2011-2029 within the context of all other plans and projects within South Hampshire and east Dorset. In practice therefore, in combination assessment is of most relevance when the plan would otherwise be screened out because its individual contribution is inconsequential. For the purposes of this assessment, we have determined that, due to the nature of the identified impacts, the key other plans and projects relate to the additional housing, transportation and commercial/industrial allocations proposed for neighbouring authorities over the lifetime of the Plan. The following plans and projects have been identified for consideration 'in combination' at the screening stage for the Local Plan:

- Strategic Guidance for the Solent (Solent Forum)
- The Hampshire Minerals and Waste Plan
- Test Valley Borough Local Plan
- New Forest District Local Plan
- New Forest National Park Authority Local Plan
- Fareham Borough Council Local Plan
- Winchester City Council Local PlanSouthampton Water and Western Solent Shoreline Management Plan and related Coastal Strategies
- Southampton Local Plan
- Southampton City Centre Area Action Plan
- Southampton Airport Master Plan
- Hampshire Local Transport Plan 2011-2031
- Test and Itchen, Catchment Flood Management Plan
- South East Hampshire Catchment Flood Management Plan
- PUSH Integrated Water Management Strategy (IWMS)
- Southern Water – Water Resource Management Plan
- Test and Itchen Catchment Abstraction Management Strategy

- PUSH Green Infrastructure Strategy
- ABP Project Capital dredge of berths 204 and 205
- ABP Project Southampton Approach Channel Dredge
- Netley Coastal Defence Scheme
- Southampton Flood Alleviation Scheme

2.5.5 These projects and plans are discussed in the following report where relevant. If not discussed then they have not been identified as being relevant for consideration 'in combination' with the Eastleigh Local Plan.

3 Pathways of impact and screening

3.1 Introduction

3.1.1 In carrying out a HRA it is important to determine the various ways in which land use plans can impact on European sites by following the pathways along which development can be connected with European sites, in some cases many kilometres distant. Briefly defined, pathways are routes by which a change in activity associated with a development can lead to an effect upon a European site.

3.1.2 The pathways of impact considered further due to the potential for them to impact upon relevant internationally designated sites are detailed below. Whether they are actually likely to arise from the Local Plan is considered later in the report.

3.2 Disturbance

Mechanical erosion

3.2.1 Most types of aquatic or terrestrial European site can be affected by excessive levels of recreational activity. For example, there have been several papers published that empirically demonstrate that damage to vegetation in woodlands and other habitats can be caused by high volumes of recreational users. While these are not directly applicable to the New Forest they do clearly demonstrate that trampling can be an issue for sensitive habitats:

Wilson & Seney (1994)[2] examined the degree of track erosion caused by hikers, motorcycles, horses and cyclists from 108 plots along tracks in the Gallatin National Forest, Montana. Although the results proved difficult to interpret, it was concluded that horses and hikers disturbed more sediment on wet tracks, and therefore caused more erosion, than motorcycles and bicycles.

Cole et al (1995a, b)[3] conducted experimental off-track trampling in 18 closed forest, dwarf scrub and meadow & grassland communities (each tramped between 0 – 500 times) over five mountain regions in the US. Vegetation cover was assessed two weeks and one year after trampling, and an inverse relationship with trampling intensity was discovered, although this relationship was weaker after one year than two weeks indicating some recovery of the vegetation. Differences in plant morphological characteristics were found to explain more variation in response between different vegetation types than soil and topographic factors. Low-growing, mat-forming grasses regained their cover best after two weeks and were considered most resistant to trampling, while tall forbs (non-woody vascular plants other than grasses, sedges, rushes and ferns) were considered least resistant. Cover of hemicryptophytes and geophytes (plants with buds below the soil surface) was heavily reduced after two weeks, but had recovered well after one year and as such these were considered most resilient to trampling. Chamaephytes (plants with buds above the soil surface) were least resilient to trampling. It was concluded that these would be the least tolerant of a regular cycle of disturbance.

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

[3] Cole, D.N. 1995a. Experimental trampling of vegetation. I. Relationship between trampling intensity and vegetation response. Journal of Applied Ecology 32: 203-214

Cole, D.N. 1995b. Experimental trampling of vegetation. II. Predictors of resistance and resilience. Journal of Applied Ecology 32: 215-224

Cole (1995c)[4] conducted a follow-up study (in 4 vegetation types) in which shoe type (trainers or walking boots) and trampler weight were varied. Although immediate damage was greater with walking boots, there was no significant difference after one year. Heavier tramplers caused a greater reduction in vegetation height than lighter tramplers, but there was no difference in effect on cover.

Cole & Spildie (1998)[5] experimentally compared the effects of off-track trampling by hiker and horse (at two intensities – 25 and 150 passes) in two woodland vegetation types (one with an erect forb understorey and one with a low shrub understorey). Horse traffic was found to cause the largest reduction in vegetation cover. The forb-dominated vegetation suffered greatest disturbance, but recovered rapidly. Higher trampling intensities caused more disturbance.

Disturbance of Birds by Human Activity

3.2.2 Concern regarding the effects of disturbance on birds in particular, stems from the fact that they are expending energy unnecessarily and the time they spend responding to disturbance is time that is not spent feeding[6]. Disturbance therefore risks increasing energetic output while reducing energetic input, which can adversely affect the 'condition' and ultimately survival of the birds In addition, displacement of birds from one feeding site to others can increase the pressure on the resources available within the remaining sites, as they have to sustain a greater number of birds.[7] Moreover, the more time a breeding bird spends disturbed from its nest, the more its eggs are likely to cool and the more vulnerable they are to predators. Finally, regular disturbance can also render some areas of otherwise suitable habitat unavailable for nesting such that breeding territories fail to be established or are limited to sub-optimal habitat.

3.2.3 The potential for disturbance may be less in winter than in summer, in that there are often a smaller number of recreational users and birds are not breeding. However, winter activity can still cause important disturbance, especially as birds are particularly vulnerable at this time of year due to food shortages. Several empirical studies have, through correlative analysis, demonstrated that out-of-season recreational activity can result in quantifiable disturbance:

Tuite et al[8] found that during periods of high recreational activity, bird numbers at Llangorse Lake decreased by 30% over a time period correlating with an increase in recreational activity. During periods of low recreational activity, however, no such correlation was observed. In addition, all species were found to spend less time in their 'preferred zones' (the areas of the lake used most in the absence of recreational activity) as recreational intensity increased.

Underhill et al[9] counted waterfowl and all disturbance events on 54 water bodies within the South West London Water bodies Special Protection Area and clearly correlated disturbance with a decrease in bird numbers at weekends in smaller sites and with the movement of birds within larger sites from disturbed to less disturbed areas.

[4] Cole, D.N. 1995c. Recreational trampling experiments: effects of trampler weight and shoe type. Research Note INT-RN-425. U.S. Forest Service, Intermountain Research Station, Utah.
[5] Cole, D.N., Spildie, D.R. 1998. Hiker, horse and llama trampling effects on native vegetation in Montana, USA. Journal of Environmental Management 53: 61-71
[6] Riddington, R. *et al*. 1996. The impact of disturbance on the behaviour and energy budgets of Brent geese. *Bird Study* 43:269-279
[7] Gill, J.A., Sutherland, W.J. & Norris, K. 1998. The consequences of human disturbance for estuarine birds. *RSPB Conservation Review* 12: 67-72
[8] Tuite, C. H., Owen, M. & Paynter, D. 1983. Interaction between wildfowl and recreation at Llangorse Lake and Talybont Reservoir, South Wales. *Wildfowl* 34: 48-63
[9] Underhill, M.C. *et al.* 1993. *Use of Waterbodies in South West London by Waterfowl. An Investigation of the Factors Affecting Distribution, Abundance and Community Structure.* Report to Thames Water Utilities Ltd. and English Nature. Wetlands Advisory Service, Slimbridge

Evans & Warrington[10] found that on Sundays total water bird numbers (including shoveler and gadwall) were 19% higher on Stocker's Lake LNR in Hertfordshire, and attributed this to displacement of birds resulting from greater recreational activity on surrounding water bodies at weekends relative to week days. However, recreational activity was not quantified in detail, nor were individual recreational activities evaluated separately.

Tuite et al[11] used a large (379 site), long-term (10-year) dataset (September – March species counts) to correlate seasonal changes in wildfowl abundance with the presence of various recreational activities. They found that shoveler was one of the most sensitive species to disturbance. The greatest impact on winter wildfowl numbers was associated with sailing/windsurfing and rowing.

3.2.4 Human activity can affect birds either directly (e.g. through causing them to flee) or indirectly (e.g. through damaging their habitat). The most obvious direct effect is that of immediate mortality such as death by shooting, but human activity can also lead to behavioural changes (e.g. alterations in feeding behaviour, avoidance of certain areas *etc.*) and physiological changes (e.g. an increase in heart rate) that, although less noticeable, may ultimately result in major population-level effects by altering the balance between immigration/birth and emigration/death.[12]

3.2.5 The degree of impact that varying levels of noise will have on different species of bird is poorly understood except that a number of studies have found that an increase in traffic levels on roads does lead to a reduction in the bird abundance within adjacent hedgerows - Reijnen et al (1995) examined the distribution of 43 passerine species (i.e. 'songbirds'), of which 60% had a lower density closer to the roadside than further away. By controlling vehicle usage they also found that the density generally was lower along busier roads than quieter roads[13].

3.2.6 Activity will often result in a flight response (flying, diving, swimming or running) from the animal that is being disturbed. This carries an energetic cost that requires a greater food intake. Research that has been conducted concerning the energetic cost to wildlife of disturbance indicates a significant negative effect.

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

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

Sensitivity of waterfowl

3.2.9 The distance at which a species takes flight when approached by a disturbing stimulus is known as the 'tolerance distance' (also called the 'escape flight distance') and differs between species to the same stimulus and within a species to different stimuli. These are

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

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

[12] Riley, J. 2003. Review of Recreational Disturbance Research on Selected Wildlife in Scotland. Scottish Natural Heritage.

[13] Reijnen, R. et al. 1995. The effects of car traffic on breeding bird populations in woodland. III. Reduction of density in relation to the proximity of main roads. Journal of Applied Ecology 32: 187-202

given in Table 2, which compiles 'tolerance distances' from a literature review. It is reasonable to assume from this that disturbance is unlikely to be experienced more than a few hundred metres from the birds in question. In addition, the regular mechanized noise that is associated with industrial sites is likely to be less disturbing that the presence of visible human activity in areas in which the birds are not used to observing such activity.

Table 2 - Tolerance distances of 21 water bird species to various forms of recreational disturbance, as described in the literature. All distances are in metres. Single figures are mean distances; when means are not published, ranges are given. [1] Tydeman (1978), [2] Keller (1989), [3] Van der Meer (1985), [4] Wolff et al (1982), [5] Blankestijn et al (1986).[14]

	Type of disturbance		
Species	Rowing boats/kayak	Sailing boats	Walking
Little grebe		60 – 100 [1]	
Great crested grebe	50 – 100 [2]	20 – 400 [1]	
Mute swan		3 – 30 [1]	
Teal		0 – 400 [1]	
Mallard		10 – 100 [1]	
Shoveler		200 – 400 [1]	
Pochard		60 – 400 [1]	
Tufted duck		60 – 400 [1]	
Goldeneye		100 – 400 [1]	
Smew		0 – 400 [1]	
Moorhen		100 – 400 [1]	
Coot		5 – 50 [1]	
Curlew			211 [3]; 339 [4]; 213 [5]
Shelduck			148 [3]; 250 [4]
Grey plover			124 [3]
Ringed plover			121 [3]
Bar-tailed godwit			107 [3]; 219 [4]
Brent goose			105 [3]
Oystercatcher			85 [3]; 136 [4]; 82 [5]
Dunlin			71 [3]; 163 [2]

3.2.10 The Solent Forum undertook a project to examine bird disturbance and possible mitigation in the Solent area. A Phase 1 report outlined the existing visitor data for the Solent, canvassed expert opinion on recreational impacts on birds, and assessed current available data on relevant species. Phase II of the Solent Disturbance and Mitigation

[14] Tydeman, C.F. 1978. *Gravel Pits as conservation areas for breeding bird communities*. PhD thesis. Bedford College

Keller, V. 1989. Variations in the response of Great Crested Grebes *Podiceps cristatus* to human disturbance - a sign of adaptation? *Biological Conservation* 49:31-45

Van der Meer, J. 1985. *De verstoring van vogels op de slikken van de Oosterschelde*. Report 85.09 Deltadienst Milieu en Inrichting, Middelburg. 37 pp.

Wolf, W.J., Reijenders, P.J.H. & Smit, C.J. 1982. The effects of recreation on the Wadden Sea ecosystem: many questions but few answers. In: G. Luck & H. Michaelis (Eds.), *Schriftenreihe M.E.L.F., Reihe A: Agnew. Wissensch* 275: 85-107

Blankestijn, S. *et al.* 1986. *Seizoensverbreding in de recreatie en verstoring van Wulp en Scholkester op hoogwatervluchplaatsen op Terschelling*. Report Projectgroep Wadden, L.H. Wageningen. 261pp.

Project (now the Solent Recreation Mitigation Partnership)[15] identified that survival rates for dunlin, ringed plover, oystercatcher and curlew were predicted to decrease under any increase in visitor rates. Redshank survival rate was predicted to decrease if visitor rates were to increase to over 1.25 times the current rate, approximately double the increase expected through future housing. Grey plover survival rate would be decreased slightly if visitor rates increased to over 1.5 times the current rate, and black-tailed godwit survival was not reduced even when visitor rates were doubled. The highest increases in visitor rates (generally in the range 10 to 20%) were predicted to occur along sections of open shore, particularly to the east of Southampton Water in association with high densities of housing.

3.2.11 It was reported that the potential impact of visitors on wader survival throughout the Solent can be inferred by comparing visitor densities throughout the Solent (expressed relative to intertidal habitat area) to visitor densities predicted to decrease survival within Southampton Water. This showed that coastal sections with predicted future daily visitor rates during autumn and winter of over 30 per ha (low tide) were predicted to decrease survival of some SPA/Ramsar species due to disturbance.

3.2.12 Phase III [16] assessed mitigation measures associated with the forecast future number of people visiting the Solent and the associated impact on the survival rates of shorebirds. Appendix 5 of the report set out a series of potential schemes that could be delivered by local authorities working with housing developers. Each local authority has now assembled a programme of schemes and a standard tariff exists for each dwelling.

Noise and Vibration on other Wildlife

3.2.13 The River Itchen is designated for several species of fish and the European otter, all of which will be more or less sensitive to noise and vibration through the water column (and in the case of the otter, in close proximity to holts and other terrestrial habitat). Much of the information in this section is derived from literature reviews undertaken by Bureau Veritas on behalf of Eastleigh Council for the Eastleigh River Side project[17].

Sensitivity of Atlantic salmon

3.2.14 In addition to direct trauma, a significant risk associated with underwater noise generated by piling is the creation of an acoustic barrier to fish migration. Acoustic barriers/deterrents have the potential to impede fish as they migrate up and down the estuary. Any factor that limits the ability of fish to reach spawning grounds will potentially have a catastrophic effect on recruitment for a given species in that year and thus maintenance of the population.

3.2.15 A joint study in Southampton Docks was carried out in 2003 between Subacoustech Ltd and Fawley Aquatic Research Laboratories. The study investigated the effects of underwater noise generated by piling (vibro/impact) on caged brown trout. Five cages of the test species were situated at increasing distances from the piling events and subsequent behavioural and physical observations summarised. The test species showed

[15] Stillman, R. A., West, A. D., Clarke, R. T. & Liley, D. (2012) Solent Disturbance and Mitigation Project Phase II: Predicting the impact of human disturbance on overwintering birds in the Solent. Report to the Solent Forum

[16] Liley D & Tyldesley, D. 2013. Solent Disturbance and Mitigation Project: Phase III, Mitigation. Unpublished report. Footprint Ecology/David Tyldesley & Associates

[17] Postlethwaite B. February 2010. Noise Quality Assessment Eastleigh River Side Project. Unpublished report by Bureau Veritas on behalf of Eastleigh Borough Council

no reaction (behavioural and physical) to impact piling at the regulatory stand-off range (400 m) and to vibro piling even at very close range (< 50 m)[18].

3.2.16 The metric most commonly used for the assessment of the behavioural and audiological effects of noise on animals is that of 'decibels above the hearing threshold' or dB_{ht}. This is species-specific, requiring knowledge of the hearing threshold of the species in question, and has been most widely investigated for marine species. The Atlantic salmon has relatively poor hearing with peak sensitivity at 160 Hz. For marine species, it is becoming accepted practice in the UK to consider that between 0 – 50 dB_{ht} (*Species*) there is a low likelihood of disturbance. The Environment Agency criteria for acceptability of in-water levels for Atlantic salmon requires that not more than 50% of the cross sectional area of a watercourse should be exposed to noise levels greater than 50 dB_{ht} (*Salmo salar*) (in other words, 50 decibels above the hearing threshold of the Atlantic salmon) to ensure that continued use of the watercourse by migrating salmon is possible.

3.2.17 The data collated for the Bureau Veritas report suggests that noise levels may exceed the 50 dB_{ht} (*Salmo salar*) threshold for some construction activities (i.e. piling operations) taking place up to 20 m (in the case of vibropiling) or up to 70m (in the case of impact piling which is highly percussive) from the edge of the watercourse. Given the relatively narrow width of the river in this location, it is quite possible that vibration within the river will travel the full width.

Sensitivity of the otter

3.2.18 There is no available research into the hearing thresholds of the European otter. However, research undertaken into the North American otter enabled a probable hearing threshold for the European otter to be determined by Bureau Veritas. Otters have very acute high frequency hearing sensitivity (16 kHz) but much poorer hearing sensitivity than humans at frequencies below 4 kHz; this may explain why they appear to tolerate what, to humans, are perceived as 'noisy' environments. The 'Ecology of the European Otter'[19] states that otters will rest under roads, in industrial buildings, close to quarries and at other sites close to high levels of human activity. These observations indicate that otters are very flexible in their use of resting sites and do not necessarily avoid disturbance in terms of noise or proximity to human activity.

3.2.19 Bureau Veritas postulated that a sound pressure level below 50 dB_{ht} (*Lutra lutra*) would probably result in a low likelihood of disturbance for otters as it does for humans and many marine species[20]. The Bureau Veritas report further identifies that most construction activities involving ground penetration or noise would not result in disturbance (i.e. noise levels above 50 dB_{ht} (*Lutra lutra*)) if undertaken over 30m from the watercourse but that some activities (e.g. piling) may disturb up to 80m away. The zone of influence of construction noise on potential otter disturbance may even extend to 100 m from individual construction tasks if these are of a highly percussive nature (e.g. driven/impact piling).

3.2.20 This must of course be related to the duration and frequency of occurrence of the noise and the current baseline noise environment. Exceedence of the dB_{ht} (*Species*) threshold alone does not necessarily mean an adverse biological effect will result. Provided that the otter population in a particular catchment is stable, it can reasonably be concluded that a level of noise that does not exceed (or exceeds to a trivial degree) the existing pre-

[18] Nedwell J R, Lambert D, Turnpenny A W H (2003) 'Objective design of acoustic fish deterrent systems'. Proceedings of the Symposium on Cooling Water Intake Technologies to Protect Aquatic Organisms, Environmental Protection Agency, May 6- 7, 2003. Hilton Crystal City at National Airport, Arlington, VA.

[19] Chanin P., Ecology of the European Otter, Conserving Natura 2000 Rivers, Ecology series No 10, Published by Life in the Rivers.

[20] Postlethwaite B. February 2010. Noise Quality Assessment Eastleigh River Side Project. Unpublished report by Bureau Veritas on behalf of Eastleigh Borough Council

construction background noise levels is unlikely to deter the otters, even if it does exceed 50 dBht (*Lutra lutra*).

3.2.21 To be precautionary for the purposes of this HRA any development site which could involve piling within 100m of the River Itchen SAC or tributaries known/likely to be used by otters is screened in for the devising of site-specific measures at the planning application stage.

3.3 Air Quality

3.3.1 The main pollutants of concern for European sites are oxides of nitrogen (NOx), ammonia (NH_3) and sulphur dioxide (SO_2). NOx (in the form of nitrogen dioxide) can have a directly toxic effect upon vegetation at very high concentrations. It can also be toxic to mammals and possibly birds, affecting the lungs and mucus membranes. There is no evidence that it is toxic to insects as insect respiratory systems are entirely different to those of mammals and birds. Although laboratory experiments have demonstrated that high levels are toxic to mammals there are no critical levels available for protection of wildlife. As such it is not possible to assess impacts of NOx in air on wildlife. This is partly because the most severe long-term effect of NOx on the natural environment is believed to be through its role as a source of nitrogen rather than the direct effect of the gas. Increased NOx or ammonia concentrations within the atmosphere will lead to greater rates of nitrogen deposition to soils. An increase in the deposition of nitrogen from the atmosphere to soils is generally regarded to lead to an increase in soil fertility, which can have a serious deleterious effect on the quality of semi-natural, nitrogen-limited terrestrial habitats.

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

Pollutant	Source	Effects on habitats and species
Acid deposition	SO_2, NOx and ammonia all contribute to acid deposition. Although future trends in S emissions and subsequent deposition to terrestrial and aquatic ecosystems will continue to decline, it is likely that increased N emissions may cancel out any gains produced by reduced S levels.	Can affect habitats and species through both wet (acid rain) and dry deposition. Some sites will be more at risk than others depending on soil type, bed rock geology, weathering rate and buffering capacity.
Ammonia (NH_3)	Ammonia is released following decomposition and volatilisation of animal wastes. It is a naturally occurring trace gas, but levels have increased considerably with expansion in numbers of agricultural livestock. Ammonia reacts with acid pollutants such as the products of SO_2 and NO_X emissions to produce fine ammonium (NH_4+)- containing aerosol which may be transferred much longer distances (can therefore be a significant trans-boundary issue.)	Adverse effects are as a result of nitrogen deposition leading to eutrophication. As emissions mostly occur at ground level in the rural environment and NH_3 is rapidly deposited, some of the most acute problems of NH_3 deposition are for small relict nature reserves located in intensive agricultural landscapes.
Nitrogen oxides NO_x	Nitrogen oxides are mostly produced in combustion processes. About one quarter of the UK's emissions are from power stations, one-half from motor vehicles, and the rest from other industrial and domestic combustion processes.	Deposition of nitrogen compounds (nitrates (NO_3), nitrogen dioxide (NO_2) and nitric acid (HNO_3)) can lead to both soil and freshwater acidification. In addition, NO_x can cause eutrophication of soils and water. This alters the species composition of plant communities and can eliminate sensitive species.

Pollutant	Source	Effects on habitats and species
Nitrogen (N) deposition	The pollutants that contribute to nitrogen deposition derive mainly from NO_X and NH_3 emissions. These pollutants cause acidification (see also acid deposition) as well as eutrophication.	Species-rich plant communities with relatively high proportions of slow-growing perennial species and bryophytes are most at risk from N eutrophication, due to its promotion of competitive and invasive species which can respond readily to elevated levels of N. N deposition can also increase the risk of damage from abiotic factors, e.g. drought and frost.
Ozone (O_3)	A secondary pollutant generated by photochemical reactions from NO_x and volatile organic compounds (VOCs). These are mainly released by the combustion of fossil fuels. The increase in combustion of fossil fuels in the UK has led to a large increase in background ozone concentration, leading to an increased number of days when levels across the region are above 40ppb. Reducing ozone pollution is believed to require action at international level to reduce levels of the precursors that form ozone.	Concentrations of O_3 above 40 ppb can be toxic to humans and wildlife, and can affect buildings. Increased ozone concentrations may lead to a reduction in growth of agricultural crops, decreased forest production and altered species composition in semi-natural plant communities.
Sulphur Dioxide SO_2	Main sources of SO_2 emissions are electricity generation, industry and domestic fuel combustion. May also arise from shipping and increased atmospheric concentrations in busy ports. Total SO_2 emissions have decreased substantially in the UK since the 1980s.	Wet and dry deposition of SO_2 acidifies soils and freshwater, and alters the species composition of plant and associated animal communities. The significance of impacts depends on levels of deposition and the buffering capacity of soils.

3.3.2 Sulphur dioxide emissions are overwhelmingly influenced by the output of power stations and industrial processes that require the combustion of coal and oil as well (particularly on a local scale) shipping. Ammonia emissions are dominated by agriculture, with some chemical processes also making notable contributions. As such, it is unlikely that material increases in SO_2 or NH_3 emissions will be associated with Local Development Frameworks. NOx emissions, however, are dominated by the output of vehicle exhausts (more than half of all emissions). Within a 'typical' housing development, by far the largest contribution to NOx (92%) will be made by the associated road traffic. Other sources, although relevant, are of minor importance (8%) in comparison[21]. Emissions of NOx could therefore be reasonably expected to increase as a result of greater vehicle use as an indirect effect of the Local Plan.

Local air pollution

3.3.3 According to the Department of Transport's Transport Analysis Guidance, beyond 200m, the contribution of vehicle emissions from the roadside to local pollution levels is not significant[22]. This is therefore the distance that has been used throughout this HRA in order to determine whether European sites are likely to be significantly affected by development under the Local Plan.

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

[22] http://www.dft.gov.uk/webtag/documents/expert/unit3.3.3.php#013; accessed 13/04/12

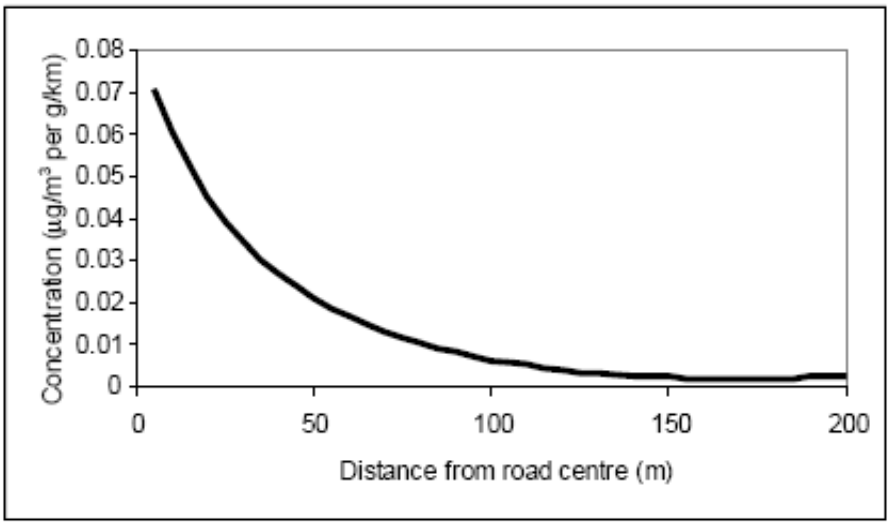


Figure 4. Traffic contribution to concentrations of pollutants at different distances from a road (Source: DfT[23])

3.3.4 In 2007 PUSH commissioned a study to examine the atmospheric pollution effects of growth planned within the South Hampshire Sub Regional Strategy on nationally and internationally important nature conservation sites[24]. A dispersion model was used to predict the contribution from roads to concentrations of oxides of nitrogen and ammonia and the rates of nutrient nitrogen and acid deposition in such sites. The model also predicted the additional contribution in 2026 resulting from traffic associated with growth generated by development in the PUSH area, including that planned for within the Local Plan.

3.4 Water quality

3.4.1 Water quality includes such components as dissolved oxygen, acidity/alkalinity, levels of other chemicals such as nitrogen and phosphorous, amount of suspended solids and heavy metals. Dissolved oxygen is affected by the Biochemical Oxygen Demand (BOD); the higher the BOD the lower the dissolved oxygen available in the water for fish and other wildlife. Excess nutrients can lead to various impacts including algal blooms and smothering growth of large algae, while high ammonia concentrations and heavy metals are directly toxic to aquatic life. Each species has its own tolerance range with respect to water quality. As noted earlier, fish, such as the salmon, which are totally dependent on water are more sensitive to changes in water quality. Water quality can have other indirect effects, for example high volumes of nitrogen and phosphorous can lead to algal blooms and excessive growth of other water plants.

3.4.2 The Environment Agency has undertaken a series of Reviews of Consents for the River Itchen and all of the Solent European sites. These identified that phosphorus concentrations in the River Itchen SAC[25] and nitrogen discharges into the coastal waters that constitute the Solent complex were leading in combination to an adverse effect on the integrity of those sites. The major discharge to the River Itchen SAC is from the

[23] http://www.dft.gov.uk/ha/standards/dmrb/vol11/section3/ha20707.pdf; accessed 04/05/12

[24] AEA Technology. 2010. Road transport emissions impacts on Nature Conservation Sites. Report to the Partnership for Urban South Hampshire

[25] The Environment Agency Stage 3 Review of Consents Report explains on page 48 why the emphasis is placed on phosphorus rather than nitrogen: '*Nitrogen levels are also monitored but are of less concern as it is not thought to be the limiting nutrient in the freshwater Itchen system*'

Chickenhall Lane Wastewater Treatment Works (WwTW) in Eastleigh although Harestock WwTW also makes a significant contribution. Historically, many water quality parameters for the River Itchen were at their poorest in the Eastleigh area. None of the BOD, ammonia concentrations or levels of suspended solids met the quality targets for the SAC in this area, while soluble phosphorous concentrations were 4 times higher than acceptable levels.

3.4.3 The Agency has therefore introduced a series of amendments to discharge consents into these receiving watercourses intended to reduce the inputs of these nutrients to acceptable levels. Provided therefore that new development can be accommodated within the headroom (i.e. remaining volumetric capacity) of the post-review discharge consents for the relevant wastewater treatment works it will not contribute to an adverse effect on any European sites.

3.4.4 The Partnership for Urban South Hampshire (PUSH) commissioned an Integrated Water Management Strategy in 2009 specifically to determine whether the existing water treatment capacity in the sub-region would be able to accommodate the level of development proposed given the associated environmental constraints. It was ultimately concluded that *'At this stage, therefore, it is considered very unlikely that major new wastewater treatment infrastructure will be required during the next 20 years other than that already required to achieve the consents set by the EA under the Urban Wastewater Treatment Directive and those proposed to fulfil the requirements of the Habitats and Birds Directives'.* However, the situation has moved on since 2009.

3.4.5 Before a final housing number and location option is determined, it will be necessary for Eastleigh Borough Council to engage with Southern Water (and the Environment Agency as appropriate) to obtain an indication that it will be possible for development to be delivered within Eastleigh Borough as set out in the Local Plan to be accommodated either within the headroom of the existing consents, or by increasing volumetric consents but tightening water quality standards to the degree necessary to ensure no deterioration downstream[26].

3.4.6 If such an assurance cannot be given, or it is likely that it will take several years for the necessary wastewater treatment infrastructure upgrades to be achieved, then it will be necessary for a study to be undertaken to define the housing numbers that could be delivered within existing consent limits and then identify solutions (if these exist) for alternative treatment scenarios. This could be similar to the work undertaken by Chichester District Council in liaison with the Environment Agency and statutory water company. The Chichester (Apuldram) WwTW discharges to the head of Chichester Harbour. Due to the sensitive nature of the Harbour the current environmental permit limit at Chichester WwTW is finite. The discharge is already treated to exceptionally tight nitrogen levels, established under the Environment Agency's Habitats Directive Review of Consents process. It was therefore established that the scope for connecting further new homes to Chichester WwTW was extremely small.

3.4.7 A Wastewater Treatment Study was therefore commissioned by Chichester District Council which identified that an upgrade to Tangmere WwTW is the preferred solution from the Wastewater Treatment Study to accommodate growth in the constrained parts of the Local Plan area. This solution to upgrade Tangmere WwTW will provide expanded capacity to accommodate an additional 3,000 homes in Chichester District and enable strategic growth. The Tangmere WwTW upgrade could be operational from 2019. Therefore it was recognised in the Chichester Local Plan that the delivery of the strategic locations would be constrained until at least 2019 in the Plan period. A Local Plan policy was therefore devised to manage the rate at which housing and employment were

[26] Southern Water Position Statement (April 2012) as supplied to Eastleigh Borough Council

delivered within the Chichester WwTW catchment, requiring it to keep pace with delivery of the identified treatment solution. It would potentially be advisable for Eastleigh to commission a similar study.

3.4.8 In the interim it would at least be necessary for Eastleigh Council to establish how many dwellings could be accommodated in the district under current permits. This number may then have to serve as a temporary cap on housing delivery until such time as the long-term solution is achieved, as with Chichester District. Since this is a Solent-wide issue (perhaps not as it relates to the River Itchen but certainly as it relates to the Solent European sites) there is considerable logic in a Solent-wide initiative to investigate this issue, particularly for those authorities that do not currently have adopted Local Plans and the forthcoming review of the South Hampshire Strategy.

3.4.9 Since the potential risks to the River Itchen SAC and Solent European sites will exist wherever in Eastleigh the additional housing is located (in that all receiving watercourses ultimately drain to one or other of these European sites) it would not be meaningful to undertake a further discussion of this matter in this particular report.

3.4.10 Water quality impacts related to site-specific development construction activities in proximity to watercourses are covered in the relevant site assessment tables in Chapters 4 and 5.

3.5 Water resources

3.5.1 Water quantity has a significant effect on the biodiversity of the river catchment in many different ways. The amount of water falling on the catchment and getting into the river, has an effect on water levels (depth) in the river, water table levels in the floodplain, and the flow rate of the river. In turn, these properties influence other important river properties – for example levels of silt and dissolved oxygen in the water.

3.5.2 Different species have their own optimal ranges for these properties (and these can vary from season to season), and their own tolerance levels. So, for example with breeding wading birds of the floodplain such as the redshank, a high water-level during the spring breeding season, resulting in shallow pools to feed from and feed the young chicks is ideal. However, too much water (flooding) can wash away nests and eggs. Too little water (drought) and the invertebrate food in the grassland is more difficult to obtain, and chicks may not get enough food.

3.5.3 For salmon, flow rates are critical to the success of the species. Low flow rates affect food availability and migration. Low flows mean reduced invertebrate food, and increased concentrations of pollutants significantly reducing the numbers of salmon returning up river to spawn. In low flow years, salmon returning to spawn can be reduced by as much as 50%. Low flow also means more silt and less oxygen in the water, significantly reducing the survival rate for the eggs of the salmon that do spawn.

3.5.4 Historically, the Environment Agency Review of Consents for the River Itchen SAC identified that abstraction could (during a dry year) result in flows in Candover Stream and the main River Itchen south of Winchester to fall to approximately 35% below naturalised flow in September. The Agency has therefore introduced a series of amendments to abstraction licences for the River Itchen SAC to reduce abstraction to acceptable levels. Provided therefore that new development can be accommodated within the headroom (i.e. remaining volumetric capacity) of the post-review abstraction licences for the relevant raw water treatment works it will not contribute to an adverse effect on any European sites.

3.5.5 Before a final housing number and location option is determined, it will be necessary for Eastleigh Borough Council to engage with Southern Water and obtain an indication that it

will be possible for development set out in the Local Plan to be accommodated within the headroom of the existing abstraction licences. Certainly at the moment Southern Water do not propose in their latest Water Resource Management Plan to increase licenced abstraction from the River Itchen in order to meet future supply requirements in the Hampshire area. If this can be confirmed, the Local Plan can be screened out on the basis that it will not lead to Likely Significant Effects on any European sites through inadequate flows. Since the potential risks to the River Itchen SAC and Solent European sites will exist wherever in Eastleigh the additional housing is located it would not be meaningful to undertake a further discussion of this matter in this report.

3.5.6 There is also a local potential to affect water flows within the River Itchen, and water levels within the River Itchen SAC floodplain components, if development sites result in a reduction (or increase) in surface water runoff into the river or its tributaries. A similar effect would arise if the flows in any tributaries of the River Itchen SAC (particularly those which constitute headwaters of the river) were affected by development. The same principle would apply to the River Hamble and thus (downstream) the freshwater/saline balance in the Solent Maritime SAC. Since this is a site-specific matter it is discussed for each potential spatial Option in the following report.

3.6 Coastal squeeze

3.6.1 Rising sea levels can be expected to cause intertidal habitats (principally saltmarsh, sand dunes and intertidal mudflats) to migrate landwards. However, in built-up areas, such landward retreat is often rendered impossible due to the presence of the sea wall and other flood defences. In addition, development frequently takes place immediately behind the sea wall, so that the flood defences cannot be moved landwards to accommodate managed retreat of threatened habitats. The net result is that the quantity of saltmarsh, sand dunes and mudflat adjacent to built-up areas will progressively decrease as sea levels rise. This process is known as ‘coastal squeeze’. In areas where sediment availability is reduced, the 'squeeze' also includes an increasingly steep beach profile and foreshortening of the seaward zones.

3.6.2 Defra's current national assessment is that the creation of an annual average of at least 100 ha of intertidal habitat associated with European sites in England that are subject to coastal squeeze, together with any more specifically identified measures to replace losses of terrestrial and supra-tidal habitats, is likely to be required to protect the overall coherence of the Natura 2000 network. This assessment takes account of intertidal habitat loss from European sites in England that is caused by a combination of all flood risk management structures and sea level rise. The assessment will be kept under review taking account of the certainty of any adverse effects and monitoring of the actual impacts of plans and projects.[16]

3.6.3 Intertidal habitat loss is mainly occurring in the south and east of the country, particularly around the Humber and Severn. Northwest England, south Wales, the Solent in Hampshire, the southeast around the Thames estuary and large parts of East Anglia are also affected but to a lesser degree. The Coastal Strategies for the Solent area are the main process whereby the losses due to flood defences and coastal squeeze and the gains due to managed retreat along the frontage will be identified at a strategic level, with strategic habitat creation solutions identified through the Environment Agency Regional Habitat Creation Programme. However, local authorities can also contribute to minimising squeeze by appropriately situating new development in line with Shoreline Management Plan policy.

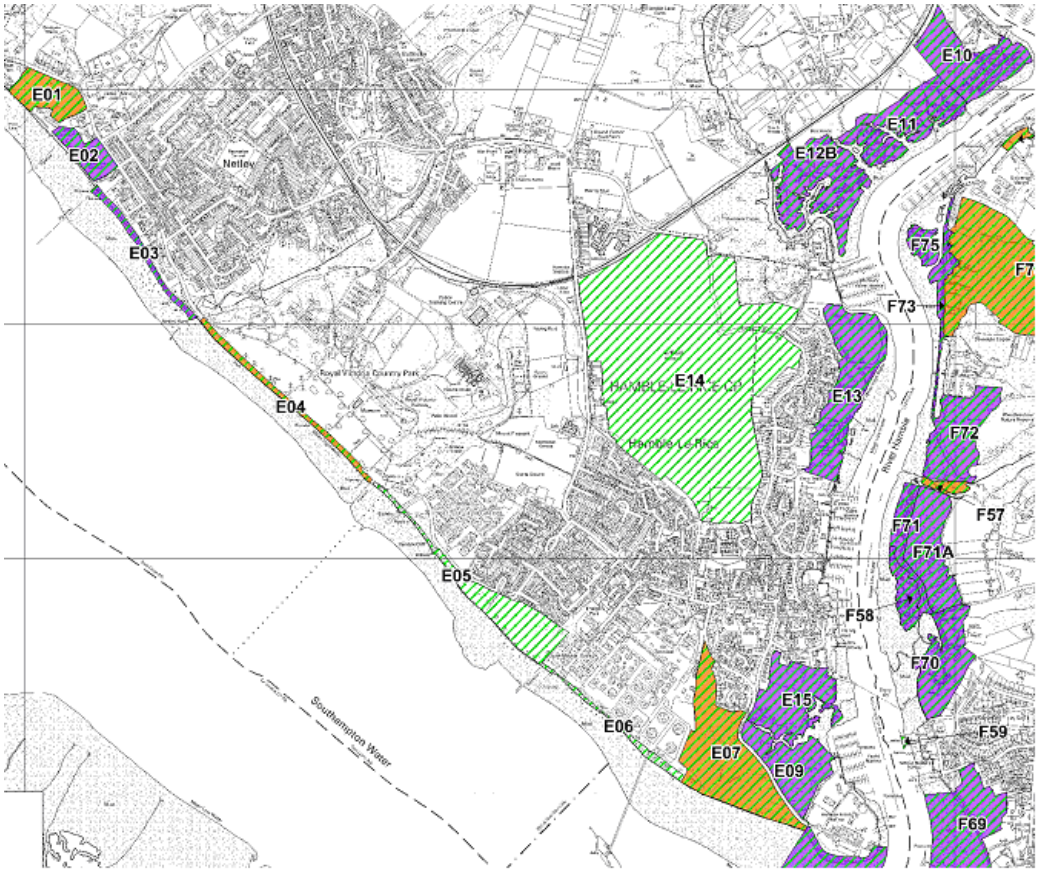
[16] Defra. 2005. Coastal Squeeze – Implications for Flood Management. http://www.defra.gov.uk/environ/fcd/policy/csqueeze.pdf

3.7 Land outside European site boundaries

3.7.1 The boundaries of European sites are defined to encompass as much as possible of the key land areas essential to the maintenance of populations of species of European importance. However, for migratory or otherwise highly mobile species it is not possible to encompass all the areas of land necessary for the maintenance of the population within the site boundary. In these instances, areas outside the European site boundary require preservation.

3.7.2 The River Itchen is designated for several mobile species of which the most highly mobile are the migratory Atlantic salmon and the European otter. Therefore preservation of salmon populations in the River Itchen SAC requires not only the protection of the river (including upstream of the SAC) but also the Solent area as the salmon migrate into the marine environment. Protection of otter populations can involve not only the protection of habitat along the Itchen itself but also of tributaries of the Itchen which may either provide habitat themselves or provide corridors linking the Itchen with the Hamble.

3.7.3 The Solent & Southampton Water SPA/Ramsar site is noted for a suite of highly mobile waterfowl and other birds. Of particular note, it is known that the populations of Brent goose for which the SPA/Ramsar site are designated are highly dependent upon areas of open short-mown grassland around the SPA as high tide roosts and feeding areas. However, the key areas are well known and have been subject to mapping exercises. Those in Eastleigh Borough are shown on the plan below. Sites of potential importance to Brent geese are coloured purple (definite) or orange (uncertain). Sites of potential importance for waders are hatched red (definite) or green (uncertain). None of the sites allocated in the Local Plan are situated on any of these land parcels. Loss of supporting habitat for SPA birds does not therefore require further consideration.



Source: Hampshire & Isle of Wight Wildlife Trust. 2010. Solent Waders and Brent Goose Strategy

3.8 Non-native species

3.8.1 Audits conducted by Scottish Natural Heritage and the former English Nature identified 988 and 2,271 non-native species present in Scotland and England respectively. Most, such as Horse Chestnut or Little Owl for example, are benign or have contributed to Britain's natural heritage. However, a minority of non-native species can become dominant in the environment where they may impact on native species, transform ecosystems and cause environmental harm. These are the invasive non-native species which form the central concern of this Strategy.

3.8.2 Invasive non-native species of flora and fauna are considered the second biggest threat after habitat loss and destruction to biodiversity worldwide and the greatest threat to fragile ecosystems such as islands. Because of the increase in the global movement of people and goods, they pose a growing problem in the conservation of biodiversity, and are a threat to economic interests such as agriculture, forestry and fisheries. The true extent of the threat posed by invasive non-native species has become much better understood in recent times, including an appreciation of the fact that past introductions have usually occurred with little awareness of the potential consequences[27].

3.8.3 The introduction of invasive non-native species and the diseases they carry is considered to be among the greatest threats to the survival of our native flora and fauna. Well documented examples that threaten our freshwater habitats include:

- New Zealand pygmyweed *Crassula helmsii*
- Killer shrimp *Dikerogammarus villosus*
- Signal crayfish *Pacifastacus leniusculus*
- Japanese knotweed *Fallopia japonica*
- Giant hogweed *Heracleum mantegazzianum*
- Himalayan balsam *Impatiens glandulifera*
- Floating pennywort *Hydrocotyle ranunculoides*
- Creeping water primrose *Ludwigia peploides*

3.8.4 Non-native weeds as outlined above can increase the risk of flooding by choking drainage channels with their rapid growth in addition to outcompeting native species.

3.8.5 If large amounts of development (e.g. 100 dwellings and upwards) are placed in close proximity to river and stream corridors the potential for non-native species to be introduced to the river corridor can increase significantly. This particularly relates to the introduction of non-native plant species through garden waste or simply through dissemination of garden plants through soil/rhizomes and seeds. Although non-native fish and aquatic invertebrates are also of great relevance they are less likely to be introduced through residential development.

[27] Defra. 2008. The Invasive Non-Native Species Framework Strategy for Great Britain

4 Solent European Sites

4.1 Introduction

4.1.1 There are several overlapping designations that cover the Solent. Although they have different interest features, the environmental conditions necessary to ensure their continuing favourable conservation status are similar as are the potential impacts of development and associated in the New Forest National Park. In order to reduce repetition, they are therefore considered collectively in this chapter.

4.1.2 These sites covered by this chapter are:

- Solent Maritime SAC; and
- Solent and Southampton Water SPA and Ramsar

Solent Maritime SAC

4.1.3 The Solent Maritime Special Area of Conservation (SAC) is a complex site encompassing a major estuarine system on the south coast of England. The SAC includes sixteen Sites of Special Scientific Interest (SSSI) spread out along the Solent, including Langstone Harbour SSSI, Chichester Harbour SSSI and extensive areas of the inshore Solent along the north coast of the Isle of Wight, the Lymington area, the western shores of Southampton Water and the Hamble Estuary.

Solent and Southampton Water SPA and Ramsar

4.1.4 The site comprises a series of estuaries and harbours with extensive mud-flats and saltmarshes together with adjacent coastal habitats including saline lagoons, shingle beaches, reedbeds, damp woodland and grazing marsh. The mud-flats support beds of *Enteromorpha* spp. and *Zostera* spp. and have a rich invertebrate fauna that forms the food resource for the estuarine birds. In summer, the site is of importance for breeding seabirds, including gulls and four species of terns. In winter, the SPA holds a large and diverse assemblage of waterbirds, including geese, ducks and waders. Dark-bellied Brent Goose *Branta b. bernicla* also feed in surrounding areas of agricultural land outside the SPA.

4.2 Reasons for Designation

Solent Maritime SAC

4.2.1 Solent Maritime qualifies as a SAC for both habitats and species. Firstly, the site contains the following Habitats Directive Annex I habitats:

- Estuaries
- Cord-grass swards (Spartina swards *Spartinion maritimae*)
- Atlantic salt meadows (*Glauco-Puccinellietalia maritimae*)
- Subtidal sandbanks (sandbanks which are slightly covered by seawater all the time)
- Intertidal mudflats and sandflats (mudflats and sandflats not covered by seawater at low tide)
- Lagoons (coastal lagoons)
- Annual vegetation of drift lines

- Coastal shingle vegetation outside the reach of waves (perennial vegetation of stony banks)
- Glasswort and other annuals colonising mud and sand (*Salicornia* and other annuals colonising mud and sand)
- Shifting dunes with marram (shifting dunes along the shoreline with *Ammophila arenaria* 'white dunes')

4.2.2 Secondly, the site contains the following Habitats Directive Annex II species:

- Desmoulin's Whorl Snail *Vertigo moulinsiana*

Conservation Objectives

Solent Maritime SAC

1. Subject to natural change, maintain* the Estuaries in favourable condition, in particular:

- Shingle communities.
- Reedbed communities.
- Saltmarsh communities.
- Intertidal mudflat & sandflat communities.
- Intertidal mixed sediment communities.
- Subtidal sediment communities.

2. The conservation objective for annual vegetation of drift lines
Subject to natural change, maintain* the Annual vegetation of drift lines in favourable condition.

3. The conservation objective for Atlantic salt meadows (*Glauco-Puccinellietalia*)
Subject to natural change, maintain* the Atlantic salt meadows (*Glauco-Puccinellietalia*) in favourable condition, in particular:

- Low marsh communities.
- Mid-marsh communities.
- Upper marsh communities.
- Transitional high marsh communities.

4. The conservation objective for *Salicornia* and other annuals colonising mud and sand
Subject to natural change, maintain* the *Salicornia* and other annuals colonising mud and sand in favourable condition, in particular:

- Annual *Salicornia* saltmarsh communities (SM8).
- *Suaeda maritima* saltmarsh communities (SM9).

5. The conservation objective for cordgrass swards (*Spartinion*)
Subject to natural change, maintain* the cordgrass swards (*Spartinion*) in favourable condition, in particular:

- Small cordgrass (*Spartina maritima*) communities.
- Smooth cordgrass (*Spartina alterniflora*) communities.
- Townsend's cordgrass (*Spartina x townsendii*) communities.

6. The conservation objective for mudflats and sandflats not covered by seawater at low tide
Subject to natural change, maintain* the mudflats and sandflats not covered by seawater at low tide in favourable condition, in particular:

- Intertidal mud communities.
- Intertidal muddy sand communities.
- Intertidal sand communities.

- Intertidal mixed sediment communities.

7. The conservation objective for sandbanks slightly covered by seawater all the time
Subject to natural change, maintain* the sandbanks slightly covered by seawater all the time in favourable condition, in particular:

- Subtidal gravel and sands.
- Subtidal muddy sand.
- Subtidal eelgrass Zostera marina beds.

8. The conservation objective for lagoons
Subject to natural change, maintain* the lagoons in favourable condition.

9. The conservation objective for perennial vegetation of stony banks
Subject to natural change, maintain* the Perennial vegetation of stony banks in favourable condition.

10. The conservation objective for shifting dunes along the shoreline with *Ammophilia arenaria* (white dunes)
Subject to natural change, maintain* the Shifting dunes along the shoreline with *Ammophilia arenaria* (white dunes) in favourable condition.

11. The conservation objective for *Vertigo moulinsiana* (Desmoulin's Whorl Snail)
Subject to natural change, maintain* in favourable condition the habitats for *Vertigo moulinsiana* (Desmoulin's Whorl Snail)

*maintenance implies restoration if the feature is not currently in favourable condition.

Solent and Southampton Water SPA and Ramsar

4.2.3 Solent and Southampton Water qualifies as a SPA for its breeding and wintering bird species. As breeding species the site contains:

- Common Tern *Sterna hirundo*
- Little Tern *Sterna albifrons*
- Mediterranean Gull *Larus melanocephalus*
- Roseate Tern *Sterna dougallii*
- Sandwich Tern *Sterna sandvicensis*

Over winter:

- Black-tailed Godwit *Limosa limosa islandica*
- Dark-bellied Brent Goose *Branta bernicla bernicla*
- Ringed Plover *Charadrius hiaticula*
- Teal *Anas crecca*

4.2.4 The area also qualifies as an SPA by supporting over 50,000 individual waterfowl.

4.2.5 Solent and Southampton Water qualifies as a Ramsar as illustrated in Table 5.

Table 5: Solent and Southampton Water Ramsar site criteria

Ramsar criterion	Description of Criterion	Solent and Southampton Water
1	A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type	The site is one of the few major sheltered channels between a substantial island and mainland in European waters, exhibiting an unusual strong double tidal flow and has long periods of slack water

Ramsar criterion	Description of Criterion	Solent and Southampton Water
	found within the appropriate biogeographic region.	at high and low tide. It includes many wetland habitats characteristic of the biogeographic region: saline lagoons, saltmarshes, estuaries, intertidal flats, shallow coastal waters, grazing marshes, reedbeds, coastal woodland and rocky boulder reefs.
2	A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.	The site supports an important assemblage of rare plants and invertebrates. At least 33 British Red Data Book invertebrates and at least eight British Red Data Book plants are represented on site.
5	A wetland should be considered internationally important if it regularly supports 20,000 or more waterbirds	**Species with peak counts in winter:** Over 50,000 waterfowl
6	A wetland should be considered internationally important if it regularly supports 1% of the individuals in a population of one species or subspecies of waterbird.	**Qualifying Species/populations (as identified at designation):** **Species with peak counts in spring/autumn:** Ringed plover , *Charadrius hiaticula*, **Species with peak counts in winter:** Dark-bellied brent goose, *Branta bernicla bernicla* Eurasian teal , *Anas crecca*Black-tailed godwit , *Limosa limosa islandica*

Conservation Objectives

Solent and Southampton Water SPA

1. The conservation objective for the internationally important populations of the regularly occurring Annex 1 Species
Subject to natural change, maintain* in favourable condition the habitats for the internationally important populations of the regularly occurring Annex 1 species, in particular:

- Standing water
- Sand and shingle
- Saltmarsh
- Intertidal mudflats and sandflats
- Shallow coastal waters
- Lagoons

2. The conservation objective for the internationally important populations of the regularly occurring migratory species
Subject to natural change, maintain* in favourable condition the habitats for the internationally important populations of the regularly occurring migratory species, in particular:

- Grazing marsh
- Reedbeds
- Standing water
- Coastal and inundation grassland
- Saltmarsh
- Intertidal mudflats and sandflats
- Boulder and cobble shores
- Mixed sediment shores
- Lagoons

3. The conservation objective for the internationally important assemblage of waterfowl
Subject to natural change, maintain* in favourable condition the habitats for the internationally important assemblage of waterfowl, in particular:

- Grazing marsh
- Reedbeds
- Standing water
- Coastal and inundation grassland
- Saltmarsh
- Intertidal mudflats and sandflats
- Boulder and cobble shores
- Mixed sediment shores
- Lagoons

*maintenance implies restoration if the feature is not currently in favourable condition.

Solent and Southampton Water Ramsar

The conservation objective for the internationally important populations of the regularly occurring Annex 1 species
Subject to natural change, maintain* in favourable condition the habitats for the internationally important populations of the regularly occurring Annex 1 species, in particular:

- Standing water
- Sand and shingle
- Saltmarsh
- Intertidal mudflats and sandflats
- Shallow coastal waters
- Lagoons

2. The conservation objective for the internationally important populations of the regularly occurring migratory species
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- Grazing marsh
- Reedbeds
- Standing water
- Coastal and inundation grassland
- Saltmarsh
- Intertidal mudflats and sandflats
- Boulder and cobble shores
- Mixed sediment shores
- Lagoons

3. The conservation objective for the internationally important assemblage of waterfowl
Subject to natural change, maintain* in favourable condition the habitats for the internationally important assemblage of waterfowl, in particular:

- Grazing marsh
- Reedbeds
- Standing water
- Coastal and inundation grassland
- Saltmarsh
- Intertidal mudflats and sandflats
- Boulder and cobble shores
- Mixed sediment shores
- Lagoons

*maintenance implies restoration if the feature is not currently in favourable condition.

4.3 Historical Trends and Current Pressures

Solent Maritime SAC

4.3.1 The Solent Maritime SAC has a number of physical constraints including existing flood defence and coast protection works that, coupled with predictions of rising sea levels may lead to coastal squeeze of intertidal habitats. Development pressures including ports, marinas, jetties etc, often involve capital/ maintenance dredging to provide/ improve deep water access, and land-claim of coastal habitats. Such development along with ongoing port activities leads to an increased risk of accidental pollution from shipping, oil/chemical spills, heavy industrial activities, former waste disposal sites and waste-water discharge, while there is risk of introduction of non-native species e.g. from shipping activity.

4.3.2 Solent Maritime SAC suffers from nutrient enrichment[28], which causes excessive growth of green weed across the site. This green weed can form dense mats within the intertidal areas throughout sheltered areas of the site, inhibiting the natural functioning of these habitats. In their Review of Consents process, the Environment Agency observed evidence of toxic contamination within certain areas of the site, including tri-butyl tin (TBT) at the head of Southampton Water and in the middle of the Solent, arising from historic use as an anti-fouling paint on boats. The Review of Consents process has identified an area of thermal pollution occurring over the shallow intertidal zone on the western shore of Southampton Water. Thermal plumes may affect the distribution of fish. There are areas of organic enrichment on the western shore of Southampton Water. This can make sediments anaerobic which can affect the distribution or composition of designated habitats.

4.3.3 Reductions in freshwater flows into the SAC may pose a risk to site's integrity. Estuaries are a very important feature of the site and implicitly require some freshwater input. It is also widely agreed that small freshwater flows may also be important to intertidal SAC habitats.

4.3.4 These issues have been and are being addressed through a number of mechanisms including the review of consents procedure under the Habitats Regulations, Biodiversity Action Plans, and other coastal strategies, management plans and management agreements. In 2000, a collaborative Solent European Marine Sites project was set up with the aim of developing a strategy for managing the marine and coastal resources of the Solent in a more integrated and sustainable way[29].

4.3.5 The key environmental conditions of the SAC are mainly:

- Sufficient space between the site and development to allow for managed retreat of intertidal habitats and avoid coastal squeeze.
- No dredging or land-claim of coastal habitats.
- Unpolluted water.
- Absence of nutrient enrichment (which can causes smothering macro-algal mats).
- Absence of non-native species.
- Maintenance of freshwater inputs.
- Balance of saline and non-saline conditions.
- Maintenance of grazing

[28] http://www.environment-agency.gov.uk/static/documents/Business/solent_maritime_sac_1885867.pdf
[29] www.solentems.org.uk/

Solent and Southampton Water SPA and Ramsar

4.3.6 The Solent and Southampton Water SPA/Ramsar has a number of physical constraints including existing flood defence and coast protection works that, coupled with predictions of rising sea levels, may lead to coastal squeeze of intertidal habitats. Development pressures including ports, marinas, jetties etc., often involve capital/ maintenance dredging to provide/ improve deep water access, and land-claim of coastal habitats. Such development along with ongoing port activities leads to an increased risk of accidental pollution from shipping, oil/chemical spills, heavy industrial activities, former waste disposal sites and waste-water discharge, while there is risk of introduction of non-native species e.g. from shipping activity.

4.3.7 The SPA/Ramsar suffers from nutrient enrichment, which causes excessive growth of green weed. This green weed can form dense mats within the intertidal areas throughout sheltered areas of the site, inhibiting the natural functioning of these habitats. The Review of Consents process has noted evidence of toxic contamination within certain areas of the site, including tri-butyl tin (TBT) at the head of Southampton Water and in the middle of the Solent, arising from historic use as an anti-fouling paint on boats. The Review of Consents process has identified an area of thermal pollution occurring over the shallow intertidal zone on the western shore of Southampton Water. Thermal plumes may affect the distribution of fish. There are areas of organic enrichment on the western shore of Southampton Water. This can make sediments anaerobic which can affect the distribution or composition of designated habitats.

4.3.8 Reductions in freshwater flows into the SAC may pose a risk to site's integrity. Recent research indicates that freshwater creeks flowing over intertidal areas are an important resource to many bird species. Birds use such freshwater zones at times of low tide for feeding, drinking, bathing and shelter. Licensed abstractions can have an adverse effect by reducing the amount of freshwater available.

4.3.9 These issues have been and are being addressed through a number of mechanisms including the review of consents procedure under the Habitats Regulations, Biodiversity Action Plans, and other coastal strategies, management plans and management agreements. In 2000, a collaborative Solent European Marine Sites project was set up with the aim of developing a strategy for managing the marine and coastal resources of the Solent in a more integrated and sustainable way.

4.3.10 The key environmental conditions required to maintain site integrity include:

- Sufficient space between the site and development to allow for managed retreat of intertidal habitats and avoid coastal squeeze.
- No dredging or land-claim of coastal habitats.
- Unpolluted water.
- Absence of nutrient enrichment.
- Absence of non-native species.
- Low levels of recreational pressure both on shore and offshore can avoid disturbance effects during sensitive (over-wintering) periods.
- Freshwater inputs are of value for providing a localised increase in prey biomass for certain bird species, specific microclimatic conditions and are used for preening and drinking.
- Low amounts of silt loss.

- Short grasslands surrounding the site are essential to maintaining interest features as they are now the key foraging resource.

4.4 Likely Significant Effects

4.4.1 The pathways discussed in the preceding Chapter are considered for each broad locational option in the table overleaf. However, there are several impact pathways that are less related to specific development locations and more to general quantum of development. Water resources (in terms of Public Water Supply) and water quality (in terms of treated sewage effluent) have already been discussed and will require discussion with the Environment Agency and statutory water company before the final housing number is selected. The other key pathways that are related to quantum are discussed below: recreational pressure and air quality.

Disturbance/recreation

4.4.2 Data on visitor activity in the Solent complex has been obtained through the Solent Recreational Mitigation Partnership. Overall, Southampton Water had a relatively high predicted density of future visitors. Five of the twelve sections of frontage in Southampton Water predicted to receive an increase in visitor density to over 30/ha (in some cases more than three times over) are located in Eastleigh (from Weston to Hound). Visitor numbers per day were typically highest on weekends compared to weekdays. Holiday makers accounted for 6% of the total number of visitors recorded. Visitors undertook a wide range of activities, with walking (without a dog) and dog walking the two most frequently recorded activities (44% and 42% of interviews). Across all sites and activities, visits were typically short, with 89% lasting less than two hours. Across all sites (and taking the data for non-holiday makers only) visitors were roughly evenly divided between those who arrived by car and those who arrived on foot. Ninety percent of all visitors arriving on foot lived within 2km, compared to only 20% of visitors arriving by car. Almost eighty percent of all visitors arriving by car (excluding holiday makers) lived within 10km, with 50% living within 4km. The overall median distance from site (across the study area) for non-tourist visitors was 1.7km.

4.4.3 The vast majority of South-Hampshire based visitors (irrespective of mode of transport) to the Eastleigh sections of frontage lived south of the A3024, i.e. within approximately 4km. However, visitors did arise from across South Hampshire. The projected increase in visitors cannot therefore be entirely attributed to Eastleigh any more than it can be stated that Eastleigh will not be contributing visitor pressure along other sections of frontage. However, it is reasonable to assume that a very high proportion of the additional visitors to the Eastleigh frontage will be Eastleigh residents, mainly from the coastal stretches of the Borough. It is therefore the case that, when taken as a whole and ‘in combination’ with development across South Hampshire, the scale of development set out in the Eastleigh Local Plan cannot currently be screened out as leading to no Likely Significant Effects until measures addressing this issue are incorporated into the Plan.

4.4.4 It has been agreed with all relevant Solent local authorities that all net new development within 5.6km of the Solent European sites will have to make a financial contribution towards the delivery of mitigation and impact management measures within those sites, to be collected by the local planning authority. This contribution is determined on a ‘per dwelling’ basis, so provided that it is applied to all new dwellings within the Eastleigh part of the 5.6km zone adequate mitigation can be delivered for the additional housing planned. It will be necessary for the Eastleigh Local Plan to have a policy framework which facilitates the collection and use of these contributions.

Air quality

4.4.5 Although the precise location of development can have an influence on patterns of vehicle exhaust emissions across the district, the larger influence is the total quantum of housing and employment development since this governs the overall scale of any changes in traffic flows. This is particularly the case since the primary roads on interest in Eastleigh district (those within 200m of European sites) are main strategic routes such as the M27 and A27.

4.4.6 The M27 crosses the Solent Maritime SAC at Landranger grid reference SU496101. Approximately 4ha of river and intertidal mudflat lies within 200m of the road at this location amounting to approximately 0.02% of the total area of the SAC. There is no critical load for mudflat, but there is a critical load for 'saltmarsh'. The minimum critical load for saltmarsh is 20 kgN/ha/yr. Although saltmarsh and intertidal mudflats are theoretically vulnerable to nitrogen deposition, inputs of nitrogen to these systems are overwhelmingly dominated by fluvial and marine sources, with atmospheric nitrogen deposition making a minimal contribution to overall nitrogen inputs. This is reflected on the UK Air Pollution Information System website which states that '*Overall, N deposition* [from atmosphere] *is likely to be of low importance for these systems as the inputs are probably significantly below the large nutrient loadings from river and tidal inputs*'[30].

4.4.7 Given the low sensitivity of coastal saltmarsh habitats to atmospheric nitrogen inputs, and their locations in the Hamble estuary relative to the M27 and the SAC boundary, adverse effects on the integrity of the SAC are unlikely to result from increasing traffic flows at this location. The twice daily washing of mudflats within and adjacent to the SAC, further reduces the likelihood of significant adverse effects on this habitat type, particularly given that the Environment Agency estimates that well over 50% of nitrogen as a whole comes from background marine and riverine sources in Solent marine sites. Nonetheless, traffic flows will need to be re-examined for the emerging Local Plan.

4.4.8 Having considered the strategic (quantum-related) issues regarding the Solent European sites, the following table examines each option under consideration and discusses the potential for site-specific impacts on the Solent European sites. A conclusion is then reached as to whether any spatial options are more favourable for European sites than others.

[30] APIS website [accessed 27/10/15]: http://www.apis.ac.uk/node/968

Option assessment table[31]

Option	Name	Further details	Source of Likely Significant Effect
A	Small extensions to settlements	A large collection of smaller locations.	The southern-most collection of parcels is c. 400-450m from the Solent European sites (River Hamble) at its closest and separated by existing residential development. However, there are a number of tributaries (such as Moorgreen stream/ Ford lake and Hedge End Stream) which flow into either the Badnum/ Hungerford stream or Spear Pond Gully. These gullies in turn flow directly into the Solent Maritime SAC. The eastern-most of the central parcels in this option is shown abutting the River Hamble c. 500m upstream of the Solent European sites. It is understood that this is intended to denote a broad location rather than actual site boundaries. It is therefore recommended that an adequate separation between the River and any built development (e.g. 50m) is included and that this zone incorporates features to both intercept surface water runoff and ensure that the surface water that does enter the River Hamble via diffuse pathways is of suitable quality. It is recommended that the relevant policy considers a buffer of at least 15m on larger watercourses and a buffer of 10m on smaller brooks and flowing ditches. In terms of features to ensure no net greenfield runoff, it is understood that normal practice in Eastleigh is to require naturalised SuDS within three forms of filtration and coverage of construction drainage in a Construction Environment Management Plan.
B	Expansion of Fair Oak and Bishopstoke to the north/north-east with related development at Allbrook Village North of Bishopstoke and Fair Oak.	Would involve delivery of a new link road from Fair Oak to connect with Junction 12 of the M3 at Allbrook. Would also involve an extension to Itchen Valley Country Park.	Option B is over 6km from the Solent European sites at their closest. There are small watercourses traversing these areas, which are likely to drain into River Itchen SAC thus presenting a water quality pathway to the Solent European sites, albeit a long way downstream. A suitable buffer will need to be incorporated either side of any watercourse, in addition to features to ensure no net increase in greenfield runoff and measures to protect the water quality of those streams. Flows within these tributaries will also require protection to ensure no change in water supply to the River Itchen (and thus the Solent Maritime SAC downstream). It is recommended that the relevant policy considers a buffer of at least 15m on larger watercourses and a buffer of 10m on smaller brooks and flowing ditches.

[31] In this table potential water quality pathways are identified linking development sites and internationally important wildlife sites. A distance of 7km has been used as a cut-off threshold for screening out specific development sites associated with this impact pathway. This distance is considered sufficiently precautionary to include all sites where there is a realistic possibility of a likely significant effect while excluding sites that are so far from the internationally important wildlife site that (given the limited risk and scale of pollution associated with housing and general commercial development) an effect, while not impossible, is clearly unlikely. This does not mean that pollution control would not be required as a general principle when working near watercourses.

			In terms of features to ensure no net greenfield runoff, it is understood that normal practice in Eastleigh is to require naturalised SuDS within three forms of filtration and coverage of construction drainage in a Construction Environment Management Plan.
C	Further Expansion of Fair Oak to the East/North-East	Land north-east of Fair Oak.	The land east of Fair Oak is over 6km from the Solent European sites although one parcel contains the River Hamble and associated tributaries including headwaters. The conclusion is the same as for Option B.
D	Expansion of Bishopstoke to the South and Horton Heath to the West.	Would include a new road link from Horton Heath to Bishopstoke Road.	This Option is approximately 5.3km from the Solent European sites. There are watercourses (including the Allington Stream) traversing these areas, which are likely to drain into River Itchen SAC thus presenting a water quality pathway to the Solent European sites, albeit a long way downstream. A suitable buffer will need to be incorporated either side of any watercourse, in addition to features to ensure no net increase in greenfield runoff and measures to protect the water quality of those streams. Flows within these tributaries will also require protection to ensure no change in water supply to the River Itchen (and thus the Solent Maritime SAC downstream). It is recommended that the relevant policy considers a buffer of at least 15m on larger watercourses and a buffer of 10m on smaller brooks and flowing ditches. In terms of features to ensure no net greenfield runoff, it is understood that normal practice in Eastleigh is to require naturalised SuDS within three forms of filtration and coverage of construction drainage in a Construction Environment Management Plan.
E	Land to the north of West End	Opposite (south) side of the railway line from Option D.	Option E is located over 4km from the Solent European sites and no obvious hydrological pathway exists. There are small watercourses traversing the option area, which are likely to drain into River Itchen SAC thus presenting a water quality pathway to the Solent European sites, albeit a long way downstream. A suitable buffer will need to be incorporated either side of any watercourse, in addition to swales to ensure no net increase in greenfield runoff and measures to protect the water quality of those streams. Flows within these tributaries will also require protection to ensure no change in water supply to the River Itchen (and thus the Solent Maritime SAC downstream). It is recommended that the relevant policy considers a buffer of at least 15m on larger watercourses and a buffer of 10m on smaller brooks and flowing ditches. In terms of features to ensure no net greenfield runoff, it is understood that normal practice in Eastleigh is to require naturalised SuDS within three forms of filtration and coverage of construction drainage in a Construction Environment Management Plan.
F	Settlement Extension to the North-East of Hedge End and North of Botley Village	Two locations which would offer contributions and land for the Botley Bypass.	The eastern-most parcel of this option is shown abutting the River Hamble c. 500m upstream of the Solent European sites. It is understood that this is intended to denote a broad location rather than actual site boundaries. It is therefore recommended that an adequate separation between the River and

			any built development (e.g. 50m) and that this zone incorporates features to both intercept surface water runoff and ensure that the surface water that does enter the River Hamble via diffuse pathways is of suitable quality. It is recommended that the relevant policy considers a buffer of at least 15m on larger watercourses and a buffer of 10m on smaller brooks and flowing ditches. In terms of features to ensure no net greenfield runoff, it is understood that normal practice in Eastleigh is to require naturalised SuDS within three forms of filtration and coverage of construction drainage in a Construction Environment Management Plan. Depending upon delivery details, the Botley Bypass has the potential to result in downstream water quality impacts on River Itchen SAC and thus the Solent Maritime SAC/Solent & Southampton Water SPA/Ramsar site.
G	Land at Hamble Airfield	Located at Hound Corner. Development on Hamble Airfield will be in the northern half of the site with open space to the south to maintain separation between this development and Hamble itself.	The southern-most parcel of this Option is located just over 100m from the Solent & Southampton Water SPA/Solent Maritime SAC (River Hamble) at its closest. However it is understood that this is only intended as a broad indication of location. In practice it is recommended that substantial setback is achieved between new built development and the European sites. To avoid any risk of air quality impacts this should be greater than 200m and discussion with the Council has concluded that a 400m separation would be appropriate to maintain the openness of this part of the SAC/SPA/Ramsar site. Such separation would ensure that there would be no site-specific effects on the SAC/SPA and would also minimise the risk of surface water runoff into the SAC/SPA.
H	Redevelopment of Eastleigh Riverside for Employment Uses	-	The Option area is c.5.4km from the Solent European sites (which lie at the mouth of the River Itchen). Since there is a fluvial pathway to the Solent European sites via the River Itchen, the same surface water quality precautions that will protect the River Itchen SAC would also protect these sites.

4.4.9 In summary, there is no clear single option which is substantially more favourable to European sites than any others. Options B, D and E are most favourable in that they pose the most limited impact pathway to the Solent European sites, although impact pathways (particularly via rivers and streams) do exist. However, water quality impact pathways should be capable of being addressed through careful design, the inclusion of appropriate buffer zones to watercourses and water quality protection measures in line with the elevated standard usually applied in Eastleigh.

4.4.10 For most of these Options the large amount of development and proximity to rivers (or tributaries of rivers) leading into the Solent Maritime SAC and Solent & Southampton Water Ramsar site (and to a lesser extent the SPA) increases the risk of introduction of invasive non-native species into the system. For these Options there is also potential for adverse water quality effects during construction, although this is easily controllable using pollution control protocols. The construction of the Botley Bypass could theoretically lead to water quality impacts on the Solent Maritime SAC downstream.

4.5 Other Plans and Projects (In Combination)

Recreational pressure

4.5.1 Data on visitor activity in the Solent complex was obtained through the Solent Recreation Mitigation Partnership. Overall, Southampton Water had a relatively high predicted density of future visitors. Based on data presented in the Phase 2 report[32] five of the twelve sections of frontage in Southampton Water predicted to receive an increase in visitor density to over 30/ha (in some cases more than three times over) are located in Eastleigh (from Weston to Hound). This increase cannot be entirely attributed to Eastleigh any more than it can be stated that Eastleigh will not be contributing visitor pressure along other sections of frontage. However, it is reasonable to assume that a significant proportion of the additional visitors to the Eastleigh frontage will be Eastleigh residents.

4.5.2 There are also a series of coastal and marine projects being implemented over the Local Plan period including the ABP Project Capital dredge of berths 204 and 205, ABP Project Southampton Approach Channel Dredge and Netley Coastal Defence Scheme. All of these could potentially result in disturbance of SPA birds depending upon when they are scheduled to occur.

4.5.3 It is therefore the case that, when taken as a whole and 'in combination' with development across South Hampshire, the Eastleigh Local Plan cannot be screened out as leading to no Likely Significant Effects.

Air quality

4.5.4 The Partnership for Urban South Hampshire initiated a sub-region wide transport and air quality study, the first stage of which reported in 2010[33]. This study identified that the growth in traffic associated with the 80,000 new dwellings to be delivered in PUSH up until 2026 would have relatively little impact on the following designated sites:

- Botley Wood and Everetts and Mushes Copses SSSI;
- The New Forest SSSI;
- Chichester Harbour SSSI;

[32] Stillman, R. A., West, A. D., Clarke, R. T. & Liley, D. (2012) Solent Disturbance and Mitigation Project Phase II: Predicting the impact of human disturbance on overwintering birds in the Solent. Report to the Solent Forum

[33] AEA Technology. 2010. Road transport emissions impacts on Nature Conservation Sites. Report to the Partnership for Urban South Hampshire

- River Test SSSI;
- Sinah Common SSSI;
- Southampton Common SSSI; and
- Upper Hamble Estuary and Woods SSSI.

4.5.5 The analysis indicated that the growth in traffic associated with PUSH would have the greatest impact on the following sites:

- Moorgreen Meadows SSSI;
- Langstone Harbour SSSI;
- Portsdown SSSI;
- Downend Chalk Pit SSSI;
- Lower Test Valley SSSI; and
- River Itchen SSSI.

4.5.6 Two of these six sites, Langstone Harbour and Portsmouth Harbour, are part of the Solent complex of European sites – specifically Portsmouth Harbour SPA/Ramsar site and Chichester & Langstone Harbours SPA/Ramsar site. In both instances the modelling predicted that nitrogen deposition would exceed the critical load for the habitats and that development in the PUSH region would collectively contribute over 1kg N/ha/yr in additional nitrogen to these sites; a considerable additional amount.

4.5.7 Given that this is a collective pan-authority issue it is considered that severe control of nitrogen deposition due to additional traffic arising specifically from Eastleigh would be disproportionate and that policy should instead focus on maximising opportunities for sustainable transport and reducing reliance on private vehicles. It is understood that the sub-region transport and air quality study is currently being updated by PUSH to inform he review of the South Hampshire strategy and the outcomes should be available to inform the next stage of the Eastleigh Local Plan process.

4.6 Conclusion

4.6.1 No particular Option stands out as being substantially more favourable to European sites than any others. Options B, D and E are most favourable in that they pose the most limited impact pathways to the Solent European sites. All Options do present pathways of impact on the Solent European sites (primarily through the water quality pathway) but should be capable of being addressed through careful design, the inclusion of appropriate buffer zones to watercourses and water quality protection to the elevated standard usually applied in Eastleigh.

5 River Itchen SAC

5.1 Introduction

5.1.1 This site comprises chalk stream and river, fen meadow, flood pasture and swamp habitats, particularly formations of in-channel vegetation dominated by water crowfoot *Ranunculus* spp, riparian vegetation communities (including wet woodlands) and side channels, runnels and ditches associated with the main river and former water meadows. There are significant populations of the nationally-rare southern damselfly *Coenagrion mercuriale* and assemblages of nationally-rare and scarce freshwater and riparian invertebrates, including the white-clawed crayfish *Austropotamobius pallipes*. Other notable species include otter *Lutra lutra*, water vole *Arvicola terrestris*, freshwater fishes including bullhead *Cottius gobbo*, brook lamprey *Lampetra planeri* and Atlantic salmon *Salmo salar*. A good range of wetland bird species breed.

5.2 Reasons for Designation

5.2.1 The River Itchen is designated as a Special Area of Conservation for the following species and habitats:

- Water courses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation - The Itchen is a classic example of a sub-type 1 chalk river. The river is dominated throughout by aquatic *Ranunculus* spp. The headwaters contain pond water-crowfoot *Ranunculus peltatus*, while two *Ranunculus* species occur further downstream: stream water-crowfoot *R. penicillatus ssp. pseudofluitans*, a species especially characteristic of calcium-rich rivers, and river water-crowfoot *R. fluitans*.
- Southern damselfly *Coenagrion mercuriale* - Strong populations of southern damselfly occur here, estimated to be in the hundreds of individuals. The site in central southern England represents one of the major population centres in the UK. It also represents a population in a managed chalk-river flood plain, an unusual habitat for this species in the UK, rather than on heathland.
- Bullhead *Cottus gobio* - The Itchen is a classic chalk river that supports high densities of bullhead throughout much of its length. The river provides good water quality, extensive beds of submerged plants that act as a refuge for the species, and coarse sediments that are vital for spawning and juvenile development.
- White-clawed crayfish *Austropotamobius pallipes*
- Brook lamprey *Lampetra planeri*
- Atlantic salmon *Salmo salar*
- Otter *Lutra lutra*

Conservation Objectives

To maintain*, in favourable condition, the river as a habitat for:

- floating formations of water crowfoot (*Ranunculus*) of plain and sub-mountainous rivers
- populations of Atlantic salmon (*Salmo salar*)
- populations of bullhead (*Cottus gobio*)
- populations of brook lamprey (*Lampetra planeri*)

- populations of white-clawed crayfish (*Austropotamobius pallipes*)

and the river and adjoining land as habitat for:

- populations of southern damselfly (*Coenagrion mercuriale*)
- populations of otter (*Lutra lutra*)

*maintenance implies restoration, if the feature is not currently in favourable condition.

5.3 Historic Trends and Current Pressures

5.3.1 A principal threat to the habitats within this SAC has been decreases in flow velocities and increases in siltation, in turn affecting macrophyte cover. Surveys during the 1990s showed declines in *Ranunculus* cover since 1990, attributable to increased abstractions in the upper catchment, coupled with a series of years with below-average rainfall. Low flows interact with nutrient inputs from point sources to produce localised increases in filamentous algae and nutrient-tolerant macrophytes at the expense of *Ranunculus*. The Environment Agency has undertaken assessments to inform licensed water abstraction at critical times. Efforts are currently being made to increase the viability of the southern damselfly population through population studies and a Species Action Plan. Evidence indicates that otter populations in the River Itchen are good and widespread in addition to being stable[34].

5.3.2 Recent Condition Assessment process reviews indicated that large sections of the river are suffering from inappropriate water levels, with siltation and abstraction cited as problems in places. In some areas, discharges were causing reduced water quality.

5.3.3 The key environmental conditions needed to maintain site integrity include:

- Maintenance of flow velocities - low flows interact with nutrient inputs from point sources to produce localised increases in filamentous algae and nutrient-tolerant macrophytes at the expense of *Ranunculus*.
- Low levels of siltation,
- Unpolluted water and low nutrient inputs, particularly phosphorus which is the key limiting nutrient in the system (i.e. the nutrient availability of which controls the vegetation's growth response to other nutrients such as nitrogen).
- Maintenance of grazing pressure is essential for Southern damselfly habitat.

5.4 Likely Significant Effects

5.4.1 The pathways discussed in the preceding Chapter are considered for each broad locational option in the table overleaf. However, there are several impact pathways that are less related to specific development locations and more to general quantum of development. Water resources (in terms of Public Water Supply) and water quality (in terms of treated sewage effluent) have already been discussed and will require discussion with the Environment Agency and statutory water company before the final housing number is selected. Air quality is the other key pathway that is related to quantum.

[34] Whyte, P. 2011. Itchen Navigation Otter Survey 2010/2011. Report by Hampshire & Isle of Wight Wildlife Trust for the Itchen Navigation Heritage Trail Project Partnership

Air quality

5.4.2 There is no reason to believe NOx in atmosphere would have a directly toxic effect on Southern damselfly since the known effect of nitrogen dioxide poisoning is through effects on the lungs and associated mucus membranes, which are absent in insects. Excessive nutrient inputs could have an adverse effect on the River Itchen SAC. However, not all nutrients will have an equal effect. As with most freshwater systems phosphorus is the key limiting nutrient in the River Itchen since it is normally scarce in freshwater systems. As such, in freshwater environments changing the nitrogen inputs is likely to have much less of an impact than changing the phosphorus loadings. In addition, as with all watercourses, nitrogen inputs from fluvial (e.g. sewage treatment works) or runoff (e.g. agriculture) sources are likely to dominate nitrogen inputs into the River Itchen compared to the relatively small amount of nitrogen deposited from atmosphere. Most of the interest features of the SAC (Watercourses of plain to montane levels with the *Ranunculion fluitantis* and *Callitricho-Batrachion* vegetation, bullhead, white-clawed crayfish, brook lamprey, and Atlantic salmon) are therefore likely to be little affected by changes in nitrogen deposition, particularly from atmosphere.

5.4.3 The habitat of the otter will include 'dry' habitats outside of the watercourse itself and these could be affected by changes in nitrogen inputs from the atmosphere. However, the relatively subtle changes in vegetation structure that would result from most increases in nitrogen deposition are unlikely to alter usage of areas by otter. Considerable increases in deposition would probably be required to overcome the influence of grazing, drainage and other factors and cause the significant shifts in vegetation structure that would deter otters.

5.4.4 Therefore, the only species that is considered likely to be susceptible in practice to changes in nitrogen deposition from atmosphere is the Southern damselfly as this also utilises riparian habitats out of the water column and (unlike otter) could be deterred from utilising an area by relatively subtle changes in vegetation structure and species composition.

5.4.5 The southern damselfly has very specialised habitat requirements, being confined to shallow, well-vegetated, base-rich runnels and flushes in open areas or small side-channels of chalk rivers. The larvae live in flushes and shallow runnels, often less than 10 cm deep, with slow-flowing water. Adults fly from June to August. Females lay eggs onto submerged plants, and the predatory aquatic larvae probably take two years to mature.

5.4.6 The Southern damselfly is identified as utilising 'fenland' and 'grazing marsh' areas of the SAC away from the main watercourse. Fenland and grazing marsh is identified on the UK Air Pollution Information System (APIS; www.apis.ac.uk) as being susceptible to excess deposition of atmospheric nitrogen and both habitats have a minimum critical load of 10 kgN/ha/yr. The M27 and A27 in (or immediately adjacent to the boundary of) Eastleigh Borough both cross (or lie within 200m of) the River Itchen SAC including areas of fenland south of Southampton Airport. The B3037 also crosses the River Itchen.

5.4.7 Nitrogen deposition derived from site-specific measurements undertaken for the Eastleigh River Side development in 2010[35] identified a rate of nitrogen deposition within the SAC in the vicinity of Chickenhall WwTW of 14.74 kgN/ha/yr. In other words the nitrogen deposition rate at the SAC within 200m of the M27 and A27 (the zone within which the roads can be expected to be having an influence on local deposition) is between 54% and 75% above the Critical Load for the relevant habitat. As such, it is possible that atmospheric nitrogen deposition from traffic on the M27 and A27 could affect the fenland

[35] Hamilton S, Monaghan D. 2010. Eastleigh Riverside Air Quality Study. Unpublished report for Eastleigh Borough Council by AEA Technology plc

and grazing marsh habitat within the SAC and thus potentially on the use of the area by Southern damselfly.

5.4.8 However, while empirical studies have identified that nitrogen deposition rates above the critical load for fenland can result in adverse effects on this habitat through excessive growth of coarse competitive species, this does not mean that deposition above the critical load will result in adverse effects in every given situation. Other factors must be taken into account, such as management regime and the relevant limiting nutrient.

5.4.9 'Poor fens' (i.e. acidic fens) are strongly nitrogen limited. In other words, nitrogen availability is the factor which ultimately controls vegetation response to other nutrients and a small change in nitrogen inputs can result in a major change in the vegetation composition. In contrast, other types of fen with a relatively alkaline pH (called 'rich' fens) such as those along the River Itchen are phosphorus-limited meaning that phosphorus availability is the factor which ultimately controls vegetation response to other nutrients. In a phosphorus limited system, high nitrogen availability may not result in a deleterious effect on vegetation provided that phosphorus availability is controlled[36]. That is not to say that nitrogen inputs would therefore be irrelevant, but it does mean that a proportionate response must be made to the risk posed by small additional nitrogen inputs. The River Itchen system is already nitrogen-rich primarily due to effluent discharge from Chickenhall WwTW and other WwTWs upstream. Nitrogen always will be present in excess in the River Itchen system, primarily due to fluvial sources.

5.4.10 The system is believed to be sufficiently phosphorus-limited that the Environment Agency Review of Consents for the River Itchen SAC, scopes out nitrogen loading early in the process. The likely ecological consequences of further exceedence of the fenland critical load for nitrogen deposition from atmospheric sources due to development in Eastleigh must therefore be set against the background of:

- phosphorus remaining the key limiting nutrient in the system; and
- nitrogen being already in excess and dominated by fluvial/WwTW/agricultural rather than atmospheric inputs.

5.4.11 Within this context, it is considered that the focus on nutrients in the River Itchen should be on phosphorus inputs (on the basis that keeping phosphorous levels low will prevent the habitat from responding as much to the nitrogen in the system) and that if nitrogen reduction in the River Itchen is considered necessary the greatest reductions are likely to be derived from reducing inputs from sewage treatment works and agriculture.

5.4.12 Having considered the strategic (quantum-related) issues regarding the River Itchen SAC, the following table examines each option under consideration and discusses the potential for site-specific impacts. A conclusion is then reached as to whether any spatial options are more favourable for European sites than others. For the purposes of this HRA, and to be precautionary, any development site which could involve piling within 100m of the River Itchen SAC or tributaries known/likely to be used by otters is screened in for the devising of site-specific measures at the planning application stage.

[36] '*In a nutrient limited system, excess of the non-limiting nutrient may not result in any signs of enrichment in the vegetation as the plants are unable to make use of one nutrient without sufficient amounts of the other'*. Source: Understanding Fen Nutrients http://www.snh.gov.uk/docs/A416930.pdf

Options assessment table[37]

Option	Name	Further details	Source of Likely Significant Effect
A	Small extensions to settlements	A large collection of smaller locations.	The western-most parcels south of Bishopstoke are connected by watercourses to the River Itchen SAC, thus presenting a water quality pathway. Continuing to enable otter passage along these watercourses from the River Itchen SAC will also be an important consideration. A suitable buffer will need to be incorporated either side of any watercourse, in addition to swales to ensure no net increase in greenfield runoff and measures to protect the water quality of those streams. Flows within these tributaries will also require protection to ensure no change in water supply to the River Itchen. It is recommended that the relevant policy considers a buffer of at least 15m on larger watercourses and a buffer of 10m on smaller brooks and flowing ditches. In terms of features to ensure no net greenfield runoff, it is understood that normal practice in Eastleigh is to require naturalised SuDS within three forms of filtration and coverage of construction drainage in a Construction Environment Management Plan.
B	Expansion of Fair Oak and Bishopstoke to the north/north-east with related development at Allbrook Village North of Bishopstoke and Fair Oak.	Would involve delivery of a new link road from Fair Oak to connect with Junction 12 of the M3 at Allbrook. Would also involve an extension to Itchen Valley Country Park.	Depending on the final boundary, the western-most part is within 150m of the River Itchen SAC, albeit separated by a road (Allbrook Hill) and existing residential properties. Other parts are up to 3.5km from the SAC. There are small watercourses traversing these areas, which are likely to drain into River Itchen SAC thus presenting a water quality pathway. Continuing to enable otter passage along these watercourses from the River Itchen SAC will also be an important consideration. A suitable buffer will need to be incorporated either side of any watercourse, in addition to swales to ensure no net increase in greenfield runoff and measures to protect the water quality of those streams. Flows within these tributaries will also require protection to ensure no change in water supply to the River Itchen. It is recommended that the relevant policy considers a buffer of at least 15m on larger watercourses and a buffer of 10m on smaller brooks and flowing ditches. In terms of features to ensure no net greenfield runoff, it is understood that normal

[37] In this table potential water quality pathways are identified linking development sites and internationally important wildlife sites. A distance of 7km has been used as a cut-off threshold for screening out specific development sites associated with this impact pathway. This distance is considered sufficiently precautionary to include all sites where there is a realistic possibility of a likely significant effect while excluding sites that are so far from the internationally important wildlife site that (given the limited risk and scale of pollution associated with housing and general commercial development) an effect, while not impossible, is clearly unlikely. This does not mean that pollution control would not be required as a general principle when working near watercourses.

			practice in Eastleigh is to require naturalised SuDS within three forms of filtration and coverage of construction drainage in a Construction Environment Management Plan. A new link road from Fair Oak to Junction 12 of the M3 would require a new crossing of the River Itchen. It will be necessary to undertake detailed transport modelling calculations to assess the potential air quality impact of this option. It will also be necessary that there is no loss of riparian habitat, that the River Itchen remains passable for otter and that any construction works adjacent to the River Itchen do not result in aquatic pollution or (via piling) any adverse noise impacts on migratory fish such as Atlantic salmon. Any crossing should be targeted at where the SAC is narrowest (i.e. most constrained to the River Itchen itself rather than associated floodplain). This will minimise the need for construction works within the SAC and in particular avoid any landtake from the SAC (for example for bridge piers). Any proposal which involved landtake from the SAC would almost certainly result in an adverse effect on the integrity of that site and would therefore need to be able to demonstrate that there were a) No Alternatives and b) Imperative Reasons of Over-Riding Interest as to why such a project should nonetheless proceed (as well as compensation to preserve the overall Natura 2000 network). It could prove very challenging to meet those tests.
C	Further Expansion of Fair Oak to the East/North-East	Land north-east of Fair Oak.	The parcel of land east of Fair Oak is added. is 3km from River Itchen SAC. Impacts are as for Option B.
D	Expansion of Bishopstoke to the South and Horton Heath to the West.	Would include a new road link from Horton Heath to Bishopstoke Road.	The western extent of this area abuts River Itchen SAC, although it is understood that this is a broad location and does not imply that development will abut (or even necessarily be close to) the SAC. Clearly it would be logical and in keeping with the currently open countryside setting of this part of the SAC. The precise size of the buffer would need to be considered as the proposal was developed in more detail. To avoid any risk of air quality impacts this should be greater than 200m and discussion with the Council has concluded that a 400m separation would be appropriate to maintain the openness of this part of the SAC. There are watercourses (including the Allington Stream) traversing these areas, which are likely to drain into River Itchen SAC thus presenting a water quality pathway. Continuing to enable otter passage along these watercourses from the River Itchen SAC will also be an important consideration. A suitable buffer will need to be incorporated either side of any watercourse, in addition to features to ensure no net increase in greenfield runoff and measures to protect the water quality of those streams. Flows within these tributaries will also require protection to ensure no change in water supply to the River Itchen. It is recommended that the relevant policy considers a buffer of at least 15m on

			larger watercourses and a buffer of 10m on smaller brooks and flowing ditches. In terms of features to ensure no net greenfield runoff, it is understood that normal practice in Eastleigh is to require naturalised SuDS within three forms of filtration and coverage of construction drainage in a Construction Environment Management Plan. A new link road from Horton Heath to Bishopstoke Road would require a new crossing of the River Itchen. It will be necessary to undertake detailed transport modelling calculations to assess the potential air quality impact of this option. It will also be necessary that there is no loss of riparian habitat, that the River Itchen remains passable for otter and that any construction works adjacent to the River Itchen do not result in aquatic pollution or (via piling) any adverse noise impacts on migratory fish such as Atlantic salmon. Any crossing should be targeted at where the SAC is narrowest (i.e. most constrained to the River Itchen itself rather than associated floodplain). This will minimise the need for construction works within the SAC and in particular avoid any landtake from the SAC (for example for bridge piers). Any proposal which involved landtake from the SAC would almost certainly result in an adverse effect on the integrity of that site and would therefore need to be able to demonstrate that there were a) No Alternatives and b) Imperative Reasons of Over-Riding Interest as to why such a project should nonetheless proceed. It could prove very challenging to meet those tests.
E	Land to the north of West End	Opposite (south) side of the railway line from Option D.	This Option is located c. 700m from River Itchen SAC at its closest and 2.3km at its most distant. There are small watercourses traversing these areas, which are likely to drain into River Itchen SAC thus presenting a water quality pathway. Continuing to enable otter passage along these watercourses from the River Itchen SAC will also be an important consideration. A suitable buffer will need to be incorporated either side of any watercourse, in addition to swales to ensure no net increase in greenfield runoff and measures to protect the water quality of those streams. Flows within these tributaries will also require protection to ensure no change in water supply to the River Itchen. It is recommended that the relevant policy considers a buffer of at least 15m on larger watercourses and a buffer of 10m on smaller brooks and flowing ditches. In terms of features to ensure no net greenfield runoff, it is understood that normal practice in Eastleigh is to require naturalised SuDS within three forms of filtration and coverage of construction drainage in a Construction Environment Management Plan.
F	Settlement Extension to the North-East of Hedge End and North of Botley Village	Two locations which would offer contributions and land for the Botley Bypass.	The option is 3.8km from the River Itchen SAC at its closest. There is no obvious site-specific impact pathway. Depending upon delivery details, the Botley Bypass has the potential to result in

			downstream water quality impacts on River Itchen SAC.
G	Land at Hamble Airfield	Located at Hound Corner. Development on Hamble Airfield will be in the northern half of the site with open space to the south to maintain separation between this development and Hamble itself.	This option is 6.8km from the River Itchen SAC and presents no impact pathway.
H	Redevelopment of Eastleigh Riverside for Employment Uses	-	The southern-most area abuts River Itchen SAC, although it is understood that this is a broad location and does not imply that development will abut (or even necessarily be close to) the SAC. Clearly it would be logical and in keeping with the currently open countryside setting of this part of the SAC. The precise size of the buffer would need to be considered as the proposal was developed in more detail. To avoid any risk of air quality impacts this should be greater than 200m and discussion with the Council has concluded that a 400m separation would be appropriate to maintain the openness of this part of the SAC. For the purposes of this HRA, and to be precautionary, any development site which could involve piling within 100m of the River Itchen SAC or tributaries known/likely to be used by otters is screened in for the devising of site-specific measures at the planning application stage. An assessment undertaken into the Eastleigh River Side site identified a number of current and historic activities that could represent potential sources of contamination. These contaminants, if present, have the potential to migrate into the River Itchen SAC and adversely affect the habitats and species within it. Contaminants carried into the River Itchen SAC by surface water drainage and surface runoff, including sediment, could also have an adverse effect on the River Itchen SAC qualifying features.

5.4.13 In summary, Options G and F pose the least potential for likely significant effects on the River Itchen SAC through a) disruption of otter passage, b) potential air quality impacts, c) potential water quality impacts and introduction of non-native species and d) noise and vibration disruption of migratory fish passage including Atlantic salmon. However, all of these pathways could be substantially reduced (and potentially entirely eliminated) through incorporation of adequate buffers along watercourses (particularly a 400m buffer from the River Itchen SAC itself) and standard noise/vibration and water quality controls. None of the Options pose a fundamental conflict with the River Itchen SAC that cannot be overcome by careful design and development practices.

5.4.14 The proposal for a new link road across the River Itchen SAC is linked with Options B - D. Any crossing should be targeted at where the SAC is narrowest (i.e. most constrained to the River Itchen itself rather than associated floodplain). This will minimise the need for construction works within the SAC and in particular avoid any landtake from the SAC (for example for bridge piers). Any proposal which involved landtake from the SAC would almost certainly result in an adverse effect on the integrity of that site and would therefore need to be able to demonstrate that there were a) No Alternatives and b) Imperative Reasons of Over-Riding Interest as to why such a project should nonetheless proceed. It could prove very challenging to meet those tests.

5.4.15 For some of the Options, the large amount of development and proximity to the River Itchen SAC or its tributaries increases the risk of introduction of non-native species into the system and there is also potential for adverse water quality effects during construction, although this is easily controllable using standard pollution control protocols. For Options A - E there are potential impacts on the wider otter terrestrial network although it is unclear how important the streams which link to the sites are for the integrity of the River Itchen SAC; this would be dealt with at the planning application level.

5.4.16 The Eastleigh Riverside site (Option H) has previously been screened for likely significant effects on the River Itchen SAC. That work screened in impacts via air quality, noise, hydrology and contaminated land. Studies were undertaken on this looking at the pre, post and during construction stages and avoidance and mitigation measures were set out. These impacts would be dealt with at the planning application stage requiring an air quality assessment, noise quality assessment, contaminated land and hydrology assessment and details of dealing with construction methods and non-native species. These requirements should be picked up in the supporting text of the policy that will underlie Option N, should that option be selected.

5.5 Other Plans and Projects (In Combination)

Air quality

5.5.1 The Partnership for Urban South Hampshire initiated a sub-region wide transport and air quality study, the first stage of which reported in 2010[38]. This study identified that the growth in traffic associated with the 80,000 new dwellings to be delivered in PUSH up until 2026 would have relatively little impact on the following designated sites:

- Botley Wood and Everetts and Mushes Copses SSSI;
- The New Forest SSSI;
- Chichester Harbour SSSI;
- River Test SSSI;

[38] AEA Technology. 2010. Road transport emissions impacts on Nature Conservation Sites. Report to the Partnership for Urban South Hampshire

- Sinah Common SSSI;
- Southampton Common SSSI; and
- Upper Hamble Estuary and Woods SSSI.

5.5.2 The analysis indicated that the growth in traffic associated with PUSH would have the greatest impact on the following sites:

- Moorgreen Meadows SSSI;
- Langstone Harbour SSSI;
- Portsdown SSSI;
- Downend Chalk Pit SSSI;
- Lower Test Valley SSSI; and
- River Itchen SSSI.

5.5.3 In the case of the River Itchen SSSI (which is the core component of the River Itchen SAC) the modelling predicted that nitrogen deposition would exceed the critical load for the fenland habitats and that development in the PUSH region would collectively contribute over 1kg N/ha/yr in additional nitrogen to these sites; a considerable additional amount. This analysis must also however be considered within the context of phosphorus being a more important limiting nutrient in the Itchen system as documented in the Environment Agency Review of Consents report for the SAC.

5.6 Conclusion

5.6.1 In summary, Options G and F pose the least potential for likely significant effects on the River Itchen SAC through a) disruption of otter passage, b) potential air quality impacts, c) potential water quality impacts and introduction of non-native species and d) noise and vibration disruption of migratory fish passage including Atlantic salmon. However, all of these pathways could be substantially reduced (and potentially entirely eliminated) through incorporation of adequate buffers along watercourses (particularly a 200m buffer from the River Itchen SAC itself where possible) and standard noise/vibration and water quality controls. None of the Options pose a fundamental conflict with the River Itchen SAC that cannot be overcome by careful design and development practices.

5.6.2 The proposal for a new link road across the River Itchen SAC is linked with Options B – D. Any crossing should be targeted at where the SAC is narrowest (i.e. most constrained to the River Itchen itself rather than associated floodplain). This will minimise the need for construction works within the SAC and in particular avoid any landtake from the SAC (for example for bridge piers).

6 Emer Bog SAC

6.1 Introduction

6.1.1 The site comprises an extensive valley bog together with associated damp acidic grassland, heathland and developing woodland over Bracklesham Beds in the Hampshire Basin. Emer Bog is an excellent example of an ungrazed valley bog with a rich flora and fauna which includes most typical bog species. The main elements of the bog vegetation include tall stands of reed *Phragmites australis* and a shorter mixed association of sedges (especially white sedge *Carex curta*, bottle sedge *C. rostrata* and star sedge *C. echinata*), with notable quantities of marsh cinquefoil *Potentilla palustris* and bog bean *Menyanthes trifoliata*, together with marsh violet *Viola palustris* and southern marsh orchid *Dactylorchis praetermissa.* The bog grades downstream into mature alder carr and upstream into heathland, heavily invaded, and partly planted, with pine, birch and scrub.

6.1.2 The invertebrate fauna of the bog and heath is of considerable interest and very large numbers of moths have been recorded. To the south and west of Emer Bog, the site includes remnants of former common land, now acidic grassland dominated by purple moor-grass *Molinia caerulea*, but with a rich flora, including petty whin *Genista anglica*, dwarf gorse *Ulex minor*, meadow thistle *Cirsium dissectum* and cross-leaved heath *Erica tetralix*.

6.2 Reasons for Designation

6.2.1 Emer Bog is designated as a Special Area of Conservation for its transition mires and quaking bogs.

Conservation Objectives

To maintain*, in favourable condition, the:

- Transition Mires and Quaking Bogs

*maintenance implies restoration, if the feature is not currently in favourable condition.

6.3 Historic Trends and Current Pressures

6.3.1 Recent Condition Assessment process reviews indicated that while a relatively small proportion of the site is in favourable condition, the vast majority has ‘recovering’ status.

6.3.2 The key environmental conditions needed to maintain site integrity include:

- Maintenance of water levels and input of water from surrounding catchment;
- Maintenance of grazing;
- Unpolluted water entering the site;
- Good air quality.

6.4 Likely Significant Effects

6.4.1 Discussions undertaken by Test Valley Council linked to a planning application in the vicinity identified that the vegetation on site is not at risk of direct trampling damage but that excessive recreational activity (particularly involving dogs) could disrupt grazing of the site which would have an indirect adverse effect on the interest features of the SAC. However, surveys undertaken to support a planning application in the area[39] identified that the SAC has relatively few (albeit well-used) parking spaces which provide a control on the number of vehicles that can park at any one time and means that it is only used by visitors from a local catchment (essentially within easy walking distance, with most visitors deriving from North Baddesley and Romsey). The survey identified that the most popular method of transport to Emer Bog was on foot (58%) and these visitors travelled an average of 560m to reach the site. Overall average distance travelled to reach the site (including people arriving by car) was 1.6 km and no visitors from Eastleigh Borough were recorded.

6.4.2 Eastleigh Borough is located approximately 2.3 km from the SAC at its closest which is on the limits of easy walking distance. More importantly there are numerous areas of publically accessible countryside (such as Flexford Nature Reserve, Valley Park Woodland Local Nature Reserve, Hocombe Mead Local Nature Reserve) closer to these parts of Eastleigh Borough (the Chandler's Ford area) such that there are many alternatives to use of the SAC which due to its wet boggy nature will naturally deter many dog walkers if drier and equally appealing walks are available. Given this and the fact that no visitors from Eastleigh were recorded in the surveys it is considered unlikely that development in the Local Plan will contribute to recreational pressure on Emer Bog SAC and therefore this site can be screened out.

6.4.3 The hydrology of Emer Bog is integral to the designation, in terms of the quantity and quality of water entering the site. Two background studies have been completed considering the hydro-ecology of the site[40]. As a result of these studies, the surface water catchment of Emer Bog has been identified. This catchment is restricted to a zone of approximately 500m around the SAC. Since Eastleigh Borough is 2.3km from the SAC at its closest no development in the Borough will affect the hydrology of the bog. The Local Plan can therefore be screened out with regard to this SAC.

6.5 Other Plans and Projects (In Combination)

6.5.1 Since development in Eastleigh will make no contribution to impacts on Emer Bog SAC, there is no mechanism for it to act in combination with other plans and projects.

6.6 Conclusion

6.6.1 It can be concluded that development set out in the Local Plan is unlikely to lead to significant effects on Emer Bog SAC either alone or in combination with other projects and plans.

[39] Nutburn Road, North Baddesley: Visitor Questionnaire Survey of Emer Bog and Baddesley Common, EPR, 2011

[40] R.H. Allen (The Environmental Project Consulting Group), 2003. Desk Study: Hydro-Ecological Appraisal of Emer Bog cSAC, North Baddesley, Hampshire, R.H. Allen (The Environmental Project Consulting Group), 2002 and Emer Bog cSAC: Review of Consents: Surface Water Quality and Hydro-Ecological Regime of Emer Bog cSAC

7 Mottisfont Bats SAC

7.1 Introduction

7.1.1 The woodland habitat around Mottisfont supports an internationally important population of the rare barbastelle bat *Barbastella barbastellus*. It is the only known maternity roost in Hampshire and one of only six known sites in the UK (2002 data)[41].

7.1.2 Mottisfont contains a mix of woodland types including hazel coppice with standards, broadleaved plantation and coniferous plantation which the bats use for breeding, roosting, commuting and feeding. A total of nine bat species have been recorded at Mottisfont, the others being whiskered *Myotis mystacinus*, brown long-eared *Plecotus auritus*, the two pipistrelles *Pipistrellus pygmaeus* and *P. pipistrellus*, serotine *Eptesicus serotinus*, noctule *Nyctalus noctula*, Daubenton's *Myotis daubentonii* and Natterer's *Myotis nattererii*.

7.2 Reasons for Designation

7.2.1 The site is designated for its Habitats Directive Annex II species barbastelle bat (*Barbastella barbastellus*).

Conservation Objectives

Subject to natural change, maintain, in favourable condition*, the broadleaved, mixed and yew woodland as a habitat for:

- Barbastelle *Barbastella barbastellus*

* or restored to favourable condition if features are judged to be unfavourable.

7.3 Historic Trends and Current Pressures

7.3.1 Approximately 70% of the site is owned by the National Trust and is open to public access. The National Trust has actively carried out woodland operations over recent years, including opening up coppice, gradually removing conifer plantations and replanting to native broadleaved woodland. A Woodland Grant Scheme which is targeted at restoration and general woodland management should enhance the habitats and ensure future sustainability. Twenty-five percent of the site is privately owned and not open to public access. The majority of this area is also subject to a Woodland Grant Scheme renewal which is targeted primarily at maintaining the rotational coppicing programme which should also ensure sustainability of woodland management. This part of the site is managed for rearing game birds.

7.3.2 The environmental requirements of the Mottisfont Bats SAC are not fully understood, due to incomplete understanding of barbastelle bat ecology, although continued woodland management practices will clearly be important. However, a study of the Mottisfont barbastelles[42] found that bats foraged up to 16km from the SAC, but the average distance was 5km.

[41] http://www.jncc.gov.uk/ProtectedSites/SACselection/sac.asp?EUCode=UK0030334
[42] Davidson-Watts, I. & McKenzie, A. (2006). Habitat use and Ranging of Barbastelle Bats of the Mottisfont Estate, Hampshire. ID Wildlife Ltd

7.3.3 Typical foraging distances for this species are 6-8km, though this may extend to reach 20km[43]. Natural England has determined that for the purposes of spatial planning a zone of 7.5km should be used as encapsulating the core foraging areas of the barbastelle population. This is the distance over which Natural England have expressed a requirement to be consulted over land use issues and development.

7.4 Likely Significant Effects

7.4.1 Eastleigh Borough is approximately 12km from Mottisfont Bats SAC if measured in a direct line. As such it lies outside the 7.5km consultation zone and therefore the Plan can be screened out as being unlikely to lead to significant effects on the SAC.

7.5 Other Plans and Projects (In Combination)

7.5.1 Since development in Eastleigh will make no contribution to impacts on Mottisfont Bats SAC, there is no mechanism for it to act in combination with other plans and projects.

7.6 Conclusion

7.6.1 It can be concluded that development set out in the Local Plan is unlikely to lead to significant effects on Mottisfont Bats SAC either alone or in combination with other projects and plans.

[43] Greenaway F (2004) Advice for the management of flightlines and foraging habitats of the Barbastelle Bat *Barbastella barbastellus*, English Nature Research Report 657

8 New Forest SAC, SPA and Ramsar site

8.1 Introduction

8.1.1 The New Forest embraces the largest area of 'unsown' vegetation in lowland England and includes the representation on a large scale of habitat formations formerly common but now fragmented and rare in lowland Western Europe. They include lowland heath, valley and seepage step mire, or fen, and ancient pasture woodland, including riparian and bog woodland.

8.1.2 Older trees support the richest known woodland lichen flora in lowland Europe, and an exceptionally species-rich deadwood fauna. The woods are also rich in fungi that are specific to pasture woodland. The vascular plants include about 60 species associated with old woodland. These older trees also support a high density of hole nesting, insectivorous birds, and provide roost sites for several species of bat including the very rare Bechstein's bat *Myotis bechsteinii.*

8.1.3 The silvicultural enclosures include 40% broad-leaved trees, mainly oak and beech, which, with the unenclosed woods, comprises the largest tract of native broad-leaved woodland in southern England.

8.1.4 The heathlands, including grass heaths and acid grasslands comprise a series of plant communities, the composition of which is related to soil structure and permeability and the effects of grazing.

8.1.5 The acid and neutral grasslands are strongly influenced by the underlying geology and by grazing. The acid grasslands are often quite extensive, relatively species-rich and comprise two main elements: (a) species which benefit from heavy grazing and are mostly prostrate or are able to survive in dwarf form and (b) species which are less palatable. The more neutral grasslands known locally as 'lawns' occur as linear features following many of the small streams, roadside verges around settlements and village greens, and as glades in association with pasture woodland.

8.1.6 The unimproved meadows in and around the Forest have similarities with the acid to neutral grasslands within the Open Forest. The frequent spring-lines and infertility of the soils have hindered agricultural improvement and these meadow communities are now rare or scarce in England.

8.1.7 The Forest contains about 90 clearly separable valley mires, or fen, within about 20 different valley systems. This is thought to be more than survive in the remainder of Britain and Western Europe. This suite of mires sits within a relatively unpolluted catchment and for this reason the greater part of the New Forest has been designated as an internationally important wetland, a Ramsar site.

8.1.8 Of the many ponds within the Forest the less acidic ponds support important populations of amphibians, including the great crested newt *Triturus cristatus*. The wetland habitats collectively form probably the most important single suite of habitats for dragonflies in Britain. Twenty-seven species breed in the New Forest. The temporary ponds that dry out in the summer provide ideal conditions for some specially adapted invertebrates and one such pond is the only known British locality for the tadpole shrimp *Triops cancriformis*.

8.1.9 The Forest supports populations of nine rare and twenty-five nationally scarce vascular plants. Nationally important breeding populations of birds as listed in Annex 1 of the EU Directive on the Conservation of Wild Birds include nightjar *Caprimulgus europaeus*, woodlark *Lullula arborea*, Dartford warbler *Sylvia undata*, and kingfisher *Alcedo atthis*. The Forest also supports a wintering population of hen harrier *Circus*

cyaneus which is also listed on Annex 1. Populations of all Britain's native reptiles are present in the New Forest including sand lizard *Lacerta angilis* and smooth snake *Coronella austriaca*, which both occur in suitable localities throughout the heathland. Otter *Lutra lutra* are found. Almost half of Britain's butterflies and moths have been recorded, and over a third of the beetle fauna.

8.2 Reasons for Designation

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

- Nutrient-poor shallow waters with aquatic vegetation on sandy plains: Hatchet Pond has an example of an oligotrophic waterbody amidst wet and dry lowland heath developed over fluvial deposits. It contains shoreweed *Littorella uniflora* and isolated populations of northern species alongside rare southern species.

- Clear-water lakes or lochs with aquatic vegetation and poor to moderate nutrient levels: In the New Forest large temporary ponds, shallow ephemeral pools and poached damp hollows in grassland support a number of specialist species. These include the two nationally scarce species coral-necklace *Illecebrum verticillatum* and yellow centaury *Cicendia filiformis*. Temporary ponds occur throughout the Forest in depressions capable of holding water for part of the year. Most ponds are small (between 5-10 m across) and, although great in number, amount to less than 10 ha in total area.

- Wet heathland with cross-leaved heath: The New Forest contains the most extensive stands of lowland northern Atlantic wet heaths in southern England.

- Dry heaths: The New Forest represents European dry heaths in southern England and is the largest area of lowland heathland in the UK. It is particularly important for the diversity of its habitats and the range of rare and scarce species which it supports.

- Purple moor grass meadows: This vegetation occurs in situations of heavy grazing by ponies and cattle in areas known locally as 'lawns', often in a fine-scale mosaic with wet heaths and other mire and grassland communities. The New Forest meadows are unusual in the UK in terms of their species composition, management and landscape position

- Depressions on peat substrates: The New Forest, one of three sites selected in southern England, is considered to hold the largest area in England of depressions on peat substrates.

- Beech forests on acid soils: The New Forest is the largest area of mature, semi-natural beech *Fagus sylvatica* woodland in Britain.

- Beech forests on neutral to rich soils: The New Forest is the largest area of mature, semi-natural beech *Fagus sylvatica* woodland in Britain.

- Dry, oak-dominated woodland: The most extensive area of active wood-pasture with old oak *Quercus* spp. and beech *Fagus sylvatica* in north-west Europe and contains outstanding invertebrate and lichen populations.

- Bog woodland

- Alder woodland on floodplains: The New Forest contains many streams and some small rivers that are less affected by drainage and canalisation than those in any other comparable area in the lowlands of England.

8.2.2 The site also contains the Habitats Directive Annex I habitats 'Very wet mires often identified by an unstable, quaking surface' and 'Calcium-rich, spring-water fed fens', although these are not a primary reason for site selection.

8.2.3 The site contains the Habitats Directive Annex II species:

- Southern damselfly *Coenagrion mercuriale*: Several population centres and strong populations estimated to be in the hundreds or thousands of individuals, representing one of four major centres of population in the UK.
- Stag beetle *Lucanus cervus*: its Hampshire/Sussex population centre, and a major stronghold for the species in the UK.

8.2.4 The site also contains the Habitats Directive Annex II species great-crested newt *Triturus cristatus*, although this is not a primary reason for site selection.

8.2.5 The New Forest is designated as a SPA for its breeding bird populations, specifically:

- 33.6% of the British population of Dartford warbler *Sylvia undata*
- 10% of the British population of honey buzzard *Pernis apivorus*
- 8.8% of the British population of nightjar *Caprimulgus europaeus*
- 12.3% of the British population of woodlark *Lullula arborea* (1997 counts)

8.2.6 The SPA is also designated for its over-wintering population of:

- 2% of the British population of hen harrier *Circus cyaneus.*

8.2.7 The reasons for designation of the New Forest as a Ramsar site are illustrated in Table 4.

Table 4: The New Forest Ramsar site criteria

Ramsar criterion	Description of Criterion	New Forest Ramsar site
1	A wetland should be considered internationally important if it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.	Valley mires and wet heaths are found throughout the site and are of outstanding scientific interest. The mires and heaths are within catchments whose uncultivated and undeveloped state buffer the mires against adverse ecological change. This is the largest concentration of intact valley mires of their type in Britain.
2	A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or threatened ecological communities	The site supports a diverse assemblage of wetland plants and animals including several nationally rare species. Seven species of nationally rare plant are found on the site, as are at least 65 British Red Data Book species of invertebrate.
3	A wetland should be considered internationally important if it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.	The mire habitats are of high ecological quality and diversity and have undisturbed transition zones. The invertebrate fauna of the site is important due to the concentration of rare and scare wetland species. The whole site complex, with its examples of semi-natural habitats is essential to the genetic and ecological diversity of southern England.

Conservation Objectives

New Forest SAC

The conservation objectives for the European interest on the SSSI are
To maintain*, in favourable condition, the:

- Alkaline fens
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanaem Salicion albae*)
- *Asperulo-Fagetum* beech forests
- Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae* or *Ilici-Fagenion*)
- Bog woodland
- Depressions on peat substrates of the *Rhyncosporion*
- European dry heath
- *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)
- North Atlantic wet heaths with *Erica tetralix*
- Old acidophilous oak woods with *Quercus robur* on sandy plains
- Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and or of the *Isoeto-Naonjuncetea*
- Oligotrophic waters containing very few minerals of sandy plains: *Littorelletalia uniflora*
- Transition mires and quaking bogs

To maintain*, in favourable condition, the habitats for the population of:

- Great crested newt (*Triturus cristatus*)
- Southern damselfly (*Coenagrion mercuriale*)
- Stag beetle (*Lucanus cervus*)

* maintenance implies restoration if the feature is not currently in favourable condition

New Forest SPA

The conservation objectives for the European interest on the SSSI are
To maintain*, in favourable condition, the:

- Alkaline fens
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanaem Salicion albae*)
- *Asperulo-Fagetum* beech forests
- Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion roboripetraeae* or *Ilici-Fagenion*)
- Bog woodland
- Depressions on peat substrates of the *Rhyncosporion*
- European dry heath
- *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)
- North Atlantic wet heaths with *Erica tetralix*
- Old acidophilous oak woods with *Quercus robur* on sandy plains
- Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and or of the *Isoeto-Naonjuncetea*
- Oligotrophic waters containing very few minerals of sandy plains: *Littorelletalia uniflora*
- Transition mires and quaking bogs

To maintain*, in favourable condition, the habitats for the populations of Annex 1 bird species + of European importance, with particular reference to:

- dry heathland
- dry grassland

- inclosure and pasture woodlands

+ Honey Buzzard, Nightjar, Woodlark, Dartford Warbler, Hen Harrier
* maintenance implies restoration if the feature is not currently in favourable condition

New Forest Ramsar

The conservation objectives for the European interest on the SSSI are
To maintain*, in favourable condition, the:

- Alkaline fens
- Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanaem Salicion albae)*
- *Asperulo-Fagetum* beech forests
- Atlantic acidophilous beech forests with *Ilex* and sometimes also *Taxus* in the shrublayer (*Quercion robori-petraeae* or *Ilici-Fagenion*)
- Bog woodland
- Depressions on peat substrates of the *Rhyncosporion*
- European dry heath
- *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*)
- North Atlantic wet heaths with *Erica tetralix*
- Old acidophilous oak woods with *Quercus robur* on sandy plains
- Oligotrophic to mesotrophic standing waters with vegetation of the *Littorelletea uniflorae* and or of the *Isoeto-Naonjuncetea*
- Oligotrophic waters containing very few minerals of sandy plains: *Littorelletalia uniflora*
- Transition mires and quaking bogs

To maintain*, in favourable condition, the habitats for the population of:

- Great crested newt (*Triturus cristatus*)
- Southern damselfly (*Coenagrion mercuriale*)
- Stag beetle (*Lucanus cervus*)

To maintain*, in favourable condition, the habitats for the populations of Annex 1 bird species + of European importance, with particular reference to:

- dry heathland
- dry grassland
- inclosure and pasture woodlands

+ Honey Buzzard, Nightjar, Woodlark, Dartford Warbler, Hen Harrier
* maintenance implies restoration if the feature is not currently in favourable condition

8.3 Historical Trends and Current Pressures

8.3.1 Issues that have been highlighted in the Natura 2000 site description for the SAC as affecting habitat condition include drainage of wetland habitats for improved grazing and forestry, afforestation of heathland habitats with conifers and other non-native species, essential grazing by commoners' animals, and increased recreational pressures.

8.3.2 Recreational pressure and disturbance has been shown to adversely affect populations of woodlark elsewhere. However, the population in the New Forest is currently at a high level. Good habitat management is also relevant for maintaining populations of woodlark and Dartford warbler and this is achieved through the grazing, cutting and burning of gorse and heather to provide a diverse age structure and prevent succession to woodland. Most of the valley mires in the Forest have been damaged in the past by drainage which has caused drying out of the peat layers.

Work to restore valley mire systems is expected to influence wading bird populations in time. In addition, the Forestry Commission has carried out an exercise to ensure that the dog-walking public are aware of the sensitivities of the site during the nesting season, and liaises with groups such as the New Forest Dog Owners Group.

8.3.3 The most recent condition assessment process carried out by Natural England (1999-2009)[44] has found that 32% of the New Forest is in favourable condition, with 65% recovering from unfavourable status. Data results from assessment of SSSIs, rather than internationally designated features, but nonetheless, provides a relevant understanding on the habitat status.

8.3.4 The key environmental conditions required to maintain site integrity include:

- Carefully balanced hydrological regime to maintain wet heath, mires and pools.
- Acid soils.
- Minimal air pollution (nitrogen deposition can cause compositional changes over time).
- Unpolluted water.
- Minimal nutrient inputs.
- Low recreational pressure.
- Appropriate grazing regime
- Appropriate habitat management regime

8.4 Likely Significant Effects

8.4.1 The distance from the western boundary of Eastleigh Borough to Ashurst on the eastern edge of the New Forest SAC is 12.2 km by road. This appears to be the shortest route between Eastleigh Borough and the New Forest SAC. The route along the M27 is longer at over 15 km.

8.4.2 An equestrian questionnaire undertaken by Eastleigh Borough Council in February 2010 of horse owners/riders in the Borough resulted in 59 responses. These indicated that 13.6% of respondents visited the New Forest to ride in public spaces, while 6.8% visited the New Forest to ride in private grounds. The survey also revealed that 84% of respondents preferred to ride their horses within 1-3 miles (1.6-4.8 km) of their stables. It is clear from these data that residents of Eastleigh Borough do not make a material contribution towards horse-riding within the New Forest SAC/SPA/Ramsar site since over 80% of Eastleigh equestrians do not ride in the New Forest, preferring to ride much closer to home.

8.4.3 In terms of visitors to the New Forest generally, surveys undertaken on behalf of the National Park Authority[45] identified that visitors to the National Park can be broken down as follows:

- Forty percent (40%) are tourists staying within or adjacent to the Park;
- Thirty-five percent (35%) are locals living within 5 miles (8km) of the site; and

[44] http://www.sssi.naturalengland.org.uk/Special/sssi/

[45] Sharp, J., Lowen, J.& Liley, D. (2008). Changing patterns of visitor numbers within the New Forest National Park, with particular reference to the New Forest SPA. Unpublished report by Footprint Ecology for the New Forest National Park Authority

- Twenty-five percent (25%) are day-trippers (i.e. those living more than 5 miles (8km) from the site but who cannot be considered tourists), with most living within 20km.

8.4.4 By definition therefore, South Hampshire residents living more than 8km from the SAC make up a relatively small proportion of visitors (i.e. a proportion of the 25% of visitors who are day-trippers). The Footprint Ecology report estimates that housing development in the period 2006-2026 within 50 km of the New Forest would result in an additional 1.05 million person visits per annum. However, it also identified that over 75% of these additional visitors would derive from within 10 km of the National Park boundary. Regular visitors (i.e. those who visit at least weekly) tend to be mainly dog walkers and most come from within 7 km of the National Park boundary.

8.4.5 The Footprint Ecology report indicated that 7% of visitors derive from 'Southampton, Eastleigh and Chandler's Ford'[46]. Further scrutiny of data made available by the Forestry Commission from their PROGRESS database[47] reveals that of those 7% of visitors the majority derive from Southampton. The data indicates that 2.6% of visitors to the New Forest derive from Eastleigh borough, with the vast majority of those coming from either Eastleigh town or Chandler's Ford. It can therefore be concluded that while Eastleigh will make a contribution to future visitor pressure in the New Forest SAC/SPA/Ramsar site, that contribution is very small, most probably because Eastleigh is over 12 km from the National Park boundary (by road[48]) at its closest, with much of the Borough over 15 km away (by road).

8.4.6 Nonetheless, Eastleigh Council has agreed to participate in measures to provide alternative areas of greenspace which will make a proportionate contribution to spreading the recreational load on the New Forest SAC/SPA/Ramsar site.

8.4.7 Eastleigh Borough Council is meeting these requirements (which also mesh with the PUSH Green Infrastructure Strategy) by taking two main approaches:

- Home Wood – this site adjoins the borough and may ultimately form part of a wider Forest Park project being led by Test Valley Borough Council (TVBC). One of its major purposes is to act as an alternative recreational draw to attract people who would otherwise visit the New Forest. Eastleigh Borough Council is improving links in the borough to it in order to maximise its accessibility from Eastleigh Borough. Home Wood is located to the west and south-west of the development site known as 'Land South of Chestnut Avenue, Eastleigh' (granted planning permission in June 2015 and due to commence construction in 2016). The Council is also seeking priority biodiversity links to be maintained and enhanced in particular between Lakeside and Home Wood, footpath and cycle path links through the site to Home Wood and from the site to the wider area supporting access to Home Wood, and financial contributions to the Home Wood proposals[49]. The Local Plan will need to ensure that there is a policy (and practical) mechanism for delivery of Home Wood and that it is delivered in a timely manner[50];

[46] 28% of the 25% of people who are day-trippers

[47] Data supplied by Nick Tucker, Forestry Commission, to James Riley, Eastleigh Borough Council on 04/05/12

[48] Although a direct line of only 5km can be drawn from Netley on the east bank of Southampton Water to the New Forest, this is an unrealistic pathway since it would require visitors to cross Southampton Water

[49] The Council's HRA for the planning application stated a requirement for '*Developer contributions equal to £1,300 per dwelling towards off-site mitigation measures, such as visitor management, access management and the provision of alternative green spaces'*

[50] In his report into the previous Local Plan (now withdrawn) the planning inspector commented that '*In order to meet the assumptions of the HRA, it is essential that the Plan highlights the purpose of the financial contribution to the Forest Park/Lakeside in relation to mitigation. It must also require alternative mitigation measures if an appropriate element of the Forest Park (eg Home Wood) has not been delivered in a timely manner in relation to the development of E1. Any such alternative mitigation must be of a suitable scale, quality and accessibility to achieve its purpose and its delivery closely linked to progress on the residential development'.*

- Improvements to existing green infrastructure assets and creation of new open space facilities where possible – Policies in the Revised Pre-submission Local Plan for improvements to Country Parks (Royal Victoria, Westwood Woodland and Manor Farm run by HCC and Lakeside and Itchen Valley run by EBC) and the Rights of Way network – Strategic footpath, cycleway and bridleway links (in particular iii. Lakeside Country Park to Home Wood.

- It is also recommended that opportunities are taken to maximise semi-natural accessible green infrastructure creation as part of large new developments, particularly in the Eastleigh/Chandler's Ford area. This would particularly apply to Option B and C.

8.5 Other Plans and Projects (In Combination)

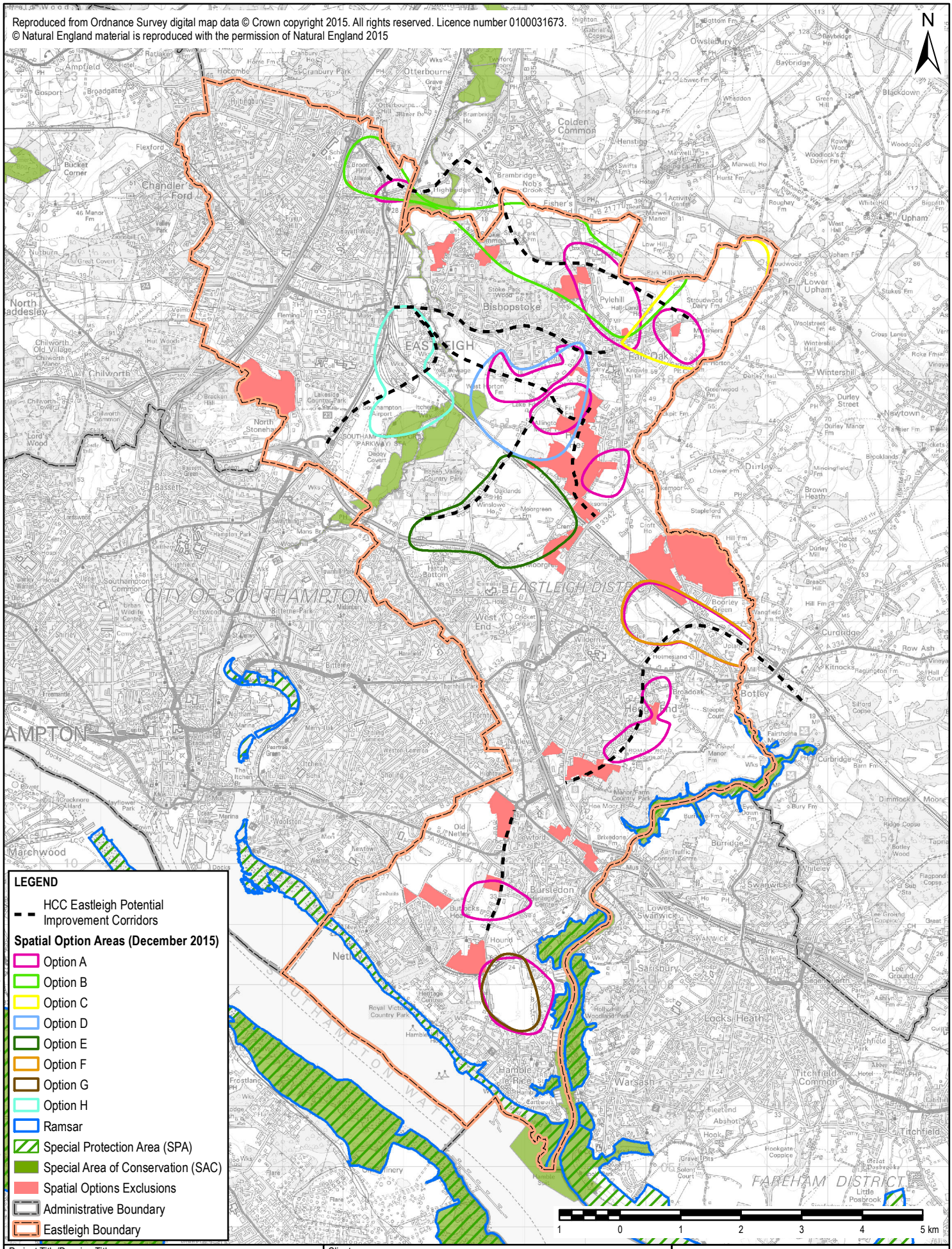
8.5.1 The preceding analysis has effectively already considered Eastleigh 'in combination' with the core strategies and local plans of surrounding authorities. Therefore no further such assessment is required.

8.6 Conclusion

8.6.1 It is concluded, that given the involvement of Eastleigh Borough Council in delivering Forest Park and other green infrastructure, there will be no adverse effect on the integrity of the New Forest SAC/SPA/Ramsar site as a result of Local Plan development in the borough.

9 Overall Concluding Statement

9.1.1 This HRA is an intentionally broad analysis of the potential spatial development options that have been put forward as part of Eastleigh Borough Council's Issues and Options consultation. It identifies certain spatial options which present a greater number of impact pathways to European sites than others but does not conclude that any broad spatial option presents insurmountable issues regarding European sites. As the Local Plan is further developed additional iterations of the HRA will be undertaken culminating in a detailed HRA of the policies and allocations within the submission Local Plan.



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Project Title/Drawing Title

BROAD PROPOSED DEVELOPMENT LOCATIONS IN THE CONTEXT OF EUROPEAN SITES

Client: EASTLEIGH BOROUGH COUNCIL

Drawn	Checked	Approved
SJ	BB	JR
Date	Scale @ A4	Purpose of Issue
18/12/2015	1:80,000	DRAFT
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FIGURE 3		

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